

ANTREX Electronics

Electronic Components Sourcing Information

Product Reference Information

Part Number: MOV-20D151KTR
Manufacturer: Bourns Inc.
Package: Disc 20mm
Availability: Please confirm with sales

Product Page:

<https://antrexco.com/product/details/bourns-inc/mov-20d151ktr.html>

Request a Quote:

[Submit RFQ for this part](#)



Scan for product page

Contact Information

Email: info@antrexco.com

WhatsApp: +86-186-8066-5326

Website: <https://antrexco.com>

Quality & Trust

New & Original Components

Supplier verification and packaging condition review

CoC / RoHS / REACH documents available on request

Secure sourcing support for OEM / EMS projects

Note:

This PDF includes an ANTREX product reference cover page.

The original manufacturer datasheet follows from the next page.



Features

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

Additional Information

Click these links for more information:



PRODUCT
SELECTOR



TECHNICAL
LIBRARY



INVENTORY



SAMPLES



CONTACT

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	E313168

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 μs)		Max. Peak Current (8/20 μs)	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 μs	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

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

Specifications are subject to change without notice. Users should verify actual device performance in their specific applications. The products described herein and this document are subject to specific legal disclaimers as set forth on the last page of this document, and at www.bourns.com/docs/legal/disclaimer.pdf.

Applications

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

MOV-20DxxxK Series – Metal Oxide Varistor

BOURNS®

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	$\frac{5.0}{(.197)}$	$\frac{26.0}{(1.024)}$	$\frac{2.8}{(.110)}$
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	$\frac{6.5}{(.256)}$	$\frac{28.0}{(1.102)}$	$\frac{3.9}{(.154)}$
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.

Specifications are subject to change without notice.

Users should verify actual device performance in their specific applications.

The products described herein and this document are subject to specific legal disclaimers as set forth on the last page of this document, and at www.bourns.com/docs/legal/disclaimer.pdf.

MOV-20DxxxK Series – Metal Oxide Varistor

BOURNS®

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	$\frac{4.2}{(.165)}$	28.0 (1.102)	$\frac{1.8}{(.071)}$
MOV-20D220KK	$\frac{4.3}{(.169)}$		$\frac{1.8}{(.071)}$
MOV-20D270KK	$\frac{4.6}{(.181)}$		$\frac{1.8}{(.071)}$
MOV-20D330KK	$\frac{4.2}{(.165)}$		$\frac{1.9}{(.075)}$
MOV-20D390KK	$\frac{4.4}{(.173)}$		$\frac{2.1}{(.083)}$
MOV-20D470KK	$\frac{4.6}{(.181)}$		$\frac{2.3}{(.091)}$
MOV-20D560KK	$\frac{4.7}{(.185)}$		$\frac{2.5}{(.098)}$
MOV-20D680KK	$\frac{4.8}{(.189)}$		$\frac{2.8}{(.110)}$
MOV-20D820KK	$\frac{4.2}{(.165)}$		$\frac{1.8}{(.071)}$
MOV-20D101KK	$\frac{4.4}{(.173)}$		$\frac{1.9}{(.075)}$
MOV-20D121KK	$\frac{4.6}{(.181)}$		$\frac{1.9}{(.075)}$
MOV-20D151KK	$\frac{4.8}{(.189)}$		$\frac{2.0}{(.079)}$
MOV-20D181KK	$\frac{4.0}{(.157)}$		$\frac{2.1}{(.083)}$
MOV-20D201KK	$\frac{4.2}{(.165)}$		$\frac{2.2}{(.087)}$
MOV-20D221KK	$\frac{4.3}{(.169)}$		$\frac{2.3}{(.091)}$
MOV-20D241KK	$\frac{4.4}{(.173)}$		$\frac{2.4}{(.094)}$
MOV-20D271KK	$\frac{4.6}{(.181)}$		$\frac{2.5}{(.098)}$
MOV-20D301KK	$\frac{4.8}{(.189)}$		$\frac{2.7}{(.106)}$

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

* Not available in Tape & Reel packaging.

(Kinked Lead Product Dimensions continue on page 4.)

Specifications are subject to change without notice.

Users should verify actual device performance in their specific applications.

The products described herein and this document are subject to specific legal disclaimers as set forth on the last page of this document, and at www.bourns.com/docs/legal/disclaimer.pdf.

MOV-20DxxxK Series – Metal Oxide Varistor

BOURNS®

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	
MOV-20D911KK*	
MOV-20D102KK*	
MOV-20D112KK*	
MOV-20D152KK*	
MOV-20D182KK*	

* 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.

Specifications are subject to change without notice. Users should verify actual device performance in their specific applications. The products described herein and this document are subject to specific legal disclaimers as set forth on the last page of this document, and at www.bourns.com/docs/legal/disclaimer.pdf.

MOV-20DxxxK Series – Metal Oxide Varistor

BOURNS®

How to Order

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

Model Designator _____
MOV = Metal Oxide Varistor

Disc Diameter _____
20D = 20 mm

Nominal Varistor Voltage _____
See Electrical Characteristics Table

Multiplier of Voltage Digits _____
0 = No multiplier
1 = nn * 10¹
2 = nn * 10²

Varistor Voltage Tolerance _____
K = 10 %

Lead Style _____
Blank = Straight Leads
K = Kinked Leads

Packaging _____
Blank = Bulk
TR = Tape & Reel*

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



Specifications are subject to change without notice.

Users should verify actual device performance in their specific applications.

The products described herein and this document are subject to specific legal disclaimers as set forth on the last page of this document, and at www.bourns.com/docs/legal/disclaimer.pdf.

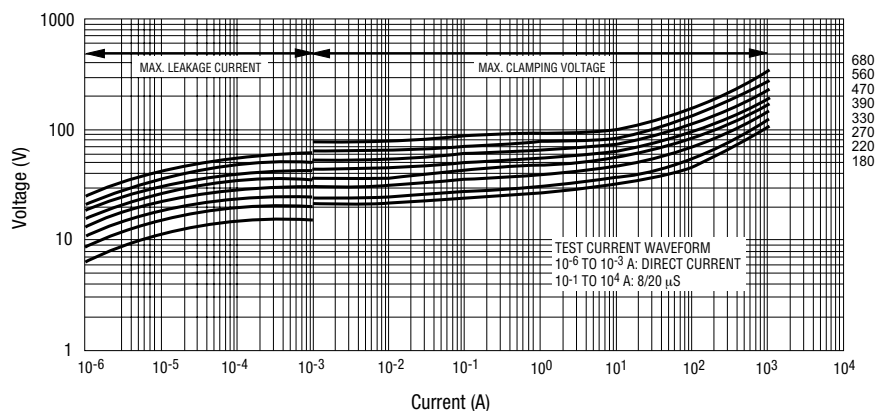
MOV-20DxxxK Series – Metal Oxide Varistor

BOURNS®

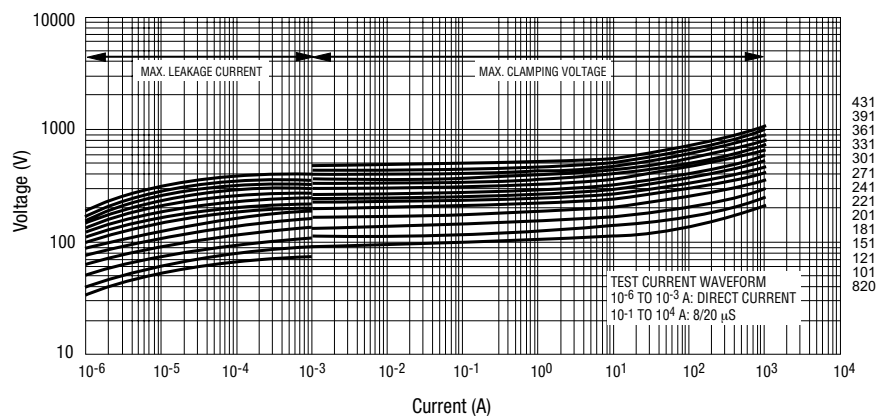
Performance Graphs

V-I Characteristics

MOV-20D180K to MOV-20D680K



MOV-20D820K to MOV-20D431K



MOV-20D471K to MOV-20D182K



Specifications are subject to change without notice.

Users should verify actual device performance in their specific applications.

The products described herein and this document are subject to specific legal disclaimers as set forth on the last page of this document, and at www.bourns.com/docs/legal/disclaimer.pdf.

MOV-20DxxxK Series – Metal Oxide Varistor

BOURNS®

Pulse Rating Curves



Specifications are subject to change without notice.

Users should verify actual device performance in their specific applications.

The products described herein and this document are subject to specific legal disclaimers as set forth on the last page of this document, and at www.bourns.com/docs/legal/disclaimer.pdf.

MOV-20DxxxK Series – Metal Oxide Varistor

BOURNS®

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	Δh	$\frac{4.0}{(0.16)}$ 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	$\frac{4.0 \pm 0.2}{(0.16 \pm 0.008)}$
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.

Specifications are subject to change without notice.

Users should verify actual device performance in their specific applications.

The products described herein and this document are subject to specific legal disclaimers as set forth on the last page of this document, and at www.bourns.com/docs/legal/disclaimer.pdf.

MOV-20DxxxK Series – Metal Oxide Varistor

BOURNS®

Packaging Information (Continued)

TAPE & REEL - Kinked Leads



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

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	Δh	$\frac{4.0}{(0.157)}$ 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

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



BOURNS®

Americas: Tel: +1 951-781-5500
 Email: americus@bourns.com

Mexico: Tel: +52-614-478-0400
 Email: mexicus@bourns.com

Asia: Tel: +886-2-2562-4117
 Email: asiacus@bourns.com

EMEA: Tel: +36 88 885 877
 Email: eurocus@bourns.com

www.bourns.com

REV. 07/25

Specifications are subject to change without notice.

Users should verify actual device performance in their specific applications.

The products described herein and this document are subject to specific legal disclaimers as set forth on the last page of this document, and at www.bourns.com/docs/legal/disclaimer.pdf.

This legal disclaimer applies to purchasers and users of Bourns® products manufactured by or on behalf of Bourns, Inc. and its affiliates (collectively, "Bourns").

Unless otherwise expressly indicated in writing, Bourns® products and data sheets relating thereto are subject to change without notice. Users should check for and obtain the latest relevant information and verify that such information is current and complete before placing orders for Bourns® products.

The characteristics and parameters of a Bourns® product set forth in its data sheet are based on laboratory conditions, and statements regarding the suitability of products for certain "typical" applications are based on Bourns' knowledge of typical requirements in generic applications. Bourns assumes that "typical" applications include failsafe/backup features to address critical risks to users and are designed to allow rework of Bourns® product to avoid scrap of a device solely due to malfunctioning Bourns® product. The characteristics and parameters of a Bourns® product in a user application may vary from the data sheet characteristics and parameters due to (i) the combination of the Bourns® product with other components in the user's application, or (ii) the environment of the user application itself. The characteristics and parameters of a Bourns® product also can and do vary in different applications and actual performance may vary over time. Thus, users should always verify the actual performance of the Bourns® product in their specific devices and applications and make their own independent judgments regarding the suitability of Bourns® product and the amount of additional test margin to design into their device or application to compensate for differences between laboratory and real-world conditions.

Unless Bourns has explicitly designated an individual Bourns® product as meeting the requirements of a particular industry standard (e.g., IATF 16949) or a particular qualification (e.g., UL listed or recognized), Bourns is not responsible for any failure of an individual Bourns® product to meet the requirements of such industry standard or particular qualification even if such industry standard or qualification is a "state of art". Users of Bourns® products are responsible for ensuring compliance with safety-related requirements and standards applicable to their devices or applications.

Bourns® products are not recommended, authorized or intended for use in applications where failure or malfunction may result in personal injury, death, or severe property or environmental damage, such as without limitation nuclear, life-critical medical and certain automotive and aviation applications. Except as set forth in the bullet points below or unless expressly and specifically approved in writing on a case-by-case basis by an authorized Bourns' representative, use of any Bourns® products in such unauthorized high-risk applications is at the user's sole risk.

- Bourns considers implantable/invasive devices and devices/procedures designed as life-supporting or life-sustaining by the U.S. Food and Drug Administration or equivalent organizations outside of the United States as "life-critical" medical applications. Bourns expressly identifies those Bourns® standard products that are suitable for use in typical medical applications that are not life-critical in its publication entitled "Bourns Medical Grade Component Guide."
- Bourns expressly identifies those Bourns® standard products that are suitable for use in typical automotive applications associated with any Automate Safety Integrity Level (ASIL) in its publication entitled "Bourns Automotive Grade Component Guide." Bourns' designation of Bourns® product as compliant with the AEC-Q standard does not by itself mean that Bourns has approved such product for use in an automotive application.
- Bourns expressly identifies Bourns® standard products that are suitable for use in the typical aviation applications/systems requiring System Design Assurance Level (RTCA DO-254 DAL) of C, D or E in its publication entitled "Bourns Civilian Aerospace/Aviation Grade Component Guide." Bourns does not test its products for compliance with United States Federal Aviation Administration standards or any other generally equivalent governmental organization standard applicable to products designed or manufactured for use in aviation applications. Use of Bourns® standard components in aviation applications associated with RTCA DO-254 DAL A or B without proper approval noted above shall be at the user's sole risk.
- Bourns will review and authorize on a case-by-case basis the use of Bourns® standard products which are at least AEC-Q compliant in space-related civil applications (rockets, satellites) with a negotiated cross-waiver and indemnity agreement.

The use and level of testing applicable to Bourns® custom products shall be negotiated on a case-by-case basis by Bourns and the user for which such Bourns® custom products are specially designed. Absent a written agreement between Bourns and the user regarding the use and level of such testing, the above provisions applicable to Bourns® standard products shall also apply to such Bourns® custom products.

Use of Bourns® products or Bourns' technology in military/defense applications must be reviewed with Bourns for compliance with applicable export control laws and embargoes. Users shall not sell, transfer, export or re-export (which includes transfers within a country) any Bourns® products or technology or technical data for use in activities which involve the design, development, production, use or stockpiling of nuclear, chemical or biological weapons or missiles, nor shall they use Bourns® products or technology or technical data in any facility which engages in activities relating to such devices. Further, Bourns® products and Bourns' technology and technical data may not under any circumstance be exported or re-exported to countries subject to international sanctions or embargoes. Bourns® products and technology may not, without prior authorization from Bourns and/or the Government of a country where such product/technology is designed and/or manufactured, be resold, transferred, or re-exported (including within the same country) to any party not eligible to receive commodities, software, and technical data originating in such country.

To the maximum extent permitted by applicable law, Bourns disclaims (i) any and all liability for special, punitive, consequential, incidental or indirect damages or lost revenues or lost profits, and (ii) any and all implied warranties (those not based on parameters specified in Bourns' data sheets and/or specifications), including implied warranties of fitness for particular purpose, non-infringement and merchantability.

For your convenience, copies of this Legal Disclaimer Notice with German, Spanish, Japanese, Traditional Chinese and Simplified Chinese bilingual versions are available at:

Web Page: <https://www.bourns.com/legal/disclaimers-terms-and-policies>

PDF: <https://www.bourns.com/docs/Legal/disclaimer.pdf>