



**WORLD PRODUCTS, LLC**  
ELECTRONIC COMPONENT SOLUTIONS



CELEBRATING 40 YEARS IN BUSINESS

# METAL OXIDE VARISTORS



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# Table of Contents

|                                                                                       |    |
|---------------------------------------------------------------------------------------|----|
| Features . . . . .                                                                    | 2  |
| Definition of Terms (according to IEEE specifications C62.33) . . . . .               | 2  |
| Power Dissipation Ratings . . . . .                                                   | 2  |
| General Characteristics . . . . .                                                     | 3  |
| Part Marking . . . . .                                                                | 3  |
| Approvals . . . . .                                                                   | 4  |
| Part Number System . . . . .                                                          | 6  |
| Standard Dimensions and Lead Modification Options . . . . .                           | 7  |
| D Series — Electrical Characteristics (5, 7, 10, 14, 20, 25 mm) . . . . .             | 18 |
| High Energy E Series — Electrical Characteristics (5, 7, 10, 14, 20, 25 mm) . . . . . | 24 |
| VZ32 KW (Wire Lead) Series — Electrical Characteristics . . . . .                     | 28 |
| VZ32 Series — Electrical Characteristics . . . . .                                    | 30 |
| VZ32 Series — Dimensions . . . . .                                                    | 31 |
| VZ34 Single Series — Electrical Characteristics . . . . .                             | 32 |
| VZ34 Single Series — Dimensions . . . . .                                             | 33 |
| VZ34 Dual Series — Electrical Characteristics . . . . .                               | 34 |
| VZ34 Dual Series — Dimensions . . . . .                                               | 35 |
| VZ40 Series — Electrical Characteristics . . . . .                                    | 36 |
| VZ40 Series — Dimensions . . . . .                                                    | 37 |
| VZ53 Series — Electrical Characteristics . . . . .                                    | 38 |
| VZ53 Series — Dimensions . . . . .                                                    | 39 |
| VZ60 Series — Electrical Characteristics . . . . .                                    | 40 |
| VZ60 Series — Dimensions . . . . .                                                    | 41 |
| Peak Pulse and Derating Curves . . . . .                                              | 42 |
| V-I Characteristics . . . . .                                                         | 43 |
| Soldering Profile . . . . .                                                           | 48 |
| 5mm / 7mm Taping Specifications . . . . .                                             | 50 |
| 10mm Taping Specifications . . . . .                                                  | 52 |
| 14mm Taping Specifications . . . . .                                                  | 56 |
| 18mm / 20mm Taping Specifications . . . . .                                           | 60 |
| Standard Bulk Packaging . . . . .                                                     | 62 |
| Applications . . . . .                                                                | 63 |
| Circuit Examples . . . . .                                                            | 64 |

## Features

- Our Metal Oxide Varistors have UL, CSA and VDE approvals. VDE approvals are in conjunction with IEC61051-2. Plus specific types comply with Accelerated Aging Test Requirements per ANSI/IEEE C62.11. The factory is ISO and TS16949 certified. Taped Parts conform to EIA standards. All electrical specifications are to industry standards with definitions conforming to IEEE specifications. Solderability to MIL STD. Epoxy flammability rating of 94V0.
- RoHS Compliance - Metal Oxide Varistors utilizing suffix (-N) denoting RoHS compliant types for disk sizes 05, 07, 10, 14, 18, 20, 25, 32, 34, 40, and 53 purchased from World Products, LLC comply with RoHS Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment. Our metal oxide varistors contain a maximum concentration value of 0.1% by weight in homogeneous materials for lead, mercury, hexavalent chromium, polybrominated biphenyls (PBB) and polybrominated diphenyl ethers (PBDE) and of 0.01% weight in homogeneous materials for cadmium. See Part Number System for more details.
- Product consistency is maintained through extremely stringent quality and statistical control. On-line automatic test equipment provides 100% inspection.
- Extensive selection of equivalents to essentially all metal oxide varistor types. All specifications available for proper accurate design-in purposes.
- Extremely low leakage current levels achieved and exceptional surge handling capability through proprietary formulations.
- Epoxy conformity and control providing for consistent physical dimensions and improved solderability.
- Varistor product design flexibility and quick design cycles in order to assist our customers with their most stringent varistor applications.



## Definition of Terms (according to IEEE specifications C62.33)

**Average Power Dissipation:** Tested using two consecutive pulses at rated peak current using a 10/1000 $\mu$ s test waveform with a minimum pulse period of 60 seconds between pulses (IEC 61000-4-5).

**Rated RMS Voltage, Rated DC Voltage:** The maximum designated values of power system voltage that may be applied continuously between the terminals of a device.

**Varistor Voltage:** Test characteristic that is used to classify varistors by type. A test current of 1mA DC is typically used to determine varistor voltage classification type. Varistor voltage clamping characteristics can be defined at various test levels.

**Rated Peak Single Pulse Transient Current:** Maximum surge current, 8/20 $\mu$ s waveform which a varistor is rated to withstand for a single surge.

**Rated Single Pulse Transient Energy:** Maximum allowable energy for a single impulse (see specified waveforms).

**Maximum Clamping Voltage:** Measured peak voltage across the device terminals when a current impulse of specified amplitude and waveform is conducted through the varistor.

**Typical Capacitance:** Typical capacitance values are measured at a test frequency of 1KHZ.

## Power Dissipation Ratings

| Disk Size              | Pm-watts | Disk Size              | Pm-watts |
|------------------------|----------|------------------------|----------|
| 5mm ( < 50 VAC )       | 0.01     | 20mm ( < 50 VAC )      | 0.20     |
| 5mm ( $\geq$ 50 VAC )  | 0.20     | 20mm ( $\geq$ 50 VAC ) | 1.00     |
| 7mm ( < 50 VAC )       | 0.02     | 25mm                   | 1.20     |
| 7mm ( $\geq$ 50 VAC )  | 0.25     | 32mm                   | 1.60     |
| 10mm ( < 50 VAC )      | 0.05     | 34mm (Single)          | 2.10     |
| 10mm ( $\geq$ 50 VAC ) | 0.40     | 34mm (Dual)            | 2.73     |
| 14mm ( < 50 VAC )      | 0.10     | 40mm                   | 2.10     |
| 14mm ( $\geq$ 50 VAC ) | 0.60     | 53mm                   | 2.50     |
| 18mm ( $\geq$ 50 VAC ) | 0.80     | 60mm                   | 2.80     |

## General Characteristics

|                                         |                                                                                                                                                                                                                            |
|-----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Storage Temperature                     | - 55° C to + 125° C                                                                                                                                                                                                        |
| Operating Surface Temperature           | 125° C                                                                                                                                                                                                                     |
| Operating Ambient Temperature           | - 55° C to + 85° C (without derating)                                                                                                                                                                                      |
| Maximum Voltage-Temperature Coefficient | < -0.01 % / °C                                                                                                                                                                                                             |
| Insulation Resistance                   | 1000 Megohm min.                                                                                                                                                                                                           |
| Hi POT (Leads to Case, 1 min.)          | 2500 VDC (Phenolic coating 500 VDC and 2000 VDC ratings)                                                                                                                                                                   |
| Typical Response Time                   | < 15 nsec.                                                                                                                                                                                                                 |
| Epoxy Rating                            | 94 V-0                                                                                                                                                                                                                     |
| Current/Energy Derating (>85°C)         | - 2.5 % / °C                                                                                                                                                                                                               |
| DC Leakage Current                      | 200µA Max (at rated DC working voltage)                                                                                                                                                                                    |
| Solderability                           | MIL STD 202G, Method 208H                                                                                                                                                                                                  |
| Failure Criteria                        | Voltage change ± 10% from initially measured Varistor Voltage. When determining if varistor is within aforementioned criteria the same temperature must be observed as was used for initial Varistor Voltage measurements. |

## Part Marking

Example: 20E241K-VB

|           |          |            |          |          |          |          |
|-----------|----------|------------|----------|----------|----------|----------|
| <b>20</b> | <b>E</b> | <b>241</b> | <b>K</b> | <b>-</b> | <b>N</b> | <b>B</b> |
| (1)       | (2)      | (3)        | (4)      | (5)      | (6)      |          |

### (1) Disk Diameter

5 = 5mm, 7 = 7mm, 10 = 10mm,  
14 = 14mm, 18 = 18mm, 20 = 20mm,  
25 = 25mm, 32 = 32mm, 34 = 34mm,  
40 = 40mm, 53 = 53mm, 60 = 60mm

### (2) Type

D = Standard  
E = High Energy  
R = (applicable only for 34mm Types)

### (3) Varistor Voltage

241 =  $24 \times 10^1 = 240$

### (4) Tolerance

J = ±5%, K = ±10%, M = ±20%

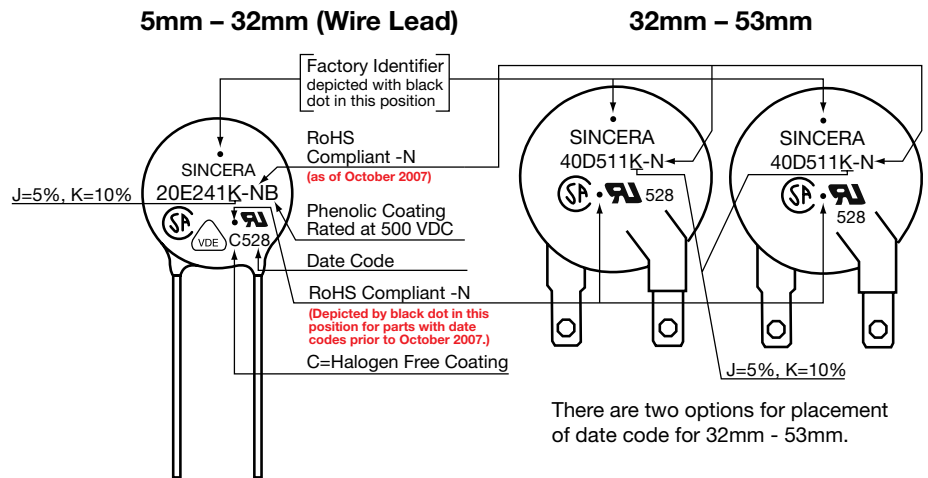
(5) N = RoHs Compliant Series (as of October 2007 forward, per Date Code)

(6) B = Phenolic coating rated at 500 VDC. Phenolic coating rated at 2000 VDC requires no marking.

### Date Code

528 = First digit represents year (5 = 2005). Second and third digits represent the week of the year. This new date code system was implemented from 9/15/05.

**NOTE:** Parts will be marked **SINCERA**. (This is the brand name.)



## Approvals

| APPROVAL<br>& FILE #                                                                    | DISK SIZE / SERIES |      |                    |                                              |                    |      |                    |      |                    |      |                    |      |                    |      |                    |      |
|-----------------------------------------------------------------------------------------|--------------------|------|--------------------|----------------------------------------------|--------------------|------|--------------------|------|--------------------|------|--------------------|------|--------------------|------|--------------------|------|
|                                                                                         | 5mm<br>"D" Series  |      | 5mm<br>"E" Series  |                                              | 7mm<br>"D" Series  |      | 7mm<br>"E" Series  |      | 10mm<br>"D" Series |      | 10mm<br>"E" Series |      | 14mm<br>"D" Series |      | 14mm<br>"E" Series |      |
|                                                                                         | TYPE               |      | TYPE               |                                              | TYPE               |      | TYPE               |      | TYPE               |      | TYPE               |      | TYPE               |      | TYPE               |      |
|                                                                                         | PB                 | RoHS | PB                 | RoHS                                         | PB                 | RoHS | PB                 | RoHS | PB                 | RoHS | PB                 | RoHS | PB                 | RoHS | PB                 | RoHS |
| UL/CUL 1449<br>3RD EDITION, FILE<br>#E321567*                                           | N/A <sub>(1)</sub> | ✓    | N/A <sub>(1)</sub> | 511K, 561K,<br>621K, 681K<br>NOT<br>APPROVED | N/A <sub>(1)</sub> | ✓    | N/A <sub>(1)</sub> | ✓    | N/A <sub>(1)</sub> | ✓    | N/A <sub>(1)</sub> | ✓    | N/A <sub>(1)</sub> | ✓    | N/A <sub>(1)</sub> | ✓    |
| UL 1449 2ND<br>EDITION, FILE<br>#E196885                                                | ✓                  | ✓    | ✓                  | ✓                                            | ✓                  | ✓    | ✓                  | ✓    | ✓                  | ✓    | ✓                  | ✓    | ✓                  | ✓    | ✓                  | ✓    |
| UL1414<br>(VALUES ≥201K)<br>FILE #E71602                                                | ✓                  | ✓    | ✓                  | ✓                                            | ✓                  | ✓    | ✓                  | ✓    | ✓                  | ✓    | ✓                  | ✓    | ✓                  | ✓    | ✓                  | ✓    |
| CSA22.1 #1<br>(VALUES ≥201K)<br>FILE #227006                                            | ✓                  | ✓    | ✓                  | ✓                                            | ✓                  | ✓    | ✓                  | ✓    | ✓                  | ✓    | ✓                  | ✓    | ✓                  | ✓    | ✓                  | ✓    |
| CSA 22.2 #1<br>FILE #241120                                                             |                    |      |                    |                                              |                    |      |                    |      |                    |      |                    |      |                    |      |                    |      |
| VDE<br>FILE #40012632                                                                   |                    |      |                    |                                              | ✓                  | ✓    |                    |      | ✓                  | ✓    |                    |      | ✓                  | ✓    |                    |      |
| VDE<br>FILE #40012630                                                                   |                    |      |                    |                                              |                    |      | ✓                  | ✓    |                    |      | ✓                  | ✓    |                    |      | ✓                  | ✓    |
| VDE<br>FILE #40028559<br>ANNEX Q                                                        |                    |      |                    |                                              |                    |      |                    |      |                    |      |                    |      |                    |      | N/A <sub>(1)</sub> | ✓    |
| VDE<br>FILE #40028554<br>ANNEX Q                                                        |                    |      |                    |                                              |                    |      |                    |      |                    |      |                    |      | N/A <sub>(1)</sub> | ✓    |                    |      |
| COMPLIES WITH<br>UL ACCELERATED<br>AGING TEST PU:<br>ANSI/IEEE C62.11<br>FILE #E196885  |                    |      |                    |                                              |                    |      |                    |      |                    |      |                    |      |                    |      |                    |      |
| COMPLIES WITH<br>UL ACCELERATED<br>AGING TEST PER:<br>ANSI/IEEE C62.11<br>FILE #E321567 | N/A <sub>(1)</sub> |      | N/A <sub>(1)</sub> |                                              | N/A <sub>(1)</sub> |      | N/A <sub>(1)</sub> |      | N/A <sub>(1)</sub> |      | N/A <sub>(1)</sub> |      | N/A <sub>(1)</sub> |      | N/A <sub>(1)</sub> |      |

### NOTES:

(1) N/A - Denotes "not applicable".

\*UL 1449 3rd Edition parts are recognized to SPD Application Category Types:

VZ05-VZ10 both "D" & "E" types (ALL), VZ14D (ALL), VZ14E (180-680 values only), and VZ20D (180-680 values only) – other.

VZ20D (820-121 values only) – Type 3.

VZ14E (820-112 values only) – Type 3.

VZ20D (151-112 values only) – Type 2.

VZ18E, VZ 20E and VZ25D – Type 2.

VZ32D - VZ53D – Type 1.

Approvals stated above are for "series types" as stated. Modification to the above "series types" denoted by special suffixes may vary with regards to above stated approvals. Please consult the Part Numbering System portion of the catalog for this information.

## Approvals

| APPROVAL & FILE #                                                           | DISK SIZE / SERIES                                                 |                                 |                    |      |                    |                                |                         |      |                                 |                  |                    |                  |                                 |                  |                         |                  |                    |      |
|-----------------------------------------------------------------------------|--------------------------------------------------------------------|---------------------------------|--------------------|------|--------------------|--------------------------------|-------------------------|------|---------------------------------|------------------|--------------------|------------------|---------------------------------|------------------|-------------------------|------------------|--------------------|------|
|                                                                             | 18mm<br>"E" Series                                                 |                                 | 20mm<br>"D" Series |      | 20mm<br>"E" Series |                                | 25mm<br>"D" Series      |      | 32mm                            |                  | 34mm               |                  | 40mm                            |                  | 53mm                    |                  | 60mm               |      |
|                                                                             | TYPE                                                               |                                 | TYPE               |      | TYPE               |                                | TYPE                    |      | TYPE                            |                  | TYPE               |                  | TYPE                            |                  | TYPE                    |                  | TYPE               |      |
|                                                                             | PB                                                                 | RoHS                            | PB                 | RoHS | PB                 | RoHS                           | PB                      | RoHS | PB                              | RoHS             | PB                 | RoHS             | PB                              | RoHS             | PB                      | RoHS             | PB                 | RoHS |
| UL/CUL 1449 3RD EDITION, FILE #E321567*                                     | N/A <sub>(1)</sub>                                                 | ✓                               | N/A <sub>(1)</sub> | ✓    | N/A <sub>(1)</sub> | ✓                              | N/A <sub>(1)</sub>      | ✓    | N/A <sub>(1)</sub>              | ✓ <sub>(2)</sub> | N/A <sub>(1)</sub> | ✓ <sub>(2)</sub> | N/A <sub>(1)</sub>              | ✓ <sub>(2)</sub> | N/A <sub>(1)</sub>      | ✓ <sub>(2)</sub> | N/A <sub>(1)</sub> |      |
| UL 1449 2ND EDITION, FILE #E196885                                          | ✓                                                                  | ✓                               |                    |      |                    |                                |                         |      |                                 |                  |                    |                  |                                 |                  |                         |                  |                    |      |
|                                                                             | VALUES 301K, 621K, 801K, 751K, 781K, 911K, 102K, 112K NOT APPROVED |                                 | ✓                  | ✓    | ✓                  | ✓                              | ✓                       | ✓    | ✓                               | ✓                | ✓                  | ✓                | ✓                               | ✓                | ✓                       | ✓                |                    |      |
| UL1414 (VALUES ≥201K) FILE #E71602                                          | ✓                                                                  | ✓                               |                    |      |                    |                                | ✓                       | ✓    | ✓                               | ✓                |                    |                  | ✓                               | ✓                | ✓                       | ✓                |                    |      |
|                                                                             | VALUES 301K, 621K, 801K, 751K, 781K, 911K, 102K, 112K NOT APPROVED |                                 | ✓                  | ✓    | ✓                  | ✓                              | VALUE 181K NOT APPROVED |      | VALUES 122K & 152K NOT APPROVED |                  |                    |                  | VALUES 122K & 152K NOT APPROVED |                  | VALUE 122K NOT APPROVED |                  |                    |      |
| CSA 22.1 #1 (VALUES ≥201K) FILE #227006                                     | ✓                                                                  | ✓                               |                    |      |                    |                                | ✓                       | ✓    |                                 |                  |                    |                  |                                 |                  |                         |                  |                    |      |
|                                                                             | VALUES 301K, 621K, 801K, 751K, 781K, 911K, 102K, 112K NOT APPROVED |                                 | ✓                  | ✓    | ✓                  | ✓                              | VALUE 181K NOT APPROVED |      |                                 |                  |                    |                  |                                 |                  |                         |                  |                    |      |
| CSA 22.2 #1 FILE #241120                                                    |                                                                    |                                 |                    |      |                    |                                |                         |      | ✓                               | ✓                | ✓                  | ✓                | ✓                               | ✓                | ✓                       | ✓                |                    |      |
| VDE FILE #40012632                                                          |                                                                    |                                 | ✓                  | ✓    |                    |                                |                         |      |                                 |                  |                    |                  |                                 |                  |                         |                  |                    |      |
| VDE FILE #40012630                                                          | ✓                                                                  | ✓                               |                    |      |                    |                                |                         |      |                                 |                  |                    |                  |                                 |                  |                         |                  |                    |      |
|                                                                             | VALUES 301K, 621K, 681K, 751K, 781K, 911K, 102K, 112K NOT APPROVED |                                 |                    |      |                    |                                |                         |      |                                 |                  |                    |                  |                                 |                  |                         |                  |                    |      |
| VDE FILE #40028559 ANNEX Q                                                  | N/A <sub>(1)</sub>                                                 | ✓                               |                    |      | N/A <sub>(1)</sub> | ✓                              |                         |      |                                 |                  |                    |                  |                                 |                  |                         |                  |                    |      |
| VDE FILE #40028554 ANNEX Q                                                  |                                                                    |                                 |                    |      |                    |                                |                         |      |                                 |                  |                    |                  |                                 |                  |                         |                  |                    |      |
| COMPLIES WITH UL ACCELERATED AGING TEST PU: ANSI/IEEE C62.11 FILE #E196885  | ✓                                                                  | ✓                               |                    |      |                    |                                | ✓                       | ✓    |                                 |                  |                    |                  |                                 |                  |                         |                  |                    |      |
|                                                                             | VALUES 301K, 621K, 681K, 751K, 781K, 911K, 102K, 112K NOT APPROVED |                                 |                    |      | ✓                  | ✓                              | VALUE 181K NOT APPROVED |      | ✓                               | ✓                |                    |                  |                                 |                  |                         |                  |                    |      |
| COMPLIES WITH UL ACCELERATED AGING TEST PER: ANSI/IEEE C62.11 FILE #E321567 | N/A <sub>(1)</sub>                                                 | VALUES 820K - 241K NOT APPROVED | N/A <sub>(1)</sub> |      | N/A <sub>(1)</sub> | VALUES 820K & 751K - 112K ONLY | N/A <sub>(1)</sub>      | ✓    | N/A <sub>(1)</sub>              |                  | N/A <sub>(1)</sub> |                  | N/A <sub>(1)</sub>              |                  | N/A <sub>(1)</sub>      |                  | N/A <sub>(1)</sub> |      |

### NOTES:

(1) N/A - Denotes "not applicable".

(2) 32mm (wire lead type - suffix "KW") is not recognized at this time. The following types are not CUL recognized: 32mm (122K & 152K), 34mm (single disk - 122K), 34mm (dual disk - 122K), 40mm (122K & 152K), 53mm (301K thru 471K).

\*UL 1449 3rd Edition parts are recognized to SPD Application Category Types:

VZ05-VZ10 both "D" & "E" types (ALL), VZ14D (ALL), VZ14E (180-680 values only), and VZ20D (180-680 values only). – other.

VZ20D (820-121 values only) – Type 3.

VZ14E (820-112 values only) – Type 3.

VZ20D (151-112 values only) – Type 2.

VZ18E, VZ 20E and VZ25D – Type 2.

VZ32D - VZ53D – Type 1.

Approvals stated above are for "series types" as stated. Modification to the above "series types" denoted by special suffixes may vary with regards to above stated approvals. Please consult the Part Numbering System portion of the catalog for this information.

## Part Number System

Example: VZ20D241KBOCX-VPN

| <u>V</u> | <u>Z</u> | <u>20</u> | <u>E</u> | <u>241</u> | <u>K</u> | <u>B</u> | <u>O</u> | <u>C</u> | <u>X</u> | - | <u>V</u> | <u>P</u> | <u>N</u> |
|----------|----------|-----------|----------|------------|----------|----------|----------|----------|----------|---|----------|----------|----------|
| (1)      | (2)      | (3)       | (4)      | (5)        | (6)      | (7)      | (8)      | (9)      | (10)     |   | (11)     | (12)     | (13)     |

### (1) Series

V = Varistor

### (2) Type

Z = Zinc Oxide

### (3) Disk Diameter

05 = 5mm, 07 = 7mm, 10 = 10mm, 14 = 14mm,  
18 = 18mm, 20 = 20mm, 25 = 25mm, 32 = 32mm,  
34 = 34mm, 40 = 40mm, 53 = 53mm, 60 = 60mm

### (4) Type

D = Standard

E = High Energy Type

R = (applicable only for 34mm Types)

### (5) Varistor Voltage

241 =  $24 \times 10^1 = 240$  (DC Volts)

### (6) Tolerance

J = 5%, K = 10%

### (7) Packing Code

B = Bulk Pack

(For taped parts packing code, see Taping Specifications.)

Note: For sizes 32 and larger please reference specification pages for fields beyond (6).

### (8) Lead Configuration (For Bulk Parts)

S = Straight

O = Outward Crimp

I = Inward Crimp

L = Inline Crimp

N = Bulk parts for 320VAC and larger come standard with inline crimp (see illustration below) for straight disk seating on PC boards. If straight leads are required instead of inline crimp please use code "N" in the appropriate position as stated above.

Note: Also applicable for 32mm (KW Series) with wire leads.

R = Bare disk without leads (no epoxy).

Available in 20mm & 25mm disk sizes\*\* (RoHS Compliant).



\* Compliant with Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS Directive). Please note solderability profile on page 107.

\*\* 32mm – 53mm types are also available as bare disk with and without leads. Reference suffix codes stated in Electrical/Dimensions section for these types in this catalog.

### (9) Lead Cutting

A =  $4.0 \pm 1.0\text{mm}$  (.16"  $\pm$  .04")

(Crimped lead)

B =  $3.0 \pm 1.0\text{mm}$  (.12"  $\pm$  .04")

(Crimped lead)

C =  $4.5 \pm 1.5\text{mm}$  (.18"  $\pm$  .06")

(Crimped lead)

D =  $6.5 \pm 1.0\text{mm}$  (.26"  $\pm$  .04")

(Crimped lead)

E =  $4.0 \pm 1.0\text{mm}$  (.18"  $\pm$  .04")

(Straight lead)

F =  $5.0 \pm 1.0\text{mm}$  (.2"  $\pm$  .04")

(Crimped lead)

G =  $3.3 \pm 0.5\text{mm}$  (.13"  $\pm$  .02")

(Crimped lead)

(For lead length reference points see

Standard Lead Modifications).

Note: Also applicable for 32mm (KW Series) with wire leads.

### (10) Lead Spacing

X = 10mm (0.4") lead spacing 1mm (0.039") lead diameter).

(For 18mm and 20mm disk diameter only.)

Z = 5mm (0.2") leadspacing.

(For 10mm and 14mm disk diameters.)

### (11) Extremely High Energy Rating

V = 15KA for 20mm, 12KA for 18mm and 7.5KA for 14mm, "E Series" parts only. Available in varistor voltages 14mm and 20mm (181-112), 18mm (181-781) (UL1414 and UL1449 3rd Edition recognized parts). CSA recognized for 14, 18 & 20mm "E Series" parts all values  $\geq 201$  with the exception of 14E (911, 102 & 112). 14E "V" series parts are rated at 7.5KA. (If you have a special voltage request, please inquire).

### (12) Coating Option

P = Phenolic Coating with 2000VDC rating. Applicable for UL1414 (5mm – 20mm), UL1449 3rd Edition (14mm, 18mm and 20mm "V" type only), and CSA (5mm – 20mm) recognized parts.

B = Phenolic Coating with 500VDC rating. Applicable for UL1414 (5mm – 20mm) and CSA (5mm - 20mm) recognized parts.

Y = Bare disk with leads (no epoxy).

Available in 20mm & 25mm disk size\*\* (RoHS Compliant 20E suffix "V" 181K - 471K CSA c/us certified File #154862).

C = Halogen Free Coating. Applicable for UL1449 (2nd & 3rd Edition), UL1414, CSA (5mm-25mm) and VDE (14D, 14E, 18E and 20E only).

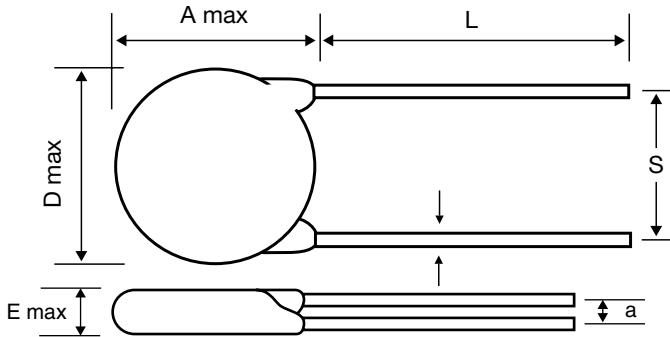
### (13) RoHS Compliant\*

N = RoHS Compliant

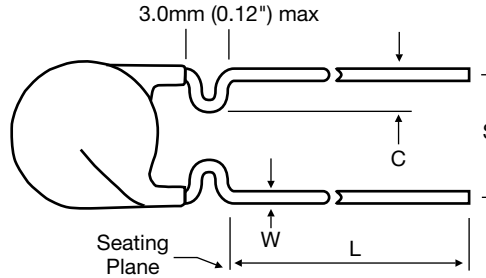
(Available in disk sizes 5mm – 53mm)

## Standard Dimensions and Lead Modification Options

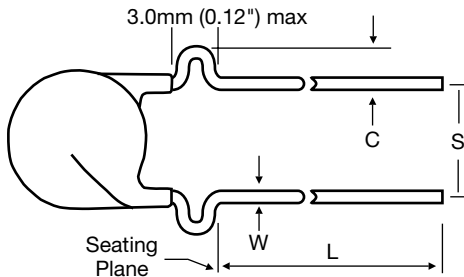
### Straight Leads



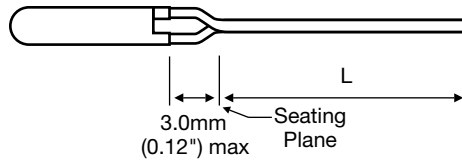
### Inward Crimp



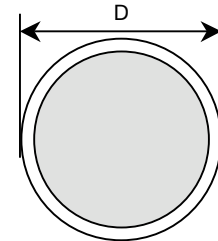
### Outward Crimp



### Inline Crimp



| Dimensions of Bare Disk |            |
|-------------------------|------------|
| Disk Size               | D          |
| 20mm                    | 20.0±1.0mm |
| 25mm                    | 25.0±1.0mm |



| Disk Size        | A max |      | D max |      | S          |             | W nom     |             | C          |              | L                                                                                                                                                | Dimension E max and a                                                               |
|------------------|-------|------|-------|------|------------|-------------|-----------|-------------|------------|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                  | mm    | in   | mm    | in   | mm ± 1     | in ± .04    | mm ± .02  | in ± .001   | mm         | in           |                                                                                                                                                  |                                                                                     |
| 5                | 10.0  | 0.4  | 7.0   | 0.28 | 5.0        | 0.2         | 0.6       | 0.024       | 1.6 ± 0.4  | 0.06 ± 0.016 | For other than standard (straight lead) lead length, please see Definitions, "Part Number System" "(9) Lead Cutting" for specs and suffix codes. | Please see E Maximum Thickness and Off-set (a) Dimension by Part Number (Next Page) |
| 7                | 12.0  | 0.47 | 9.5   | 0.37 | 5.0        | 0.2         | 0.6       | 0.024       | 1.6 ± 0.4  | 0.06 ± 0.016 |                                                                                                                                                  |                                                                                     |
| 10               | 17.0  | 0.67 | 12.5  | 0.49 | 7.5        | 0.3         | 0.8       | 0.031       | 1.6 ± 0.4  | 0.06 ± 0.016 |                                                                                                                                                  |                                                                                     |
| 14               | 20.5  | 0.8  | 16.5  | 0.65 | 7.5        | 0.3         | 0.8       | 0.031       | 1.6 ± 0.4  | 0.06 ± 0.016 |                                                                                                                                                  |                                                                                     |
| 18               | 24.0  | 0.94 | 20.0  | 0.79 | 7.5        | 0.3         | 0.8       | 0.031       | 2.05 ± 0.4 | 0.08 ± 0.016 |                                                                                                                                                  |                                                                                     |
| 18*              | 24.0  | 0.94 | 20.0  | 0.79 | 10.0       | 0.4         | 1.0       | 0.039       | 2.05 ± 0.4 | 0.08 ± 0.016 |                                                                                                                                                  |                                                                                     |
| 20               | 28.0  | 1.10 | 24.0  | 0.94 | 7.5        | 0.3         | 0.8       | 0.031       | 2.05 ± 0.4 | 0.08 ± 0.016 |                                                                                                                                                  |                                                                                     |
| 20*              | 28.0  | 1.10 | 24.0  | 0.94 | 10.0       | 0.4         | 1.0       | 0.039       | 2.05 ± 0.4 | 0.08 ± 0.016 |                                                                                                                                                  |                                                                                     |
| 25               | 31.75 | 1.25 | 27.9  | 1.1  | 12.7       | 0.5         | 1.0       | 0.039       | 2.05 ± 0.4 | 0.08 ± 0.016 |                                                                                                                                                  |                                                                                     |
| 32KW (wire lead) | 45.0  | 1.77 | 40.0  | 1.57 | 22.5 ± 1.5 | 0.9 ± 0.059 | 1.5 ± 0.5 | 0.06 ± 0.02 |            |              |                                                                                                                                                  |                                                                                     |

\* For 10mm lead spacing use suffix "X" for bulk parts (18mm and 20mm disk diameter).

Notes:

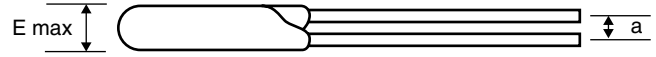
1. Maximum epoxy extending on leads (measured from bottom most portion of disk) is 3mm for all disk sizes with exception of 20mm, 25mm and 32mm disk sizes which are 4mm.
2. Reduced dimensions, special lead diameters and special lead spacing may be available upon request.
3. Bulk parts for 320VAC and larger come standard with inline crimp (as referenced above) for straight disk seating on PC boards. If 320VAC and larger size are required without in-line crimp, please reference "Part Number System" position # (8) and add "N" and reference "a" off-set dimensions.
4. The maximum straight lead length available for 5mm leadspacing is 40mm max, 7.5mm leadspacing is 32mm max, 10mm leadspacing is 35mm max.

## Standard Dimensions and Lead Modification Options (continued)

### E Max Dimensions (For Standard Epoxy)

Dimensions are in mm (inches)

#### 5D Series



| Style  | E Max<br>mm (in) | Off-set Dimension (a)<br>±1 (±0.04) mm (in) |
|--------|------------------|---------------------------------------------|
| 5D180K | 3.4 (.13)        | 1.2 (.05)                                   |
| 5D220K | 3.6 (.14)        | 1.3 (.05)                                   |
| 5D270K | 3.8 (.15)        | 1.4 (.055)                                  |
| 5D330K | 3.9 (.15)        | 1.2 (.05)                                   |
| 5D390K | 4.0 (.16)        | 1.3 (.05)                                   |
| 5D470K | 3.8 (.15)        | 1.5 (.06)                                   |
| 5D560K | 3.9 (.15)        | 1.6 (.063)                                  |
| 5D680K | 4.2 (.165)       | 1.8 (.07)                                   |
| 5D820K | 3.4 (.13)        | 1.2 (.05)                                   |
| 5D101K | 3.6 (.14)        | 1.2 (.05)                                   |
| 5D121K | 3.8 (.15)        | 1.3 (.05)                                   |
| 5D151K | 3.9 (.15)        | 1.3 (.05)                                   |
| 5D181K | 3.5 (.138)       | 1.5 (.06)                                   |
| 5D201K | 3.6 (.14)        | 1.6 (.063)                                  |

| Style  | E Max<br>mm (in) | Off-set Dimension (a)<br>±1 (±0.04) mm (in) |
|--------|------------------|---------------------------------------------|
| 5D221K | 3.6 (.14)        | 1.6 (.063)                                  |
| 5D241K | 3.7 (.145)       | 1.8 (.07)                                   |
| 5D271K | 3.8 (.15)        | 2.0 (.08)                                   |
| 5D301K | 3.9 (.15)        | 2.3 (.09)                                   |
| 5D331K | 4.1 (.16)        | 2.4 (.094)                                  |
| 5D361K | 4.4 (.17)        | 2.5 (.1)                                    |
| 5D391K | 4.5 (.18)        | 2.7 (.1)                                    |
| 5D431K | 4.7 (.185)       | 2.9 (.11)                                   |
| 5D471K | 4.9 (.19)        | 3.6 (.14)                                   |
| 5D511K | 5.1 (.2)         | *3.1 (.12)                                  |
| 5D561K | 5.3 (.21)        | *3.3 (.13)                                  |
| 5D621K | 5.5 (.22)        | *3.9 (.15)                                  |
| 5D681K | 5.7 (.22)        | *4.3 (.17)                                  |

#### 7D Series

| Style  | E Max<br>mm (in) | Off-set Dimension (a)<br>±1 (±0.04) mm (in) |
|--------|------------------|---------------------------------------------|
| 7D180K | 3.4 (.13)        | 1.2 (.05)                                   |
| 7D220K | 3.6 (.14)        | 1.3 (.05)                                   |
| 7D270K | 3.8 (.15)        | 1.4 (.055)                                  |
| 7D330K | 3.9 (.15)        | 1.2 (.05)                                   |
| 7D390K | 4.0 (.16)        | 1.3 (.05)                                   |
| 7D470K | 3.8 (.15)        | 1.5 (.06)                                   |
| 7D560K | 3.9 (.15)        | 1.6 (.063)                                  |
| 7D680K | 4.2 (.165)       | 1.8 (.07)                                   |
| 7D820K | 3.4 (.13)        | 1.2 (.05)                                   |
| 7D101K | 3.6 (.14)        | 1.2 (.05)                                   |
| 7D121K | 3.8 (.15)        | 1.3 (.05)                                   |
| 7D151K | 3.9 (.15)        | 1.3 (.05)                                   |
| 7D181K | 3.5 (.138)       | 1.5 (.06)                                   |
| 7D201K | 3.6 (.14)        | 1.6 (.063)                                  |

| Style  | E Max<br>mm (in) | Off-set Dimension (a)<br>±1 (±0.04) mm (in) |
|--------|------------------|---------------------------------------------|
| 7D221K | 3.6 (.14)        | 1.6 (.063)                                  |
| 7D241K | 3.7 (.145)       | 1.8 (.07)                                   |
| 7D271K | 3.8 (.15)        | 2.0 (.08)                                   |
| 7D301K | 3.9 (.15)        | 2.3 (.09)                                   |
| 7D331K | 4.1 (.16)        | 2.4 (.094)                                  |
| 7D361K | 4.4 (.17)        | 2.5 (.1)                                    |
| 7D391K | 4.5 (.18)        | 2.7 (.1)                                    |
| 7D431K | 4.7 (.185)       | 2.9 (.11)                                   |
| 7D471K | 4.9 (.19)        | 3.6 (.14)                                   |
| 7D511K | 5.1 (.2)         | *3.1 (.12)                                  |
| 7D561K | 5.3 (.21)        | *3.3 (.13)                                  |
| 7D621K | 5.5 (.22)        | *3.9 (.15)                                  |
| 7D681K | 5.7 (.22)        | *4.3 (.17)                                  |

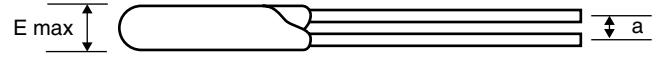
\* Bulk parts for 320VAC and larger come standard with inline crimp (as referenced at beginning of “Standard Dimensions and Lead Modification Options” section ) for straight disk seating on PC boards. Therefore, “a” dimension is not applicable. If 320VAC and larger size are required without in-line crimp, please reference “Part Number System” position # (8) and add “N” and reference “a” dimensions (for off-set) above.

## Standard Dimensions and Lead Modification Options (continued)

### E Max Dimensions (For Standard Epoxy)

Dimensions are in mm (inches)

#### 10D Series



| Style   | E Max<br>mm (in) | Off-set Dimension (a)<br>±1 (±0.04) mm (in) |
|---------|------------------|---------------------------------------------|
| 10D180K | 3.8 (.15)        | 1.4 (.055)                                  |
| 10D220K | 4.0 (.16)        | 1.5 (.06)                                   |
| 10D270K | 4.2 (.165)       | 1.6 (.063)                                  |
| 10D330K | 4.3 (.17)        | 1.8 (.07)                                   |
| 10D390K | 4.4 (.17)        | 1.6 (.063)                                  |
| 10D470K | 4.4 (.17)        | 1.7 (.067)                                  |
| 10D560K | 4.4 (.17)        | 1.8 (.07)                                   |
| 10D680K | 4.6 (.18)        | 2.1 (.083)                                  |
| 10D820K | 3.8 (.15)        | 1.4 (.055)                                  |
| 10D101K | 3.8 (.15)        | 1.4 (.055)                                  |
| 10D121K | 4.0 (.16)        | 1.5 (.06)                                   |
| 10D151K | 4.2 (.165)       | 1.5 (.06)                                   |
| 10D181K | 4.2 (.165)       | 1.6 (.063)                                  |
| 10D201K | 4.2 (.165)       | 1.8 (.07)                                   |
| 10D221K | 4.1 (.16)        | 1.8 (.07)                                   |
| 10D241K | 4.2 (.165)       | 2.0 (.08)                                   |
| 10D271K | 4.3 (.17)        | 2.2 (.087)                                  |

| Style   | E Max<br>mm (in) | Off-set Dimension (a)<br>±1 (±0.04) mm (in) |
|---------|------------------|---------------------------------------------|
| 10D301K | 4.4 (.17)        | 2.5 (.1)                                    |
| 10D331K | 4.6 (.18)        | 2.5 (.1)                                    |
| 10D361K | 4.9 (.19)        | 2.7 (.1)                                    |
| 10D391K | 5.0 (.2)         | 2.9 (.11)                                   |
| 10D431K | 5.2 (.2)         | 3.1 (.12)                                   |
| 10D471K | 5.4 (.21)        | 3.6 (.14)                                   |
| 10D511K | 5.5 (.22)        | *3.4 (.13)                                  |
| 10D561K | 5.8 (.23)        | *3.5 (.138)                                 |
| 10D621K | 6.1 (.24)        | *4.2 (.165)                                 |
| 10D681K | 6.4 (.25)        | *4.6 (.18)                                  |
| 10D751K | 6.7 (.26)        | *5.0 (.197)                                 |
| 10D781K | 6.9 (.27)        | *5.0 (.197)                                 |
| 10D821K | 7.1 (.28)        | *5.4 (.2)                                   |
| 10D911K | 7.5 (.3)         | *5.9 (.23)                                  |
| 10D102K | 7.6 (.3)         | *6.4 (.25)                                  |
| 10D112K | 7.8 (.31)        | *7.0 (.275)                                 |

#### 14D Series

| Style   | E Max<br>mm (in) | Off-set Dimension (a)<br>±1 (±0.04) mm (in) |
|---------|------------------|---------------------------------------------|
| 14D180K | 3.9 (.15)        | 1.4 (.055)                                  |
| 14D220K | 4.1 (.16)        | 1.5 (.06)                                   |
| 14D270K | 4.3 (.17)        | 1.7 (.067)                                  |
| 14D330K | 4.5 (.18)        | 1.9 (.075)                                  |
| 14D390K | 4.5 (.18)        | 1.7 (.067)                                  |
| 14D470K | 4.3 (.17)        | 1.8 (.07)                                   |
| 14D560K | 4.5 (.18)        | 2.0 (.08)                                   |
| 14D680K | 4.7 (.185)       | 2.2 (.087)                                  |
| 14D820K | 3.8 (.15)        | 1.4 (.055)                                  |
| 14D101K | 3.8 (.15)        | 1.5 (.06)                                   |
| 14D121K | 4.0 (.16)        | 1.5 (.06)                                   |
| 14D151K | 4.2 (.165)       | 1.5 (.06)                                   |
| 14D181K | 4.4 (.17)        | 1.7 (.067)                                  |
| 14D201K | 4.6 (.18)        | 1.9 (.075)                                  |
| 14D221K | 4.1 (.16)        | 1.9 (.075)                                  |
| 14D241K | 4.2 (.165)       | 2.1 (.083)                                  |
| 14D271K | 4.3 (.17)        | 2.2 (.087)                                  |

| Style   | E Max<br>mm (in) | Off-set Dimension (a)<br>±1 (±0.04) mm (in) |
|---------|------------------|---------------------------------------------|
| 14D301K | 4.4 (.17)        | 2.6 (.1)                                    |
| 14D331K | 4.6 (.18)        | 2.6 (.1)                                    |
| 14D361K | 4.9 (.19)        | 2.8 (.11)                                   |
| 14D391K | 5.0 (.2)         | 3.0 (.12)                                   |
| 14D431K | 5.2 (.2)         | 3.2 (.126)                                  |
| 14D471K | 5.4 (.21)        | 3.8 (.15)                                   |
| 14D511K | 5.5 (.22)        | *3.4 (.13)                                  |
| 14D561K | 5.8 (.23)        | *3.5 (.138)                                 |
| 14D621K | 6.1 (.24)        | *4.2 (.165)                                 |
| 14D681K | 6.4 (.25)        | *4.7 (.185)                                 |
| 14D751K | 6.7 (.26)        | *5.1 (.2)                                   |
| 14D781K | 6.9 (.27)        | *5.1 (.2)                                   |
| 14D821K | 7.1 (.28)        | *5.5 (.22)                                  |
| 14D911K | 7.5 (.3)         | *6.0 (.24)                                  |
| 14D102K | 7.6 (.3)         | *6.5 (.255)                                 |
| 14D112K | 8.0 (.31)        | *7.2 (.28)                                  |

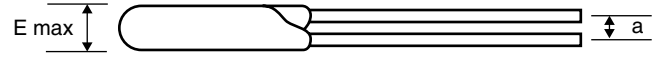
\* Bulk parts for 320VAC and larger come standard with inline crimp (as referenced at beginning of "Standard Dimensions and Lead Modification Options" section ) for straight disk seating on PC boards. Therefore, "a" dimension is not applicable. If 320VAC and larger size are required without in-line crimp, please reference "Part Number System" position # (8) and add "N" and reference "a" dimensions (for off-set) above.

## Standard Dimensions and Lead Modification Options (continued)

### E Max Dimensions (For Standard Epoxy)

Dimensions are in mm (inches)

#### 20D Series



| Style   | E Max<br>mm (in) | Off-set Dimension (a)<br>±1 (±0.04) mm (in) |
|---------|------------------|---------------------------------------------|
| 20D180K | 4.3 (.17)        | 1.5 (.06)                                   |
| 20D220K | 4.5 (.18)        | 1.6 (.063)                                  |
| 20D270K | 4.7 (.185)       | 1.8 (.07)                                   |
| 20D330K | 4.9 (.19)        | 2.1 (.083)                                  |
| 20D390K | 5.1 (.2)         | 2.1 (.083)                                  |
| 20D470K | 5.3 (.21)        | 2.2 (.087)                                  |
| 20D560K | 5.5 (.22)        | 2.2 (.087)                                  |
| 20D680K | 5.7 (.22)        | 2.4 (.094)                                  |
| 20D820K | 4.3 (.17)        | 1.5 (.06)                                   |
| 20D101K | 4.3 (.17)        | 1.6 (.063)                                  |
| 20D121K | 4.4 (.17)        | 1.6 (.063)                                  |
| 20D151K | 4.6 (.18)        | 1.6 (.063)                                  |
| 20D181K | 4.6 (.18)        | 1.8 (.07)                                   |
| 20D201K | 4.7 (.185)       | 2.0 (.08)                                   |
| 20D221K | 4.8 (.19)        | 2.0 (.08)                                   |
| 20D241K | 4.9 (.19)        | 2.2 (.087)                                  |
| 20D271K | 4.9 (.19)        | 2.3 (.09)                                   |

| Style   | E Max<br>mm (in) | Off-set Dimension (a)<br>±1 (±0.04) mm (in) |
|---------|------------------|---------------------------------------------|
| 20D301K | 5.0 (.2)         | 2.6 (.1)                                    |
| 20D331K | 5.0 (.2)         | 2.7 (.1)                                    |
| 20D361K | 5.4 (.21)        | 2.9 (.11)                                   |
| 20D391K | 5.5 (.22)        | 3.1 (.12)                                   |
| 20D431K | 5.7 (.22)        | 3.3 (.13)                                   |
| 20D471K | 5.5 (.22)        | 4.0 (.157)                                  |
| 20D511K | 5.7 (.22)        | *3.4 (.13)                                  |
| 20D561K | 5.9 (.23)        | *3.8 (.15)                                  |
| 20D621K | 6.2 (.24)        | *4.5 (.18)                                  |
| 20D681K | 6.5 (.26)        | *4.8 (.19)                                  |
| 20D751K | 6.8 (.27)        | *5.2 (.2)                                   |
| 20D781K | 7.0 (.275)       | *5.4 (.2)                                   |
| 20D821K | 7.2 (.28)        | *5.6 (.22)                                  |
| 20D911K | 7.5 (.3)         | *6.5 (.255)                                 |
| 20D102K | 7.9 (.31)        | *6.6 (.26)                                  |
| 20D112K | 8.4 (.33)        | *7.3 (.287)                                 |

#### 25D Series

| Style   | E Max<br>mm (in) | Off-set Dimension (a)<br>±1 (±0.04) mm (in) |
|---------|------------------|---------------------------------------------|
| 25D181K | 4.8 (.19)        | 2.2 (.087)                                  |
| 25D201K | 5.0 (.2)         | 2.2 (.087)                                  |
| 25D221K | 5.0 (.2)         | 2.2 (.087)                                  |
| 25D241K | 5.3 (.21)        | 2.4 (.094)                                  |
| 25D271K | 5.5 (.22)        | 2.5 (.1)                                    |
| 25D301K | 5.6 (.22)        | 2.7 (.1)                                    |
| 25D331K | 5.9 (.23)        | 2.8 (.11)                                   |
| 25D361K | 5.9 (.23)        | 3.0 (.12)                                   |
| 25D391K | 6.0 (.24)        | 3.3 (.13)                                   |
| 25D431K | 6.5 (.256)       | 3.5 (.138)                                  |
| 25D471K | 6.5 (.26)        | 5.0 (.197)                                  |

| Style   | E Max<br>mm (in) | Off-set Dimension (a)<br>±1 (±0.04) mm (in) |
|---------|------------------|---------------------------------------------|
| 25D511K | 6.8 (.27)        | *3.5 (.138)                                 |
| 25D561K | 7.0 (.275)       | *3.9 (.15)                                  |
| 25D621K | 7.4 (.29)        | *4.8 (.19)                                  |
| 25D681K | 7.5 (.29)        | *5.0 (.197)                                 |
| 25D751K | 7.6 (.30)        | *5.4 (.2)                                   |
| 25D781K | 8.0 (.31)        | *5.5 (.22)                                  |
| 25D821K | 8.2 (.32)        | *5.8 (.23)                                  |
| 25D911K | 8.2 (.32)        | *7.0 (.275)                                 |
| 25D102K | 8.8 (.35)        | *7.2 (.28)                                  |
| 25D112K | 9.4 (.37)        | *7.4 (.29)                                  |

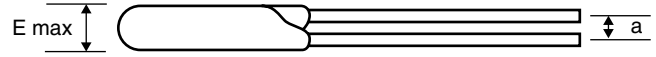
\* Bulk parts for 320VAC and larger come standard with inline crimp (as referenced at beginning of “Standard Dimensions and Lead Modification Options” section ) for straight disk seating on PC boards. Therefore, “a” dimension is not applicable. If 320VAC and larger size are required without in-line crimp, please reference “Part Number System” position # (8) and add “N” and reference “a” dimensions (for off-set) above.

## Standard Dimensions and Lead Modification Options (continued)

### E Max Dimensions (For Standard Epoxy)

Dimensions are in mm (inches)

#### 32D Series



| Style    | E Max<br>mm (in) | Off-set Dimension (a)<br>±1 (±0.04) mm (in) |
|----------|------------------|---------------------------------------------|
| 32D201KW | 5.6 (.22)        | 2.6 (.1)                                    |
| 32D221KW | 5.7 (.22)        | 2.7 (.11)                                   |
| 32D241KW | 5.8 (.23)        | 2.8 (.11)                                   |
| 32D271KW | 5.9 (.23)        | 2.9 (.11)                                   |
| 32D331KW | 6.3 (.25)        | 3.3 (.13)                                   |
| 32D361KW | 6.5 (.255)       | 3.5 (.137)                                  |
| 32D391KW | 6.6 (.26)        | 3.6 (.14)                                   |
| 32D431KW | 6.8 (.27)        | 3.8 (.15)                                   |
| 32D471KW | 6.9 (.27)        | 3.9 (.15)                                   |
| 32D511KW | 7.3 (.29)        | *4.3 (.17)                                  |
| 32D561KW | 7.3 (.29)        | *4.3 (.17)                                  |

| Style    | E Max<br>mm (in) | Off-set Dimension (a)<br>±1 (±0.04) mm (in) |
|----------|------------------|---------------------------------------------|
| 32D621KW | 7.9 (.31)        | *4.9 (.19)                                  |
| 32D681KW | 8.1 (.32)        | *5.1 (.2)                                   |
| 32D751KW | 8.5 (.33)        | *5.5 (.216)                                 |
| 32D781KW | 8.7 (.34)        | *5.7 (.22)                                  |
| 32D821KW | 9.0 (.35)        | *6.0 (.236)                                 |
| 32D911KW | 9.4 (.37)        | *6.4 (.25)                                  |
| 32D951KW | 9.8 (.39)        | *6.7 (.26)                                  |
| 32D102KW | 10.0 (.39)       | *7.0 (.275)                                 |
| 32D112KW | 10.5 (.41)       | *7.5 (.295)                                 |
| 32D122KW | 11.0 (.43)       | *8.0 (.31)                                  |
| 32D152KW | 12.5 (.49)       | *9.5 (.37)                                  |

#### 5E High Energy Series

| Style  | E Max<br>mm (in) | Off-set Dimension (a)<br>±1 (±0.04) mm (in) |
|--------|------------------|---------------------------------------------|
| 5E820K | 3.4 (.13)        | 1.2 (.05)                                   |
| 5E181K | 3.5 (.138)       | 1.5 (.06)                                   |
| 5E201K | 3.6 (.14)        | 1.6 (.063)                                  |
| 5E221K | 3.6 (.14)        | 1.6 (.063)                                  |
| 5E241K | 3.7 (.145)       | 1.8 (.07)                                   |
| 5E271K | 3.8 (.15)        | 2.0 (.08)                                   |

| Style  | E Max<br>mm (in) | Off-set Dimension (a)<br>±1 (±0.04) mm (in) |
|--------|------------------|---------------------------------------------|
| 5E331K | 4.1 (.16)        | 2.4 (.094)                                  |
| 5E361K | 4.4 (.17)        | 2.5 (.1)                                    |
| 5E391K | 4.5 (.18)        | 2.7 (.1)                                    |
| 5E431K | 4.7 (.185)       | 2.9 (.11)                                   |
| 5E471K | 4.9 (.19)        | 3.6 (.14)                                   |
|        |                  |                                             |

#### 7E High Energy Series

| Style  | E Max<br>mm (in) | Off-set Dimension (a)<br>±1 (±0.04) mm (in) |
|--------|------------------|---------------------------------------------|
| 7E820K | 3.4 (.13)        | 1.2 (.05)                                   |
| 7E181K | 3.5 (.138)       | 1.5 (.06)                                   |
| 7E201K | 3.6 (.14)        | 1.6 (.063)                                  |
| 7E221K | 3.6 (.14)        | 1.6 (.063)                                  |
| 7E241K | 3.7 (.145)       | 1.8 (.07)                                   |
| 7E271K | 3.8 (.15)        | 2.0 (.08)                                   |

| Style  | E Max<br>mm (in) | Off-set Dimension (a)<br>±1 (±0.04) mm (in) |
|--------|------------------|---------------------------------------------|
| 7E331K | 4.1 (.16)        | 2.4 (.094)                                  |
| 7E361K | 4.4 (.17)        | 2.5 (.1)                                    |
| 7E391K | 4.5 (.18)        | 2.7 (.1)                                    |
| 7E431K | 4.7 (.185)       | 2.9 (.11)                                   |
| 7E471K | 4.9 (.19)        | 3.6 (.14)                                   |
|        |                  |                                             |

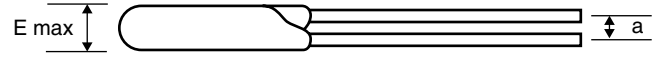
\* Bulk parts for 320VAC and larger come standard with inline crimp (as referenced at beginning of “Standard Dimensions and Lead Modification Options” section ) for straight disk seating on PC boards. Therefore, “a” dimension is not applicable. If 320VAC and larger size are required without in-line crimp, please reference “Part Number System” position # (8) and add “N” and reference “a” dimensions (for off-set) above.

## Standard Dimensions and Lead Modification Options (continued)

### E Max Dimensions (For Standard Epoxy)

Dimensions are in mm (inches)

#### 10E High Energy Series



| Style   | E Max<br>mm (in) | Off-set Dimension (a)<br>±1 (±0.04) mm (in) |
|---------|------------------|---------------------------------------------|
| 10E820K | 3.8 (.15)        | 1.4 (.055)                                  |
| 10E181K | 4.2 (.165)       | 1.8 (.07)                                   |
| 10E201K | 4.2 (.165)       | 1.8 (.07)                                   |
| 10E221K | 4.1 (.16)        | 1.8 (.07)                                   |
| 10E241K | 4.2 (.165)       | 2.0 (.08)                                   |
| 10E271K | 4.3 (.17)        | 2.2 (.087)                                  |
| 10E331K | 4.6 (.18)        | 2.5 (.1)                                    |

| Style   | E Max<br>mm (in) | Off-set Dimension (a)<br>±1 (±0.04) mm (in) |
|---------|------------------|---------------------------------------------|
| 10E361K | 4.9 (.19)        | 2.7 (.1)                                    |
| 10E391K | 5.0 (.2)         | 2.9 (.11)                                   |
| 10E431K | 5.2 (.2)         | 3.1 (.12)                                   |
| 10E471K | 5.4 (.21)        | 3.6 (.14)                                   |
| 10E511K | 5.5 (.22)        | *3.4 (.13)                                  |
| 10E561K | 5.8 (.23)        | *3.5 (.138)                                 |
| 10E821K | 7.1 (.28)        | *5.4 (.2)                                   |

#### 14E High Energy Series

| Style     | E Max<br>mm (in) | Off-set Dimension (a)<br>±1 (±0.04) mm (in) |
|-----------|------------------|---------------------------------------------|
| **14E820K | 3.8 (.15)        | 1.4 (.055)                                  |
| **14E181K | 4.4 (.17)        | 1.7 (.067)                                  |
| **14E201K | 4.6 (.18)        | 1.9 (.075)                                  |
| **14E221K | 4.5 (.18)        | 1.9 (.075)                                  |
| **14E241K | 4.5 (.18)        | 2.1 (.083)                                  |
| **14E271K | 4.5 (.18)        | 2.2 (.087)                                  |
| **14E331K | 4.6 (.18)        | 2.6 (.1)                                    |

| Style     | E Max<br>mm (in) | Off-set Dimension (a)<br>±1 (±0.04) mm (in) |
|-----------|------------------|---------------------------------------------|
| **14E361K | 4.9 (.19)        | 2.8 (.11)                                   |
| **14E391K | 5.0 (.2)         | 3.0 (.12)                                   |
| **14E431K | 5.2 (.2)         | 3.2 (.126)                                  |
| **14E471K | 5.4 (.21)        | 3.8 (.15)                                   |
| **14E511K | 5.5 (.22)        | *3.4 (.13)                                  |
| **14E561K | 5.8 (.23)        | *3.5 (.138)                                 |
| **14E821K | 7.1 (.28)        | *5.5 (.22)                                  |

#### 18E High Energy Series

| Style     | E Max<br>mm (in) | Off-set Dimension (a)<br>±1 (±0.04) mm (in) |
|-----------|------------------|---------------------------------------------|
| **18E820K | 4.1 (.16)        | 1.5 (.06)                                   |
| **18E181K | 4.4 (.17)        | 1.9 (.075)                                  |
| **18E201K | 4.7 (.185)       | 1.9 (.075)                                  |
| **18E221K | 4.9 (.19)        | 1.9 (.075)                                  |
| **18E241K | 5.0 (.2)         | 2.0 (.08)                                   |
| **18E271K | 5.1 (.2)         | 2.2 (.08)                                   |
| **18E301K | 5.2 (.2)         | 2.3 (.09)                                   |
| **18E331K | 5.2 (.2)         | 2.7 (.11)                                   |
| **18E361K | 5.4 (.21)        | 2.8 (.11)                                   |
| **18E391K | 5.5 (.22)        | 3.0 (.12)                                   |
| **18E431K | 5.7 (.22)        | 3.2 (.126)                                  |

| Style     | E Max<br>mm (in) | Off-set Dimension (a)<br>±1 (±0.04) mm (in) |
|-----------|------------------|---------------------------------------------|
| **18E471K | 5.8 (.23)        | 3.9 (.15)                                   |
| **18E511K | 6.1 (.24)        | *3.4 (.13)                                  |
| **18E561K | 6.2 (.24)        | *3.8 (.15)                                  |
| **18E621K | 6.2 (.24)        | *3.2 (.13)                                  |
| **18E681K | 6.3 (.25)        | *3.3 (.13)                                  |
| **18E751K | 6.5 (.26)        | *3.5 (.14)                                  |
| **18E781K | 6.8 (.27)        | *3.7 (.15)                                  |
| **18E821K | 7.4 (.29)        | *5.5 (.22)                                  |
| **18E911K | 7.6 (.3)         | *4.1 (.16)                                  |
| **18E102K | 7.9 (.31)        | *4.4 (.18)                                  |
| **18E112K | 8.3 (.32)        | *4.8 (.19)                                  |

\* Bulk parts for 320VAC and larger come standard with inline crimp (as referenced at beginning of “Standard Dimensions and Lead Modification Options” section ) for straight disk seating on PC boards. Therefore, “a” dimension is not applicable. If 320VAC and larger size are required without in-line crimp, please reference “Part Number System” position # (8) and add “N” and reference “a” dimensions (for off-set) above.

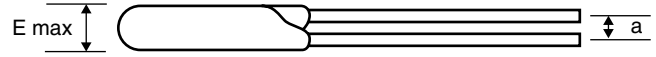
\*\* For suffix “V” (Extremely High Energy Type) add 0.1 (0.004) to “E Max.”

# Standard Dimensions and Lead Modification Options (continued)

## E Max Dimensions (For Standard Epoxy)

Dimensions are in mm (inches)

### 20E High Energy Series



| Style     | E Max<br>mm (in) | Off-set Dimension (a)<br>±1 (±0.04) mm (in) |
|-----------|------------------|---------------------------------------------|
| **20E820K | 4.3 (.17)        | 1.5 (.06)                                   |
| **20E181K | 4.6 (.18)        | 1.8 (.07)                                   |
| **20E201K | 4.9 (.19)        | 2.0 (.08)                                   |
| **20E221K | 5.0 (.2)         | 2.0 (.08)                                   |
| **20E241K | 5.1 (.2)         | 2.2 (.087)                                  |
| **20E271K | 5.4 (.21)        | 2.3 (.09)                                   |
| **20E301K | 5.5 (.22)        | 2.6 (.1)                                    |
| **20E331K | 5.8 (.23)        | 2.7 (.1)                                    |
| **20E361K | 5.4 (.21)        | 2.9 (.11)                                   |
| **20E391K | 5.5 (.22)        | 3.1 (.12)                                   |
| **20E431K | 5.7 (.22)        | 3.3 (.13)                                   |

| Style     | E Max<br>mm (in) | Off-set Dimension (a)<br>±1 (±0.04) mm (in) |
|-----------|------------------|---------------------------------------------|
| **20E471K | 5.8 (.23)        | 4.0 (.157)                                  |
| **20E511K | 5.9 (.23)        | *3.4 (.13)                                  |
| **20E561K | 5.9 (.23)        | *3.8 (.15)                                  |
| **20E621K | 6.6 (.26)        | *4.5 (.18)                                  |
| **20E681K | 6.9 (.27)        | *4.8 (.19)                                  |
| **20E751K | 7.2 (.28)        | *5.2 (.2)                                   |
| **20E781K | 7.4 (.29)        | *5.4 (.2)                                   |
| **20E821K | 7.2 (.28)        | *5.6 (.22)                                  |
| **20E911K | 8.0 (.32)        | *6.5 (.255)                                 |
| **20E102K | 8.4 (.33)        | *6.6 (.26)                                  |
| **20E112K | 8.4 (.33)        | *7.3 (.287)                                 |

\* Bulk parts for 320VAC and larger come standard with inline crimp (as referenced at beginning of “Standard Dimensions and Lead Modification Options” section ) for straight disk seating on PC boards. Therefore, “a” dimension is not applicable. If 320VAC and larger size are required without in-line crimp, please reference “Part Number System” position # (8) and add “N” and reference “a” dimensions (for off-set) above.

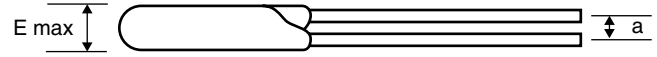
\*\* For suffix “V” (Extremely High Energy Type) add 0.1 (0.004) to “E Max.”

# Standard Dimensions and Lead Modification Options (continued)

## E Max Dimensions (For Phenolic Coating)

Dimensions are in mm (inches)

### 5D Series



| Style    | E Max mm (in) |            | Off-set Dimension<br>(a) ±1 (±0.04) mm (in) |
|----------|---------------|------------|---------------------------------------------|
|          | B             | P          |                                             |
| 5D180K   | 3.8 (.15)     | 5.0 (.196) | 1.2 (.05)                                   |
| 5D220K   | 3.9 (.15)     | 5.1 (.2)   | 1.3 (.05)                                   |
| 5D270K   | 4.0 (.157)    | 5.2 (.2)   | 1.4 (.055)                                  |
| 5D330K   | 4.0 (.157)    | 5.2 (.2)   | 1.2 (.05)                                   |
| 5D390K   | 4.1 (.16)     | 5.3 (.21)  | 1.3 (.05)                                   |
| 5D470K   | 4.1 (.16)     | 5.3 (.21)  | 1.5 (.06)                                   |
| 5D560K   | 4.2 (.165)    | 5.4 (.21)  | 1.6 (.063)                                  |
| 5D680K   | 4.4 (.17)     | 5.8 (.23)  | 1.8 (.07)                                   |
| **5D820K | 3.8 (.15)     | 5.2 (.2)   | 1.2 (.05)                                   |
| **5D101K | 3.8 (.15)     | 5.2 (.2)   | 1.2 (.05)                                   |
| **5D121K | 3.9 (.15)     | 5.3 (.21)  | 1.3 (.05)                                   |
| **5D151K | 3.9 (.15)     | 5.3 (.21)  | 1.3 (.05)                                   |
| **5D181K | 4.1 (.16)     | 5.5 (.216) | 1.5 (.06)                                   |
| **5D201K | 4.1 (.16)     | 5.5 (.216) | 1.6 (.063)                                  |

| Style    | E Max mm (in) |            | Off-set Dimension<br>(a) ±1 (±0.04) mm (in) |
|----------|---------------|------------|---------------------------------------------|
|          | B             | P          |                                             |
| **5D221K | 4.5 (.177)    | 5.4 (.21)  | 1.6 (.063)                                  |
| **5D241K | 4.7 (.185)    | 5.5 (.216) | 1.8 (.07)                                   |
| **5D271K | 4.8 (.19)     | 5.5 (.216) | 2.0 (.08)                                   |
| **5D301K | 4.9 (.19)     | 5.6 (.22)  | 2.3 (.09)                                   |
| **5D331K | 5.0 (.196)    | 5.6 (.22)  | 2.4 (.094)                                  |
| **5D361K | 5.1 (.2)      | 5.7 (.22)  | 2.5 (.1)                                    |
| **5D391K | 5.2 (.2)      | 5.9 (.23)  | 2.7 (.1)                                    |
| **5D431K | 5.3 (.21)     | 6.0 (.236) | 2.9 (.11)                                   |
| **5D471K | 6.0 (.236)    | 7.2 (.28)  | 3.6 (.14)                                   |
| 5D511K   | 6.3 (.25)     | 7.5 (.295) | *3.1 (.12)                                  |
| 5D561K   | 5.5 (.216)    | 6.7 (.26)  | *3.3 (.13)                                  |
| 5D621K   | 5.6 (.22)     | 6.8 (.267) | *3.9 (.15)                                  |
| 5D681K   | 5.9 (.23)     | 7.1 (.28)  | *4.3 (.17)                                  |

### 7D Series

| Style    | E Max mm (in) |            | Off-set Dimension<br>(a) ±1 (±0.04) mm (in) |
|----------|---------------|------------|---------------------------------------------|
|          | B             | P          |                                             |
| 7D180K   | 3.9 (.15)     | 5.1 (.2)   | 1.2 (.05)                                   |
| 7D220K   | 4.0 (.157)    | 5.2 (.2)   | 1.3 (.05)                                   |
| 7D270K   | 4.1 (.16)     | 5.3 (.21)  | 1.4 (.055)                                  |
| 7D330K   | 4.1 (.16)     | 5.3 (.21)  | 1.2 (.05)                                   |
| 7D390K   | 4.2 (.165)    | 5.4 (.21)  | 1.3 (.05)                                   |
| 7D470K   | 4.2 (.165)    | 5.4 (.21)  | 1.5 (.06)                                   |
| 7D560K   | 4.4 (.17)     | 5.6 (.22)  | 1.6 (.063)                                  |
| 7D680K   | 4.6 (.18)     | 6.0 (.236) | 1.8 (.07)                                   |
| **7D820K | 3.8 (.15)     | 5.2 (.2)   | 1.2 (.05)                                   |
| **7D101K | 3.8 (.15)     | 5.2 (.2)   | 1.2 (.05)                                   |
| **7D121K | 3.9 (.15)     | 5.3 (.21)  | 1.3 (.05)                                   |
| **7D151K | 3.9 (.15)     | 5.3 (.21)  | 1.3 (.05)                                   |
| **7D181K | 4.1 (.16)     | 5.5 (.216) | 1.5 (.06)                                   |
| **7D201K | 4.1 (.16)     | 5.5 (.216) | 1.6 (.063)                                  |

| Style    | E Max mm (in) |            | Off-set Dimension<br>(a) ±1 (±0.04) mm (in) |
|----------|---------------|------------|---------------------------------------------|
|          | B             | P          |                                             |
| **7D221K | 4.5 (.177)    | 5.4 (.21)  | 1.6 (.063)                                  |
| **7D241K | 4.7 (.185)    | 5.5 (.216) | 1.8 (.07)                                   |
| **7D271K | 4.8 (.19)     | 5.5 (.216) | 2.0 (.08)                                   |
| **7D301K | 4.9 (.19)     | 5.6 (.22)  | 2.3 (.09)                                   |
| **7D331K | 5.0 (.196)    | 5.7 (.22)  | 2.4 (.094)                                  |
| **7D361K | 5.1 (.2)      | 5.7 (.22)  | 2.5 (.1)                                    |
| **7D391K | 5.2 (.2)      | 5.9 (.23)  | 2.7 (.1)                                    |
| **7D431K | 5.3 (.21)     | 6.1 (.24)  | 2.9 (.11)                                   |
| **7D471K | 6.0 (.236)    | 7.2 (.28)  | 3.6 (.14)                                   |
| 7D511K   | 6.4 (.25)     | 7.6 (.3)   | *3.1 (.12)                                  |
| 7D561K   | 5.6 (.22)     | 6.8 (.267) | *3.3 (.13)                                  |
| 7D621K   | 5.7 (.22)     | 6.9 (.27)  | *3.9 (.15)                                  |
| 7D681K   | 5.9 (.23)     | 7.1 (.28)  | *4.3 (.17)                                  |

\* Bulk parts for 320VAC and larger come standard with inline crimp (as referenced at beginning of "Standard Dimensions and Lead Modification Options" section ) for straight disk seating on PC boards. Therefore, "a" dimension is not applicable. If 320VAC and larger size are required without in-line crimp, please reference "Part Number System" position # (8) and add "N" and reference "a" dimensions (for off-set) above.

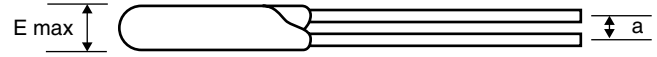
\*\* These dimensions also apply to "E" Series (High Energy) parts. For suffix "V" (Extremely High Energy Type) add 0.1 (0.004) to "E Max."

## Standard Dimensions and Lead Modification Options (continued)

### E Max Dimensions (For Phenolic Coating)

Dimensions are in mm (inches)

#### 10D Series



| Style     | E Max mm (in) |            | Off-set Dimension<br>(a) ±1 (±0.04) mm (in) |
|-----------|---------------|------------|---------------------------------------------|
|           | B             | P          |                                             |
| 10D180K   | 4.3 (.17)     | 5.5 (.216) | 1.4 (.055)                                  |
| 10D220K   | 4.5 (.177)    | 5.7 (.22)  | 1.5 (.06)                                   |
| 10D270K   | 4.7 (.185)    | 5.9 (.23)  | 1.6 (.063)                                  |
| 10D330K   | 4.8 (.19)     | 6.0 (.236) | 1.8 (.07)                                   |
| 10D390K   | 4.9 (.19)     | 6.1 (.24)  | 1.6 (.063)                                  |
| 10D470K   | 4.8 (.19)     | 6.1 (.24)  | 1.7 (.067)                                  |
| 10D560K   | 4.9 (.19)     | 6.1 (.24)  | 1.8 (.07)                                   |
| 10D680K   | 5.1 (.2)      | 6.5 (.256) | 2.1 (.083)                                  |
| **10D820K | 4.4 (.17)     | 5.8 (.23)  | 1.4 (.055)                                  |
| **10D101K | 4.3 (.17)     | 5.7 (.22)  | 1.4 (.055)                                  |
| **10D121K | 4.4 (.17)     | 5.8 (.23)  | 1.5 (.06)                                   |
| **10D151K | 4.5 (.177)    | 5.9 (.23)  | 1.5 (.06)                                   |
| **10D181K | 4.7 (.185)    | 6.1 (.24)  | 1.6 (.063)                                  |
| **10D201K | 4.7 (.185)    | 6.1 (.24)  | 1.8 (.07)                                   |
| **10D221K | 4.8 (.19)     | 5.8 (.23)  | 1.8 (.07)                                   |
| **10D241K | 5.0 (.196)    | 5.9 (.23)  | 2.0 (.08)                                   |
| **10D271K | 5.1 (.2)      | 6.0 (.236) | 2.2 (.087)                                  |

| Style     | E Max mm (in) |            | Off-set Dimension<br>(a) ±1 (±0.04) mm (in) |
|-----------|---------------|------------|---------------------------------------------|
|           | B             | P          |                                             |
| **10D301K | 5.2 (.2)      | 6.1 (.24)  | 2.5 (.1)                                    |
| **10D331K | 5.3 (.21)     | 6.3 (.25)  | 2.5 (.1)                                    |
| **10D361K | 5.4 (.21)     | 6.4 (.25)  | 2.7 (.1)                                    |
| **10D391K | 5.5 (.216)    | 6.5 (.256) | 2.9 (.11)                                   |
| **10D431K | 5.6 (.22)     | 6.7 (.26)  | 3.1 (.12)                                   |
| **10D471K | 5.6 (.22)     | 6.8 (.267) | 3.6 (.14)                                   |
| **10D511K | 5.9 (.23)     | 7.1 (.28)  | *3.4 (.13)                                  |
| **10D561K | 6.0 (.236)    | 7.2 (.28)  | *3.5 (.138)                                 |
| **10D621K | 6.3 (.25)     | 7.5 (.295) | *4.2 (.165)                                 |
| **10D681K | 6.6 (.26)     | 7.8 (.307) | *4.6 (.18)                                  |
| **10D751K | 6.8 (.267)    | 8.0 (.315) | *5.0 (.197)                                 |
| **10D781K | 7.1 (.28)     | 8.1 (.32)  | *5.0 (.197)                                 |
| **10D821K | 7.4 (.29)     | 8.4 (.33)  | *5.4 (.2)                                   |
| 10D911K   | 7.8 (.307)    | 8.8 (.346) | *5.9 (.23)                                  |
| 10D102K   | 8.2 (.32)     | 9.2 (.36)  | *6.4 (.25)                                  |
| 10D112K   | 8.5 (.335)    | 9.5 (.37)  | *7.0 (.275)                                 |

#### 14D Series

| Style     | E Max mm (in) |            | Off-set Dimension<br>(a) ±1 (±0.04) mm (in) |
|-----------|---------------|------------|---------------------------------------------|
|           | B             | P          |                                             |
| 14D180K   | 4.4 (.17)     | 5.6 (.22)  | 1.4 (.055)                                  |
| 14D220K   | 4.6 (.18)     | 5.8 (.23)  | 1.5 (.06)                                   |
| 14D270K   | 4.8 (.19)     | 6.0 (.236) | 1.7 (.067)                                  |
| 14D330K   | 5.0 (.196)    | 6.2 (.24)  | 1.9 (.075)                                  |
| 14D390K   | 4.7 (.185)    | 5.9 (.23)  | 1.7 (.067)                                  |
| 14D470K   | 4.8 (.19)     | 6.2 (.24)  | 1.8 (.07)                                   |
| 14D560K   | 5.0 (.196)    | 6.2 (.24)  | 2.0 (.08)                                   |
| 14D680K   | 5.2 (.2)      | 6.6 (.26)  | 2.2 (.087)                                  |
| **14D820K | 4.4 (.17)     | 5.8 (.23)  | 1.4 (.055)                                  |
| **14D101K | 4.4 (.17)     | 5.8 (.23)  | 1.5 (.06)                                   |
| **14D121K | 4.5 (.177)    | 5.9 (.23)  | 1.5 (.06)                                   |
| **14D151K | 4.5 (.177)    | 5.9 (.23)  | 1.5 (.06)                                   |
| **14D181K | 4.7 (.185)    | 6.1 (.24)  | 1.7 (.067)                                  |
| **14D201K | 4.7 (.185)    | 6.1 (.24)  | 1.9 (.075)                                  |
| **14D221K | 4.8 (.19)     | 5.8 (.23)  | 1.9 (.075)                                  |
| **14D241K | 5.0 (.196)    | 5.9 (.23)  | 2.1 (.083)                                  |
| **14D271K | 5.1 (.2)      | 6.0 (.236) | 2.2 (.087)                                  |

| Style     | E Max mm (in) |            | Off-set Dimension<br>(a) ±1 (±0.04) mm (in) |
|-----------|---------------|------------|---------------------------------------------|
|           | B             | P          |                                             |
| **14D301K | 5.2 (.2)      | 6.1 (.24)  | 2.6 (.1)                                    |
| **14D331K | 5.3 (.21)     | 6.3 (.25)  | 2.6 (.1)                                    |
| **14D361K | 5.4 (.21)     | 6.4 (.25)  | 2.8 (.11)                                   |
| **14D391K | 5.5 (.216)    | 6.5 (.256) | 3.0 (.12)                                   |
| **14D431K | 5.6 (.22)     | 6.7 (.26)  | 3.2 (.126)                                  |
| **14D471K | 5.7 (.22)     | 6.9 (.27)  | 3.8 (.15)                                   |
| **14D511K | 5.9 (.23)     | 7.1 (.28)  | *3.4 (.13)                                  |
| **14D561K | 6.2 (.24)     | 7.4 (.29)  | *3.5 (.138)                                 |
| **14D621K | 6.4 (.25)     | 7.6 (.3)   | *4.2 (.165)                                 |
| **14D681K | 6.6 (.26)     | 7.8 (.307) | *4.7 (.185)                                 |
| **14D751K | 6.9 (.27)     | 8.1 (.32)  | *5.1 (.2)                                   |
| **14D781K | 7.3 (.287)    | 8.2 (.32)  | *5.1 (.2)                                   |
| **14D821K | 7.5 (.3)      | 8.5 (.335) | *5.5 (.22)                                  |
| 14D911K   | 7.9 (.31)     | 8.9 (.35)  | *6.0 (.24)                                  |
| 14D102K   | 8.2 (.32)     | 9.2 (.36)  | *6.5 (.255)                                 |
| 14D112K   | 8.7 (.34)     | 9.7 (.38)  | *7.2 (.28)                                  |

\* Bulk parts for 320VAC and larger come standard with inline crimp (as referenced at beginning of "Standard Dimensions and Lead Modification Options" section ) for straight disk seating on PC boards. Therefore, "a" dimension is not applicable. If 320VAC and larger size are required without in-line crimp, please reference "Part Number System" position # (8) and add "N" and reference "a" dimensions (for off-set) above.

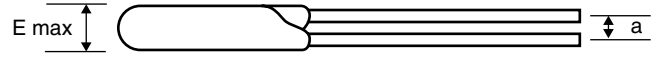
\*\* These dimensions also apply to "E" Series (High Energy) parts. For suffix "V" (Extremely High Energy Type) add 0.1 (0.004) to "E Max."

## Standard Dimensions and Lead Modification Options (continued)

### E Max Dimensions (For Phenolic Coating)

Dimensions are in mm (inches)

#### 20D Series



| Style     | E Max mm (in) |            | Off-set Dimension<br>(a) $\pm 1$ ( $\pm 0.04$ ) mm (in) |
|-----------|---------------|------------|---------------------------------------------------------|
|           | B             | P          |                                                         |
| 20D180K   | 4.8 (.19)     | 6.0 (.236) | 1.5 (.06)                                               |
| 20D220K   | 5.1 (.2)      | 6.2 (.24)  | 1.6 (.063)                                              |
| 20D270K   | 5.2 (.2)      | 6.4 (.25)  | 1.8 (.07)                                               |
| 20D330K   | 5.4 (.21)     | 6.6 (.26)  | 2.1 (.083)                                              |
| 20D390K   | 5.2 (.2)      | 6.4 (.25)  | 2.1 (.083)                                              |
| 20D470K   | 5.4 (.21)     | 6.6 (.26)  | 2.2 (.087)                                              |
| 20D560K   | 5.6 (.22)     | 6.8 (.27)  | 2.2 (.087)                                              |
| 20D680K   | 5.9 (.23)     | 7.3 (.287) | 2.4 (.094)                                              |
| **20D820K | 4.8 (.19)     | 6.2 (.24)  | 1.5 (.06)                                               |
| **20D101K | 4.8 (.19)     | 6.2 (.24)  | 1.6 (.063)                                              |
| **20D121K | 4.9 (.19)     | 6.3 (.25)  | 1.6 (.063)                                              |
| **20D151K | 5.0 (.196)    | 6.4 (.25)  | 1.6 (.063)                                              |
| **20D181K | 5.1 (.2)      | 6.5 (.256) | 1.8 (.07)                                               |
| **20D201K | 5.2 (.2)      | 6.6 (.26)  | 2.0 (.08)                                               |
| **20D221K | 5.4 (.21)     | 6.5 (.256) | 2.0 (.08)                                               |
| **20D241K | 5.7 (.22)     | 6.6 (.26)  | 2.2 (.087)                                              |
| **20D271K | 5.8 (.23)     | 6.6 (.26)  | 2.3 (.09)                                               |

| Style     | E Max mm (in) |             | Off-set Dimension<br>(a) $\pm 1$ ( $\pm 0.04$ ) mm (in) |
|-----------|---------------|-------------|---------------------------------------------------------|
|           | B             | P           |                                                         |
| **20D301K | 5.7 (.22)     | 6.7 (.28)   | 2.6 (.1)                                                |
| **20D331K | 5.8 (.23)     | 6.8 (.27)   | 2.7 (.1)                                                |
| **20D361K | 5.9 (.23)     | 6.8 (.27)   | 2.9 (.11)                                               |
| **20D391K | 6.0 (.236)    | 7.0 (.275)  | 3.1 (.12)                                               |
| **20D431K | 6.0 (.236)    | 7.1 (.28)   | 3.3 (.13)                                               |
| **20D471K | 6.1 (.24)     | 7.3 (.287)  | 4.0 (.157)                                              |
| **20D511K | 6.3 (.25)     | 7.5 (.3)    | *3.4 (.13)                                              |
| **20D561K | 6.6 (.26)     | 7.8 (.307)  | *3.8 (.15)                                              |
| **20D621K | 6.8 (.27)     | 8.0 (.31)   | *4.5 (.18)                                              |
| **20D681K | 7.0 (.275)    | 8.2 (.32)   | *4.8 (.19)                                              |
| **20D751K | 7.3 (.287)    | 8.5 (.335)  | *5.2 (.2)                                               |
| **20D781K | 7.6 (.3)      | 8.6 (.34)   | *5.4 (.2)                                               |
| **20D821K | 7.8 (.31)     | 8.8 (.346)  | *5.6 (.22)                                              |
| **20D911K | 8.2 (.32)     | 9.2 (.36)   | *6.5 (.255)                                             |
| **20D102K | 8.6 (.34)     | 9.6 (.377)  | *6.6 (.26)                                              |
| **20D112K | 9.1 (.36)     | 10.1 (.397) | *7.3 (.287)                                             |

\* Bulk parts for 320VAC and larger come standard with inline crimp (as referenced at beginning of "Standard Dimensions and Lead Modification Options" section ) for straight disk seating on PC boards. Therefore, "a" dimension is not applicable. If 320VAC and larger size are required without in-line crimp, please reference "Part Number System" position # (8) and add "N" and reference "a" dimensions (for off-set) above.

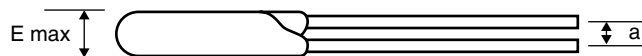
\*\* These dimensions also apply to "E" Series (High Energy) parts. For suffix "V" (Extremely High Energy Type) add 0.1 (0.004) to "E Max."

## Standard Dimensions and Lead Modification Options (continued)

### E Max Dimensions (For Phenolic Coating)

Dimensions are in mm (inches)

#### 18E High Energy Series



| Style     | E Max mm (in) |            | Off-set Dimension<br>(a) $\pm 1$ ( $\pm 0.04$ ) mm (in) |
|-----------|---------------|------------|---------------------------------------------------------|
|           | B             | P          |                                                         |
| **18E820K | 4.5 (.177)    | 5.9 (.23)  | 1.5 (.06)                                               |
| **18E181K | 5.0 (.196)    | 6.4 (.25)  | 1.9 (.075)                                              |
| **18E201K | 5.0 (.196)    | 6.4 (.25)  | 1.9 (.075)                                              |
| **18E221K | 5.3 (.21)     | 6.4 (.25)  | 1.9 (.075)                                              |
| **18E241K | 5.5 (.216)    | 6.4 (.25)  | 2.0 (.08)                                               |
| **18E271K | 5.6 (.22)     | 6.4 (.25)  | 2.2 (.08)                                               |
| **18E301K | 5.7 (.22)     | 6.6 (.26)  | 2.3 (.09)                                               |
| **18E331K | 5.7 (.22)     | 6.6 (.26)  | 2.7 (.11)                                               |
| **18E361K | 5.7 (.22)     | 6.6 (.26)  | 2.8 (.11)                                               |
| **18E391K | 5.8 (.23)     | 6.9 (.27)  | 3.0 (.12)                                               |
| **18E431K | 5.9 (.23)     | 7.0 (.275) | 3.2 (.126)                                              |

| Style     | E Max mm (in) |           | Off-set Dimension<br>(a) $\pm 1$ ( $\pm 0.04$ ) mm (in) |
|-----------|---------------|-----------|---------------------------------------------------------|
|           | B             | P         |                                                         |
| **18E471K | 6.0 (.236)    | 7.2 (.28) | 3.9 (.15)                                               |
| **18E511K | 6.2 (.24)     | 7.4 (.29) | *3.4 (.13)                                              |
| **18E561K | 6.5 (.256)    | 7.7 (.3)  | *3.8 (.15)                                              |
| **18E621K | 6.7 (.26)     | 7.9 (.31) | *3.2 (.13)                                              |
| **18E681K | 6.9 (.27)     | 8.1 (.32) | *3.3 (.13)                                              |
| **18E751K | 7.2 (.28)     | 8.4 (.33) | *3.5 (.14)                                              |
| **18E781K | 7.5 (.3)      | 8.5 (.33) | *3.7 (.15)                                              |
| **18E821K | 7.7 (.3)      | 8.7 (.34) | *5.5 (.22)                                              |
| **18E911K | 8.1 (.32)     | 9.1 (.36) | *4.1 (.16)                                              |
| **18E102K | 8.5 (.33)     | 9.5 (.37) | *4.4 (.18)                                              |
| **18E112K | 9.0 (.35)     | 10 (.39)  | *4.8 (.19)                                              |

\* Bulk parts for 320VAC and larger come standard with inline crimp (as referenced at beginning of “Standard Dimensions and Lead Modification Options” section ) for straight disk seating on PC boards. Therefore, “a” dimension is not applicable. If 320VAC and larger size are required without in-line crimp, please reference “Part Number System” position # (8) and add “N” and reference “a” dimensions (for off-set) above.

\*\* For suffix “V” (Extremely High Energy Type) add 0.1 (0.004) to “E Max.”

# D Series – Electrical Characteristics (5, 7, 10, 14, 20, 25 mm)

| Part Number | Maximum Continuous Rated Voltage |          | Rated Single Pulse Transient |                  |             | Varistor Voltage @1mA DC |           | Maximum Clamping Voltage @Test Current 8/20µs |      | Typical Capacitance @1KHZ 25°C |
|-------------|----------------------------------|----------|------------------------------|------------------|-------------|--------------------------|-----------|-----------------------------------------------|------|--------------------------------|
|             |                                  |          | Energy                       |                  | Peak        |                          |           |                                               |      |                                |
|             | AC RMS Volts                     | DC Volts | 2ms Joules                   | 10/1000µs Joules | 8/20µs Amps | Min Volts                | Max Volts | Volts                                         | Amps | pF                             |
| VZ05D180KBS | 11                               | 14       | 0.4                          | 0.6              | 100         | 16.2                     | 19.8      | 36                                            | 1    | 1500                           |
| VZ07D180KBS |                                  |          | 0.8                          | 1.0              | 250         |                          |           | 36                                            | 2.5  | 2900                           |
| VZ10D180KBS |                                  |          | 1.7                          | 2.1              | 500         |                          |           | 36                                            | 5    | 6000                           |
| VZ14D180KBS |                                  |          | 3.5                          | 4.0              | 1000        |                          |           | 36                                            | 10   | 15000                          |
| VZ20D180KBS |                                  |          | 10                           | 12               | 2000        |                          |           | 36                                            | 20   | 27000                          |
| VZ05D220KBS | 14                               | 18       | 0.6                          | 0.8              | 100         | 20                       | 24        | 43                                            | 1    | 1260                           |
| VZ07D220KBS |                                  |          | 0.9                          | 1.3              | 250         |                          |           | 43                                            | 2.5  | 2400                           |
| VZ10D220KBS |                                  |          | 2.0                          | 2.5              | 500         |                          |           | 43                                            | 5    | 5000                           |
| VZ14D220KBS |                                  |          | 4.0                          | 5.0              | 1000        |                          |           | 43                                            | 10   | 12000                          |
| VZ20D220KBS |                                  |          | 13                           | 15               | 2000        |                          |           | 43                                            | 20   | 20000                          |
| VZ05D270KBS | 17                               | 22       | 0.7                          | 0.9              | 100         | 24                       | 30        | 53                                            | 1    | 1050                           |
| VZ07D270KBS |                                  |          | 1.1                          | 1.4              | 250         |                          |           | 53                                            | 2.5  | 1800                           |
| VZ10D270KBS |                                  |          | 2.5                          | 3.0              | 500         |                          |           | 53                                            | 5    | 4000                           |
| VZ14D270KBS |                                  |          | 5.0                          | 6.0              | 1000        |                          |           | 53                                            | 10   | 8500                           |
| VZ20D270KBS |                                  |          | 15                           | 17               | 2000        |                          |           | 53                                            | 20   | 15000                          |
| VZ05D330KBS | 20                               | 26       | 0.9                          | 1.2              | 100         | 30                       | 36        | 65                                            | 1    | 850                            |
| VZ07D330KBS |                                  |          | 1.3                          | 1.7              | 250         |                          |           | 65                                            | 2.5  | 1500                           |
| VZ10D330KBS |                                  |          | 3.1                          | 4.0              | 500         |                          |           | 65                                            | 5    | 3500                           |
| VZ14D330KBS |                                  |          | 6.0                          | 7.5              | 1000        |                          |           | 65                                            | 10   | 7200                           |
| VZ20D330KBS |                                  |          | 20                           | 22               | 2000        |                          |           | 65                                            | 20   | 12200                          |
| VZ05D390KBS | 25                               | 31       | 1.1                          | 1.3              | 100         | 35                       | 43        | 77                                            | 1    | 600                            |
| VZ07D390KBS |                                  |          | 1.6                          | 2.1              | 250         |                          |           | 77                                            | 2.5  | 1230                           |
| VZ10D390KBS |                                  |          | 3.7                          | 4.6              | 500         |                          |           | 77                                            | 5    | 3100                           |
| VZ14D390KBS |                                  |          | 7.0                          | 8.6              | 1000        |                          |           | 77                                            | 10   | 6300                           |
| VZ20D390KBS |                                  |          | 24                           | 26               | 2000        |                          |           | 77                                            | 20   | 10000                          |
| VZ05D470KBS | 30                               | 38       | 1.4                          | 1.6              | 100         | 42                       | 52        | 93                                            | 1    | 500                            |
| VZ07D470KBS |                                  |          | 2.0                          | 2.5              | 250         |                          |           | 93                                            | 2.5  | 950                            |
| VZ10D470KBS |                                  |          | 4.5                          | 5.5              | 500         |                          |           | 93                                            | 5    | 2800                           |
| VZ14D470KBS |                                  |          | 9.0                          | 10               | 1000        |                          |           | 93                                            | 10   | 5500                           |
| VZ20D470KBS |                                  |          | 30                           | 33               | 2000        |                          |           | 93                                            | 20   | 9350                           |

# **D Series — Electrical Characteristics (5, 7, 10, 14, 20, 25 mm) (cont.)**

| Part Number | Maximum Continuous Rated Voltage |          | Rated Single Pulse Transient |                  |             | Varistor Voltage @1mA DC |           | Maximum Clamping Voltage @Test Current 8/20µs |      | Typical Capacitance @1KHZ 25°C |
|-------------|----------------------------------|----------|------------------------------|------------------|-------------|--------------------------|-----------|-----------------------------------------------|------|--------------------------------|
|             |                                  |          | Energy                       |                  | Peak        |                          |           |                                               |      |                                |
|             | AC RMS Volts                     | DC Volts | 2ms Joules                   | 10/1000µs Joules | 8/20µs Amps | Min Volts                | Max Volts | Volts                                         | Amps | pF                             |
| VZ05D560KBS | 35                               | 45       | 1.5                          | 1.9              | 100         | 50                       | 62        | 110                                           | 1    | 400                            |
| VZ07D560KBS |                                  |          | 2.5                          | 3.1              | 250         |                          |           | 110                                           | 2.5  | 890                            |
| VZ10D560KBS |                                  |          | 5.5                          | 7.0              | 500         |                          |           | 110                                           | 5    | 2400                           |
| VZ14D560KBS |                                  |          | 10                           | 11               | 1000        |                          |           | 110                                           | 10   | 4800                           |
| VZ20D560KBS |                                  |          | 35                           | 38               | 2000        |                          |           | 110                                           | 20   | 8000                           |
| VZ05D680KBS | 40                               | 56       | 1.8                          | 2.3              | 100         | 61.2                     | 74.8      | 135                                           | 1    | 360                            |
| VZ07D680KBS |                                  |          | 3.0                          | 3.8              | 250         |                          |           | 135                                           | 2.5  | 850                            |
| VZ10D680KBS |                                  |          | 6.5                          | 8.2              | 500         |                          |           | 135                                           | 5    | 2100                           |
| VZ14D680KBS |                                  |          | 13                           | 14               | 1000        |                          |           | 135                                           | 10   | 4000                           |
| VZ20D680KBS |                                  |          | 40                           | 43               | 2000        |                          |           | 135                                           | 20   | 6800                           |
| VZ05D820KBS | 50                               | 66       | 2.4                          | 3.0              | 400         | 74                       | 90        | 135                                           | 5    | 350                            |
| VZ07D820KBS |                                  |          | 4.2                          | 5.5              | 1200        |                          |           | 135                                           | 10   | 830                            |
| VZ10D820KBS |                                  |          | 8.4                          | 12               | 2500        |                          |           | 135                                           | 25   | 1600                           |
| VZ14D820KBS |                                  |          | 15                           | 22               | 4500        |                          |           | 135                                           | 50   | 3300                           |
| VZ20D820KBS |                                  |          | 37                           | 48               | 6500        |                          |           | 135                                           | 100  | 5600                           |
| VZ05D101KBS | 60                               | 85       | 2.4                          | 3.5              | 400         | 90                       | 110       | 165                                           | 5    | 320                            |
| VZ07D101KBS |                                  |          | 4.8                          | 6.5              | 1200        |                          |           | 165                                           | 10   | 730                            |
| VZ10D101KBS |                                  |          | 10                           | 15               | 2500        |                          |           | 165                                           | 25   | 1400                           |
| VZ14D101KBS |                                  |          | 20                           | 30               | 4500        |                          |           | 165                                           | 50   | 2900                           |
| VZ20D101KBS |                                  |          | 38                           | 50               | 6500        |                          |           | 165                                           | 100  | 4700                           |
| VZ05D121KBS | 75                               | 102      | 3.0                          | 5.0              | 400         | 108                      | 132       | 200                                           | 5    | 250                            |
| VZ07D121KBS |                                  |          | 5.9                          | 7.8              | 1200        |                          |           | 200                                           | 10   | 570                            |
| VZ10D121KBS |                                  |          | 12                           | 18               | 2500        |                          |           | 200                                           | 25   | 1200                           |
| VZ14D121KBS |                                  |          | 22                           | 34               | 4500        |                          |           | 200                                           | 50   | 2600                           |
| VZ20D121KBS |                                  |          | 40                           | 55               | 6500        |                          |           | 200                                           | 100  | 4100                           |

**D Series — Electrical Characteristics (5, 7, 10, 14, 20, 25 mm) (cont.)**

| Part Number | Maximum Continuous Rated Voltage |          | Rated Single Pulse Transient |                  |             | Varistor Voltage @1mA DC |           | Maximum Clamping Voltage @Test Current 8/20µs |      | Typical Capacitance @1KHZ 25°C |
|-------------|----------------------------------|----------|------------------------------|------------------|-------------|--------------------------|-----------|-----------------------------------------------|------|--------------------------------|
|             |                                  |          | Energy                       |                  | Peak        |                          |           |                                               |      |                                |
|             | AC RMS Volts                     | DC Volts | 2ms Joules                   | 10/1000µs Joules | 8/20µs Amps | Min Volts                | Max Volts | Volts                                         | Amps | pF                             |
| VZ05D151KBS | 95                               | 127      | 3.5                          | 5.5              | 400         | 135                      | 165       | 250                                           | 5    | 180                            |
| VZ07D151KBS |                                  |          | 7.6                          | 9.7              | 1200        |                          |           | 250                                           | 10   | 400                            |
| VZ10D151KBS |                                  |          | 16                           | 22               | 2500        |                          |           | 250                                           | 25   | 1100                           |
| VZ14D151KBS |                                  |          | 30                           | 45               | 4500        |                          |           | 250                                           | 50   | 2000                           |
| VZ20D151KBS |                                  |          | 50                           | 70               | 6500        |                          |           | 250                                           | 100  | 3200                           |
| VZ05D181KBS | 120                              | 160      | 4.2                          | 8.0              | 400         | 170                      | 207       | 320                                           | 5    | 155                            |
| VZ07D181KBS |                                  |          | 8.8                          | 12               | 1200        |                          |           | 300                                           | 10   | 305                            |
| VZ10D181KBS |                                  |          | 18.5                         | 27.5             | 2500        |                          |           | 300                                           | 25   | 700                            |
| VZ14D181KBS |                                  |          | 33                           | 53               | 4500        |                          |           | 300                                           | 50   | 1400                           |
| VZ20D181KBS |                                  |          | 60                           | 85               | 10000       |                          |           | 300                                           | 100  | 2500                           |
| VZ25D181KBS |                                  |          | 90                           | 180              | 18000       |                          |           | 300                                           | 100  | 3900                           |
| VZ05D201KBS | 130                              | 175      | 5.0                          | 8.5              | 400         | 184                      | 224       | 340                                           | 5    | 140                            |
| VZ07D201KBS |                                  |          | 10                           | 13               | 1200        |                          |           | 340                                           | 10   | 275                            |
| VZ10D201KBS |                                  |          | 20                           | 30               | 2500        |                          |           | 300                                           | 25   | 640                            |
| VZ14D201KBS |                                  |          | 38                           | 60               | 4500        |                          |           | 300                                           | 50   | 1370                           |
| VZ20D201KBS |                                  |          | 70                           | 95               | 10000       |                          |           | 300                                           | 100  | 2200                           |
| VZ25D201KBS |                                  |          | —                            | 200              | 20000       |                          |           | 300                                           | 100  | 3600                           |
| VZ05D221KBS | 140                              | 180      | 6.0                          | 9.0              | 400         | 198                      | 242       | 360                                           | 5    | 125                            |
| VZ07D221KBS |                                  |          | 11                           | 14               | 1200        |                          |           | 360                                           | 10   | 250                            |
| VZ10D221KBS |                                  |          | 23                           | 32               | 2500        |                          |           | 360                                           | 25   | 600                            |
| VZ14D221KBS |                                  |          | 40                           | 60               | 4500        |                          |           | 360                                           | 50   | 1150                           |
| VZ20D221KBS |                                  |          | 75                           | 100              | 10000       |                          |           | 360                                           | 100  | 2000                           |
| VZ25D221KBS |                                  |          | —                            | 225              | 20000       |                          |           | 360                                           | 100  | 3300                           |
| VZ05D241KBS | 150                              | 200      | 6.5                          | 10               | 400         | 216                      | 264       | 395                                           | 5    | 115                            |
| VZ07D241KBS |                                  |          | 11                           | 16               | 1200        |                          |           | 395                                           | 10   | 230                            |
| VZ10D241KBS |                                  |          | 25                           | 35               | 2500        |                          |           | 395                                           | 25   | 560                            |
| VZ14D241KBS |                                  |          | 45                           | 66               | 4500        |                          |           | 395                                           | 50   | 1060                           |
| VZ20D241KBS |                                  |          | 82                           | 120              | 10000       |                          |           | 395                                           | 100  | 1900                           |
| VZ25D241KBS |                                  |          | —                            | 235              | 20000       |                          |           | 395                                           | 100  | 3000                           |

**D Series — Electrical Characteristics (5, 7, 10, 14, 20, 25 mm) (cont.)**

| Part Number  | Maximum Continuous Rated Voltage |          | Rated Single Pulse Transient |                  |             | Varistor Voltage @1mA DC |           | Maximum Clamping Voltage @Test Current 8/20µs |      | Typical Capacitance @1KHZ 25°C |
|--------------|----------------------------------|----------|------------------------------|------------------|-------------|--------------------------|-----------|-----------------------------------------------|------|--------------------------------|
|              |                                  |          | Energy                       |                  | Peak        |                          |           |                                               |      |                                |
|              | AC RMS Volts                     | DC Volts | 2ms Joules                   | 10/1000µs Joules | 8/20µs Amps | Min Volts                | Max Volts | Volts                                         | Amps | pF                             |
| VZ05D271KBS  | 180                              | 230      | 7.5                          | 11               | 400         | 255                      | 311       | 475                                           | 5    | 105                            |
| VZ07D271KBS  |                                  |          | 13                           | 18               | 1200        |                          |           | 455                                           | 10   | 205                            |
| VZ10D271KBS  |                                  |          | 30                           | 40               | 2500        |                          |           | 455                                           | 25   | 500                            |
| VZ14D271KBS  |                                  |          | 52                           | 72               | 4500        |                          |           | 455                                           | 50   | 950                            |
| VZ20D271KBS  |                                  |          | 90                           | 127              | 10000       |                          |           | 455                                           | 100  | 1700                           |
| *VZ25D271KBS |                                  |          | —                            | 245              | 20000       |                          |           | 465                                           | 100  | 2600                           |
| VZ05D301KBS  | 195                              | 250      | 8.0                          | 11.5             | 400         | 270                      | 330       | 525                                           | 5    | 95                             |
| VZ07D301KBS  |                                  |          | 13                           | 19               | 1200        |                          |           | 505                                           | 10   | 185                            |
| VZ10D301KBS  |                                  |          | 32                           | 42.5             | 2500        |                          |           | 505                                           | 25   | 450                            |
| VZ14D301KBS  |                                  |          | 56                           | 78               | 4500        |                          |           | 505                                           | 50   | 890                            |
| VZ20D301KBS  |                                  |          | 100                          | 135              | 10000       |                          |           | 505                                           | 100  | 1540                           |
| VZ25D301KBS  |                                  |          | —                            | 255              | 20000       |                          |           | 505                                           | 100  | 2400                           |
| VZ05D331KBS  | 210                              | 275      | 8.5                          | 11.7             | 400         | 297                      | 363       | 540                                           | 5    | 85                             |
| VZ07D331KBS  |                                  |          | 14                           | 20               | 1200        |                          |           | 540                                           | 10   | 170                            |
| VZ10D331KBS  |                                  |          | 33.5                         | 44.5             | 2500        |                          |           | 540                                           | 25   | 415                            |
| VZ14D331KBS  |                                  |          | 63                           | 87               | 4500        |                          |           | 540                                           | 50   | 800                            |
| VZ20D331KBS  |                                  |          | 110                          | 148              | 10000       |                          |           | 540                                           | 100  | 1400                           |
| *VZ25D331KBS |                                  |          | —                            | 270              | 20000       |                          |           | 540                                           | 100  | 2200                           |
| VZ05D361KBS  | 230                              | 300      | 9.0                          | 13               | 400         | 324                      | 396       | 595                                           | 5    | 80                             |
| VZ07D361KBS  |                                  |          | 17                           | 25               | 1200        |                          |           | 595                                           | 10   | 155                            |
| VZ10D361KBS  |                                  |          | 36                           | 47               | 2500        |                          |           | 595                                           | 25   | 380                            |
| VZ14D361KBS  |                                  |          | 70                           | 98               | 4500        |                          |           | 595                                           | 50   | 725                            |
| VZ20D361KBS  |                                  |          | 120                          | 163              | 10000       |                          |           | 595                                           | 100  | 1320                           |
| VZ25D361KBS  |                                  |          | —                            | 315              | 20000       |                          |           | 595                                           | 100  | 2100                           |
| VZ05D391KBS  | 250                              | 330      | 10                           | 15               | 400         | 351                      | 429       | 650                                           | 5    | 75                             |
| VZ07D391KBS  |                                  |          | 19                           | 26               | 1200        |                          |           | 650                                           | 10   | 145                            |
| VZ10D391KBS  |                                  |          | 40                           | 60               | 2500        |                          |           | 650                                           | 25   | 350                            |
| VZ14D391KBS  |                                  |          | 72                           | 102              | 4500        |                          |           | 650                                           | 50   | 665                            |
| VZ20D391KBS  |                                  |          | 130                          | 180              | 10000       |                          |           | 650                                           | 100  | 1210                           |
| VZ25D391KBS  |                                  |          | —                            | 342              | 20000       |                          |           | 650                                           | 100  | 1900                           |

# **D Series — Electrical Characteristics (5, 7, 10, 14, 20, 25 mm) (cont.)**

| Part Number | Maximum Continuous Rated Voltage |          | Rated Single Pulse Transient |                  |             | Varistor Voltage @1mA DC |           | Maximum Clamping Voltage @Test Current 8/20µs |      | Typical Capacitance @1KHZ 25°C |
|-------------|----------------------------------|----------|------------------------------|------------------|-------------|--------------------------|-----------|-----------------------------------------------|------|--------------------------------|
|             |                                  |          | Energy                       |                  | Peak        |                          |           |                                               |      |                                |
|             | AC RMS Volts                     | DC Volts | 2ms Joules                   | 10/1000µs Joules | 8/20µs Amps | Min Volts                | Max Volts | Volts                                         | Amps | pF                             |
| VZ05D431KBS | 275                              | 370      | 11                           | 16               | 400         | 387                      | 473       | 710                                           | 5    | 65                             |
| VZ07D431KBS |                                  |          | 21                           | 28               | 1200        |                          |           | 710                                           | 10   | 130                            |
| VZ10D431KBS |                                  |          | 45                           | 65               | 2500        |                          |           | 710                                           | 25   | 310                            |
| VZ14D431KBS |                                  |          | 75                           | 115              | 4500        |                          |           | 710                                           | 50   | 600                            |
| VZ20D431KBS |                                  |          | 140                          | 190              | 10000       |                          |           | 710                                           | 100  | 1120                           |
| VZ25D431KBS |                                  |          | —                            | 370              | 20000       |                          |           | 710                                           | 100  | 1700                           |
| VZ05D471KBS | 300                              | 385      | 13                           | 19               | 400         | 423                      | 517       | 775                                           | 5    | 55                             |
| VZ07D471KBS |                                  |          | 23                           | 30               | 1200        |                          |           | 775                                           | 10   | 115                            |
| VZ10D471KBS |                                  |          | 47                           | 70               | 2500        |                          |           | 775                                           | 25   | 280                            |
| VZ14D471KBS |                                  |          | 80                           | 125              | 4500        |                          |           | 775                                           | 50   | 570                            |
| VZ20D471KBS |                                  |          | 150                          | 220              | 10000       |                          |           | 775                                           | 100  | 1000                           |
| VZ25D471KBS |                                  |          | —                            | 390              | 20000       |                          |           | 775                                           | 100  | 1600                           |
| VZ05D511KBS | 320                              | 420      | 15                           | 21               | 400         | 459                      | 561       | 865                                           | 5    | 39                             |
| VZ07D511KBS |                                  |          | 23                           | 32               | 1200        |                          |           | 850                                           | 10   | 82                             |
| VZ10D511KBS |                                  |          | 50                           | 71               | 2500        |                          |           | 840                                           | 25   | 260                            |
| VZ14D511KBS |                                  |          | 84                           | 128              | 4500        |                          |           | 840                                           | 50   | 530                            |
| VZ20D511KBS |                                  |          | 152                          | 222              | 10000       |                          |           | 840                                           | 100  | 950                            |
| VZ25D511KBS |                                  |          | —                            | 422              | 20000       |                          |           | 840                                           | 100  | 1500                           |
| VZ05D561KBS | 360                              | 470      | 17                           | 25               | 400         | 522                      | 638       | 960                                           | 5    | 36                             |
| VZ07D561KBS |                                  |          | 27                           | 39               | 1200        |                          |           | 960                                           | 10   | 75                             |
| VZ10D561KBS |                                  |          | 48                           | 72               | 2500        |                          |           | 910                                           | 25   | 240                            |
| VZ14D561KBS |                                  |          | 85                           | 139              | 4500        |                          |           | 950                                           | 50   | 480                            |
| VZ20D561KBS |                                  |          | 154                          | 226              | 10000       |                          |           | 910                                           | 100  | 900                            |
| VZ25D561KBS |                                  |          | —                            | 460              | 20000       |                          |           | 910                                           | 100  | 1300                           |
| VZ05D621KBS | 390                              | 505      | 19                           | 27               | 400         | 558                      | 682       | 1040                                          | 5    | 33                             |
| VZ07D621KBS |                                  |          | 29                           | 43               | 1200        |                          |           | 1040                                          | 10   | 68                             |
| VZ10D621KBS |                                  |          | 49                           | 73               | 2500        |                          |           | 1025                                          | 25   | 150                            |
| VZ14D621KBS |                                  |          | 88                           | 142              | 4500        |                          |           | 1025                                          | 50   | 270                            |
| VZ20D621KBS |                                  |          | 158                          | 228              | 10000       |                          |           | 1025                                          | 100  | 770                            |
| VZ25D621KBS |                                  |          | —                            | 495              | 20000       |                          |           | 1025                                          | 100  | 1200                           |

**D Series — Electrical Characteristics (5, 7, 10, 14, 20, 25 mm) (cont.)**

| Part Number | Maximum Continuous Rated Voltage |          | Rated Single Pulse Transient |                  |             | Varistor Voltage @1mA DC |           | Maximum Clamping Voltage @Test Current 8/20µs |      | Typical Capacitance @1KHZ 25°C |
|-------------|----------------------------------|----------|------------------------------|------------------|-------------|--------------------------|-----------|-----------------------------------------------|------|--------------------------------|
|             |                                  |          | Energy                       |                  | Peak        |                          |           |                                               |      |                                |
|             | AC RMS Volts                     | DC Volts | 2ms Joules                   | 10/1000µs Joules | 8/20µs Amps | Min Volts                | Max Volts | Volts                                         | Amps | pF                             |
| VZ05D681KBS | 420                              | 560      | 21                           | 30               | 400         | 612                      | 748       | 1120                                          | 5    | 30                             |
| VZ07D681KBS |                                  |          | 32                           | 45               | 1200        |                          |           | 1120                                          | 10   | 62                             |
| VZ10D681KBS |                                  |          | 50                           | 74               | 2500        |                          |           | 1120                                          | 25   | 130                            |
| VZ14D681KBS |                                  |          | 90                           | 142              | 4500        |                          |           | 1120                                          | 50   | 240                            |
| VZ20D681KBS |                                  |          | 160                          | 230              | 10000       |                          |           | 1120                                          | 100  | 700                            |
| VZ25D681KBS |                                  |          | —                            | 515              | 20000       |                          |           | 1120                                          | 100  | 1100                           |
| VZ10D751KBS | 460                              | 615      | 51                           | 75               | 2500        | 675                      | 825       | 1240                                          | 25   | 120                            |
| VZ14D751KBS |                                  |          | 100                          | 143              | 4500        |                          |           | 1240                                          | 50   | 210                            |
| VZ20D751KBS |                                  |          | 175                          | 255              | 10000       |                          |           | 1240                                          | 100  | 640                            |
| VZ25D751KBS |                                  |          | —                            | 530              | 20000       |                          |           | 1240                                          | 100  | 1000                           |
| VZ10D781KBS | 485                              | 640      | 52                           | 80               | 2500        | 702                      | 858       | 1290                                          | 25   | 120                            |
| VZ14D781KBS |                                  |          | 105                          | 148              | 4500        |                          |           | 1240                                          | 50   | 205                            |
| VZ20D781KBS |                                  |          | 180                          | 265              | 10000       |                          |           | 1240                                          | 100  | 590                            |
| VZ25D781KBS |                                  |          | —                            | 540              | 20000       |                          |           | 1240                                          | 100  | 990                            |
| VZ10D821KBS | 510                              | 675      | 55                           | 85               | 2500        | 738                      | 902       | 1350                                          | 25   | 110                            |
| VZ14D821KBS |                                  |          | 110                          | 157              | 4500        |                          |           | 1350                                          | 50   | 200                            |
| VZ20D821KBS |                                  |          | 195                          | 282              | 10000       |                          |           | 1350                                          | 100  | 510                            |
| VZ25D821KBS |                                  |          | —                            | 550              | 20000       |                          |           | 1350                                          | 100  | 920                            |
| VZ10D911KBS | 550                              | 745      | 60                           | 93               | 2500        | 819                      | 1001      | 1400                                          | 25   | 90                             |
| VZ14D911KBS |                                  |          | 120                          | 175              | 4500        |                          |           | 1400                                          | 50   | 175                            |
| VZ20D911KBS |                                  |          | 215                          | 310              | 10000       |                          |           | 1400                                          | 100  | 430                            |
| VZ25D911KBS |                                  |          | —                            | 600              | 20000       |                          |           | 1400                                          | 100  | 860                            |
| VZ10D102KBS | 625                              | 825      | 68                           | 102              | 2500        | 900                      | 1100      | 1650                                          | 25   | 80                             |
| VZ14D102KBS |                                  |          | 130                          | 190              | 4500        |                          |           | 1620                                          | 50   | 145                            |
| VZ20D102KBS |                                  |          | 230                          | 342              | 10000       |                          |           | 1620                                          | 100  | 380                            |
| VZ25D102KBS |                                  |          | —                            | 630              | 20000       |                          |           | 1620                                          | 100  | 760                            |
| VZ10D112KBS | 680                              | 895      | 72                           | 115              | 2500        | 957.6                    | 1170.4    | 1815                                          | 25   | 70                             |
| VZ14D112KBS |                                  |          | 140                          | 215              | 4500        |                          |           | 1800                                          | 50   | 140                            |
| VZ20D112KBS |                                  |          | 250                          | 383              | 10000       |                          |           | 1800                                          | 100  | 340                            |
| VZ25D112KBS |                                  |          | —                            | 700              | 20000       |                          |           | 1800                                          | 100  | 690                            |

# High Energy E Series — Electrical Characteristics (5, 7, 10, 14, 18, 20 mm)

| Part Number   | Maximum Continuous Rated Voltage |          | Rated Single Pulse Transient |             | Varistor Voltage @1mA DC |           | Maximum Clamping Voltage @Test Current 8/20µs |      | Typical Capacitance @1KHZ 25°C |
|---------------|----------------------------------|----------|------------------------------|-------------|--------------------------|-----------|-----------------------------------------------|------|--------------------------------|
|               |                                  |          | Energy                       | Peak        |                          |           |                                               |      |                                |
|               | AC RMS Volts                     | DC Volts | 10/1000µs Joules             | 8/20µs Amps | Min Volts                | Max Volts | Volts                                         | Amps | pF                             |
| VZ05E820KBS   | 50                               | 66       | 3.5                          | 800         | 74                       | 90        | 135                                           | 5    | 355                            |
| VZ07E820KBS   |                                  |          | 7                            | 1750        |                          |           |                                               | 10   | 790                            |
| VZ10E820KBS   |                                  |          | 14                           | 3500        |                          |           |                                               | 25   | 1780                           |
| VZ14E820KBS   |                                  |          | 28                           | 6500        |                          |           |                                               | 50   | 3310                           |
| VZ18E820KBS   |                                  |          | 46                           | 8000        |                          |           |                                               | 80   | 4300                           |
| VZ20E820KBS   |                                  |          | 56                           | 10000       |                          |           |                                               | 100  | 5300                           |
| VZ05E181KBS   | 120                              | 160      | 8                            | 800         | 170                      | 207       | 310                                           | 5    | 130                            |
| VZ07E181KBS   |                                  |          | 16                           | 1750        |                          |           | 320                                           | 10   | 210                            |
| VZ10E181KBS   |                                  |          | 33                           | 3500        |                          |           | 320                                           | 25   | 460                            |
| VZ14E181KBS   |                                  |          | 56                           | 6500        |                          |           | 320                                           | 50   | 800                            |
| VZ18E181KBS   |                                  |          | 70                           | 9000        |                          |           | 320                                           | 80   | 1300                           |
| VZ20E181KBS   |                                  |          | 135                          | 12000       |                          |           | 320                                           | 100  | 1800                           |
| VZ05E201KBS   | 130                              | 175      | 8.5                          | 800         | 185                      | 225       | 340                                           | 5    | 120                            |
| VZ07E201KBS   |                                  |          | 17.5                         | 1750        |                          |           | 330                                           | 10   | 200                            |
| VZ10E201KBS   |                                  |          | 42                           | 3500        |                          |           | 330                                           | 25   | 430                            |
| VZ14E201KBS   |                                  |          | 78                           | 6500        |                          |           | 330                                           | 50   | 770                            |
| VZ18E201KBS   |                                  |          | 140                          | 9000        |                          |           | 340                                           | 80   | 1270                           |
| VZ18E201KBS-V |                                  |          | 160                          | 12000       |                          |           | 340                                           | 80   | 2000                           |
| VZ20E201KBS   |                                  |          | 170                          | 12000       |                          |           | 340                                           | 100  | 1700                           |
| VZ20E201KBS-V |                                  |          | 195                          | 15000       |                          |           | 340                                           | 100  | 2200                           |
| VZ05E221KBS   | 140                              | 180      | 9                            | 800         | 198                      | 242       | 360                                           | 5    | 110                            |
| VZ07E221KBS   |                                  |          | 19                           | 1750        |                          |           |                                               | 10   | 190                            |
| VZ10E221KBS   |                                  |          | 43                           | 3500        |                          |           |                                               | 25   | 410                            |
| VZ14E221KBS   |                                  |          | 85                           | 6500        |                          |           |                                               | 50   | 740                            |
| VZ18E221KBS   |                                  |          | 150                          | 9000        |                          |           |                                               | 80   | 1220                           |
| VZ18E221KBS-V |                                  |          | 180                          | 12000       |                          |           |                                               | 80   | 1700                           |
| VZ20E221KBS   |                                  |          | 180                          | 12000       |                          |           |                                               | 100  | 1600                           |
| VZ20E221KBS-V |                                  |          | 220                          | 15000       |                          |           |                                               | 100  | 2100                           |

# High Energy E Series — Electrical Characteristics (5, 7, 10, 14, 18, 20 mm) (cont.)

| Part Number   | Maximum Continuous Rated Voltage |          | Rated Single Pulse Transient |             | Varistor Voltage @1mA DC |           | Maximum Clamping Voltage @Test Current 8/20μs |      | Typical Capacitance @1KHZ 25°C |
|---------------|----------------------------------|----------|------------------------------|-------------|--------------------------|-----------|-----------------------------------------------|------|--------------------------------|
|               |                                  |          | Energy                       | Peak        |                          |           | Volts                                         | Amps | pF                             |
|               | AC RMS Volts                     | DC Volts | 10/1000μs Joules             | 8/20μs Amps | Min Volts                | Max Volts |                                               |      |                                |
| VZ05E241KBS   | 150                              | 200      | 10.5                         | 800         | 216                      | 264       | 395                                           | 5    | 100                            |
| VZ07E241KBS   |                                  |          | 21                           | 1750        |                          |           |                                               | 10   | 170                            |
| VZ10E241KBS   |                                  |          | 45                           | 3500        |                          |           |                                               | 25   | 380                            |
| VZ14E241KBS   |                                  |          | 90                           | 6500        |                          |           |                                               | 50   | 700                            |
| VZ18E241KBS   |                                  |          | 155                          | 9000        |                          |           |                                               | 80   | 1200                           |
| VZ18E241KBS-V |                                  |          | 195                          | 12000       |                          |           |                                               | 80   | 1500                           |
| VZ20E241KBS   |                                  |          | 190                          | 12000       |                          |           |                                               | 100  | 1500                           |
| VZ20E241KBS-V |                                  |          | 240                          | 15000       |                          |           |                                               | 100  | 2000                           |
| VZ05E271KBS   | 180                              | 230      | 11                           | 800         | 255                      | 311       | 475                                           | 5    | 90                             |
| VZ07E271KBS   |                                  |          | 24                           | 1750        |                          |           | 450                                           | 10   | 150                            |
| VZ10E271KBS   |                                  |          | 49                           | 3500        |                          |           | 450                                           | 25   | 350                            |
| VZ14E271KBS   |                                  |          | 99                           | 6500        |                          |           | 450                                           | 50   | 640                            |
| VZ18E271KBS   |                                  |          | 163                          | 9000        |                          |           | 455                                           | 80   | 1050                           |
| VZ20E271KBS   |                                  |          | 200                          | 12000       |                          |           | 455                                           | 100  | 1300                           |
| VZ18E301KBS   | 195                              | 250      | 170                          | 9000        | 270                      | 330       | 505                                           | 80   | 1010                           |
| VZ20E301KBS   |                                  |          | 210                          | 12000       |                          |           | 505                                           | 100  | 1200                           |
| VZ05E331KBS   | 210                              | 275      | 13                           | 800         | 297                      | 363       | 540                                           | 5    | 75                             |
| VZ07E331KBS   |                                  |          | 28                           | 1750        |                          |           | 540                                           | 10   | 130                            |
| VZ10E331KBS   |                                  |          | 58                           | 3500        |                          |           | 540                                           | 25   | 300                            |
| VZ14E331KBS   |                                  |          | 115                          | 6500        |                          |           | 545                                           | 50   | 580                            |
| VZ18E331KBS   |                                  |          | 190                          | 9000        |                          |           | 545                                           | 80   | 950                            |
| VZ20E331KBS   |                                  |          | 228                          | 12000       |                          |           | 545                                           | 100  | 1100                           |
| VZ05E361KBS   | 230                              | 300      | 16                           | 800         | 324                      | 396       | 595                                           | 5    | 69                             |
| VZ07E361KBS   |                                  |          | 32                           | 1750        |                          |           |                                               | 10   | 123                            |
| VZ10E361KBS   |                                  |          | 65                           | 3500        |                          |           |                                               | 25   | 285                            |
| VZ14E361KBS   |                                  |          | 140                          | 6500        |                          |           |                                               | 50   | 540                            |
| VZ18E361KBS   |                                  |          | 220                          | 9000        |                          |           |                                               | 80   | 870                            |
| VZ20E361KBS   |                                  |          | 275                          | 12000       |                          |           |                                               | 100  | 1050                           |

# High Energy E Series — Electrical Characteristics (5, 7, 10, 14, 18, 20 mm) (cont.)

| Part Number   | Maximum Continuous Rated Voltage |          | Rated Single Pulse Transient |             | Varistor Voltage @1mA DC |           | Maximum Clamping Voltage @Test Current 8/20µs |      | Typical Capacitance @1KHZ 25°C |
|---------------|----------------------------------|----------|------------------------------|-------------|--------------------------|-----------|-----------------------------------------------|------|--------------------------------|
|               |                                  |          | Energy                       | Peak        |                          |           |                                               |      |                                |
|               | AC RMS Volts                     | DC Volts | 10/1000µs Joules             | 8/20µs Amps | Min Volts                | Max Volts | Volts                                         | Amps | pF                             |
| VZ05E391KBS   | 250                              | 330      | 17                           | 800         | 351                      | 429       | 675                                           | 5    | 63                             |
| VZ07E391KBS   |                                  |          | 35                           | 1750        |                          |           | 650                                           | 10   | 116                            |
| VZ10E391KBS   |                                  |          | 70                           | 3500        |                          |           | 650                                           | 25   | 270                            |
| VZ14E391KBS   |                                  |          | 150                          | 6500        |                          |           | 650                                           | 50   | 500                            |
| VZ18E391KBS   |                                  |          | 245                          | 9000        |                          |           | 650                                           | 80   | 800                            |
| VZ20E391KBS   |                                  |          | 305                          | 12000       |                          |           | 650                                           | 100  | 1000                           |
| VZ05E431KBS   | 275                              | 370      | 20                           | 800         | 387                      | 473       | 740                                           | 5    | 57                             |
| VZ07E431KBS   |                                  |          | 40                           | 1750        |                          |           | 710                                           | 10   | 108                            |
| VZ10E431KBS   |                                  |          | 80                           | 3500        |                          |           | 710                                           | 25   | 255                            |
| VZ14E431KBS   |                                  |          | 165                          | 6500        |                          |           | 710                                           | 50   | 460                            |
| VZ18E431KBS   |                                  |          | 270                          | 9000        |                          |           | 710                                           | 80   | 730                            |
| VZ20E431KBS   |                                  |          | 330                          | 12000       |                          |           | 710                                           | 100  | 950                            |
| VZ05E471KBS   | 300                              | 385      | 21                           | 800         | 423                      | 517       | 775                                           | 5    | 50                             |
| VZ07E471KBS   |                                  |          | 42                           | 1750        |                          |           |                                               | 10   | 100                            |
| VZ10E471KBS   |                                  |          | 85                           | 3500        |                          |           |                                               | 25   | 230                            |
| VZ14E471KBS   |                                  |          | 175                          | 6500        |                          |           |                                               | 50   | 400                            |
| VZ18E471KBS   |                                  |          | 290                          | 9000        |                          |           |                                               | 80   | 660                            |
| VZ20E471KBS   |                                  |          | 350                          | 12000       |                          |           |                                               | 100  | 900                            |
| VZ10E511KBS   | 320                              | 420      | 92                           | 3500        | 459                      | 561       | 840                                           | 25   | 210                            |
| VZ14E511KBS   |                                  |          | 190                          | 6500        |                          |           |                                               | 50   | 350                            |
| VZ18E511KBS   |                                  |          | 314                          | 9000        |                          |           |                                               | 80   | 570                            |
| VZ18E511KBS-V |                                  |          | 350                          | 12000       |                          |           |                                               | 80   | 570                            |
| VZ20E511KBS   |                                  |          | 382                          | 12000       |                          |           |                                               | 100  | 800                            |
| VZ20E511KBS-V |                                  |          | 400                          | 15000       |                          |           |                                               | 100  | 800                            |

# High Energy E Series — Electrical Characteristics (5, 7, 10, 14, 18, 20 mm) (cont.)

| Part Number | Maximum Continuous Rated Voltage |          | Rated Single Pulse Transient |             | Varistor Voltage @1mA DC |           | Maximum Clamping Voltage @Test Current 8/20µs |      | Typical Capacitance @1KHZ 25°C |
|-------------|----------------------------------|----------|------------------------------|-------------|--------------------------|-----------|-----------------------------------------------|------|--------------------------------|
|             |                                  |          | Energy                       | Peak        |                          |           |                                               |      | pF                             |
|             | AC RMS Volts                     | DC Volts | 10/1000µs Joules             | 8/20µs Amps | Min Volts                | Max Volts | Volts                                         | Amps |                                |
| VZ10E561KBS | 360                              | 470      | 97                           | 3500        | 522                      | 638       | 910                                           | 25   | 170                            |
| VZ14E561KBS |                                  |          | 210                          | 6500        |                          |           |                                               | 50   | 320                            |
| VZ18E561KBS |                                  |          | 330                          | 9000        |                          |           |                                               | 80   | 560                            |
| VZ20E561KBS |                                  |          | 420                          | 12000       |                          |           |                                               | 100  | 720                            |
| VZ18E621KBS | 390                              | 505      | 330                          | 9000        | 558                      | 682       | 1025                                          | 80   | 470                            |
| VZ20E621KBS |                                  |          | 430                          | 12000       |                          |           |                                               | 100  | 710                            |
| VZ18E681KBS | 420                              | 560      | 340                          | 9000        | 612                      | 748       | 1120                                          | 80   | 430                            |
| VZ20E681KBS |                                  |          | 435                          | 12000       |                          |           |                                               | 100  | 680                            |
| VZ18E751KBS | 460                              | 615      | 360                          | 9000        | 675                      | 825       | 1240                                          | 80   | 390                            |
| VZ20E751KBS |                                  |          | 440                          | 12000       |                          |           |                                               | 100  | 620                            |
| VZ18E781KBS | 485                              | 640      | 365                          | 9000        | 702                      | 858       | 1290                                          | 80   | 370                            |
| VZ20E781KBS |                                  |          | 450                          | 12000       |                          |           | 1240                                          | 100  | 560                            |
| VZ10E821KBS | 510                              | 675      | 110                          | 3500        | 738                      | 902       | 1350                                          | 25   | 110                            |
| VZ14E821KBS |                                  |          | 235                          | 6500        |                          |           |                                               | 50   | 190                            |
| VZ18E821KBS |                                  |          | 388                          | 9000        |                          |           |                                               | 80   | 310                            |
| VZ20E821KBS |                                  |          | 460                          | 12000       |                          |           |                                               | 100  | 530                            |
| VZ18E911KBS | 550                              | 745      | 405                          | 9000        | 819                      | 1001      | 1400                                          | 80   | 280                            |
| VZ20E911KBS |                                  |          | 510                          | 12000       |                          |           |                                               | 100  | 440                            |
| VZ18E102KBS | 625                              | 825      | 450                          | 9000        | 900                      | 1100      | 1620                                          | 80   | 250                            |
| VZ20E102KBS |                                  |          | 560                          | 12000       |                          |           |                                               | 100  | 425                            |
| VZ18E112KBS | 680                              | 895      | 500                          | 9000        | 962                      | 1175      | 1800                                          | 80   | 230                            |
| VZ20E112KBS |                                  |          | 620                          | 12000       |                          |           |                                               | 100  | 380                            |

## VZ32 KW (Wire Lead) Series – Electrical Characteristics

| Part Number | Continuous Rated Voltage |          | Rated Single Pulse Transient |              | Varistor Voltage @1mA DC |           | Maximum Clamping Voltage @Test Current 8/20µs |      | Typical Capacitance @1KHZ 25°C |
|-------------|--------------------------|----------|------------------------------|--------------|--------------------------|-----------|-----------------------------------------------|------|--------------------------------|
|             |                          |          | Energy                       | Peak         |                          |           |                                               |      |                                |
|             | AC RMS Volts             | DC Volts | 10/1000µs Joules             | 8/20µs KAmps | Min Volts                | Max Volts | Volts                                         | Amps | pF                             |
| VZ32D201KW  | 130                      | 175      | 210                          | 25           | 184                      | 224       | 340                                           | 200  | 4700                           |
| VZ32D221KW  | 140                      | 180      | 235                          | 25           | 198                      | 242       | 360                                           | 200  | 4300                           |
| VZ32D241KW  | 150                      | 200      | 240                          | 25           | 216                      | 264       | 395                                           | 200  | 4000                           |
| VZ32D271KW  | 180                      | 230      | 255                          | 25           | 255                      | 311       | 455                                           | 200  | 3500                           |
| VZ32D331KW  | 210                      | 275      | 300                          | 25           | 297                      | 363       | 550                                           | 200  | 3000                           |
| VZ32D361KW  | 230                      | 300      | 325                          | 25           | 324                      | 396       | 595                                           | 200  | 2800                           |
| VZ32D391KW  | 250                      | 330      | 350                          | 25           | 351                      | 429       | 650                                           | 200  | 2500                           |
| VZ32D431KW  | 275                      | 370      | 380                          | 25           | 387                      | 473       | 710                                           | 200  | 2200                           |
| VZ32D471KW  | 300                      | 385      | 400                          | 25           | 423                      | 517       | 775                                           | 200  | 2000                           |
| VZ32D511KW  | 320                      | 420      | 430                          | 25           | 459                      | 561       | 840                                           | 200  | 1900                           |
| VZ32D561KW  | 360                      | 470      | 480                          | 25           | 522                      | 638       | 910                                           | 200  | 1700                           |
| VZ32D621KW  | 390                      | 505      | 500                          | 25           | 558                      | 682       | 1025                                          | 200  | 1600                           |
| VZ32D681KW  | 420                      | 560      | 525                          | 25           | 612                      | 748       | 1120                                          | 200  | 1500                           |
| VZ32D751KW  | 460                      | 615      | 540                          | 25           | 675                      | 825       | 1240                                          | 200  | 1400                           |
| VZ32D781KW  | 485                      | 640      | 550                          | 25           | 702                      | 858       | 1290                                          | 200  | 1300                           |
| VZ32D821KW  | 510                      | 675      | 580                          | 25           | 738                      | 902       | 1355                                          | 200  | 1200                           |
| VZ32D911KW  | 550                      | 745      | 620                          | 25           | 819                      | 1001      | 1500                                          | 200  | 1150                           |
| VZ32D951KW  | 575                      | 765      | 650                          | 25           | 855                      | 1045      | 1570                                          | 200  | 1100                           |
| VZ32D102KW  | 625                      | 825      | 680                          | 25           | 900                      | 1100      | 1650                                          | 200  | 1000                           |
| VZ32D112KW  | 680                      | 895      | 760                          | 25           | 957.6                    | 1170.4    | 1815                                          | 200  | 900                            |
| VZ32D122KW  | 750                      | 970      | 790                          | 25           | 1062                     | 1300      | 1980                                          | 200  | 800                            |
| VZ32D152KW  | 880                      | 1150     | 850                          | 25           | 1350                     | 1650      | 2640                                          | 200  | 680                            |

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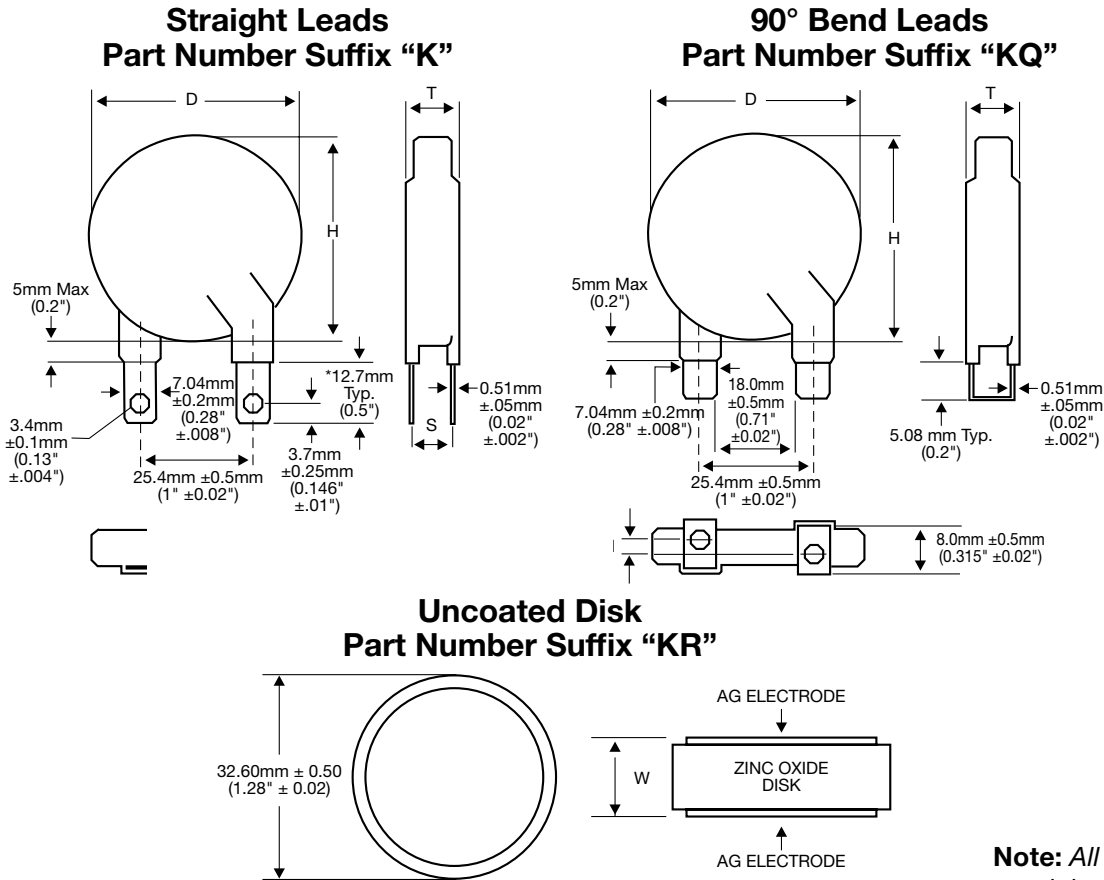
## VZ32 Series — Electrical Characteristics

| Part Number  | Continuous Rated Voltage |          | Rated Single Pulse Transient |              | Varistor Voltage @1mA DC |           | Maximum Clamping Voltage @Test Current 8/20µs |      | Typical Capacitance @1KHZ 25°C |
|--------------|--------------------------|----------|------------------------------|--------------|--------------------------|-----------|-----------------------------------------------|------|--------------------------------|
|              |                          |          | Energy                       | Peak         |                          |           |                                               |      |                                |
|              | AC RMS Volts             | DC Volts | 10/1000µs Joules             | 8/20µs KAmps | Min Volts                | Max Volts | Volts                                         | Amps | pF                             |
| VZ32D201 □□□ | 130                      | 175      | 210                          | 30           | 185                      | 225       | 340                                           | 200  | 4700                           |
| VZ32D221 □□□ | 140                      | 180      | 240                          | 30           | 198                      | 242       | 360                                           | 200  | 4300                           |
| VZ32D241 □□□ | 150                      | 200      | 250                          | 30           | 216                      | 264       | 395                                           | 200  | 4000                           |
| VZ32D271 □□□ | 180                      | 230      | 260                          | 30           | 255                      | 311       | 455                                           | 200  | 3500                           |
| VZ32D331 □□□ | 210                      | 275      | 310                          | 30           | 297                      | 363       | 550                                           | 200  | 3000                           |
| VZ32D361 □□□ | 230                      | 300      | 330                          | 30           | 324                      | 396       | 595                                           | 200  | 2800                           |
| VZ32D391 □□□ | 250                      | 330      | 360                          | 30           | 351                      | 429       | 650                                           | 200  | 2500                           |
| VZ32D431 □□□ | 275                      | 370      | 400                          | 30           | 387                      | 473       | 710                                           | 200  | 2200                           |
| VZ32D471 □□□ | 300                      | 385      | 405                          | 30           | 423                      | 517       | 775                                           | 200  | 2000                           |
| VZ32D511 □□□ | 320                      | 420      | 440                          | 30           | 459                      | 561       | 840                                           | 200  | 1900                           |
| VZ32D561 □□□ | 360                      | 470      | 500                          | 30           | 522                      | 638       | 910                                           | 200  | 1700                           |
| VZ32D621 □□□ | 390                      | 505      | 550                          | 30           | 558                      | 682       | 1025                                          | 200  | 1600                           |
| VZ32D681 □□□ | 420                      | 560      | 600                          | 30           | 612                      | 748       | 1120                                          | 200  | 1500                           |
| VZ32D751 □□□ | 460                      | 615      | 600                          | 30           | 675                      | 825       | 1240                                          | 200  | 1400                           |
| VZ32D781 □□□ | 485                      | 640      | 600                          | 30           | 702                      | 858       | 1290                                          | 200  | 1300                           |
| VZ32D821 □□□ | 510                      | 675      | 600                          | 30           | 738                      | 902       | 1355                                          | 200  | 1200                           |
| VZ32D911 □□□ | 550                      | 745      | 630                          | 30           | 819                      | 1001      | 1500                                          | 200  | 1150                           |
| VZ32D951 □□□ | 575                      | 765      | 660                          | 30           | 855                      | 1045      | 1570                                          | 200  | 1100                           |
| VZ32D102 □□□ | 625                      | 825      | 690                          | 30           | 900                      | 1100      | 1650                                          | 200  | 1000                           |
| VZ32D112 □□□ | 680                      | 895      | 770                          | 30           | 957.6                    | 1170.4    | 1815                                          | 200  | 900                            |
| VZ32D122 □□□ | 750                      | 970      | 810                          | 30           | 1062                     | 1300      | 1980                                          | 200  | 800                            |
| VZ32D152 □□□ | 880                      | 1150     | 860                          | 30           | 1350                     | 1650      | 2640                                          | 200  | 680                            |

□□□ Part Number Suffix Code  
(ie: VZ32D201KR)

- K - Straight Lead
- KL - Straight Lead - Left Side Lead Orientation
- KQ - 90° Bend Lead
- KR - Uncoated Disk - Without Leads
- KF - Uncoated Disk - With Leads
- KN - Uncoated Disk - With one Lead only, Right side orientation
- KNL - Uncoated Disk - With one Lead only, Left side orientation

## VZ32 Series — Dimensions



**Note:** All drawings with leads are right side oriented.

| Part Number  | D max.       | H max.       | T max.     | S ± .7mm (±.03") | d                  | W                    |
|--------------|--------------|--------------|------------|------------------|--------------------|----------------------|
| VZ32D201 □□□ | 40<br>(1.57) | 40<br>(1.57) | 7.5 (.30)  | 2.5 (.09)        | 5.7±1.0 (.22±.04)  | 1.09±0.50 (.04±.02)  |
| VZ32D221 □□□ |              |              | 7.5 (.30)  | 2.5 (.09)        | 5.5±1.0 (.22±.04)  | 1.19±0.50 (.047±.02) |
| VZ32D241 □□□ |              |              | 7.5 (.30)  | 2.8 (.11)        | 5.4±1.0 (.21±.04)  | 1.32±0.50 (.05±.02)  |
| VZ32D271 □□□ |              |              | 8.5 (.33)  | 2.8 (.11)        | 5.2±1.0 (.20±.04)  | 1.44±0.50 (.056±.02) |
| VZ32D331 □□□ |              |              | 9.0 (.35)  | 3.1 (.12)        | 4.8±1.0 (.19±.04)  | 1.78±0.50 (.07±.02)  |
| VZ32D361 □□□ |              |              | 9.0 (.35)  | 3.3 (.13)        | 4.6±1.0 (.18±.04)  | 1.97±0.50 (.077±.02) |
| VZ32D391 □□□ |              |              | 9.0 (.35)  | 3.6 (.14)        | 4.4±1.0 (.17±.04)  | 2.11±0.50 (.083±.02) |
| VZ32D431 □□□ |              |              | 9.0 (.35)  | 3.6 (.14)        | 4.2±1.0 (.165±.04) | 2.34±0.50 (.09±.02)  |
| VZ32D471 □□□ |              |              | 9.7 (.38)  | 3.8 (.15)        | 4.2±1.0 (.165±.04) | 2.53±0.50 (.1±.02)   |
| VZ32D511 □□□ |              |              | 9.7 (.38)  | 3.8 (.15)        | 4.0±1.0 (.16±.04)  | 2.77±0.50 (.11±.02)  |
| VZ32D561 □□□ |              |              | 9.7 (.38)  | 4.0 (.16)        | 4.0±1.0 (.16±.04)  | 3.08±0.5 (.12±.02)   |
| VZ32D621 □□□ |              |              | 9.7 (.38)  | 4.3 (.17)        | 3.9±1.0 (.15±.04)  | 3.40±0.50 (.134±.02) |
| VZ32D681 □□□ |              |              | 9.7 (.38)  | 4.6 (.18)        | 3.6±1.0 (.14±.04)  | 3.64±0.50 (.143±.02) |
| VZ32D751 □□□ |              |              | 10.5 (.41) | 4.8 (.19)        | 3.3±1.0 (.13±.04)  | 4.11±0.50 (.16±.02)  |
| VZ32D781 □□□ |              |              | 10.5 (.41) | 4.8 (.19)        | 3.1±1.0 (.12±.04)  | 4.15±0.50 (.16±.02)  |
| VZ32D821 □□□ |              |              | 10.5 (.41) | 5.1 (.20)        | 2.9±1.0 (.11±.04)  | 4.47±0.50 (.176±.02) |
| VZ32D911 □□□ |              |              | 11.5 (.45) | 5.6 (.22)        | 2.5±1.0 (.10±.04)  | 4.95±0.50 (.195±.02) |
| VZ32D951 □□□ |              |              | 11.5 (.45) | 5.6 (.22)        | 2.3±1.0 (.09±.04)  | 5.05±0.50 (.2±.02)   |
| VZ32D102 □□□ |              |              | 12 (.47)   | 5.8 (.22)        | 2.1±1.0 (.08±.04)  | 5.48±0.50 (.215±.02) |
| VZ32D112 □□□ |              |              | 12 (.47)   | 6.4 (.25)        | 2.1±1.0 (.08±.04)  | 5.96±0.50 (.23±.02)  |
| VZ32D122 □□□ |              |              | 13 (.51)   | 8.4 (.33)        | 1.5±1.0 (.06±.04)  | 7.2±0.50 (.28±.02)   |
| VZ32D152 □□□ |              |              | 13 (.51)   | 10.5 (.41)       | 0.5±1.0 (.02±.04)  | 7.2±0.50 (.28±.02)   |

## VZ34 Single Series – Electrical Characteristics

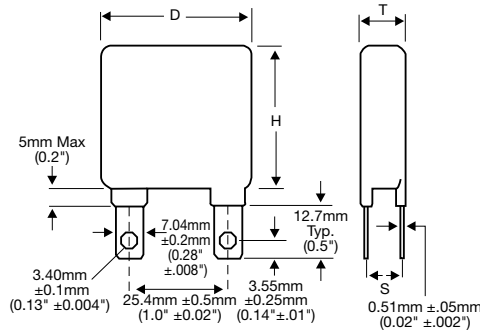
| Part Number  | Continuous Rated Voltage |          | Rated Single Pulse Transient |                     | Varistor Voltage @1mA DC |           | Maximum Clamping Voltage @Test Current 8/20µs |      | Typical Capacitance @1KHZ 25°C |
|--------------|--------------------------|----------|------------------------------|---------------------|--------------------------|-----------|-----------------------------------------------|------|--------------------------------|
|              |                          |          | Energy                       | Peak                |                          |           |                                               |      |                                |
|              | AC RMS Volts             | DC Volts | 10/1000µs Joules             | 8/20µs KAmps 1 time | Min Volts                | Max Volts | Volts                                         | Amps | pF                             |
| VZ34R201 □□□ | 130                      | 175      | 310                          | 40                  | 185                      | 225       | 340                                           | 300  | 10000                          |
| VZ34R221 □□□ | 140                      | 180      | 330                          | 40                  | 198                      | 242       | 360                                           | 300  | 9000                           |
| VZ34R241 □□□ | 150                      | 200      | 360                          | 40                  | 216                      | 264       | 395                                           | 300  | 8000                           |
| VZ34R271 □□□ | 180                      | 230      | 390                          | 40                  | 255                      | 311       | 455                                           | 300  | 7100                           |
| VZ34R301 □□□ | 195                      | 250      | 405                          | 40                  | 270                      | 330       | 505                                           | 300  | 6000                           |
| VZ34R331 □□□ | 210                      | 275      | 430                          | 40                  | 297                      | 363       | 540                                           | 300  | 4800                           |
| VZ34R361 □□□ | 230                      | 300      | 460                          | 40                  | 324                      | 396       | 595                                           | 300  | 5600                           |
| VZ34R391 □□□ | 250                      | 330      | 490                          | 40                  | 351                      | 429       | 650                                           | 300  | 5000                           |
| VZ34R431 □□□ | 275                      | 370      | 550                          | 40                  | 387                      | 473       | 710                                           | 300  | 4500                           |
| VZ34R471 □□□ | 300                      | 385      | 600                          | 40                  | 423                      | 517       | 775                                           | 300  | 4000                           |
| VZ34R511 □□□ | 320                      | 420      | 640                          | 40                  | 459                      | 561       | 840                                           | 300  | 3800                           |
| VZ34R561 □□□ | 360                      | 470      | 710                          | 40                  | 522                      | 638       | 910                                           | 300  | 3700                           |
| VZ34R621 □□□ | 390                      | 505      | 800                          | 40                  | 558                      | 682       | 1025                                          | 300  | 3300                           |
| VZ34R681 □□□ | 420                      | 560      | 910                          | 40                  | 612                      | 748       | 1120                                          | 300  | 3000                           |
| VZ34R751 □□□ | 460                      | 615      | 920                          | 40                  | 675                      | 825       | 1240                                          | 300  | 2600                           |
| VZ34R781 □□□ | 485                      | 640      | 930                          | 40                  | 702                      | 858       | 1290                                          | 300  | 2700                           |
| VZ34R821 □□□ | 510                      | 675      | 940                          | 40                  | 738                      | 902       | 1355                                          | 300  | 2500                           |
| VZ34R911 □□□ | 550                      | 745      | 960                          | 40                  | 819                      | 1001      | 1500                                          | 300  | 1800                           |
| VZ34R951 □□□ | 575                      | 765      | 1000                         | 40                  | 855                      | 1045      | 1570                                          | 300  | 1700                           |
| VZ34R102 □□□ | 625                      | 825      | 1055                         | 40                  | 900                      | 1100      | 1650                                          | 300  | 1600                           |
| VZ34R112 □□□ | 680                      | 895      | 1155                         | 40                  | 957.6                    | 1170.4    | 1815                                          | 300  | 1500                           |
| VZ34R122 □□□ | 750                      | 970      | 1250                         | 40                  | 1062                     | 1300      | 1980                                          | 300  | 1300                           |

□□□ - Part Number Suffix Code  
(ie: VZ34R201K)

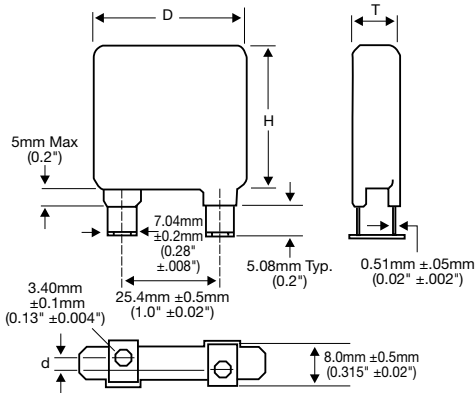
- K - Straight Lead
- KA - Tab Leads Outward Crimp
- KL - Straight Lead - Left Side Lead Orientation
- KQ - 90° Bend Lead
- KR - Uncoated Disk - Without Leads
- KF - Uncoated Disk - With Leads
- KN - Uncoated Disk - With one Lead only, Right side orientation
- KNL - Uncoated Disk - With one Lead only, Left side orientation

## VZ34 Single Series – Dimensions

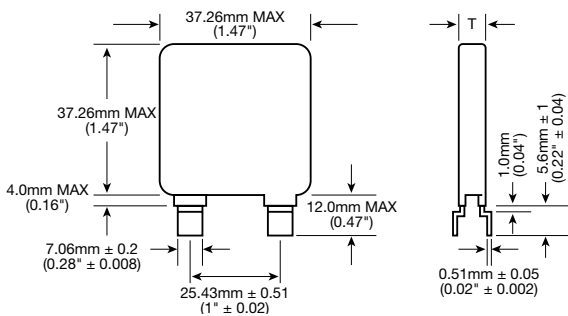
**Straight Leads**  
**Part Number Suffix “K”**



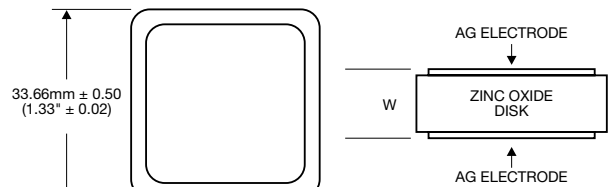
**90° Bend Leads**  
**Part Number Suffix “KQ”**



**Tab Leads Outward Crimp**  
**Part Number Suffix “KA”**



**Uncoated Disk**  
**Part Number Suffix “KR”**



**Note:** All drawings with leads are right side oriented.

| Part Number  | D max.       | H max.       | T max.     | S ±.7mm (±.03") | d                  | W                    |
|--------------|--------------|--------------|------------|-----------------|--------------------|----------------------|
| VZ34R201 □□□ | 42<br>(1.65) | 42<br>(1.65) | 7.5 (.30)  | 2.5 (.10)       | 5.7±1.0 (.22±.04)  | 1.34±0.50 (.05±.02)  |
| VZ34R221 □□□ |              |              | 7.5 (.30)  | 2.5 (.10)       | 5.5±1.0 (.22±.04)  | 1.47±0.50 (.057±.02) |
| VZ34R241 □□□ |              |              | 7.5 (.30)  | 2.8 (.11)       | 5.4±1.0 (.21±.04)  | 1.62±0.50 (.06±.02)  |
| VZ34R271 □□□ |              |              | 8.5 (.33)  | 2.8 (.11)       | 5.2±1.0 (.20±.04)  | 1.77±0.50 (.07±.02)  |
| VZ34R301 □□□ |              |              | 9.0 (.35)  | 3.0 (.12)       | 5.0±1.0 (.20±.04)  | 2.00±0.50 (.078±.02) |
| VZ34R331 □□□ |              |              | 9.0 (.35)  | 3.1 (.12)       | 4.8±1.0 (.19 ±.04) | 2.19±0.50 (.086±.02) |
| VZ34R361 □□□ |              |              | 9.0 (.35)  | 3.3 (.13)       | 4.6±1.0 (.18±.04)  | 2.42±0.50 (.095±.02) |
| VZ34R391 □□□ |              |              | 9.0 (.35)  | 3.6 (.14)       | 4.4±1.0 (.17±.04)  | 2.59±0.50 (.1±.02)   |
| VZ34R431 □□□ |              |              | 9.0 (.35)  | 3.6 (.14)       | 4.2±1.0 (.17±.04)  | 2.88±0.50 (.11±.02)  |
| VZ34R471 □□□ |              |              | 9.7 (.38)  | 3.8 (.15)       | 4.2±1.0 (.17±.04)  | 3.1 ±0.50 (.12±.02)  |
| VZ34R511 □□□ |              |              | 9.7 (.38)  | 3.8 (.15)       | 4.0±1.0 (.16±.04)  | 3.41±0.50 (.134±.02) |
| VZ34R561 □□□ |              |              | 9.7 (.38)  | 4.0 (.16)       | 4.0±1.0 (.16±.04)  | 4.19±0.50 (.165±.02) |
| VZ34R621 □□□ |              |              | 9.7 (.38)  | 4.3 (.17)       | 3.9±1.0 (.15±.04)  | 4.19±0.50 (.165±.02) |
| VZ34R681 □□□ |              |              | 9.7 (.38)  | 4.6 (.18)       | 3.6±1.0 (.14±.04)  | 4.49±0.50 (.177±.02) |
| VZ34R751 □□□ |              |              | 10.5 (.41) | 4.8 (.19)       | 3.3±1.0 (.13±.04)  | 4.95±0.50 (.195±.02) |
| VZ34R781 □□□ |              |              | 10.5 (.41) | 4.8 (.19)       | 3.1±1.0 (.12±.04)  | 5.12±0.50 (.2±.02)   |
| VZ34R821 □□□ |              |              | 10.5 (.41) | 5.1 (.20)       | 2.9±1.0 (.11±.04)  | 5.50±0.50 (.22±.02)  |
| VZ34R911 □□□ |              |              | 11.5 (.45) | 5.6 (.22)       | 2.5±1.0 (.10±.04)  | 6.09±0.50 (.24±.02)  |
| VZ34R951 □□□ |              |              | 11.5 (.45) | 5.6 (.22)       | 2.3±1.0 (.09±.04)  | 6.38±0.50 (.25±.02)  |
| VZ34R102 □□□ |              |              | 12.0 (.47) | 5.8 (.23)       | 2.1±1.0 (.08±.04)  | 6.75±0.50 (.265±.02) |
| VZ34R112 □□□ |              |              | 12.0 (.47) | 6.4 (.25)       | 2.1±1.0 (.08±.04)  | 7.34±0.50 (.29±.02)  |
| VZ34R122 □□□ |              |              | 12.5 (.49) | 6.8 (.27)       | 1.9±1.0 (.07±.04)  | 7.5±0.50 (.30±.02)   |

## VZ34 Dual Series – Electrical Characteristics

| Part Number  | Continuous Rated Voltage* |          | Rated Single Pulse Transient |                     | Varistor Voltage @1mA DC* |           | Maximum Clamping Voltage @Test Current 8/20µs |      | Typical Capacitance @1KHZ 25°C** |
|--------------|---------------------------|----------|------------------------------|---------------------|---------------------------|-----------|-----------------------------------------------|------|----------------------------------|
|              |                           |          | Energy***                    | Peak***             |                           |           |                                               |      |                                  |
|              | AC RMS Volts              | DC Volts | 10/1000µs Joules             | 8/20µs KAmps 1 time | Min Volts                 | Max Volts | Volts*                                        | Amps | pF                               |
| VZ34R201 □□□ | 130                       | 175      | 310                          | 40                  | 185                       | 225       | 340                                           | 300  | 7900                             |
| VZ34R221 □□□ | 140                       | 180      | 330                          | 40                  | 198                       | 242       | 360                                           | 300  | 7200                             |
| VZ34R241 □□□ | 150                       | 200      | 360                          | 40                  | 216                       | 264       | 395                                           | 300  | 6600                             |
| VZ34R271 □□□ | 180                       | 230      | 390                          | 40                  | 255                       | 311       | 455                                           | 300  | 5600                             |
| VZ34R301 □□□ | 195                       | 250      | 405                          | 40                  | 270                       | 330       | 505                                           | 300  | 5200                             |
| VZ34R331 □□□ | 210                       | 275      | 430                          | 40                  | 297                       | 363       | 540                                           | 300  | 4800                             |
| VZ34R361 □□□ | 230                       | 300      | 460                          | 40                  | 324                       | 396       | 595                                           | 300  | 4400                             |
| VZ34R391 □□□ | 250                       | 330      | 490                          | 40                  | 351                       | 429       | 650                                           | 300  | 4100                             |
| VZ34R431 □□□ | 275                       | 370      | 550                          | 40                  | 387                       | 473       | 710                                           | 300  | 3800                             |
| VZ34R471 □□□ | 300                       | 385      | 600                          | 40                  | 423                       | 517       | 775                                           | 300  | 3400                             |
| VZ34R511 □□□ | 320                       | 420      | 640                          | 40                  | 459                       | 561       | 840                                           | 300  | 3200                             |
| VZ34R561 □□□ | 360                       | 470      | 710                          | 40                  | 522                       | 638       | 910                                           | 300  | 2700                             |
| VZ34R621 □□□ | 390                       | 505      | 800                          | 40                  | 558                       | 682       | 1025                                          | 300  | 2600                             |
| VZ34R681 □□□ | 420                       | 560      | 910                          | 40                  | 612                       | 748       | 1120                                          | 300  | 2400                             |
| VZ34R751 □□□ | 460                       | 615      | 920                          | 40                  | 675                       | 825       | 1240                                          | 300  | 2200                             |
| VZ34R781 □□□ | 485                       | 640      | 930                          | 40                  | 702                       | 858       | 1290                                          | 300  | 2100                             |
| VZ34R821 □□□ | 510                       | 675      | 940                          | 40                  | 738                       | 902       | 1355                                          | 300  | 2000                             |
| VZ34R911 □□□ | 550                       | 745      | 960                          | 40                  | 819                       | 1001      | 1500                                          | 300  | 1800                             |
| VZ34R951 □□□ | 575                       | 765      | 1000                         | 40                  | 855                       | 1045      | 1570                                          | 300  | 1700                             |
| VZ34R102 □□□ | 625                       | 825      | 1055                         | 40                  | 900                       | 1100      | 1650                                          | 300  | 1600                             |
| VZ34R112 □□□ | 680                       | 895      | 1155                         | 40                  | 957.6                     | 1170.4    | 1815                                          | 300  | 1500                             |
| VZ34R122 □□□ | 750                       | 970      | 1250                         | 40                  | 1062                      | 1300      | 1980                                          | 300  | 1300                             |

□□□ - Part Number Suffix Code  
(ie: VZ34R201KD)

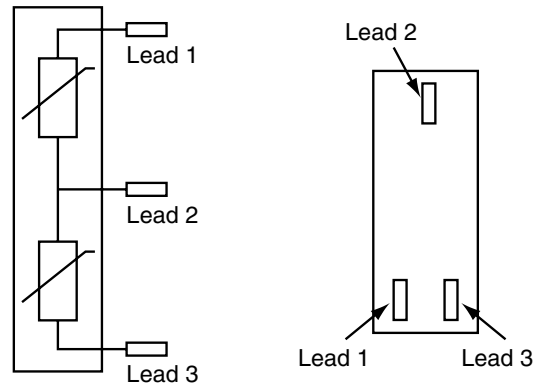
- KD - Straight Lead
- KDQ - 90° Bend Lead

\* For leads 1-3, double published rating

\*\* For leads 1-3, 50% of published rating

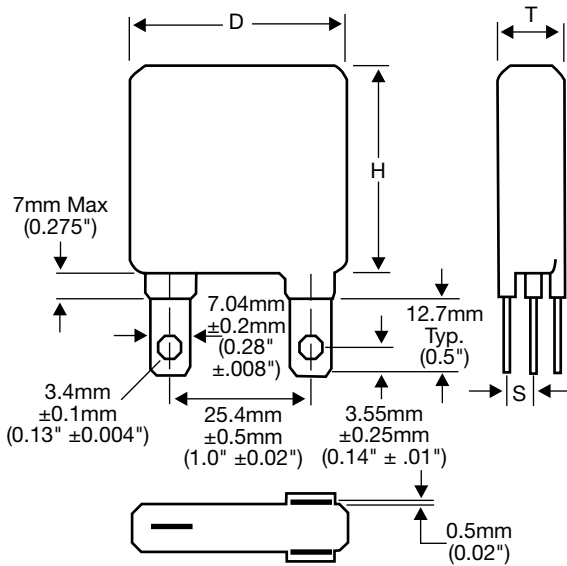
\*\*\* If leads 1-3 are shorted together, then the energy between 2 and (1+3) will be double the rating.

### Termination

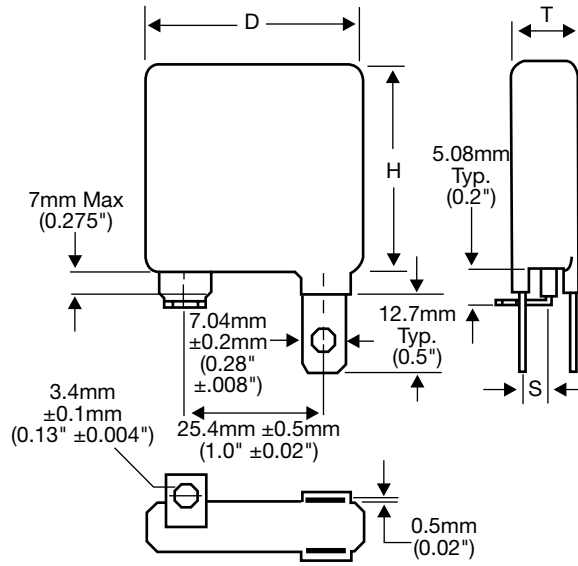


# VZ34 Dual Series – Dimensions

**Straight Leads**  
**Part Number Suffix “KD”**



**90° Bend Leads**  
**Part Number Suffix “KDQ”**



**Note:** All drawings with leads are right side oriented.

| Part Number  | D max.       | H max.       | T max.     | S ±.7mm (±.03") |
|--------------|--------------|--------------|------------|-----------------|
| VZ34R201 □□□ | 42<br>(1.65) | 42<br>(1.65) | 9.1 (.36)  | 4.1 (.16)       |
| VZ34R221 □□□ |              |              | 9.2 (.36)  | 4.2 (.17)       |
| VZ34R241 □□□ |              |              | 9.3 (.37)  | 4.6 (.18)       |
| VZ34R271 □□□ |              |              | 9.5 (.37)  | 4.8 (.19)       |
| VZ34R301 □□□ |              |              | 10.5 (.41) | 5.2 (.20)       |
| VZ34R331 □□□ |              |              | 11.3 (.44) | 5.4 (.21)       |
| VZ34R361 □□□ |              |              | 11.5 (.45) | 5.8 (.23)       |
| VZ34R391 □□□ |              |              | 11.6 (.46) | 6.2 (.24)       |
| VZ34R431 □□□ |              |              | 11.9 (.47) | 6.5 (.26)       |
| VZ34R471 □□□ |              |              | 12.8 (.50) | 6.9 (.27)       |
| VZ34R511 □□□ |              |              | 13.1 (.52) | 7.2 (.28)       |
| VZ34R561 □□□ |              |              | 13.4 (.53) | 7.7 (.30)       |
| VZ34R621 □□□ |              |              | 13.6 (.54) | 8.2 (.32)       |
| VZ34R681 □□□ |              |              | 13.9 (.55) | 8.8 (.35)       |
| VZ34R751 □□□ |              |              | 15.3 (.60) | 9.3 (.37)       |
| VZ34R781 □□□ |              |              | 15.5 (.61) | 9.6 (.38)       |
| VZ34R821 □□□ |              |              | 15.5 (.61) | 10.1 (.40)      |
| VZ34R911 □□□ |              |              | 17.0 (.67) | 11.1 (.44)      |
| VZ34R951 □□□ |              |              | 17.2 (.68) | 11.3 (.44)      |
| VZ34R102 □□□ |              |              | 18.0 (.71) | 11.8 (.46)      |
| VZ34R112 □□□ |              |              | 18.6 (.73) | 13.0 (.51)      |

# VZ40 Series — Electrical Characteristics

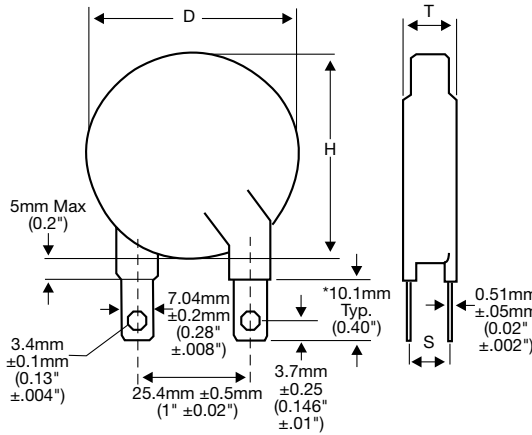
| Part Number  | Continuous Rated Voltage |          | Rated Single Pulse Transient |              | Varistor Voltage @1mA DC |           | Maximum Clamping Voltage @Test Current 8/20μs |      | Typical Capacitance @1KHZ 25°C |
|--------------|--------------------------|----------|------------------------------|--------------|--------------------------|-----------|-----------------------------------------------|------|--------------------------------|
|              |                          |          | Energy                       | Peak         |                          |           |                                               |      |                                |
|              | AC RMS Volts             | DC Volts | 10/1000μs Joules             | 8/20μs KAmps | Min Volts                | Max Volts | Volts                                         | Amps | pF                             |
| VZ40D201 □□□ | 130                      | 175      | 310                          | 40           | 185                      | 225       | 340                                           | 300  | 10000                          |
| VZ40D221 □□□ | 140                      | 180      | 330                          | 40           | 198                      | 242       | 360                                           | 300  | 9000                           |
| VZ40D241 □□□ | 150                      | 200      | 360                          | 40           | 216                      | 264       | 395                                           | 300  | 8000                           |
| VZ40D271 □□□ | 180                      | 230      | 390                          | 40           | 255                      | 311       | 455                                           | 300  | 7100                           |
| VZ40D301 □□□ | 195                      | 250      | 405                          | 40           | 270                      | 330       | 505                                           | 300  | 6550                           |
| VZ40D331 □□□ | 210                      | 275      | 460                          | 40           | 297                      | 363       | 550                                           | 300  | 6000                           |
| VZ40D361 □□□ | 230                      | 300      | 475                          | 40           | 324                      | 396       | 595                                           | 300  | 5600                           |
| VZ40D391 □□□ | 250                      | 330      | 490                          | 40           | 351                      | 429       | 650                                           | 300  | 5000                           |
| VZ40D431 □□□ | 275                      | 370      | 550                          | 40           | 387                      | 473       | 710                                           | 300  | 4500                           |
| VZ40D471 □□□ | 300                      | 385      | 600                          | 40           | 423                      | 517       | 775                                           | 300  | 4000                           |
| VZ40D511 □□□ | 320                      | 420      | 640                          | 40           | 459                      | 561       | 840                                           | 300  | 3800                           |
| VZ40D561 □□□ | 360                      | 470      | 710                          | 40           | 522                      | 638       | 910                                           | 300  | 3700                           |
| VZ40D621 □□□ | 390                      | 505      | 800                          | 40           | 558                      | 682       | 1025                                          | 300  | 3300                           |
| VZ40D681 □□□ | 420                      | 560      | 910                          | 40           | 612                      | 748       | 1120                                          | 300  | 3000                           |
| VZ40D751 □□□ | 460                      | 615      | 910                          | 40           | 675                      | 825       | 1240                                          | 300  | 2600                           |
| VZ40D781 □□□ | 485                      | 640      | 910                          | 40           | 702                      | 858       | 1290                                          | 300  | 2500                           |
| VZ40D821 □□□ | 510                      | 675      | 910                          | 40           | 738                      | 902       | 1355                                          | 300  | 2300                           |
| VZ40D911 □□□ | 550                      | 745      | 960                          | 40           | 819                      | 1001      | 1500                                          | 300  | 2200                           |
| VZ40D951 □□□ | 575                      | 765      | 1000                         | 40           | 855                      | 1045      | 1570                                          | 300  | 2000                           |
| VZ40D102 □□□ | 625                      | 825      | 1055                         | 40           | 900                      | 1100      | 1650                                          | 300  | 1900                           |
| VZ40D112 □□□ | 680                      | 895      | 1155                         | 40           | 957.6                    | 1170.4    | 1815                                          | 300  | 1800                           |
| VZ40D122 □□□ | 750                      | 970      | 1250                         | 40           | 1062                     | 1300      | 1980                                          | 300  | 1700                           |
| VZ40D152 □□□ | 900                      | 1200     | 1400                         | 40           | 1350                     | 1650      | 2475                                          | 300  | 1500                           |

□□□ Part Number Suffix Code  
(ie: VZ40D201KR)

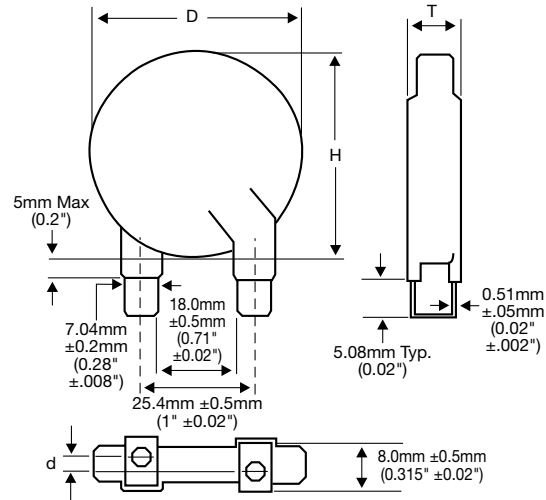
- K - Straight Lead
- KL - Straight Lead - Left Side Lead Orientation
- KQ - 90° Bend Lead
- KR - Uncoated Disk - Without Leads
- KF - Uncoated Disk - With Leads
- KN - Uncoated Disk - With one Lead only, Right side orientation
- KNL - Uncoated Disk - With one Lead only, Left side orientation

## VZ40 Series — Dimensions

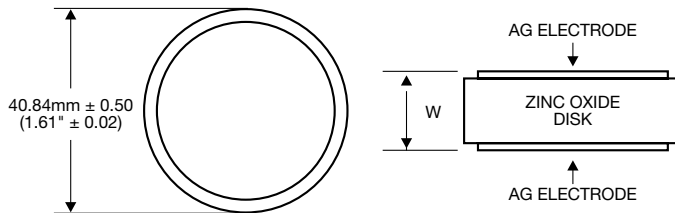
**Straight Leads**  
Part Number Suffix “K”



**90° Bend Leads**  
Part Number Suffix “KQ”



**Uncoated Disk**  
Part Number Suffix “KR”



**Note:** All drawings with leads are right side oriented.

| Part Number  | D max.       | H max.       | T max.     | S ±.7mm (±.03") | d                  | W                    |
|--------------|--------------|--------------|------------|-----------------|--------------------|----------------------|
| VZ40D201 □□□ | 48<br>(1.89) | 48<br>(1.89) | 7.5 (.30)  | 2.5 (.09)       | 5.7±1.0 (.22±.04)  | 1.13±0.50 (.044±.02) |
| VZ40D221 □□□ |              |              | 7.5 (.30)  | 2.5 (.09)       | 5.5±1.0 (.22±.04)  | 1.24±0.50 (.049±.02) |
| VZ40D241 □□□ |              |              | 7.5 (.30)  | 2.8 (.11)       | 5.4±1.0 (.21±.04)  | 1.38±0.50 (.054±.02) |
| VZ40D271 □□□ |              |              | 8.5 (.33)  | 2.8 (.11)       | 5.2±1.0 (.20±.04)  | 1.50±0.50 (.06±.02)  |
| VZ40D301 □□□ |              |              | 8.7 (.34)  | 3.0 (.12)       | 5.0±1.0 (.20±.04)  | 1.68±0.50 (.07±.02)  |
| VZ40D331 □□□ |              |              | 9.0 (.35)  | 3.1 (.12)       | 4.8±1.0 (.19±.04)  | 1.86±0.50 (.073±.02) |
| VZ40D361 □□□ |              |              | 9.0 (.35)  | 3.3 (.13)       | 4.6±1.0 (.18±.04)  | 2.06±0.50 (.08±.02)  |
| VZ40D391 □□□ |              |              | 9.0 (.35)  | 3.6 (.14)       | 4.4±1.0 (.17±.04)  | 2.2±0.50 (.087±.02)  |
| VZ40D431 □□□ |              |              | 9.0 (.35)  | 3.6 (.14)       | 4.2±1.0 (.165±.04) | 2.44±0.50 (.096±.02) |
| VZ40D471 □□□ |              |              | 9.7 (.38)  | 3.8 (.15)       | 4.2±1.0 (.165±.04) | 2.64±0.50 (.104±.02) |
| VZ40D511 □□□ |              |              | 9.7 (.38)  | 3.8 (.15)       | 4.0±1.0 (.16±.04)  | 2.89±0.50 (.113±.02) |
| VZ40D561 □□□ |              |              | 9.7 (.38)  | 4.1 (.16)       | 4.0±1.0 (.16±.04)  | 3.21±0.50 (.13±.02)  |
| VZ40D621 □□□ |              |              | 9.7 (.38)  | 4.3 (.17)       | 3.9±1.0 (.15±.04)  | 3.55±0.50 (.14±.02)  |
| VZ40D681 □□□ |              |              | 9.7 (.38)  | 4.6 (.18)       | 3.6±1.0 (.14±.04)  | 3.81±0.50 (.15±.02)  |
| VZ40D751 □□□ |              |              | 10.5 (.41) | 4.8 (.19)       | 3.3±1.0 (.13±.04)  | 4.19±0.50 (.165±.02) |
| VZ40D781 □□□ |              |              | 10.5 (.41) | 4.8 (.19)       | 3.1±1.0 (.12±.04)  | 4.34±0.50 (.17±.02)  |
| VZ40D821 □□□ |              |              | 10.5 (.41) | 5.1 (.20)       | 2.9±1.0 (.11±.04)  | 4.67±0.50 (.184±.02) |
| VZ40D911 □□□ |              |              | 11.5 (.45) | 5.6 (.22)       | 2.5±1.0 (.10±.04)  | 5.1±0.50 (.2±.02)    |
| VZ40D951 □□□ |              |              | 11.5 (.45) | 5.6 (.22)       | 2.3±1.0 (.09±.04)  | 5.28±0.50 (.21±.02)  |
| VZ40D102 □□□ |              |              | 12.0 (.47) | 5.8 (.22)       | 2.1±1.0 (.08±.04)  | 5.72±0.50 (.225±.02) |
| VZ40D112 □□□ |              |              | 12.0 (.47) | 6.4 (.25)       | 2.1±1.0 (.08±.04)  | 6.22±0.50 (.24±.02)  |
| VZ40D122 □□□ |              |              | 13.0 (.51) | 8.4 (.33)       | 1.9±1.0 (.07±.04)  | 7.5±0.50 (.30±.02)   |
| VZ40D152 □□□ |              |              | 14.5 (.57) | 10.2 (.40)      | 1.0±1.0 (.039±.04) | 9.2±0.50 (.36±.02)   |

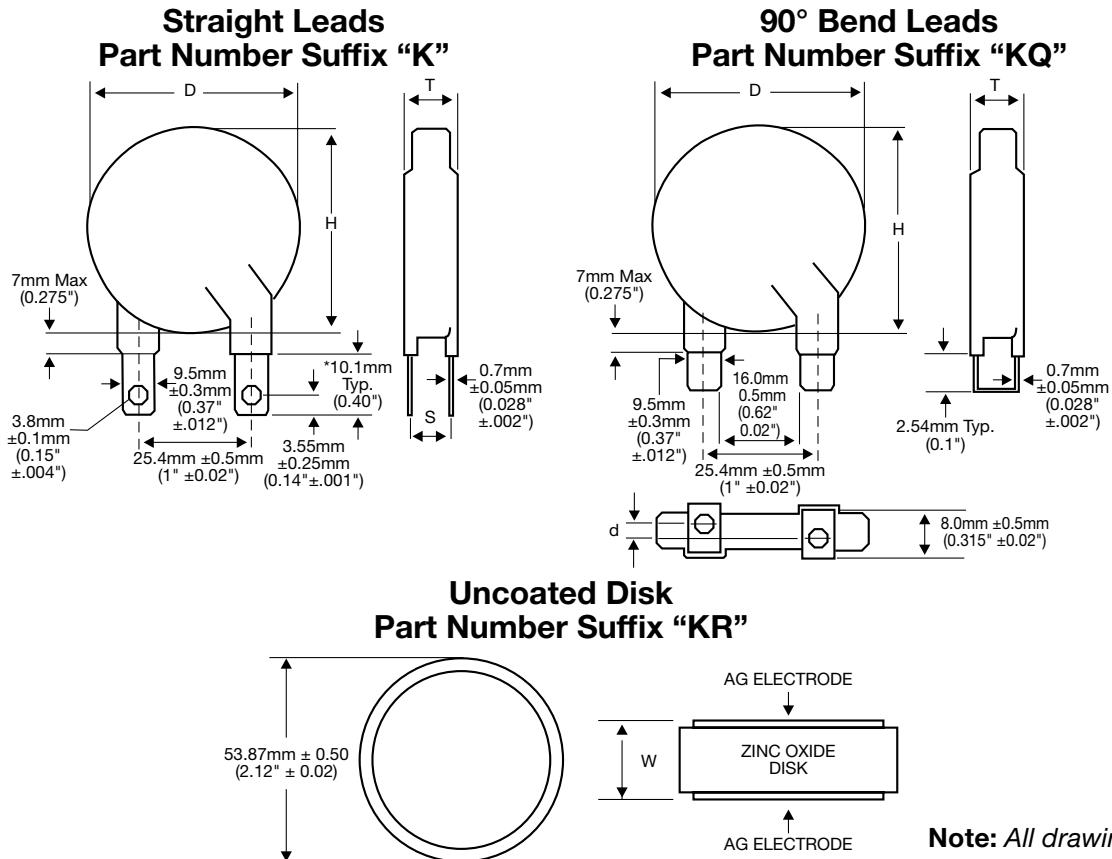
## VZ53 Series – Electrical Characteristics

| Part Number  | Continuous Rated Voltage |          | Rated Single Pulse Transient |              | Varistor Voltage @1mA DC |           | Maximum Clamping Voltage @Test Current 8/20μs |      | Typical Capacitance @1KHZ 25°C |
|--------------|--------------------------|----------|------------------------------|--------------|--------------------------|-----------|-----------------------------------------------|------|--------------------------------|
|              |                          |          | Energy                       | Peak         |                          |           |                                               |      |                                |
|              | AC RMS Volts             | DC Volts | 10/1000μs Joules             | 8/20μs KAmps | Min Volts                | Max Volts | Volts                                         | Amps | pF                             |
| VZ53D201 □□□ | 130                      | 175      | 490                          | 70           | 185                      | 225       | 340                                           | 500  | 18000                          |
| VZ53D221 □□□ | 140                      | 180      | 530                          | 70           | 198                      | 242       | 360                                           | 500  | 16000                          |
| VZ53D241 □□□ | 150                      | 200      | 570                          | 70           | 216                      | 264       | 395                                           | 500  | 14000                          |
| VZ53D271 □□□ | 180                      | 230      | 630                          | 70           | 255                      | 311       | 455                                           | 500  | 12500                          |
| VZ53D301 □□□ | 195                      | 250      | 655                          | 70           | 270                      | 330       | 505                                           | 500  | 12000                          |
| VZ53D331 □□□ | 210                      | 275      | 680                          | 70           | 297                      | 363       | 550                                           | 500  | 11500                          |
| VZ53D361 □□□ | 230                      | 300      | 730                          | 70           | 324                      | 396       | 595                                           | 500  | 10000                          |
| VZ53D391 □□□ | 250                      | 330      | 880                          | 70           | 351                      | 429       | 650                                           | 500  | 8800                           |
| VZ53D431 □□□ | 275                      | 370      | 950                          | 70           | 387                      | 473       | 710                                           | 500  | 8000                           |
| VZ53D471 □□□ | 300                      | 385      | 1000                         | 70           | 423                      | 517       | 775                                           | 500  | 7200                           |
| VZ53D511 □□□ | 320                      | 420      | 1100                         | 70           | 459                      | 561       | 840                                           | 500  | 6600                           |
| VZ53D561 □□□ | 360                      | 430      | 1200                         | 70           | 522                      | 638       | 910                                           | 500  | 6400                           |
| VZ53D621 □□□ | 390                      | 505      | 1300                         | 70           | 558                      | 682       | 1025                                          | 500  | 6200                           |
| VZ53D681 □□□ | 420                      | 560      | 1500                         | 70           | 612                      | 748       | 1120                                          | 500  | 5300                           |
| VZ53D751 □□□ | 460                      | 615      | 1600                         | 70           | 675                      | 825       | 1240                                          | 500  | 5000                           |
| VZ53D781 □□□ | 485                      | 640      | 1650                         | 70           | 702                      | 858       | 1290                                          | 500  | 4800                           |
| VZ53D821 □□□ | 510                      | 675      | 1800                         | 70           | 738                      | 902       | 1355                                          | 500  | 4400                           |
| VZ53D911 □□□ | 550                      | 745      | 2000                         | 70           | 819                      | 1001      | 1500                                          | 500  | 4100                           |
| VZ53D951 □□□ | 575                      | 765      | 2100                         | 70           | 855                      | 1045      | 1570                                          | 500  | 4000                           |
| VZ53D102 □□□ | 625                      | 825      | 2200                         | 70           | 900                      | 1100      | 1650                                          | 500  | 3700                           |
| VZ53D112 □□□ | 680                      | 895      | 2500                         | 70           | 957.6                    | 1170.4    | 1815                                          | 500  | 3300                           |
| VZ53D122 □□□ | 750                      | 970      | 2700                         | 70           | 1062                     | 1300      | 1980                                          | 500  | 3400                           |

□□□ - Part Number Suffix Code  
(ie: VZ53D201KR)

- K - Straight Lead
- KL - Straight Lead - Left Side Lead Orientation
- KQ - 90° Bend Lead
- KR - Uncoated Disk - Without Leads
- KF - Uncoated Disk - With Leads
- KN - Uncoated Disk - With one Lead only, Right side orientation
- KNL - Uncoated Disk - With one Lead only, Left side orientation

# VZ53 Series – Dimensions



**Note:** All drawings with leads are right side oriented.

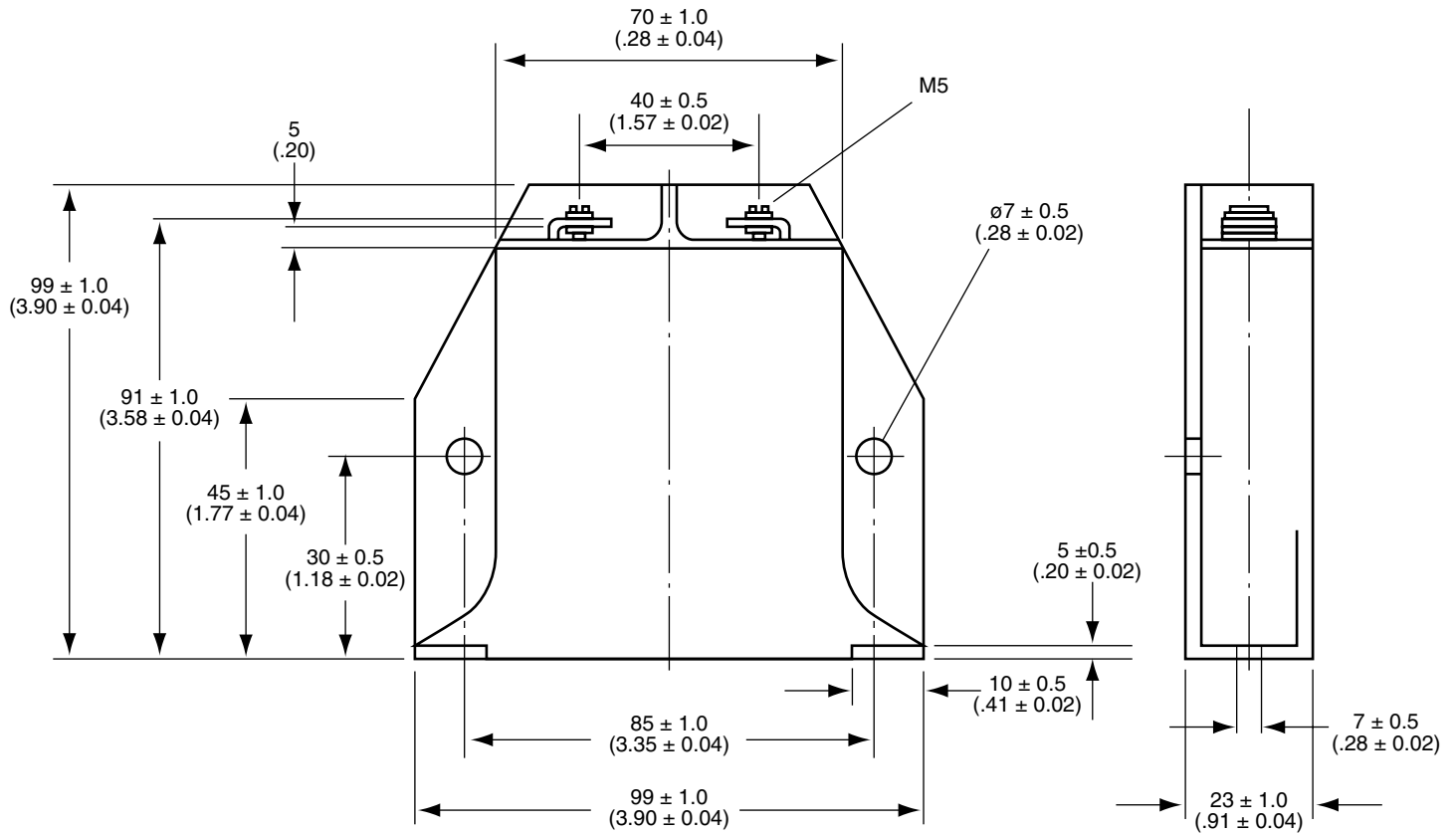
| PartNumber   | D max.      | H max.      | T max.     | S ±.7mm (±.03") | d                  | W                    |
|--------------|-------------|-------------|------------|-----------------|--------------------|----------------------|
| VZ53D201 □□□ | 61<br>(2.4) | 61<br>(2.4) | 7.5 (.30)  | 2.5 (.10)       | 5.7±1.0 (.22±.04)  | 1.41±0.50 (.056±.02) |
| VZ53D221 □□□ |             |             | 7.5 (.30)  | 2.5 (.10)       | 5.5±1.0 (.22±.04)  | 1.55±0.50 (.061±.02) |
| VZ53D241 □□□ |             |             | 7.5 (.30)  | 2.8 (.10)       | 5.4±1.0 (.21±.04)  | 1.72±0.50 (.068±.02) |
| VZ53D271 □□□ |             |             | 8.5 (.33)  | 2.8 (.10)       | 5.2±1.0 (.20±.04)  | 1.87±0.50 (.074±.02) |
| VZ53D301 □□□ |             |             | 8.7 (.34)  | 3.0 (.12)       | 5.0±1.0 (.20±.04)  | 2.10±0.50 (.08±.02)  |
| VZ53D331 □□□ |             |             | 9.0 (.35)  | 3.1 (.12)       | 4.8±1.0 (.19±.04)  | 2.32±0.50 (.091±.02) |
| VZ53D361 □□□ |             |             | 9.0 (.35)  | 3.3 (.13)       | 4.6±1.0 (.18±.04)  | 2.56±0.50 (.1±.02)   |
| VZ53D391 □□□ |             |             | 9.0 (.35)  | 3.6 (.14)       | 4.4±1.0 (.17±.04)  | 2.74±0.50 (.108±.02) |
| VZ53D431 □□□ |             |             | 9.0 (.35)  | 3.6 (.14)       | 4.2±1.0 (.165±.04) | 3.05±0.50 (.12±.02)  |
| VZ53D471 □□□ |             |             | 9.7 (.38)  | 3.8 (.15)       | 4.2±1.0 (.165±.04) | 3.29±0.50 (.13±.02)  |
| VZ53D511 □□□ |             |             | 9.7 (.38)  | 3.8 (.15)       | 4.0±1.0 (.16±.04)  | 3.60±0.50 (.14±.02)  |
| VZ53D561 □□□ |             |             | 9.7 (.38)  | 4.3 (.17)       | 4.0±1.0 (.16±.04)  | 4.43±0.50 (.174±.02) |
| VZ53D621 □□□ |             |             | 9.7 (.38)  | 4.3 (.17)       | 3.9±1.0 (.15±.04)  | 4.43±0.50 (.174±.02) |
| VZ53D681 □□□ |             |             | 9.7 (.38)  | 4.6 (.18)       | 3.6±1.0 (.14±.04)  | 4.74±0.50 (.187±.02) |
| VZ53D751 □□□ |             |             | 10.5 (.41) | 4.6 (.18)       | 3.3±1.0 (.13±.04)  | 5.23±0.50 (.206±.02) |
| VZ53D781 □□□ |             |             | 10.5 (.41) | 4.8 (.19)       | 3.1±1.0 (.12±.04)  | 5.41±0.50 (.21±.02)  |
| VZ53D821 □□□ |             |             | 10.5 (.41) | 5.1 (.20)       | 2.9±1.0 (.11±.04)  | 5.82±0.50 (.23±.02)  |
| VZ53D911 □□□ |             |             | 11.5 (.45) | 5.6 (.22)       | 2.5±1.0 (.10±.04)  | 6.44±0.50 (.25±.02)  |
| VZ53D951 □□□ |             |             | 11.5 (.45) | 5.6 (.22)       | 2.3±1.0 (.09±.04)  | 6.74±0.50 (.265±.02) |
| VZ53D102 □□□ |             |             | 11.5 (.45) | 5.8 (.23)       | 2.1±1.0 (.08±.04)  | 7.13±0.50 (.28±.02)  |
| VZ53D112 □□□ |             |             | 11.5 (.45) | 6.4 (.25)       | 2.1±1.0 (.08±.04)  | 7.76±0.50 (.306±.02) |
| VZ53D122 □□□ |             |             | 12.6 (.50) | 7.0 (.28)       | 1.5±1.0 (.06±.04)  | 8.49±0.50 (.334±.02) |

## VZ60 Series — Electrical Characteristics

| Part Number | Continuous Rated Voltage |          | Rated Single Pulse Transient |              | Varistor Voltage @1mA DC |           | Maximum Clamping Voltage @Test Current 8/20µs |      | Typical Capacitance @1KHZ 25°C |
|-------------|--------------------------|----------|------------------------------|--------------|--------------------------|-----------|-----------------------------------------------|------|--------------------------------|
|             |                          |          | Energy                       | Peak         |                          |           |                                               |      |                                |
|             | AC RMS Volts             | DC Volts | 10/1000µs Joules             | 8/20µs KAmps | Min Volts                | Max Volts | Volts                                         | Amps | pF                             |
| VZ60B201K   | 130                      | 175      | 630                          | 80           | 185                      | 225       | 340                                           | 500  | 15000                          |
| VZ60B221K   | 140                      | 180      | 650                          | 80           | 198                      | 242       | 365                                           | 500  | 13250                          |
| VZ60B241K   | 150                      | 200      | 750                          | 80           | 216                      | 264       | 395                                           | 500  | 12500                          |
| VZ60B271K   | 180                      | 230      | 800                          | 80           | 255                      | 311       | 455                                           | 500  | 11000                          |
| VZ60B301K   | 195                      | 250      | 870                          | 80           | 270                      | 330       | 500                                           | 500  | 10000                          |
| VZ60B331K   | 210                      | 275      | 950                          | 80           | 297                      | 363       | 550                                           | 500  | 9000                           |
| VZ60B361K   | 230                      | 300      | 980                          | 80           | 324                      | 396       | 595                                           | 500  | 8500                           |
| VZ60B391K   | 250                      | 330      | 1020                         | 80           | 351                      | 429       | 650                                           | 500  | 7500                           |
| VZ60B431K   | 275                      | 370      | 1140                         | 80           | 387                      | 473       | 710                                           | 500  | 7000                           |
| VZ60B471K   | 300                      | 385      | 1240                         | 80           | 423                      | 517       | 775                                           | 500  | 6500                           |
| VZ60B511K   | 320                      | 420      | 1320                         | 80           | 459                      | 561       | 845                                           | 500  | 6000                           |
| VZ60B561K   | 360                      | 470      | 1400                         | 80           | 522                      | 638       | 920                                           | 500  | 5500                           |
| VZ60B621K   | 390                      | 505      | 1490                         | 80           | 558                      | 682       | 1025                                          | 500  | 5000                           |
| VZ60B681K   | 420                      | 560      | 1550                         | 80           | 612                      | 748       | 1120                                          | 500  | 4500                           |
| VZ60B751K   | 460                      | 615      | 1610                         | 80           | 675                      | 825       | 1240                                          | 500  | 4300                           |
| VZ60B781K   | 485                      | 640      | 1670                         | 80           | 702                      | 858       | 1290                                          | 500  | 4000                           |
| VZ60B821K   | 510                      | 675      | 1840                         | 80           | 738                      | 902       | 1355                                          | 500  | 3900                           |
| VZ60B911K   | 550                      | 745      | 1960                         | 80           | 819                      | 1001      | 1500                                          | 500  | 3300                           |
| VZ60B951K   | 575                      | 765      | 2070                         | 80           | 855                      | 1045      | 1570                                          | 500  | 3100                           |
| VZ60B102K   | 625                      | 825      | 2170                         | 80           | 900                      | 1100      | 1650                                          | 500  | 3000                           |
| VZ60B112K   | 680                      | 895      | 2360                         | 80           | 957.6                    | 1170.4    | 1815                                          | 500  | 2700                           |
| VZ60B122K   | 750                      | 990      | 2570                         | 80           | 1080                     | 1320      | 1980                                          | 500  | 2500                           |
| VZ60B142K   | 880                      | 1140     | 2650                         | 80           | 1260                     | 1540      | 2310                                          | 500  | 2300                           |
| VZ60B162K   | 1000                     | 1280     | 2870                         | 80           | 1440                     | 1760      | 2640                                          | 500  | 2000                           |

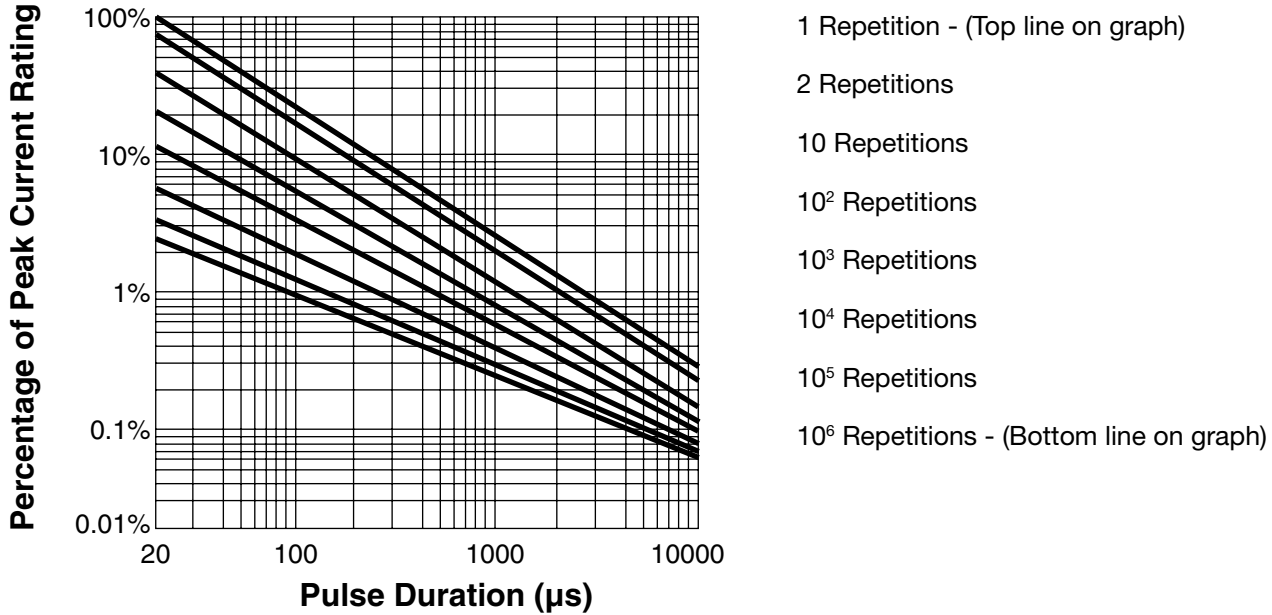
## VZ60 Series – Dimensions

mm (inches)

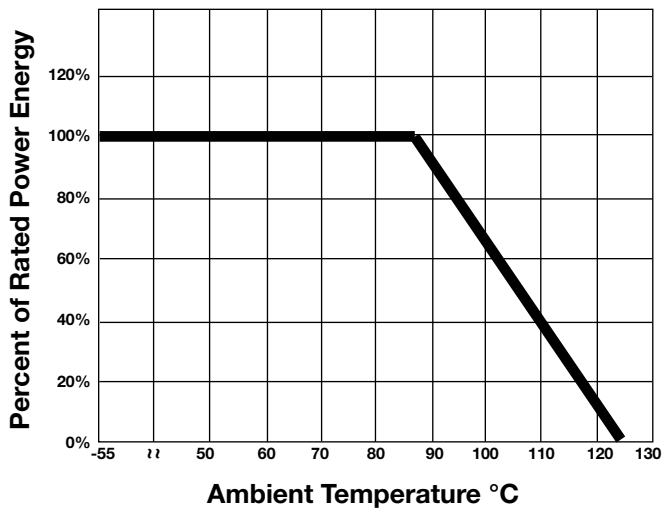


## Peak Pulse and Derating Curves

### Peak Current Per Pulse Versus Pulse Duration



### Temperature Derating Curve Power and Energy Rating vs. Temperature

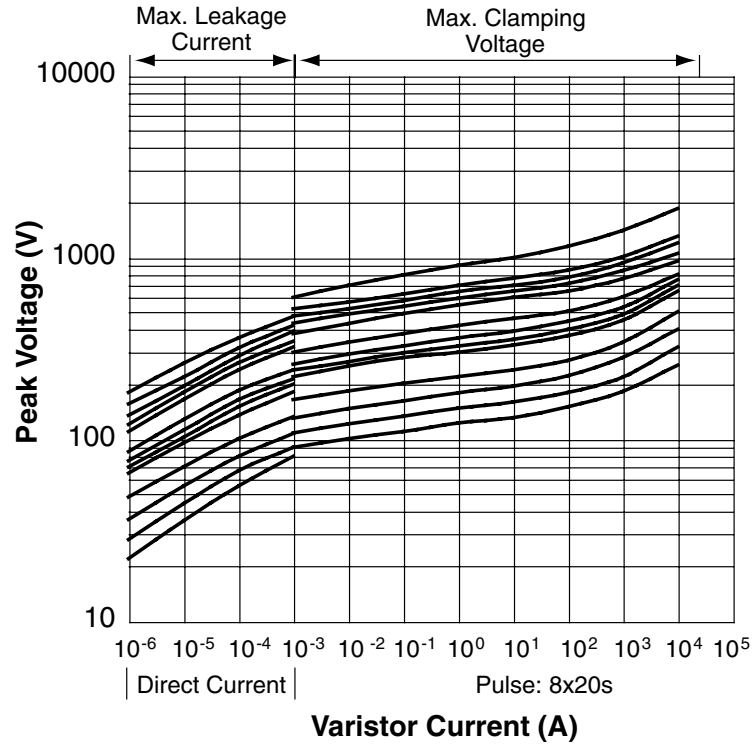


## V-I Characteristics

### 5mm Disk Size

VZ05D561K - (Top line on graph)  
 VZ05D471K  
 VZ05D431K  
 VZ05D391K  
 VZ05D361K  
 VZ05D271K  
 VZ05D241K  
 VZ05D221K  
 VZ05D201K  
 VZ05D151K  
 VZ05D121K  
 VZ05D101K  
 VZ05D820K - (Bottom line on graph)

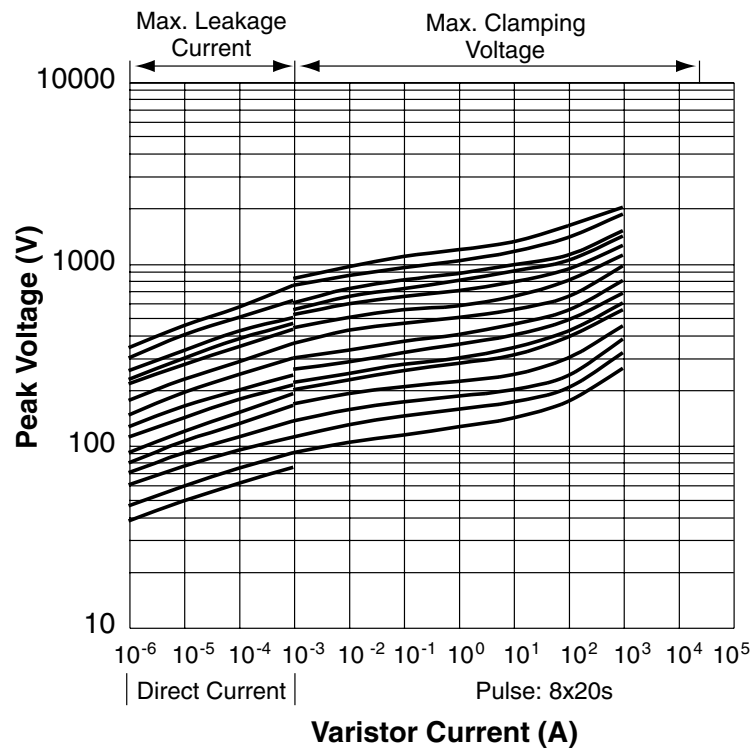
(Also applies to "E" series parts)



### 7mm Disk Size

VZ07D681K - (Top line on graph)  
 VZ07D621K  
 VZ07D561K  
 VZ07D511K  
 VZ07D471K  
 VZ07D391K  
 VZ07D331K  
 VZ07D271K  
 VZ07D241K  
 VZ07D201K  
 VZ07D181K  
 VZ07D151K  
 VZ07D121K  
 VZ07D101K  
 VZ07D820K - (Bottom line on graph)

(Also applies to "E" series parts)



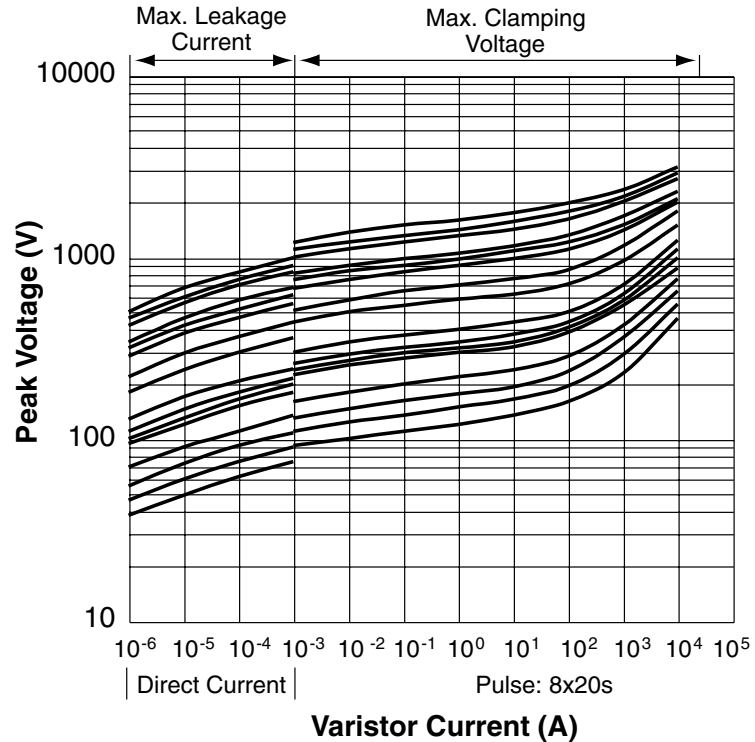
At idle power, current levels shown to the left of the diskontinuity illustrate typically the high end leakage current. However, if lower leakage current levels are desired, they may be guaranteed. In the clamping voltage region to the right of the diskontinuity, maximum clamping voltage is plotted.

## V-I Characteristics (continued)

### 10mm Disk Size

VZ10D112K - (Top line on graph)  
 VZ10D102K  
 VZ10D911K  
 VZ10D751K  
 VZ10D681K  
 VZ10D621K  
 VZ10D471K  
 VZ10D391K  
 VZ10D271K  
 VZ10D241K  
 VZ10D221K  
 VZ10D201K  
 VZ10D151K  
 VZ10D121K  
 VZ10D101K  
 VZ10D820K - (Bottom line on graph)

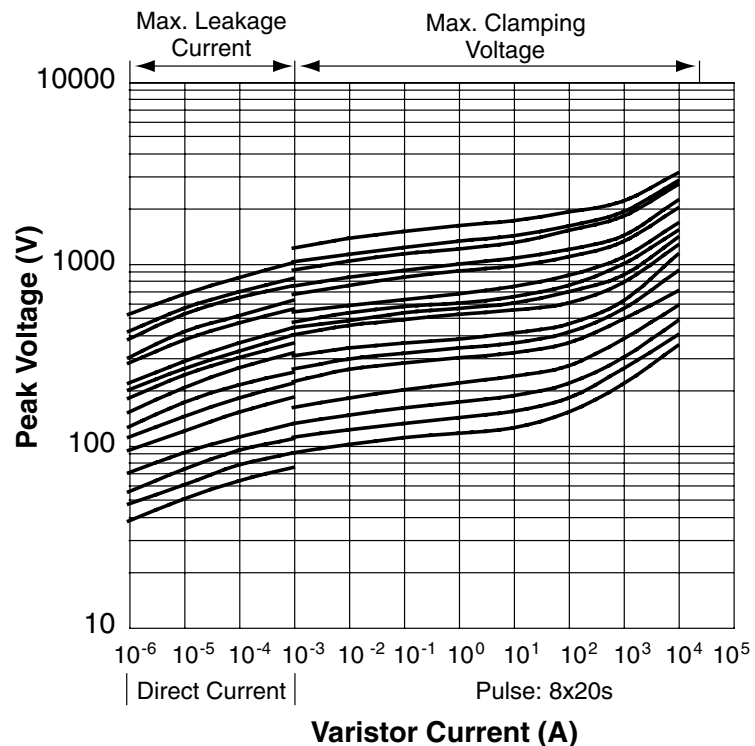
(Also applies to "E" series parts)



### 14mm Disk Size

VZ14D112K - (Top line on graph)  
 VZ14D911K  
 VZ14D821K  
 VZ14D681K  
 VZ14D621K  
 VZ14D471K  
 VZ14D431K  
 VZ14D391K  
 VZ14D361K  
 VZ14D271K  
 VZ14D241K  
 VZ14D201K  
 VZ14D151K  
 VZ14D121K  
 VZ14D101K  
 VZ14D820K - (Bottom line on graph)

(Also applies to "E" series parts)

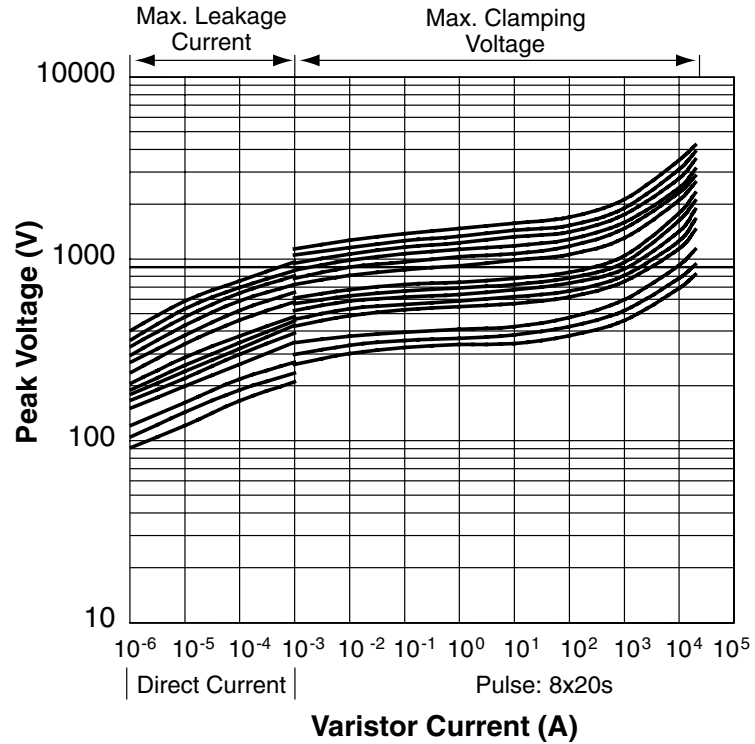


At idle power, current levels shown to the left of the diskontinuity illustrate typically the high end leakage current. However, if lower leakage current levels are desired, they may be guaranteed. In the clamping voltage region to the right of the diskontinuity, maximum clamping voltage is plotted.

## V-I Characteristics (continued)

### 18mm Disk Size

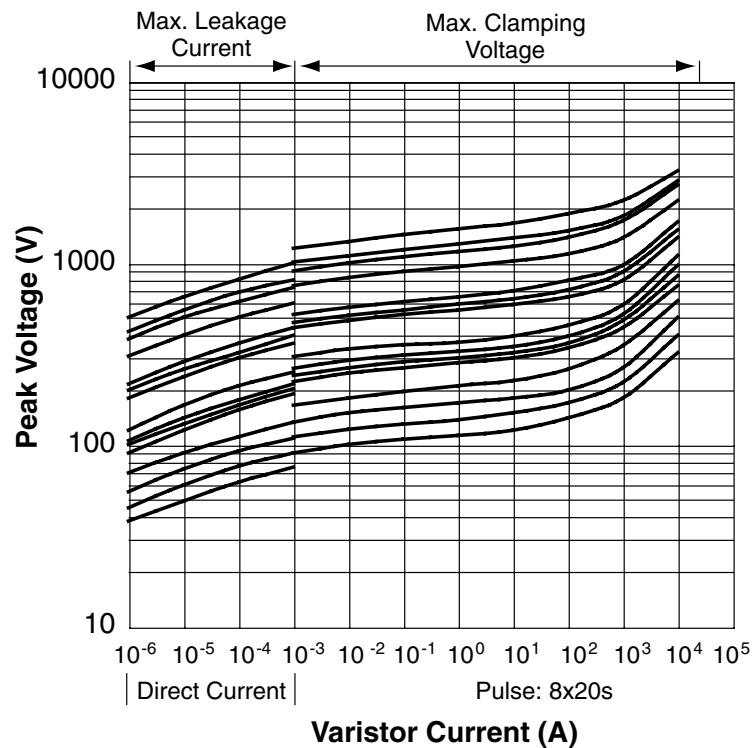
VZ18E951K - (Top line on graph)  
 VZ18E911K  
 VZ18E821K  
 VZ18E751K  
 VZ18E681K  
 VZ18E621K  
 VZ18E511K  
 VZ18E471K  
 VZ18E431K  
 VZ18E391K  
 VZ18E361K  
 VZ18E271K  
 VZ18E241K  
 VZ18E201K - (Bottom line on graph)



### 20mm Disk Size

VZ20D112K - (Top line on graph)  
 VZ20D911K  
 VZ20D821K  
 VZ20D681K  
 VZ20D471K  
 VZ20D431K  
 VZ20D391K  
 VZ20D271K  
 VZ20D241K  
 VZ20D221K  
 VZ20D201K  
 VZ20D151K  
 VZ20D121K  
 VZ20D101K  
 VZ20D820K - (Bottom line on graph)

(Also applies to "E" series parts)

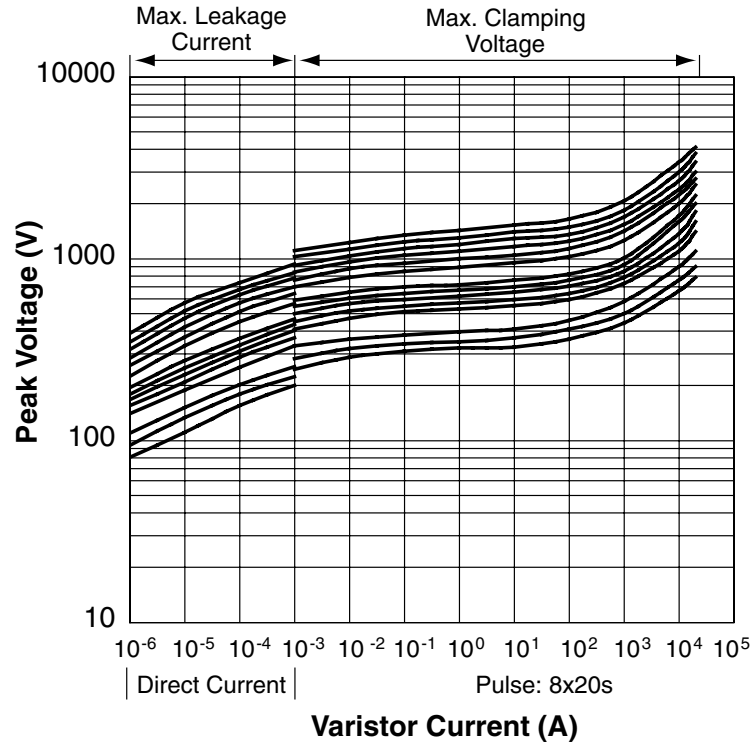


At idle power, current levels shown to the left of the diskontinuity illustrate typically the high end leakage current. However, if lower leakage current levels are desired, they may be guaranteed. In the clamping voltage region to the right of the diskontinuity, maximum clamping voltage is plotted.

## V-I Characteristics (continued)

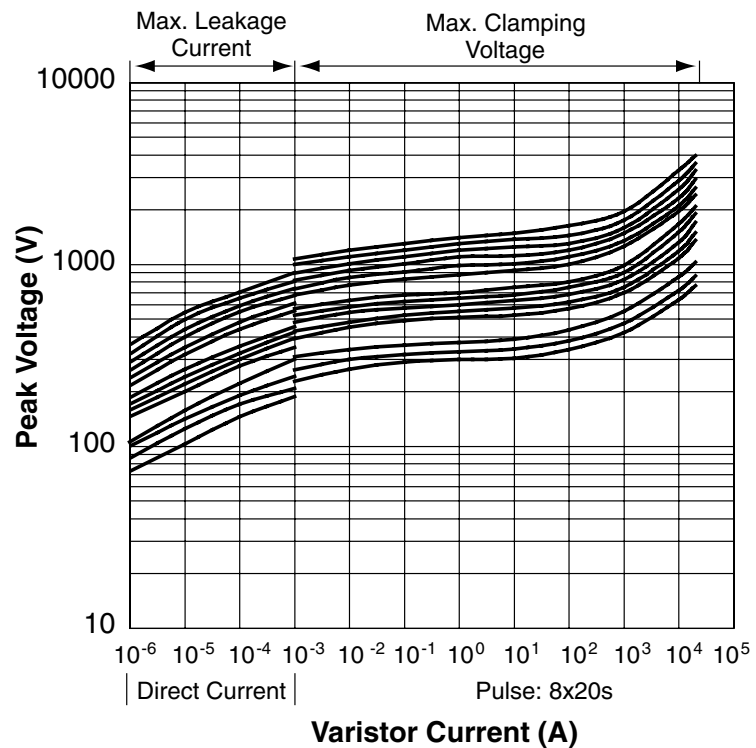
### 25mm Disk Size

VZ25D951K - (Top line on graph)  
 VZ25D911K  
 VZ25D821K  
 VZ25D751K  
 VZ25D681K  
 VZ25D621K  
 VZ25D511K  
 VZ25D471K  
 VZ25D431K  
 VZ25D391K  
 VZ25D361K  
 VZ25D271K  
 VZ25D241K  
 VZ25D201K - (Bottom line on graph)



### 32mm Disk Size

VZ32D951K - (Top line on graph)  
 VZ32D911K  
 VZ32D821K  
 VZ32D751K  
 VZ32D681K  
 VZ32D621K  
 VZ32D511K  
 VZ32D471K  
 VZ32D431K  
 VZ32D391K  
 VZ32D361K  
 VZ32D271K  
 VZ32D241K  
 VZ32D201K - (Bottom line on graph)

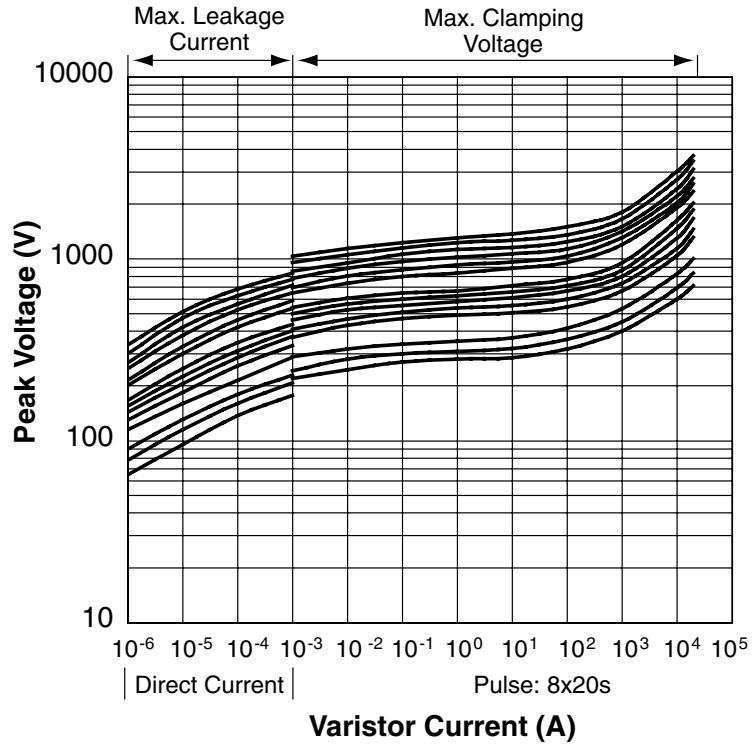


At idle power, current levels shown to the left of the diskontinuity illustrate typically the high end leakage current. However, if lower leakage current levels are desired, they may be guaranteed. In the clamping voltage region to the right of the diskontinuity, maximum clamping voltage is plotted.

## V-I Characteristics (continued)

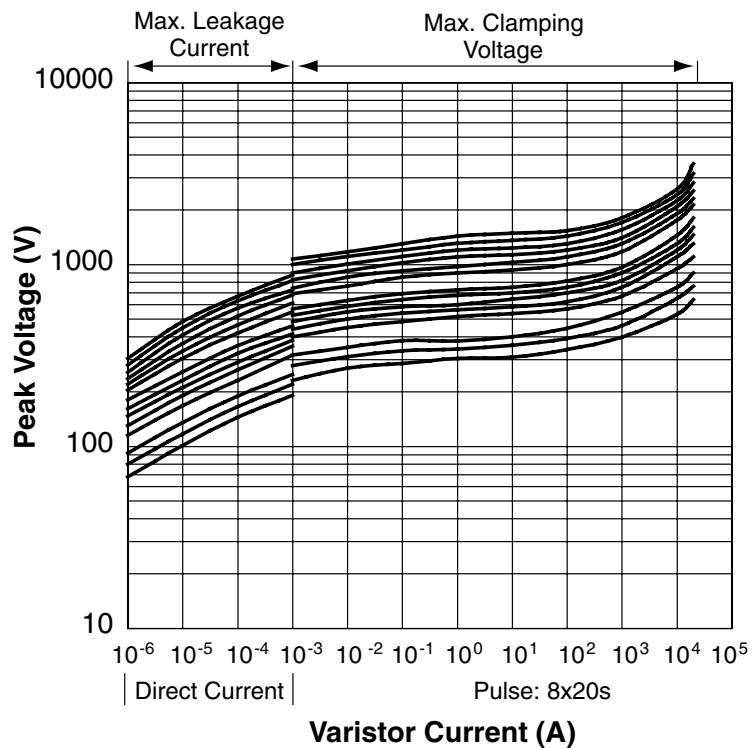
### 34mm Disk Size

VZ34D951K - (Top line on graph)  
 VZ34D911K  
 VZ34D821K  
 VZ34D751K  
 VZ34D681K  
 VZ34D621K  
 VZ34D511K  
 VZ34D471K  
 VZ34D431K  
 VZ34D391K  
 VZ34D361K  
 VZ34D271K  
 VZ34D241K  
 VZ32D201K - (Bottom line on graph)



### 40mm Disk Size

VZ40D951K - (Top line on graph)  
 VZ40D911K  
 VZ40D821K  
 VZ40D751K  
 VZ40D681K  
 VZ40D621K  
 VZ40D511K  
 VZ40D471K  
 VZ40D431K  
 VZ40D391K  
 VZ40D361K  
 VZ40D271K  
 VZ40D241K  
 VZ40D201K - (Bottom line on graph)

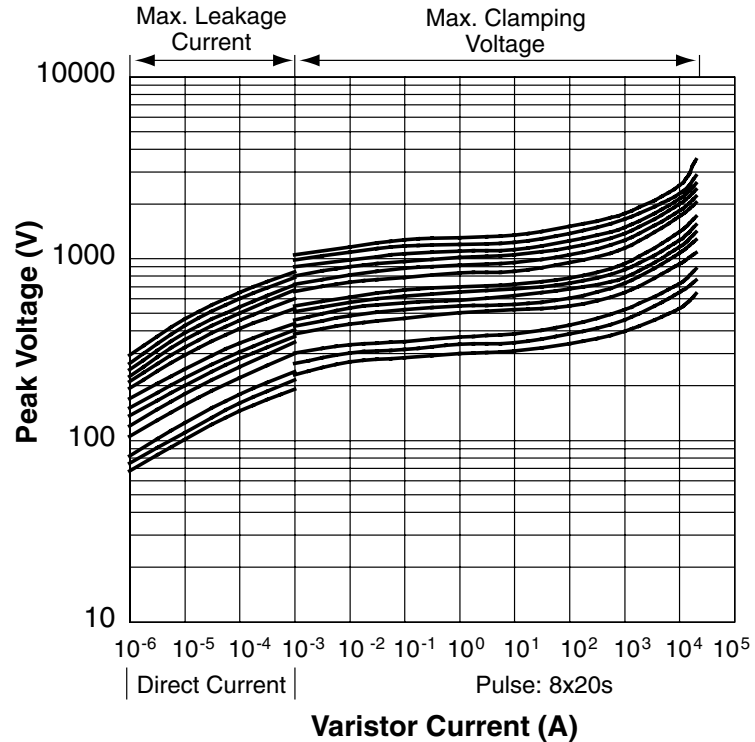


At idle power, current levels shown to the left of the diskontinuity illustrate typically the high end leakage current. However, if lower leakage current levels are desired, they may be guaranteed. In the clamping voltage region to the right of the diskontinuity, maximum clamping voltage is plotted.

## V-I Characteristics (continued)

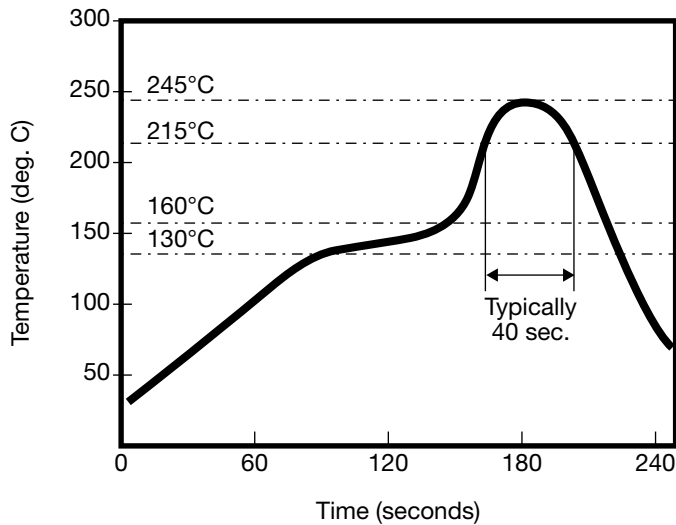
### 53mm Disk Size

VZ53D951K - (Top line on graph)  
 VZ53D911K  
 VZ53D821K  
 VZ53D751K  
 VZ53D681K  
 VZ53D621K  
 VZ53D511K  
 VZ53D471K  
 VZ53D431K  
 VZ53D391K  
 VZ53D361K  
 VZ53D271K  
 VZ53D241K  
 VZ53D201K - (Bottom line on graph)

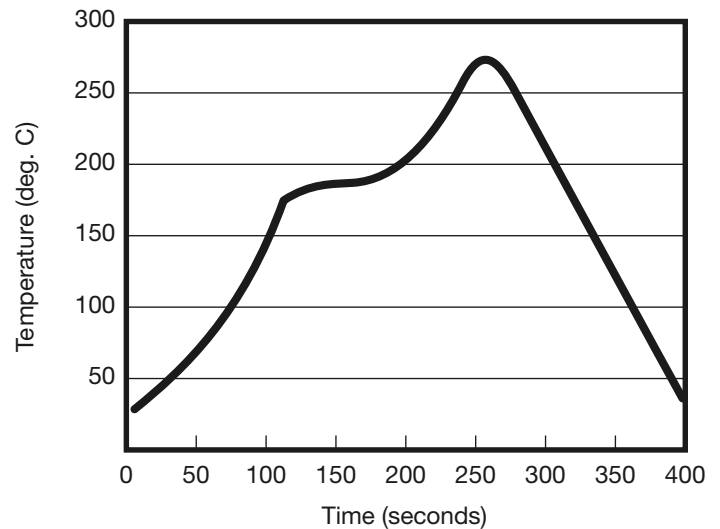


## Soldering Profile

### Standard Product



### RoHS Compliant Product



1. RT to 160°: 100-150 second
2. 150° to 200°: around 60 seconds
3. 200° to 270°: around 60 seconds
4. Peak temperature and time: 270±5°: 3 ±0.5sec
5. 270° to RT: at least 120 seconds

At idle power, current levels shown to the left of the diskontinuity illustrate typically the high end leakage current. However, if lower leakage current levels are desired, they may be guaranteed. In the clamping voltage region to the right of the diskontinuity, maximum clamping voltage is plotted.

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## 5mm / 7mm Taping Specifications

| Item                                        | Symbol | 5mm Disk Size |                             | 7mm Disk Size |                             |
|---------------------------------------------|--------|---------------|-----------------------------|---------------|-----------------------------|
|                                             |        | T11, T1       | T17, T3, T1D, T14, T1W, T32 | T11, T1       | T17, T3, T1D, T14, T1W, T32 |
| Body Diameter                               | D      | 7 max         | 7 max                       | 9.5 max       | 9.5 max                     |
| Lead Wire Diameter                          | d      | 0.6 ± 0.02    | 0.6 ± 0.02                  | 0.6 ± 0.02    | 0.6 ± 0.02                  |
| Pitch of Component                          | P      | 12.7 ± 1      | 12.7 ± 1                    | 12.7 ± 1      | 12.7 ± 1                    |
| Feed Hole Pitch                             | P0     | 12.7 ± 0.3    | 12.7 ± 0.3                  | 12.7 ± 0.3    | 12.7 ± 0.3                  |
| Feed Hole Center to Lead                    | P1     | 3.85 ± 0.7    | 3.85 ± 0.7                  | 3.85 ± 0.7    | 3.85 ± 0.7                  |
| Lead to Lead Distance<br>(Center to Center) | F      | 5 ± 0.8       | 5 ± 0.8                     | 5 ± 0.8       | 5 ± 0.8                     |
| Component Alignment                         | △h     | 2.0 max       | 2.0 max                     | 2.0 max       | 2.0 max                     |
| Basepaper Tape Width                        | W      | 18 +1/-0.5    | 18 +1/-0.5                  | 18 +1/-0.5    | 18 +1/-0.5                  |
| Adhesive Tape Width                         | W0     | 10 min        | 10 min                      | 10 min        | 10 min                      |
| Hole Position                               | W1     | 9 ± 0.5       | 9 ± 0.5                     | 9 ± 0.5       | 9 ± 0.5                     |
| Adhesive Tape Border                        | W2     | 3 max         | 3 max                       | 3 max         | 3 max                       |
| Component Height                            | H1     | 30 max        | 30 max                      | 32 max        | 32 max                      |
| Lead-Wire Clinch Height                     | H0     | —             | 16 ± 0.5                    | —             | 16 ± 0.5                    |
| Lead-Wire Protrusion                        | Lx     | 1.0 max       | 1.0 max                     | 1.0 max       | 1.0 max                     |
| Feed Hole Diameter                          | D0     | 4 ± 0.2       | 4 ± 0.2                     | 4 ± 0.2       | 4 ± 0.2                     |
| Total Tape Thickness                        | t      | »0.7 max      | »0.7 max                    | »0.7 max      | »0.7 max                    |
| Length of Clipped Lead                      | L      | 11 max        | 11 max                      | 11 max        | 11 max                      |
| Component Height from<br>Seating Plane      | A      | —             | 13 max                      | —             | 15 max                      |
| Hole Center to Component<br>Center          | P2     | 6.35 ± .7     | 6.35 ± .7                   | 6.35 ± .7     | 6.35 ± .7                   |

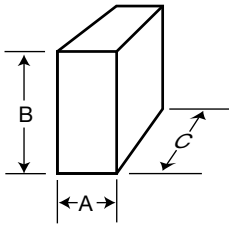
All dimensions are in Millimeters.

Note: Basepaper Thickness = 0.375mm ± 0.1mm (Ammo Box), 0.53mm ± 0.1mm (Reel)

Adhesive Tape Thickness = 0.16mm ± 0.03mm

Largest voltage which can be taped is 420VAC. For 320VAC and larger, only T1W or T32 is available

## 5mm / 7mm Taping Specifications (continued)



### Ammo Box

5mm and 7mm Disk Size, (T11, T17, T1D, T1W)

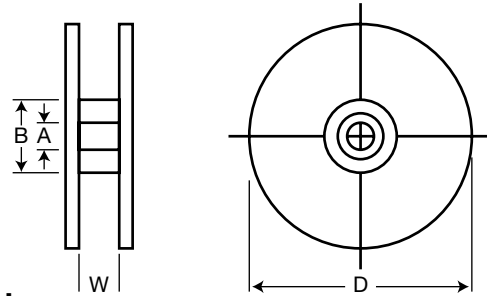
A = 50 max, B = 300 max, C = 340 max

2,000 pieces (5 $\phi$ )

< 250VAC = 1,500 pieces (7 $\phi$ )

$\geq$  250VAC = 1,000 pieces (7 $\phi$ )

All dimensions are in Millimeters.



### Reel

5mm and 7mm Disk Size, (T1, T3, T14, T32)

W = Approximately 50, D = 350 $\phi$ max,

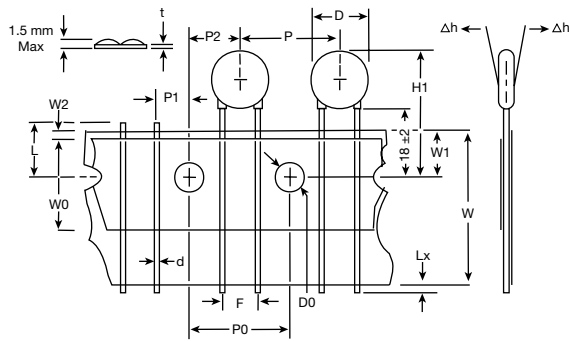
A = Approximately 30 $\phi$ , B = Approximately 95 $\phi$

2,000 pieces (5 $\phi$ )

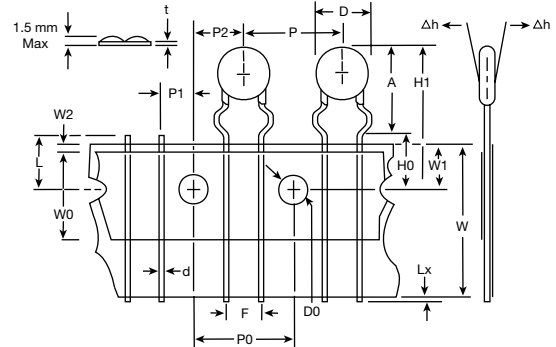
< 250VAC = 1,500 pieces (7 $\phi$ )

$\geq$  250VAC = 1,000 pieces (7 $\phi$ )

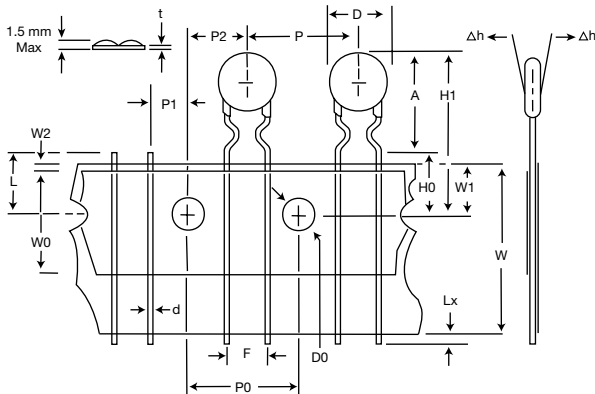
### Straight Lead T11 (Ammo Box) and T1 (Reel)



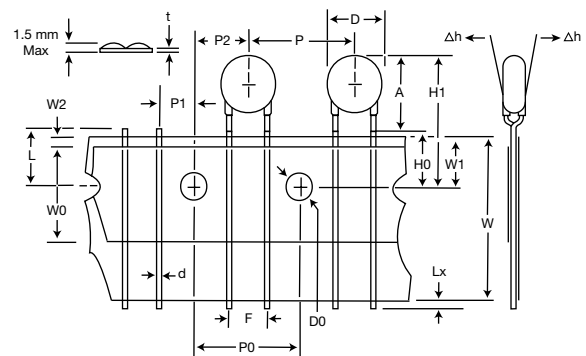
### Outward Crimp T17 (Ammo Box) and T3 (Reel)



### Inward Crimp T1D (Ammo Box) and T14 (Reel)



### In-Line Crimp T1W (Ammo Box) and T32 (Reel)



Based on EIA-468-B Specifications.

# 10mm Taping Specifications

| Item                                     | Symbol | Straight Leads |            | Outward Crimp |            | Inline Crimp |            | Inward Crimp |            |
|------------------------------------------|--------|----------------|------------|---------------|------------|--------------|------------|--------------|------------|
|                                          |        | T36, T19       | T7, T18    | T1U, T1N      | T10, T26   | T43, T4      | T15, T38   | T8, T16      | T6, T12    |
| Body Diameter                            | D      | 12.5 max       | 12.5 max   | 12.5 max      | 12.5 max   | 12.5 max     | 12.5 max   | 12.5 max     | 12.5 max   |
| Lead Wire Diameter                       | d      | 0.8 ± 0.06     | 0.8 ± 0.06 | 0.8 ± 0.06    | 0.8 ± 0.06 | 0.8 ± 0.06   | 0.8 ± 0.06 | 0.8 ± 0.06   | 0.8 ± 0.06 |
| Pitch of Component                       | P      | 25.4 ± 1       | 25.4 ± 1   | 25.4 ± 1      | 25.4 ± 1   | 25.4 ± 1     | 25.4 ± 1   | 25.4 ± 1     | 25.4 ± 1   |
| Feed Hole Pitch                          | P0     | 12.7 ± 0.3     | 12.7 ± 0.3 | 12.7 ± 0.3    | 12.7 ± 0.3 | 12.7 ± 0.3   | 12.7 ± 0.3 | 12.7 ± 0.3   | 12.7 ± 0.3 |
| Feed Hole Center to Lead                 | P1     |                | 3.85 ± 0.7 |               | 3.85 ± 0.7 |              | 3.85 ± 0.7 |              | 3.85 ± 0.7 |
| Lead to Lead Distance (Center to Center) | F      | 7.5 ± 0.8      | 5.0 ± 0.8  | 7.5 ± 0.8     | 5.0 ± 0.8  | 7.5 ± 0.8    | 5.0 ± 0.8  | 7.5 ± 0.8    | 5.0 ± 0.8  |
| Component Alignment                      | Δh     | 2.0 max        | 2.0 max    | 2.0 max       | 2.0 max    | 2.0 max      | 2.0 max    | 2.0 max      | 2.0 max    |
| Basepaper Tape Width                     | W      | 18 +1/-0.5     | 18 +1/-0.5 | 18 +1/-0.5    | 18 +1/-0.5 | 18 +1/-0.5   | 18 +1/-0.5 | 18 +1/-0.5   | 18 +1/-0.5 |
| Adhesive Tape Width                      | W0     | 10 min         | 10 min     | 10 min        | 10 min     | 10 min       | 10 min     | 10 min       | 10 min     |
| Hole Position                            | W1     | 9 ± 0.5        | 9 ± 0.5    | 9 ± 0.5       | 9 ± 0.5    | 9 ± 0.5      | 9 ± 0.5    | 9 ± 0.5      | 9 ± 0.5    |
| Adhesive Tape Border                     | W2     | 3 max          | 3 max      | 3 max         | 3 max      | 3 max        | 3 max      | 3 max        | 3 max      |
| Component Height                         | H1     | 33 max         | 33 max     | 38.5 max      | 38.5 max   | 35.5 max     | 38.5 max   | 38.5 max     | 38.5 max   |
| Lead-Wire Protrusion                     | Lx     | 1.0 max        | 1.0 max    | 1.0 max       | 1.0 max    | 1.0 max      | 1.0 max    | 1.0 max      | 1.0 max    |
| Feed Hole Diameter                       | D0     | 4 ± 0.2        | 4 ± 0.2    | 4 ± 0.2       | 4 ± 0.2    | 4 ± 0.2      | 4 ± 0.2    | 4 ± 0.2      | 4 ± 0.2    |
| Total Tape Thickness                     | t      | »0.7 max       | »0.7 max   | »0.7 max      | »0.7 max   | »0.7 max     | »0.7 max   | »0.7 max     | »0.7 max   |
| Length of Clipped Lead                   | L      | 11 max         | 11 max     | 11 max        | 11 max     | 11 max       | 11 max     | 11 max       | 11 max     |
| Component Height from Seating Plane      | A      | —              | —          | 19.5 max      | 19.5 max   | 19.5 max     | 19.5 max   | 19.5 max     | 19.5 max   |
| Hole Center to Component Center          | P2     |                | 6.35 ± 0.7 |               | 6.35 ± 0.7 |              | 6.35 ± 0.7 |              | 6.35 ± 0.7 |

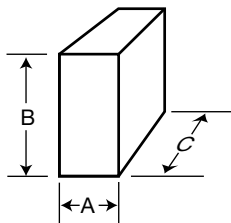
All dimensions are in Millimeters.

Note: Basepaper Thickness = 0.375mm ± 0.1mm (Ammo Box), 0.53mm ± 0.1mm (Reel)

Adhesive Tape Thickness = 0.16mm ± 0.03mm

Largest voltage which can be taped is 460VAC. For 320VAC and larger, only T15, T43, T38 or T4 is available

## 10mm Taping Specifications (continued)



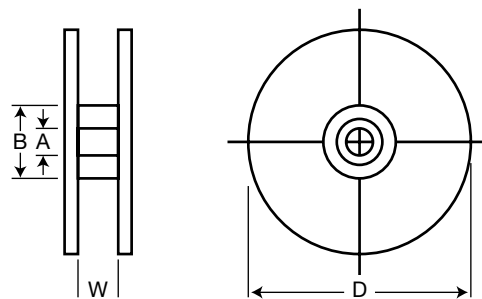
### Ammo Box

Ammo Box Taping Codes  
(T7, T36, T15, T43, T1U, T10, T8, T6)

A = 65 max  
B = 250 max  
C = 340 max

< 300VAC = 500 to 1,000 pieces  
≥ 300VAC = 300 pieces

All dimensions are in Millimeters.



### Reel

Reel Taping Codes  
(T19, T18, T4, T38, T26, T1N, T16, T12)

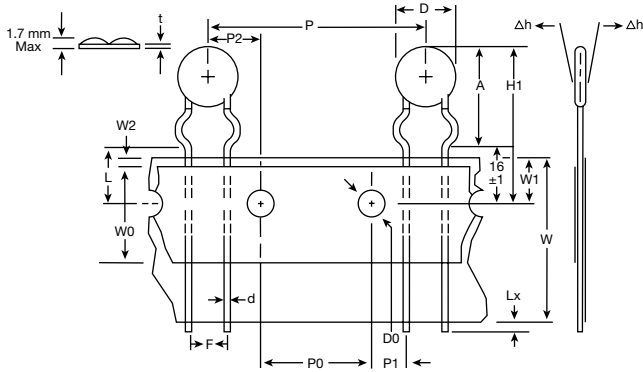
W = Approximately 50  
D = 350ømax  
A = Approximately 30ø  
B = Approximately 95ø

< 300VAC = 500 to 1,000 pieces  
≥ 300VAC = 300 pieces

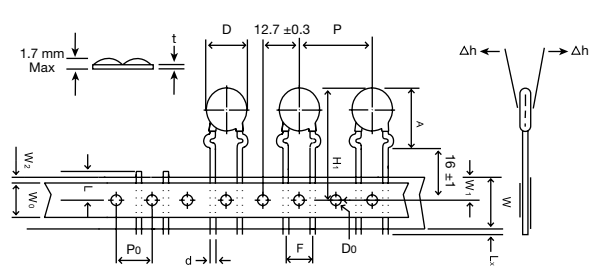


## 10mm Taping Specifications (continued)

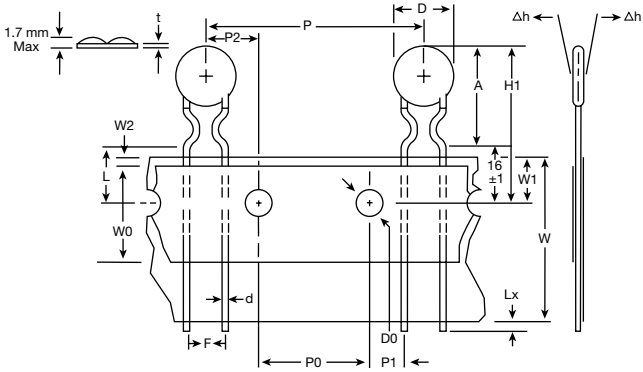
**Outward Crimp**  
**T10 (Ammo Box) and T26 (Reel)**  
**(5mm Lead Spacing)**



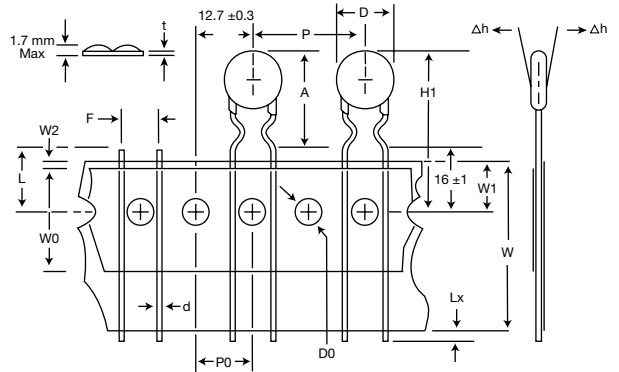
**Outward Crimp**  
**T1U (Ammo Box) and T1N (Reel)**  
**(7.5mm Lead Spacing)**



**Inward Crimp**  
**T6 (Ammo Box) and T12 (Reel)**  
**(5mm Lead Spacing)**



**Inward Crimp**  
**T8 (Ammo Box) and T16 (Reel)**  
**(7.5mm Lead Spacing)**



Based on EIA-468-B Specifications.

# 14mm Taping Specifications

| Item                                     | Symbol | Straight Leads |            | Outward Crimp |            | Inline Crimp |            | Inward Crimp |            |
|------------------------------------------|--------|----------------|------------|---------------|------------|--------------|------------|--------------|------------|
|                                          |        | T36, T19       | T7, T18    | T1U, T1N      | T10, T26   | T43, T4      | T15, T38   | T8, T16      | T6, T12    |
| Body Diameter                            | D      | 16.5 max       | 16.5 max   | 16.5 max      | 16.5 max   | 16.5 max     | 16.5 max   | 16.5 max     | 16.5 max   |
| Lead Wire Diameter                       | d      | 0.8 ± 0.06     | 0.8 ± 0.06 | 0.8 ± 0.06    | 0.8 ± 0.06 | 0.8 ± 0.06   | 0.8 ± 0.06 | 0.8 ± 0.06   | 0.8 ± 0.06 |
| Pitch of Component                       | P      | 25.4 ± 1       | 25.4 ± 1   | 25.4 ± 1      | 25.4 ± 1   | 25.4 ± 1     | 25.4 ± 1   | 25.4 ± 1     | 25.4 ± 1   |
| Feed Hole Pitch                          | P0     | 12.7 ± 0.3     | 12.7 ± 0.3 | 12.7 ± 0.3    | 12.7 ± 0.3 | 12.7 ± 0.3   | 12.7 ± 0.3 | 12.7 ± 0.3   | 12.7 ± 0.3 |
| Feed Hole Center to Lead                 | P1     |                | 3.85 ± 0.7 |               | 3.85 ± 0.7 |              | 3.85 ± 0.7 |              | 3.85 ± 0.7 |
| Lead to Lead Distance (Center to Center) | F      | 7.5 ± 0.8      | 5.0 ± 0.8  | 7.5 ± 0.8     | 5.0 ± 0.8  | 7.5 ± 0.8    | 5.0 ± 0.8  | 7.5 ± 0.8    | 5.0 ± 0.8  |
| Component Alignment                      | Δh     | 2.0 max        | 2.0 max    | 2.0 max       | 2.0 max    | 2.0 max      | 2.0 max    | 2.0 max      | 2.0 max    |
| Basepaper Tape Width                     | W      | 18 +1/-0.5     | 18 +1/-0.5 | 18 +1/-0.5    | 18 +1/-0.5 | 18 +1/-0.5   | 18 +1/-0.5 | 18 +1/-0.5   | 18 +1/-0.5 |
| Adhesive Tape Width                      | W0     | 10 min         | 10 min     | 10 min        | 10 min     | 10 min       | 10 min     | 10 min       | 10 min     |
| Hole Position                            | W1     | 9 ± 0.5        | 9 ± 0.5    | 9 ± 0.5       | 9 ± 0.5    | 9 ± 0.5      | 9 ± 0.5    | 9 ± 0.5      | 9 ± 0.5    |
| Adhesive Tape Border                     | W2     | 3 max          | 3 max      | 3 max         | 3 max      | 3 max        | 3 max      | 3 max        | 3 max      |
| Component Height                         | H1     | 37 max         | 37 max     | 40 max        | 40 max     | 40 max       | 40 max     | 40 max       | 40 max     |
| Lead-Wire Protrusion                     | Lx     | 1.0 max        | 1.0 max    | 1.0 max       | 1.0 max    | 1.0 max      | 1.0 max    | 1.0 max      | 1.0 max    |
| Feed Hole Diameter                       | D0     | 4 ± 0.2        | 4 ± 0.2    | 4 ± 0.2       | 4 ± 0.2    | 4 ± 0.2      | 4 ± 0.2    | 4 ± 0.2      | 4 ± 0.2    |
| Total Tape Thickness                     | t      | »0.7 max       | »0.7 max   | »0.7 max      | »0.7 max   | »0.7 max     | »0.7 max   | »0.7 max     | »0.7 max   |
| Length of Clipped Lead                   | L      | 11 max         | 11 max     | 11 max        | 11 max     | 11 max       | 11 max     | 11 max       | 11 max     |
| Component Height from Seating Plane      | A      | —              | —          | 22.5 max      | 22.5 max   | 22.5 max     | 22.5 max   | 22.5 max     | 22.5 max   |
| Hole Center to Component Center          | P2     |                | 6.35 ± 0.7 |               | 6.35 ± 0.7 |              | 6.35 ± 0.7 |              | 6.35 ± 0.7 |

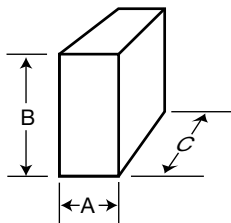
All dimensions are in Millimeters.

Note: Basepaper Thickness = 0.375mm ± 0.1mm (Ammo Box), 0.53mm ± 0.1mm (Reel)

Adhesive Tape Thickness = 0.16mm ± 0.03mm

Largest voltage which can be taped is 460VAC. For 320VAC and larger, only T15, T43, T38 or T4 is available

## 14mm Taping Specifications (continued)



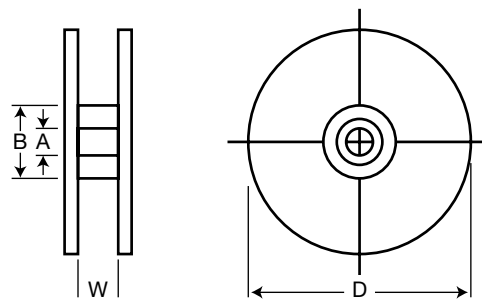
### Ammo Box

Ammo Box Taping Codes  
(T7, T36, T15, T43, T1U, T10, T8, T6)

A = 65 max  
B = 250 max  
C = 340 max

< 300VAC = 500 to 1,000 pieces  
≥ 300VAC = 300 pieces

**All dimensions are in Millimeters.**



### Reel

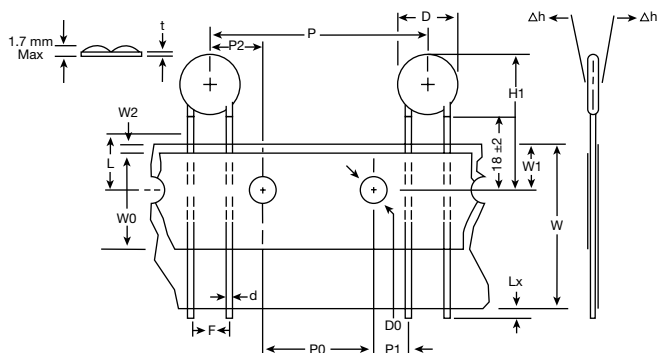
Reel Taping Codes  
(T19, T18, T4, T38, T26, T1N, T16, T12)

W = Approximately 50  
D = 350ømax  
A = Approximately 30ø  
B = Approximately 95ø

< 300VAC = 500 to 1,000 pieces  
≥ 300VAC = 300 pieces

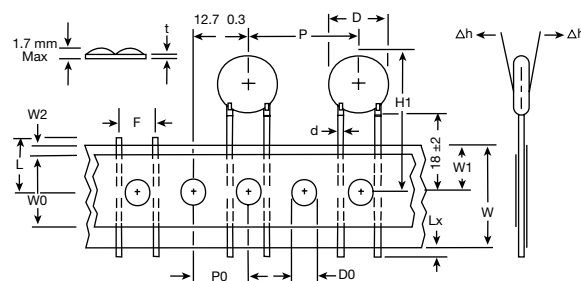
### 14mm Taping Specifications (continued)

**Straight Lead**  
T7 (Ammo Box) and T18 (Reel)  
(5mm Lead Spacing)

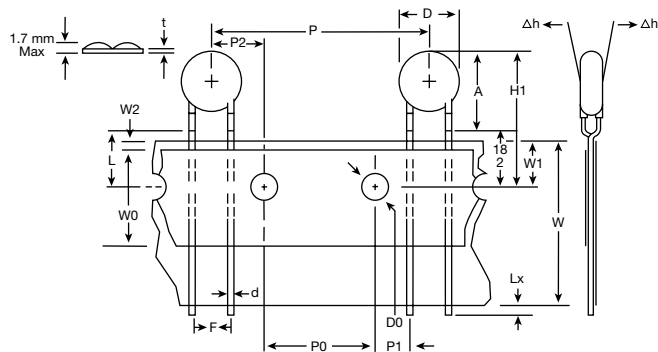


### Straight Lead

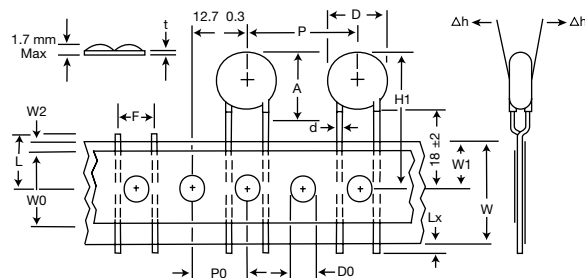
T36 (Ammo Box) and T19 (Reel)  
(7.5mm Lead Spacing)



### In-Line Crimp T15 (Ammo Box) and T38 (Reel) (5mm Lead Spacing)



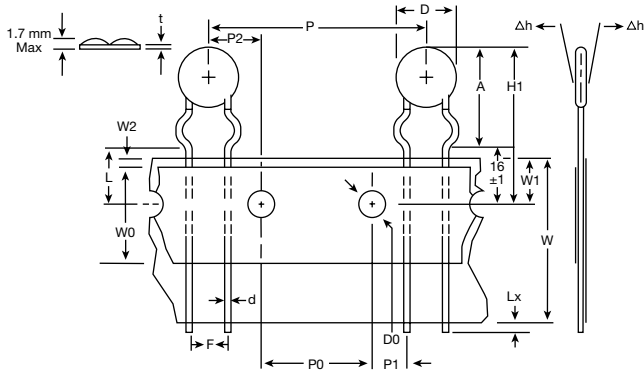
### In-Line Crimp T43 (Ammo Box) and T4 (Reel) (7.5mm Lead Spacing)



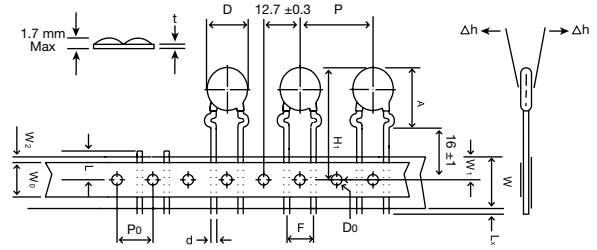
Based on EIA-468-B Specifications.

## 14mm Taping Specifications (continued)

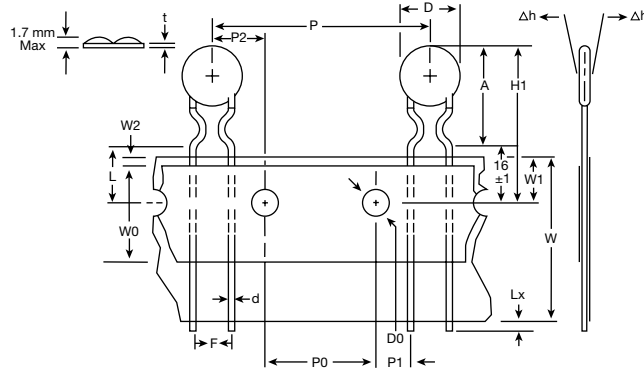
**Outward Crimp**  
T10 (Ammo Box) and T26 (Reel)  
(5mm Lead Spacing)



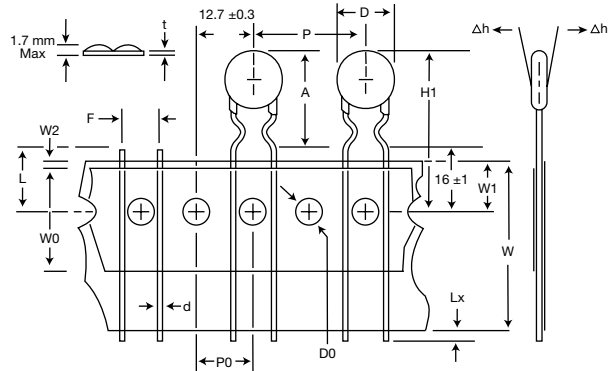
**Outward Crimp**  
T1U (Ammo Box) and T1N (Reel)  
(7.5mm Lead Spacing)



**Inward Crimp**  
T6 (Ammo Box) and T12 (Reel)  
(5mm Lead Spacing)



**Inward Crimp**  
T8 (Ammo Box) and T16 (Reel)  
(7.5mm Lead Spacing)



**18mm / 20mm Taping Specifications**

| Item                                        | Symbol | Straight Leads |            | Outward Crimp |            | Inline Crimp |            | Inward Crimp |            |
|---------------------------------------------|--------|----------------|------------|---------------|------------|--------------|------------|--------------|------------|
|                                             |        | T44, T1H       | T5, T30    | T1X, T45      | T50, T2X   | T2, T25      | T60, T3X   | T40, T4X     | T35, T2D   |
| Body Diameter                               | D      | *24 max        | *24 max    | *24 max       | *24 max    | *24 max      | *24 max    | *24 max      | *24 max    |
| Lead Wire Diameter                          | d      | 0.8 ± 0.06     | 1.0 ± 0.1  | 0.8 ± 0.06    | 1.0 ± 0.1  | 0.8 ± 0.06   | 1.0 ± 0.1  | 0.8 ± 0.06   | 1.0 ± 0.1  |
| Pitch of Component                          | P      | 25.4 ± 1       | 25.4 ± 1   | 25.4 ± 1      | 25.4 ± 1   | 25.4 ± 1     | 25.4 ± 1   | 25.4 ± 1     | 25.4 ± 1   |
| Feed Hole Pitch                             | P0     | 12.7 ± 0.3     | 12.7 ± 0.3 | 12.7 ± 0.3    | 12.7 ± 0.3 | 12.7 ± 0.3   | 12.7 ± 0.3 | 12.7 ± 0.3   | 12.7 ± 0.3 |
| Lead to Lead Distance<br>(Center to Center) | F      | 7.5 ± 0.8      | 10 ± 1     | 7.5 ± 0.8     | 10 ± 1     | 7.5 ± 0.8    | 10 ± 1     | 7.5 ± 0.8    | 10 ± 1     |
| Component Alignment                         | △h     | 2.0 max        | 2.0 max    | 2.0 max       | 2.0 max    | 2.0 max      | 2.0 max    | 2.0 max      | 2.0 max    |
| Basepaper Tape Width                        | W      | 18+1/-0.5      | 18+1/-0.5  | 18+1/-0.5     | 18+1/-0.5  | 18+1/-0.5    | 18+1/-0.5  | 18+1/-0.5    | 18+1/-0.5  |
| Adhesive Tape Width                         | W0     | 10 min         | 10 min     | 10 min        | 10 min     | 10 min       | 10 min     | 10 min       | 10 min     |
| Hole Position                               | W1     | 9 ± 0.5        | 9 ± 0.5    | 9 ± 0.5       | 9 ± 0.5    | 9 ± 0.5      | 9 ± 0.5    | 9 ± 0.5      | 9 ± 0.5    |
| Adhesive<br>Tape Border                     | W2     | 3 max          | 3 max      | 3 max         | 3 max      | 3 max        | 3 max      | 3 max        | 3 max      |
| Component Height                            | H1     | *48 max        | *48 max    | *48 max       | *48 max    | *48 max      | *48 max    | *48 max      | *48 max    |
| Lead-Wire Clinch<br>Height                  | H0     | 18 ± 2         | 18 ± 2     | 16 ± 1        | 16 ± 1     | 16 ± 1       | 16 ± 1     | 16 ± 1       | 16 ± 1     |
| Lead-Wire Protrusion                        | Lx     | 1.0 max        | 1.0 max    | 1.0 max       | 1.0 max    | 1.0 max      | 1.0 max    | 1.0 max      | 1.0 max    |
| Feed Hole Diameter                          | D0     | 4 ± 0.2        | 4 ± 0.2    | 4 ± 0.2       | 4 ± 0.2    | 4 ± 0.2      | 4 ± 0.2    | 4 ± 0.2      | 4 ± 0.2    |
| Total Tape Thickness                        | t      | »0.7 max       | »0.7 max   | »0.7 max      | »0.7 max   | »0.7 max     | »0.7 max   | »0.7 max     | »0.7 max   |
| Length of Clipped Lead                      | L      | 11 max         | 11 max     | 11 max        | 11 max     | 11 max       | 11 max     | 11 max       | 11 max     |
| Component Height<br>from Seating Plane      | A      | —              | —          | *29 max       | *29 max    | *31 max      | *31 max    | *29 max      | *29 max    |

All dimensions are in Millimeters.

Note: Basepaper Thickness = 0.375mm ± 0.1mm (Ammo Box), 0.53mm ± 0.1mm (Reel).

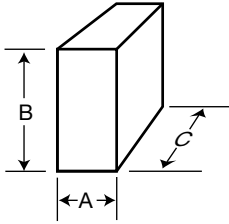
Adhesive Tape Thickness = 0.16mm ± 0.03mm.

\* - 18mm disk size dimensions: D = 22 max, H1 = 46 max, A = 26 max.

Largest voltage which can be taped is 460VAC.

For 320VAC and larger, only T2, T25, T60 or T3X is available

## 18mm / 20mm Taping Specifications (continued)



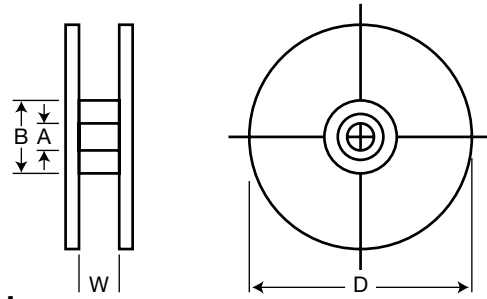
### Ammo Box

Ammo Box Taping Codes  
(T44, T5, T2, T60, T45, T50, T40, T35)

A = 65 max, B = 250 max  
C = 340 max

< 300VAC = 500 pieces, ≥ 300VAC = 300 pieces

All dimensions are in Millimeters.



### Reel

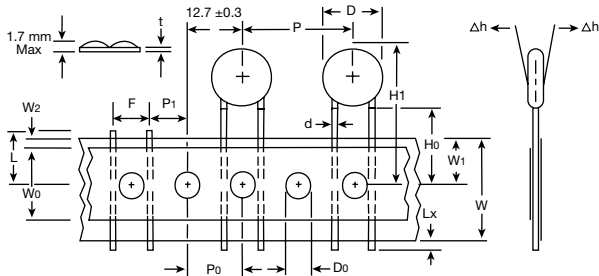
Reel Taping Codes  
(T1H, T30, T25, T3X, T1X, T2X, T4X, T2D)

A = Approx. 30Ø, B = Approx. 95Ø  
W = Approx. 50, D = 350Ømax

< 300VAC = 500 pieces, ≥ 300VAC = 300 pieces

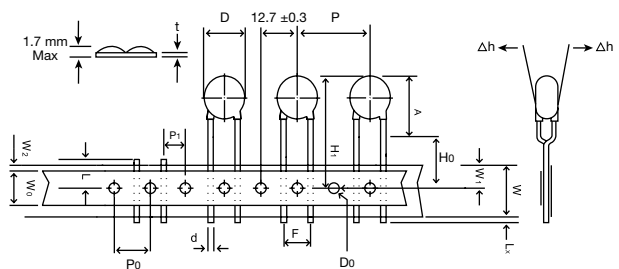
### Straight Lead

T44 (Ammo Box) and T1H (Reel) (7.5mm Lead Spacing)  
T5 (Ammo Box) and T30 (Reel) (10mm Lead Spacing)



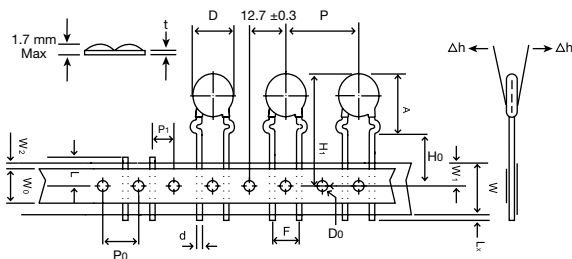
### In-Line Crimp

T2 (Ammo Box) and T25 (Reel) (7.5mm Lead Spacing)  
T60 (Ammo Box) and T3X (Reel) (10mm Lead Spacing)



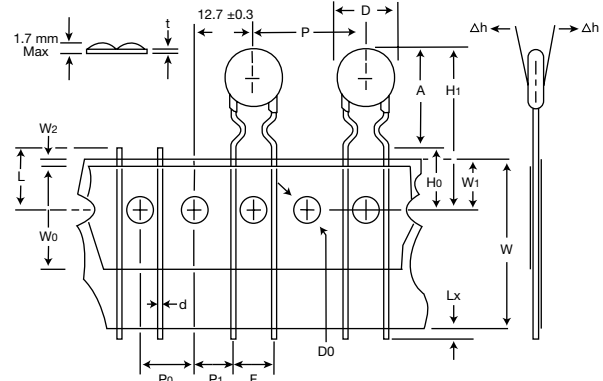
### Outward Crimp

T45 (Ammo Box) and T1X (Reel) (7.5mm Lead Spacing)  
T50 (Ammo Box) and T2X (Reel) (10mm Lead Spacing)



### Inward Crimp

T40 (Ammo Box) and T4X (Reel) (7.5mm Lead Spacing)  
T35 (Ammo Box) and T2D (Reel) (10mm Lead Spacing)

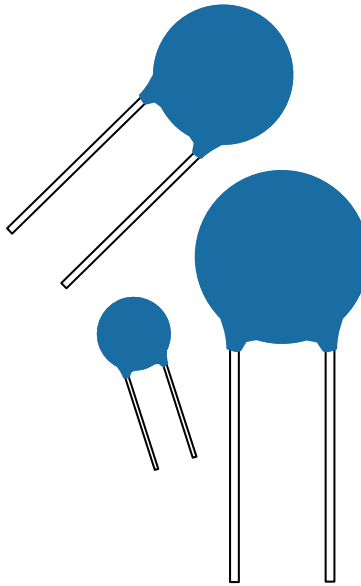


Based on EIA-468-B Specifications.

## Standard Bulk Packaging

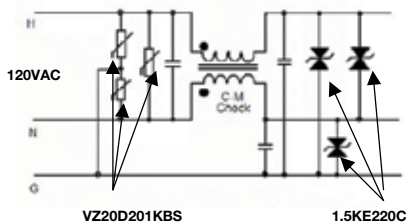
| Disk Size mm         | Varistor Voltage | Quantity<br>pieces/bag | Quantity<br>pieces/carton |
|----------------------|------------------|------------------------|---------------------------|
| Diameter 05          | ALL              | 1000                   | 10000                     |
| Diameter 07          | ALL              | 500                    | 5000                      |
| Diameter 10          | 180K-471K        | 500                    | 5000                      |
|                      | Above 511K       | 300                    | 3000                      |
| Diameter 14          | 180K-751K        | 300                    | 3000                      |
|                      | Above 781K       | 200                    | 2000                      |
| Diameter 18          | ALL              | 200                    | 2000                      |
| Diameter 20          | 180K-621K        | 100                    | 1000                      |
|                      | Above 681K       | 50                     | 500                       |
| Diameter 25          | 180K-621K        | 50                     | 500                       |
|                      | Above 681K       | 30                     | 300                       |
| 32D (wire lead type) | 201K-391K        | 170                    | 340                       |
|                      | 431K-621K        | 160                    | 320                       |
|                      | 681K-112K        | 130                    | 260                       |
| 32D                  | 201K-391K        | 170                    | 340                       |
|                      | 431K-621K        | 160                    | 320                       |
|                      | 681K-112K        | 130                    | 260                       |
| 34R                  | 201K-391K        | 170                    | 340                       |
|                      | 431K-621K        | 160                    | 320                       |
|                      | 681K-112K        | 130                    | 260                       |
| 40D                  | 201K-391K        | 170                    | 340                       |
|                      | 431K-621K        | 160                    | 320                       |
|                      | 681K-112K        | 130                    | 260                       |
| 53D                  | 201K-391K        | 85                     | 170                       |
|                      | 431K-621K        | 80                     | 160                       |
|                      | 681K-112K        | 65                     | 130                       |

## Applications

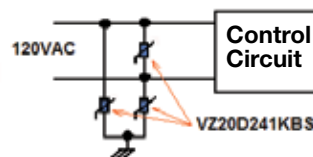


**Metal Oxide Varistors** are transient voltage surge suppression products. Used in both AC and DC applications, these devices clamp transient voltages and divert transient currents. Metal oxide Varistors are available in the widest range of voltages and current handling sizes.

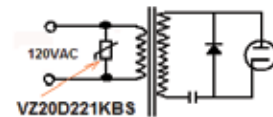
**MOV In AC Line Protection**



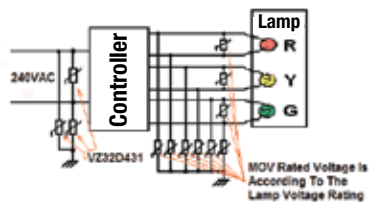
**MOV In Control Circuit Protection**



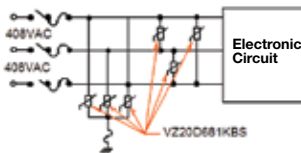
**MOV In Microwave Oven**



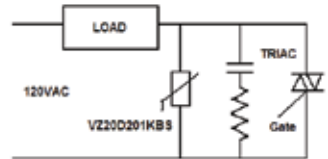
**MOV In Traffic Light Protection**



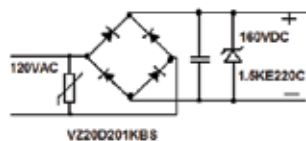
**MOV for 3 Phase AC Line Protection**



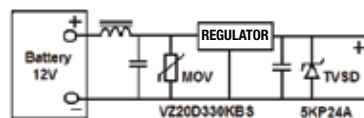
**MOV in Triac Protection**



**MOV in Bridge Rectifier Protection**



**MOV in Automotive Equipment Protection**

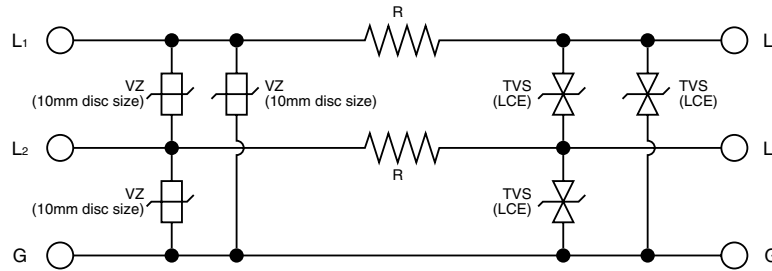


All application notes/circuits are shown as examples only. It is the responsibility of the purchaser to insure that the application meets purchaser's specifications. No representation or warranty, whether express or implied, is given and no liability is assumed by WPI with respect to the use of such examples.

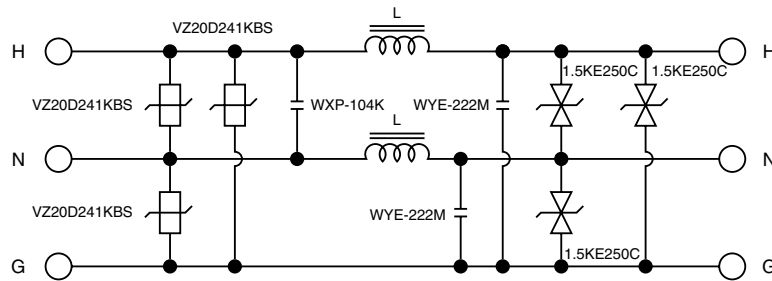
WPI Reserves Copyright

## Circuit Examples

### Data Line Protection

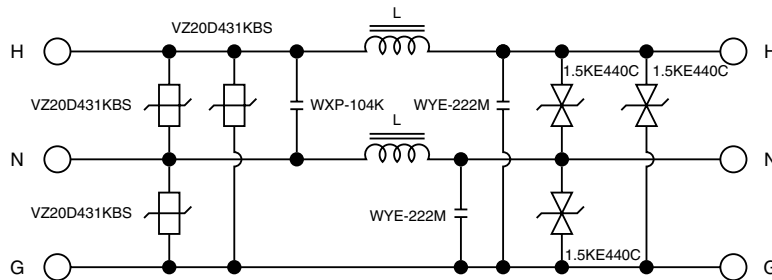


### 120VAC Line Protection



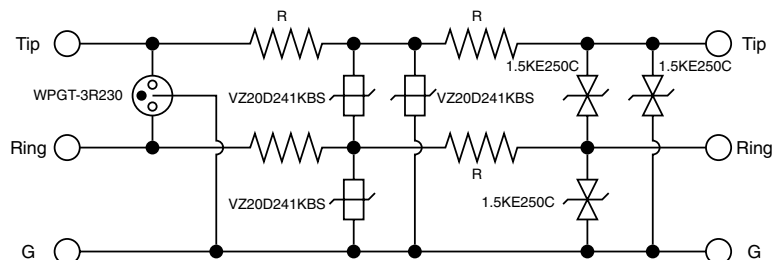
WXP = World Products RFI Suppressor "X Type" (Across-the-Line)  
WYE = World Products RFI Suppressor "Y Type" (Line-to-Ground)

### 240VAC Line Protection



WXP = World Products RFI Suppressor "X Type" (Across-the-Line)  
WYE = World Products RFI Suppressor "Y Type" (Line-to-Ground)

### Telecom Circuit Protection



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