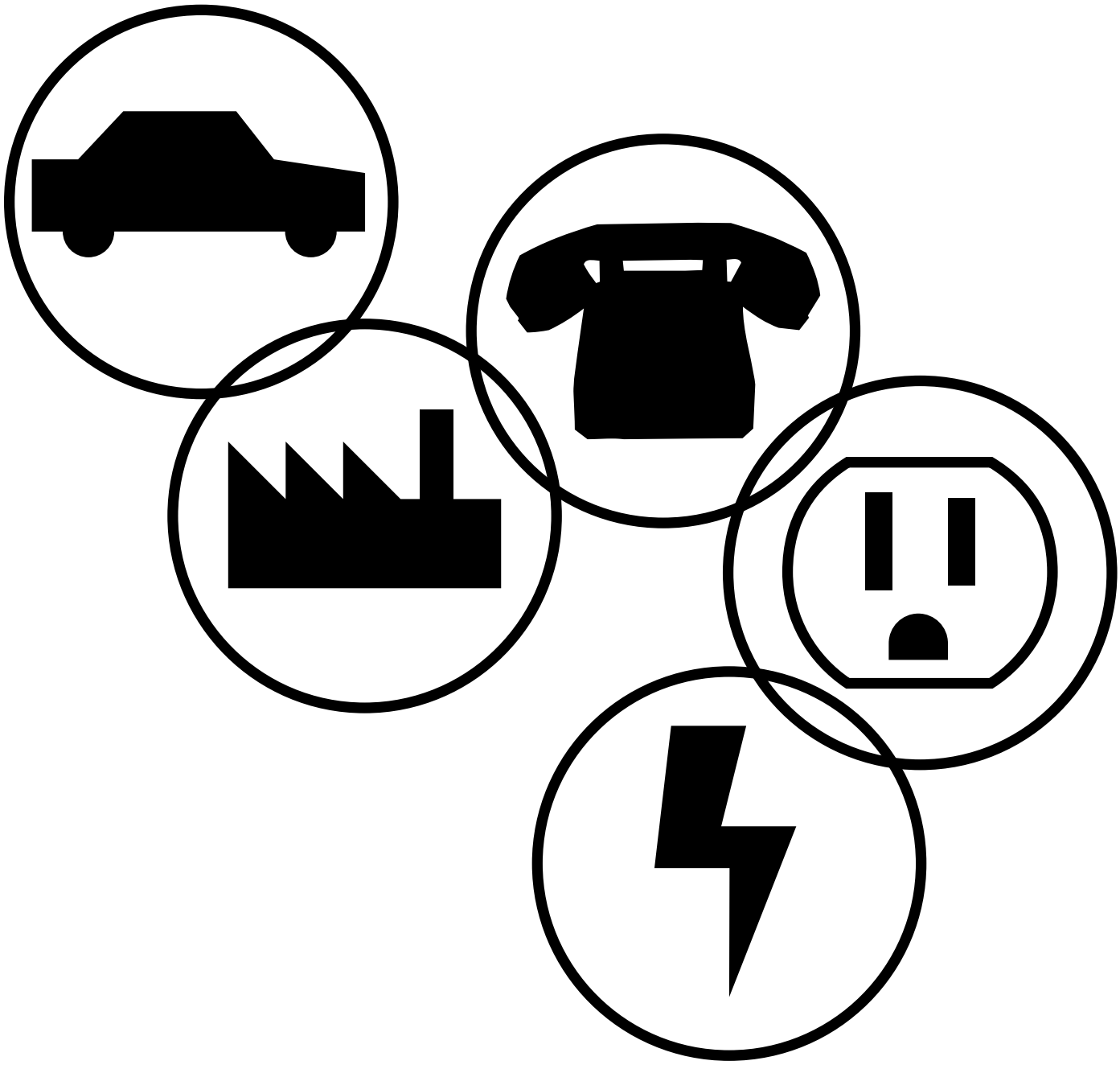
WORLD PRODUCTS INC.
ELECTRONIC COMPONENT SOLUTIONS

METAL OXIDE VARISTORS



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Definitions

Features

- **Our Metal Oxide Varistors have UL, CSA and VDE approvals.** Plus specific types comply with Accelerated Aging Test Requirements per ANSI/IEEE C62.11. The factory is **ISO** 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**.
- **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)

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, 8/20μs 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

Disc Size	Pm-watts
5mm (< 50 VAC)	0.01
5mm (≥ 50 VAC)	0.15
7mm (< 50 VAC)	0.02
7mm (≥ 50 VAC)	0.25
10mm (< 50 VAC)	0.05
10mm (≥ 50 VAC)	0.40
14mm (< 50 VAC)	0.10
14mm (≥ 50 VAC)	0.60
18mm (≥ 50 VAC)	0.80

Disc Size	Pm-watts
20mm (< 50 VAC)	0.20
20mm (≥ 50 VAC)	1.00
25mm	1.20
32mm	1.60
34mm (Single)	2.10
34mm (Dual)	2.73
40mm	2.10
53mm	2.50
60mm	2.8

Definitions (continued)

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 2000 VDC)
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 202F
Failure Criteria	Voltage change ± 10% from initially measured Varistor Voltage. When determining if varistor is within afore mentioned criteria the same temperature must be observed as was used for initial Varistor Voltage measurements.

Part Marking

Example: 5D241K

10 (1) **D** (2) **471** (3) **K** (4)

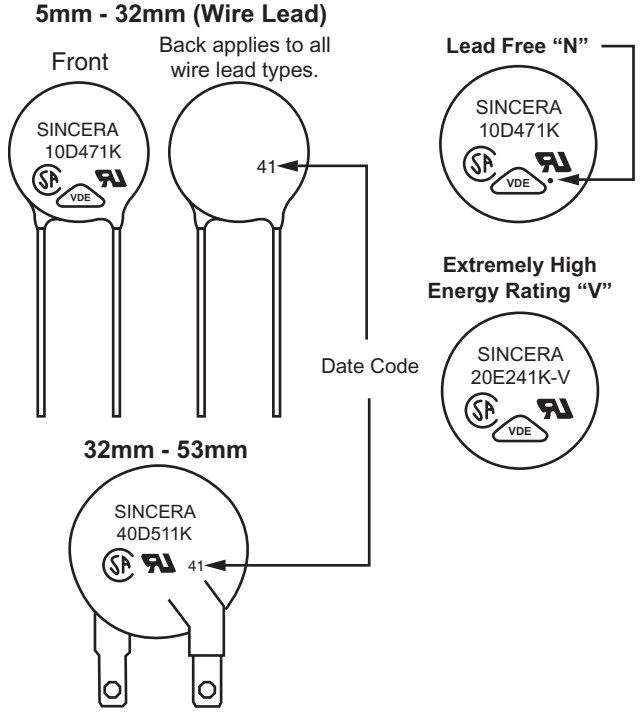
(1) Disc Diameter
5 = 5mm, **7** = 7mm, **10** = 10mm,
14 = 14mm, **18** = 18mm, **20** = 20mm
25 = 25mm, **32** = 32mm, **34** = 34mm,
40 = 40mm, **53** = 53mm, **60** = 60mm

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

(3) Varistor Voltage
471 = 47 x 10^1 = 470 (DC Volts)

(4) Tolerance
J = 5%, **K** = 10%, **M** = 20%

Date Code
41 = First digit represents year - 2004 = 4
Second digit represents month -
1-9 January through September and O for October,
N for November, D for December.
* - Parts will be marked **Sincera**. (This is the brand name.)



Definitions (continued)

Part Number System

Example: VZ20D241KBOCX-VS

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

(1) Series
V = Varistor

(2) Type
Z = Zinc Oxide

(3) Disc 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 x 10^1 = 240 (DC Volts)

(6) Tolerance
J = 5%, K = 10%, M = 20%

(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 disc 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.

(9) Lead Cutting
A = 4.0 ± 1.0mm (.16” ± .04”)
(Crimped lead)
B = 3.0 ± 1.0mm (.12” ± .04”)
(Crimped lead)
C = 4.5 ± 1.5mm (.18” ± .06”)
(Crimped lead)
D = 6.5 ± 1.0mm (.26” ± .04”)
(Crimped lead)
E = 4.0 ± 1.0mm (.18” ± .04”)
(Straight lead)
F = 5.0 ± 1.0mm (.2” ± .04”)
(Crimped lead)
G = 3.3 ± 0.5mm (.13” ± .02”)
(Crimped lead)
(For lead length reference points see Standard Lead Modifications).
Applies only to wire lead type product (5mm-25mm) including 32mm (KW Series).

(10) Lead Spacing
X = 10mm (0.4”) lead spacing (1mm (0.039”) lead diameter).
(For 18mm and 20mm disc diameter only.)
Z = 5mm (0.2”) leadspacing.
(For 10mm and 14mm disc diameters.)

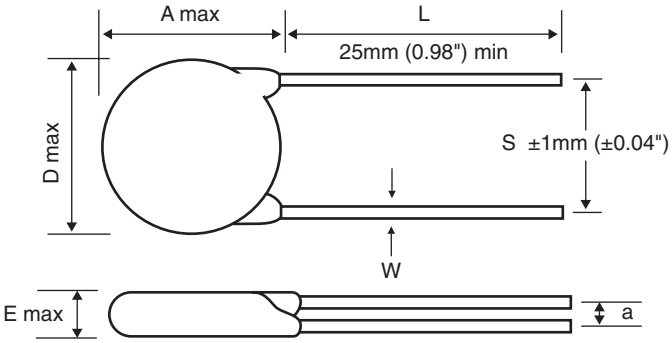
(11) Extremely High Energy Rating
V = 15KA for 20mm and 12KA for 18mm, “E Series” parts only. Available in varistor voltages 201, 221, 241 and 511 (UL1414, UL1449, UL497B and CSA Recognized parts.)
(If you have a special voltage request, please inquire).

(12) Coating Option
P = Non-Flammable Phenolic Coating. Applicable for UL1414 (5mm – 25mm), UL1449 (5mm – 25mm), and CSA (5mm – 53mm) recognized parts.
Note: Applicable for disk sizes 5mm-53mm.

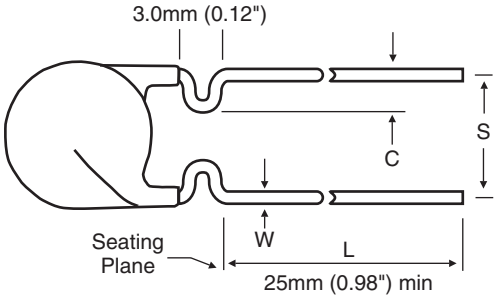
(13) Lead-Free (Pb-Free) Type
N = Lead-free varistor.
(Available in disk sizes 5mm-60mm)
UL1414 (5mm-25mm) and CSA (5mm -53mm).
(UL1449 and UL497B Pending).

Standard Dimensions and Lead Modification Options

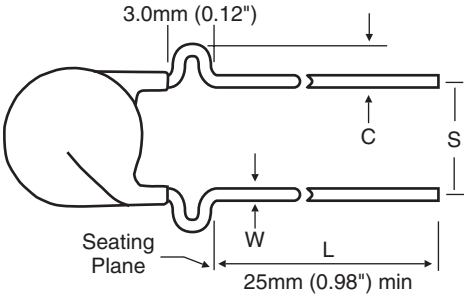
Straight Leads



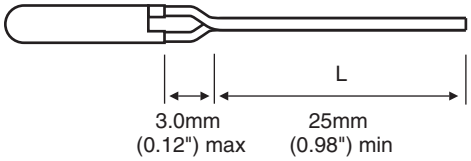
Inward Crimp



Outward Crimp



Inline Crimp



Disc Size	A max		D max		S		W nom		C		L	Dimension E max and a
mm	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 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 disc diameter).

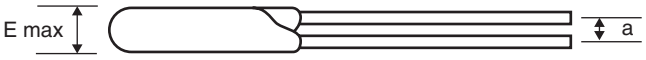
Notes:

1. Maximum epoxy extending on leads (measured from bottom most portion of disc) is 3mm for all disc sizes with exception of 20mm, 25mm and 32mm disc sizes which are 4mm.
2. Reduced dimensions, special lead diameters and special lead spacing may be avaliable upon request.
3. Bulk parts for 320VAC and larger come standard with inline crimp (as referenced above) for straight disc 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 avaliable 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

Dimensions are in mm (inches)



5D Series

Style	E Max mm (in)	Off-set Dimension (a) ±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 mm (in)	Off-set Dimension (a) ±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 mm (in)	Off-set Dimension (a) ±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)

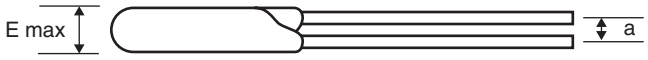
Style	E Max mm (in)	Off-set Dimension (a) ±1 (±0.04) mm (in)
7D221K	3.6 (.14)	1.6 (.063)
7D241K	3.7 (.145)	1.8 (.07)
7D271K	3.8 (.15)	2.0 (.08)
7D301K	3.9 (.15)	2.3 (.09)
7D331K	4.1 (.16)	2.4 (.094)
7D361K	4.4 (.17)	2.5 (.1)
7D391K	4.5 (.18)	2.7 (.1)
7D431K	4.7 (.185)	2.9 (.11)
7D471K	4.9 (.19)	3.6 (.14)
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 disc 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 Code” position # (8) and add “N” and reference “a” dimensions (for off-set) above.

Standard Dimensions and Lead Modification Options (continued)

E Max Dimensions

Dimensions are in mm (inches)



10D Series

Style	E Max mm (in)	Off-set Dimension (a) ±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 mm (in)	Off-set Dimension (a) ±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 mm (in)	Off-set Dimension (a) ±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)

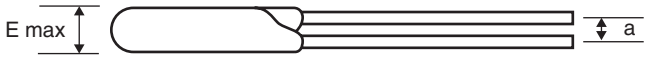
Style	E Max mm (in)	Off-set Dimension (a) ±1 (±0.04) mm (in)
14D301K	4.4 (.17)	2.6 (.1)
14D331K	4.6 (.18)	2.6 (.1)
14D361K	4.9 (.19)	2.8 (.11)
14D391K	5.0 (.2)	3.0 (.12)
14D431K	5.2 (.2)	3.2 (.126)
14D471K	5.4 (.21)	3.8 (.15)
14D511K	5.5 (.22)	*3.4 (.13)
14D561K	5.8 (.23)	*3.5 (.138)
14D621K	6.1 (.24)	*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 disc 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 Code” position # (8) and add “N” and reference “a” dimensions (for off-set) above.

Standard Dimensions and Lead Modification Options (continued)

E Max Dimensions

Dimensions are in mm (inches)



20D Series

Style	E Max mm (in)	Off-set Dimension (a) ±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 mm (in)	Off-set Dimension (a) ±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 mm (in)	Off-set Dimension (a) ±1 (±0.04) mm (in)
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)

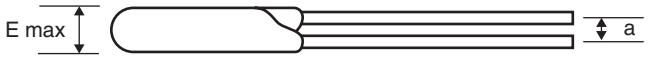
Style	E Max mm (in)	Off-set Dimension (a) ±1 (±0.04) mm (in)
25D511K	6.8 (.27)	*3.5 (.138)
25D561K	7.0 (.275)	*3.9 (.15)
25D621K	7.4 (.29)	*4.8 (.19)
25D681K	7.5 (.29)	*5.0 (.197)
25D751K	7.6 (.30)	*5.4 (.2)
25D781K	8.0 (.31)	*5.5 (.22)
25D821K	8.2 (.32)	*5.8 (.23)
25D911K	8.2 (.32)	*7.0 (.275)
25D102K	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 disc 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 Code” position # (8) and add “N” and reference “a” dimensions (for off-set) above.

Standard Dimensions and Lead Modification Options (continued)

E Max Dimensions

Dimensions are in mm (inches)



32D Series

Style	E Max mm (in)	Off-set Dimension (a) ±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 mm (in)	Off-set Dimension (a) ±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 mm (in)	Off-set Dimension (a) ±1 (±0.04) mm (in)
5E820K	3.4 (.13)	1.2 (.05)
5E181K	3.5 (.138)	1.5 (.06)
5E201K	3.5 (.138)	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 mm (in)	Off-set Dimension (a) ±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	4.7 (.185)	3.6 (.14)

7E High Energy Series

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

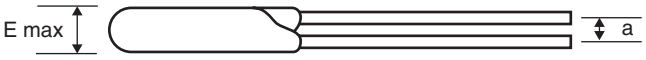
Style	E Max mm (in)	Off-set Dimension (a) ±1 (±0.04) mm (in)
7E331K	4.1 (.16)	2.4 (.094)
7E361K	4.4 (.17)	2.5 (.1)
7E391K	4.5 (.18)	2.7 (.1)
7E431K	4.7 (.185)	2.9 (.11)
7E471K	4.7 (.185)	3.6 (.14)

* 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 disc 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 Code” position # (8) and add “N” and reference “a” dimensions (for off-set) above.

Standard Dimensions and Lead Modification Options (continued)

E Max Dimensions

Dimensions are in mm (inches)
Note: For Suffix "V" add 0.1 (0.004)



10E High Energy Series

Style	E Max mm (in)	Off-set Dimension (a) ±1 (±0.04) mm (in)
10E820K	3.8 (.15)	1.4 (.055)
10E181K	3.9 (.15)	1.6 (.063)
10E201K	3.9 (.15)	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 mm (in)	Off-set Dimension (a) ±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	5.2 (.2)	3.6 (.14)
10E511K	5.3 (.21)	*3.4 (.13)
10E561K	5.8 (.23)	*3.5 (.138)
10E821K	6.7 (.26)	*5.4 (.2)

14E High Energy Series

Style	E Max mm (in)	Off-set Dimension (a) ±1 (±0.04) mm (in)
14E820K	3.8 (.15)	1.4 (.055)
14E181K	4.4 (.17)	1.7 (.067)
14E201K	4.4 (.17)	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 mm (in)	Off-set Dimension (a) ±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	5.2 (.2)	3.8 (.15)
14E511K	5.3 (.21)	*3.4 (.13)
14E561K	5.8 (.23)	*3.5 (.138)
14E821K	6.7 (.26)	*5.5 (.22)

18E High Energy Series

Style	E Max mm (in)	Off-set Dimension (a) ±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)
18E331K	5.2 (.2)	2.7 (.11)

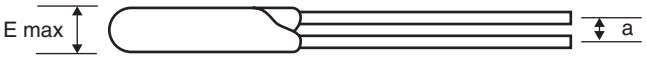
Style	E Max mm (in)	Off-set Dimension (a) ±1 (±0.04) mm (in)
18E361K	5.4 (.21)	2.8 (.11)
18E391K	5.5 (.22)	3.0 (.12)
18E431K	5.7 (.22)	3.2 (.126)
18E471K	5.8 (.23)	3.9 (.15)
18E511K	6.1 (.24)	*3.4 (.13)
18E561K	6.2 (.24)	*3.8 (.15)
18E821K	7.4 (.29)	*5.5 (.22)

* 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 disc 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 Code" position # (8) and add "N" and reference "a" dimensions (for off-set) above.

Standard Dimensions and Lead Modification Options (continued)

E Max Dimensions

Dimensions are in mm (inches)
Note: For Suffix “V” add 0.1 (0.004)



20E High Energy Series

Style	E Max mm (in)	Off-set Dimension (a) ±1 (±0.04) mm (in)
20E820K	4.3 (.17)	1.5 (.06)
20E181K	4.3 (.17)	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 mm (in)	Off-set Dimension (a) ±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	8.5 (.33)	*6.6 (.26)
20E112K	8.0 (.32)	*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 disc 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 Code” position # (8) and add “N” and reference “a” dimensions (for off-set) above.

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	20	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

UL 1449 recognized (File# E172311). UL 497B recognized (File# E199593). No values recognized beyond 680VAC.
UL 1414 recognized (File# E182369). No values recognized below 130VAC.
CSA 22.2 #1 certified (File #227006). No values certified below 130VAC.
VDE (File # 40012633 for VZ05), (File # 40012632 for VZ07, VZ10, VZ14, and VZ20).

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	75	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

UL 1449 recognized (File# E172311). UL 497B recognized (File# E199593). No values recognized beyond 680VAC.
UL 1414 recognized (File# E182369). No values recognized below 130VAC.
CSA 22.2 #1 certified (File #227006). No values certified below 130VAC.
VDE (File # 40012633 for VZ05), (File # 40012632 for VZ07, VZ10, VZ14, and VZ20).

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
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	18000			340	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	18000			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	18000			395	100	3000

UL 1449 recognized (File# E172311). UL 497B recognized (File# E199593). No values recognized beyond 680VAC.
UL 1414 recognized (File# E182369). No values recognized below 130VAC.
CSA 22.2 #1 certified (File #227006). No values certified below 130VAC.
VDE (File # 40012633 for VZ05), (File # 40012632 for VZ07, VZ10, VZ14, and VZ20).
* 25mm are UL 1449 (File# E172311) and CSA 22.2 #1 Certified (File# 227006). No values certified below 130VAC. 25mm types comply with Accelerated Aging Test Requirements per ANSI/IEEE C62.11, UL File# E172311.

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	18000			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	18000			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	18000			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	18000			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	18000			650	100	1900

UL 1449 recognized (File# E172311). UL 497B recognized (File# E199593). No values recognized beyond 680VAC.
UL 1414 recognized (File# E182369). No values recognized below 130VAC.
CSA 22.2 #1 certified (File #227006). No values certified below 130VAC.
VDE (File # 40012633 for VZ05), (File # 40012632 for VZ07, VZ10, VZ14, and VZ20).
* 25mm are UL 1449 (File# E172311) and CSA 22.2 #1 Certified (File# 227006). No values certified below 130VAC. 25mm types comply with Accelerated Aging Test Requirements per ANSI/IEEE C62.11, UL File# E172311.

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	18000			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	18000			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	18000			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	18000			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	18000			1025	100	1200

UL 1449 recognized (File# E172311). UL 497B recognized (File# E199593). No values recognized beyond 680VAC.
UL 1414 recognized (File# E182369). No values recognized below 130VAC.
CSA 22.2 #1 certified (File #227006). No values certified below 130VAC.
VDE (File # 40012633 for VZ05 except values 511, 561, and 621), (File # 40012632 for VZ07, VZ10, VZ14, and VZ20).
* 25mm are UL 1449 (File# E172311) and CSA 22.2 #1 Certified (File# 227006). No values certified below 130VAC. 25mm types comply with Accelerated Aging Test Requirements per ANSI/IEEE C62.11, UL File# E172311.

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	18000			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	18000			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	18000			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	18000			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	18000			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	18000			1620	100	760
VZ10D112KBS	680	895	72	115	2500	962	1175	1815	25	70
VZ14D112KBS			140	215	4500			1800	50	140
VZ20D112KBS			250	383	10000			1800	100	340
*VZ25D112KBS			—	700	18000			1800	100	690

UL 1449 recognized (File# E172311). UL 497B recognized (File# E199593). No values recognized beyond 680VAC.
UL 1414 recognized (File# E182369). No values recognized below 130VAC.
CSA 22.2 #1 certified (File #227006). No values certified below 130VAC.
VDE (File # 40012632 for VZ07, VZ10, VZ14, and VZ20).
* 25mm are UL 1449 (File# E172311) and CSA 22.2 #1 Certified (File# 227006). No values certified below 130VAC. 25mm types comply with Accelerated Aging Test Requirements per ANSI/IEEE C62.11, UL File# E172311.

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
	AC RMS Volts	DC Volts	Energy 10/1000µs Joules	Peak 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

All parts approved as follows:
UL 1449 recognized (File # E172311).
UL 1414 recognized (File # E182369).
No value recognized below 130VAC
VDE (File # 40012630 for VZ07, VZ10, VZ14, and VZ18).

UL 497B recognized (File # E199593).
No voltage recognized beyond 680VAC.
CSA 22.2 #1 certified (File #227006).
No value certified below 130VAC
Note: VZ18 and VZ20 Series Types comply with Accelerated Aging Test Requirements per ANSI/IEEE C62.11, UL File# E172311.

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
	AC RMS Volts	DC Volts	Energy 10/1000µs Joules	Peak 8/20µs Amps	Min Volts	Max Volts	Volts	Amps	pF
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
VZ20E301KBS	195	250	210	12000	270	330	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

All parts approved as follows:
UL 1449 recognized (File # E172311).
UL 1414 recognized (File # E182369).
No value recognized below 130VAC
VDE (File # 40012630 for VZ07, VZ10, VZ14, and VZ18).

UL 497B recognized (File # E199593).
No voltage recognized beyond 680VAC.
CSA 22.2 #1 certified (File #227006).
No value certified below 130VAC
Note: VZ18 and VZ20 Series Types comply with Accelerated Aging Test Requirements per ANSI/IEEE C62.11, UL File# E172311.

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
	AC RMS Volts	DC Volts	Energy 10/1000µs Joules	Peak 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

All parts approved as follows:
UL 1449 recognized (File # E172311).
UL 1414 recognized (File # E182369).
No value recognized below 130VAC
VDE (File # 40012630 for VZ07, VZ10, VZ14, and VZ18).

UL 497B recognized (File # E199593).
No voltage recognized beyond 680VAC.
CSA 22.2 #1 certified (File #227006).
No value certified below 130VAC
Note: VZ18 and VZ20 Series Types comply with Accelerated Aging Test Requirements per ANSI/IEEE C62.11, UL File# E172311.

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
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
VZ20E621KBS	390	505	430	12000	558	682	1025	100	710
VZ20E681KBS	420	560	435	12000	612	748	1120	100	680
VZ20E751KBS	460	615	440	12000	675	825	1240	100	620
VZ20E781KBS	485	640	450	12000	702	858	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
VZ20E911KBS	550	745	510	12000	819	1001	1400	100	440
VZ20E102KBS	625	825	560	12000	900	1100	1620	100	425
VZ20E112KBS	680	895	620	12000	962	1175	1800	100	380

All parts approved as follows:
UL 1449 recognized (File # E172311).
UL 1414 recognized (File # E182369).
No value recognized below 130VAC
VDE (File # 40012630 for VZ07, VZ10, VZ14, and VZ18).
UL 497B recognized (File # E199593).
No voltage recognized beyond 680VAC.
CSA 22.2 #1 certified (File #227006).
No value certified below 130VAC
Note: VZ18 and VZ20 Series Types comply with Accelerated Aging Test Requirements per ANSI/IEEE C62.11, UL File# E172311.

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	962	1175	1815	200	900
VZ32D122KW	750	970	790	25	1062	1300	1980	200	800
VZ32D152KW	880	1150	850	25	1350	1650	2640	200	680

All parts recognized as follows:
UL1449 - (File #E196885)
Complies with accelerated aging test requirements per ANSI/IEEE C62.11, UL File #E172311.

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	962	1175	1815	200	900
VZ32D122 □□□	750	970	810	30	1062	1300	1980	200	800

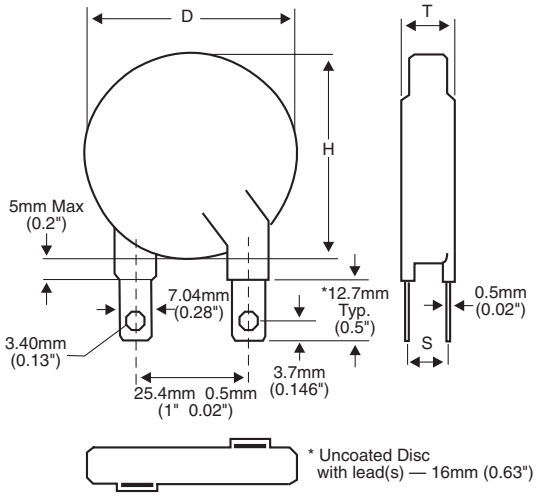
□□□ Part Number Suffix Code
(ie: VZ32D201**KR**)

- **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

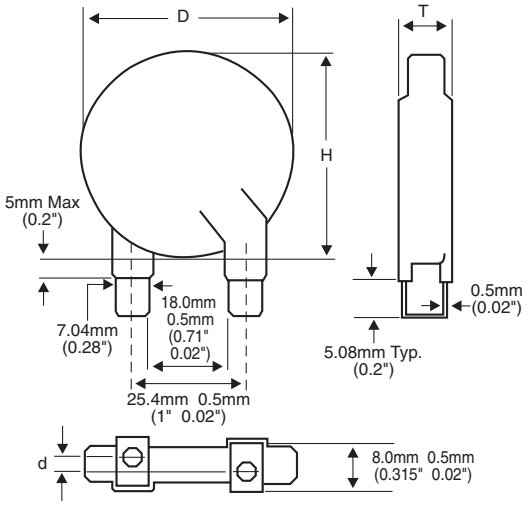
UL 1449 recognized (File# E196885)
UL 1414 recognized (File# E182369) except VZ32D122
CSA 22.2 #1 certified (File #227006).
All Uncoated Disk types are recognized to UL1449 (File # E196885)
Complies with accelerated aging test requirements per ANSI/IEEE C62.11, UL File #E172311.

VZ32 Series Dimensions

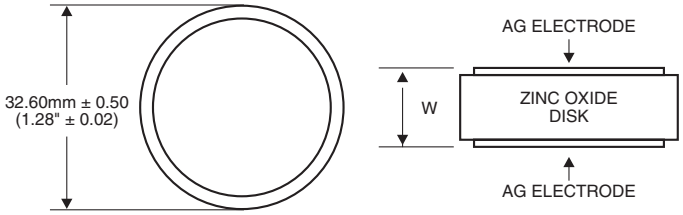
Straight Leads
Part Number Suffix "K"



90° Bend Leads
Part Number Suffix "KQ"



Uncoated Disk
Part Number Suffix "KR"



Part Number	D max.	H max.	T max.	S	d	W
VZ32D201 □□□	40 (1.57)	40 (1.57)	7.5 (.30)	2.3 (.09)	5.7±1.0 (.22± 04)	1.09±0.50 (.04±.02)
VZ32D221 □□□			7.5 (.30)	2.3 (.09)	5.±1.0 (.22±.04)	1.19±0.50 (.047±.02)
VZ32D241 □□□			7.5 (.30)	2.3 (.09)	5.4±1.0 (.21±.04)	1.32±0.50 (.05±.02)
VZ32D271 □□□			8.5 (.33)	2.3 (.09)	5.2±1.0 (.20±.04)	1.44±0.50 (.056±.02)
VZ32D331 □□□			9.0 (.35)	2.5 (.10)	4.8±1.0 (.19±.04)	1.78±0.50 (.07±.02)
VZ32D361 □□□			9.0 (.35)	2.9 (.11)	4.6±1.0 (.18±.04)	1.97±0.50 (.077±.02)
VZ32D391 □□□			9.0 (.35)	3.1 (.12)	4.4±1.0 (.17±.04)	2.11±0.50 (.083±.02)
VZ32D431 □□□			9.0 (.35)	3.3 (.13)	4.2±1.0 (.165±.04)	2.34±0.50 (.09±.02)
VZ32D471 □□□			9.7 (.38)	3.6 (.14)	4.2±1.0 (.165±.04)	2.53±0.50 (.1±.02)
VZ32D511 □□□			9.7 (.38)	3.9 (.15)	4.0±1.0 (.16±.04)	2.77±0.50 (.11±.02)
VZ32D621 □□□			9.7 (.38)	3.9 (.15)	3.9±1.0 (.15±.04)	3.40±0.50 (.134±.02)
VZ32D681 □□□			9.7 (.38)	4.1 (.16)	3.6±1.0 (.14±.04)	3.64±0.50 (.143±.02)
VZ32D751 □□□			10.5 (.41)	4.4 (.17)	3.3±1.0 (.13±.04)	4.11±0.50 (.16±.02)
VZ32D781 □□□			10.5 (.41)	4.5 (.18)	3.1±1.0 (.12±.04)	4.15±0.50 (.16 ±.02)
VZ32D821 □□□			10.5 (.41)	4.6 (.18)	2.9±1.0 (.11±.04)	4.47±0.50 (.176±.02)
VZ32D911 □□□			11.5 (.45)	4.6 (.18)	2.5±1.0 (.10±.04)	4.95±0.50 (.195±.02)
VZ32D951 □□□			11.5 (.45)	5.2 (.20)	2.3±1.0 (.09±.04)	5.05±0.50 (.2±.02)
VZ32D102 □□□			11.5 (.45)	5.4 (.21)	2.1±1.0 (.08±.04)	5.48±0.50 (.215±.02)
VZ32D112 □□□			11.5 (.45)	5.7 (.22)	2.1±1.0 (.08±.04)	5.96±0.50 (.23±.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	2700
VZ34R621 □□□	390	505	800	40	558	682	1025	300	3300
VZ34R681 □□□	420	560	910	40	612	748	1120	300	3000
VZ34R751 □□□	460	615	980	40	675	825	1240	300	2600
VZ34R781 □□□	485	640	1020	40	702	858	1290	300	2700
VZ34R821 □□□	510	675	1100	40	738	902	1355	300	2500
VZ34R911 □□□	550	745	1150	40	819	1001	1500	300	1800
VZ34R951 □□□	575	765	1200	40	855	1045	1570	300	1700
VZ34R102 □□□	625	825	1250	40	900	1100	1650	300	1600
VZ34R112 □□□	680	895	1350	40	962	1175	1815	300	1500
VZ34R122 □□□	750	970	1450	40	1062	1300	1980	300	1300

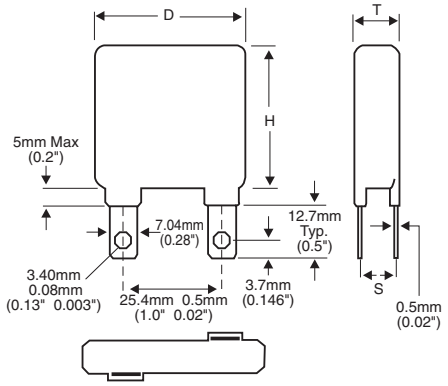
□□□ - Part Number Suffix Code
(ie: VZ34R201**KR**)

- **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

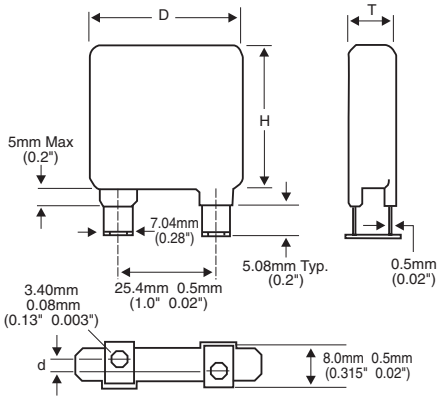
UL 1449 Recognized (File # E196885)
UL 1414 recognized (File #E182369) except VZ34R122
CSA 22.2 #1 certified (File #227006).
All Uncoated Disk types are recognized to UL1449 (File # E196885)

VZ34 Single - Series Dimensions

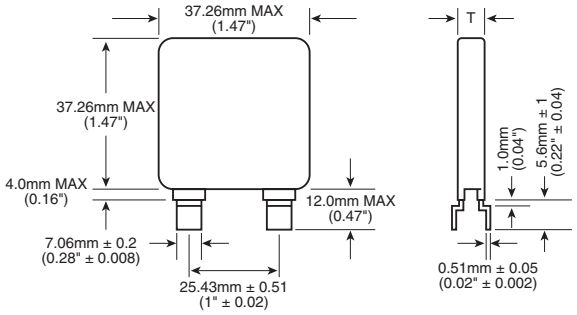
Straight Leads
Part Number Suffix "K"



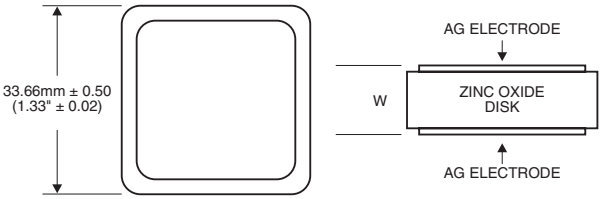
90° Bend Leads
Part Number Suffix "KQ"



Tab Leads Outward Crimp
Part Number Suffix "KA"



Uncoated Disk
Part Number Suffix "KR"



Part Number	D max.	H max.	T max.	S ±1.0 (±.04)	d	W
VZ34R201 □□□	42 (1.65)	42 (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)
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)

VZ34 Dual - Series Electrical Characteristics

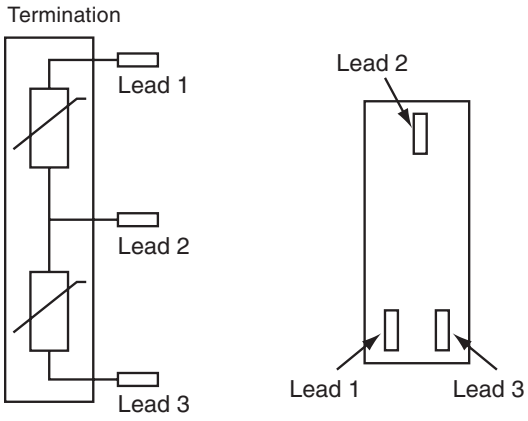
Part Number	Continuous Rated Voltage*		Rated Single Pulse Transient		Varistor Voltage @1mA DC*		Maximum Clamping Voltage @Test Current 8/20µs		Typical Capacitance @1KHZ 25°C**
			Energy*	Peak***					
	AC RMS Volts	DC Volts	10/1000µs Joules	8/20µs KAmps 1 time	Min Volts	Max Volts	Volts*	Amps	pF
VZ34R201 □□□	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	980	40	675	825	1240	300	2200
VZ34R781 □□□	485	640	1020	40	702	858	1290	300	2100
VZ34R821 □□□	510	675	1100	40	738	902	1355	300	2000
VZ34R911 □□□	550	745	1150	40	819	1001	1500	300	1800
VZ34R951 □□□	575	765	1200	40	855	1045	1570	300	1700
VZ34R102 □□□	625	825	1250	40	900	1100	1650	300	1600
VZ34R112 □□□	680	895	1350	40	962	1175	1815	300	1500
VZ34R122 □□□	750	970	1450	40	1062	1300	1980	300	1300

□□□ - Part Number Suffix Code
(ie: VZ34R201**KD**)

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

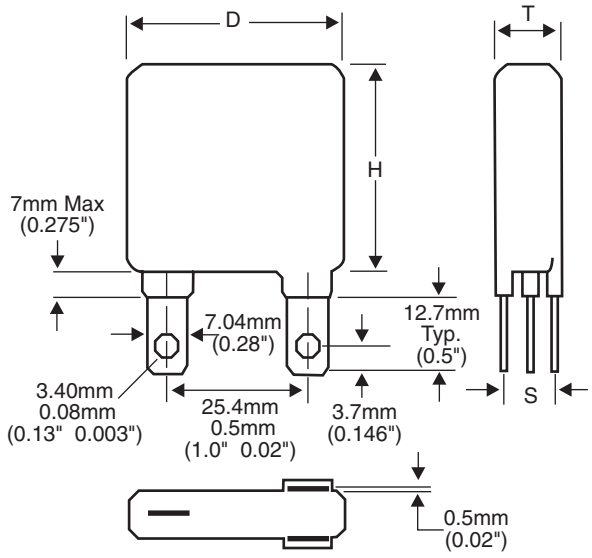
UL 1449 Recognized (File # E196885)
UL 1414 recognized (File #E182369) except VZ34R122
CSA 22.2 #1 certified (File #227006).

* 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.

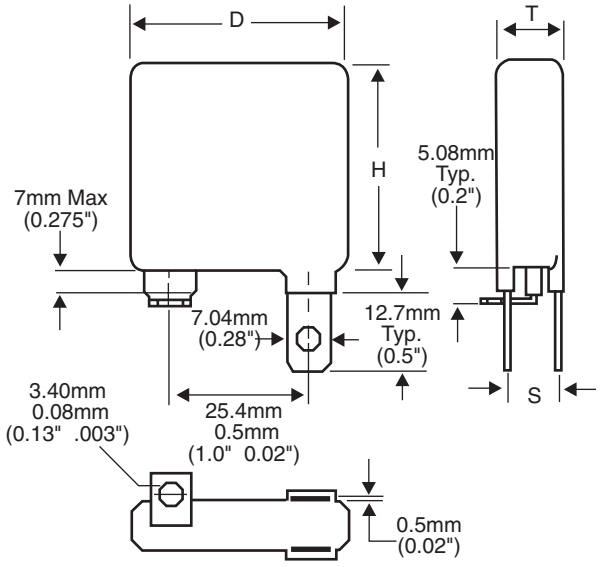


VZ34 Dual - Series Dimensions

Straight Leads
Part Number Suffix "KD"



90° Bend Leads
Part Number Suffix "KDQ"



Part Number	D max.	H max.	T max.	S
VZ34R201 □□□	42 (1.65)	42 (1.65)	9.1 (.36)	4.1±1.0 (.16±0.04)
VZ34R221 □□□			9.2 (.36)	4.2±1.0 (.17±0.04)
VZ34R241 □□□			9.3 (.37)	4.6±1.0 (.18±0.04)
VZ34R271 □□□			9.5 (.37)	4.8±1.0 (.19±0.04)
VZ34R301 □□□			10.5 (.41)	5.2±1.0 (.20±0.04)
VZ34R331 □□□			11.3 (.44)	5.4±1.0 (.21±0.04)
VZ34R361 □□□			11.5 (.45)	5.8±1.0 (.23±0.04)
VZ34R391 □□□			11.6 (.46)	6.2±1.0 (.24±0.04)
VZ34R431 □□□			11.9 (.47)	6.5±1.0 (.26±0.04)
VZ34R471 □□□			12.8 (.50)	6.9±1.0 (.27±0.04)
VZ34R511 □□□			13.1 (.52)	7.2±1.0 (.28±0.04)
VZ34R621 □□□			13.6 (.54)	8.2±1.0 (.32±0.04)
VZ34R681 □□□			13.9 (.55)	8.8±1.0 (.35±0.04)
VZ34R751 □□□			15.1 (.59)	9.3±1.0 (.37±0.04)
VZ34R781 □□□			15.3 (.60)	9.6±1.0 (.38±0.04)
VZ34R821 □□□			15.5 (.61)	10.1±1.0 (.40±0.04)
VZ34R911 □□□			17.0 (.67)	11.1±1.0 (.44±0.04)
VZ34R951 □□□			17.2 (.68)	11.3±1.0 (.44±0.04)
VZ34R102 □□□			18.0 (.71)	11.8±1.0 (.46±0.04)
VZ34R112 □□□			18.6 (.73)	13.0±1.0 (.51±0.04)

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	425	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	962	1175	1815	300	1800
VZ40D122 □□□	750	970	1450	40	1062	1300	1980	300	1300

□□□ Part Number Suffix Code
(ie: VZ40D201**KR**)

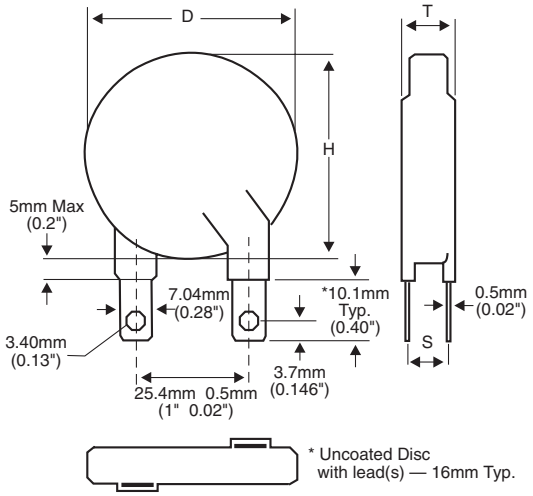
- **K** - Straight Lead
- **KL** - Straight Lead - Left Side Lead Orientation
- **KQ** - 90° Bend Lead
- **KR** - Uncoated Disk - Without Leads
- **KF** - Uncoated Disk - With Leads
- **KN** - Uncoated Disk - With one Lead only, Right side orientation
- **KNL** - Uncoated Disk - With one Lead only, Left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

UL 1449 recognized (File# E196885)
UL 1414 recognized (File# E182369) except VZ40D122
CSA 22.2 #1 certified (File #227006).

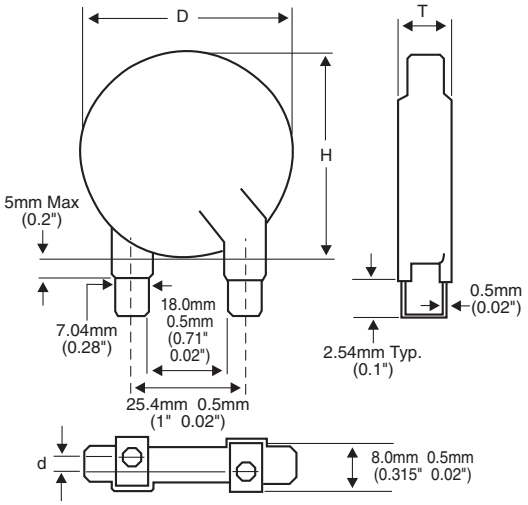
All Uncoated Disk types are recognized to UL1449 (File # E196885)

VZ40 Series Dimensions

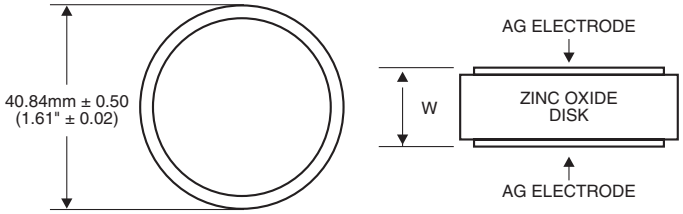
Straight Leads
Part Number Suffix "K"



90° Bend Leads
Part Number Suffix "KQ"



Uncoated Disk
Part Number Suffix "KR"



Part Number	D max.	H max.	T max.	S	d	W
VZ40D201 □□□	48 (1.89)	48 (1.89)	7.5 (.30)	2.3 (.09)	5.7±1.0 (.22±.04)	1.13±0.50 (.044±.02)
VZ40D221 □□□			7.5 (.30)	2.3 (.09)	5.5±1.0 (.22±.04)	1.24±0.50 (.049±.02)
VZ40D241 □□□			7.5 (.30)	2.5 (.10)	5.4±1.0 (.21±.04)	1.38±0.50 (.054±.02)
VZ40D271 □□□			8.5 (.33)	2.9 (.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)	3.9 (.15)	4.2±1.0 (.165±.04)	2.44±0.50 (.096±.02)
VZ40D471 □□□			9.7 (.38)	3.9 (.15)	4.2±1.0 (.165±.04)	2.64±0.50 (.104±.02)
VZ40D511 □□□			9.7 (.38)	4.1 (.16)	4.0±1.0 (.16±.04)	2.89±0.50 (.113±.02)
VZ40D621 □□□			9.7 (.38)	4.4 (.17)	3.9±1.0 (.15±.04)	3.55±0.50 (.14±.02)
VZ40D681 □□□			9.7 (.38)	4.5 (.18)	3.6±1.0 (.14±.04)	3.81±0.50 (.15±.02)
VZ40D751 □□□			10.5 (.41)	4.6 (.18)	3.3±1.0 (.13±.04)	4.19±0.50 (.165±.02)
VZ40D781 □□□			10.5 (.41)	4.6 (.18)	3.1±1.0 (.12±.04)	4.34±0.50 (.17±.02)
VZ40D821 □□□			10.5 (.41)	5.2 (.20)	2.9±1.0 (.11±.04)	4.67±0.50 (.184±.02)
VZ40D911 □□□			11.5 (.45)	5.4 (.21)	2.5±1.0 (.10±.04)	5.1± 0.50 (.2±.02)
VZ40D951 □□□			11.5 (.45)	5.4 (.21)	2.3±1.0 (.09±.04)	5.28±0.50 (.21±.02)
VZ40D102 □□□			11.5 (.45)	5.7 (.22)	2.1±1.0 (.08±.04)	5.72±0.50 (.225±.02)
VZ40D112 □□□			11.5 (.45)	5.7 (.22)	2.1±1.0 (.08±.04)	6.22±0.50 (.24±.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	1900	70	819	1001	1500	500	4100
VZ53D951 □□□	575	765	2000	70	855	1045	1570	500	4000
VZ53D102 □□□	625	825	2070	70	900	1100	1650	500	3700
VZ53D112 □□□	680	895	2270	70	962	1175	1815	500	3300
VZ53D122 □□□	750	970	2400	70	1062	1300	1980	500	3400

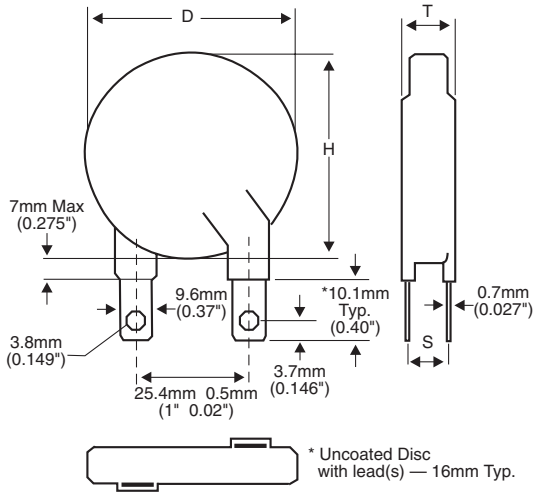
□□□ - Part Number Suffix Code
(ie: VZ53D201**KR**)

- **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

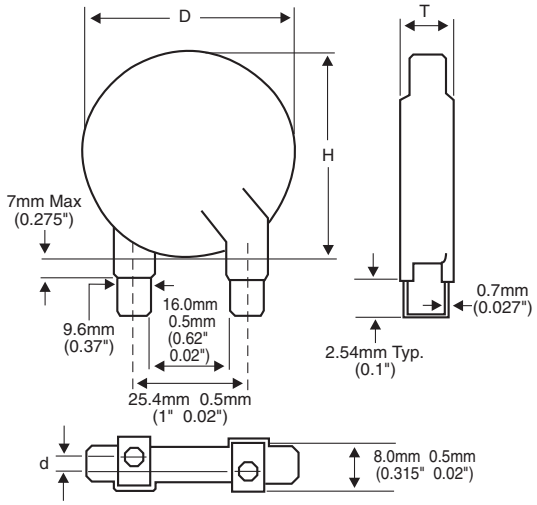
UL 1449 Recognized (File # E196885)
UL 1414 recognized (File #E182369) except VZ53D122
CSA 22.2 #1 certified (File #227006)
All Uncoated Disk types are recognized to UL1449 (File # E196885)

VZ53 Series Dimensions

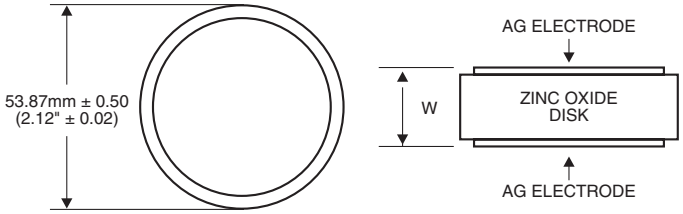
Straight Leads
Part Number Suffix "K"



90° Bend Leads
Part Number Suffix "KQ"



Uncoated Disk
Part Number Suffix "KR"



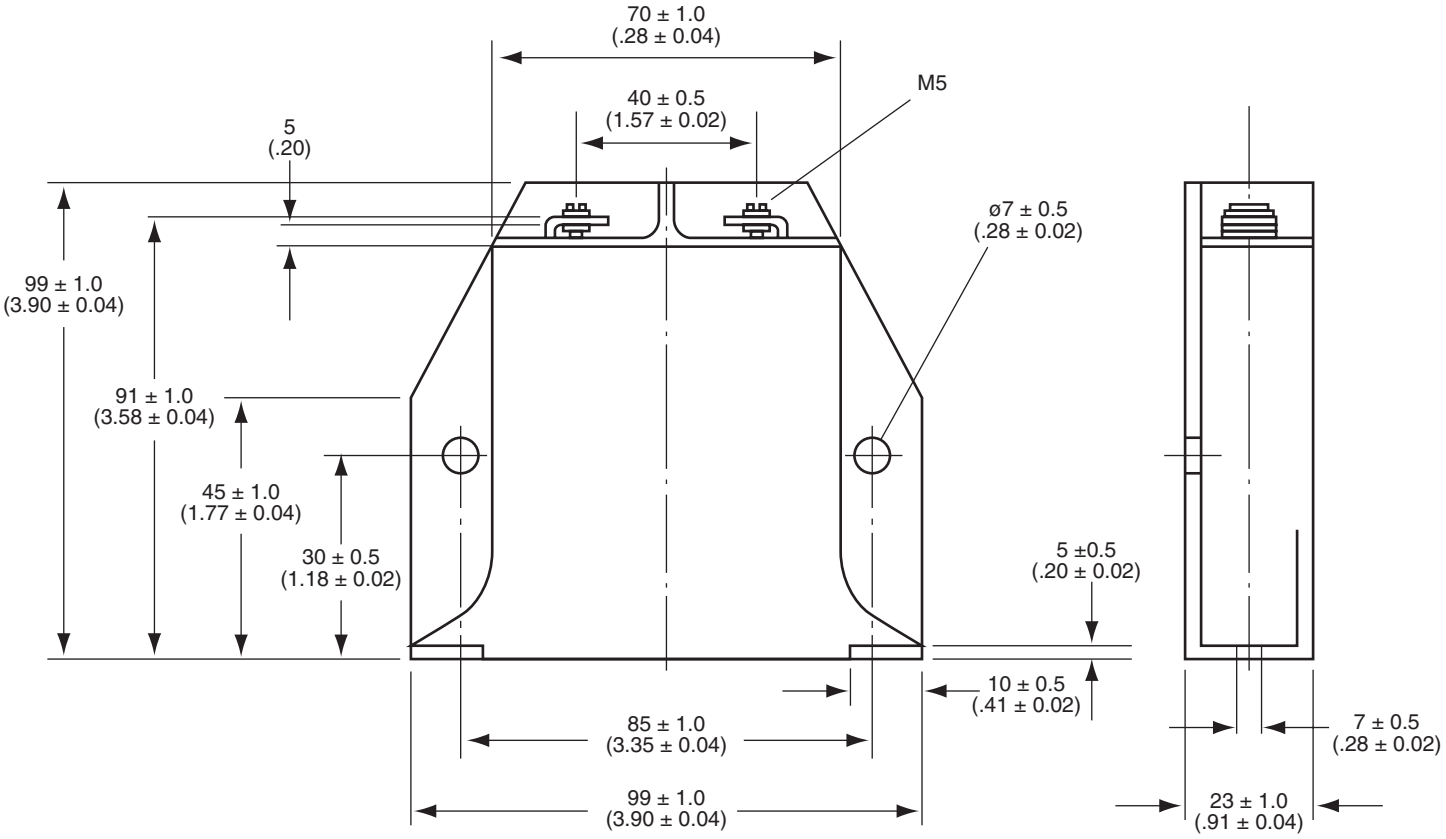
PartNumber	D max.	H max.	T max.	S	d	W
VZ53D201 □□□	61 (2.4)	61 (2.4)	7.5 (.30)	2.3 (.09)	5.7±1.0 (.22±.04)	1.41±0.50 (.056±.02)
VZ53D221 □□□			7.5 (.30)	2.3 (.09)	5.5±1.0 (.22±.04)	1.55±0.50 (.061±.02)
VZ53D241 □□□			7.5 (.30)	2.5 (.10)	5.4±1.0 (.21±.04)	1.72±0.50 (.068±.02)
VZ53D271 □□□			8.5 (.33)	2.9 (.11)	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)	3.9 (.15)	4.2±1.0 (.165±.04)	3.05±0.50 (.12±.02)
VZ53D471 □□□			9.7 (.38)	3.9 (.15)	4.2±1.0 (.165±.04)	3.29±0.50 (.13±.02)
VZ53D511 □□□			9.7 (.38)	4.1 (.16)	4.0±1.0 (.16±.04)	3.60±0.50 (.14±.02)
VZ53D621 □□□			9.7 (.38)	4.4 (.17)	3.9±1.0 (.15±.04)	4.43±0.50 (.174±.02)
VZ53D681 □□□			9.7 (.38)	4.5 (.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)	4.6 (.18)	3.1±1.0 (.12±.04)	5.41±0.50 (.21±.02)
VZ53D821 □□□			10.5 (.41)	5.2 (.20)	2.9±1.0 (.11±.04)	5.82±0.50 (.23±.02)
VZ53D911 □□□			11.5 (.45)	5.4 (.21)	2.5±1.0 (.10±.04)	6.44±0.50 (.25±.02)
VZ53D951 □□□			11.5 (.45)	5.4 (.21)	2.3±1.0 (.09±.04)	6.74±0.50 (.265±.02)
VZ53D102 □□□			11.5 (.45)	5.7 (.22)	2.1±1.0 (.08±.04)	7.13±0.50 (.28±.02)
VZ53D112 □□□			11.5 (.45)	5.7 (.22)	2.1±1.0 (.08±.04)	7.76±0.50 (.306±.02)
VZ53D122 □□□			11.68 (.46)	5.7 (.22)	2.1±1.0 (.08±.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
VZ60B102K	625	825	2170	80	900	1100	1650	500	3000
VZ60B112K	680	895	2360	80	962	1175	1815	500	2700
VZ60B951K	575	765	2070	80	855	1045	1570	500	3100
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

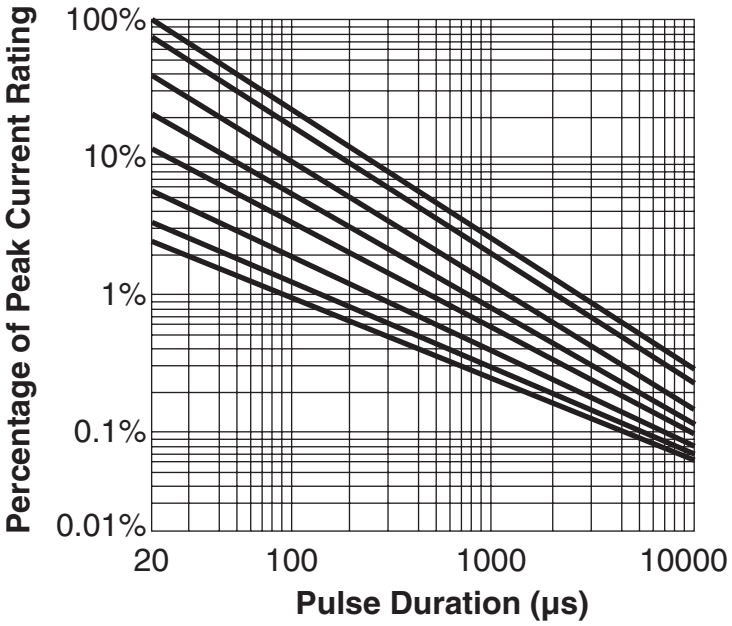
VZ60 Series Dimensions

mm (inches)



Peak Pulse and Derating Curves

Peak Current Per Pulse Versus Pulse Duration



1 Time - (Top line on graph)

2 Times

10 Times

10^2 Times

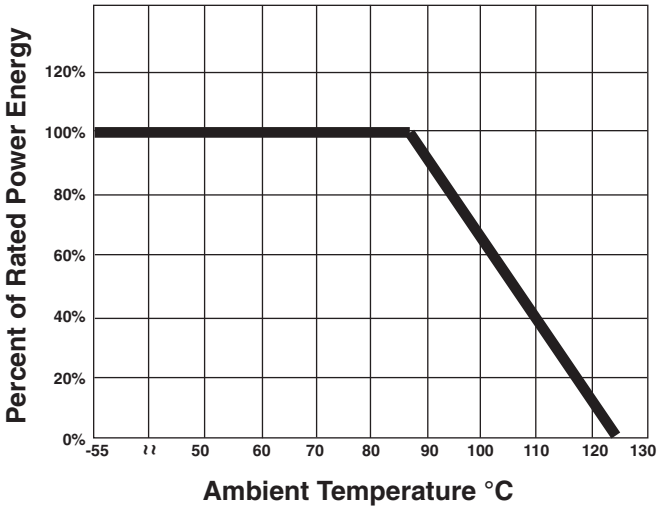
10^3 Times

10^4 Times

10^5 Times

10^6 Times - (Bottom line on graph)

Temperature Derating Curve Power and Energy Rating vs. Temperature

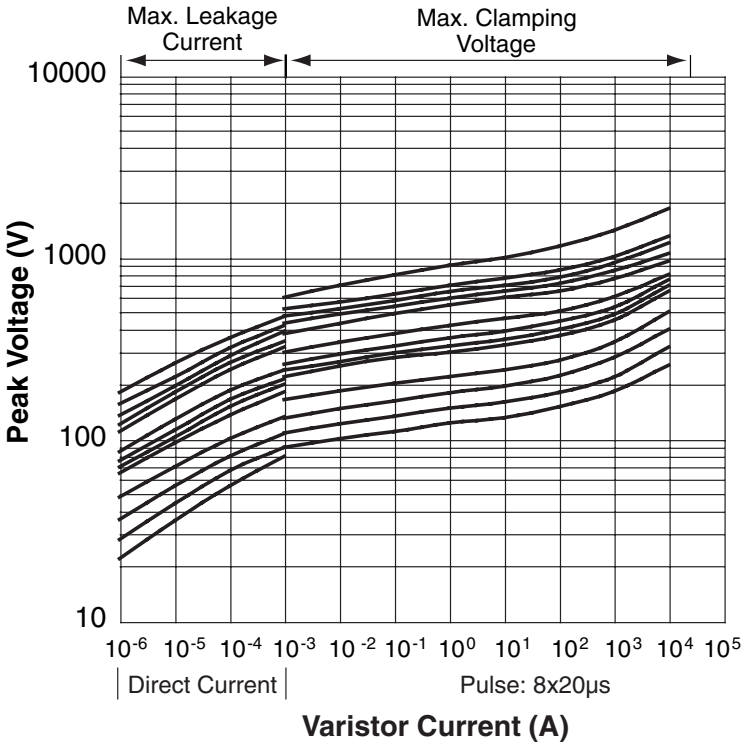


V-I Characteristics

5mm Disc Size

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

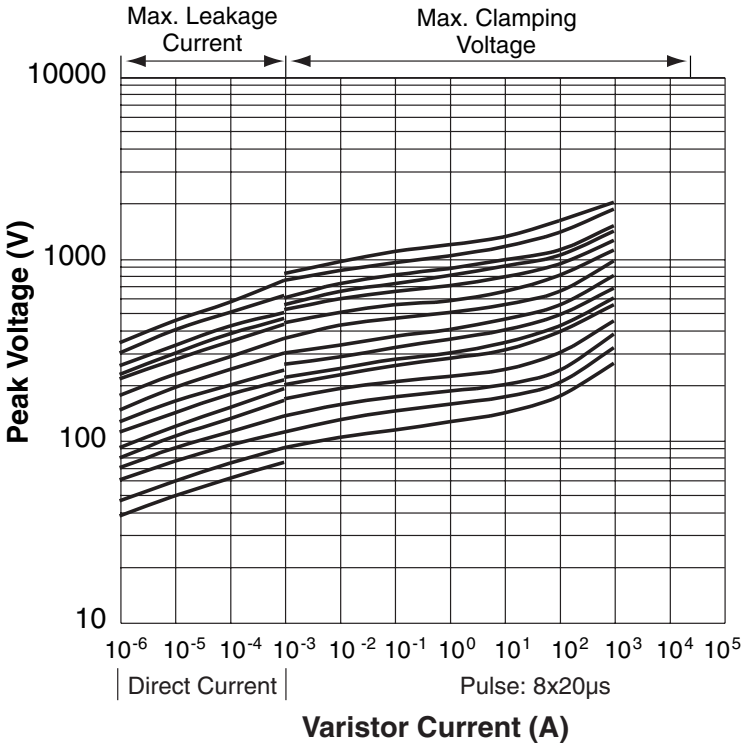
(Also applies to “E” series parts)



7mm Disc 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)



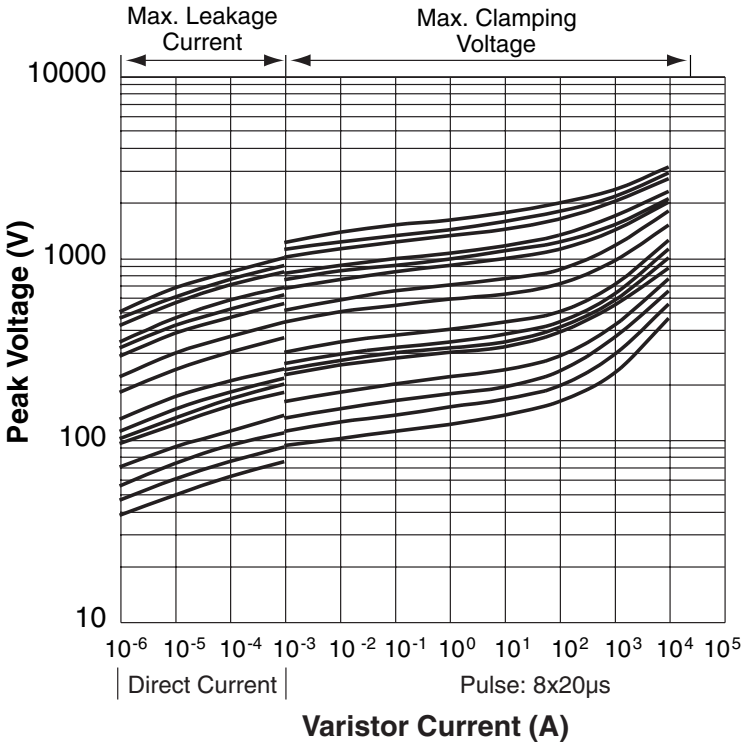
At idle power, current levels shown to the left of the discontinuity illustrate typically the high end leakage current.
However, if lower leakage current levels are desired, they may be guaranteed. In the clamping voltage region to the right of the discontinuity, maximum clamping voltage is plotted.

V-I Characteristics (continued)

10mm Disc 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)

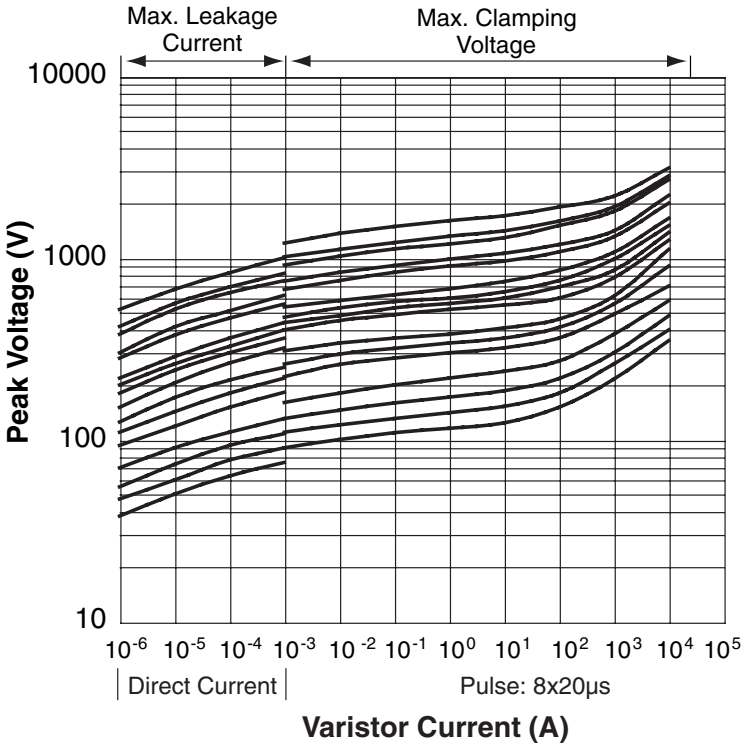
(Also applies to “E” series parts)



14mm Disc 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)

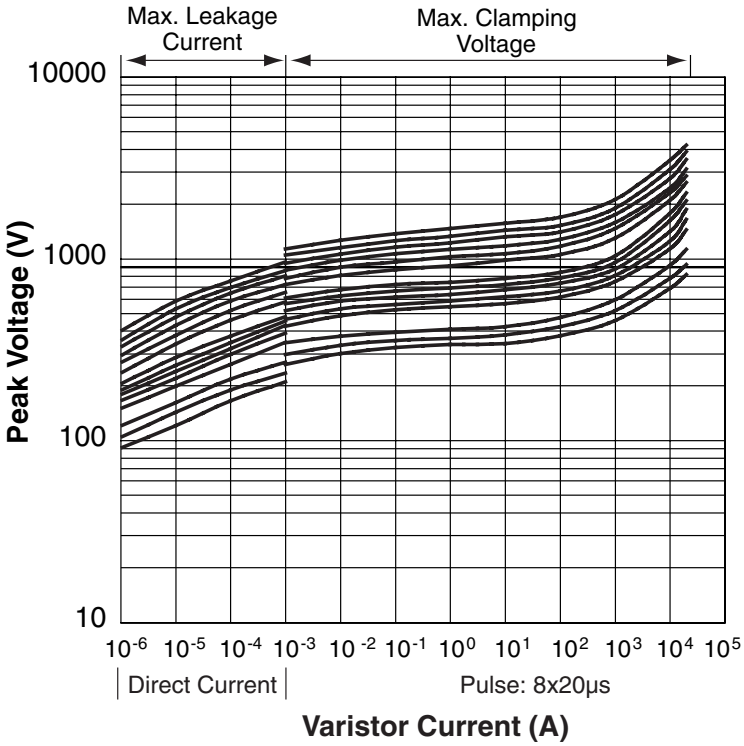


At idle power, current levels shown to the left of the discontinuity illustrate typically the high end leakage current. However, if lower leakage current levels are desired, they may be guaranteed. In the clamping voltage region to the right of the discontinuity, maximum clamping voltage is plotted.

V-I Characteristics (continued)

18mm Disc Size

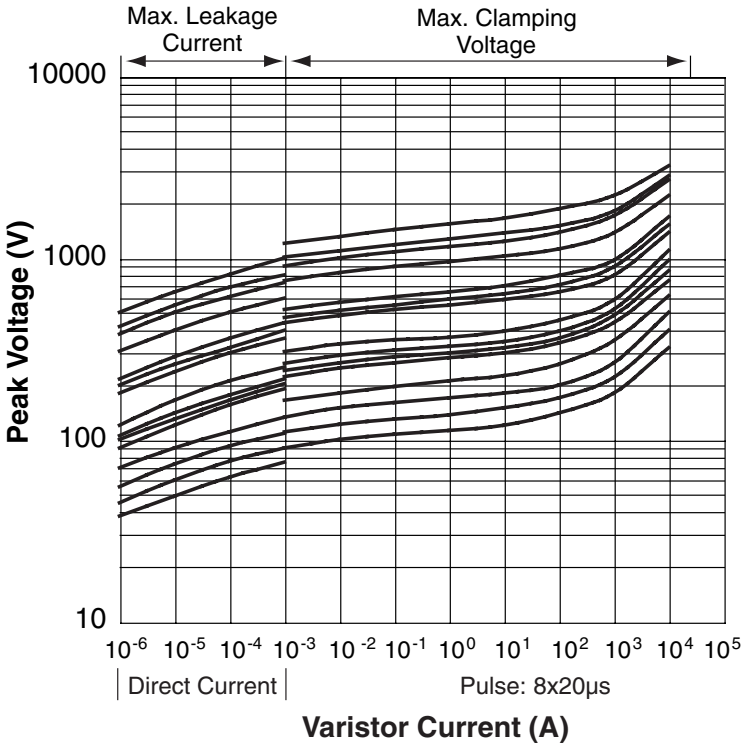
VZ18E951K - (Top line on graph)
VZ18E911K
VZ18E821K
VZ18E751K
VZ18E681K
VZ18E621K
VZ18E511K
VZ18E471K
VZ18E431K
VZ18E391K
VZ18E361K
VZ18E271K
VZ18E241K
VZ18E201K - (Bottom line on graph)



20mm Disc 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)

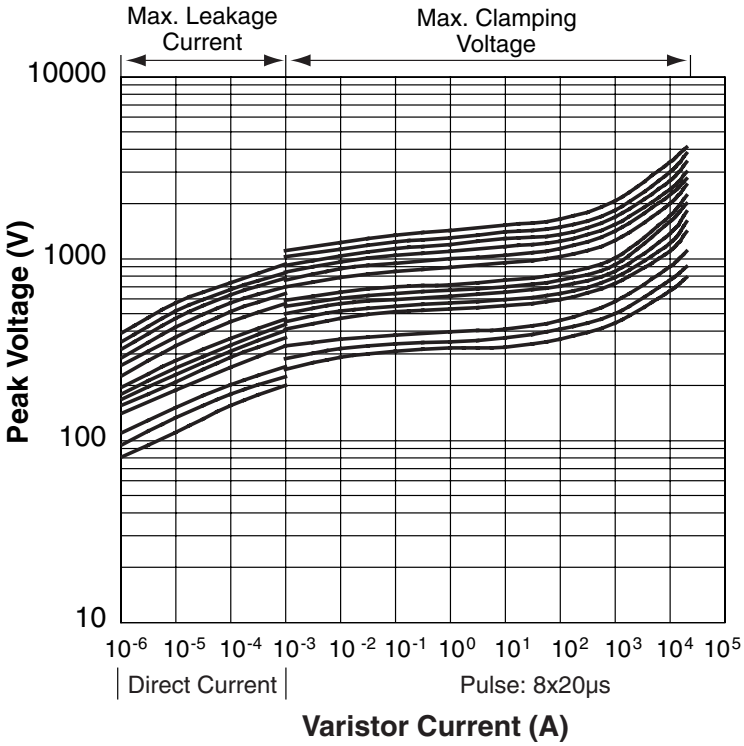


At idle power, current levels shown to the left of the discontinuity illustrate typically the high end leakage current. However, if lower leakage current levels are desired, they may be guaranteed. In the clamping voltage region to the right of the discontinuity, maximum clamping voltage is plotted.

V-I Characteristics (continued)

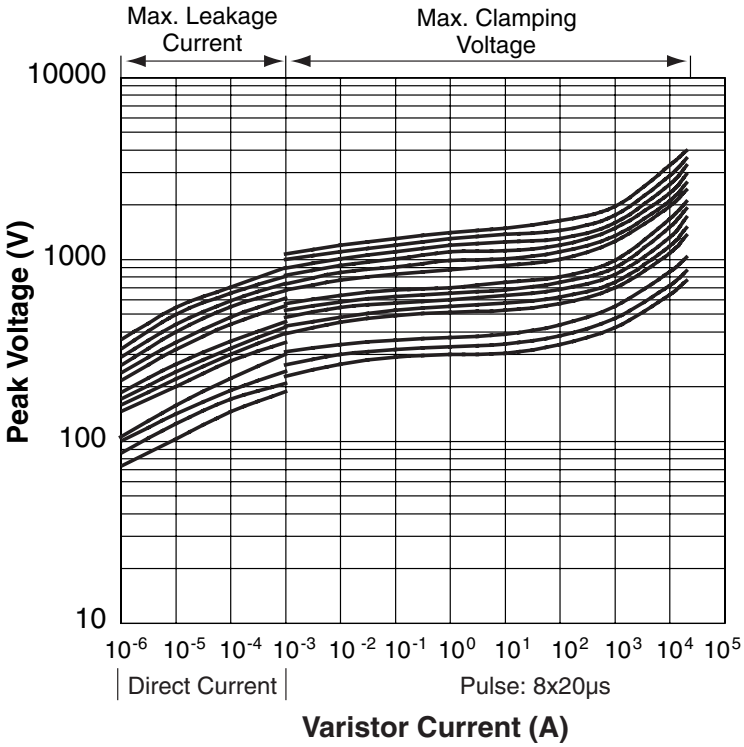
25mm Disc Size

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



32mm Disc Size

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

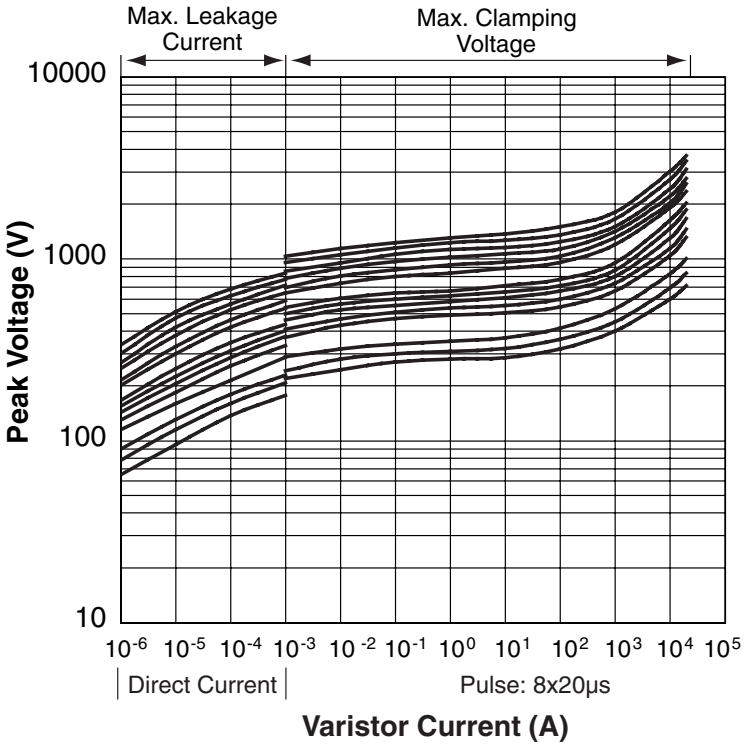


At idle power, current levels shown to the left of the discontinuity illustrate typically the high end leakage current. However, if lower leakage current levels are desired, they may be guaranteed. In the clamping voltage region to the right of the discontinuity, maximum clamping voltage is plotted.

V-I Characteristics (continued)

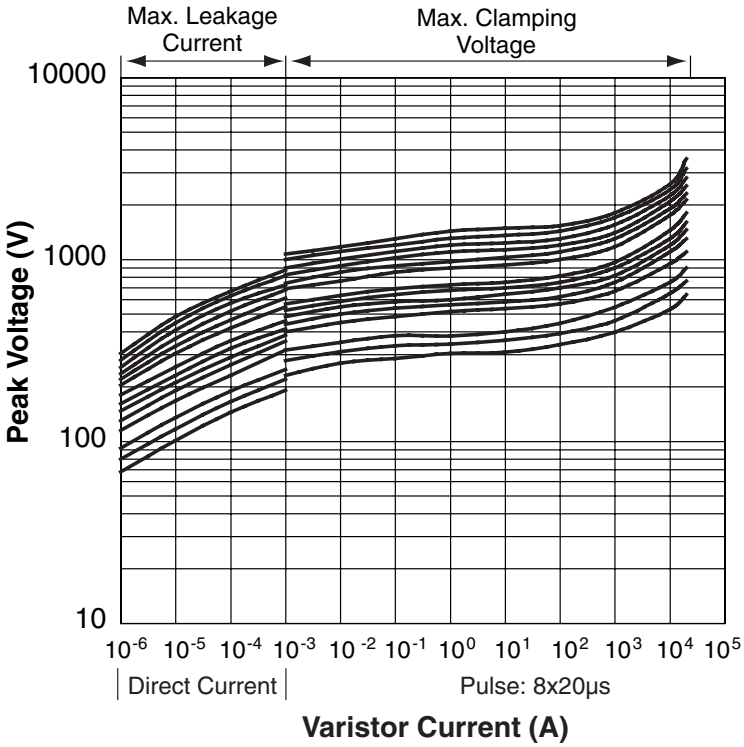
34mm Disc Size

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



40mm Disc Size

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

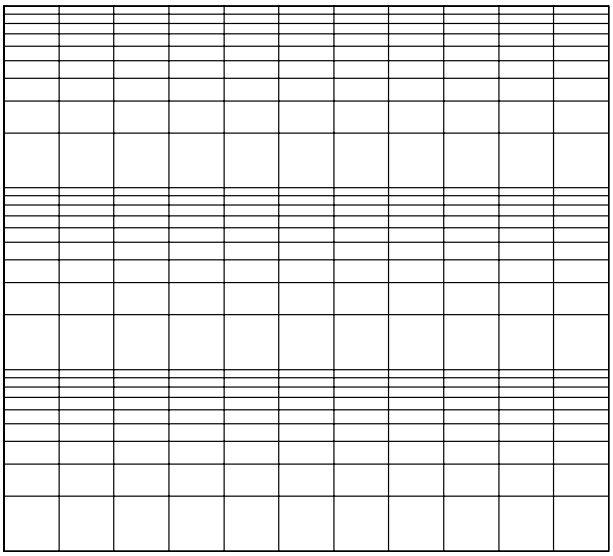


At idle power, current levels shown to the left of the discontinuity illustrate typically the high end leakage current. However, if lower leakage current levels are desired, they may be guaranteed. In the clamping voltage region to the right of the discontinuity, maximum clamping voltage is plotted.

V-I Characteristics (continued)

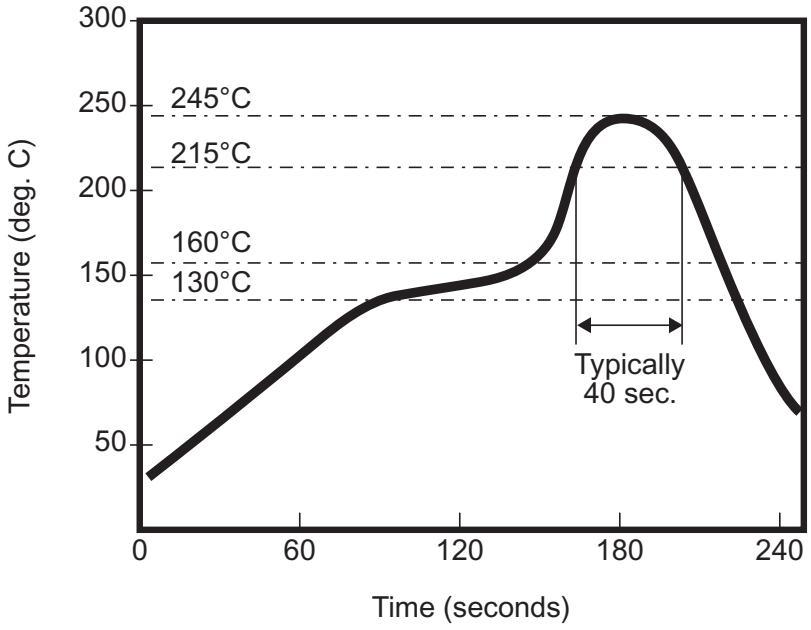
53mm Disc Size

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



At idle power, current levels shown to the left of the discontinuity 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 discontinuity, maximum clamping voltage is plotted.

Soldering Profile

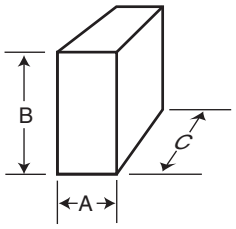


5mm / 7mm Taping Specifications

Item	Symbol	5mm Disc Size		7mm Disc 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 (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 Seating Plane	A	—	13 max	—	15 max
Hole Center to Component 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)

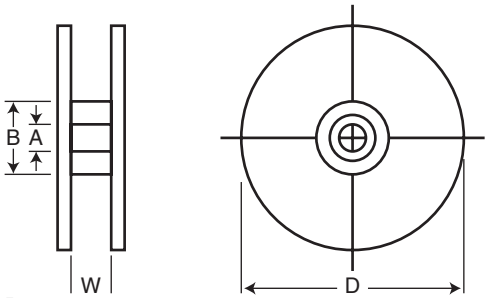


Ammo Box

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

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

2,000 pieces (5ø)
< 250VAC = 1,500 pieces (7ø)
> 250VAC = 1,000 pieces (7ø)



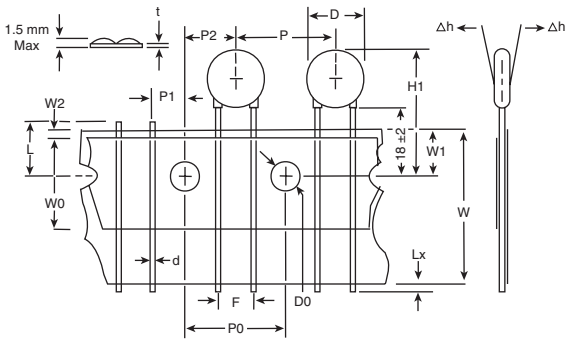
Reel

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

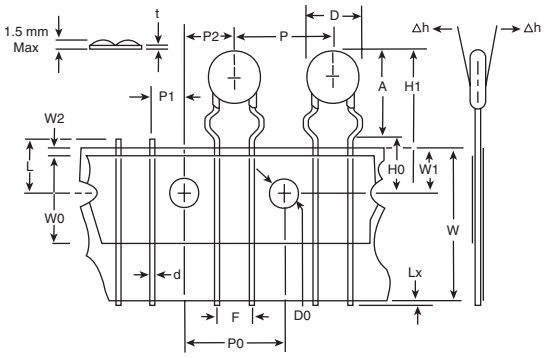
W = Approximately 50, D = 350ømax,
A = Approximately 30ø, B = Approximately 95ø
2,000 pieces (5ø)
< 250VAC = 1,500 pieces (7ø)
> 250VAC = 1,000 pieces (7ø)

All dimensions are in Millimeters.

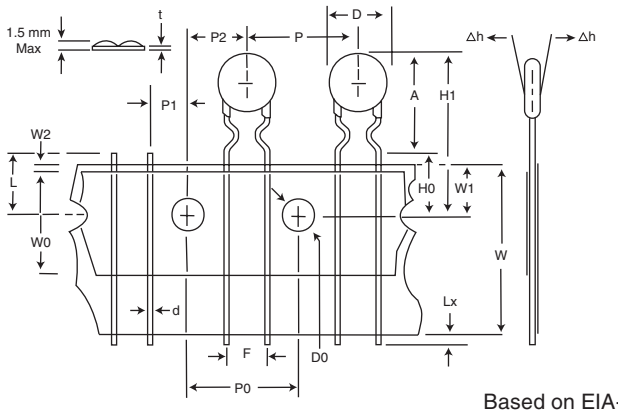
Straight Lead
T11 (Ammo Box) and T1 (Reel)



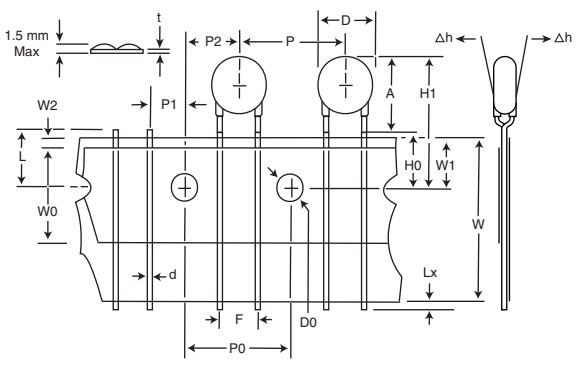
Outward Crimp
T17 (Ammo Box) and T3 (Reel)



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



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



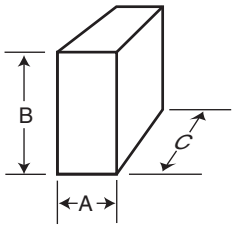
Based on EIA-468-B Specifications.

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	△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 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)

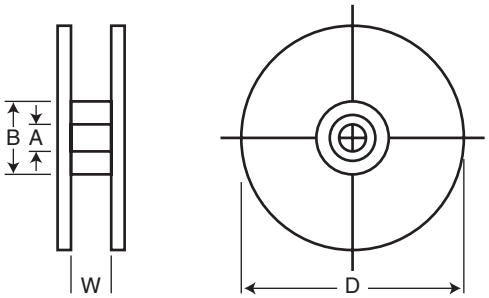


Ammo Box

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



Reel

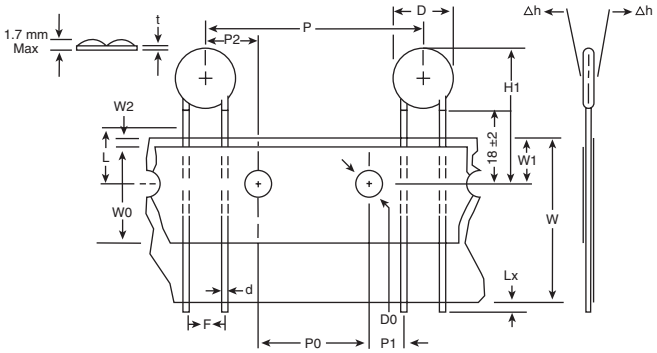
Reel Taping Codes
(T19, T18, T4, T38, T26, T1N, T16, T12)

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

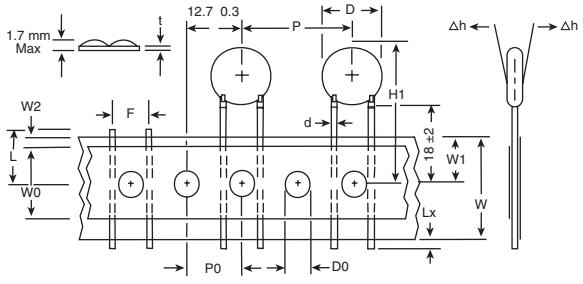
< 300VAC = 500 to 1,000 pieces
> 300VAC = 300 pieces

All dimensions are in Millimeters.

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



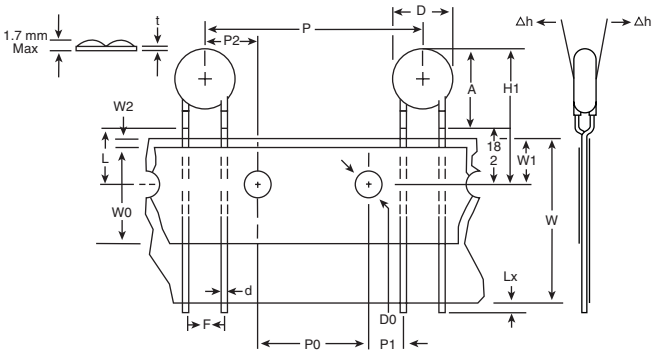
Straight Lead
T36 (Ammo Box) and T19 (Reel)
(7.5mm Lead Spacing)



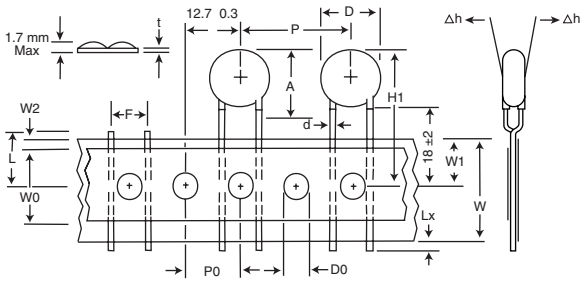
Based on EIA-468-B Specifications.

10mm Taping Specifications (continued)

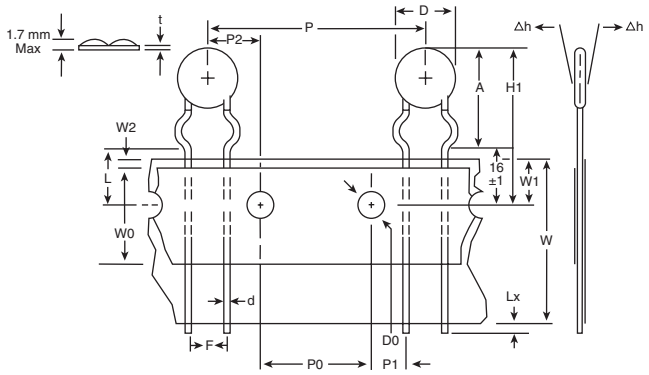
In-Line Crimp
T15 (Ammo Box) and T38 (Reel)
(5mm Lead Spacing)



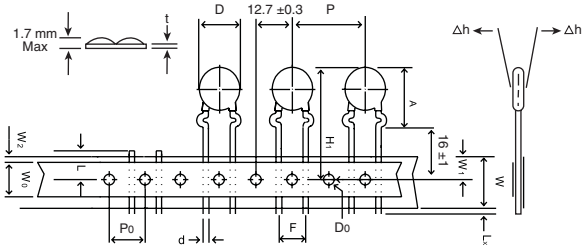
In-Line Crimp
T43 (Ammo Box) and T4 (Reel)
(7.5mm Lead Spacing)



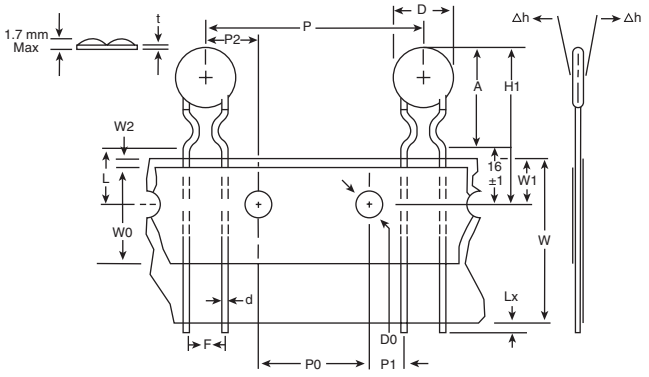
Outward Crimp
T10 (Ammo Box) and T26 (Reel)
(5mm Lead Spacing)



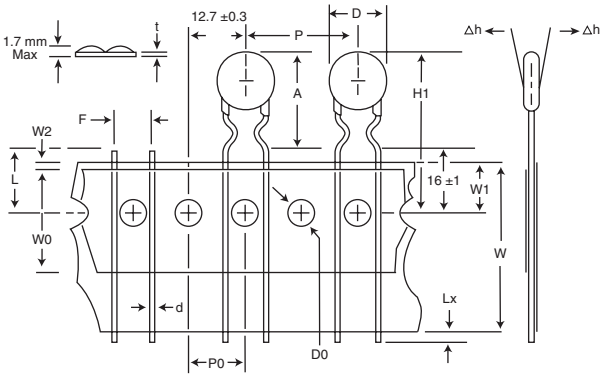
Outward Crimp
T1U (Ammo Box) and T1N (Reel)
(7.5mm Lead Spacing)



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



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



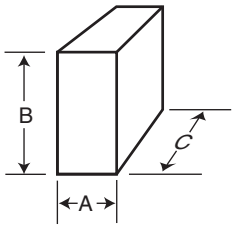
Based on EIA-468-B Specifications.

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	△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 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)

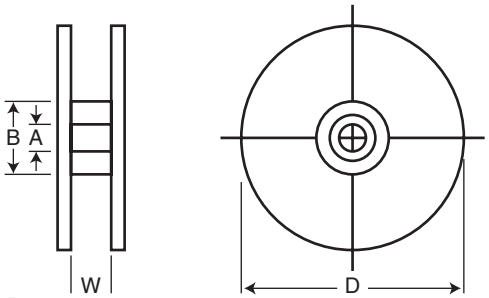


Ammo Box

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



Reel

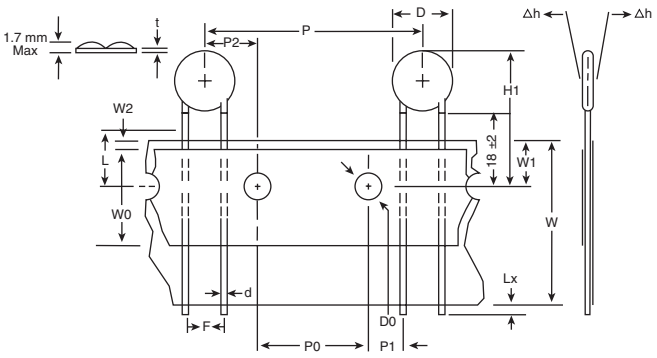
Reel Taping Codes
(T19, T18, T4, T38, T26, T1N, T16, T12)

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

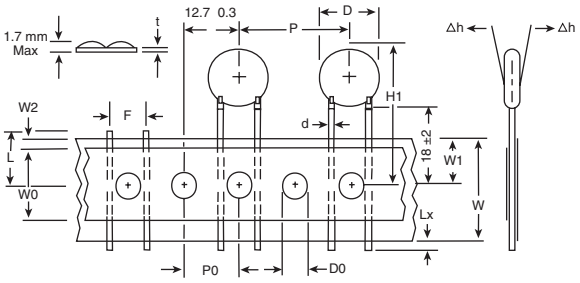
< 300VAC = 500 to 1,000 pieces
≥ 300VAC = 300 pieces

All dimensions are in Millimeters.

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



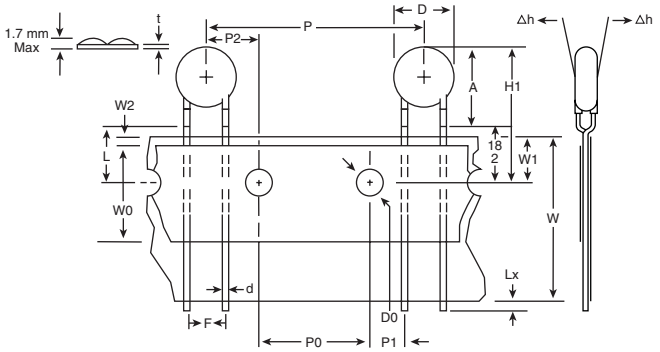
Straight Lead
T36 (Ammo Box) and T19 (Reel)
(7.5mm Lead Spacing)



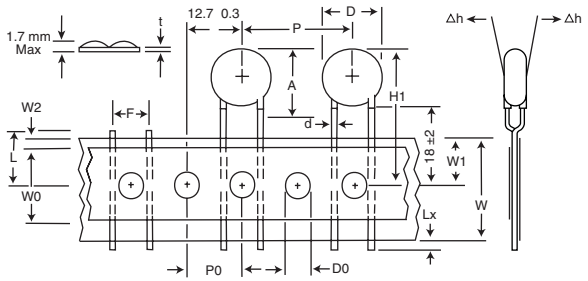
Based on EIA-468-B Specifications.

14mm Taping Specifications (continued)

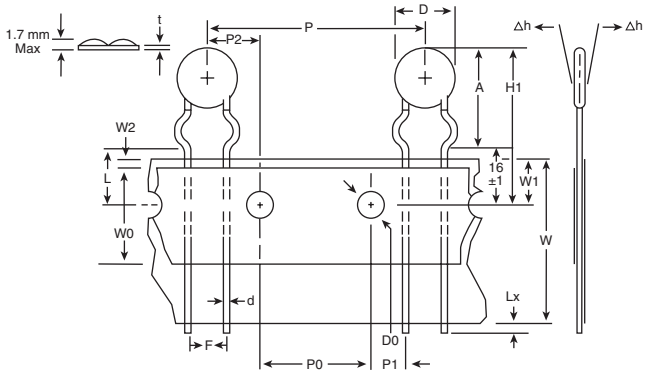
In-Line Crimp
T15 (Ammo Box) and T38 (Reel)
(5mm Lead Spacing)



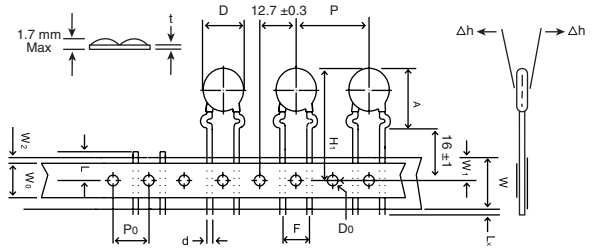
In-Line Crimp
T43 (Ammo Box) and T4 (Reel)
(7.5mm Lead Spacing)



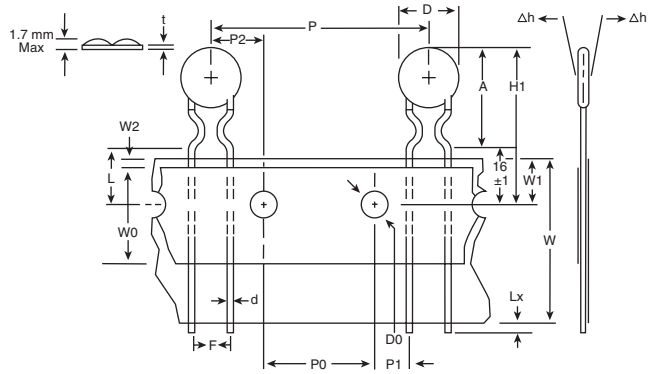
Outward Crimp
T10 (Ammo Box) and T26 (Reel)
(5mm Lead Spacing)



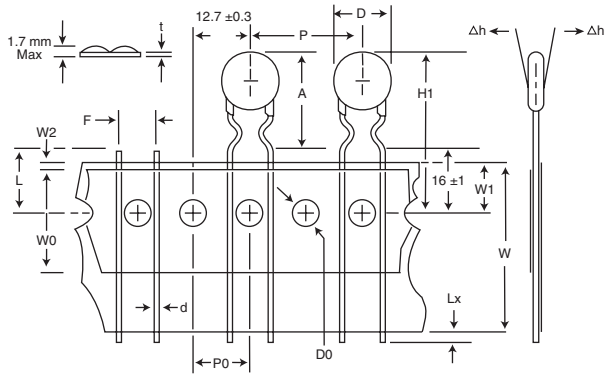
Outward Crimp
T1U (Ammo Box) and T1N (Reel)
(7.5mm Lead Spacing)



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



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



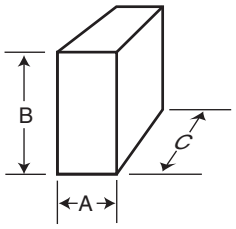
Based on EIA-468-B Specifications.

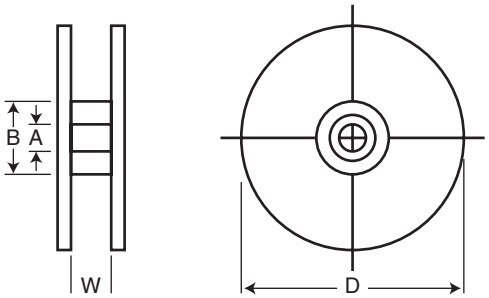
18mm / 20mm Taping Specifications

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 (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 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 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 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 disc 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

Reel

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

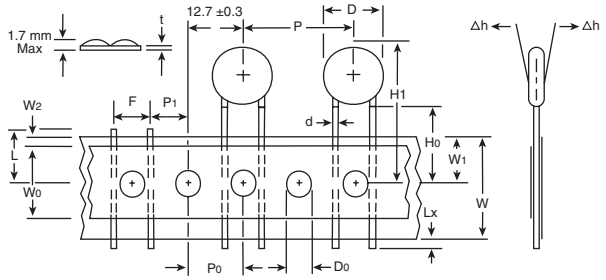
A = Approx. 30ø, B = Approx. 95ø
W = Approx. 50, D = 350ømax

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

All dimensions are in Millimeters.

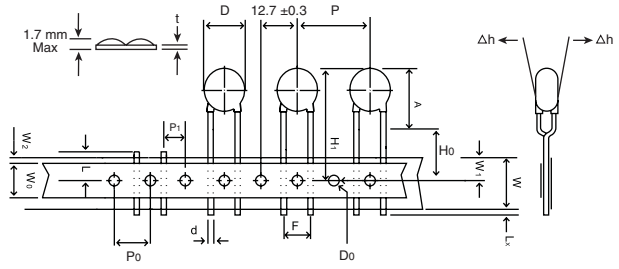
Straight Lead

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



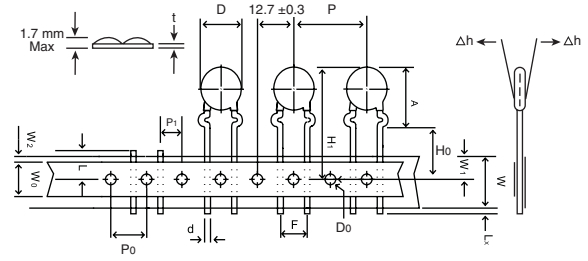
In-Line Crimp

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



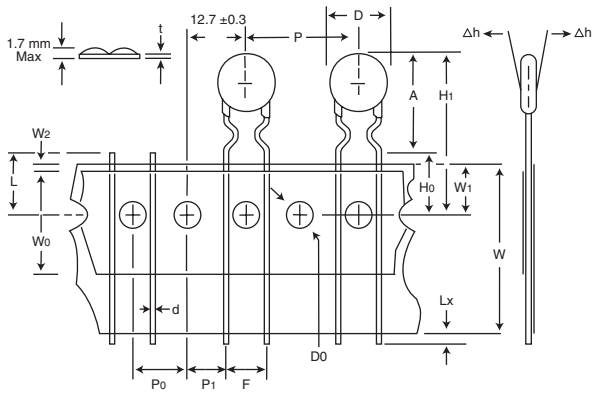
Outward Crimp

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



Inward Crimp

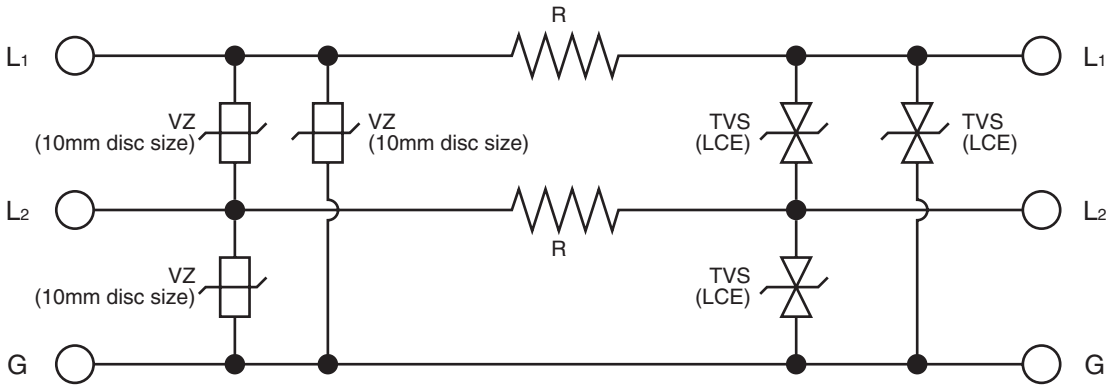
T40 (Ammo Box) and T4X (Reel) (7.5mm Lead Spacing)
T35 (Ammo Box) and T2D (Reel) (10mm Lead Spacing)



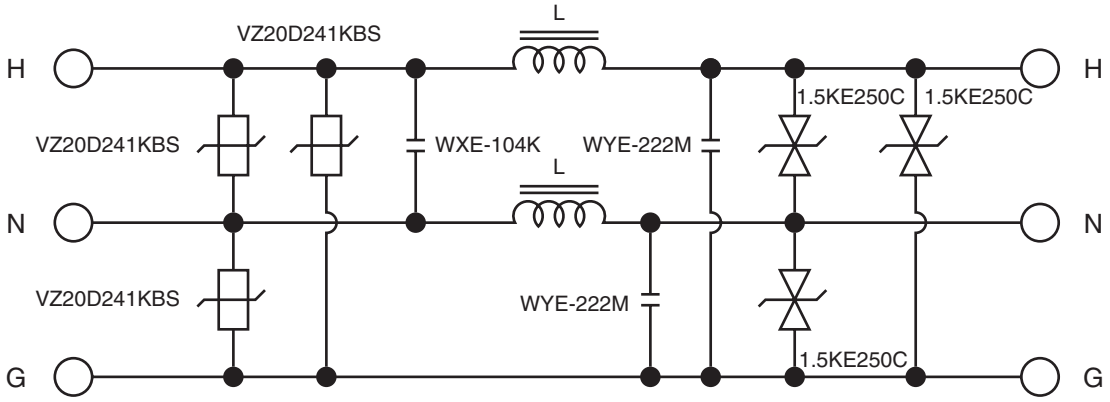
Based on EIA-468-B Specifications.

Circuit Examples

Data Line Protection



AC Line Protection



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

Telecom Circuit Protection