

## Thick Film Power Resistor



### FEATURES

- AEC-Q200 qualified
- Cold system without external radiation
- High power / volume ratio
- Cooled by auxiliary heatsink (not supplied)
- Non-inductive
- Pre-applied phase change thermal interface PC-TIM (optional)
- Internal temperature monitoring with a NTC thermistor (optional)
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS**  
COMPLIANT

### LINKS TO ADDITIONAL RESOURCES



### APPLICATIONS

- Automotive: precharge, discharge, and active discharge
- Industrial and AMS: power conversion and snubber

### STANDARD ELECTRICAL SPECIFICATIONS

MODEL	RESISTANCE RANGE $\Omega$	MAX. RATED POWER $BC_{85}^{\circ C}$ W	TOLERANCE <sup>(1)</sup> $\pm$ %	TEMPERATURE COEFFICIENT $\pm$ ppm/ $^{\circ}C$	E-SERIES OHMIC VALUES
ISOA	10 to 220	200	10, 5	150	E24
	220 to 1M	200	10, 5	100	E24

#### Note

<sup>(1)</sup>  $\pm 2$  % or  $\pm 1$  % on special request for limited resistance value and with reduction of maximum power and pulse rating (contact us for details)

### MECHANICAL SPECIFICATIONS

UL 94 flame classifications	Housing and potting materials comply with UL 94 V-0 standard
Resistive element	Cermet
Substrate	Alumina
Encapsulation	Resin filled case

### TECHNICAL SPECIFICATIONS

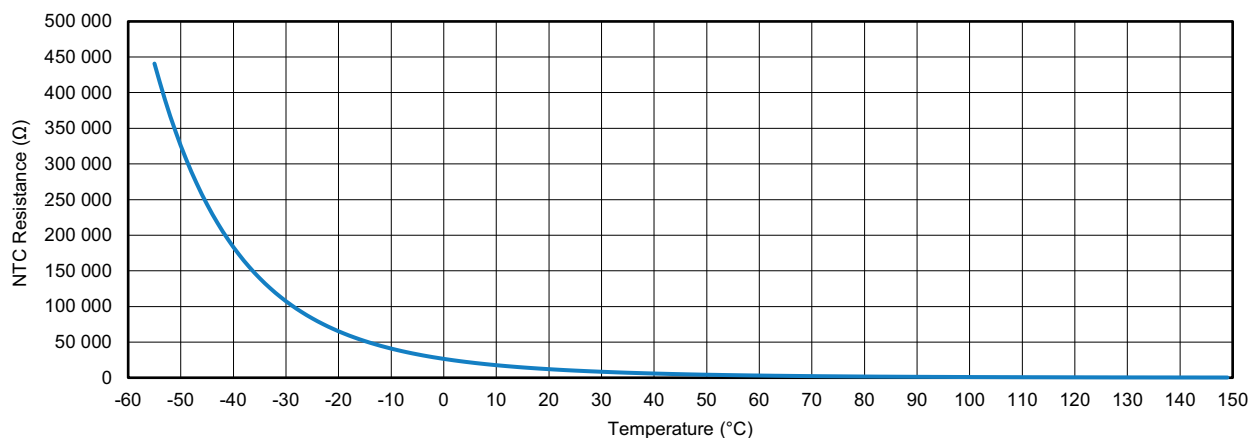
PARAMETER	ISOA200
Nominal power at 85 $^{\circ}C$ bottom case temperature	200 W
Operating temperature range	-55 $^{\circ}C$ to +150 $^{\circ}C$
Maximum operating voltage	1500 V
Dielectric strength with all terminals connected as one pole	4000 V <sub>RMS</sub> (50 Hz / 1 min)
Dielectric strength power resistor to NTC resistor	1500 V <sub>RMS</sub> (50 Hz / 1 min)
CTI	> 600
Creepage distance	> 4.2 mm
Clearance distance	> 3.6 mm
Insulation	$\geq 10 G\Omega$ at 1000 V <sub>DC</sub>
Inductance	$\leq 50$ nH
NTC characteristics (option)	Vishay NTCS0603E3103FLT <a href="http://www.vishay.com/ppg?29056">www.vishay.com/ppg?29056</a>
Weight (max.)	< 16 g

**PERFORMANCES** (AEC-Q200 Revision E Qualification Type Tests)

TESTS	CONDITIONS	REQUIREMENTS
High temperature exposure	MIL-STD-202 method 108 Condition: 1000 h at T = 155 °C. Unpowered	$\leq \pm (2 \% + 0.1 \Omega)$
Temperature cycling	JESD22 method JA-104 1000 cycles (-55 °C to +125 °C)	$\leq \pm (2 \% + 0.1 \Omega)$
Biased humidity	MIL-STD-202 method 103 Condition: 1000 h 85 °C / 85 % RH	$\leq \pm (5 \% + 0.1 \Omega)$
Operational life	MIL-STD-202 method 108 Condition: D steady state T <sub>A</sub> = 85 °C of bottom case at rated power 200 W 90' On / 30' off / 1000 h	$\leq \pm (2 \% + 0.1 \Omega)$
ESD	AEC-Q200-002 Condition: 6 kV to 25 kV	$\leq \pm (0.5 \% + 0.05 \Omega)$
Vibration	MIL-STD-202 method 204 Condition B: 10 g's for 20 min for 1 cycle, 12 cycles each of 3 orientations (total of 36). Test from 10 Hz to 2000 Hz	$\leq \pm (0.5 \% + 0.05 \Omega)$
Mechanical shock	MIL-STD-202 method 213 Fig. 1 Condition C: 100 g's/6 ms 3.75 m/s 3 shock/direction, 2 directions along 3 axes (18 shocks)	$\leq \pm (0.5 \% + 0.05 \Omega)$
Terminal strength (lead)	MIL-STD-202 method 211 Test lead device lead integrity only. Conditions: A (2.27 kg)	$\leq \pm (0.5 \% + 0.05 \Omega)$

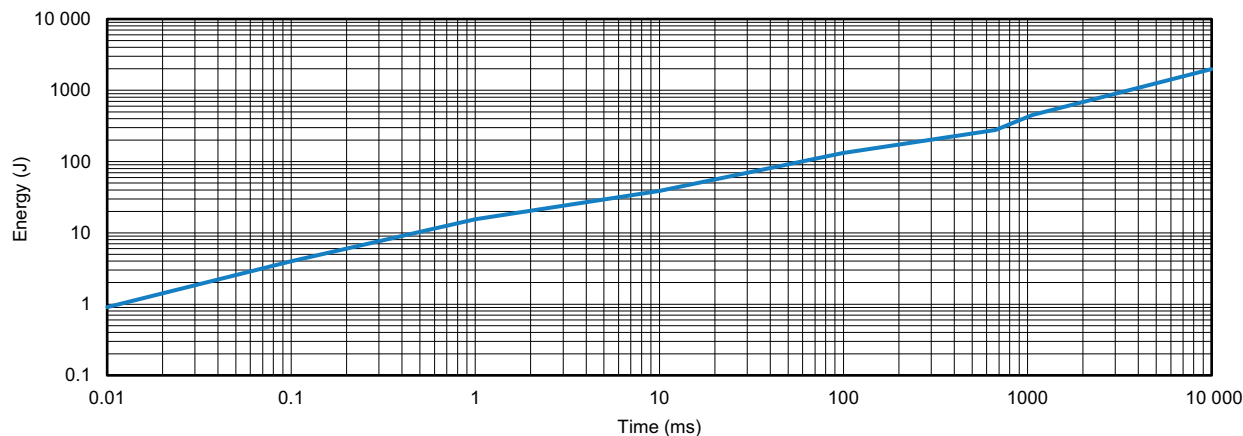
**Note**

- All tests were done in Vishay MCB laboratories conditions

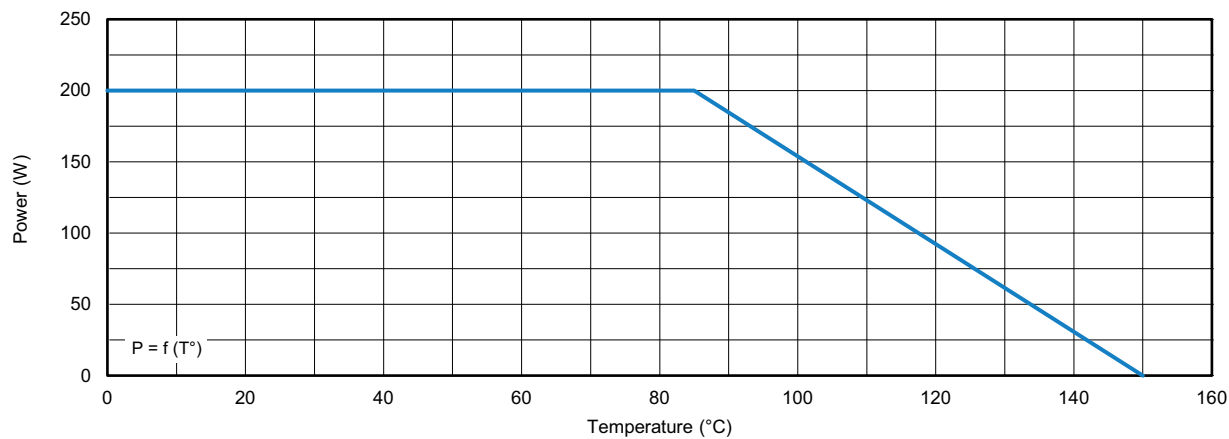
**RESISTANCE VALUE VS. TEMPERATURE FOR NTC0603E3103FLT**



## PULSE ENERGY

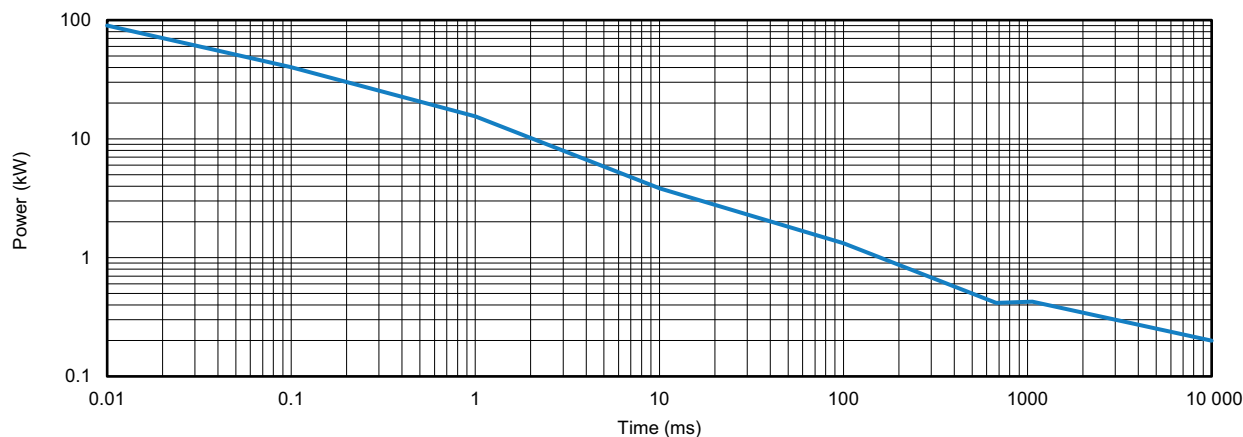


## POWER DISSIPATION

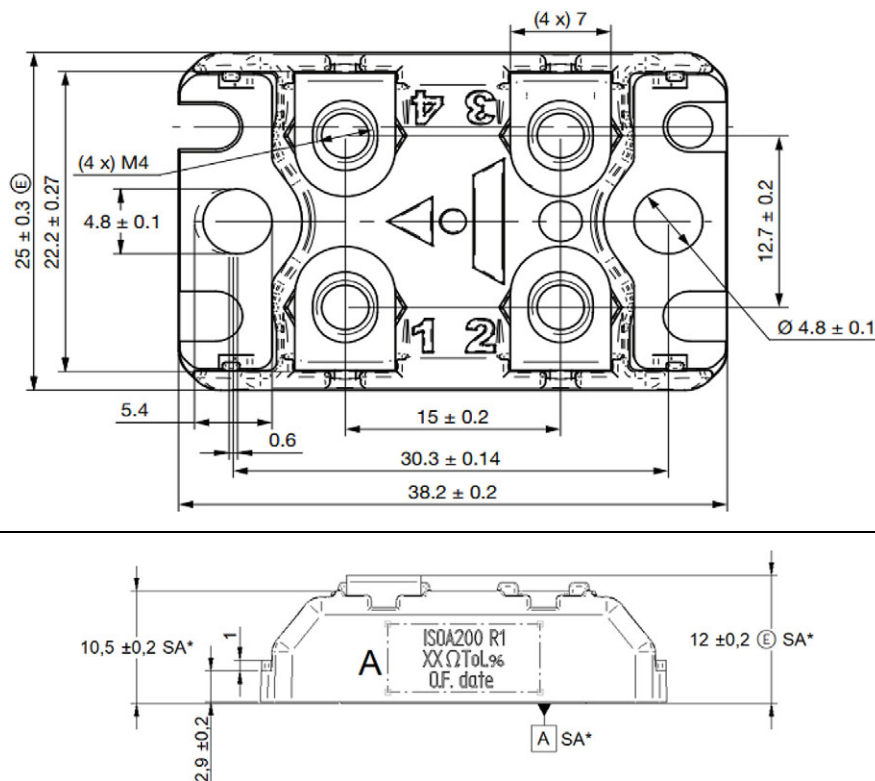


Permanent applicable power (W) as a function of bottom case temperature (°C)

## POWER VS. TIME



**DIMENSIONS** in millimeters

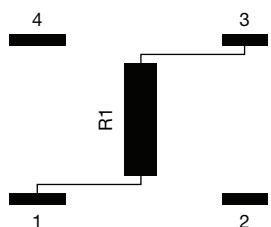


### Note

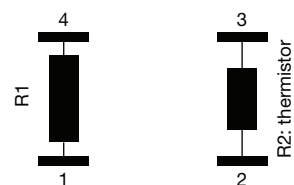
(1) SA: under alumina

## INTERNAL CONFIGURATION

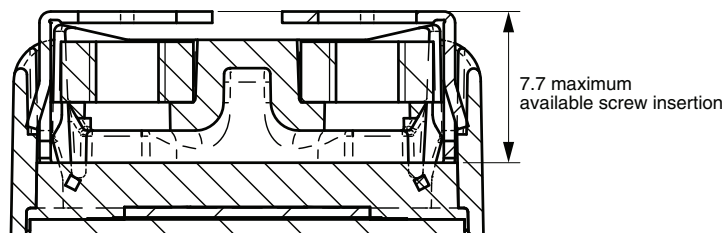
**CONFIGURATION R1 OR T1**



**CONFIGURATION N1 OR NT**



## ASSEMBLY



Tightening torque for mechanical fixation	1.8 Nm ± 0.2 Nm
Tightening torque for electrical connections	1.3 Nm ± 0.2 Nm

**STORAGE CONDITIONS**

Parts shall be stored in a dry place from 0 °C to +40 °C at 80 % RH maximum.

**COOLING**

The temperature of the heatsink may be maintained at the specified values with:

- Forced air ventilation or internal circulation of a liquid cooling
- Heatsink contact surface: < Ra 6.3 μ
- Evenness defect: 0.05 mm / 50 mm and 0.025 mm / 25 mm
- Surface temperature gradient (isotherm): 20 °C max.
- Thermal compound not supplied (resistance < 0.025 °C / W / 0.05 mm preconized)
- For mounting recommendations please contact [wmcbfixedresistors@vishay.com](mailto:wmcbfixedresistors@vishay.com)

**Note**

- The user must select the thermal resistance of the heatsink according to the power applied

**ORDERING INFORMATION**

ISOA MODEL	200 STYLE	R1 CONFIGURATION	200 RESISTANCE VALUE	5 % TOLERANCE	XXX CUSTOM DESIGN	TU10 PACKAGING
		Single resistor or Resistor and NTC		± 5 % ± 10 % Other on request		

**GLOBAL PART NUMBER INFORMATION**

I	S	O	A	2	0	0	R	1	2	0	0	0	J	T	X	X	X
1	2	3	4	5	6	7											
1	2	3	4	5	6	7											
TYPE	POWER	OPTIONS	OHMIC VALUE	TOLERANCE	PACKAGING	INDUSTRIALIZATION NUMBER											
ISOA	200 = 200 W	R1: 1 resistor only N1: 1 resistor and NTC T1: 1 resistor and TIM NT: 1 resistor and NTC and TIM	The first three digits are significant figures and the last specifies the number of zeros to follow, R designates decimal point. 1301 = 1300 Ω	J = 5 % K = 10 % A = other on request	T = tube 10 pieces	3 specific digits (if applicable)											



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