

Power Resistor, for Mounting onto a Heatsink Thick Film Technology



FEATURES

- 100 W at 25 °C case temperature
- High power rating
- High overload capabilities up to 2500 V_{RMS}
- Wide resistance range from 0.06 Ω to 1 MΩ
- High thermal capacity up to 1 °C/W
- Easy mounting
- Reduced size and weight
- High insulation: 10⁶ MΩ
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912


**RoHS
COMPLIANT**

DIMENSIONS

DIMENSIONS		MODEL	LCH 100
	LCH100...R	L	47.8
		W	15.5
		H	29.4
		P Leads Pitch	30.5
		F Connections Pitch	39.7
		T	21.4
		S	8
		Ø D	3.2
		V Leads	M2

Note

- General tolerance: ± 0.3 mm

STANDARD ELECTRICAL SPECIFICATIONS

MODEL	SIZE	RESISTANCE RANGE Ω	RATED POWER ⁽²⁾ P _{25 °C} W	LIMITING ELEMENT VOLTAGE V	TOLERANCE ± %	TEMPERATURE COEFFICIENT ± ppm/°C	CRITICAL RESISTANCE Ω
LCH 100	100	0.06 to 1M ⁽¹⁾	100	1285	1, 2, 5, 10	150	16 512

Notes
⁽¹⁾ E24 series

⁽²⁾ Chassis mounted

MECHANICAL SPECIFICATIONS

Mechanical Protection	Insulated case
Resistive Element	Cermet
Substrate	Alumina
Connections	Tinned copper alloy
Weight	12 g

ENVIRONMENTAL SPECIFICATIONS

Temperature Range	- 55 °C to 125 °C
Climatic Category	55/125/56

TECHNICAL SPECIFICATIONS

Standard Resistance Tolerances	± 1 % to ± 10 % From 0.06 Ω to 1 MΩ only ± 5 % and ± 10 % available
Temperature Coefficient	± 150 ppm/°C (R > 1 Ω) - 55 °C/+ 125 °C
Insulation Resistance	10 ⁶ MΩ
Inductance	≤ 0.1 μH



PERFORMANCE		
TESTS	CONDITIONS	REQUIREMENTS
Momentary Overload	IEC 60115-1 2 Pr/5 s $U_S < 2 U_L$	$< \pm (0.25 \% + 0.05 \Omega)$
Rapid Temperature Change	IEC 60115-1 125 °C CEI 68215 Test Na 5 cycles - 55 °C to + 125 °C	$< \pm (0.25 \% + 0.05 \Omega)$
Load Life	IEC 60115-1 90' on/30' off 1000 h Pr at + 25 °C	$< \pm (0.5 \% + 0.05 \Omega)$
Humidity (Steady State)	IEC 60115-1 IEC 60068-2-3 Test Ca 56 days RH 95 % MIL-STD-202 Method 103 B and C	$< \pm (0.5 \% + 0.05 \Omega)$

RESISTANCE VALUE IN RELATION TO TOLERANCE AND TCR		
Resistance Value	$< 1 \Omega$	$> 1 \Omega$
Standard Tolerances	$\pm 5 \%$ $\pm 10 \%$	
Standard TCR IEC 60115-1 - 55 °C/+ 125 °C	$\pm 450 \text{ ppm}/^\circ\text{C}$	$\pm 150 \text{ ppm}/^\circ\text{C}$
Tolerance on Request	$\pm 1 \% \text{ to } \pm 2 \%$ (only for $R > 1 \Omega$ to $1 \text{ M}\Omega$)	

SPECIAL FEATURES	
MODEL	LCH 100
Power Rating Chassis Mounted	100 W (25 °C case temp.)
Thermal Resistance $R_{TH(j-c)}$	1 °C/W
Limiting Element Voltage (V_{RMS})	1285 V
Max. Overload Voltage (V_{RMS})	2500 V
Dielectric Strength (V_{RMS}) 50 Hz, 1 min MIL-STD-202 Method 301 10 mA Max.	3500 V
Critical Resistance	16 512 Ω



RECOMMENDATIONS FOR MOUNTING 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, heat-sink) are coated with a silicone grease (type SI 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	LCH 100
	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 °C.
- Tests should be performed by the user.

CHOICE OF THE HEATSINK

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

$$P = \frac{\Delta T}{[R_{TH(j-c)} + R_{TH(c-a)}]} \quad (1)$$

P: Expressed in W

ΔT: Difference between maximum working temperature and room temperature.

R_{TH(j-c)}: Thermal resistance value measured between resistance layer and outer side of the resistor. It is the thermal resistance of the component (See Special Features table).

R_{TH(c-a)}: Thermal resistance value measured between outer side of the resistor and room temperature. It is the thermal resistance of the heatsink depending on the heatsink itself (type, shape) and the quality of the fastening device.

Example:

R_{TH(c-a)}: For LCH 100 power rating 20 W at ambient temperature + 50 °C.

$$\Delta T \leq 125 \text{ °C} - 50 \text{ °C} \leq 75 \text{ °C}$$

$$R_{TH(j-c)} = 1 \text{ °C/W (Special Features)}$$

$$R_{TH(j-c)} + R_{TH(c-a)} = \frac{\Delta T}{P} = \frac{75}{20} = 3.75 \text{ °C/W}$$

$$R_{TH(c-a)} \leq 3.75 \text{ °C/W} - 1 \text{ °C/W} \leq 2.75 \text{ °C/W}$$



OVERLOADS

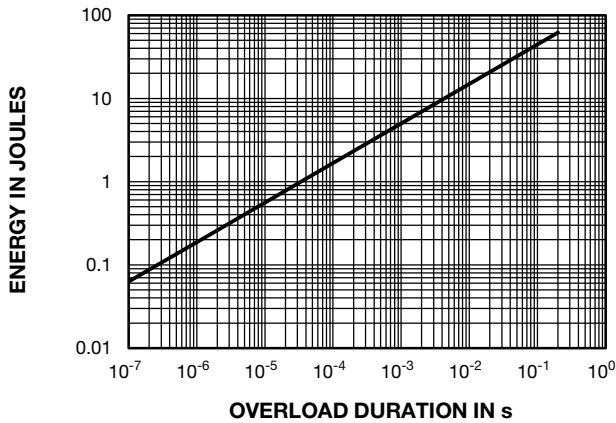
The applied voltage must always be lower than the maximum overload voltage as shown in the special features table.

The values indicated on the graph below are applicable to resistors in air or mounted onto a heatsink.

MARKING

Model, style, resistance value (in Ω), tolerance (in %), manufacturing date, Vishay Sfernice trademark.

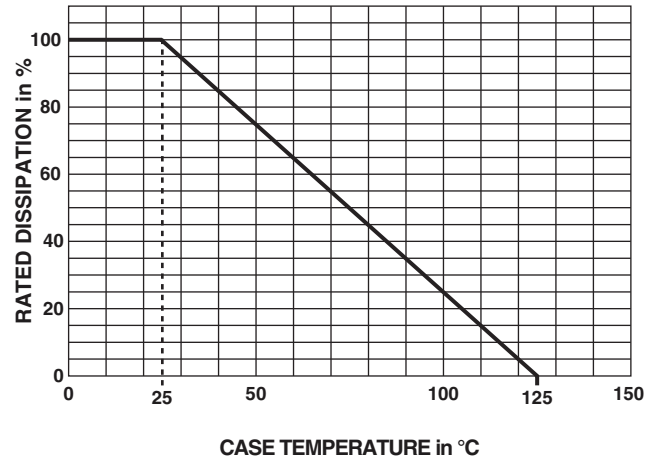
ENERGY CURVE



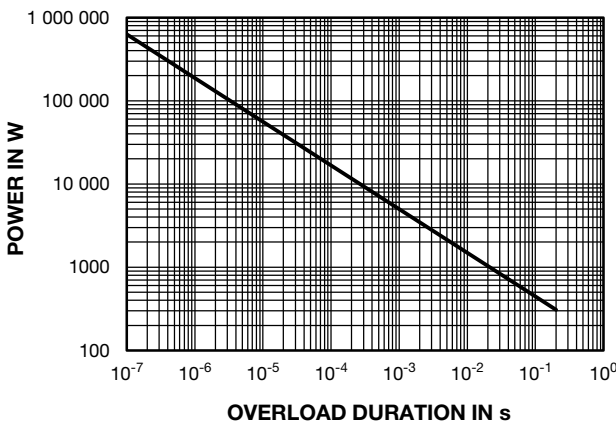
POWER RATING

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

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

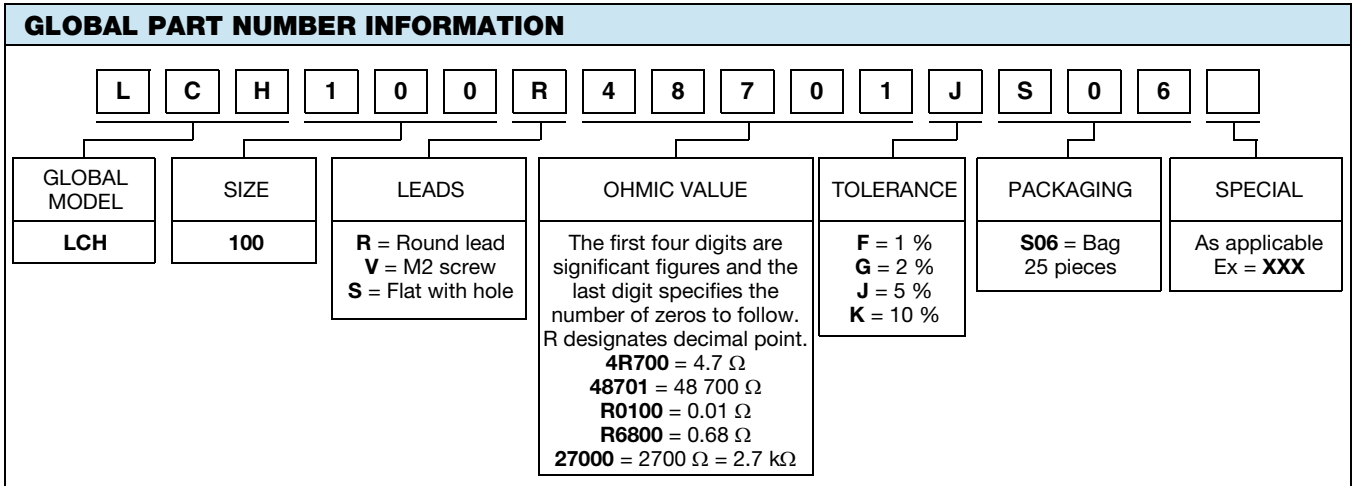


POWER CURVE





ORDERING INFORMATION					
LCH	100	3.3 kΩ	± 5 %	R	XXX
MODEL	STYLE	RESISTANCE VALUE	TOLERANCE	CONNECTIONS	CUSTOM DESIGN
			Optional ± 1 % ± 2 % ± 5 % ± 10 %	Optional S: Flat with hole R: Round lead V: M2 screw	Optional





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