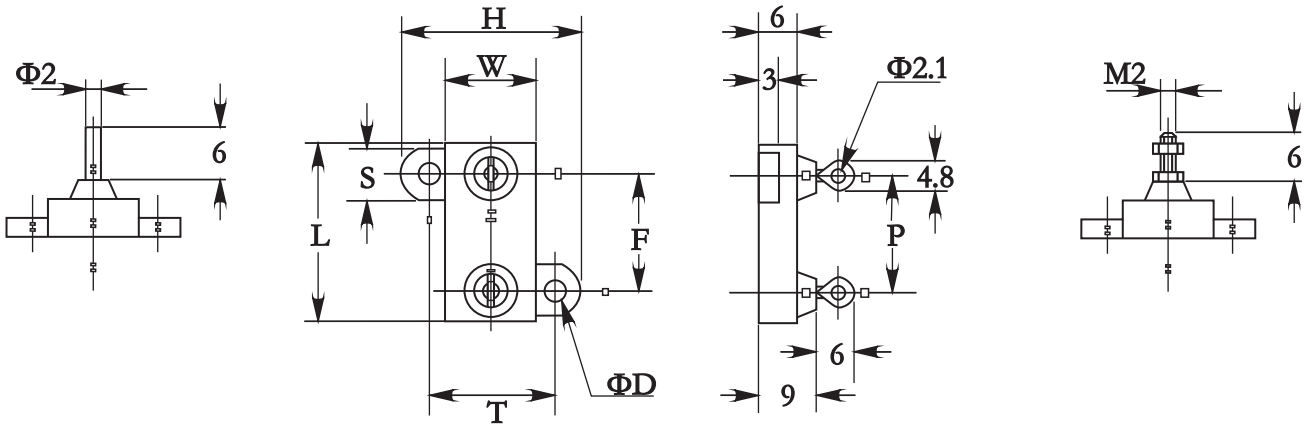
RSH Thick film Resistors

Manufactured in cermet thick film technology, these power resistors exhibit remarkable characteristics and the series includes4 types ranging from 5 W to 50 W. Designed to be mounted onto a heatsink, the resistor can bear high short time overloads and 3 types of terminations are available. The resistors are non inductive and are particularly suitable for high frequency operation and cut-out circuits.

Features

- Compliant with requirement #26 of NF-EN45545-2
- High overload capabilities up to 2500 VRMS
- Wide resistance range from 0.24Ωto 1 M
- High thermal capacity up to 0.8 ℃/W
- High insulation: 10^6 MΩ
- 5 W to 50 W
- High power rating
- Easy mounting
- Reduced size and weight

Dimensions



Type	Power (W)	Dimensions(mm)							
		L±0.5	W±0.3	H±0.3	P Leads Pitch	F Connection Pitch	T±0.3	S±0.3	ΦD±0.3
RSH	5W	16.6	9.0	16.4	10.2	11.3	12.5	5.3	2.4
	10W	19.0	11.0	20.6	12.7	14.3	15.9	5.0	2.4
	25W	28.0	14.0	27.5	18.3	18.3	19.8	7.7	3.2
	50W	47.8	15.5	29.5	30.5	39.7	21.4	8.0	3.2

Ordering Information

Example:

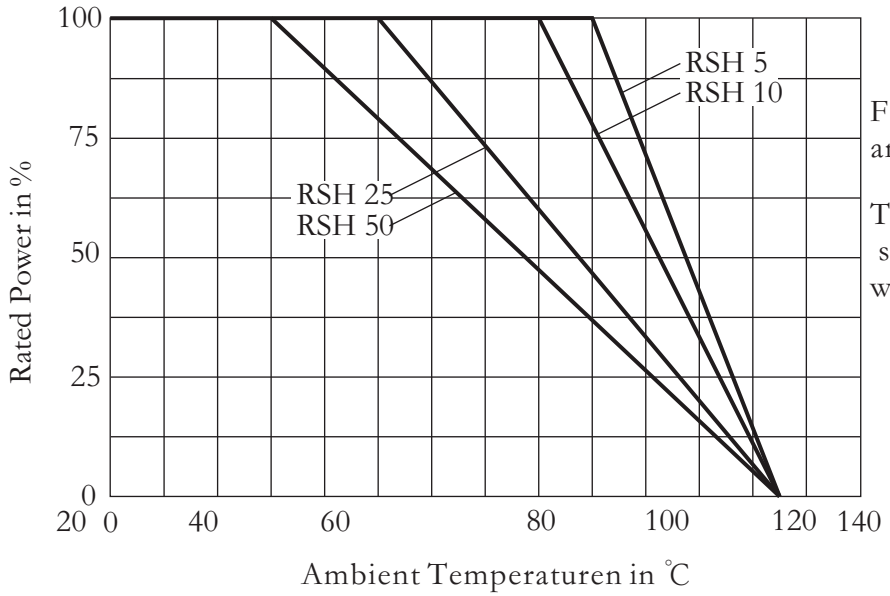
RSH	05	J	4R7
(1)	(2)	(3)	(4)
Series Name	Power Rating	Resistance Tolerance	Resistance

(1)Type: RSH SERIES
(2)Power Rating: 05=5W、10=10W、25=25W、50=50W
(3)Tolerance: F=±1%,G=±2%,J=±5%,K=±10%
(4)Resistance Value:4R7=4.7R、R10=0.1Ω、47R0=47Ω

Applications And Ratings

Type	Power(W) @25℃	Resistance range(Ω)	Tolerance ±%	Temperature coefficient ±ppm/℃	Series
RSH	5W	0.24Ω~1M	F=±1% G=±2% J=±5% K=±10%	>1Ω ±150ppm/℃ <1Ω ±250ppm/℃	E24 Range
	10W	0.24Ω~1M			
	25W	0.24Ω~1M			
	50W	0.24Ω~1M			

Derating Curve

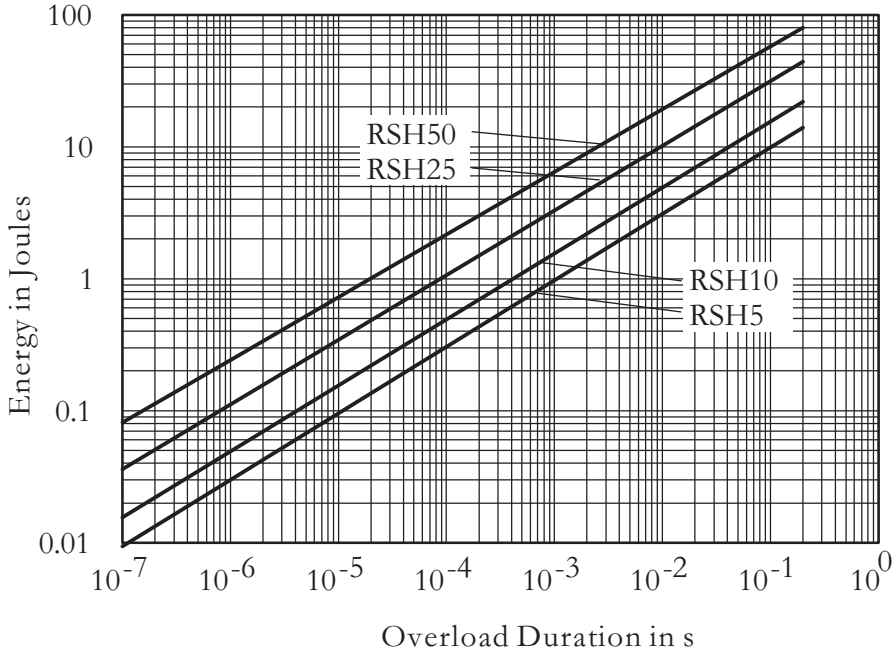


For resistors mounted onto heatsink and thermal resistanceof 1 ° C/W.

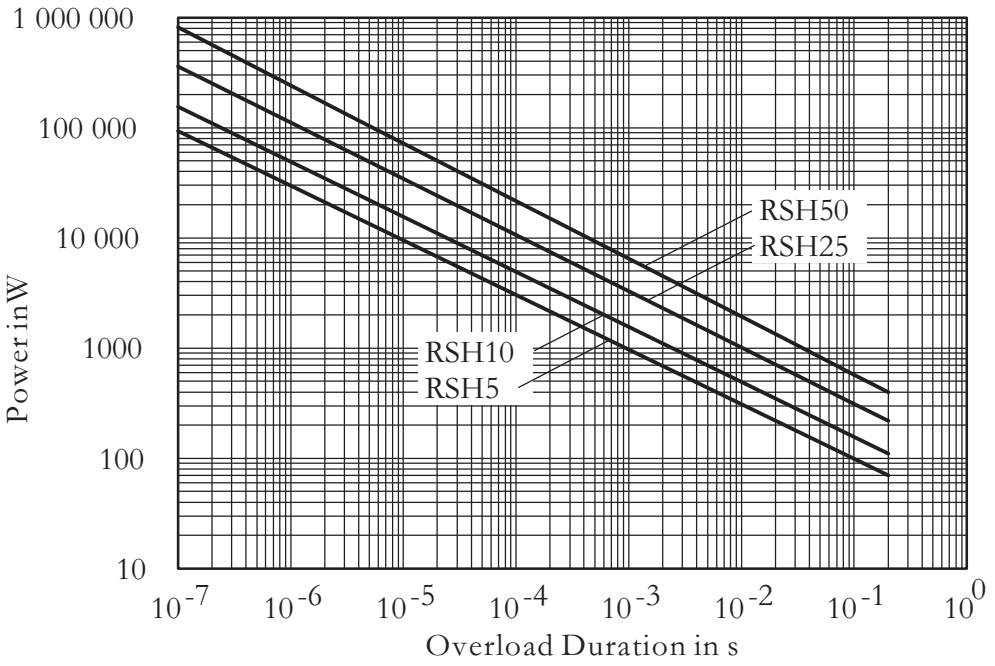
To improve the thermal conductivity, surfaces in contact should be coated with a silicone grease.

The applied voltage must always be lower than the maximum overload voltage as shown in the special features table.
The values indicated on the graph below are applicable to resistors in air or mounted onto a heatsink.

Energy Curve



Power Curve



Performance

PERFORMANCE

TESTS	CONDITIONS	REQUIREMENTS
Momentary Overload	NF EN140000 CEI 115_1 2 Pr/5 s $U_S < 1.5U_L$	< ± (0.25 % + 0.05)
Rapid Temperature Change	NF EN140000 125 °C CEI 68215 Test Na 5 cycles -55 °C to +125 °C	< ± (0.25 % + 0.05)
Load Life	NF EN140000 CEI 115_1 1000 h Pr at +25 °C	< ± (0.5 % + 0.05)
Humidity (Steady State)	56 days RH 95 % MIL-STD-202 Method 103 B and C	< ± (0.5 % + 0.05)

ENVIRONMENTAL SPECIFICATIONS

Temperature Range	-55 °C to +125 °C
Climatic Category	55 / 125 / 56
Flammability	IEC 60695-11-5 2 applications 30 s separated by 60 s

SPECIAL FEATURES

MODEL	RSH 5	RSH 10	RSH 25	RSH 50
Power Rating-Cha ssis Mounted	5W	10W	25W	50W
Power Rating-Unmounted	2W	2.5W	4W	5.5W
Thermal Resistance $R_{th\ (j-c)}$	4.8 °C /W	3.2 °C /W	1.4 °C /W	0.8 °C /W
Limiting Element Voltage (V_{RMS})	160V	250V	550V	1285V
Dielectric Strength (V_{RMS}) 50 Hz, 1 min MIL-STD-202 Method 301 10 mA max.	2000V	2000V	3500V	3500V
Critical Resistance	5120	6250	12100	33024

Recommendations For Rmounting Onto A Heatsink

- Surfaces in contact must be carefully cleaned.
- The heatsink must have an acceptable flatness: From 0.05 mm to 0.1 mm/100 mm.
- Roughness of the heatsink must be around 6.3 μm. In order to improve thermal conductivity, surfaces in contact (alumina,heatsink) are coated with a silicone grease (type Sl 340 from Rhône-Poulenc or Dow 340 from Dow Corning).
- The fastening of the resistor to the heatsink is under pressure control of two screws (not supplied).

Tightening Torque on heatsink	RSH 5	RSH 10	RSH 25	RSH 50
	0.5 Nm	0.6 Nm	0.7 Nm	1 Nm

- In order to improve the dissipation, either forced-air cooling or liquid cooling may be used.
- A low thermal radiation of the case allows several resistors to be mounted onto the same heatsink.
- Do not forget to respect an insulation value between two resistors (dielectric strength in dry air 1 kV/mm).
- In any case the hot spot temperature, measured locally on the case must not exceed 125℃.
- Tests should be performed by the user.

Choice of The Heatsink

The user must choose according to the working conditions of the component (power, room temperature). Maximum working temperature must not exceed 125 ℃. The dissipated power is simply calculated by the following ratio:

$$P = \frac{\triangle T(1)}{R_{TH}(j\text{-}c) + R_{TH}(c\text{-}h) + R_{TH}(h\text{-}a)}$$

P: Expressed in W

△T:Difference between maximum working temperature and room temperature or fluid cooling temperature.

R th (j - c) :Thermal resistance value measured between resistive layer and outer side of the resistor. It is the thermal resistance of the component.

R th (c - h) : Thermal resistance value measured between outer side of the resistor and upper side of the heatsink. This is the thermal resistance of the interface (grease, thermal pad), and the quality of the fastening device.

R th (h - a) : Thermal resistance of the heatsink.

Example:

R_{TH} (c - a) for RSH 25 power rating 20 W at ambient temperature +50℃

Thermal resistance R_{TH} (j - c) : 2.5 ℃/W

Considering equation (1) we have:

△T =≤25 ℃ - 50 ℃ ≤75 ℃

R_{TH} (j - c) = 1.4 ℃/W (Special Features)

R_{TH} (j - c) + R_{TH} (c - h) + R_{TH} (h - a) $= \frac{\triangle T}{P} = \frac{75}{20}$ = 3.75 ℃/W

R_{TH} (c - h) + R_{TH} (h - a)≤ 3.75 ℃/W - 1.4 ℃/W≤ 2.35 ℃/W

with a thermal grease R_{TH} (c - h) = 1 ℃/W, we need a heatsink with R_{TH} (h - a) = 1.35 ℃/W