



## Features

- High voltage and current rating
- Straight and kinked lead styles available
- Bidirectional
- Surge protection
- Fast response time
- RoHS compliant\*
- Agency listing: US

## Additional Information

Click these links for more information:

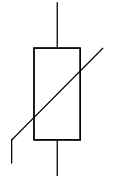


# MOV-20DxxxK Series – Metal Oxide Varistor

## General Information

The MOV-20DxxxK Series of 20 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.



## Industry Standard Compliance

Standard	UL 1449
File Number	<a href="#">E313168</a>

## Absolute Maximum Ratings (@ $T_A = 25^\circ\text{C}$ Unless Otherwise Noted)

Parameter	Symbol	Min.	Typ.	Max.	Unit
Operating Temperature	$T_{OPR}$	-40	25	+105	$^\circ\text{C}$
Storage Temperature	$T_{STG}$	-40	25	+125	$^\circ\text{C}$
Rated Wattage	$P_W$			1.00	Watt
Varistor Voltage Temperature Coefficient	$V_{TC}$	0		0.05	$\% / ^\circ\text{C}$
Response Time	$T_r$		10	25	ns
Varistor Voltage Tolerance	$V_{tol}$	-10	0	10	$\%$

## Electrical Characteristics (@ $T_A = 25^\circ\text{C}$ Unless Otherwise Noted)

Bourns Part No.	Max. Continuous Voltage (V)		Voltage @ 1 mA DC (V)			Voltage @ Class Current (8/20 $\mu\text{s}$ )		Max. Peak Current (8/20 $\mu\text{s}$ )	Max. Energy (J)	Typ. Cap. (pF)
	r.m.s.	d.c.	Min.	Nom.	Max.	Class Current (A)	Max. Clamping Voltage (V)	One Time	8/20 $\mu\text{s}$	1 kHz
MOV-20D180K	11	14	16	18	20	20	36	2000	11.0	34200
MOV-20D220K	14	18	20	22	24	20	43	2000	14.0	24000
MOV-20D270K	17	22	24	27	30	20	53	2000	18.0	21600
MOV-20D330K	20	26	30	33	36	20	65	2000	23.0	19200
MOV-20D390K	25	31	35	39	43	20	77	2000	26.0	18000
MOV-20D470K	30	38	42	47	52	20	93	2000	33.0	16800
MOV-20D560K	35	45	50	56	62	20	110	2000	41.0	13200
MOV-20D680K	40	56	61	68	75	20	135	2000	46.0	10800
MOV-20D820K	50	65	74	82	90	100	135	6500	38.0	6000
MOV-20D101K	60	85	90	100	110	100	165	6500	45.0	5040
MOV-20D121K	75	100	108	120	132	100	200	6500	55.0	4200
MOV-20D151K	95	125	135	150	165	100	250	6500	70.0	3240
MOV-20D181K	115	150	162	180	198	100	300	6500	85.0	2640
MOV-20D201K	130	170	185	200	225	100	340	6500	95.0	2400
MOV-20D221K	140	180	198	220	242	100	360	6500	100.0	2160
MOV-20D241K	150	200	216	240	264	100	395	6500	108.0	1980
MOV-20D271K	175	225	243	270	297	100	455	6500	127.0	1800
MOV-20D301K	190	250	270	300	330	100	500	6500	136.0	1560
MOV-20D331K	210	275	297	330	363	100	550	6500	150.0	1440
MOV-20D361K	230	300	324	360	396	100	595	6500	163.0	1320
MOV-20D391K	250	320	351	390	429	100	650	6500	180.0	1200
MOV-20D431K	275	350	387	430	473	100	710	6500	190.0	1116
MOV-20D471K	300	385	423	470	517	100	775	6500	220.0	1020
MOV-20D511K	320	415	459	510	561	100	845	6500	220.0	936
MOV-20D561K	350	460	504	560	616	100	925	6500	220.0	852
MOV-20D621K	385	505	558	620	682	100	1025	6500	220.0	780
MOV-20D681K	420	560	612	680	748	100	1120	6500	220.0	720
MOV-20D751K	460	615	675	750	825	100	1240	6500	230.0	636
MOV-20D781K	485	640	702	780	858	100	1290	6500	255.0	612
MOV-20D821K	510	670	738	820	902	100	1355	6500	265.0	600
MOV-20D911K	550	745	819	910	1001	100	1500	6500	282.0	528
MOV-20D102K	625	825	900	1000	1100	100	1650	6500	310.0	480
MOV-20D112K	680	895	990	1100	1210	100	1815	6500	342.0	432
MOV-20D152K	940	1200	1350	1500	1650	100	2475	6500	383.0	384
MOV-20D182K	1100	1465	1620	1800	1980	100	2970	6500	625.0	312



**WARNING**  
Cancer and Reproductive Harm  
[www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)

\*RoHS Directive 2015/863, Mar 31, 2015 and Annex.

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## Applications

- Power supplies
- Power systems
- Line voltage
- Telecom systems
- White goods / appliances

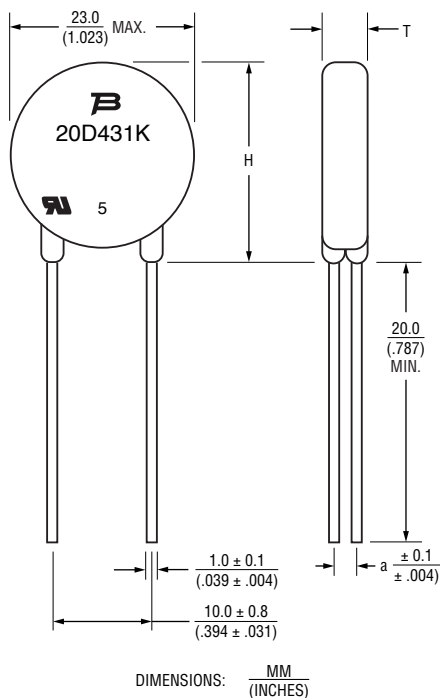
## MOV-20DxxxK Series – Metal Oxide Varistor

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### Product Dimensions

This is an RoHS compliant molded radial package with 100 % Sn plating on the terminations.

#### Straight Leads



Bourns Part Number	Dim T (Max.)	Dim H (Max.)	Dim a (Typ.)
MOV-20D180K	$\frac{4.2}{(.165)}$	26.0 (1.024)	$\frac{1.8}{(.071)}$
MOV-20D220K	$\frac{4.3}{(.169)}$		$\frac{1.8}{(.071)}$
MOV-20D270K	$\frac{4.6}{(.181)}$		$\frac{1.8}{(.071)}$
MOV-20D330K	$\frac{4.2}{(.165)}$		$\frac{1.9}{(.075)}$
MOV-20D390K	$\frac{4.4}{(.173)}$		$\frac{2.1}{(.083)}$
MOV-20D470K	$\frac{4.6}{(.181)}$		$\frac{2.3}{(.091)}$
MOV-20D560K	$\frac{4.7}{(.185)}$		$\frac{2.5}{(.098)}$
MOV-20D680K	$\frac{4.8}{(.189)}$		$\frac{2.8}{(.110)}$
MOV-20D820K	$\frac{4.2}{(.165)}$		$\frac{1.8}{(.071)}$
MOV-20D101K	$\frac{4.4}{(.173)}$		$\frac{1.9}{(.075)}$
MOV-20D121K	$\frac{4.6}{(.181)}$		$\frac{1.9}{(.075)}$
MOV-20D151K	$\frac{4.8}{(.189)}$		$\frac{2.0}{(.079)}$
MOV-20D181K	$\frac{4.0}{(.157)}$		$\frac{2.1}{(.083)}$
MOV-20D201K	$\frac{4.2}{(.165)}$		$\frac{2.2}{(.087)}$
MOV-20D221K	$\frac{4.3}{(.169)}$		$\frac{2.3}{(.091)}$
MOV-20D241K	$\frac{4.4}{(.173)}$		$\frac{2.4}{(.094)}$
MOV-20D271K	$\frac{4.6}{(.181)}$		$\frac{2.5}{(.098)}$
MOV-20D301K	$\frac{4.8}{(.189)}$		$\frac{2.7}{(.106)}$

Bourns Part Number	Dim T (Max.)	Dim H (Max.)	Dim a (Typ.)
MOV-20D331K	$\frac{5.0}{(.197)}$	26.0 (1.024)	$\frac{2.8}{(.110)}$
MOV-20D361K	$\frac{5.2}{(.205)}$		$\frac{2.9}{(.114)}$
MOV-20D391K	$\frac{5.4}{(.213)}$		$\frac{3.1}{(.122)}$
MOV-20D431K	$\frac{5.6}{(.220)}$		$\frac{3.3}{(.130)}$
MOV-20D471K	$\frac{5.9}{(.232)}$		$\frac{3.4}{(.134)}$
MOV-20D511K	$\frac{6.0}{(.236)}$		$\frac{3.7}{(.146)}$
MOV-20D561K	$\frac{6.5}{(.256)}$	28.0 (1.102)	$\frac{3.9}{(.154)}$
MOV-20D621K	$\frac{6.9}{(.272)}$		$\frac{4.1}{(.161)}$
MOV-20D681K	$\frac{7.0}{(.276)}$		$\frac{4.2}{(.165)}$
MOV-20D751K	$\frac{7.2}{(.283)}$		$\frac{4.4}{(.173)}$
MOV-20D781K	$\frac{7.4}{(.291)}$		$\frac{4.4}{(.173)}$
MOV-20D821K	$\frac{7.8}{(.307)}$		$\frac{4.6}{(.181)}$
MOV-20D911K*	$\frac{8.2}{(.323)}$		$\frac{4.6}{(.181)}$
MOV-20D102K*	$\frac{8.7}{(.343)}$		$\frac{4.8}{(.189)}$
MOV-20D112K*	$\frac{9.2}{(.362)}$		$\frac{5.2}{(.205)}$
MOV-20D152K**	N/A		
MOV-20D182K**	N/A		

\* Not available in Tape & Reel packaging.

\*\* Not available in Straight Lead configuration; see Kinked Leads (In-line) configuration.

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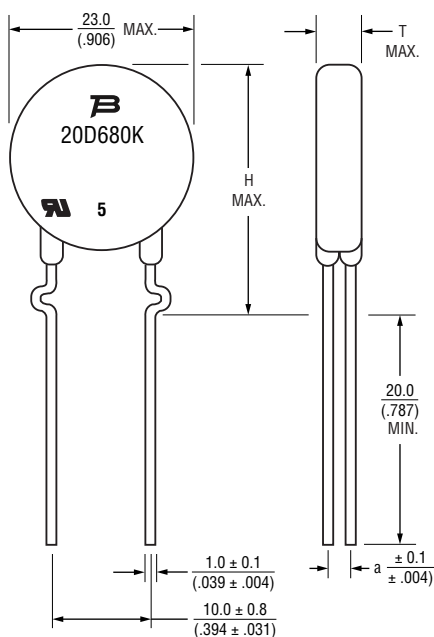
# MOV-20DxxxK Series – Metal Oxide Varistor

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## Product Dimensions (Continued)

This is an RoHS compliant molded radial package with 100 % Sn plating on the terminations.

### Kinked Leads (Outward)



Bourns Part Number	Dim T (Max.)	Dim H (Max.)	Dim a (Typ.)
MOV-20D180KK	4.2 (.165)	28.0 (1.102)	1.8 (.071)
MOV-20D220KK	4.3 (.169)		1.8 (.071)
MOV-20D270KK	4.6 (.181)		1.8 (.071)
MOV-20D330KK	4.2 (.165)		1.9 (.075)
MOV-20D390KK	4.4 (.173)		2.1 (.083)
MOV-20D470KK	4.6 (.181)		2.3 (.091)
MOV-20D560KK	4.7 (.185)		2.5 (.098)
MOV-20D680KK	4.8 (.189)		2.8 (.110)
MOV-20D820KK	4.2 (.165)		1.8 (.071)
MOV-20D101KK	4.4 (.173)		1.9 (.075)
MOV-20D121KK	4.6 (.181)		1.9 (.075)
MOV-20D151KK	4.8 (.189)		2.0 (.079)
MOV-20D181KK	4.0 (.157)		2.1 (.083)
MOV-20D201KK	4.2 (.165)		2.2 (.087)
MOV-20D221KK	4.3 (.169)		2.3 (.091)
MOV-20D241KK	4.4 (.173)		2.4 (.094)
MOV-20D271KK	4.6 (.181)		2.5 (.098)
MOV-20D301KK	4.8 (.189)		2.7 (.106)

Bourns Part Number	Dim T (Max.)	Dim H (Max.)	Dim a (Typ.)	
MOV-20D331KK	5.0 (.197)	28.0 (1.102)	2.8 (.110)	
MOV-20D361KK	5.2 (.205)		2.9 (.114)	
MOV-20D391KK	5.4 (.213)		3.1 (.122)	
MOV-20D431KK	5.6 (.220)		3.3 (.130)	
MOV-20D471KK	5.9 (.232)		3.4 (.134)	
MOV-20D511KK	6.0 (.236)		3.7 (.146)	
MOV-20D561KK	6.5 (.256)		3.9 (.154)	
MOV-20D621KK	6.9 (.272)		4.1 (.161)	
MOV-20D681KK	7.0 (.276)		30.0 (1.181)	4.2 (.165)
MOV-20D751KK	7.2 (.283)			4.4 (.173)
MOV-20D781KK	7.4 (.291)		4.4 (.173)	
MOV-20D821KK		N/A See Kinked Leads (In-line) Configuration		
MOV-20D911KK*				
MOV-20D102KK*				
MOV-20D112KK*				
MOV-20D152KK*				
MOV-20D182KK*				

\* Not available in Tape & Reel packaging.

(Kinked Lead Product Dimensions continue on page 4.)

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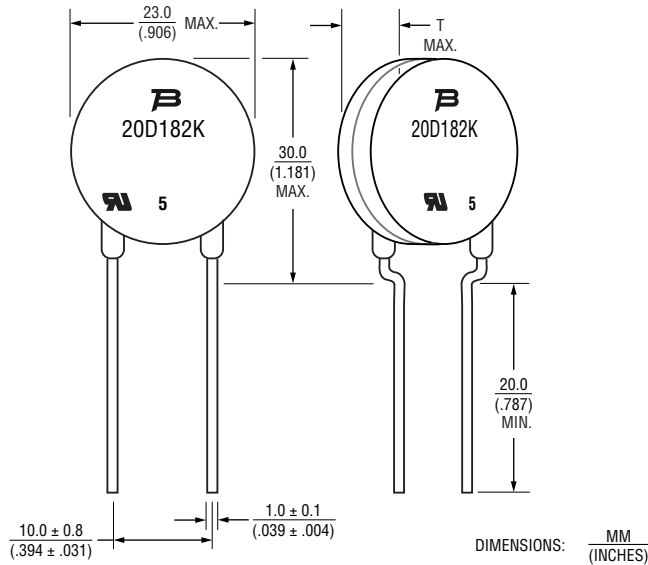
# MOV-20DxxxK Series – Metal Oxide Varistor

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## Product Dimensions (Continued)

This is an RoHS compliant molded radial package with 100 % Sn plating on the terminations.

### Kinked Leads (In-line)



Bourns Part Number	Dim T (Max.)
MOV-20D180KK	N/A See Kinked Leads (Outward) Configuration
MOV-20D220KK	
MOV-20D270KK	
MOV-20D330KK	
MOV-20D390KK	
MOV-20D470KK	
MOV-20D560KK	
MOV-20D680KK	
MOV-20D820KK	
MOV-20D101KK	
MOV-20D121KK	
MOV-20D151KK	
MOV-20D181KK	
MOV-20D201KK	
MOV-20D221KK	
MOV-20D241KK	
MOV-20D271KK	
MOV-20D301KK	

Bourns Part Number	Dim T (Max.)	
MOV-20D331KK	N/A See Kinked Leads (Outward) Configuration	
MOV-20D361KK		
MOV-20D391KK		
MOV-20D431KK		
MOV-20D471KK		
MOV-20D511KK		
MOV-20D561KK		
MOV-20D621KK		
MOV-20D681KK		
MOV-20D751KK		
MOV-20D781KK		
MOV-20D821KK		$\frac{7.8}{(.307)}$
MOV-20D911KK*		$\frac{8.2}{(.323)}$
MOV-20D102KK*	$\frac{8.7}{(.343)}$	
MOV-20D112KK*	$\frac{9.2}{(.362)}$	
MOV-20D152KK*	$\frac{11.4}{(.449)}$	
MOV-20D182KK*	$\frac{13.0}{(.512)}$	

\* Not available in Tape & Reel packaging.

## Typical Part Marking

Bourns Part Number	Bourns Part Marking
MOV-20D180K	20D180K
MOV-20D220K	20D220K
MOV-20D270K	20D270K
MOV-20D330K	20D330K
MOV-20D390K	20D390K
MOV-20D470K	20D470K
MOV-20D560K	20D560K
MOV-20D680K	20D680K
MOV-20D820K	20D820K
MOV-20D101K	20D101K
MOV-20D121K	20D121K
MOV-20D151K	20D151K
MOV-20D181K	20D181K
MOV-20D201K	20D201K
MOV-20D221K	20D221K
MOV-20D241K	20D241K
MOV-20D271K	20D271K
MOV-20D301K	20D301K
MOV-20D331K	20D331K
MOV-20D361K	20D361K
MOV-20D391K	20D391K
MOV-20D431K	20D431K
MOV-20D471K	20D471K
MOV-20D511K	20D511K
MOV-20D561K	20D561K
MOV-20D621K	20D621K
MOV-20D681K	20D681K
MOV-20D751K	20D751K
MOV-20D781K	20D781K
MOV-20D821K	20D821K
MOV-20D911K	20D911K
MOV-20D102K	20D102K
MOV-20D112K	20D112K
MOV-20D152K	20D152K
MOV-20D182K	20D182K

NOTE: The "5" marking on MOV products is for traceability of production assembly for quality assurance compliance.

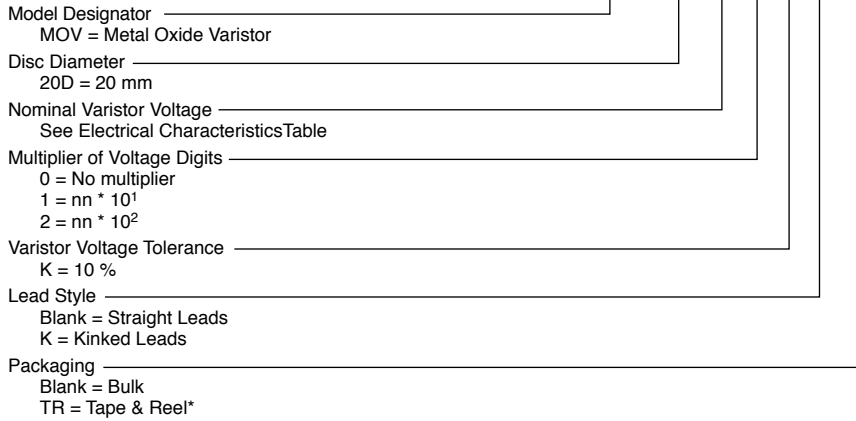
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# MOV-20DxxxK Series – Metal Oxide Varistor



## How to Order

MOV - 20D nn (n) K (TR)



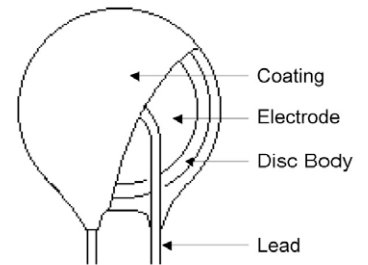
Examples: MOV-20D270KK = 27 V, Kinked Leads, Bulk Pack  
 MOV-20D331KTR = 330 V, Straight Leads, Tape & Reel

\* Models MOV-20D911K, 102K, 112K, 152K and 182K are not available in Tape & Reel packaging.

## Environmental Specifications

Moisture Sensitivity Level ..... 1  
 ESD Classification (HBM)..... N/A

## Internal Construction



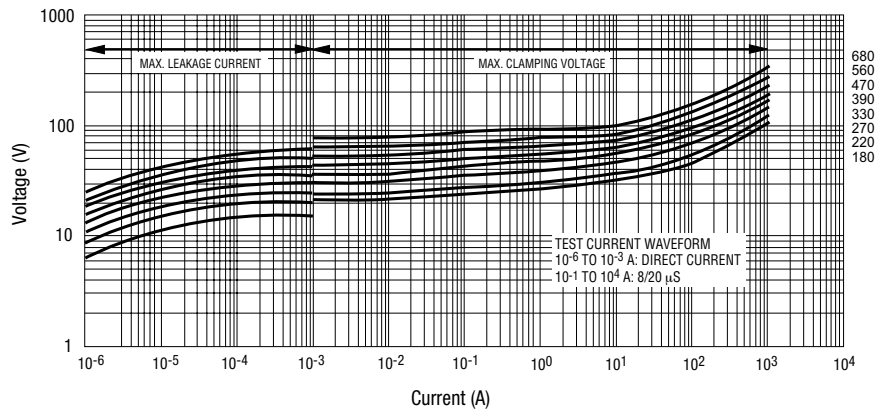
# MOV-20DxxxK Series – Metal Oxide Varistor



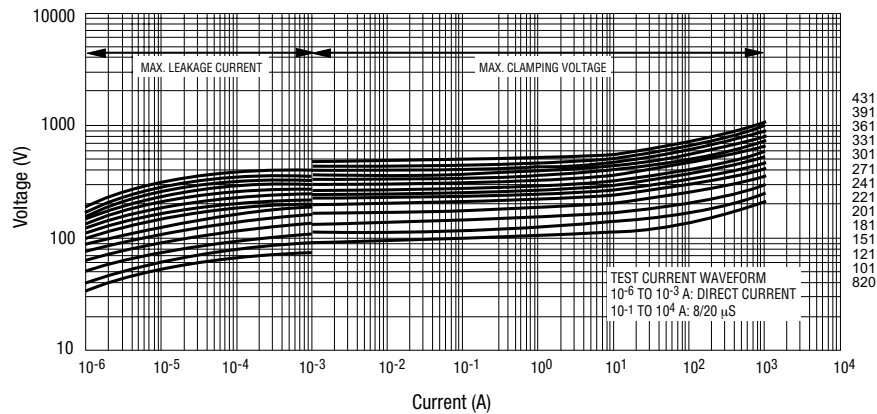
## Performance Graphs

### V-I Characteristics

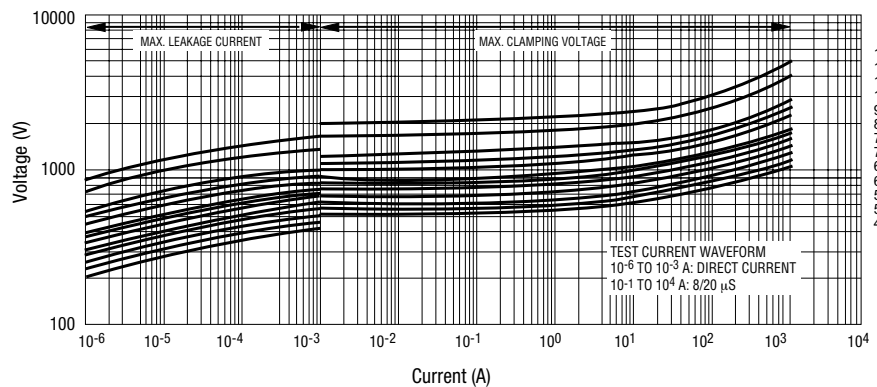
MOV-20D180K to MOV-20D680K



MOV-20D820K to MOV-20D431K



MOV-20D471K to MOV-20D182K



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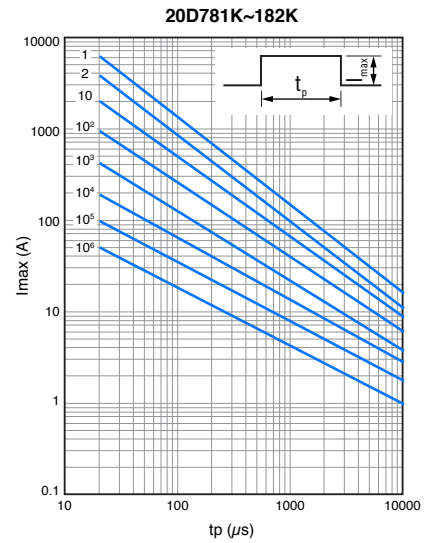
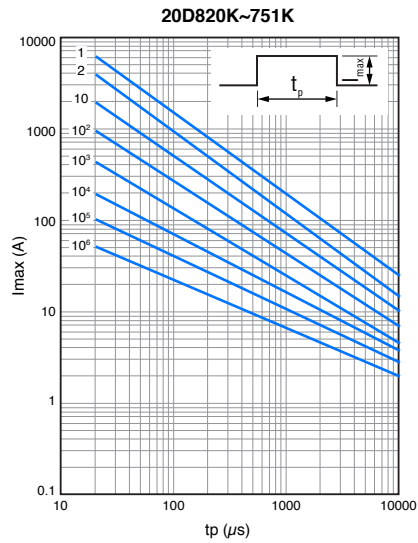
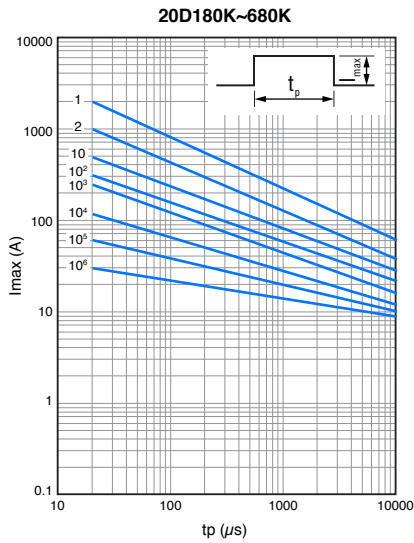
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# MOV-20DxxxK Series – Metal Oxide Varistor

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## Pulse Rating Curves



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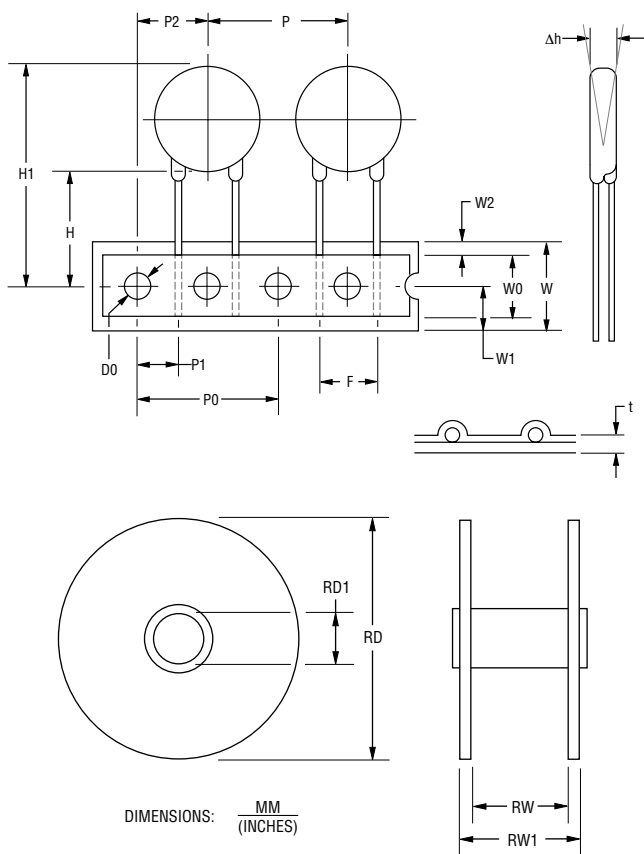
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# MOV-20DxxxK Series – Metal Oxide Varistor

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## Packaging Information

### TAPE & REEL - Straight Leads



Item	Symbol	20 mm Disc
Reel Outside Diameter	RD	$\frac{355}{(13.98)}$
Reel Inner Diameter	RD1	$\frac{30}{(1.181)}$
Tape Width	RW	$\frac{55}{(2.16)}$
Reel Width	RW1	$\frac{63}{(2.48)}$ max.
Pitch of Component	P	$\frac{25.4 \pm 1.0}{(1.00 \pm 0.04)}$
Feed Hole Pitch	P0	$\frac{12.7 \pm 0.2}{(0.50 \pm 0.008)}$
Feed Hole Center to Pitch	P1	$\frac{7.77 \pm 0.7}{(0.31 \pm 0.03)}$
Feed Hole Center to Component Center	P2	$\frac{12.7 \pm 0.7}{(0.50 \pm 0.03)}$
Lead to Lead Distance	F	$\frac{10.0 \pm 0.8}{(0.39 \pm 0.03)}$
Component Alignment	$\Delta h$	$\frac{4.0}{(0.16)}$ max.
Tape Width	W	$\frac{18.0 \pm 0.5}{(0.71 \pm 0.02)}$
Hole Down Tape Width	W0	$\frac{12.0 \pm 0.8}{(0.47 \pm 0.03)}$
Hole Position	W1	$\frac{9.0 \pm 0.5}{(0.35 \pm 0.02)}$
Hole Down Tape Position	W2	$\frac{3.0}{(0.12)}$ max.
Height From Center to Component Base	H	$\frac{19.0 \pm 1.0}{(0.75 \pm 0.04)}$
Component Height	H1	$\frac{47.0}{(1.85)}$ max.
Feed Hole Diameter	D0	$\frac{4.0 \pm 0.2}{(0.16 \pm 0.08)}$
Total Tape Thickness	t	$\frac{0.6 \pm 0.3}{(0.02 \pm 0.01)}$
Quantity per Reel	-	250

NOTE: Models MOV-20D911K, 102K, 112K, 152K and 182K are not available in Tape & Reel packaging.

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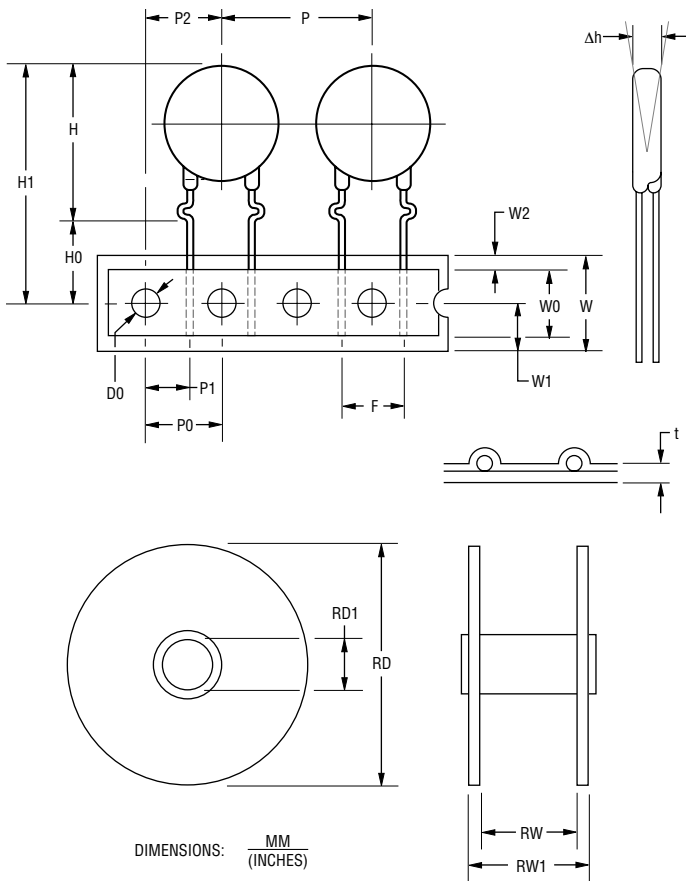
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# MOV-20DxxxK Series – Metal Oxide Varistor

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## Packaging Information (Continued)

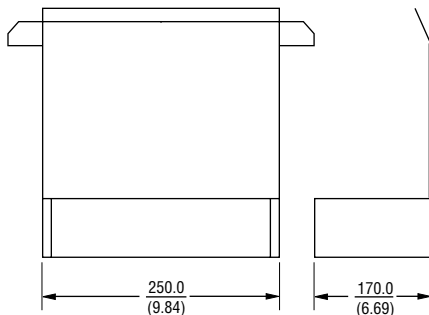
### TAPE & REEL - Kinked Leads



Item	Symbol	20 mm Disc
Reel Outside Diameter	RD	$\frac{355}{(13.98)}$
Reel Inner Diameter	RD1	$\frac{30}{(1.181)}$
Tape Width	RW	$\frac{55}{(2.16)}$
Reel Width	RW1	$\frac{63}{(2.48)}$ max.
Pitch of Component	P	$\frac{25.4 \pm 1.0}{(1.00 \pm 0.04)}$
Feed Hole Pitch	P0	$\frac{12.7 \pm 0.2}{(0.50 \pm 0.008)}$
Feed Hole Center to Pitch	P1	$\frac{7.77 \pm 0.7}{(0.31 \pm 0.03)}$
Feed Hole Center to Component Center	P2	$\frac{12.7 \pm 0.7}{(0.50 \pm 0.03)}$
Lead to Lead Distance	F	$\frac{10.0 \pm 0.8}{(0.39 \pm 0.03)}$
Component Alignment	$\Delta h$	$\frac{4.0}{(0.157)}$ max.
Tape Width	W	$\frac{18.0 \pm 0.5}{(0.71 \pm 0.02)}$
Hole Down Tape Width	W0	$\frac{12.0 \pm 0.8}{(0.47 \pm 0.03)}$
Hole Position	W1	$\frac{9.0 \pm 0.5}{(0.35 \pm 0.02)}$
Hole Down Tape Position	W2	$\frac{3.0}{(0.12)}$ max.
Height From Component Top to Kinked Base (MOV-20D180KK~511KK)	H	$\frac{28.0}{(1.10)}$ max.
Height From Component Top to Kinked Base (MOV-20D561KK~821KK)	H	$\frac{30.0}{(1.18)}$ max.
Seating Plane Height	H0	$\frac{16.0 \pm 0.5}{(0.63 \pm 0.02)}$
Component Height	H1	$\frac{47.0}{(1.85)}$ max.
Feed Hole Diameter	D0	$\frac{4.0 \pm 0.2}{(0.16 \pm 0.08)}$
Total Tape Thickness	t	$\frac{0.6 \pm 0.3}{(0.02 \pm 0.01)}$
Quantity per Reel	-	250

NOTE: Models MOV-20D911KK, 102KK, 112KK, 152KK and 182KK are not available in Tape & Reel packaging.

### BULK



QUANTITY:  
 MOV-20D180K – 20D301K = 500 PCS. PER BOX  
 MOV-20D331K – 20D431K = 400 PCS. PER BOX  
 MOV-20D471K – 20D821K = 300 PCS. PER BOX  
 MOV-20D911K – 20D182K = 200 PCS. PER BOX

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Users should verify actual device performance in their specific applications.

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