Revision History

Date	Version	Page	Description	Author
2022.03.27	A1	/	Initial Draft	Jinhua zou
2022.10.27	A2	2，7~9	Add Agency Information and Safety Precautions	Jinhua zou
2023.11.21	A3	1	Add Version History	Jinhua zou
2026.07.24	A4	2	UL and CUL “Agency File Number” Changed to E508408	Jinhua zou

Features

- Operating voltage（V_{AC}） range from 150V to 900V.
- Fast responding to transient over-voltage.
- Large absorbing transient energy capability.
- Low clamping ratio and no following-on current.



General Information

- Surge protection in consumer electronics
- Surge protection in industrial electronics
- Relay and electromagnetic valve surge absorption
- Transistor, diode, IC, thyristor or triac semiconductor protection
- Surge protection in electronic home appliances, gas and petroleum appliances

General Characteristics

- Body: Round varistor element
- Coating: Epoxy resin, flame-retardant to UL 94 V-0
- Operating Temperature: -40ºC to +125ºC
- Storage Temperature: -40ºC to +125ºC
- Terminals: tinned wire

Part Number Code

1	0	D	4	7	1	K	H

- 1 0 — Element Diameter
- D — Type: D:Disk
- 4 7 1 — Nominal Varistor Voltage: 471=47*10¹V
- K — Varistor Voltage Tolerance: K = ±10 %
- H — Surge Series: H:Super Surge Type

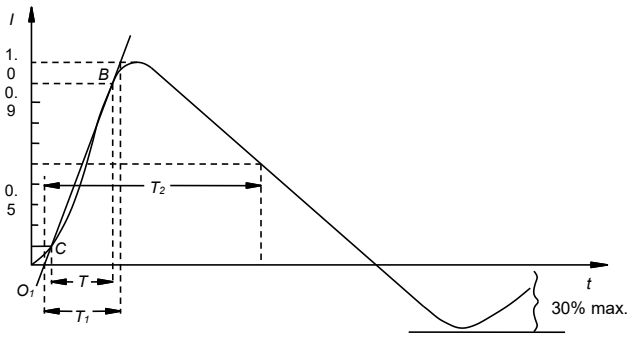
Agency Information

Agency Information		Agency File Number	Operating temperature range
	UL	E508408	- 40° C to 125° C
	CUL	E508408	- 40° C to 125° C
	CQC	CQC22001337360	- 40° C to +125° C
	TUV	J50541477	- 40° C to +125° C

Electrical Characteristics

Type Number	Varistor Voltage	Max. Allowable Voltage		Max. Energy (10/1000μs)	Max. Clamping Voltage (8/20μs)		Withstanding Surge Current (1.2/50μs &8/20μs)		Rated Power	Typical Capacitance (Reference)
	V_{1mA}(V)	V_{AC}(V)	V_{DC}(V)	(J)	I_P(A)	V_C(V)	Imax(A)	Vn(40 times)	(W)	@1KHz(pf)
10D241KH	216~264	150	200	64	25	395	3500	4kV/2kA	0.4	360
10D271KH	243~297	175	225	67	25	455	3500	4kV/2kA	0.4	330
10D301KH	270~330	195	250	70	25	505	3500	4kV/2kA	0.4	290
10D331KH	297~363	210	275	72	25	550	3500	4kV/2kA	0.4	280
10D361KH	324~396	230	300	76	25	595	3500	4kV/2kA	0.4	260
10D391KH	351~429	250	320	82	25	650	3500	4kV/2kA	0.4	240
10D431KH	387~473	275	350	93	25	710	3500	4kV/2kA	0.4	220
10D471KH	423~517	300	385	99	25	775	3500	4kV/2kA	0.4	190
10D511KH	459~561	320	418	107	25	845	3500	4kV/2kA	0.4	180
10D561KH	504~616	350	460	113	25	920	3500	4kV/2kA	0.4	180
10D621KH	558~682	385	505	125	25	1025	3500	4kV/2kA	0.4	160
10D681KH	612~748	420	560	128	25	1120	3500	4kV/2kA	0.4	140
10D751KH	675~825	460	615	134	25	1240	3500	4kV/2kA	0.4	130
10D781KH	702~858	485	640	139	25	1290	3500	4kV/2kA	0.4	130
10D821KH	738~902	510	670	146	25	1355	3500	4kV/2kA	0.4	130
10D911KH	819~1001	550	745	152	25	1500	3500	4kV/2kA	0.4	150
10D951KH	855~1045	580	780	158	25	1570	3500	4kV/2kA	0.4	130
10D102KH	900~1100	625	825	170	25	1650	3500	4kV/2kA	0.4	120
10D112KH	990~1210	680	895	180	25	1815	3500	4kV/2kA	0.4	110
10D152KH	1350~1650	900	1220	217	25	2475	3500	4kV/2kA	0.4	100

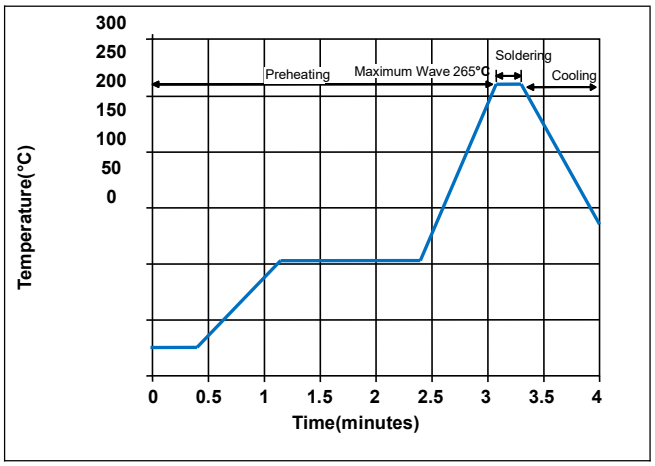
Electrical Ratings

<table>
<tr><th>Items</th><th>Test Condition/Description</th><th>Requirement</th></tr>
<tr><td>Varistor Voltage</td><td>The voltage between two terminals with the specified measuring current 1mA.DC applied is called Vb.</td><td rowspan="5">To meet the Specified value</td></tr>
<tr><td>Maximum Allowable Voltage</td><td>The recommended maximum sine wave voltage (RMS) or the Maximum DC voltage can be applied continuously.</td></tr>
<tr><td>Maximum Clamping Voltage</td><td>The maximum voltage between two terminals with the specification standard impulse current.
Applied waveform: 8/20μs


T1=1.25*T=8μs±20%
T2=20μs±20%</td></tr>
<tr><td>Rated Wattage</td><td>The maximum average power that can be applied within the specified ambient temperature.</td></tr>
<tr><td>Energy</td><td>The maximum energy within the varistor voltage change of ±10% when one impulse of 10/1000μs or 2ms is applied.</td></tr>
<tr><td>Withstanding Surge Current</td><td>The maximum current within the varistor voltage change of ±10% with the standard impulse current (8/20μs) applied one time.</td></tr>
<tr><td>Surge Life</td><td>The change of Vb shall be measured after the impulse listed below which is applied 10,000 times continuously with the interval of ten seconds at room temperature.
<table><tr><td rowspan="2">10Φ series</td><td>18V to 68V</td><td>50A (8/20μs)</td></tr><tr><td>82V to 1800V</td><td>100A (8/20μs)</td></tr></table></td><td>$\frac{\Delta Vb}{Vb} \leq \pm 10\%$</td></tr>
</table>

Soldering Recommendation

Wave Lead Free Soldering Recommendation



Item	Conditions
Peak Temperature	265ºC
Dipping Time	10 seconds (max.)
Soldering	1 time

Recommendation Reworking Conditions with Soldering Iron

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

Dimensions

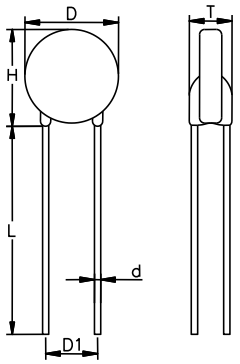


TABLE 1		
Symbol	**Millimeters**	**Inches**
H(max)	15.0	0.591
L(min)	15.0	0.591
D(max)	12.0	0.472
D1(±1.0)	7.5	0.295
T(max)	TABLE 2	
d(±0.1)	0.8	0.031
Packaging Quantity: 500pcs/bag		

TABLE 2---T(max.)

Model	Millimeters	Inches	Model	Millimeters	Inches
18V~39V	4.5	0.177	430V~560V	6.0	0.236
47V~68V	5.0	0.197	620V~780V	7.0	0.276
82V~150V	4.5	0.177	820V~1200V	8.2	0.323
180V~270V	5.0	0.197	1300V~1500V	9.3	0.366
330V~390V	5.5	0.217	1600V-1800V	11.0	0.433

安全注意事项
SAFETY PRECAUTIONS

使用压敏电阻器时，压敏电阻器周围条件（设备设计中的材料、环境、电源条件、电路条件等）发生异常时，则可能引发火灾、触电、烧伤、以及产品故障。

In case that a varistor is used, if an abnormality takes place because of peripheral conditions of the varistor(material, environments,power source conditions, circuit conditions, etc. In equipment design), fire, electric shock, burn, or product failure may be occur.

下列内容为使用时的相关注意事项，请认真确认后再行使用。如对未及事项有疑议，请速与我公司担当部门联系。

The precautions for this product are described below; understand the content thoroughly before usage. For more questions,contact us.

1 严格遵守事项
Precautions to be strictly observed

1.1 额定性能确认

Confirmation of performance ratings

请遵守压敏电阻器的最大连续工作电压，耐冲击电流、最大能量耐量、浪涌寿命、额定功率和操作温度范围等额定性能的规定，在规定范围内使用。

Use the varistor within its rated range of performance such as the maximum continuous operating voltage, withstanding surge current, maximum energy, impulse life, rated power and operating temperature range。

超出规定范围使用，则会造成压敏电阻器性能劣化，破坏元件，严重可引起压敏电阻器冒烟或起火。

If used outside the range, the varistor can be degrade and have element fracture, which may result in smoking and ignition.

1.2 为避免意外现象发生，请采用如下对策

To avoid accidents due to unexpected phenomena, take the following measures

1) 压敏电阻器受损时，可能出现破碎飞散，因此要对集成产品加保护盖或外盒。

In the event of fracture of the varistor, its pieces may scatter; hence, put the case or cover of the set product in place.

2) 请勿安装在可燃物品（塑料电线、树脂合成物等）附近。若无法避免，请使用不燃性保护外壳。

Do not install the varistor near combustible substances (polyvinyl chloride wires, resin moldings, etc.). If it's difficult to do, install a nonflammable cover.

3) 线间使用

Across-the-line use

在线间使用时，将保险丝与压敏电阻器串联。

When the varistor is used across a line, put a current fuse in series with the varistor.

4) 线-地间使用

Use between line to ground

a) 在线-地间使用时，压敏电阻器短路时会产生接地电阻，电流保险丝不会熔断，可能引起压敏电阻器外涂层树脂冒烟或起火。If the case that the varistor is used between a line to the ground, the short circuit of the varistor may not blow the current fusebecause of grounding resistance, which may cause smoking and ignition of the varistors exterior resin.

为避免上述情况，请在电源端安装漏电断路器。如无漏电断路器，则需将电流保险丝与温度保险丝串联使用。

As the measure against it, install an earth leakage breaker on the power supply side of the varistor position. If no earth leakagebreaker is installed, use a thermal fuse together with a current fuse in series.

b) 在带电部件与金属部件之间使用压敏电阻器时，压敏电阻器短路时有触电危险，故请将金属部件接地或勿与人体接触。

If the case that the varistor is used between a live parts to metal case, an electric shock may develop at a shortcircuit of thevaristor; hence, ground the metal case to the ground or keep it from the human body.

2 使用注意事项

Application notes

2.1 注意下列事项，可能导致压敏电阻器寿命缩短或引发故障

Pay attention to the following items to avoid the shortened life and failure of the varistor.

1) 电路条件

Circuit conditions

a) 选定的压敏电阻器的电压最大值在最大连续工作电压值之上。

Select a varistor of which the maximum voltage including fluctuations in source voltage allows for the maximum permissible circuitvoltage.

b) 短间隔性地施加浪涌时（施加抗干扰模拟试验电压时），不可超过压敏电阻器的额定功率。

In cases that surges are intermittently applied at short intervals (for example, in case that the voltage of the noise simulator test is implemented etc.),

2.2 使用环境

Operating environments

1)压敏电阻器不可在室外使用。

The varistor is designed to be used indoors. Do not use it exposed outdoors.

2)不可在阳光直射场所、发热源附近或温度超过使用温度范围的场所使用。

Do not use the varistor in places exposed to temperatures beyond the operating temperature range, such as places exposedto sunlight and vicinities of heating equipment.

3)不可在淋雨、蒸汽、高湿度的场所使用。

Do not use the varistor in places exposed to high temperatures and high humidity, such as places exposed directly to rain,wind, dew condensation, and vapor.

4)不可在粉尘或盐分较多的场所以及被腐蚀性气体污染的环境中使用。

Do not use the varistor in dusty and salty places and atmospheres polluted by corrosive gases.

2.3 加工条件

Processing conditions

1)不可采用可能导致外涂层树脂劣化的溶剂（稀释剂、丙酮等）进行清洗。

Do not wash the varistor by such solvents (thinner, acetone, etc) as its exterior resin deteriorates.

2)不可施加可能导致外涂层树脂或元件出现破损的冲击或撞击、压力。

Do not apply a strong vibration or shock (by falling, etc) to the varistor, cracking to its exterior resin and element may occur.

3)将压敏电阻器进行树脂镀膜（含护膜塑模）时，不可使用可能导致压敏电阻器劣化的树脂。

When coating the varistor with resin (including molding), do not use such resin.

4)压敏电阻器外涂层树脂附近的引线部位不可进行强烈折弯或施加外力。

Do not bend the varistor lead wires at the position close to its varistor exterior resin, or apply external force to the position.

5)焊接时，请在如下条件下进行。且不可将构成压敏电阻器的焊接部位或绝缘材料熔化。

When soldering the varistor lead wires, follow the recommended conditions and do not melt the solder and insulatingmaterials constituting the varistor.

焊接方式 Soldering method	推荐条件 Recommended condition	注意事项 Attention item
波峰焊 Flow soldering	260°C, 10 秒以内 260°C, within 10 sec	引线型不是回流焊对象产品 Lead wires type is not reflow soldering object part.
上述以外的条件下使用时，请用户端自行确认。 For use other than the above conditions, please the client to confirm. 仅限进行 1 次返工，烙铁温度 350°c 以下，时间控制在 5 秒以内。 Only 1 times rework, soldering iron temperature should not exceed 350°c and should not be applied for more than 5		

2.4.长期保管

Long-term storage

1)压敏电阻器不可保存在高温、高湿场所。保存场所室温 40°C 以下，湿度 75%RH 以下，保存期限为 1 年。

Do not store the varistor under high temperature and high humidity. Store it at a temperature up to 40 °C and at humiditybelow 75% RH, and use it within 1 year.

长期间保管（1 年以上）时，使用时请确认产品的可焊性。

Before using the varistor that has been stored for a long period (1 years or longer), confirm the solderability.

2)不可保存在腐蚀性气体（硫化氢、亚硫酸、氯气、氨气等）环境中。

Avoid atmospheres full of corrosive gases (hydrogen sulfide, sulfurous acid, chlorine, ammonia, etc).

3) 保存场所避免阳光直射、结露等。

Avoid direct sunlight and dew condensation.

3 说明

Notices

用于可靠性要求极高的设备（航空航天设备、医疗设备等）时，请事先至本公司咨询使用型号和保护措施等相关事宜。

In cases that the varistor is used in equipment (aerospace equipment, medical equipment, etc) requiring extremely high reliability, ask us for a selection of part no., and protection coordination, etc in advance.

若未按照产品规格书记载事项进行操作，并由此导致出现异常时，本公司不负任何责任。

Note that we do not take any responsibility for faults and abnormalities resulting from the use not in conformity with the contents of entries in the delivery specification.

出现使用电路电压的异常上升、超高浪涌的侵入等不可预期因素时，可能导致压敏电阻器起火。为防止延烧到使用设备上，外部结构材料需使用阻燃材料进行多重保护。

There is a possibility that the varistor will unexpectedly cause smoke or ignite because of an abnormal rise of the circuit voltage and invasion of excessive surge. To prevent that accident from spreading over the equipment and not to expand the damage, use multiplex protection such as the adoption of frame- retardant materials for housing parts and structural parts.