Metal Oxide Varistors KSE-10K Series

Features

- Wide operating voltage (V1mA) range from 18V to 1800V.
- Fast responding to transient over-voltage.
- Large absorbing transient energy capability.
- Low clamping ratio and no following-on current.

General Information

The KSE-10K Series of 10 mm radial leaded varistor devices protects against overvoltage transients such as lightning, power contact and power induction. The metal oxide varistors offer a choice of varistor voltages from 18 V to 1500 V and Vrms voltages from 11 V to 930 V. The devices have a high current handling, high energy absorption capability and fast response times to protect against transient faults up to rated limits.

General characteristics

- Storage Temperature: -40°C ~ +125°C
- Operating Temperature: -40°C ~ +85°C
- Coating: Epoxy resin
- Disk: Zinc Oxide
- Leads: Cp/Cu wire (tinned copper-clad steel wire)

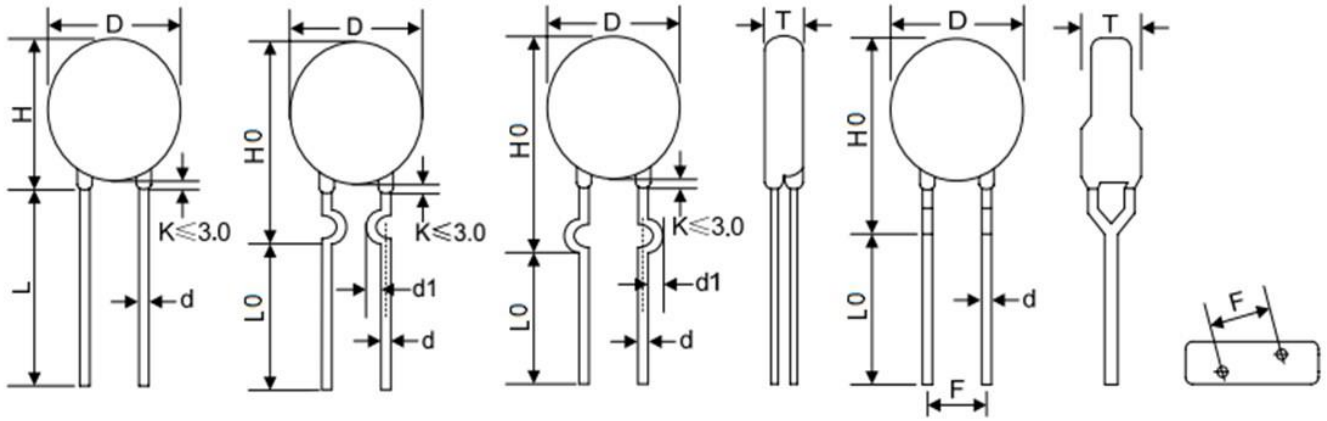
Product name

K	S	E	-	1	0	K	4	7	1

KSE	Disc Diameter	Varistor Voltage Tolerance	Nominal Varistor Voltage
KEEN SIDE electronics	10 = 10 mm	K = 10 %	471 = $47*10^1$ V

1. OUTLINE

1.1 DIMENSIONS



I-Type O-Type F-Type

Table1

Unit: mm

Symbol	Dimension
D(max.)	12.5
H(max.)	16.5
H0(max.)	17.5
F(±0.8)	7.5
T	Table2
d(±0.05)	0.8
d1(±0.4)	1.4
L(min.)	20.0
L0(min.)	15.0
Epoxy Color: Blue	

Table2

Unit: mm

Model	T	Model	T
180K	3.6	331K	4.7
220K	3.7	361K	4.9
270K	3.9	391K	5.0
330K	3.8	431K	5.2
390K	3.9	471K	5.4
470K	4.1	511K	5.6
560K	4.3	561K	5.8
680K	4.6	621K	6.1
820K	4.0	681K	6.4
101K	4.2	751K	6.5
121K	4.4	781K	6.6
151K	4.7	821K	6.8
181K	4.1	911K	7.1
201K	4.2	102K	7.6
221K	4.3	112K	8.0
241K	4.4	122K	8.5
271K	4.6	152K	8.8
301K	4.7		

I-Type varistors - typical, other types – on demand.

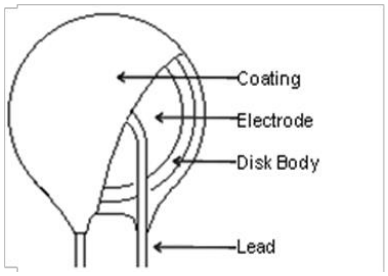
2. ELECTRICAL PARAMETERS

Model (Standard)	Maximum Allowable Voltage		Varistor voltage	IR3	@	Clamping voltage		Maximum Peak Current (8/20μs)		Maximum Energy 10/1000μs		Rated Power	Typical Capacitance (Reference)
	AC rms	DC	$V_{1.0\,mA}$	μA		VC	IP	Standard	High Surge	Standard	High Surge	(w)	@ 1KHz
	(V)	(V)	(V)			(V)	(A)	(A)		(JOULE)			(pf)
KSE-10K180	11	14	18(15-21.6)	50	10	36	5	500/ 250*2	1000/ 500*2	2,1	3	0,05	5600
KSE-10K220	14	18	22(19.5-26)		10	43				2,5	5		4500
KSE-10K270	17	22	27(24-31)		10	53				3	6		3700
KSE-10K330	20	26	33(29.5-36.5)		10	65				4	7		3000
KSE-10K390	25	31	39(35-43)		10	77				4,6	9		2400
KSE-10K470	30	38	47(42-52)		10	93				5,5	11		2100
KSE-10K560	35	45	56(50-62)		10	110				7	13		1800
KSE-10K680	40	56	68(61-75)		10	135				8,2	15		1500
KSE-10K820	50	65	82(74-90)	30	20	135	25	2500/ 1250*2	3500/ 2500*2	12	17	0,4	1200
KSE-10K101	60	85	100(90-110)		20	165				15	18		1000
KSE-10K121	75	100	120(108-132)		20	200				18	21		830
KSE-10K151	95	125	150(135-165)		20	250				22	25		670
KSE-10K181	115	150	180(162-198)		20	300				27	30		560
KSE-10K201	130	170	200(185-225)		20	340				30	35		500
KSE-10K221	140	180	220(198-242)		20	360				32	39		450
KSE-10K241	150	200	240(216-264)		20	395				35	42		420
KSE-10K271	175	225	270(243-297)		20	455				37	49		370
KSE-10K301	190	250	300(270-330)		20	500				40	54		330
KSE-10K331	210	275	330(297-363)		20	550				43	58		300
KSE-10K361	230	300	360(324-396)		20	595				47	65		280
KSE-10K391	250	320	390(351-429)		20	650				60	70		260
KSE-10K431	275	350	430(387-473)		20	710				65	80		230
KSE-10K471	300	385	470(423-517)		20	775				67	85		210
KSE-10K511	320	415	510(459-561)		20	845				69	90		200
KSE-10K561	350	460	560(504-616)		20	925				70	92		180
KSE-10K621	385	505	620(558-682)		20	1025				72	95		160
KSE-10K681	420	560	680(612-748)		20	1120				75	98		150
KSE-10K751	460	615	750(675-825)		20	1240				77	100		130
KSE-10K781	485	640	780(702-858)		20	1290				80	105		125
KSE-10K821	510	670	820(738-902)		20	1355				85	110		120
KSE-10K911	550	745	910(819-1001)		20	1500				93	130		110
KSE-10K102	625	825	1000(900-1100)		20	1650				102	140		100
KSE-10K112	680	895	1100(990-1210)		20	1815				115	155		90
KSE-10K122	750	990	1200(1080-1320)		20	1980				127	165		80
KSE-10K152	930	1200	1500(1350-1650)		20	2475				135	180		70

High Surge Type Varistors – available on demand.

PARAMETERS DESCRIPTION			
2.1	Max. Allowable Voltage	Reference p2*	At 1.0mA DC
2.2	Varistor Voltage(Test Time For 30ms)		V0.1mA □ V1mA ■
2.3	Rated Wattage		Test Current Waveform 8/20μs
2.4	Max. Clamping Voltage		Test Current Waveform 8/20μs
2.5	Withstanding Surge Current		Test Current Waveform 10/1000μs
2.6	Max. Energy		@1KHz
2.7	Typical Capacitance		At 80% of Varistor Voltage
2.8	Leakage Current		$\alpha=\log\frac{I_1}{I_2}/\log\frac{V_1}{V_2}$
2.9	Nonlinear Exponent (α)		$\frac{Vc@85°C-Vc@25°C}{Vcat25°C}\times\frac{1}{80}\times100(\%/°C)$
2.10	Temperature Coefficient of Varistor Voltage	-0.05≤Tc≤0.05 (% /°C)	$\left\lvert\frac{V_{1mA@-40℃}-V_{1mA@25℃}}{V_{1mA@25℃}}\times\frac{1}{65}\times100\%(\%/℃)\right\rvert$
2.11	Impulse Life	≦±10%(V1mA)	Test Current Waveform 8/20μs

3. MATERIAL LIST

3.1	Drawing			
3.2	Material Chart RoHs	Item	Composition	Manufacturer
		Coating	Epoxy Resin	Made in China, and in line with the UL 94-V0 testing, meet the environmental requirements
		Lead	Cp/Cu wire	Made in China, meet the environmental requirements
		Electrode	Silver	Made in China, meet the environmental requirements
		Disk	Zinc Oxide	Made in China, meet the environmental requirements
		Solder	Sn:96.5%CU 0.5%Ag3.0%	Made in China, meet the environmental requirements

4. MECHANICAL REQUIREMENTS

4.1	Tensile of Terminations	No Outstanding Damage	1.0 Kgf; 10Sec.
4.2	Bending of Terminations	No Outstanding Damage	0.5 Kgf; 90, 3 Times
4.3	Vibration	No Outstanding Damage	Freq: 10-55Hz; Amp:0.75mm,1Min.
4.4	Solderability	Min. 95% of The Terminal Should Be Covered With Solder Uniformly	Solder Temp:245±5℃ Immersed Time: ≤5Sec.
4.5	Resistance of soldering heat	△ V1mA/V1mA ≦ ±5%	Solder Temp: 260±5℃ Immersed Time: 10±1Sec.

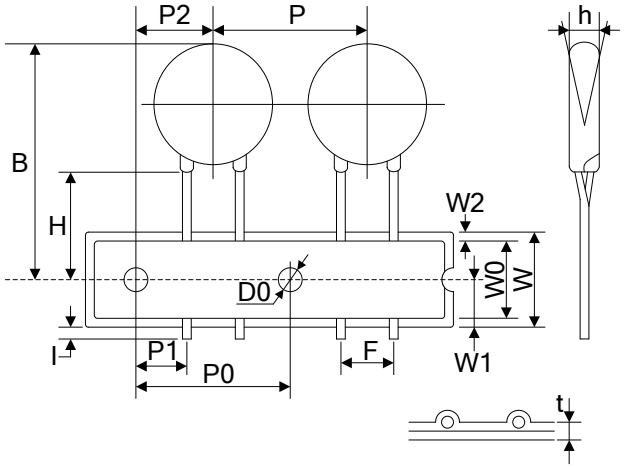
5. ENVIRONMENTAL REQUIREMENTS

5.1	High Temperature Storage	△V1mA/V1mA ≦ ±5%	Ambient Temp: 125±2℃ Duration:1000h
5.2	Low Temperature Storage	△V1mA/V1mA ≦ ±5%	Ambient Temp: -40±2℃ Duration:1000h
5.3	High Humidity Storage/Damp Heat	△V1mA/V1mA ≦ ±5%	Ambient Temp: 40±2℃ 90-95% R.H. Duration:1000h
5.4	Temperature Cycle	△V1mA/V1mA ≦ ±5%	Step / Temperature (℃) / Period (min) 1 / -40±3 / 30 ±3 2 / Room Temp / 15 ±3 3 / 85±3 / 30 ±3 4 / Room Temp / 15 ±3
5.5	High Temperature Load	△V1mA/V1mA ≦ ±10%	Ambient temp:85±2℃ Duration:1000h Load: MAX. Allowable Voltage
5.6	High Humidity Load	△V1mA/V1mA ≦ ±10%	Ambient Temp: 40±2℃ 90-95%R.H.Duration:1000H Load: MAX. Allowable Voltage
5.7	Operating Temperature Range	-40℃ ~ +85 ℃	
5.8	Storage Temperature Range	-40℃ ~ +125℃	

6.Marking Code

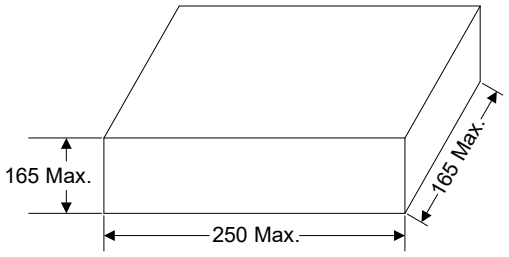
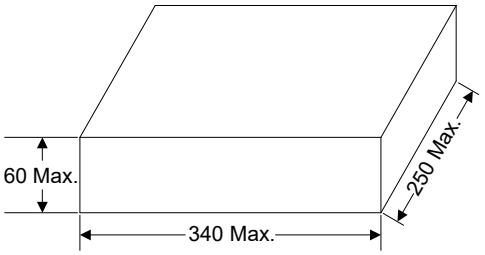
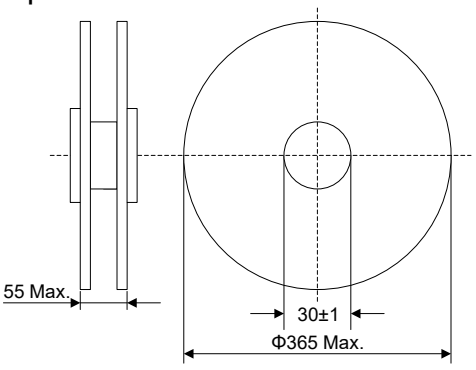
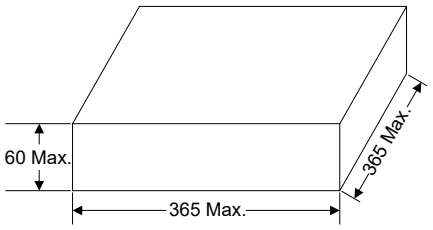
10K471

7. Taping Dimensions



Symbol	Dimension (mm)
P	25.4±1.0
P0	12.7±1.0
P1	8.95±0.7
P2	12.7±1.3
F	7.5±0.8
h	0±2
W	18.0±1.0
W0	12.0±1.0
W1	9.0±0.5
W2	3.0max
H	20.0±2.0
I	1.0max
D0	4.0±0.2
t	0.6±0.3
B	36max

8. Quantity

Packaging Dimensions (Unit: mm)	Quantity
Bulk (typ.)  	500pcs/bag 4bags/box (180K~621K)
	400pcs/bag 4bags/box (681K~112K)
	300pcs/bag 4bags/box (122K~152K)
Tape & Box  	750pcs/box (180K~241K)
	600pcs/box (271K~391K)
	500pcs/box (431K~621K)
	300pcs/box (681K~751K)
	300pcs/box (781K~112K)
Tape & Reel   	1000pcs/reel (180K~391K)
	750pcs/reel (431K~621K)
	500pcs/reel (681K~751K)
	500pcs/reel (781K~112K)