Metal Oxide Varistors KSE-05K 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-05K Series of 5 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 750 V and Vrms voltages from 11 V to 460 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 ~ +105°C
- Coating: Epoxy resin
- Disk: Zinc Oxide
- Leads: Cp/Cu wire (tinned copper-clad steel wire)

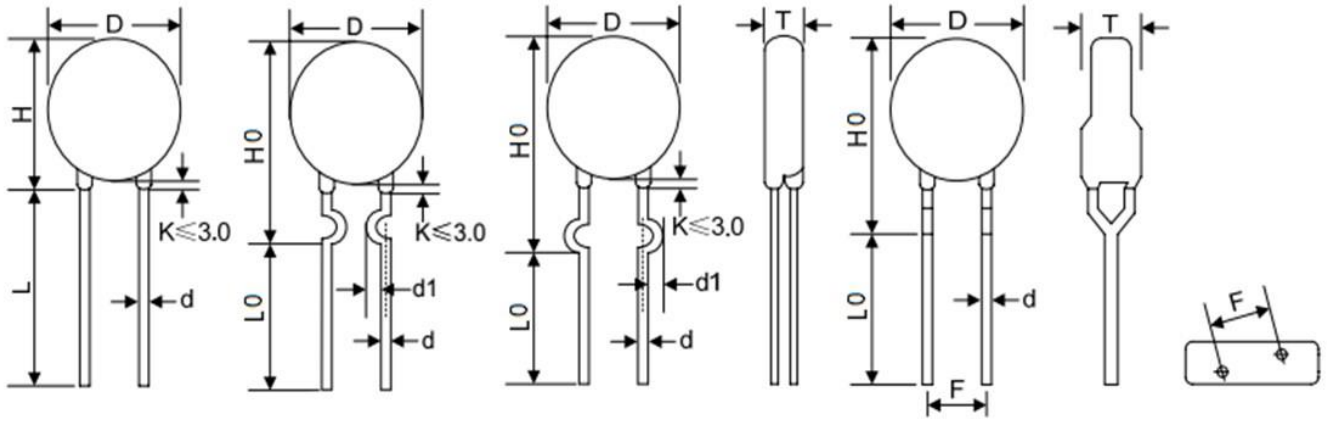
Product name

K	S	E	-	0	5	K	4	7	1

KSE	Disc Diameter	Varistor Voltage Tolerance	Nominal Varistor Voltage
KEEN SIDE electronics	05 = 5 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.)	7.5
H(max.)	10.5
H0(max.)	13.0
F(±0.8)	5.0
T	Table2
d(±0.05)	0.6
d1(±0.4)	1.2
L(min.)	20.0
L0(min.)	15.0
Epoxy Color: Blue	

Table2

Unit: mm

Model	T	Model	T
180K	2.03-3.33	221K	2.58-3.98
220K	2.12-3.45	241K	2.66-4.11
270K	2.22-3.64	271K	2.78-4.30
330K	2.34-3.81	301K	2.90-4.49
390K	2.30-3.63	331K	3.02-4.67
470K	2.42-3.84	361K	3.14-4.86
560K	2.56-4.07	391K	3.26-5.05
680K	2.75-4.34	431K	3.42-5.30
820K	2.18-3.39	471K	3.58-5.55
101K	2.28-3.56	511K	3.74-5.81
121K	2.40-3.75	561K	3.94-6.12
151K	2.30-3.54	621K	4.18-6.50
181K	2.42-3.73	681K	4.32-6.87
201K	2.52-3.89	751K	4.42-6.95

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

KEEN SIDE electronics

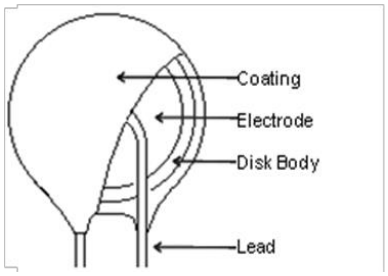
2. ELECTRICAL PARAMETERS

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	V1.0 mA	μA		VC	IP	Standard	High Surge	Standard	High Surge	(W)	@1KHz
	(V)	(V)	(V)			(V)	(A)	(A)		(JOULE)			(pf)
KSE-05K180	11	14	18(15-21.6)	50	10	40	1	100/ 50*2	250/ 100*2	0,4	0,6	0,01	1400
KSE-05K220	14	18	22(19.5-26)		10	48				0,5	0,7		1150
KSE-05K270	17	22	27(24-31)		10	60				0,6	0,9		930
KSE-05K330	20	26	33(29.5-36.5)		10	73				0,8	1,1		760
KSE-05K390	25	31	39(35-43)		15	80				0,9	1,2		640
KSE-05K470	30	38	47(42-52)		15	104				1,1	1,5		530
KSE-05K560	35	45	56(50-62)		15	123				1,3	1,8		450
KSE-05K680	40	56	68(61-75)		15	145				1,6	2,2		370
KSE-05K820	50	65	82(74-90)	16	28	150	5	400/ 200*2	800/ 400*2	2,5	4	0,1	300
KSE-05K101	60	85	100(90-110)		28	175				3	4,1		250
KSE-05K121	75	100	120(108-132)		28	210				4	4,9		210
KSE-05K151	95	125	150(135-165)		28	260				4,8	6,5		165
KSE-05K181	115	150	180(162-198)		38	320				5,9	7,5		140
KSE-05K201	130	170	200(185-225)		38	355				6,5	8,5		125
KSE-05K221	140	180	220(198-242)		38	380				7	9		110
KSE-05K241	150	200	240(216-264)		38	415				8	10,5		100
KSE-05K271	175	225	270(243-297)		38	475				8,5	11		95
KSE-05K301	190	250	300(270-330)		38	520				9	12		85
KSE-05K331	210	275	330(297-363)		38	570				9,5	13		75
KSE-05K361	230	300	360(324-396)		38	620				10	16		70
KSE-05K391	250	320	390(351-429)		38	675				12	17		65
KSE-05K431	275	350	430(387-473)		38	745				13	20		60
KSE-05K471	300	385	470(423-517)		38	810				15	21		55
KSE-05K511	320	415	510(459-561)		38	845				16	22,5		50
KSE-05K561	350	460	560(504-616)		38	920				16,8	24		45
KSE-05K621	385	505	620(558-682)		30	1025				17,7	26,6		40
KSE-05K681	420	560	680(612-748)		30	1120				19,4	29,1		38
KSE-05K751	460	615	750(675-825)		30	1240				22,4	32,0		30

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)		$\frac{Vc@105℃-Vc@25℃}{Vc@25℃}\times\frac{1}{80}\times 100(\%/℃)$
2.10	Temperature Coefficient of Varistor Voltage	-0.05≤Tc≤0.05 (% /°C)	$\left\lvert\frac{V_{1mA@-40℃}-V_{1mA@25℃}}{V_{1mA@25℃}}\times\frac{1}{65}\times 100\%(\%/℃)\right\rvert$
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.

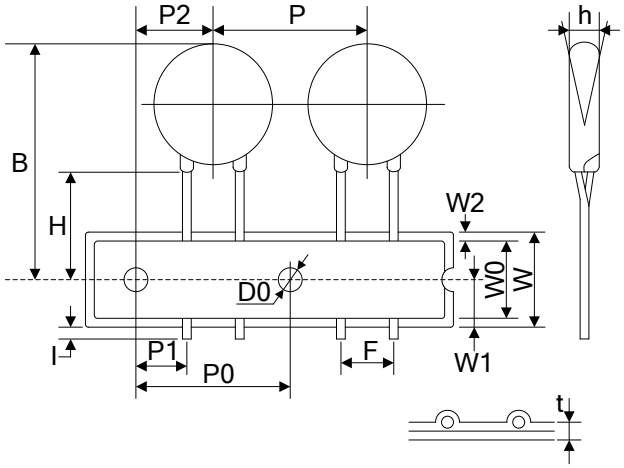
5. ENVIRONMENTAL REQUIREMENTS

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℃ ~ +105℃	
5.8	Storage Temperature Range	-40℃ ~ +125℃	

6.Marking Code

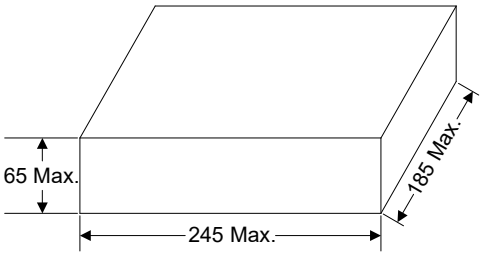
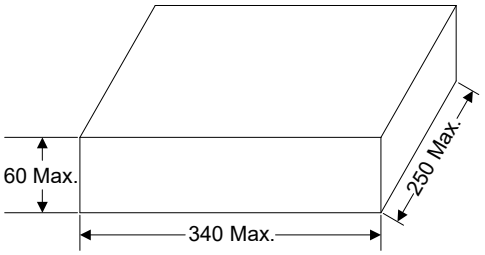
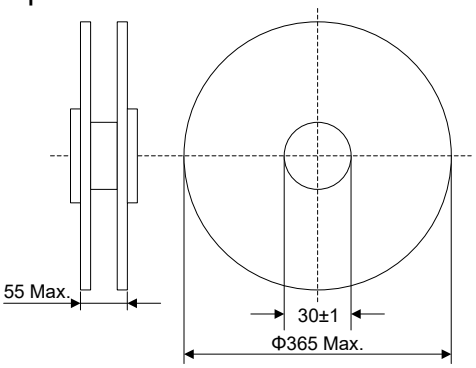
05K471

7. Taping Dimensions



Symbol	Dimension (mm)
P	12.7±1.0
P0	12.7±0.3
P1	3.85±0.7
P2	6.35±1.3
F	5.0±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	32max

8. Quantity

Packaging Dimensions (Unit: mm)	Quantity
Bulk (typ.) 	1000pcs/bag 2bags/box (180K~751K)
Tape & Box 	2000pcs/box (180K~331K)
	1500pcs/box (361K~391K)
	1000pcs/box (431K~751K)
Tape & Reel  	2500pcs/reel (180K~331K)
	2000pcs/reel (361K~391K)
	1500pcs/reel (431K~751K)