EBG RESISTORS

A Miba Group Company

Power Resistors

Series MSP-35 SMD TO-220

35 W Thick Film Resistor for surface mount including Metal Tab

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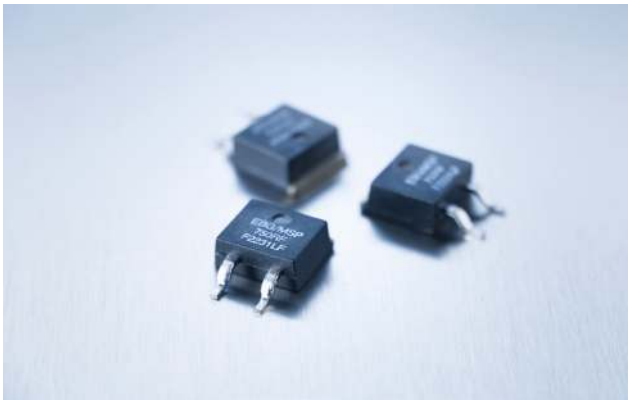


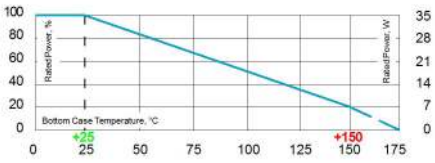
Features

- 35 W operating power
- **SMD TO-220 package** configuration
- Molded case for environmental protection
- Resistor element is electrically insulated from the metal sink tab
- Non-Inductive design
- ROHS compliant
- Materials in accordance with UL 94 V-0

Technical Specifications

Resistance value	0.1 Ω ≤ 1 MΩ (other values on special request)
Resistance tolerance	±10 % to ±1 % ±0.5 % on special request for limited ohmic values
Temperature coefficient	< 3 Ω: ask for details > 3 Ω ≤ 10 Ω: ±100 ppm + 0.002 Ω/°C referenced to 25 °C, ΔR taken at +85°C > 10 Ω: ±50 ppm/°C referenced to 25 °C, ΔR taken at +85°C
Power rating	35 W at 25°C bottom case temperature
Maximum operating voltage	350 V
Dielectric strength voltage	1,800 V AC
Insulation resistance	> 10 GΩ at 1,000 V DC
Momentary overload	2x rated power with applied voltage not to exceed 1.5x maximum continuous operating voltage for 5 sec. ΔR ±(0.3 % + 0.01 Ω) max.
Load life	MIL-R-39009, 2,000 hours at rated power, ΔR ±(1.0 % + 0.001 Ω) max.
Moisture resistance	MIL-STD-202, method 106 ΔR = (0.5 % + 0.01 Ω) max.
Thermal shock	MIL-STD-202, method 107, Cond. F, ΔR = (0.3 % + 0.01 Ω) max.
Working temperature range	-55°C to +175°C
Terminal strength	MIL-STD-202, method 211, Cond. A (Pull Test) 2.4 N, ΔR = (0.2 % + 0.01 Ω) max.
Vibration, high frequency	MIL-STD-202, method 204, Cond. D, ΔR = (0.2 % + 0.01 Ω) max.
Lead material	nickel-plated copper, dip-tinned
Ground plate material	german silver
Heat resistance to cooling plate	Rth < 4.28 K/W
Weight	~1,4 g

Power Rating



Derating (thermal resist.) MSP-35:
0.23 W/K (4.28 K/W)

Case temperature must be used for definition of the applied power limit. Case temperature measurement must be done with a thermo-couple contacting the center of the component mounted on the designed heat sink. Thermal grease should be applied properly.

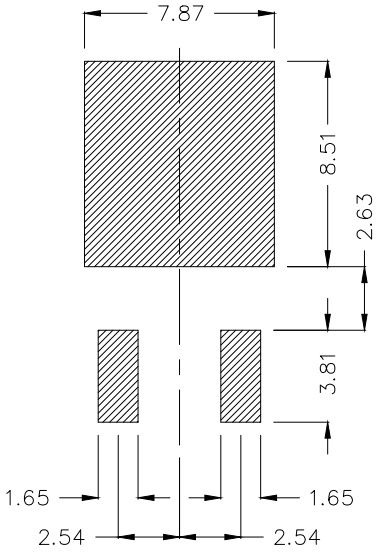
How to make a request

MSP_Ohmic Value_Tolerance

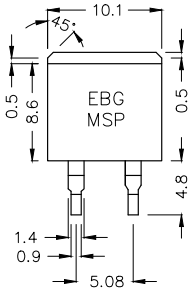
For example:
MSP 39R 5%

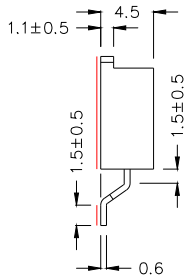
Higher soler profile:
MHP 560R 1%

Soldering Template



Dimensions in mm





Tolerances ±0.2 unless otherwise noted!
TO 220 style power package for SMD applcations
35 W power rating at 25°C case temerature.

Flatness of ground plate to contacts <0.1mm

Soldering Note:
During surface mount soldering, the soldering temperature profile must not cause the metal tab of this device to exceed 215°C.
If the solder profile is higher than 215°C (up to 260°C), please use our alternative type **MHP-35 SMD TO-220**. Please contact us for further information!

The above spec. sheet features our standard products. For further options please contact our local EBG representative or contact us directly.

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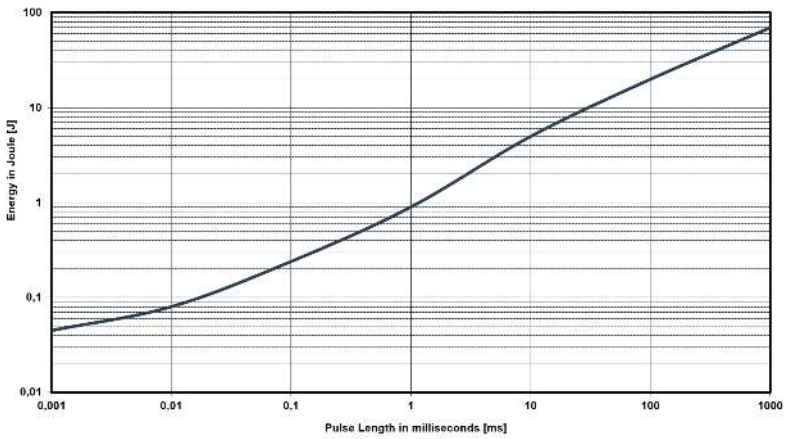
Pulse Energy Curve (typical rating for MSP-35)

Note: These energy values are reference values → depending on ohmic value e.g. 1 Ω to 10 Ω and used resistive paste, a variation in max. energy load capability is possible

Test procedure

Every test resistor was mounted with thermal compound (0.9 W/mK) on a water cooled heatsink

- Constant inlet water temperature: +50°C
- The test time of each tested resistor: 10min.
- Break time between two pulses: 1sec.
- To determine good / defect parts the ohmic value was measured before and after tests: a change of tolerance of more than 0.1 % means defect



Description of Pulse Energy Curve

- Shape of pulse = e-function
- Time between two pulses = 1 second
- Pulse length = time constant of 1 tau (1 means ... tau = 1ms)

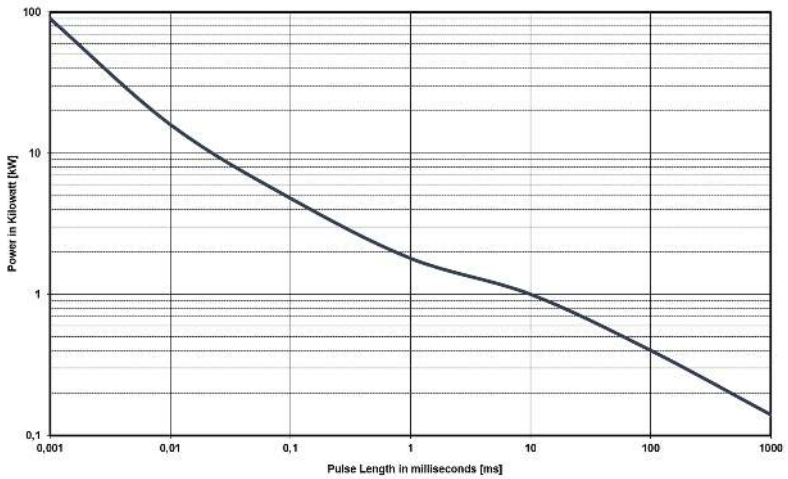
Example

At 1 ms tau the MSP-35 with e.g. 1 Ω to 10 Ω can withstand an energy level of about 0.9 J, when the pulse pause time is ≥ 1s

At a symmetrical frequency > 1 kHz at pulse length ≥ 10 µsec. the maximum applied pulse energy for MSP-35 is a result out of the nominal power 35 W divided by the operating frequency (at 25°C bottom case) (E = 35 W / F)

Pulse Power Curve (typical rating for MSP-35)

The power curve shows the max. possible power which can be applied for a certain duration.
Referring to the same test procedure as described above.



Description of Pulse Power Curve

- Shape of pulse = e-function
- Time between two pulses = 1 second
- Pulse length = time constant of 1 tau (1 means ... tau = 1ms)

Example

For the time-constant of 1 ms you can apply about 1.8 kW max., if the time between two such peaks is ≥ 1s