

Metal Oxide Varistors KSE-14K Series

Features

- Wide operating voltage (V_{1mA}) range from 18V to 1800V.
- Fast responding to transient over-voltage.
- Large absorbing transient energy capability.
- Low clamping ratio and no following-on current.



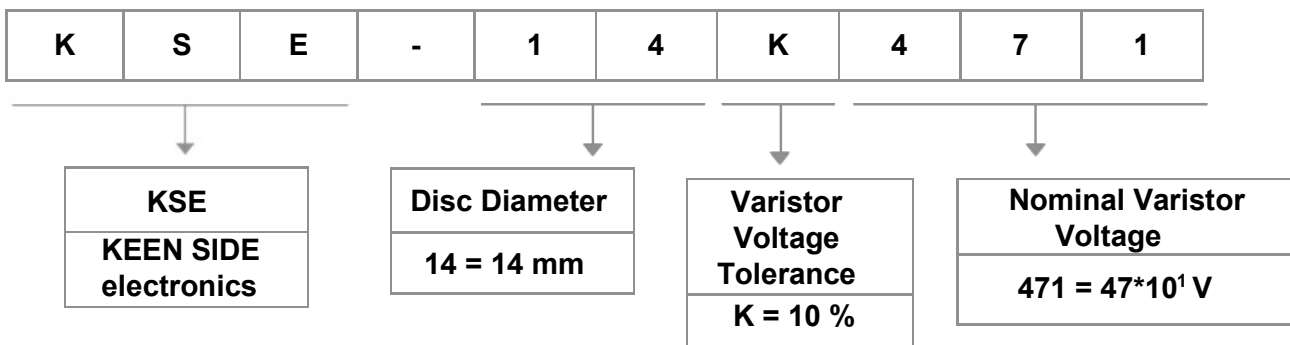
General Information

The KSE-14K Series of 14 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 1800 V and V_{rms} voltages from 11 V to 1100 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: $-40^{\circ}\text{C} \sim +125^{\circ}\text{C}$
- Operating Temperature: $-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$
- Coating: Epoxy resin
- Disk: Zinc Oxide
- Leads: Cp/Cu wire (tinned copper-clad steel wire)

Product name



1. OUTLINE

1.1 DIMENSIONS

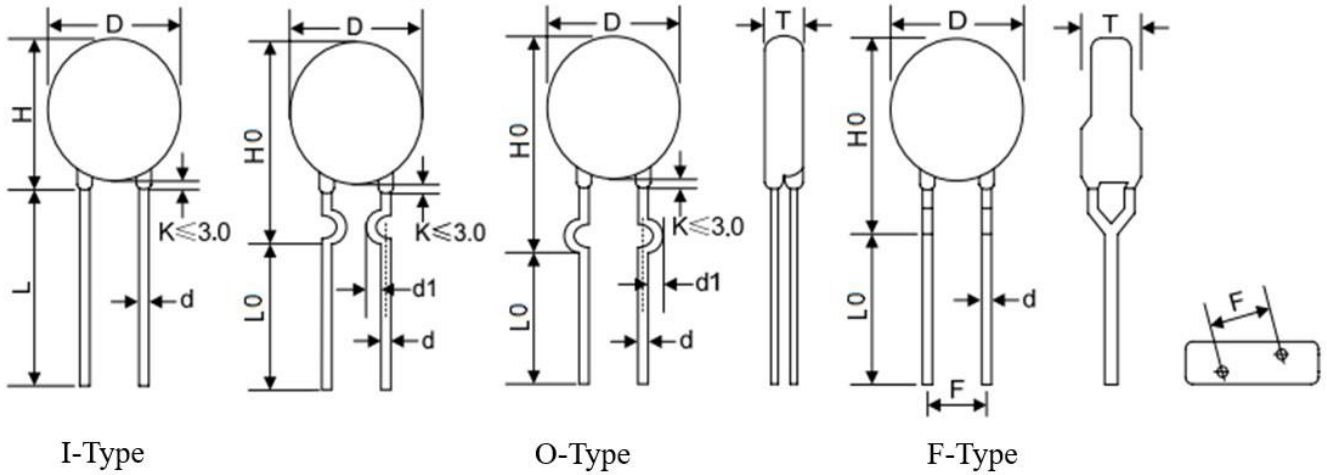


Table1	
Unit: mm	
Symbol	Dimension
D(max.)	16.5
H(max.)	20.0
H0(max.)	21.0
F(±0.8)	7.5
T	Table2
d(±0.05)	0.8
d1(±0.4)	1.4
L(min.)	20.0
L0(min.)	15.0
Epoxy Color: Blue	

Table2			
Unit: mm			
Model	T	Model	T
180K	3.6	361K	4.9
220K	3.7	391K	5.0
270K	3.9	431K	5.2
330K	3.8	471K	5.4
390K	3.9	511K	5.6
470K	4.1	561K	5.8
560K	4.3	621K	6.1
680K	4.6	681K	6.4
820K	4.0	751K	6.5
101K	4.2	781K	6.6
121K	4.4	821K	6.8
151K	4.0	911K	7.1
181K	4.1	102K	7.1
201K	4.2	112K	7.6
221K	4.3	122K	8.0
241K	4.4	142K	8.8
271K	4.6	162K	9.2
301K	4.7	182K	9.6
331K	4.7		

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

2. ELECTRICAL PARAMETERS

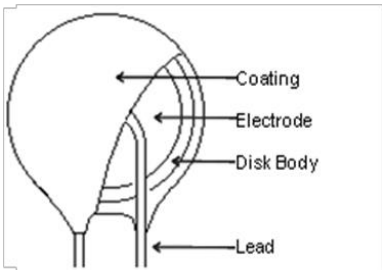
Model (Standard)	Maximum Allowable Voltage		Varistor voltage $V_{1.0\text{mA}}$	IR3 μA	@	Clamping voltage		Maximum Peak Current (8/20 μs)		Maximum Energy 10/1000 μs		Rated Power (w)	Typical Capacitance (Reference) @ 1KHz (pf)
	AC rms	DC				VC (V)	IP (A)	Standard (A)	High Surge (A)	Standard (JOULE)	High Surge (JOULE)		
	(V)	(V)	(V)	(A)								(A)	(JOULE)
KSE-14K180	11	14	18(15-21.6)	50	10	36	10	1000/ 500*2	2000/ 1000*2	4	7	0,1	11100
KSE-14K220	14	18	22(19.5-26)		10	43				5	8		9100
KSE-14K270	17	22	27(24-31)		10	53				6	10		7400
KSE-14K330	20	26	33(29.5-36.5)		10	65				7,5	12		6100
KSE-14K390	25	31	39(35-43)		10	77				8,6	13		5100
KSE-14K470	30	38	47(42-52)		10	93				10	17		4300
KSE-14K560	35	45	56(50-62)		10	110				11	20		3600
KSE-14K680	40	56	68(61-75)		10	135				14	24		2900
KSE-14K820	50	65	82(74-90)	30	20	135	50	4500/ 2500*2	6000/ 4500*2	22	27	0,6	2400
KSE-14K101	60	85	100(90-110)		20	165				28	33		2000
KSE-14K121	75	100	120(108-132)		20	200				32	40		1700
KSE-14K151	95	125	150(135-165)		20	250				40	53		1300
KSE-14K181	115	150	180(162-198)		20	300				50	60		1100
KSE-14K201	130	170	200(185-225)		20	340				57	70		1000
KSE-14K221	140	180	220(198-242)		20	360				60	78		900
KSE-14K241	150	200	240(216-264)		20	395				63	84		830
KSE-14K271	175	225	270(243-297)		20	455				70	99		740
KSE-14K301	190	250	300(270-330)		20	500				77	108		670
KSE-14K331	210	275	330(297-363)		20	550				85	115		610
KSE-14K361	230	300	360(324-396)		20	595				93	130		560
KSE-14K391	250	320	390(351-429)		20	650				100	140		510
KSE-14K431	275	350	430(387-473)		20	710				115	155		460
KSE-14K471	300	385	470(423-517)		20	775				118	175		430
KSE-14K511	320	415	510(459-561)		20	845				121	180		390
KSE-14K561	350	460	560(504-616)		20	925				125	185		360
KSE-14K621	385	505	620(558-682)		20	1025				128	190		320
KSE-14K681	420	560	680(612-748)		20	1120				130	200		290
KSE-14K751	460	615	750(675-825)		20	1240				143	210		270
KSE-14K781	485	640	780(702-858)		20	1290				148	220		260
KSE-14K821	510	670	820(738-902)		20	1355				157	235		240
KSE-14K911	550	745	910(819-1001)		20	1500				175	255		220
KSE-14K102	625	825	1000(900-1100)		20	1650				190	280		200
KSE-14K112	680	895	1100(990-1210)		20	1815				213	310		180
KSE-14K122	750	990	1200(1080-1320)		20	1980				232	324		160
KSE-14K142	880	1140	1400(1260-1540)		20	2310				238	327		150
KSE-14K162	1000	1280	1600(1440-1760)		20	2640				243	331		140
KSE-14K182	1100	1465	1800(1620-1980)	20	2970	250	335	130					

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)		$\frac{V_C@85^\circ\text{C} - V_C@25^\circ\text{C}}{V_C@25^\circ\text{C}} \times \frac{1}{80} \times 100(\%/^\circ\text{C})$	
2.10	Temperature Coefficient of Varistor Voltage		$-0.05 \leq T_c \leq 0.05$ (% / °C)	$\left \frac{V_{1\text{mA}@-40^\circ\text{C}} - V_{1\text{mA}@25^\circ\text{C}}}{V_{1\text{mA}@25^\circ\text{C}}} \times \frac{1}{65} \times 100(\%/^\circ\text{C}) \right $
2.11	Impulse Life		≅ ±10%(V1mA)	Test Current Waveform 8/20μs

3. MATERIAL LIST

3.1	Drawing			
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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% Ag:3.0%	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°C Immersed Time: ≤5Sec.
4.5	Resistance of soldering heat	ΔV 1mA/V1mA ≤ ±5%	Solder Temp: 260±5°C Immersed Time: 10±1Sec.

5. ENVIRONMENTAL REQUIREMENTS

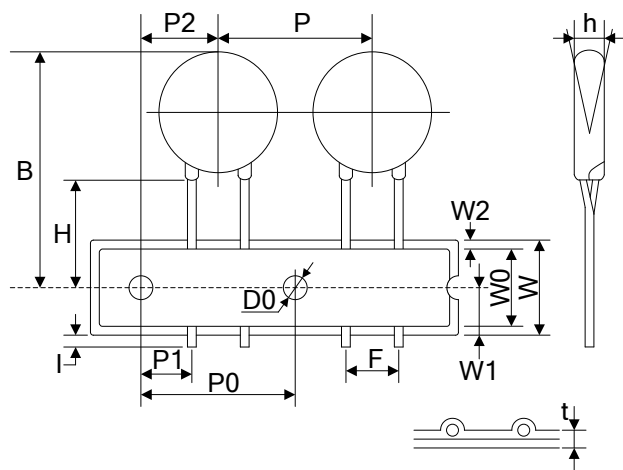
5.1	High Temperature Storage	$\Delta V1mA/V1mA$ $\leq \pm 5\%$	Ambient Temp: $125 \pm 2^\circ\text{C}$ Duration: 1000h		
5.2	Low Temperature Storage	$\Delta V1mA/V1mA$ $\leq \pm 5\%$	Ambient Temp: $-40 \pm 2^\circ\text{C}$ Duration: 1000h		
5.3	High Humidity Storage/Damp Heat	$\Delta V1mA/V1mA$ $\leq \pm 5\%$	Ambient Temp: $40 \pm 2^\circ\text{C}$ 90-95% R.H. Duration: 1000h		
5.4	Temperature Cycle	$\Delta V1mA/V1mA$ $\leq \pm 5\%$	Step	Temperature ($^\circ\text{C}$)	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	$\Delta V1mA/V1mA$ $\leq \pm 10\%$	Ambient temp: $85 \pm 2^\circ\text{C}$ Duration: 1000h Load: MAX. Allowable Voltage		
5.6	High Humidity Load	$\Delta V1mA/V1mA$ $\leq \pm 10\%$	Ambient Temp: $40 \pm 2^\circ\text{C}$ 90-95% R.H. Duration: 1000H Load: MAX. Allowable Voltage		
5.7	Operating Temperature Range	$-40^\circ\text{C} \sim +85^\circ\text{C}$			
5.8	Storage Temperature Range	$-40^\circ\text{C} \sim +125^\circ\text{C}$			

6. Marking Code

14K471



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

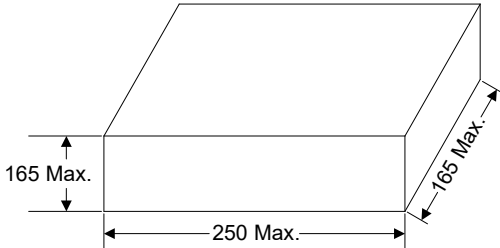
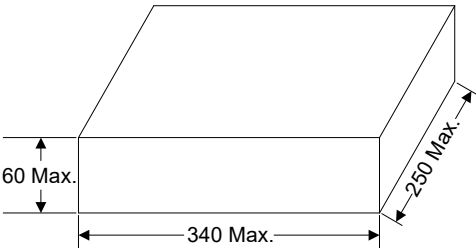
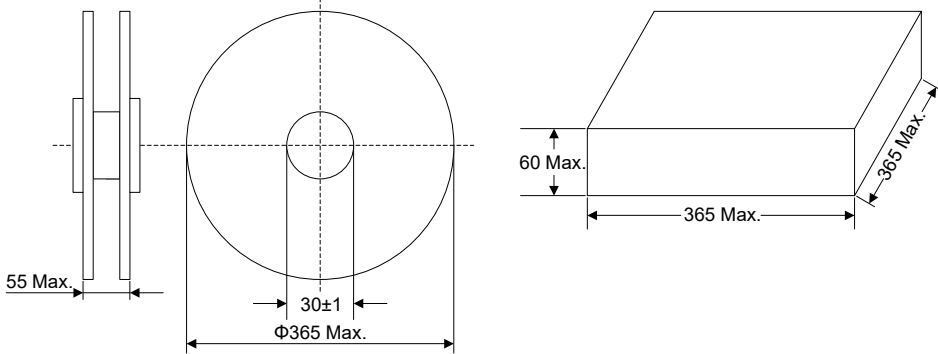
t

0.6 ± 0.3

B

40max

8. Quantity

Packaging Dimensions (Unit: mm)	Quantity
<p>Bulk (typ.)</p> 	<p>400pcs/bag 4bags/box (180K~331K)</p> <p>300pcs/bag 4bags/box (361K~621K)</p> <p>250pcs/bag 4bags/box (681K~112K)</p> <p>150pcs/bag 4bags/box (122K~182K)</p>
<p>Tape & Box</p> 	<p>750pcs/box (180K~241K)</p> <p>600pcs/box (180K~621K)</p> <p>600pcs/box (271K~331K)</p> <p>500pcs/box (361K~621K)</p> <p>400pcs/box (681K~751K)</p> <p>350pcs/box (781K~112K)</p>
<p>Tape & Reel</p> 	<p>1000pcs/reel (180K~331K)</p> <p>750pcs/reel (361K~621K)</p> <p>500pcs/reel (681K~751K)</p> <p>400pcs/reel (781K~112K)</p>