

## Metal Oxide Varistors KSE-07K 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.



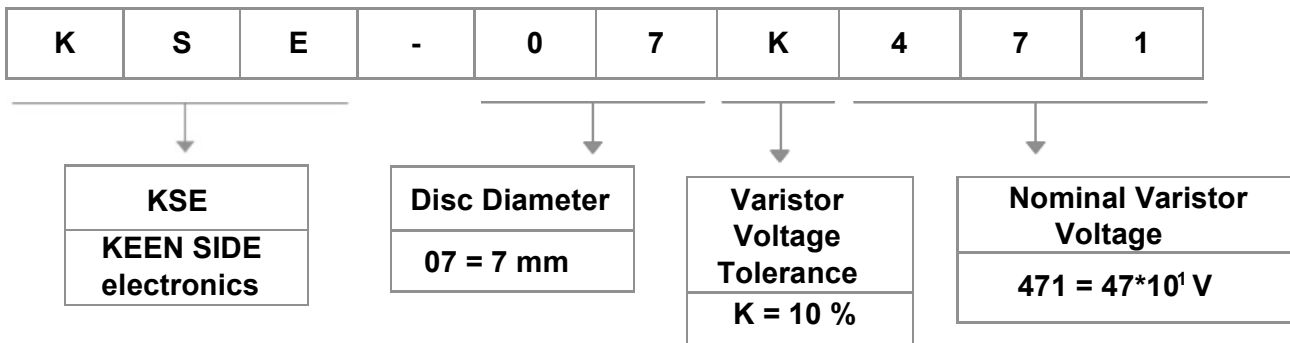
### General Information

The KSE-07K Series of 7 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 910 V and  $V_{rms}$  voltages from 11 V to 550 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

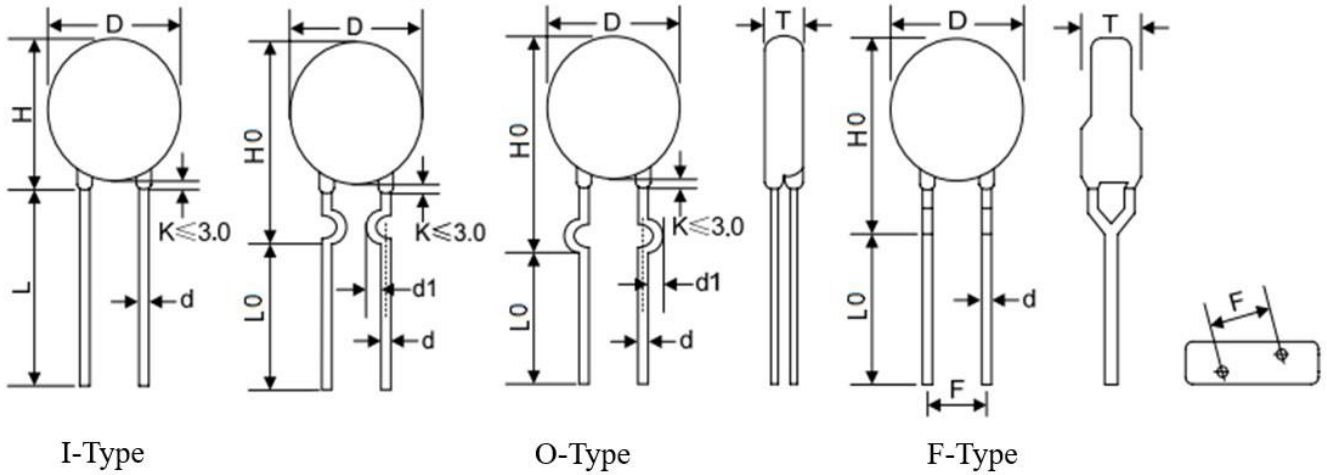


Table1	
Unit: mm	
Symbol	Dimension
D(max.)	9.0
H(max.)	12.0
H0(max.)	13.5
F(±0.8)	5.0
T	Table2
d(±0.05)	0.6
d1(±0.4)	1.2
L(min.)	20.0
L0(min.)	15.0
Epoxy Color: Blue	

Table2			
Unit: mm			
Model	T	Model	T
180K	3.2	271K	4.2
220K	3.3	301K	4.3
270K	3.5	331K	4.3
330K	3.4	361K	4.5
390K	3.5	391K	4.6
470K	3.7	431K	4.8
560K	3.9	471K	5.0
680K	4.2	511K	5.2
820K	3.6	561K	5.4
101K	3.8	621K	5.7
121K	4.0	681K	6.0
151K	3.6	751K	6.1
181K	3.7	781K	6.2
201K	3.8	821K	6.4
221K	3.9	911K	7.2
241K	4.0		

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

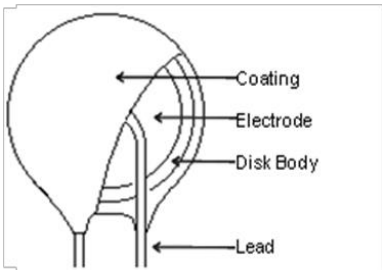
2. ELECTRICAL PARAMETERS													
Model (Standard)	Maximum Allowable Voltage		Varistor voltage	IR3	@	Clamping voltage		Maximum Peak Current (8/20µs)		Maximum Energy 10/1000µs		Rated Power	Typical Capacitance (Reference)
	AC rms	DC	V <sub>1.0 mA</sub>	µA		VC	IP	Standard	High Surge	Standard	High Surge	(w)	@ 1KHz
	(V)	(V)				(V)	(V)	(A)	(A)		(JOULE)		(pf)
KSE-07K180	11	14	18(15-21.6)	50	10	36	2,5	250/ 125*2	500/ 250*2	0,9	2	0,02	2800
KSE-07K220	14	18	22(19.5-26)		10	43				1,1	2,4		2300
KSE-07K270	17	22	27(24-31)		10	53				1,4	3		1800
KSE-07K330	20	26	33(29.5-36.5)		10	65				1,7	3,5		1500
KSE-07K390	25	31	39(35-43)		10	77				2,1	4		1300
KSE-07K470	30	38	47(42-52)		10	93				2,5	5		1100
KSE-07K560	35	45	56(50-62)		10	110				3,1	6		890
KSE-07K680	40	56	68(61-75)		10	135				3,6	7		740
KSE-07K820	50	65	82(74-90)	30	20	135	10	1200/ 600*2	1750/ 1200*2	5,5	10	0,25	600
KSE-07K101	60	85	100(90-110)		20	165				6,5	12		500
KSE-07K121	75	100	120(108-132)		20	200				7,8	13		420
KSE-07K151	95	125	150(135-165)		20	250				9,7	15		330
KSE-07K181	115	150	180(162-198)		20	300				11,7	16		280
KSE-07K201	130	170	200(185-225)		20	340				13	17		250
KSE-07K221	140	180	220(198-242)		20	360				14	19		230
KSE-07K241	150	200	240(216-264)		20	395				15	21		210
KSE-07K271	175	225	270(243-297)		20	455				18	24		185
KSE-07K301	190	250	300(270-330)		20	500				20	26		165
KSE-07K331	210	275	330(297-363)		20	550				23	28		150
KSE-07K361	230	300	360(324-396)		20	595				24	32		140
KSE-07K391	250	320	390(351-429)		20	650				26	35		130
KSE-07K431	275	350	430(387-473)		20	710				28	40		115
KSE-07K471	300	385	470(423-517)		20	775				29	42		105
KSE-07K511	320	415	510(459-561)		20	845				31	45		100
KSE-07K561	350	460	560(504-616)		20	925				35	49		90
KSE-07K621	385	505	620(558-682)		20	1025				38	55		80
KSE-07K681	420	560	680(612-748)		20	1120				42	60		75
KSE-07K751	460	615	750(675-825)		20	1240				45	64		70
KSE-07K781	485	640	780(702-858)	20	1290	48	69	65					
KSE-07K821	510	670	820(738-902)	20	1355	52	73	60					
KSE-07K911	550	745	910(819-1001)	20	1500	57	78	55					

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)		$\frac{V_C@85^\circ\text{C} - V_C@25^\circ\text{C}}{V_{cat25^\circ\text{C}}} \times \frac{1}{80} \times 100(\%/^\circ\text{C})$
2.10	Temperature Coefficient of Varistor Voltage		$-0.05 \leq T_c \leq 0.05$ (% / °C)
2.11	Impulse Life	$\cong \pm 10\%(V1mA)$	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%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°C Immersed Time: ≤5Sec.
4.5	Resistance of soldering heat	$\Delta$ V1mA/V1mA ≤ ±5%	Solder Temp: 260±5°C Immersed Time: 10±1Sec.

## 5. ENVIRONMENTAL REQUIREMENTS

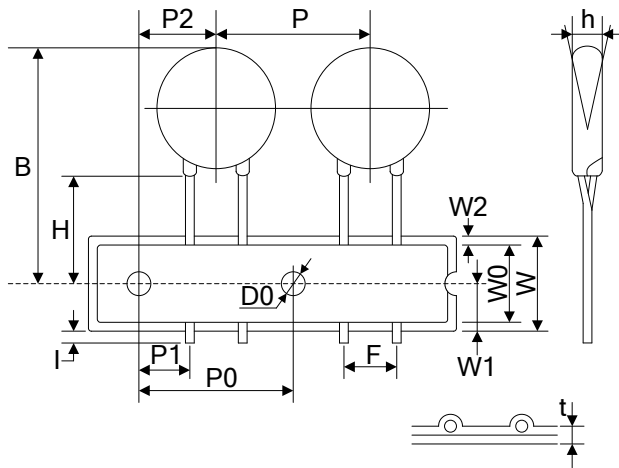
5.1	High Temperature Storage	$\Delta V1mA/V1mA$ $\leq \pm 5\%$	Ambient Temp: 125±2°C Duration:1000h		
5.2	Low Temperature Storage	$\Delta V1mA/V1mA$ $\leq \pm 5\%$	Ambient Temp: -40±2°C Duration:1000h		
5.3	High Humidity Storage/Damp Heat	$\Delta V1mA/V1mA$ $\leq \pm 5\%$	Ambient Temp: 40±2°C 90-95%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

## 6. Marking Code

# 07K471



## 7. Taping Dimensions



Symbol	Dimension (mm)
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P	12.7±1.0
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P0	12.7±0.3
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P1	3.85±0.7
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P2	6.35±1.3
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F	5.0±0.8
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h	0±2
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W	18.0±1.0
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W0	12.0±1.0
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W1	9.0±0.5
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W2	3.0max
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H	20.0±2.0
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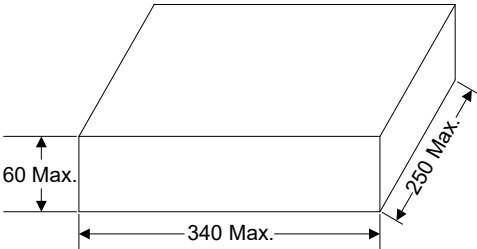
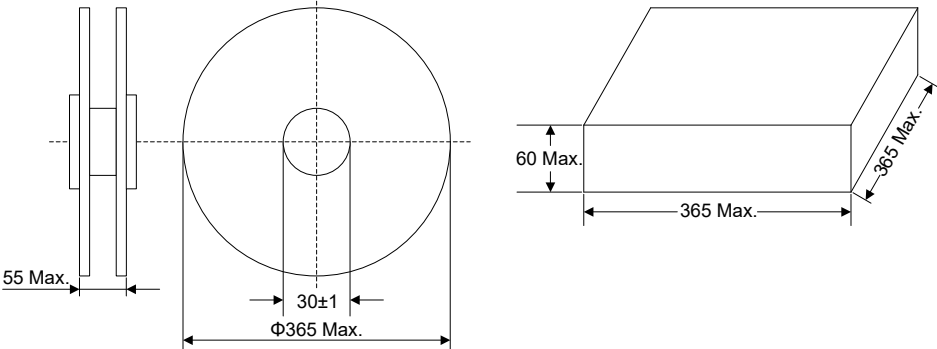
I	1.0max
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D0	4.0±0.2
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t	0.6±0.3
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B	32max
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## 8. Quantity

Packaging Dimensions (Unit: mm)	Quantity
Bulk (typ.) 	1000pcs/bag 4bags/box (180K~911K)
Tape & Box 	1500pcs/box (180K~331K)  1500pcs/box (361K~391K)  1000pcs/box (431K~911K)
Tape & Reel 	2000pcs/reel (180K~331K)  1500pcs/reel (361K~391K)  1500pcs/reel (431K~911K)