



GMOV Metal Oxide Varistors

Leaded GMOV Varistor, High Surge 10D Series

Series/Type: 10D*K***Y**
Ordering code: VCRR10D*K***Y**

Date: January 2020
Version: 1

Features

- Wide Maximum Allowable Voltage from(Recommended MCOV) 55V to 560V

- Fast responding to transient over-voltage ●

Large absorbing transient energy capability

- Low clamping ratio and no follow-on current

- Moisture sensitivity level: Level 1

- Operating Temperature:-40℃ ~+105℃

- Storage Temperature:-40℃ ~+105℃

Application information

- AC Power

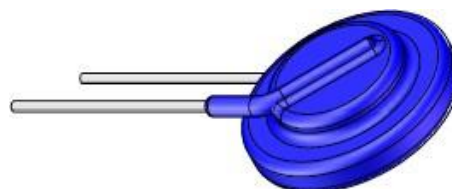
- Surge protection in consumer electronics ●

Surge protection in industrial electronics

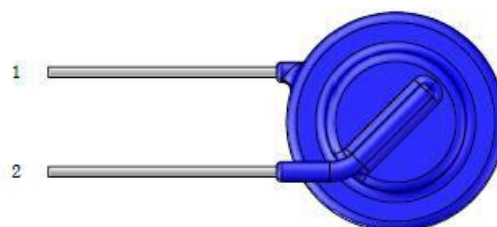
- Surge protection in electronic home appliances, gas and petroleum appliances

- Relay and electromagnetic valve surge absorption

Exterior



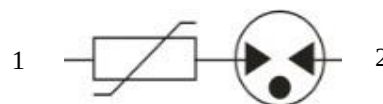
Package (Top View)



Agency Approvals

Icon	Description
RoHS	Compliance with 2011/65/EU

Schematic Symbol

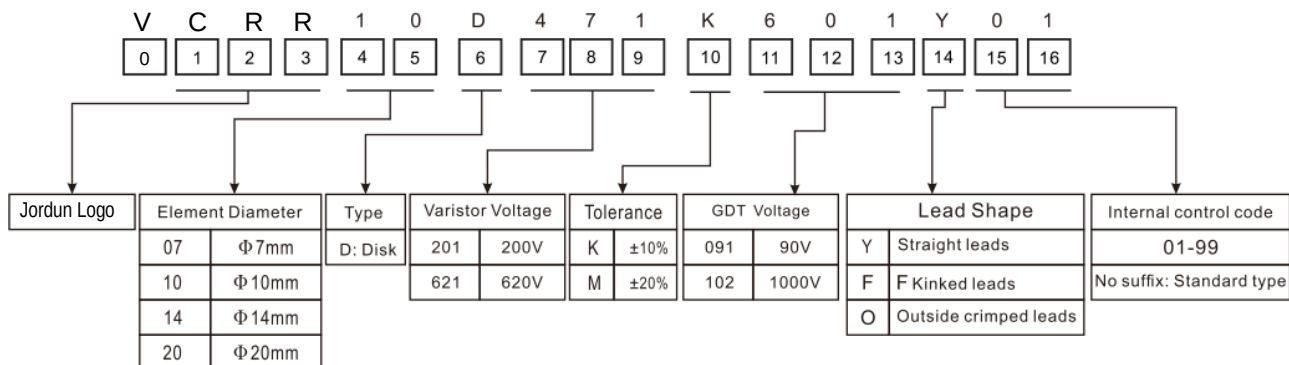


Electrical Characteristics

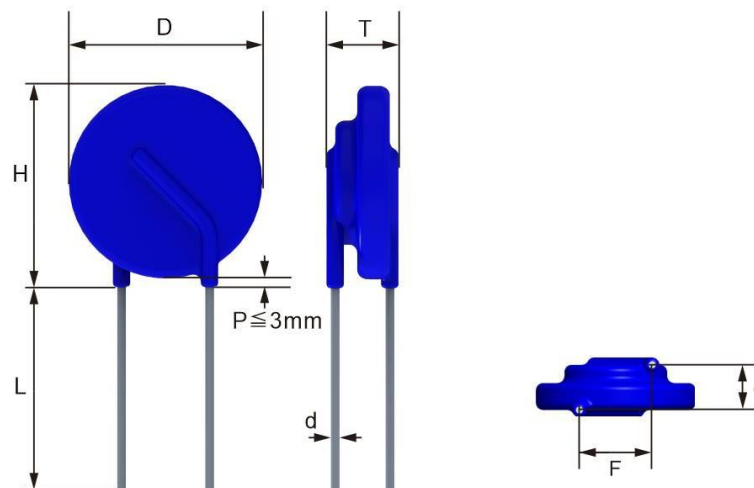
Part No	UL	Recommend	UL	Split Components Parameters		Platform	Peak	Withstanding	Maximum	Typical
	VOLTS	d MCOV	MCOV	MOV	GDT	voltage	voltage	Surge Current	Energy	Capacitance
	V _{AC} (V)	V _{AC} (V)	V _{AC} (V)	V _{1mA} (V)	V _{100V/S} (V)	V _{1000V/us} (V)	V _{1000V/us} (V)	1.2/50-8/20μs 4kV-2kA (Time)	10/1000μs (J)	@1KHz (pf)
VCRR10D820K091Y	52	55	70	82(74~90)	90(72~108)	≤150	≤710	40	17.0	5
VCRR10D820K351Y	52	60	70	82(74~90)	350(280~420)	≤150	≤1020	40	17.0	5
VCRR10D101K091Y	65	70	85	100(90~110)	90(72~108)	≤180	≤710	40	18.0	5
VCRR10D101K351Y	65	75	85	100(90~110)	350(280~420)	≤180	≤1020	40	18.0	5
VCRR10D121K091Y	75	80	100	120(108~132)	90(72~108)	≤210	≤710	40	21.0	5
VCRR10D121K351Y	75	90	100	120(108~132)	350(280~420)	≤210	≤1020	40	21.0	5
VCRR10D151K091Y	95	100	120	150(135~165)	90(72~108)	≤270	≤708	40	25.0	5
VCRR10D151K351Y	95	115	120	150(135~165)	350(280~420)	≤270	≤1020	40	25.0	5
VCRR10D181K091Y	115	120	150	180(162~198)	90(72~108)	≤320	≤710	40	30.0	5
VCRR10D181K351Y	115	135	150	180(162~198)	350(280~420)	≤320	≤1020	40	30.0	5

Part No	UL	Recommende	UL	Split Components Parameters		Platform	Peak	Withstanding	Maximum	Typical
	VOLTS	d MCOV	MCOV	MOV	GDT	voltage	voltage	Surge Current	Energy	Capacitance (Reference)
	V _{AC} (V)	V _{AC} (V)	V _{AC} (V)	V _{1mA} (V)	V _{100V/S} (V)					
						V _{1000V/us} (V)	V _{1000V/us} (V)	1.2/50-8/20μs 4kV-2kA (Time)	10/1000μs (J)	@1KHz (pf)
VCRR10D201K091Y	130	140	170	200(180~220)	90(72~108)	≤350	≤710	40	35.0	5
VCRR10D201K351Y	130	145	170	200(180~220)	350(280~420)	≤350	≤1020	40	35.0	5
VCRR10D221K351Y	140	150	185	220(198~242)	350(280~420)	≤390	≤1020	40	39.0	5
VCRR10D221K601Y	140	170	185	220(198~242)	600(480~720)	≤390	≤1320	40	39.0	5
VCRR10D241K351Y	150	160	200	240(216~264)	350(280~420)	≤430	≤1020	40	42.0	5
VCRR10D241K601Y	150	180	200	240(216~264)	600(480~720)	≤430	≤1320	40	42.0	5
VCRR10D271K351Y	175	190	230	270(243~297)	350(280~420)	≤480	≤1020	40	49.0	5
VCRR10D271K601Y	175	210	230	270(243~297)	600(480~720)	≤480	≤1320	40	49.0	5
VCRR10D301K351Y	190	200	250	300(270~330)	350(280~420)	≤530	≤1020	40	54.0	5
VCRR10D301K601Y	190	230	250	300(270~330)	600(480~720)	≤530	≤1320	40	54.0	5
VCRR10D331K351Y	210	220	280	330(297~363)	350(280~420)	≤580	≤1020	40	58.0	5
VCRR10D331K601Y	210	250	280	330(297~363)	600(480~720)	≤580	≤1320	40	58.0	5
VCRR10D361K351Y	230	240	300	360(324~396)	350(280~420)	≤640	≤1020	40	65.0	5
VCRR10D361K601Y	230	270	300	360(324~396)	600(480~720)	≤640	≤1320	40	65.0	5
VCRR10D391K351Y	250	260	330	390(351~429)	350(280~420)	≤690	≤1020	40	70.0	5
VCRR10D391K102Y	250	310	330	390(351~429)	1000(800~1200)	≤690	≤1800	40	70.0	5
VCRR10D 431K601Y	275	300	360	430(387~473)	600(480~720)	≤760	≤1320	40	80.0	5
VCRR10D 431K102Y	275	330	360	430(387~473)	1000(800~1200)	≤760	≤1800	40	80.0	5
VCRR10D471K601Y	300	320	390	470(423~517)	600(480~720)	≤830	≤1320	40	85.0	5
VCRR10D471K102Y	300	360	390	470(423~517)	1000(800~1200)	≤830	≤1800	40	85.0	5
VCRR10D511K601Y	320	340	420	510(459~561)	600(480~720)	≤986	≤1320	40	90.0	5
VCRR10D511K102Y	320	390	420	510(459~561)	1000(800~1200)	≤900	≤1800	40	90.0	5
VCRR10D561K601Y	350	370	460	560(504~616)	600(480~720)	≤986	≤1320	40	92.0	5
VCRR10D 561K102Y	350	420	460	560(504~616)	1000(800~1200)	≤990	≤1800	40	92.0	5
VCRR10D 621K601Y	385	400	510	620(558~682)	600(480~720)	≤1100	≤1320	40	95.0	5
VCRR10D621K102Y	385	460	510	620(558~682)	1000(800~1200)	≤1100	≤1800	40	95.0	5
VCRR10D681K601Y	420	440	550	680(612~748)	600(480~720)	≤1200	≤1320	40	98.0	5
VCRR10D 681K102Y	420	520	550	680(612~748)	1000(800~1200)	≤1200	≤1800	40	98.0	5
VCRR10D751K601Y	460	480	600	750(675~825)	600(480~720)	≤1320	≤1320	40	100.0	5
VCRR10D751K102Y	460	560	600	750(675~825)	1000(800~1200)	≤1320	≤1800	40	100.0	5

Part Numbering System



Dimensions



Notes: The foot shape can be customized according to customer needs.

Unit: mm

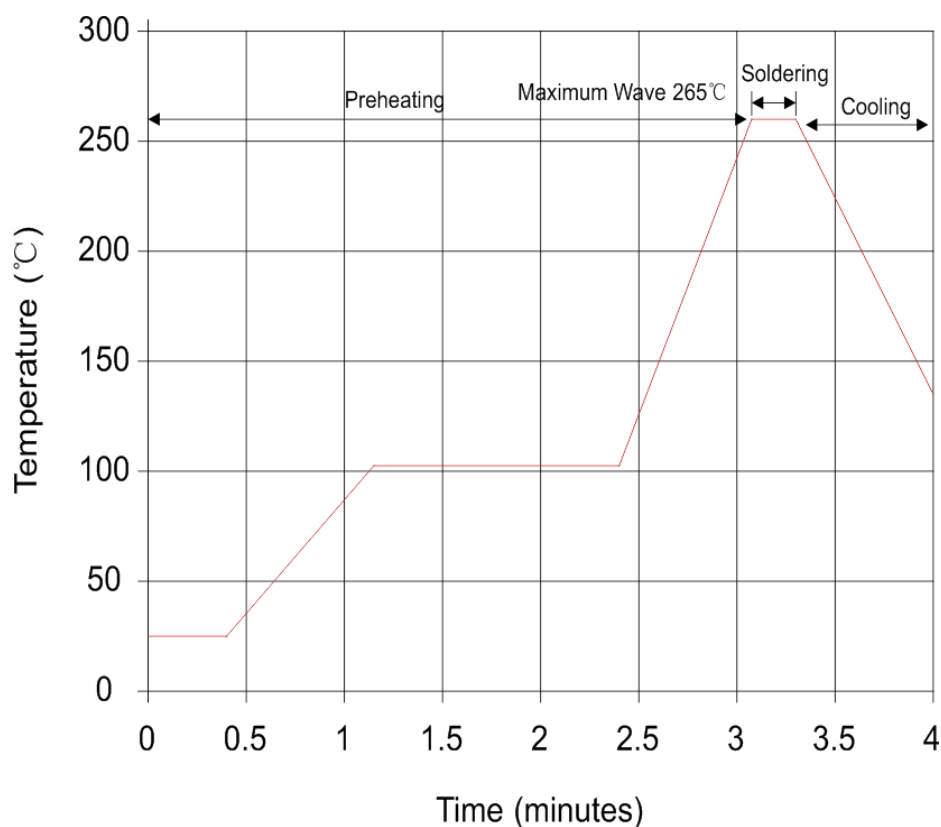
Symbol	Dimension
H(max)	15
L(min)	20
D(max)	13
F	7.5 ± 0.8
T	Table 2
e(± 1.0)	Table 2
d(± 0.05)	0.8

Unit: mm

Model	T(Max)	e	Model	T(Max)	e
820K	7.50	3.93	331K	8.50	4.83
101K	7.50	4.14	361K	8.50	5.00
121K	7.50	4.36	391K	9.00	5.17
151K	8.00	4.70	431K	9.00	5.39
181K	8.00	4.00	471K	9.00	5.61
201K	8.00	4.11	511K	9.00	5.83
221K	8.00	4.22	561K	9.00	6.11
241K	8.00	4.33	621K	10.00	6.44
271K	8.00	4.50	681K	10.00	6.78
301K	8.50	4.67	751K	10.00	7.17

Soldering Recommendation

Lead-free Wave Soldering Recommendation

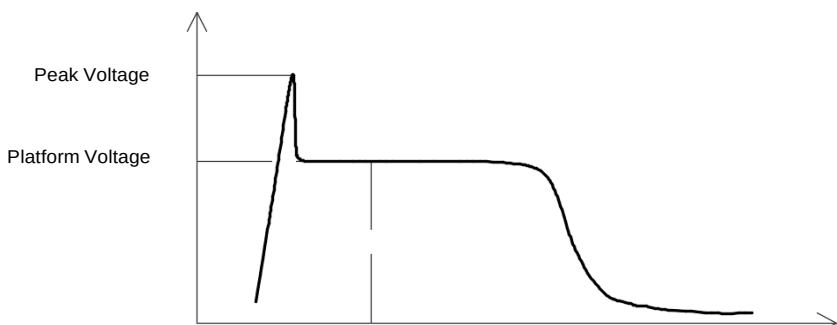


Item	Conditions
Peak Temperature	265°C
Dipping Time	10 seconds (max)
Soldering	1 time

Recommendation Reworking Conditions with Soldering Iron

Item	Conditions
Temperature of Soldering Iron-tip	360°C
Soldering Time	3 seconds (max)
Distance from Varistor	2mm (min)

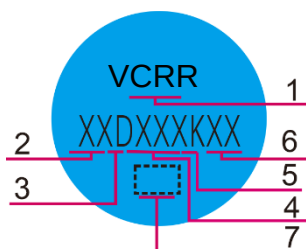
Mechanical Characteristics

Items	Test conditions / Methods	Specifications								
1000V/us Wave chart		Impulse Voltage Wave								
Tensile Strength of Terminals	Gradually applying the force specified and keeping the unit fixed for 10±1 sec <table><tr><th>Terminal diameter (mm)</th><th>Force (kg)</th></tr><tr><td>0.5<d≤0.8</td><td>1.0</td></tr><tr><td>0.8<d≤1.25</td><td>2.0</td></tr><tr><td>1.25<d</td><td>4.0</td></tr></table>	Terminal diameter (mm)	Force (kg)	0.5<d≤0.8	1.0	0.8<d≤1.25	2.0	1.25<d	4.0	No visible damage Peak voltage △V1000V/us/V1000V/us ≤± 20% Platform voltage △V1000V/us/V1000V/us ≤± 10%
Terminal diameter (mm)	Force (kg)									
0.5<d≤0.8	1.0									
0.8<d≤1.25	2.0									
1.25<d	4.0									
Bending Strength of Terminals	Hold specimen and apply the force specified below to each lead. Bend the specimen to 90°, then return to the original position. Repeat the procedure in the opposite direction. <table><tr><th>Terminal diameter (mm)</th><th>Force (kg)</th></tr><tr><td>0.5<d≤0.8</td><td>0.5</td></tr><tr><td>0.8<d≤1.25</td><td>1.0</td></tr><tr><td>1.25<d</td><td>2.0</td></tr></table>	Terminal diameter (mm)	Force (kg)	0.5<d≤0.8	0.5	0.8<d≤1.25	1.0	1.25<d	2.0	No visible damage Peak voltage △V1000V/us/V1000V/us ≤± 20% Platform voltage △V1000V/us/V1000V/us ≤± 10%
Terminal diameter (mm)	Force (kg)									
0.5<d≤0.8	0.5									
0.8<d≤1.25	1.0									
1.25<d	2.0									
Vibration	Frequency range: 10~55 Hz Amplitude: 0.75mm or 98m/s² Direction: 3 mutually perpendicular directions, 2hrs each.	No visible damage Peak voltage △V1000V/us/V1000V/us ≤± 20% Platform voltage △V1000V/us/V1000V/us ≤± 10%								
Solder ability	Solder Temp: 245±5℃ Dipping Time: 2±0.5 sec	Atleast 95% of terminal electrode is covered by new solder								
Resistance to Soldering Heat	Solder Temp: 260±5℃ Dipping Time: 10±1 sec	No visible damage Peak voltage △V1000V/us/V1000V/us ≤± 20% Platform voltage △V1000V/us/V1000V/us ≤± 10%								

Reliability

Items	Test conditions / Methods	Specifications															
High Temperature Storage	Ambient Temp: $105\pm 2^{\circ}\text{C}$ Duration: 1000hrs	No visible damage Peak voltage $ \Delta V_{1000V/us}/V_{1000V/us} \leq \pm 20\%$ Platform voltage $ \Delta V_{1000V/us}/V_{1000V/us} \leq \pm 10\%$															
Low Temperature Storage	Ambient Temp: $-40\pm 2^{\circ}\text{C}$ Duration: 1000hrs	No visible damage Peak voltage $ \Delta V_{1000V/us}/V_{1000V/us} \leq \pm 20\%$ Platform voltage $ \Delta V_{1000V/us}/V_{1000V/us} \leq \pm 10\%$															
Humidity	Ambient Temp: $40\pm 2^{\circ}\text{C}$, 90~95% R.H. Duration: 1000hrs	No visible damage Peak voltage $ \Delta V_{1000V/us}/V_{1000V/us} \leq \pm 20\%$ Platform voltage $ \Delta V_{1000V/us}/V_{1000V/us} \leq \pm 10\%$															
Temperature Cycle	The conditions shown below shall be repeated 5 cycles <table border="1"> <thead> <tr> <th>Step</th><th>Temperature ($^{\circ}\text{C}$)</th><th>Period (minutes)</th></tr> </thead> <tbody> <tr> <td>1</td><td>-40 ± 3</td><td>30 ± 3</td></tr> <tr> <td>2</td><td>Room temperature</td><td>15 ± 3</td></tr> <tr> <td>3</td><td>105 ± 3</td><td>30 ± 3</td></tr> <tr> <td>4</td><td>Room temperature</td><td>15 ± 3</td></tr> </tbody> </table>	Step	Temperature ($^{\circ}\text{C}$)	Period (minutes)	1	-40 ± 3	30 ± 3	2	Room temperature	15 ± 3	3	105 ± 3	30 ± 3	4	Room temperature	15 ± 3	No visible damage Peak voltage $ \Delta V_{1000V/us}/V_{1000V/us} \leq \pm 20\%$ Platform voltage $ \Delta V_{1000V/us}/V_{1000V/us} \leq \pm 10\%$
Step	Temperature ($^{\circ}\text{C}$)	Period (minutes)															
1	-40 ± 3	30 ± 3															
2	Room temperature	15 ± 3															
3	105 ± 3	30 ± 3															
4	Room temperature	15 ± 3															
High Temperature Load	Ambient Temp: $105\pm 2^{\circ}\text{C}$ Duration: 1000hrs Load: Max. Allowable Voltage In AC eara.	No visible damage Peak voltage $ \Delta V_{1000V/us}/V_{1000V/us} \leq \pm 20\%$ Platform voltage $ \Delta V_{1000V/us}/V_{1000V/us} \leq \pm 10\%$															
Damp Heat Load	Ambient Temp: $40\pm 2^{\circ}\text{C}$, 90~95% R.H. Duration: 1000hrs Load: Max. Allowable Voltage	No visible damage Peak voltage $ \Delta V_{1000V/us}/V_{1000V/us} \leq \pm 20\%$ Platform voltage $ \Delta V_{1000V/us}/V_{1000V/us} \leq \pm 10\%$															
Voltage Proof	Metal balls method, 1000Vac 1 min.(820K~331K), 1500Vac 1 min.(361K~751K)	No visible damage															

Marking Code



1. Jordun : MOV+GDT
2. XX:Disk size 07、10、14、20
3. D: Disk
4. XXX: Varistor Voltage
5. K: Tolerance, $k=\pm 10$
6. XX:Special Code
7. UL Mark

Quantity

Packaging Dimensions (Unit: mm)

Inner box size	Outer box size	Quantity
Bulk 		500pcs/bag 2bags/box 8Inner Box/Per Carton (820K~301K)
Bulk 		400pcs/bag 2bags/box 8Inner Box/Per Carton (331K~511K)
Bulk 		300pcs/bag 2bags/box 8Inner Box/Per Carton (561K~751K)