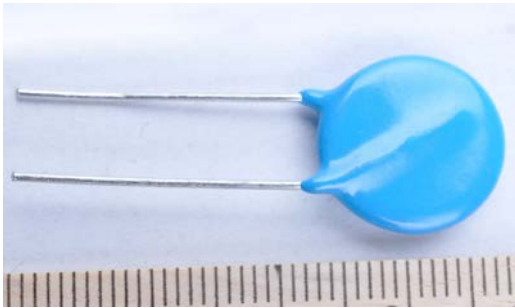


## Metal Oxide Varistors - 07K Series



### Features

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

### General Information

The KSE-07Kxxx 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 820 V and Vrms voltages from 11 V to 510 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

No Radioactive Material Storage Temperature: -55°C to +125°C

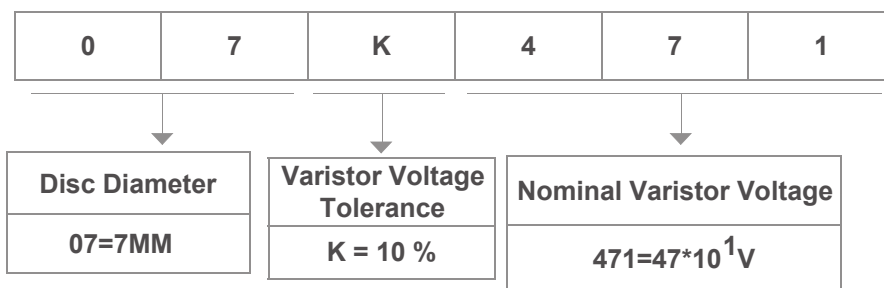
Operating Temperature: -55°C to +85°C

Body: Nickel Plated

Leads: Surface-mount, Axial Devices: Tin Plated

Devices with No Leads: Nickel Plated

### Product Name



## Metal Oxide Varistors - 07K Series

### Electrical Characteristics

Type Number	Maximum Allowable Voltage		Varistor Voltage	Maximum Clamping Voltage		Withstanding Surge Current		Maximum Energy (10/1000 $\mu$ s)		Rated Power	Typical Capacitance (Reference)
	V <sub>AC</sub> (V)	V <sub>DC</sub> (V)	V <sub>1mA</sub> (V)	I <sub>P</sub> (A)	V <sub>C</sub> (V)	I(A) Standard	I(A) High Surge	(J) Standard	(J) High Surge	(W)	@1KHz(pf)
KSE-07K180	11	14	18(15~21.6)	2.5	36	250	500	0.9	2.0	0.02	2800
KSE-07K220	14	18	22(19.5~26)	2.5	43	250	500	1.1	2.4	0.02	2300
KSE-07K270	17	22	27(24~31)	2.5	53	250	500	1.4	3.0	0.02	1800
KSE-07K330	20	26	33(29.5~36.5)	2.5	65	250	500	1.7	3.5	0.02	1500
KSE-07K390	25	31	39(35~43)	2.5	77	250	500	2.1	4.0	0.02	1300
KSE-07K470	30	38	47(42~54)	2.5	93	250	500	2.5	5.0	0.02	1100
KSE-07K560	35	45	56(50~62)	2.5	110	250	500	3.1	6.0	0.02	900
KSE-07K680	40	56	68(61~75)	2.5	135	250	500	3.6	7.0	0.02	740
KSE-07K820	50	65	82(74~90)	10	135	1200	1750	5.5	10.0	0.25	600
KSE-07K101	60	85	100(90~110)	10	165	1200	1750	6.5	12.0	0.25	500
KSE-07K121	75	100	120(108~132)	10	200	1200	1750	7.8	13.0	0.25	420
KSE-07K151	95	125	150(135~165)	10	250	1200	1750	9.7	13.0	0.25	330
KSE-07K181	115	150	180(162~198)	10	300	1200	1750	11.7	16.0	0.25	280
KSE-07K201	130	170	200(180~220)	10	340	1200	1750	13.0	17.0	0.25	250
KSE-07K221	140	180	220(198~242)	10	360	1200	1750	14.0	19.0	0.25	230
KSE-07K241	150	200	240(216~264)	10	395	1200	1750	15.0	21.0	0.25	210
KSE-07K271	175	225	270(243~297)	10	455	1200	1750	18.0	24.0	0.25	185
KSE-07K301	190	250	300(270~330)	10	500	1200	1750	20.0	26.0	0.25	165
KSE-07K331	210	275	330(297~363)	10	550	1200	1750	23.0	28.0	0.25	150
KSE-07K361	230	300	360(324~396)	10	595	1200	1750	25.0	32.0	0.25	140
KSE-07K391	250	320	390(351~429)	10	650	1200	1750	25.0	35.0	0.25	130
KSE-07K431	275	350	430(387~473)	10	710	1200	1750	28.0	40.0	0.25	115
KSE-07K471	300	385	470(423~517)	10	775	1200	1750	30.0	42.0	0.25	105
KSE-07K511	320	415	510(459~561)	10	845	1200	1750	30.0	45.0	0.25	100
KSE-07K561	350	460	560(504~616)	10	925	1200	1750	30.0	49.0	0.25	90
KSE-07K621	385	505	620(558~682)	10	1025	1200	1750	33.0	55.0	0.25	80
KSE-07K681	420	560	680(612~748)	10	1120	1200	1750	33.0	60.0	0.25	75
KSE-07K751	460	615	750(675~825)	10	1240	1200	1750	67.2	65.0	0.25	70
KSE-07K781	185	640	780(702~858)	10	1290	1200	1750	67.2	65.0	0.25	70
KSE-07K821	510	670	820(738~902)	10	1355	1200	1750	67.2	70.0	0.25	60

## Metal Oxide Varistors - 07K Series

Electrical Rating				
Item	Test Condition / Description			Requirement
Varistor Voltage	The voltage between two terminals with the specified measuring current 1mA. DC applied is call Vb.			To meet the specified value
Maximum Allowable Voltage	The recommended maximum sine wave voltage (RMS) or the maximum DC voltage can be applied continuously.			
Rated Wattaget	The maximum average power that can be applied within the specified ambient temperature.			
IEnergy	The maximum energy within the varistor voltage change of $\pm 10\%$ when one impulse of 10/1000 $\mu$ sec. or 2 msec. is applied.			
Withstanding Surge Current	The maximum current within the varistor voltage change of $\pm 10\%$ with the standard impulse current (8/20 $\mu$ sec.) applied one time.			$\frac{\Delta V_b}{V_b} \leq \pm 10\%$
Surge Life	The change of Vb shall be measured after the impulse listed below is applied 10,000 times continuously with the interval of ten seconds at room temperature.			
	5K series	180K to 680K	10A (8/20 $\mu$ sec.)	
		820K to 751K	20A (8/20 $\mu$ sec.)	
	7K series	180K to 680K	25A (8/20 $\mu$ sec.)	
		820K to 821K	50A (8/20 $\mu$ sec.)	
	10K series	180K to 680K	50A (8/20 $\mu$ sec.)	
		820K to 182K	100A (8/20 $\mu$ sec.)	
	14K series	180K to 680K	75A (8/20 $\mu$ sec.)	
		820K to 182K	150A (8/20 $\mu$ sec.)	
	20K series	180K to 680K	100A (8/20 $\mu$ sec.)	
820K to 182K		200A (8/20 $\mu$ sec.)		

## Metal Oxide Varistors - 07K Series

### Current Energy and Power Dissipation Ratings

Should transients occur in rapid succession, the average power dissipation is the energy (watt-seconds) per pulse times the number of pulses per second. The power so developed must be within the specifications shown on the Device Ratings and Specifications Table for the specific device. The operating values of a MOV need to be derated at high temperatures as shown above. Because varistors only dissipate a relatively small amount of average power they are not suitable for repetitive applications that involve substantial amounts of average power dissipation.

Figure 1A - Power Derating for Epoxy Coated

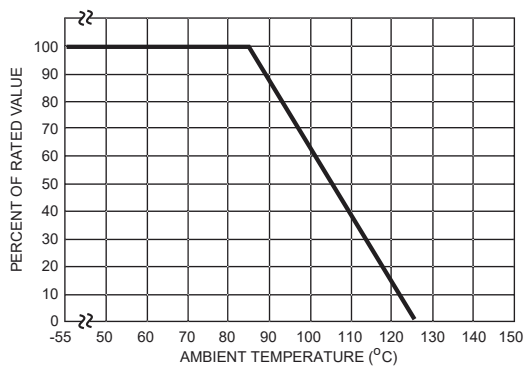
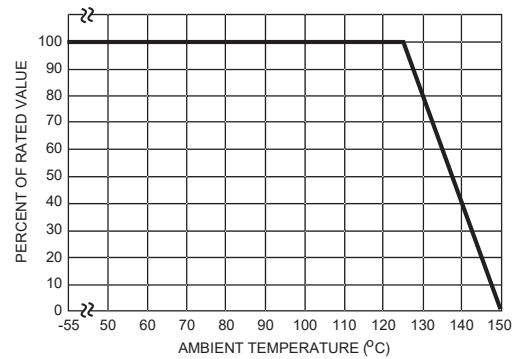
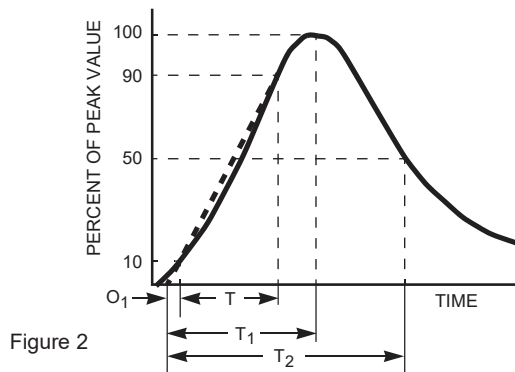


Figure 1B - Power Derating for Pholenic Coated



### Peak Pulse Current Test Waveform



$O_1$  = Virtual Origin of Wave  
 $T$  = Time from 10% to 90% of Peak  
 $T_1$  = Rise Time =  $1.25 \times T$   
 $T_2$  = Decay Time

Example - For an 8/20  $\mu$ s Current Waveform:

$8\mu$ s =  $T_1$  = Rise Time

$20\mu$ s =  $T_2$  = Decay Time

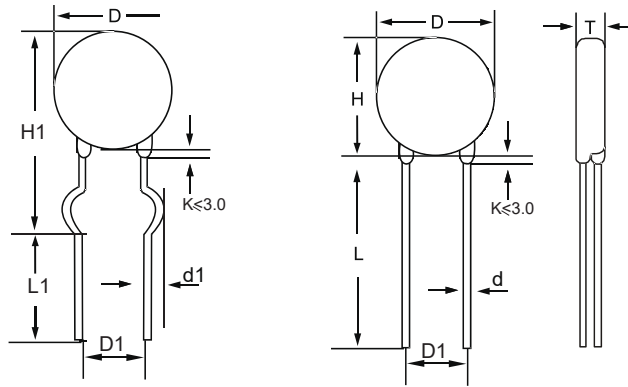
### Packaging

Part Number	Component Package	Quantity	Packaging Option	Packaging Specification
7K	7.0	1000	BOX	2000

## Metal Oxide Varistors - 07K Series

### Package Dimensions

Unit:mm



**TABLE 1**

Symbol	Dimensions
H(max.)	12.0
H1(max.)	13.5
L(min.)	20.0
L1(min.)	15.0
D(max.)	9.0
D1(±0.8)	5.0
T(max.)	TABLE 2
d(±0.05)	0.6
d1(±0.4)	1.2

**TABLE 2**

Model	T(max.)	Model	T(max.)
180K	4.5	221K	4.5
220K	4.6	241K	4.6
270K	4.7	271K	4.9
330K	4.9	301K	5.0
390K	4.8	331K	5.1
470K	4.9	361K	5.2
560K	5.0	391K	5.4
680K	5.2	431K	5.7
820K	4.1	471K	6.0
101K	4.3	511K	6.2
121K	4.5	561K	6.5
151K	4.8	621K	6.4
181K	4.3	681K	6.5
201K	4.4	751K	6.5

### Warehouse Storage Conditions of Products

• Storage Conditions:

1. Storage Temperature: -10°C~+40°C
2. Relative Humidity: ≤75%RH
3. Keep away from corrosive atmosphere and sunlight.

• Period of Storage: 1 year