LTO 100

Vishay Sfernice

Power Resistor Thick Film Technology

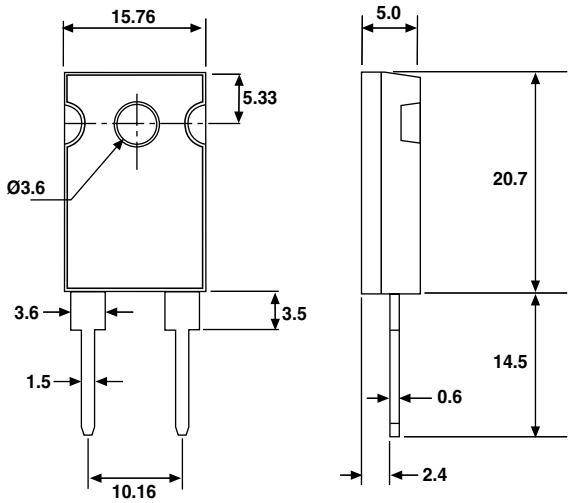
LTO series are the extension of RTO types. We used the direct ceramic mounting design (no metal tab) of our RCH power resistors applied to semiconductor packages.

FEATURES

- 100 Watt at 25 °C Case Temperature Heatsink Mounted
- Direct mounting ceramic on heatsink
- Broad Resistance Range: R015 to 1M
- Non Inductive
- TO-247 package: Compact and easy to mount
- RoHS compliant

RoHS COMPLIANT

DIMENSIONS in millimeters



• Tolerance unless otherwise specified: ± 0.3 mm

MECHANICAL SPECIFICATIONS

Mechanical Protection	Molded
Resistive Element	Thick Film
Substrate	Alumina
Connections	Tinned Copper
Weight	3.5 g max.
Mounting Torque	1N-m

DIMENSIONS

Standard Package	TO-247 Isolated case

ENVIRONMENTAL SPECIFICATIONS

Temperature Range	- 55 °C to + 175 °C
Climatic Category	55/155/56

ELECTRICAL SPECIFICATIONS	
Resistance Range	0.015 Ω to 1 MΩ
Tolerances (Standard)	± 1 % to ± 10 %
Dissipation and Associated	Onto a heatsink
Power Rating and Thermal Resistance of the component	100 W at + 25 °C (case temperature) R_{TH} (j-c): 1.5 °C/W free air: 3.5 W at + 25 °C
Temperature Coefficient	See Performance table
Standard	± 150 ppm/°C
Limiting Element Voltage	375 V
Dielectric Strength MIL STD 202	1500 V_{RMS} - 1 minute - 10 mA max.
Insulation Resistance	≥ 10^4 MΩ
Inductance	≤ 0.1 µH
Critical Resistance	1.41 kΩ

PERFORMANCE		
TESTS	**CONDITIONS**	**TYPICAL DRIFTS**
Momentary Overload	EN 60115-1 1.5 Pr/5 s Us < 1.5 UL	± (0.5 % + 0.005 Ω)
Rapid Temperature Change	EN 60115-1 IEC 60068-2-14 Tests Na 5 cycles - 55 °C to + 155 °C	± (0.5 % + 0.005 Ω)
Load Life	EN 60115-1 1000 h Pr at + 25 °C	± (1 % + 0.005 Ω)
Humidity (Steady State)	MIL STD 202 Method 103 B Cond. D	± (0.5 % + 0.005 Ω)
Vibration	MIL STD 202 Method 204 Cond. D	± (0.2 % + 0.005 Ω)
Terminal Strength	MIL STD 202 Method 211 Cond. A1	± (0.2 % + 0.005 Ω)
Shock	100G, MIL STD 202 Method 213 Cond. I	± (0.5 % + 0.005 Ω)

SPECIAL FEATURES				
Resistance Values	≥ 0.010	≥ 0.015	≥ 0.1	≥ 0.5
Tolerances	± 1 % at ± 10 %			
Typical Temperature Coefficient (- 55 °C/+ 150 °C)	± 900 ppm/°C	± 700 ppm/°C	± 250 ppm/°C	± 150 ppm/° C

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 175 °C. The dissipated power is simply calculated by the following ratio:

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

P: expressed in W

ΔT: difference between maximum working temperature and room temperature.

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

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 itself (type, shape), the quality of the fastening device, and the thermal resistance of the thermal compound.

Example:

R_{TH}: (c-a) for LTO100 power rating 10 W at ambient temperature + 25 °C.

Thermal resistance R_{TH} (j-c): 1.5 °C/W

Considering equation (1) we have:

ΔT = 175 °C - 25 °C = 150 °C

$R_{TH}\,(j\text{-}c) + R_{TH}\,(c\text{-}a) = \frac{\Delta T}{P} = \frac{150}{10} = 15$ °C/W

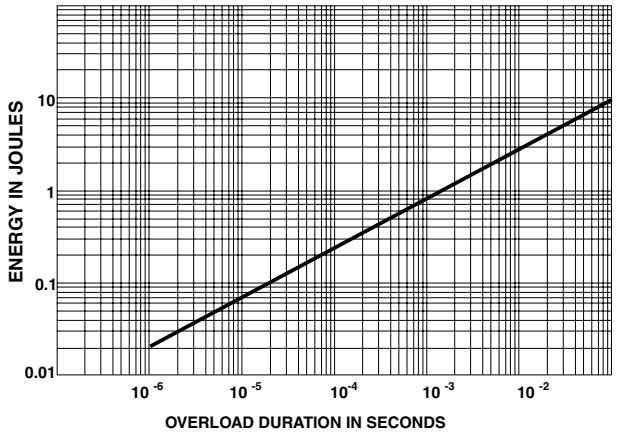
$R_{TH}\,(c\text{-}a)$ = 15 °C/W - 1.5 °C/W = 13.5 °C/W

with a thermal grease $R_{TH}\,(c - h)$ = 1 °C/W, we need a heat sink with $R_{TH}\,(h - a)$ = 12.5 °C/W.

OVERLOADS

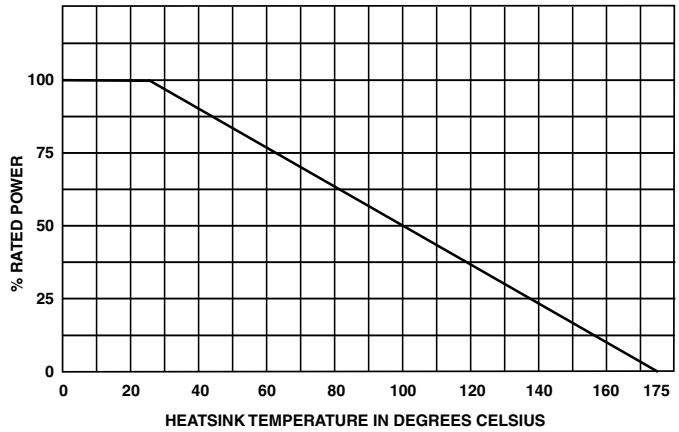
In any case the applied voltage must be lower than the maximum overload voltage of 560V.
The values indicated on the graph below are applicable to resistors in air or mounted onto a heatsink.

ENERGY CURVE



POWER RATING CHART

The temperature of the case should be maintained within the limits specified.
To improve the thermal conductivity, surfaces in contact should be coated with a silicone grease and the torque applied on the screw for tightening should be around 1N-m.



MARKING

Model, Style, Resistance Value (in Ω), Tolerance (in %), Manufacturing Date, VISHAY trademark.

PACKAGING

Tube of 30 units

ORDERING INFORMATION

LTO	100	F	100 kΩ	± 1 %	xxx	TU30	e3
MODEL	STYLE	CONNECTIONS	RESISTANCE VALUE	TOLERANCE	CUSTOM DESIGN	PACKAGING	LEAD FREE
				± 1 % ± 2 % ± 5 % ± 10 %	Optional on request: special TCR, shape etc.		

SAP PART NUMBERING GUIDELINES

L	T	O	1	0	0	F	1	0	0	0	2	F	T	E	3
MODEL			STYLE			CONNECTIONS	RESISTANCE VALUE					TOL	PACK	LEAD (Pb)-FREE	

SAP Part Number LTO100F10002FTE3

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