DEVETECH ELECTRONICS CO. LTD

VARISTOR
CUSTOMER: DACHS ELECTRONICA
P/N: TMRSS01-10D220KH

DESIGNED BY	
CHECKED BY	
APPROVED BY	

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Varistor

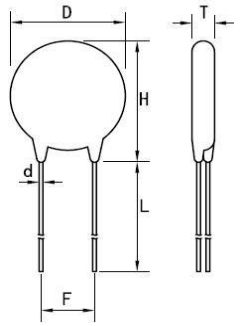
Product Specification For Approval

Approved Item	**TMRSS01-10D220KH**	
Customer P/N		
Lead form	■ Straight ☐ Crimped (mm) ☐ Y Kink ☐ Inner Crimped	
Operating temperature	■ -40~125℃ □ -40~85℃	
Surge type	■Standard ☐ High energy ☐ Combined wave	
Packing	■ Bulk □Ammo □Reel	
Approval Standard And File Number	40028836 E317616 12001076476 ISO9001/2008	
STANDARD	GB/T10193-1997 GB/T10194-1997 / UL1449 TYPE5 IEC61051	
ISSUE DATE / REV	**2020/5/21**	**A1**
Special description		

SPECIFICATION	**TMRSS01-10D220KH**

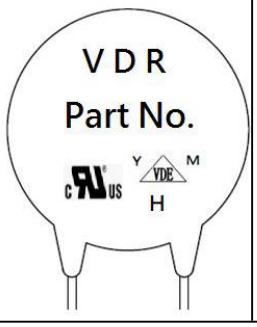
1 . OUTLINE

1.1	APPEARANCE WITHOUT DIRT&CRACK,MARKING SHOULD BE CLEAR
1.2	Marking & Dimensions



D(max)	12.0mm
T(max)	4.6mm
F(±0.8)	7.5mm
H(max)	15.0mm
L(min)	15.0mm
d(±0.05)	0.8mm

Marking



Trademark : VDR
Part No. : TMRSS01-10D220KH

Standard for Safety: UL+CUL /VDE

Date Code: Y:Year M:Month

H: 125℃

2 . ELECTRICAL PARAMETER

	Electrical specifications	Performance requirements	Unit	Description and test method
2.1	MAX ALLOWABLE VOLTAGE	14	VAC	Maximum duration that the varistor can withstand for a long time
		18	VDC	Sine AC voltage rms or maximum DC voltage.
2.2	VARISTOR VOLTAGE	19.8-24.2	(V)	At 1mA DC current in the varistor, Voltage drop between two electrodes of a varistor.
2.3	RATED WATTAGE	0.05	(W) 10^4 times 10^4	Under the action of a current pulse group with a waveform of 8/20 μs, a time interval of 6.3 sec, and a number of 10^4, the varistor can withstand the maximum average power. "Able to withstand" means that the varistor voltage U1mA after impact is not greater than ± 10 compared with that before impact, and no mechanical damage can be seen visually.
2.4	MAX CLAMPING VOLTAGE	43	(V)	When a surge current with a waveform of 8 / 20μs and a peak value of 100A flows into the varistor, the voltage peak between the two electrodes.
2.5	WITHSTANDING SURGE CURRENT	500	(A) 1 TIME	The varistor can withstand a waveform of 8 / 20μs Peak inrush current. "Affordable" means: The varistor voltage U1mA after impact is not greater than ± 10 compared with that before impact, and no mechanical damage can be seen visually.
		250	(A) 2 TIMES	

2.6	MAX ENERGY	2.5	JOULE	When a square wave current of 10/100 μs is applied to the varistor, it can withstand the maximum surge energy. "Able to withstand" means that the varistor voltage U1mA after impact is not greater than ± 10 compared with that before impact, and no mechanical damage can be seen visually.
2.7	TEMPFRATURE COEFFICIENT	0~0.05	%/℃	$\frac{U_{1mA}(25^{\circ}C) - U_{1mA}(85^{\circ}C)}{U_{1mA}(25^{\circ}C)} \times \frac{1}{60} \times 100$ %
2.8	TYPICAI CAPACITNACE TANCE (reference)	4500	PF	Frequency: 1kHz ± 10, signal level ≤1VRMS, zero bias.
2.9	LEAKAGE CURRENT	≤40	μA	When the maximum continuous DC working voltage is applied to both ends, the current flowing through the varistor.
2.10	Impulse Response Time	< 25		nSec
2.11	Packing material	Blue flame retardant epoxy resin (in compliance with UL 94 V-0)		
2.12	Main material	Zinc oxide		
2.13	Apperance	No smudges, no cracks, clear signs		
2.14	Standard test environmental conditions	Unless otherwise specified, testing of all items should be performed under the following environmental conditions: Temperature: 5 ~ 35 ℃, relative humidity: 45 ~ 85RH		

3. Mechanical requirements & environmental requirements

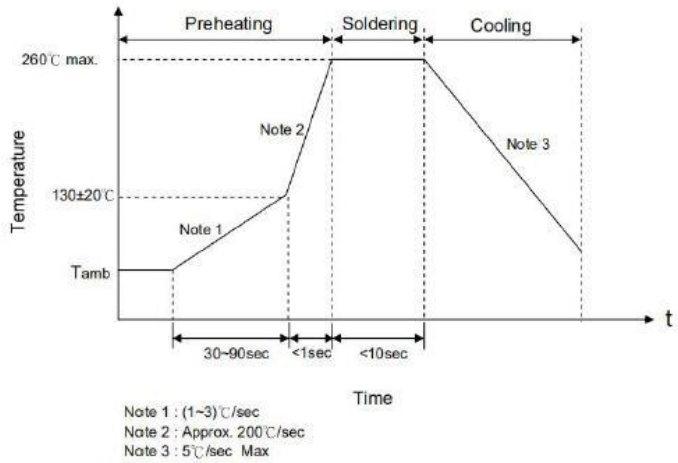
No.		Item	Performance requirements	Description and test method
Environmental characteristics	3.1	Climatic sequence	$\frac{\Delta U_{1mA}}{U_{1mA}} \leq \pm 5\%$ —— No obvious mechanical damage	IEC 68-2-4, test Db Dry heat: (125 ± 2 ℃) × 16hrs, Damp heat cycle: one cycle (55 ± 2 ℃) × 24hrs, 95 ~ 100% RH Cold: (-40 ± 2 ℃) × 2hrs, Damp heat cycle: once (55 ± 2 ℃) × 24hrs, 95 ~ 100% RH, The remaining cycle is 5 times, 24hrs / cycle. IEC 68-2-4, Db (125±2℃)×16hrs, (55±2℃)×24hrs、 95~100%RH (-40±2℃)×2hrs,
	3.2	Steady-state damp heat	$\frac{\Delta U_{1mA}}{U_{1mA}} \leq \pm 5\%$ No obvious mechanical damage	IEC68-2-3 Temperature / time: (40 ± 2 ℃) / 500hrs, humidity: 90 ~ 95% RH.
	3.3	Rapid temperature change	$\frac{\Delta U_{1mA}}{U_{1mA}} \leq \pm 5\%$ No obvious mechanical damage	IEC 68-2-14, test Na TA = -40 ° C, TB = + 125 ° C; a total of five cycles, 30 minutes at each limit temperature. IEC 68-2-14, Na TA=- 40℃， TB= +125℃
	3.4	Upper category temperature durability	$\frac{\Delta U_{1mA}}{U_{1mA}} \leq \pm 10\%$ No obvious mechanical damage	IEC 68-2-2 Temperature: 125 ° C ± 2 ° C, time: 1000hrs. Voltage: Maximum continuous operating voltage (AC). 125℃±2℃、1000hrs。
	3.5	Damp heat environment durability	$\frac{\Delta U_{1mA}}{U_{1mA}} \leq \pm 10\%$ No obvious mechanical damage	IEC68-2-3 Temperature: 125 ℃ ± 2 ℃, time: 500hrs, humidity: 90 ~ 95% RH. Voltage: Maximum continuous operating voltage (AC).

Mechanical properties	3.6	Vibration	$\frac{\Delta U_{1m4}}{U_{1m4}} \le \pm 5\%$ No obvious mechanical damage	IEC68-2-6, Test Fc method B4 Total duration: 6hrs (three directions, 2hrs in each direction). Frequency range: 10 Hz to 55 Hz, amplitude: 0.75 mm or acceleration of 98 m / s2
	3.7	Shock	$\frac{\Delta U_{1m4}}{U_{1m4}} \le \pm 5\%$ No obvious mechanical damage	IEC 68-2-27, Test Ea Pulse waveform: half sine wave, acceleration: 490m / s2 Pulse width: 11ms, three directions, 6 times in each direction.
	3.8	Solderability	95% of the impregnated part is covered with solder	IEC 68-2-20, Test Ta Method 1 Tank temperature: 235 ± 5 ℃ Dipping time: 2 ± 0.5sec
	3.9	Resistance to welding heat	No obvious mechanical damage	IEC 68-2-20, Test Tb method 1A Tin temperature: 260 ° C, Duration: 5sec
	3.10	Terminal strength	$\frac{\Delta U_{1m4}}{U_{1m4}} \le \pm 5\%$	IEC68-2-21, Test Ua Tension-Strength: 10 N (ø 0.6 and 0.8 mm lead) 20N (ø 1.0mm lead) Duration: 10 sec. Bending-Force: 5 N (ø 0.6 and ø 0.8 mm lead), 10N (ø 1.0 mm lead) Bend times: 2 times
General	3.11	Operating temperature range	(-40℃ ～+ 125℃)	Temperature range for varistor without derating
	3.12	Storage temperature range	(-40℃ ～+150℃)	Under no load condition
	3.13	Withstand voltage	≥2500VAC	Between the electrode lead of the varistor and the surface of its encapsulation layer, 1 min.

4. Maximum Clamping Voltage

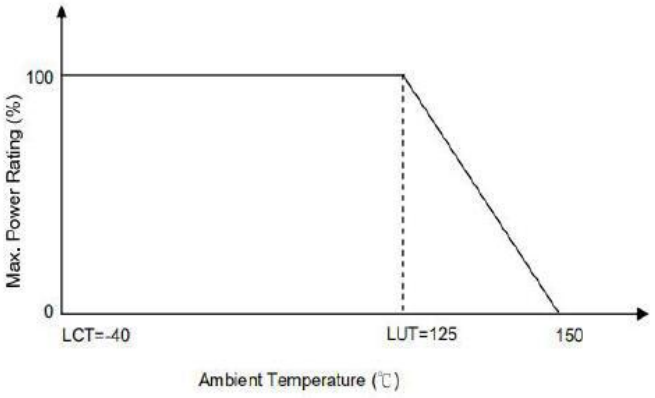
Soldering Recommendation & Power Derating Curve

■ **Wave Soldering Profile**



Note 1 : (1~3)℃/sec
Note 2 : Approx. 200℃/sec
Note 3 : 5℃/sec Max

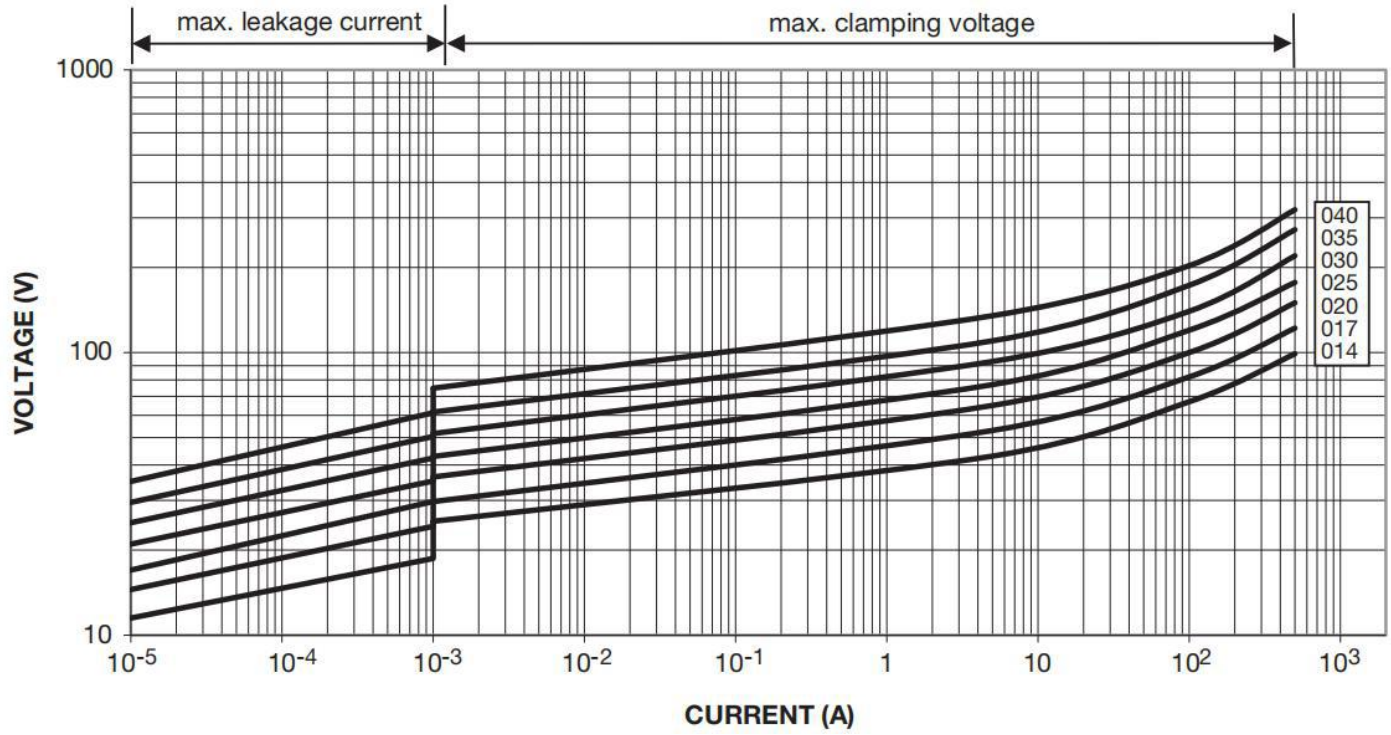
When operating temperature exceeds125 , the power, the Max. continuous operation Voltage, the Max. Surge Current and the Max. Energy should be derated as below figure, the derated coefficient is -4%



V/I CHARACTERISTICS V-I

14 V_{RMS} to 40 V_{RMS}

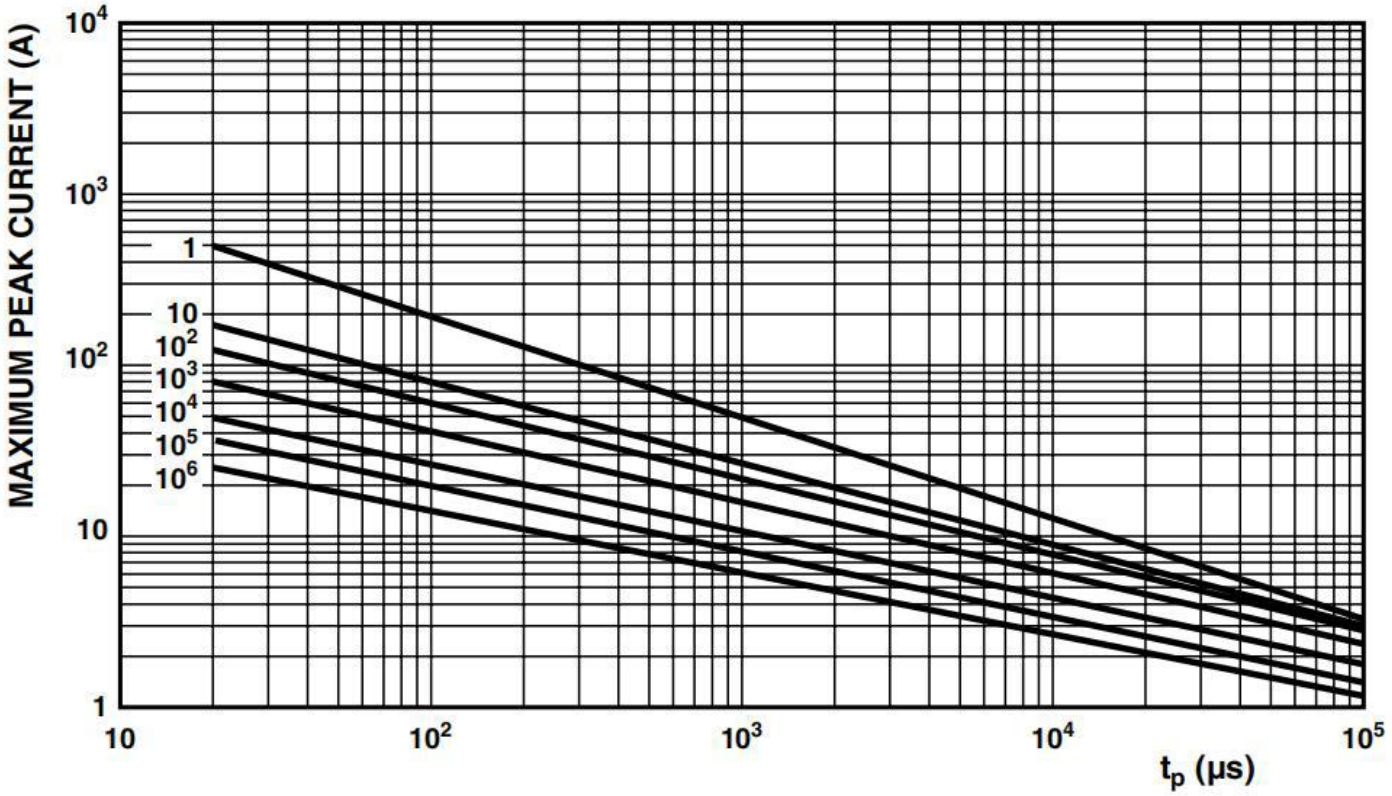
TMRSS01-10D220K to 10D680K



MAXIMUM APPLICABLE TRANSIENT CURRENT AS A FUNCTION OF PULSE DURATION

14 V_{RMS} to 40 V_{RMS}

TMRSS01-10D220K to 10D680K



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