

DATA SHEET

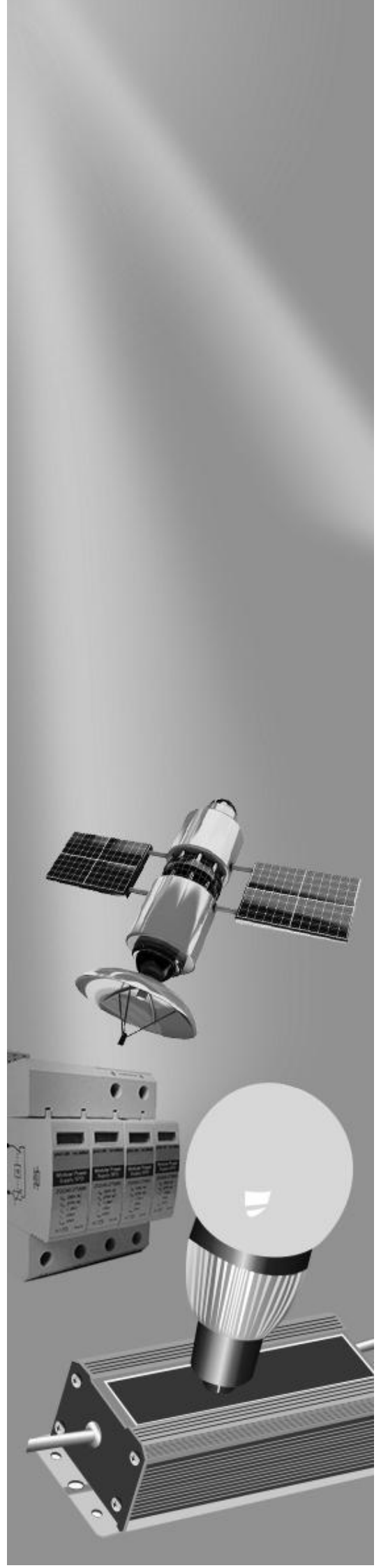
METAL OXIDE VARISTORS SILICONE AUTOMOTIVE PRODUCT

KH-AT Series

RoHS compliant & Halogen free



Product specification– November 07, 2025 V.1



Metal Oxide Varistor: KH-AT Series

Silicone Automotive Product、Plug-in Type

■ Features

1. High operating temperature range up to 125 °C.
2. High resistance to cyclic temperature stress
3. AEC-Q200 qualified
4. High temperature cycling resistance, high heat and moisture resistance, meeting the requirements of 85°C wet heat test.
5. Agency approval: UL\CSA\TUV

■ Recommended Applications

1. Telecom infrastructure devices
2. Industrial power and devices
3. On board charger
4. Automotive DC-DC converter

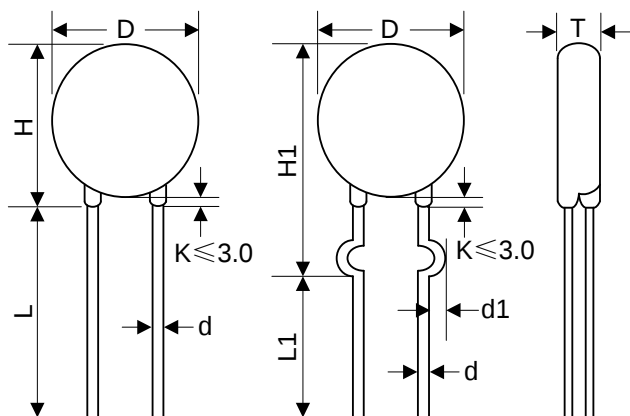
■ Parameters

	KH-AT Series	Units
AC Voltage Range (Vac)	130 to 750	V
DC Voltage Range (Vdc)	170 to 990	V
Peak Current for 8/20μS Current Wave	1750 to 10000	A
Operation Ambient Temperature Range	-40 to +125	°C
Storage Temperature Range	-40 to +150	°C
Varistor Voltage Range (Vdc)	200 to 1200	V
Humidity Bias (85°C/85%RH, 85% of rated Varistor voltage)	1000	hours
Temperature Cycling (-40~125°C)	1000	cycles

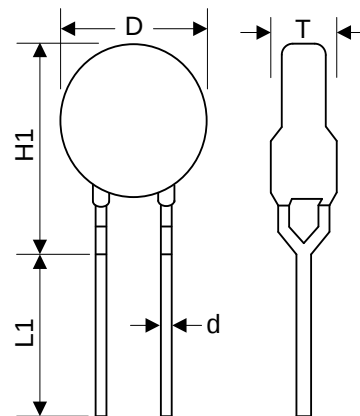
Part Number Code

4	7	1	K	H	1	4	-	F	X	X	T	R	A	T	
1	2	3	4	5	6	7	8	9	10	11	12	14	15		
↓			↓	↓		↓	↓	↓		↓		↓	↓		
Varistor Voltage(V1mA)			Tolerance of Voltage		Body Size		Optional suffix			Product Category					
820	82x10 ⁰ V=82V		K	±10%	07	Φ7mm	One or more-character combinations			Automotive varistor					
471	47x10 ¹ V=470V				10	Φ10mm									
102	10x10 ² V=1000V				14	Φ14mm									
						20	Φ20mm								
			↓								↓				
			Appearance								Packaging				
H		Silicone coating											TR		Tape & Reel P0=12.7mm
													ER		Tape & Reel P0=15.0mm
													TB		Tape & Box P0=12.7mm
													EB		Tape & Box P0=15.0mm
													Blank		Bulk

Structure and Dimensions



O Type



F Type

Fig 1. Straight Lead Fig 2. Outer Kink Lead

Fig 3. In Line Kink Lead

Dimension Table (Unit: mm)

	07D		10D		14D		20D	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
D	-	9.5	-	13.0	-	17.0	-	23.0
H	-	12.0	-	16.0	-	20.0	-	26.5
H1	-	14.5	-	18.5	-	22.5	-	29.0
F	4.2	5.8	6.7	8.3	6.7	8.3	9.0	11.0
d	0.55	0.65	0.75	0.85	0.75	0.85	0.95	1.05
L(min)	20							
L1(min)	15							
d1(Kink Lead)	0.8	1.6	1.0	1.8	1.0	1.8	1.2	2.0

METAL OXIDE VARISTORS

KH-AT Series

16

T max. Table Unit: mm

Model	07D	10D	14D	20D	e (±1)
201K	4.4	5.0	5.0	5.2	2.0
221K	4.5	5.1	5.1	5.4	2.1
241K	4.6	5.2	5.2	5.5	2.2
271K	4.9	5.4	5.4	5.7	2.4
301K	5.0	5.5	5.5	5.8	2.5
331K	5.1	5.7	5.7	6.0	2.5
361K	5.2	5.9	5.9	6.2	2.7
391K	5.6	6.2	6.2	6.4	2.8
431K	5.8	6.5	6.5	6.6	3.0
471K	6.2	6.7	6.7	6.8	3.2
511K	6.4	6.8	6.8	7.0	3.4
561K	6.6	7.0	7.0	7.2	3.6
621K	7.1	7.3	7.3	7.5	3.9
681K	7.3	7.6	7.6	7.8	4.2
751K	7.5	8.4	8.4	8.6	4.3
781K	-	8.8	8.8	9.2	4.4
821K	-	9.5	9.5	9.8	4.6
911K	-	10.0	10.0	10.5	5.0
102K	-	10.6	10.6	11.0	5.2
112K	-	-	11.0	11.4	5.5
122K	-	-	-	11.8	5.8

■ Electrical Characteristics

■ 07D Series

Part No.	Varistor Voltage (@ 1mA DC)	Max. Continuous Voltage		Max. Clamping Voltage (8/20μs)		Max. Surge Current (8/20μs)	Rated Power	Max. Energy (10/1000μs)
	V1mA	Vac(rms)	Vdc	IP	VP	I _{max}	P	W _{max}
	(V)	(V)	(V)	(A)	(V)	(A)	(W)	(J)
201KH07-AT	200(180~220)	130	170	10	340	1750	0.25	17
221KH07-AT	220(198~242)	140	180	10	360	1750	0.25	19
241KH07-AT	240(216~264)	150	200	10	395	1750	0.25	21
271KH07-AT	270(243~297)	175	225	10	455	1750	0.25	24
301KH07-AT	300(270~330)	190	250	10	500	1750	0.25	26
331KH07-AT	330(297~363)	210	275	10	550	1750	0.25	28
361KH07-AT	360(324~396)	230	300	10	595	1750	0.25	32
391KH07-AT	390(351~429)	250	320	10	650	1750	0.25	35
431KH07-AT	430(387~473)	275	350	10	710	1750	0.25	40
471KH07-AT	470(423~517)	300	385	10	775	1750	0.25	42
511KH07-AT	510(459~561)	320	415	10	845	1750	0.25	45
561KH07-AT	560(504~616)	350	460	10	925	1750	0.25	49
621KH07-AT	620(558~682)	385	505	10	1025	1750	0.25	55
681KH07-AT	680(612~748)	420	560	10	1120	1750	0.25	60
751KH07-AT	750(675~825)	460	615	10	1240	1750	0.25	64



■ 10D Series

Part No.	Varistor Voltage (@ 1mA DC)	Max. Continuous Voltage		Max. Clamping Voltage (8/20μs)		Max. Surge Current (8/20μs)	Rated Power	Max. Energy (10/1000μs)
	V _{1mA}	V _{ac(rms)}	V _{dc}	I _P	V _P	I _{max}	P	W _{max}
	(V)	(V)	(V)	(A)	(V)	(A)	(W)	(J)
201KH10-AT	200(180~220)	130	170	25	340	3500	0.4	35
221KH10-AT	220(198~242)	140	180	25	360	3500	0.4	39
241KH10-AT	240(216~264)	150	200	25	395	3500	0.4	42
271KH10-AT	270(243~297)	175	225	25	455	3500	0.4	49
301KH10-AT	300(270~330)	190	250	25	500	3500	0.4	54
331KH10-AT	330(297~363)	210	275	25	550	3500	0.4	58
361KH10-AT	360(324~396)	230	300	25	595	3500	0.4	65
391KH10-AT	390(351~429)	250	320	25	650	3500	0.4	70
431KH10-AT	430(387~473)	275	350	25	710	3500	0.4	80
471KH10-AT	470(423~517)	300	385	25	775	3500	0.4	85
511KH10-AT	510(459~561)	320	415	25	845	3500	0.4	90
561KH10-AT	560(504~616)	350	460	25	925	3500	0.4	92
621KH10-AT	620(558~682)	385	505	25	1025	3500	0.4	95
681KH10-AT	680(612~748)	420	560	25	1120	3500	0.4	98
751KH10-AT	750(675~825)	460	615	25	1240	3500	0.4	100
781KH10-AT	780(702~858)	485	640	25	1290	3500	0.4	105
821KH10-AT	820(738~902)	510	670	25	1355	3500	0.4	110
911KH10-AT	910(819~1001)	550	745	25	1500	3500	0.4	130
102KH10-AT	1000(900~1100)	625	825	25	1650	3500	0.4	140

■ 14D Series

Part No.	Varistor Voltage (@ 1mA DC)	Max. Continuous Voltage		Max. Clamping Voltage (8/20μs)		Max. Surge Current (8/20μs)	Rated Power	Max. Energy (10/1000μs)
	V _{1mA}	V _{ac(rms)}	V _{dc}	I _P	V _P	I _{max}	P	W _{max}
	(V)	(V)	(V)	(A)	(V)	(A)	(W)	(J)
201KH14-AT	200(180~220)	130	170	50	340	6000	0.6	70
221KH14-AT	220(198~242)	140	180	50	360	6000	0.6	78
241KH14-AT	240(216~264)	150	200	50	395	6000	0.6	84
271KH14-AT	270(243~297)	175	225	50	455	6000	0.6	99
301KH14-AT	300(270~330)	190	250	50	500	6000	0.6	108
331KH14-AT	330(297~363)	210	275	50	550	6000	0.6	115
361KH14-AT	360(324~396)	230	300	50	595	6000	0.6	130
391KH14-AT	390(351~429)	250	320	50	650	6000	0.6	140
431KH14-AT	430(387~473)	275	350	50	710	6000	0.6	155
471KH14-AT	470(423~517)	300	385	50	775	6000	0.6	175
511KH14-AT	510(459~561)	320	415	50	845	6000	0.6	180

METAL OXIDE VARISTORS

KH-AT Series

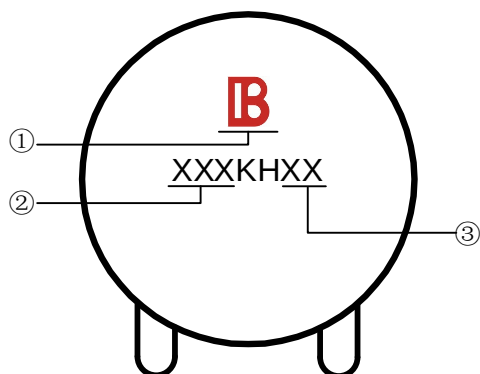
561KH14-AT	560(504~616)	350	460	50	925	6000	0.6	185
621KH14-AT	620(558~682)	385	505	50	1025	6000	0.6	190
681KH14-AT	680(612~748)	420	560	50	1120	6000	0.6	200
751KH14-AT	750(675~825)	460	615	50	1240	6000	0.6	210
781KH14-AT	780(702~858)	485	640	50	1290	6000	0.6	220
821KH14-AT	820(738~902)	510	670	50	1355	6000	0.6	235
911KH14-AT	910(819~1001)	550	745	50	1500	6000	0.6	255
102KH14-AT	1000(900~1100)	625	825	50	1650	6000	0.6	280
112KH14-AT	1100(990~1210)	680	895	50	1815	6000	0.6	310

20D Series

Part No.	Varistor Voltage (@ 1mA DC)	Max. Continuous Voltage		Max. Clamping Voltage (8/20μs)		Max. Surge Current (8/20μs)	Rated Power	Max. Energy (10/1000μs)
	V _{1mA}	V _{ac(rms)}	V _{dc}	I _P	V _P	I _{max}	P	W _{max}
	(V)	(V)	(V)	(A)	(V)	(A)	(W)	(J)
201KH20-AT	200(180~220)	130	170	100	340	10000	1.0	140
221KH20-AT	220(198~242)	140	180	100	360	10000	1.0	155
241KH20-AT	240(216~264)	150	200	100	395	10000	1.0	168
271KH20-AT	270(243~297)	175	225	100	455	10000	1.0	190
301KH20-AT	300(270~330)	190	250	100	500	10000	1.0	210
331KH20-AT	330(297~363)	210	275	100	550	10000	1.0	228
361KH20-AT	360(324~396)	230	300	100	595	10000	1.0	255
391KH20-AT	390(351~429)	250	320	100	650	10000	1.0	275
431KH20-AT	430(387~473)	275	350	100	710	10000	1.0	305
471KH20-AT	470(423~517)	300	385	100	775	10000	1.0	350
511KH20-AT	510(459~561)	320	415	100	845	10000	1.0	360
561KH20-AT	560(504~616)	350	460	100	925	10000	1.0	380
621KH20-AT	620(558~682)	385	505	100	1025	10000	1.0	390
681KH20-AT	680(612~748)	420	560	100	1120	10000	1.0	400
751KH20-AT	750(675~825)	460	615	100	1240	10000	1.0	420
781KH20-AT	780(702~858)	485	640	100	1290	10000	1.0	440
821KH20-AT	820(738~902)	510	670	100	1355	10000	1.0	460
911KH20-AT	910(819~1001)	550	745	100	1500	10000	1.0	510
102KH20-AT	1000(900~1100)	625	825	100	1650	10000	1.0	565
112KH20-AT	1100(990~1210)	680	895	100	1815	10000	1.0	620
122KH20-AT	1200(1080~1320)	750	990	100	1980	10000	1.0	660

Notes: For models with a varistor voltage greater than 1000V, only the F-type kinked lead is available.

■ Marking Code



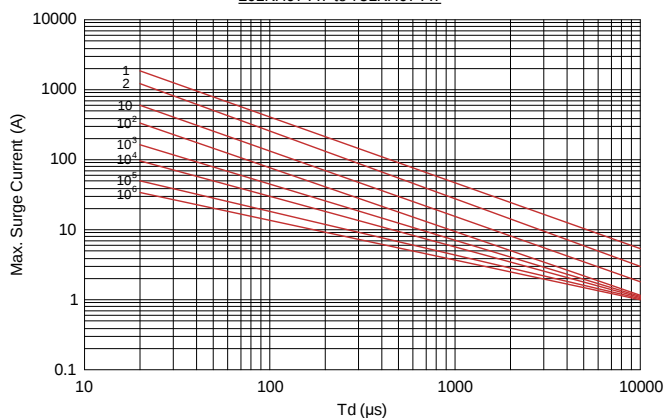
① Brightking Logo

② Varistor Voltage

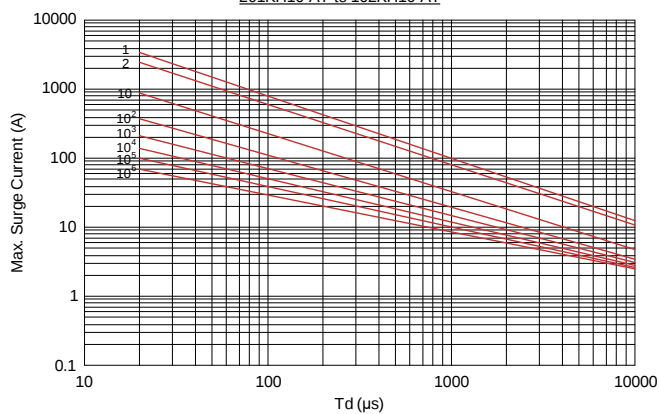
③ Varistor Size

■ Maximum Surge Current Derating Curve

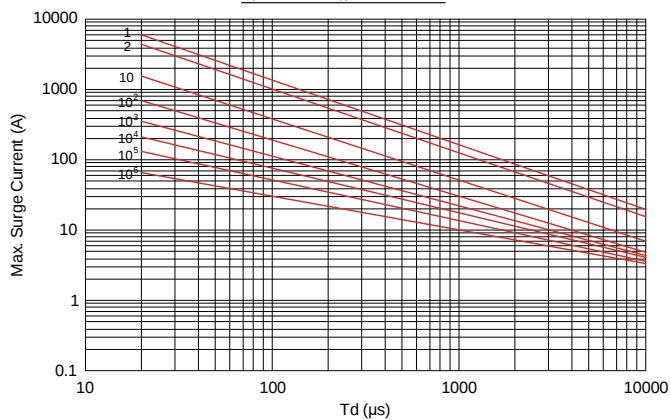
201KH07-AT to 751KH07-AT



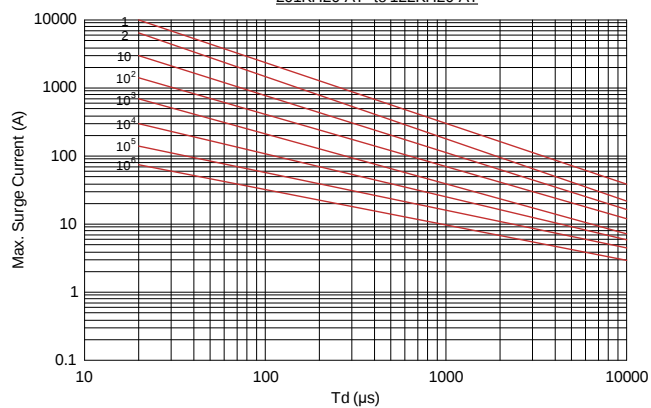
201KH10-AT to 102KH10-AT



201KH14-AT to 112KH14-AT

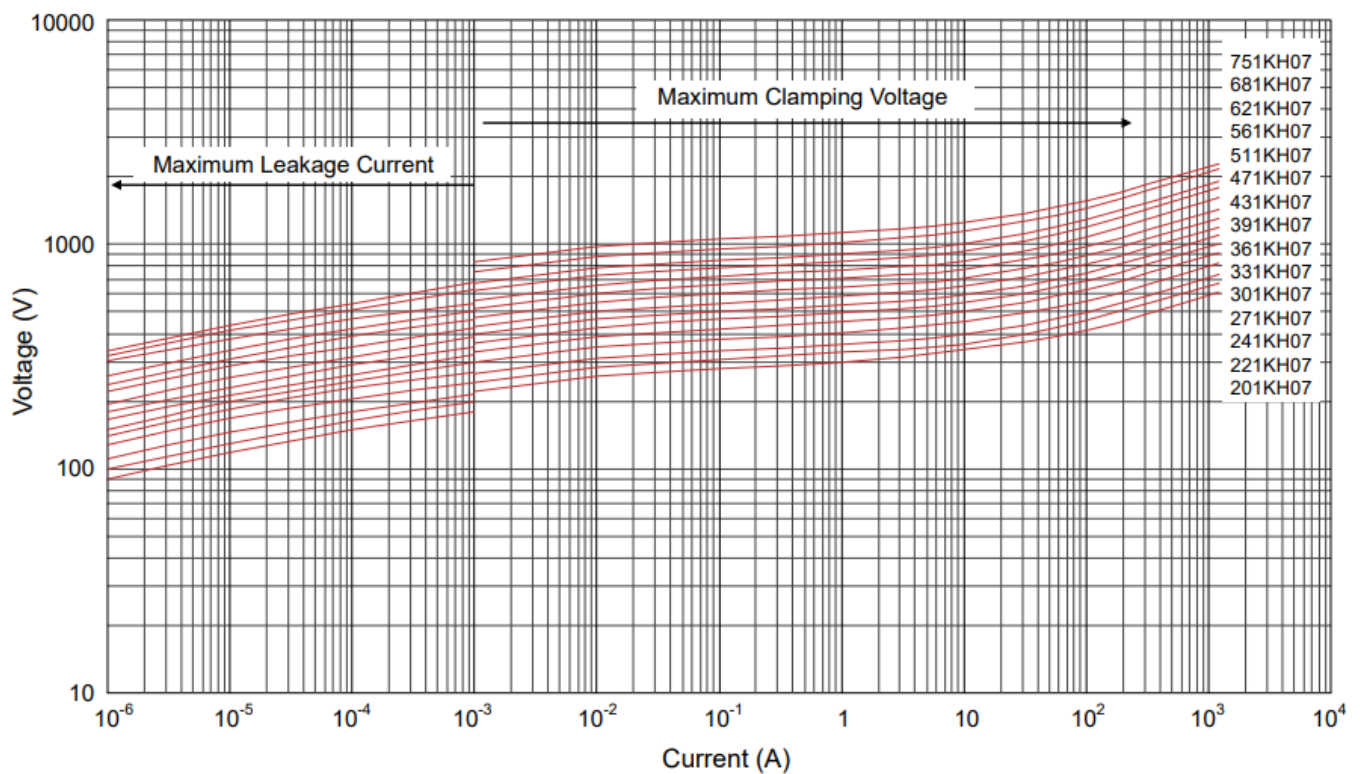


201KH20-AT to 122KH20-AT

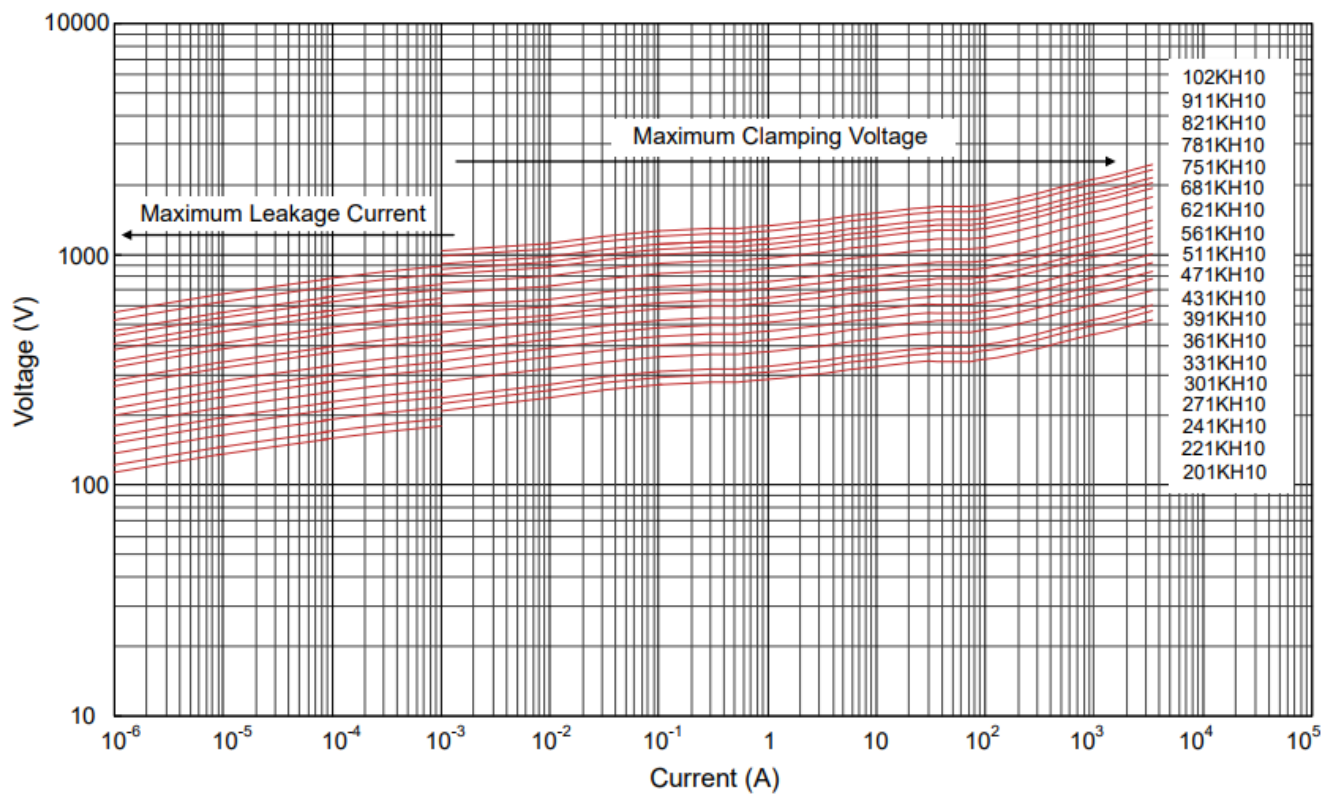


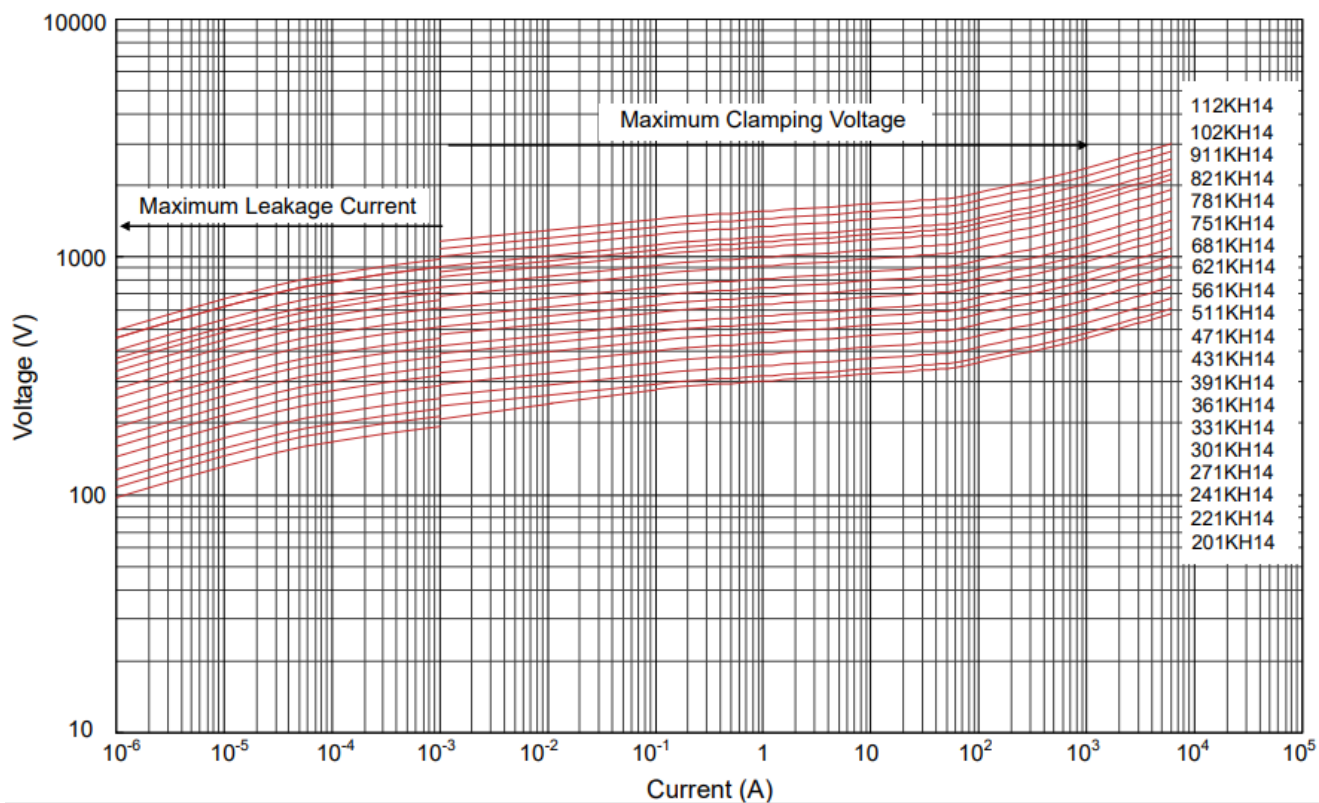
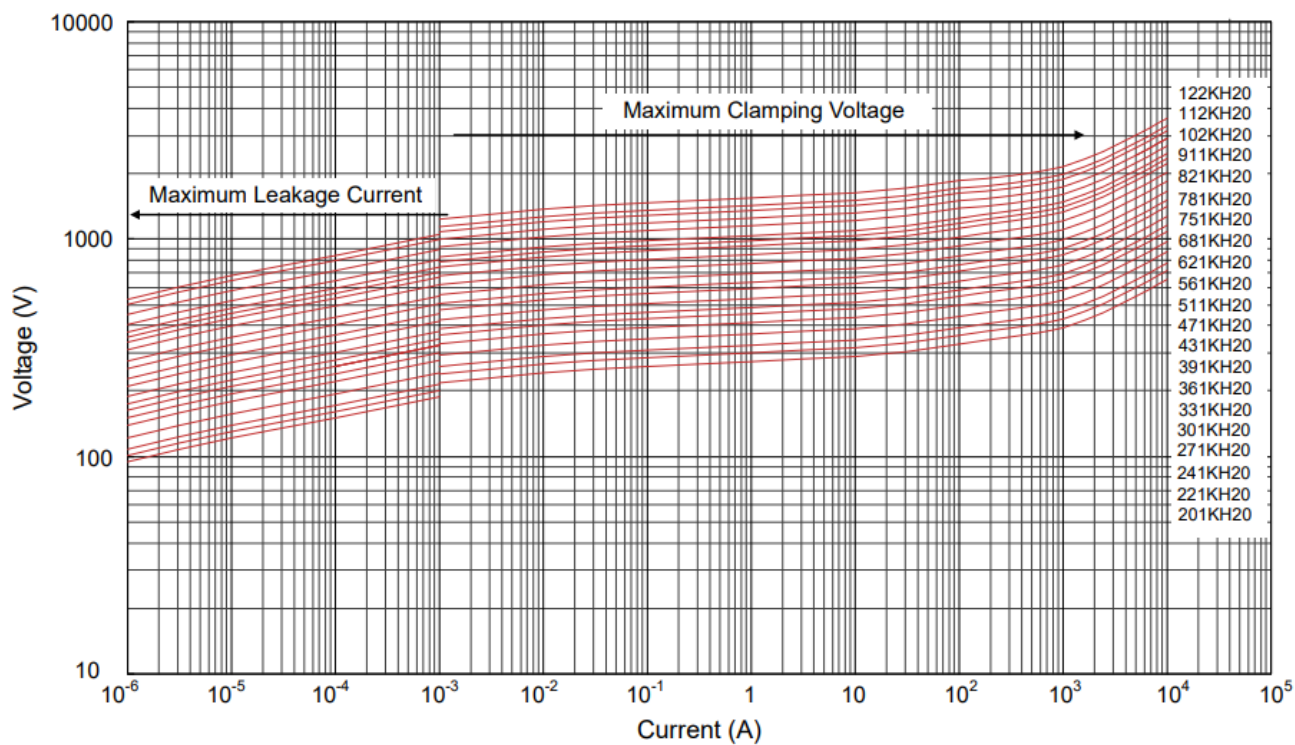
■ Maximum Leakage Current and Maximum Clamping Voltage Curve

201KH07 to 751KH07



201KH10 to 102KH10



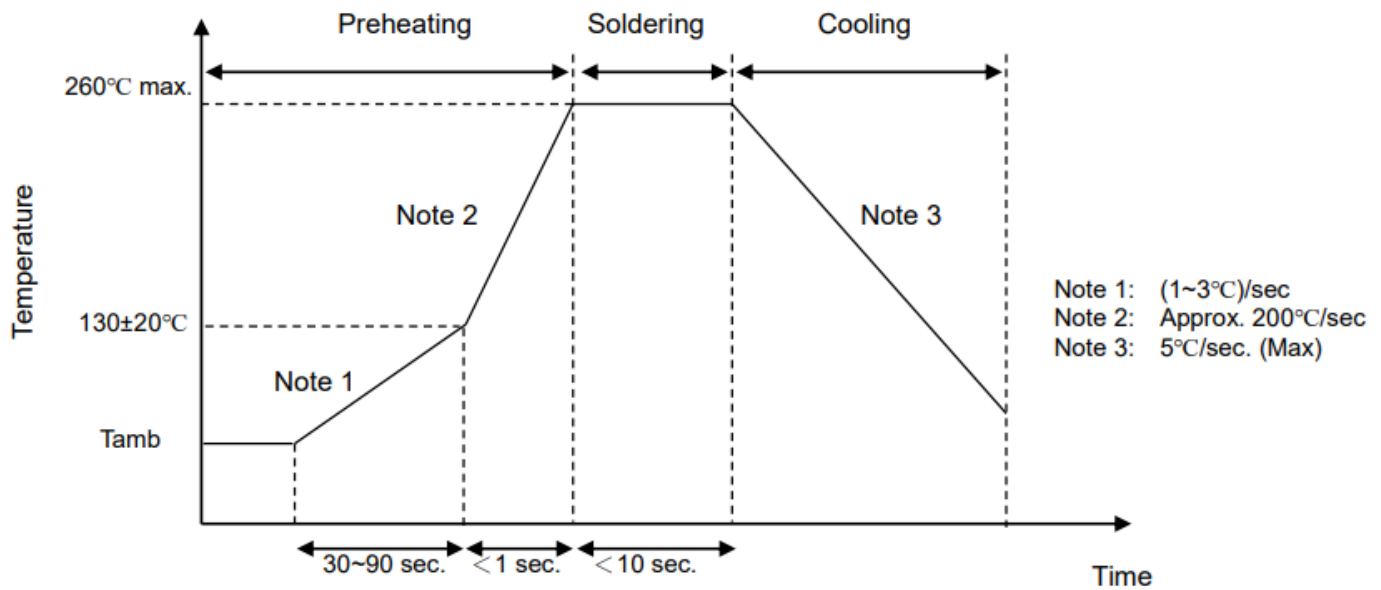
201KH14 to 112KH14201KH20 to 122KH20

■ Reliability (based on AEC-Q200 Rev-E)

Item	Standard	Test conditions/Methods	Specifications
Terminal Strength	MIL-STD-202 Method 211	1. Pull test (2.27 kg) 2. Wire-lead bend test (227 g) Duration of the applied forces: 10±1sec	$\Delta V_{1mA} / V_{1mA}$ $\leq 10\%$ No visible damage
Vibration	MIL-STD-202 Method 204	Acceleration 5 g's Sweep time: 20min. Frequency range: 10 to 2000 Hz 3×12 cycles	$\Delta V_{1mA} / V_{1mA}$ $\leq 10\%$ No visible damage
Solderability	J-STD-002	245±5°C , 5+0/-0.5sec	At least 95% of terminal electrode is covered by new solder
Resistance to Soldering Heat	MIL-STD-202 Method 210	No pre-heat of samples. Temperature 260±5°C, Time 10±1 s Immersion and emersion rate 25mm/s ±6mm/s Number of heat cycles 1	$\Delta V_{1mA} / V_{1mA}$ $\leq 10\%$ No visible damage
Biased Humidity	MIL-STD-202 Method 103	Test temp.: 85°C. Rel. humidity of air: 85% Duration: 1000 h Test Power Bias at 85% (+5%/-0%) of rated varistor voltage. Measurement at 24±2 hours after test conclusion.	$\Delta V_{1mA} / V_{1mA}$ $\leq 10\%$ No visible damage
High Temperature Storage	MIL-STD-202 Method 108	Test temp.: 150+3/-0°C. Duration: 1000 h Unpowered Measurement at 24±2 hours after test conclusion.	$\Delta V_{1mA} / V_{1mA}$ $\leq 10\%$ No visible damage
Operational Life	MIL-STD-202 Method 108	Test temp.: 125+3/-0°C. Duration: 1000 h Test Power: Bias at 85% (+5%/-0%) of rated varistor voltage. Measurement at 24±2 hours after test conclusion.	$\Delta V_{1mA} / V_{1mA}$ $\leq 10\%$ No visible damage
Mechanical Shock	MIL-STD-202, Method 213	Peak value 100g's half sine waveform Normal duration (D): 6ms In 3 directions perpendicularly intersecting each other (total 18 times)	$\Delta V_{1mA} / V_{1mA}$ $\leq 10\%$ No visible damage
Temperature Cycling	JESD22 Method JA-104	Lower test temp.: -40+0/-3°C Upper test temp.: 125+3/-0°C Soak time at lower or upper temp.: 15 min. Transfer time: 5 mins. Cycle time: 2 Cycles/hour. Number of cycles: 1000 Measurement at 24±2 hours after test conclusion.	$\Delta V_{1mA} / V_{1mA}$ $\leq 10\%$ No visible damage
Resistance to solvents	MIL-STD-202 Method 215	Add aqueous wash chemical- OKEM Clean or equivalent. Do not use banned solvents.	No visible damage
8/20 μ s Surge Life	IEC 61051-1	8/20 μ s waveform, 10 surge currents, unipolar, interval 30 sec, amplitude corresponding to max. surge current derating curves for 20 μ s.	$\Delta V_{1mA} / V_{1mA}$ $\leq 10\%$ No visible damage

■ Soldering Recommendation

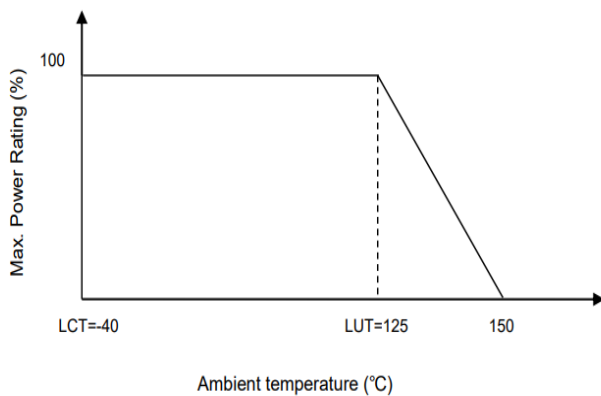
● Wave Soldering Profile



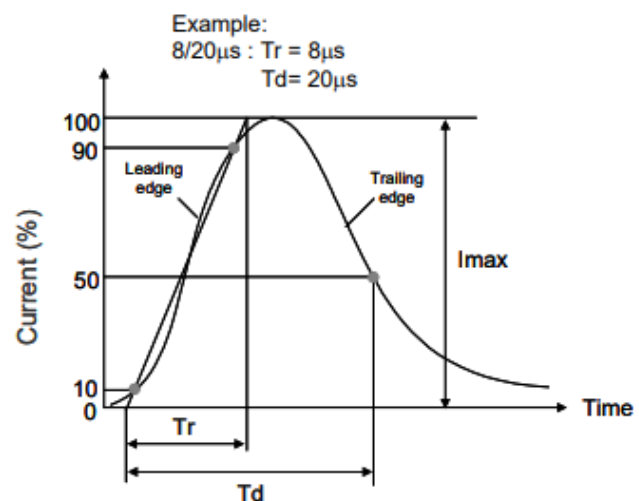
● Recommended Reworking Conditions with Soldering Iron

Item	Conditions
Temperature of Soldering Iron-tip	360°C (max.)
Soldering Time	3 sec (max.)
Distance from Varistor	2 mm (min.)

■ Power Derating Curve



■ Surge Current Standard Waveform



■ Packaging

■ Taping Specification

■ Straight lead

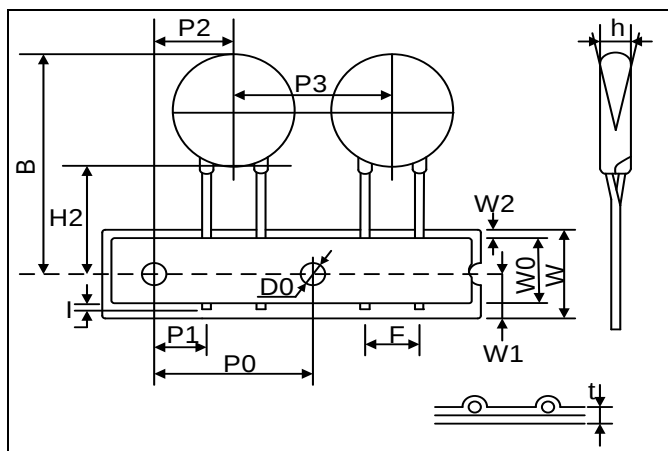


Figure A

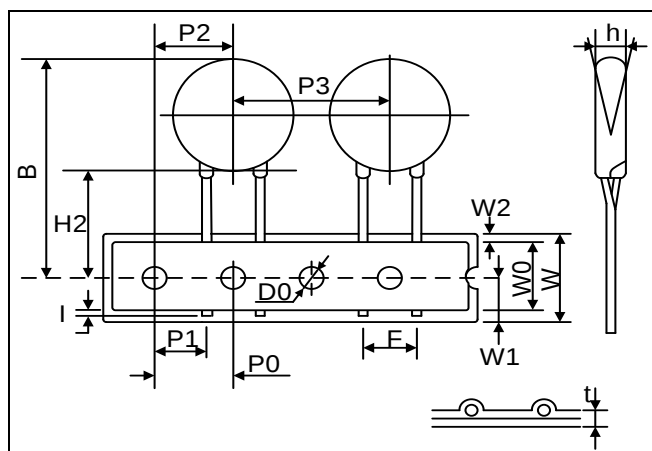


Figure B

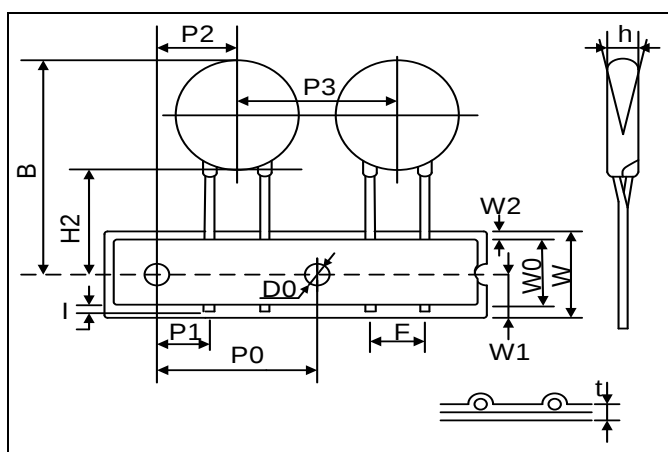


Figure C

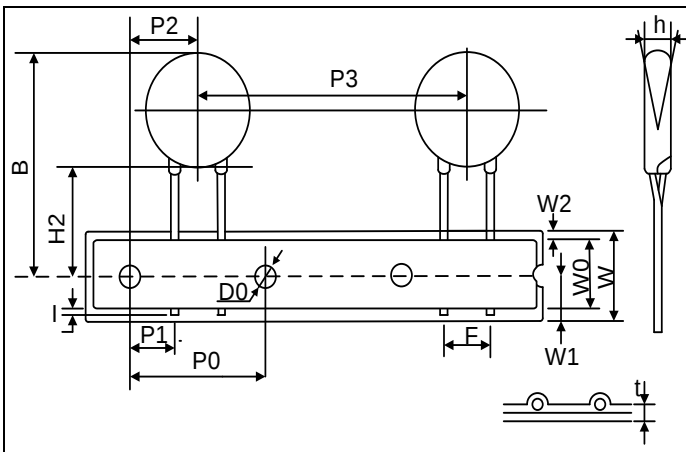


Figure D

(Unit: mm)

Taping Code	Series	P0	P1	P2	P3	F	h	W	W0	W1	W2	H2	I	D0	t	B	Figure
		±1.0	±0.7	±1.3	±1.0	±0.8	0	±1.0	±1.0	+0.5	Max.	±2.0	Max.	±0.2	±0.3	Max.	
(P0:12.7)	07	12.7	3.85	6.35	12.7	5.0	±2	18.0	12.0	9.0	3.0	20.0	2.0	4.0	0.6	32	A
	10	12.7	8.95	12.7	25.4	7.5	±2	18.0	12.0	9.0	3.0	20.0	2.0	4.0	0.6	36	B
	14	12.7	8.95	12.7	25.4	7.5	±4	18.0	12.0	9.0	3.0	20.0	2.0	4.0	0.6	40	B
	20	12.7	8.95/7.7	12.7	25.4	7.5/10.0	±4	18.0	12.0	9.0	3.0	20.0	2.0	4.0	0.6	45	B
(P0:15.0)	10	15.0	3.85	7.5	15.0	7.5	±2	18.0	12.0	9.0	3.0	20.0	2.0	4.0	0.6	36	C
	14	15.0	3.85	7.5	30.0	7.5	±4	18.0	12.0	9.0	3.0	20.0	2.0	4.0	0.6	40	D

■ In Line Kink Lead

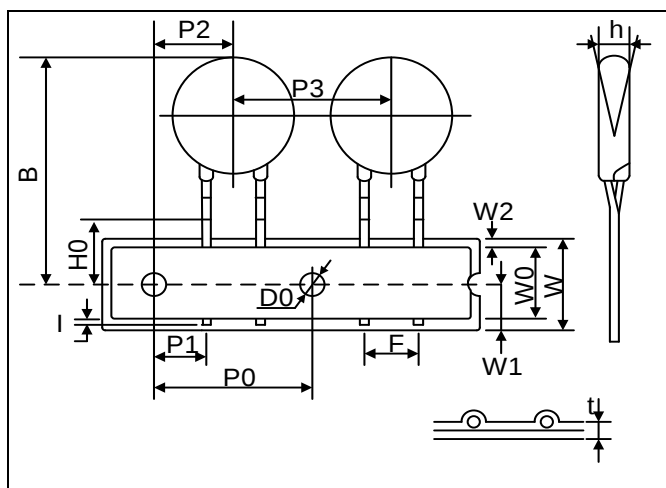


Figure A

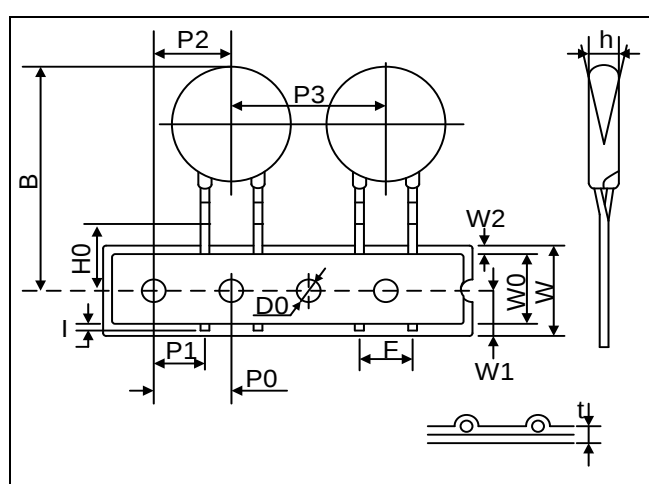


Figure B

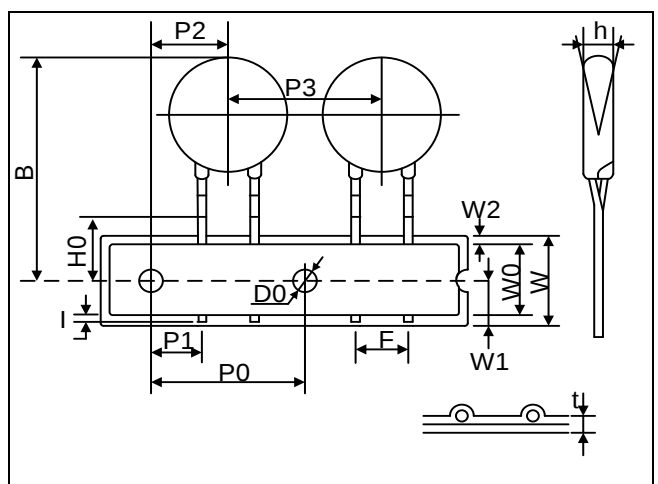


Figure C

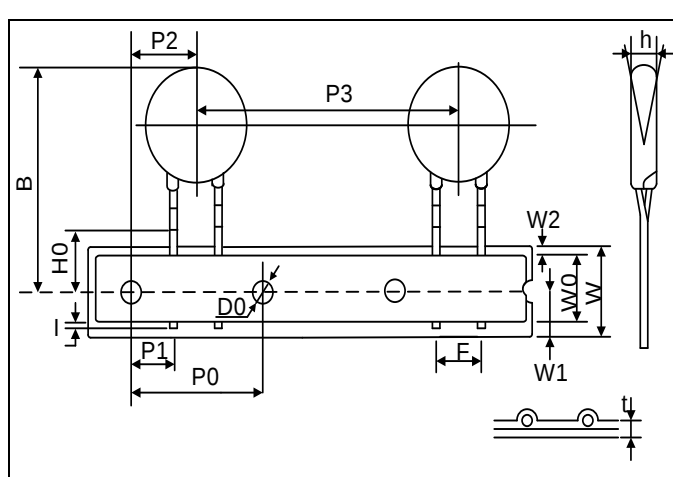


Figure D

(Unit: mm)

Taping Code	Series	P0	P1	P2	P3	F	h	W	W0	W1	W2	H0	I	D0	t	B	Figure
		±1.0	±0.7	±1.3	±1.0	±0.8	0	±1.0	±1.0	+0.5	Max.	±1.0	Max.	±0.2	±0.3	Max.	
(P0:12.7)	07	12.7	3.85	6.35	12.7	5.0	±2	18.0	12.0	9.0	3.0	16.0	2.0	4.0	0.6	32	A
	10	12.7	8.95	12.7	25.4	7.5	±2	18.0	12.0	9.0	3.0	16.0	2.0	4.0	0.6	36	B
	14	12.7	8.95	12.7	25.4	7.5	±4	18.0	12.0	9.0	3.0	16.0	2.0	4.0	0.6	40	B
	20	12.7	8.95/7.7	12.7	25.4	7.5/10.0	±4	18.0	12.0	9.0	3.0	16.0	2.0	4.0	0.6	45	B
(P0:15.0)	10	15.0	3.85	7.5	15.0	7.5	±2	18.0	12.0	9.0	3.0	16.0	2.0	4.0	0.6	36	C
	14	15.0	3.85	7.5	30.0	7.5	±4	18.0	12.0	9.0	3.0	16.0	2.0	4.0	0.6	40	D

Outer Kink Lead

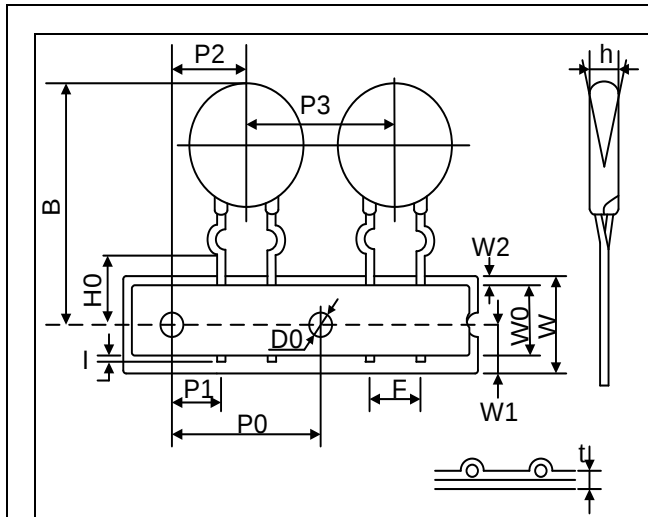


Figure A

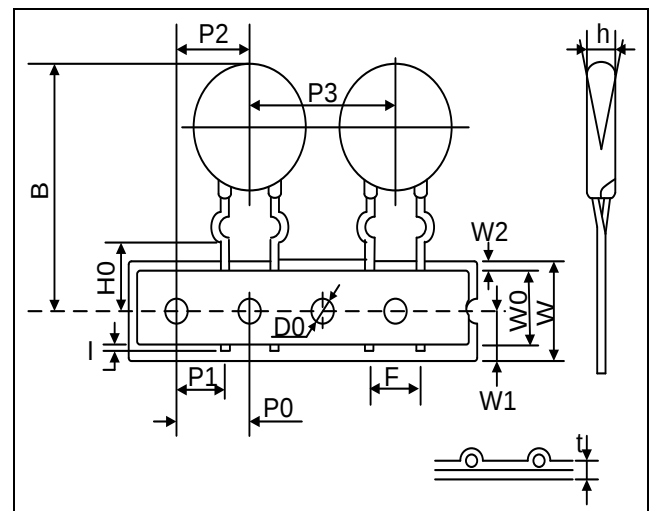


Figure B

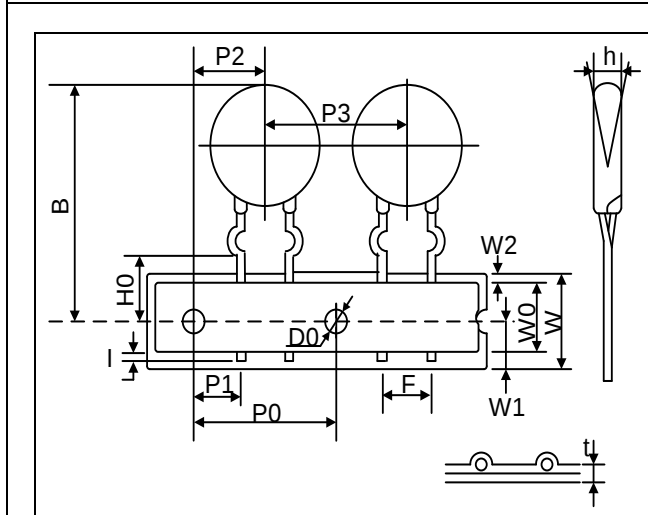


Figure C

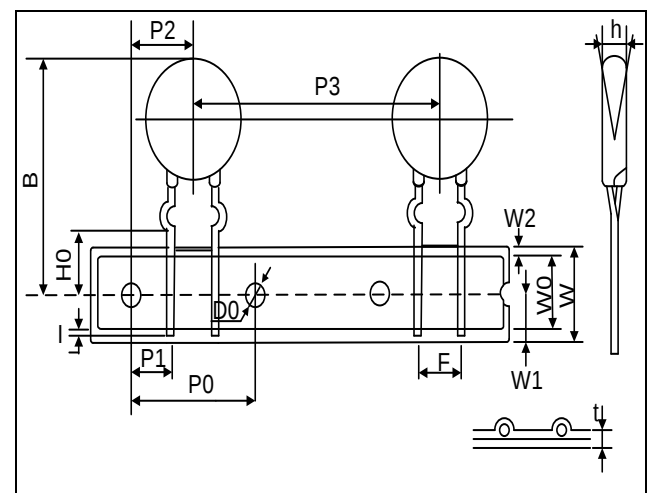


Figure D

(Unit: mm)

Taping Code	Series	P0	P1	P2	P3	F	h	W	W0	W1	W2	H0	I	D0	t	B	Figure
		±1.0	±0.7	±1.3	±1.0	±0.8	0	±1.0	±1.0	+0.5	Max.	±1.0	Max.	±0.2	±0.3	Max.	
(P0:12.7)	07	12.7	3.85	6.35	12.7	5.0	±2	18.0	12.0	9.0	3.0	16.0	2.0	4.0	0.6	32	A
	10	12.7	8.95	12.7	25.4	7.5	±2	18.0	12.0	9.0	3.0	16.0	2.0	4.0	0.6	36	B
	14	12.7	8.95	12.7	25.4	7.5	±4	18.0	12.0	9.0	3.0	16.0	2.0	4.0	0.6	40	B
	20	12.7	8.95/7.7	12.7	25.4	7.5/10.0	±4	18.0	12.0	9.0	3.0	16.0	2.0	4.0	0.6	45	B
(P0:15.0)	10	15.0	3.85	7.5	15.0	7.5	±2	18.0	12.0	9.0	3.0	16.0	2.0	4.0	0.6	36	C
	14	15.0	3.85	7.5	30.0	7.5	±4	18.0	12.0	9.0	3.0	16.0	2.0	4.0	0.6	40	D

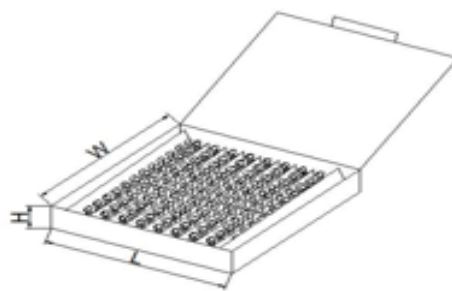
■ Quantity

● Bulk Packing

Series	Voltage Type	Ordinary goods (pcs/bag)	
		Long lead	Short lead
07Φ	201K-271K	800	800
	301K-511K	700	700
	561K-751K	500	500
10Φ	201K-271K	500	500
	301K-391K	450	450
	431K-561K	400	400
	621K-781K	350	350
	821K-102K	300	300
14Φ	201K-271K	400	400
	301K-391K	300	300
	431K-561K	250	250
	621K-781K	200	200
	821K-112K	150	150
20Φ	201K-471K	75	75
	511K-681K	50	50
	751K-122K	25	25

● Ammo Packing

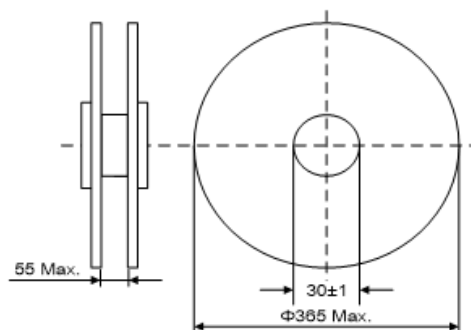
Series	Voltage Type	P0: 12.7mm (pcs/box)	P0: 15.0mm (pcs/box)
07Φ	201K-361K	1200	/
	391K-561K	1000	
	621K-751K	750	
10Φ	201K-241K	650	900
	271K-361K	600	900
	391K-471K	500	800
	511K-621K	450	700
	681K-751K	400	600
	781K-102K	300	500
14Φ	201K-241K	650	450
	271K-331K	600	450
	361K-471K	500	400
	511K-621K	450	350
	681K-751K	400	300
	781K-112K	300	250
20Φ	201K-301K	350	/
	331K-681K	250	
	751K-911K	200	



Series	L±5	W±5	H±5
07~10Φ	340	245	45
14~20Φ	340	245	50

● Reel Packing

Series	Voltage Type	P0: 12.7mm (pcs/reel)	P0: 15.0mm (pcs/reel)
07 Φ	201K-331K	1800	/
	361K-391K	1500	
	431K-751K	1200	
10 Φ	201K-331K	800	1000
	361K-621K	750	800
	681K-751K	600	750
	781K-112K	500	600
14 Φ	201K-331K	800	800
	361K-621K	600	600
	681K-751K	500	500
	781K-112K	450	450
20 Φ	201K-301K	400	/
	331K-681K	300	
	751K-102K	250	



Legal Disclaimer

YAGEO, its distributors and agents (collectively, "YAGEO"), hereby disclaims any and all liabilities for any errors, inaccuracies or incompleteness contained in any product related information, including but not limited to product specifications, datasheets, pictures and/or graphics. YAGEO may make changes, modifications and/or improvements to product related information at any time and without notice.

YAGEO makes no representation, warranty, and/or guarantee about the fitness of its products for any particular purpose or the continuing production of any of its products. To the maximum extent permitted by law, YAGEO disclaims (i) any and all liability arising out of the application or use of any YAGEO product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for a particular purpose, non-infringement and merchantability.

YAGEO products are designed for general purpose applications under normal operation and usage conditions. Please contact YAGEO for the applications listed below which require especially high reliability for the prevention of defects which might directly cause damage to the third party's life, body or property: Aerospace equipment (artificial satellite, rocket, etc.), Atomic energy-related equipment, Aviation equipment, Disaster prevention equipment, crime prevention equipment, Electric heating apparatus, burning equipment, Highly public information network equipment, data-processing equipment, Medical devices, Military equipment, Power generation control equipment, Safety equipment, Traffic signal equipment, Transportation equipment and Undersea equipment, or for any other application or use in which the failure of YAGEO products could result in personal injury or death, or serious property damage. Particularly **YAGEO Corporation and its affiliates do not recommend the use of commercial or automotive grade products for high reliability applications or manned space flight.**

Information provided here is intended to indicate product specifications only. YAGEO reserves all the rights for revising this content without further notification, as long as products are unchanged. Any product change will be announced by PCN.