DataSheet No:E20015

Version:V0

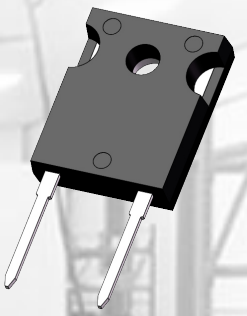
Date:2026/02/26

睿思

Planar Non-inductive Power Resistor

TPAN0247

Resistance	0.1Ω~1MΩ
Tolerance	±0.5%
TCR	±100ppm/℃
Rated Power	150W



Applicable to

Precision Test and Measurement
Semiconductor Equipment
Automotive Electronics
Industrial Electrical Equipment

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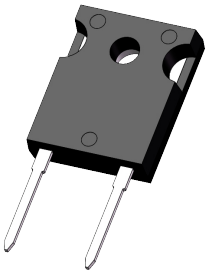
TPAN0247

Planar Non-inductive Power Resistor

High Power with Excellent Reliability & Stability



Introduction

TPAN0247 is a TO-247 non-inductive high-power resistor. The TO-247transistor outline package is an THT package, commonly used for high-power transistors, small to medium-sized integrated circuits, power resistors, etc.

The rated power of TPAN0247 series is 150W. TPAN0247 adopts a flange for its better heat dissipation to balance the thermal characteristics of the circuit. It is usually designed for current measurement, energy absorption, discharge, RC absorption, high-speed switching, high frequency transmission circuits, voltage regulation, constant power loads, and low-energy pulse loads. Its industry applications include industrial lasers, welding equipment, testing equipment, instrumentation, UPS, automobiles, switching power supplies, etc.

TPAN0247 series high-power molded resistor has excellent long-term stability, low TCR, high heat dissipation, low thermal resistance and low current noise, applying for a wide range. From raw materials, core production equipment, to process technology, TPAN0247 production is independent and controllable and achieves stable quality and timely delivery.

RoHS AEC-Q200 3D

Electrical Parameters

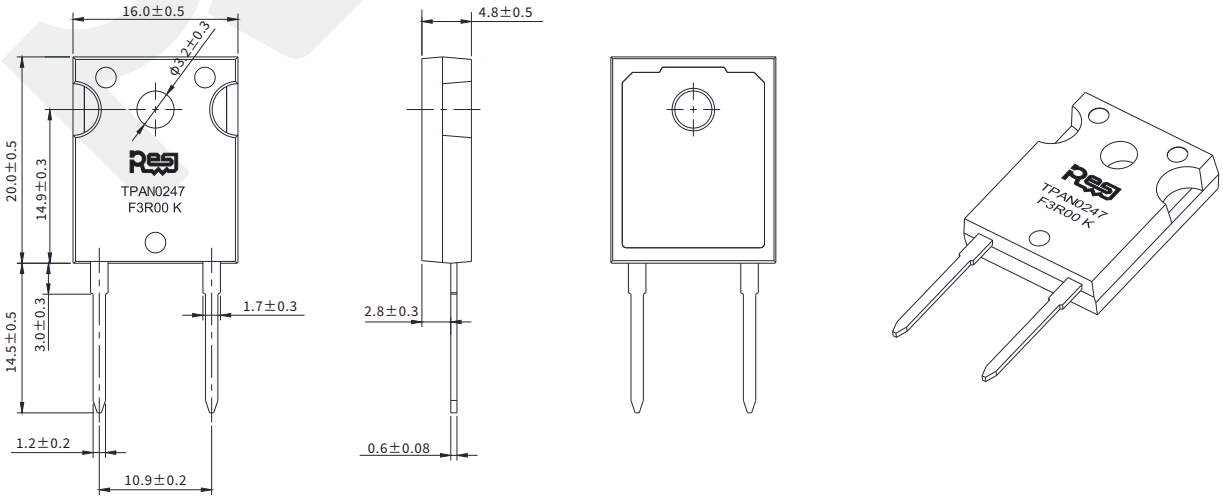
Series	Resistance Ω	TCR ppm/°C(+20°C Ref)	Tolerance %	Max. Operating Voltage*(2)	Rated Power*(3) With Heat Sink. Flange≤25°C	Without Heat Sink	Operating Temperature
TPAN0247	0.1≤R≤1M	±100 ±150*(1)	±0.5, ±1, ±5	700V	150W	3.5W	-55~+150°C

Galvanic Isolation	Insulation Resistance	Thermal Resistance	Inductance	E-Series Value	Technology	Housing	Unit Weight
2000VAC	≥10^4MΩ	0.8°C/W	≤0.1μH	E24	Thick Film	Epoxy Molded	6.25±0.5g

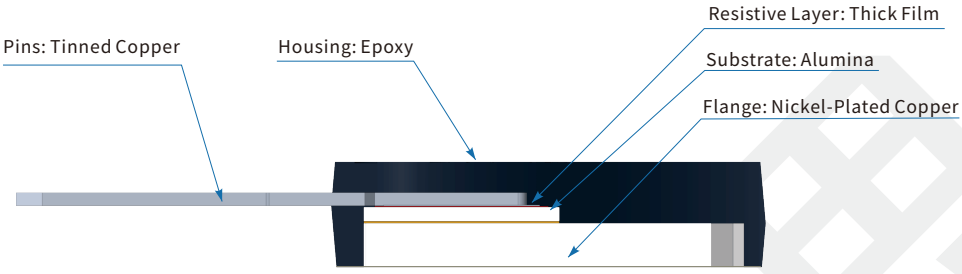
* (1) Applies only to 0.1Ω .
* (2) According to P=UI, combined with power and the maximum operating voltage, calculate the maximum current value (P and U whichever is less).
* (3) If the actual operating power is greater than 3.5W, it must be used with a heat sink. The recommended heat sink and installation method refer to pages 6 and 7.

Dimensions

Unit: mm



Construction



Marking

The first line (four digits) represents brand.
The second line (eight digits) represents product series and package.
The third line (six digits) represents tolerance, resistance and TCR.

Series	Illustration	E-Series Value	Demonstration
TPAN0247		E24	RESI：Brand TPAN0247：Series & Package F：Tolerance 3R00：Resistance K：TCR

Part Number Information

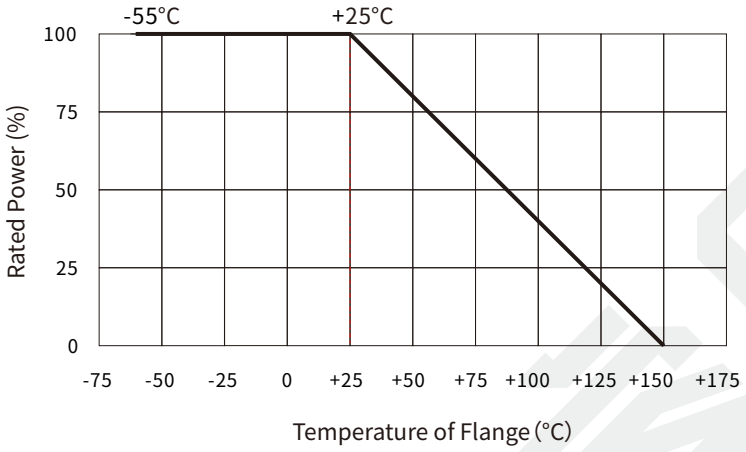
Example：TPAN0247F3R00K9 (TPAN 0247series ±1% 3Ω ±100ppm/°C Standard)

T	P	A	N	0	2	4	7	F	3	R	0	0	K	9

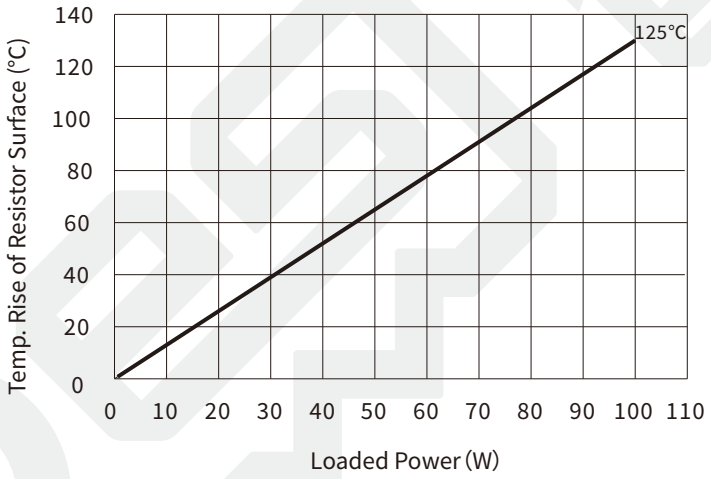
Series	Package	Tolerance	Resistance	TCR	Code
TPAN	0247	D=±0.5% F=±1% J=±5%	R500=0.5Ω 3R00=3Ω 1K00=1KΩ 10K0=10KΩ	K=±100ppm/°C R=±150ppm/°C*(1)	9=Standard Others=custom

*(1) Applies only to 0.1Ω .

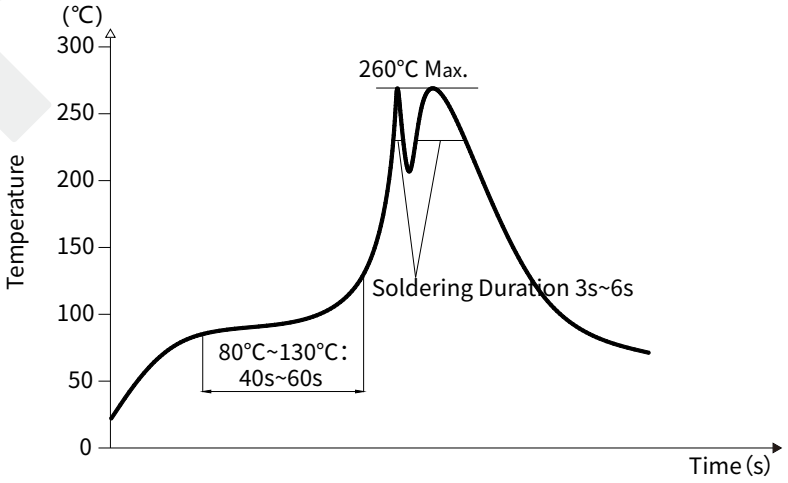
Derating Curve



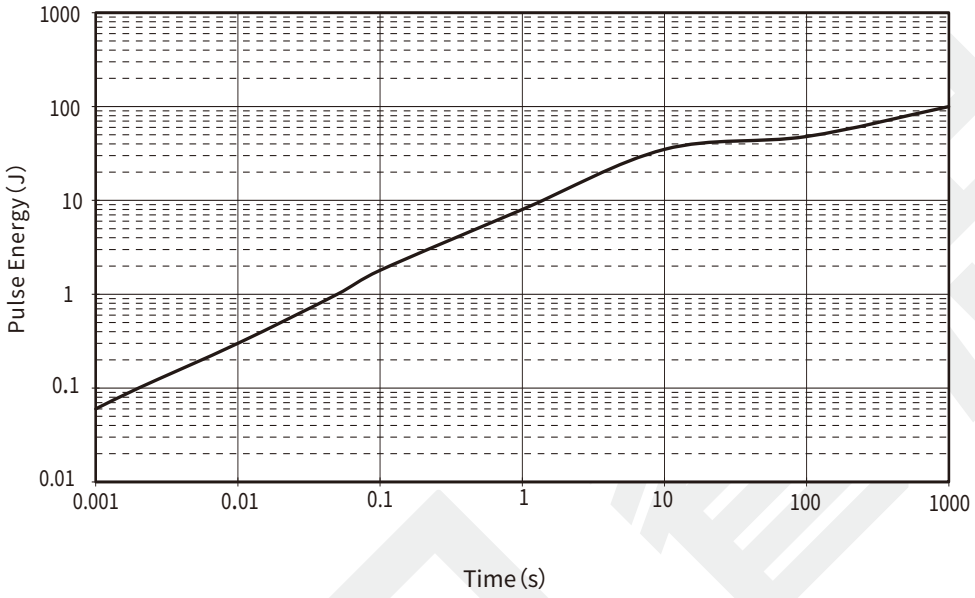
Power - Temperature Rise Curve



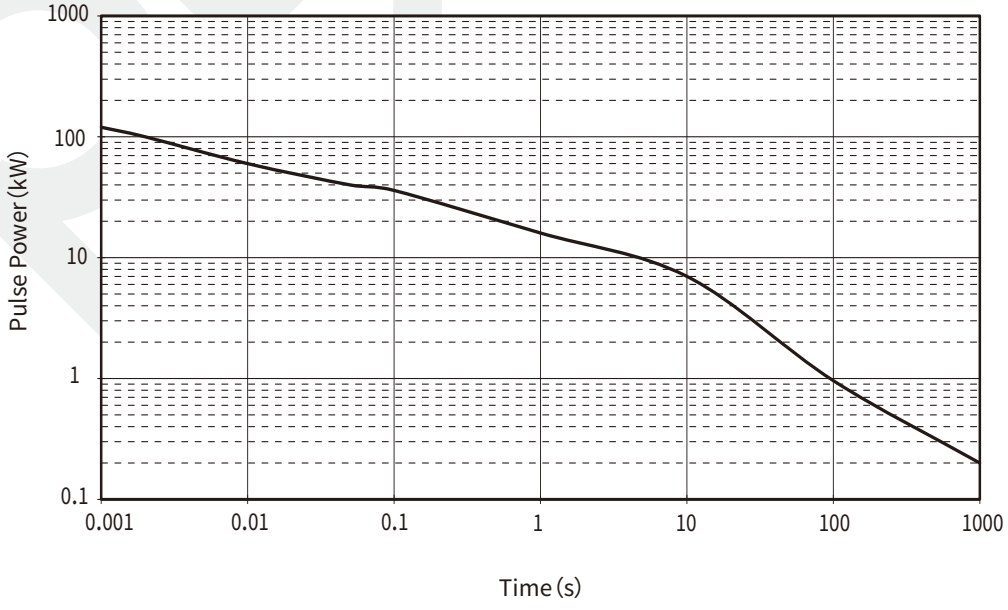
Suggested Lead-Free Wave Soldering Curve



Pulse Energy Curve



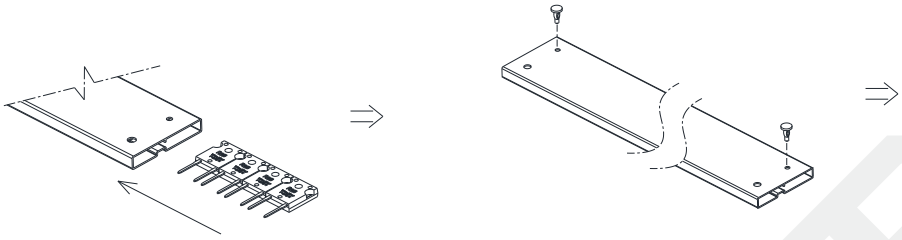
Pulse Power Curve



Performance

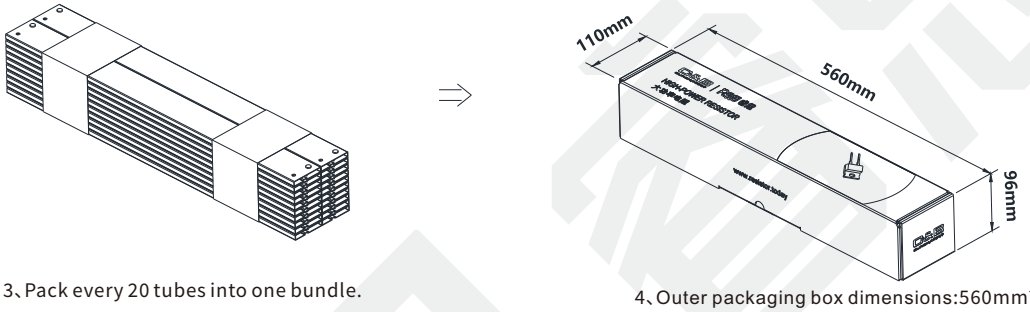
Test	Test Method	Standards	Performance
High Temperature Storage	1000h@+155°C,unpowered.	AEC-Q200 TEST 3 MIL-STD-202 Method 108	△R≤±1%
Bias Humidity	+85°C,85%RH,powered 10% rated power for 1000h. Inspect within 24±4 hours after the test.	AEC-Q200 TEST 7 MIL-STD-202 Method 103	△R≤±0.5%
Load Life	Water-cooled heat sink inlet water temperature: 25°C, 1000h, rated power,not exceeding maximum operating voltage,90 min on,30 min off.	AEC-Q200 TEST 8 MIL-STD-202 Method 108	△R≤±1%
Resistance to Solvent	Three types of solvents were used. Immerse (the item) in the solvent for 5 minutes,wipe ten times,then clean and dry at room temperature.	AEC-Q200 TEST 12 MIL-STD-202 Method 215	Clear marking. No visible damage.
Mechanical Shock	Half Sine Wave, peak acceleration 100g's,pulse duration 6ms, 3 times in each of six directions, on three different axes.	AEC-Q200 TEST 13 MIL-STD-202 Method 213	△R≤±0.25%
Vibration	10-2KHz,5g's,20min/cycle,12 cycles in each directions of X Y Z.	AEC-Q200 TEST 14 MIL-STD-202 Method 204	△R≤±0.25%
Resistance to Solder Heat	+260°C tin bath for 10s	AEC-Q200 TEST 15 MIL-STD-202 Method 210	△R≤±0.25%
Thermal Shock	-55°C,15min~ambient temperature<20s~+125°C,15min,1000 cycles.	AEC-Q200 TEST 16 MIL-STD-202 Method 107	△R≤±0.5%
Solderability	+245°C tin bath for 3s	AEC-Q200 TEST 18 IEC 60115-1 4.17	No visible damage. 95% minimum coverage
TCR	-55°C ~ +125°C,+20°C Ref.	AEC-Q200 TEST 19 IEC 60115-1 4.8	Within the nominal value range
Flammability	Flame the sample for 10 seconds,twice.	UL-94	UL-94 V0
Terminal Strength	Tensile stress：20N,5~10s. Bending stress：10N,5~10s.	IEC60115-1 4.16	△R≤±0.2%
Withstand Voltage	Apply an effective 2000VAC between the terminal and flange for 60 seconds.	MIL-STD-202 Method 301	No breakdown or flashover △R≤±0.25%
Short Time Overload	2x rated power (3.5W) for 5s,not exceeding 1.5x maximum operating voltage.	IEC 60115-1 4.13	△R≤±0.5%
Low Temperature Operation	-55 °C,unpowered for 1h,powered rated voltage for 45 min, unpowered for 15 min.	IEC 60115-1 4.36	△R≤±0.5%

Packaging



1、Place every 30 pieces of product into an anti-static PVC tube.
PVC tube dimensions:508mm*47.8mm*7.8mm.

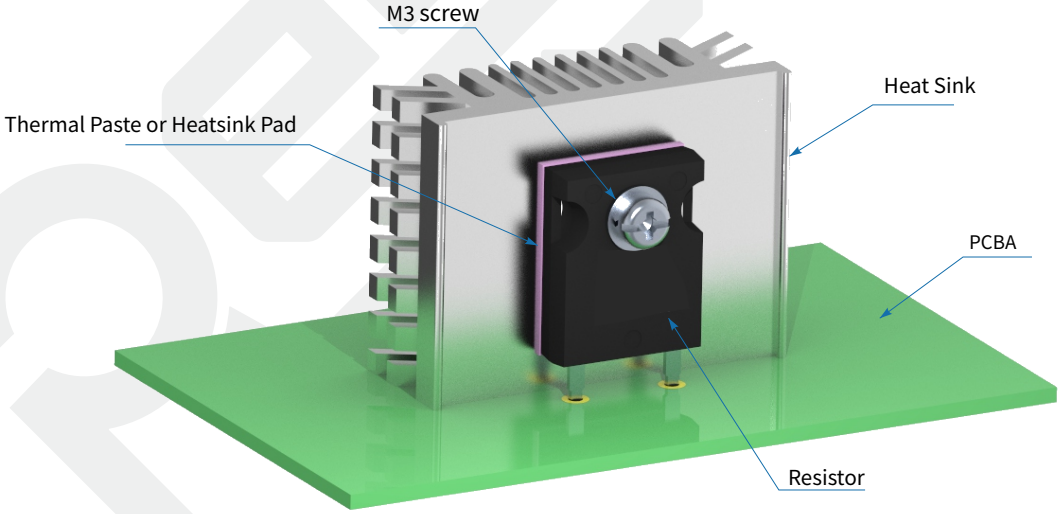
2、Attach the rubber pins on both ends.



3、Pack every 20 tubes into one bundle.

4、Outer packaging box dimensions:560mm*110mm*96mm.

Installation



(1) The general installation of TO-247 resistors is shown in the figure above. For good thermal conductivity, thermal paste or heatsink pads must be used at the contact position between the bottom of the resistor flange and the heat sink, to ensure contact area for heat dissipation;

(2) The bolt connecting the flange with the heat sink should be of a specification with spring washers to prevent looseness and sliding during long-term use, which may cause gaps and affect the thermal conductivity.;

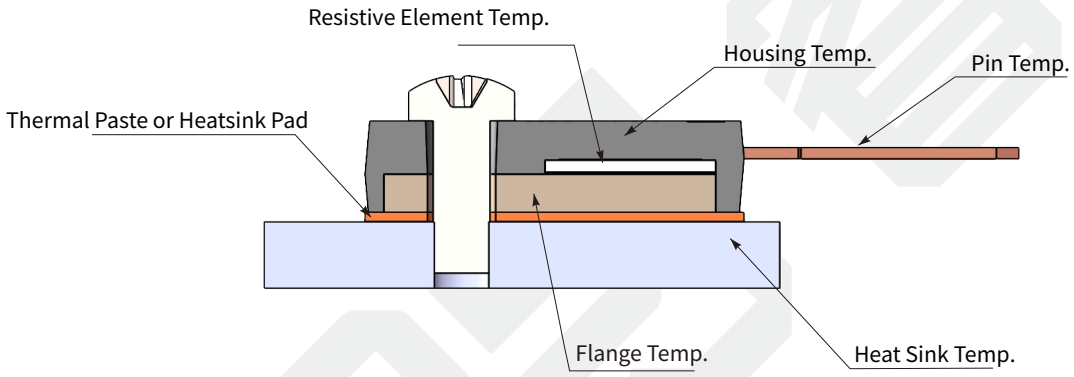
(3) The Mounting srew torque is 0.9Nm(Max.), to avoid cracks or warping deformation of the product caused by excessive torque;

(4) For full power application, it is necessary to refer to the derating curve diagram and ensure that the temperature of the bottom flange is ≤25 ℃ by using water cooling or oil cooling to ensure the load life and reliability of the resistor.

Statement of Rated Power and Temperature

The maximum rated power of TPAN0247 series high-power resistor is 150W, which is based on 25 ℃ operating ambient temperature of the flange. The temperature measurement point is in the center of the back of the flange, which is below the resistive element. The temperature of the resistor flange is different from the temperature of the housing, pin or ambient temperature. The heat dissipation effect of the resistor can be reflected by the flange temperature. Heat dissipation effect is a crucial factor.When equipment or resistor fails, please investigate the heat dissipation of the resistor first. If the flange is overtemperature, it usually indicates that the heat dissipation effect has not achieved the conditions specified in the datasheet, which means the installation of the heat sink or the heat dissipation capacity of the applied heat sink does not meet the requirements. Long-term use can lead to drift of the resistance, thereby reducing the load life of the resistor. When using resistors, it is recommended to apply appropriate thermal design, calculation, and temperature measurement or finite element analysis to verify the feasibility of the design and avoid resistor failure due to poor heat dissipation.。

Temperature Diagram of Product Assembly



Heat Sink Selection

Users must choose a suitable heat sink based on the usage conditions of the resistors (e.g. power, ambient temperature, etc.). The maximum operating temperature of TPAN0247 series is 150°C. TPAN0247 power calculation is as follows:

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

P: The operating power of the resistor;

ΔT: The difference of the maximum operating temperature of the resistor and the ambient temperature;

$R_{TH\ (j-c)}$: The thermal resistance between the resistive layer and the outer part of the resistor, i.e. the thermal resistance of the resistor;

$R_{TH\ (c-h)}$: The thermal resistance between the outer part of the resistor and the upper part of the heat sink, i.e. the thermal resistance at TH (c-h) the contact interface;

$R_{TH\ (h-a)}$: The thermal resistance of the heat sink.

Example::

$R_{TH\ (h-a)}$:: Determine an operating power of 50W and an ambient temperature of +25 ℃ for TPAN0247 ;

Referring to the datasheet, the thermal resistance $R_{TH\ (j-c)}$ of TPAN0247 series is 0.87℃/W;

The calculation is as follows::

ΔT=150℃-25℃=125℃

$R_{TH\ (j-c)}+R_{TH\ (c-h)}+R_{TH\ (h-a)}=\Delta T/P=125/50=2.5℃/W$

$R_{TH\ (c-h)}+R_{TH\ (h-a)}=2.5-0.8=1.7℃/W$

The thermal resistance at the contact interface, $R_{TH\ (c-h)}$ can be concluded, based on the operating condition. If $R_{TH\ (c-h)}$ is 0.1 ℃/W, a heat sink with $R_{TH\ (h-a)}$ less than 1.6℃/W is needed.

Popular Part Numbers

Part Number	Package	Tolerance	Resistance	TCR	Rated Power	Max. Operating Voltage
TPAN0247DR100R9	TO-247	±0.5%	0.1Ω	±150ppm/°C	150W	700V
TPAN0247DR500K9	TO-247	±0.5%	0.5Ω	±100ppm/°C	150W	700V
TPAN0247D1R00K9	TO-247	±0.5%	1Ω	±100ppm/°C	150W	700V
TPAN0247D2R00K9	TO-247	±0.5%	2Ω	±100ppm/°C	150W	700V
TPAN0247D7R50K9	TO-247	±0.5%	7.5Ω	±100ppm/°C	150W	700V
TPAN0247D10R0K9	TO-247	±0.5%	10Ω	±100ppm/°C	150W	700V
TPAN0247D20R0K9	TO-247	±0.5%	20Ω	±100ppm/°C	150W	700V
TPAN0247D33R0K9	TO-247	±0.5%	33Ω	±100ppm/°C	150W	700V
TPAN0247D50R0K9	TO-247	±0.5%	50Ω	±100ppm/°C	150W	700V
TPAN0247D100RK9	TO-247	±0.5%	100Ω	±100ppm/°C	150W	700V
TPAN0247D200RK9	TO-247	±0.5%	200Ω	±100ppm/°C	150W	700V
TPAN0247D500RK9	TO-247	±0.5%	500Ω	±100ppm/°C	150W	700V
TPAN0247D1K00K9	TO-247	±0.5%	1KΩ	±100ppm/°C	150W	700V
TPAN0247D5K00K9	TO-247	±0.5%	5KΩ	±100ppm/°C	150W	700V
TPAN0247D10K0K9	TO-247	±0.5%	10KΩ	±100ppm/°C	150W	700V
TPAN0247D100KK9	TO-247	±0.5%	100KΩ	±100ppm/°C	150W	700V
TPAN0247D500KK9	TO-247	±0.5%	500KΩ	±100ppm/°C	150W	700V
TPAN0247D1M00K9	TO-247	±0.5%	1MΩ	±100ppm/°C	150W	700V
TPAN0247FR100R9	TO-247	±1%	0.1Ω	±150ppm/°C	150W	700V
TPAN0247FR500K9	TO-247	±1%	0.5Ω	±100ppm/°C	150W	700V
TPAN0247F1R00K9	TO-247	±1%	1Ω	±100ppm/°C	150W	700V
TPAN0247F2R00K9	TO-247	±1%	2Ω	±100ppm/°C	150W	700V
TPAN0247F7R50K9	TO-247	±1%	7.5Ω	±100ppm/°C	150W	700V
TPAN0247F10R0K9	TO-247	±1%	10Ω	±100ppm/°C	150W	700V
TPAN0247F20R0K9	TO-247	±1%	20Ω	±100ppm/°C	150W	700V
TPAN0247F33R0K9	TO-247	±1%	33Ω	±100ppm/°C	150W	700V
TPAN0247F50R0K9	TO-247	±1%	50Ω	±100ppm/°C	150W	700V
TPAN0247F100RK9	TO-247	±1%	100Ω	±100ppm/°C	150W	700V
TPAN0247F200RK9	TO-247	±1%	200Ω	±100ppm/°C	150W	700V
TPAN0247F500RK9	TO-247	±1%	500Ω	±100ppm/°C	150W	700V
TPAN0247F1K00K9	TO-247	±1%	1KΩ	±100ppm/°C	150W	700V
TPAN0247F5K00K9	TO-247	±1%	5KΩ	±100ppm/°C	150W	700V
TPAN0247F10K0K9	TO-247	±1%	10KΩ	±100ppm/°C	150W	700V
TPAN0247F100KK9	TO-247	±1%	100KΩ	±100ppm/°C	150W	700V
TPAN0247F500KK9	TO-247	±1%	500KΩ	±100ppm/°C	150W	700V
TPAN0247F1M00K9	TO-247	±1%	1MΩ	±100ppm/°C	150W	700V
TPAN0247JR100R9	TO-247	±5%	0.1Ω	±150ppm/°C	150W	700V
TPAN0247JR500K9	TO-247	±5%	0.5Ω	±100ppm/°C	150W	700V
TPAN0247J1R00K9	TO-247	±5%	1Ω	±100ppm/°C	150W	700V
TPAN0247J2R00K9	TO-247	±5%	2Ω	±100ppm/°C	150W	700V
TPAN0247J7R50K9	TO-247	±5%	7.5Ω	±100ppm/°C	150W	700V
TPAN0247J10R0K9	TO-247	±5%	10Ω	±100ppm/°C	150W	700V
TPAN0247J20R0K9	TO-247	±5%	20Ω	±100ppm/°C	150W	700V
TPAN0247J33R0K9	TO-247	±5%	33Ω	±100ppm/°C	150W	700V
TPAN0247J50R0K9	TO-247	±5%	50Ω	±100ppm/°C	150W	700V
TPAN0247J100RK9	TO-247	±5%	100Ω	±100ppm/°C	150W	700V
TPAN0247J200RK9	TO-247	±5%	200Ω	±100ppm/°C	150W	700V
TPAN0247J500RK9	TO-247	±5%	500Ω	±100ppm/°C	150W	700V
TPAN0247J1K00K9	TO-247	±5%	1KΩ	±100ppm/°C	150W	700V
TPAN0247J5K00K9	TO-247	±5%	5KΩ	±100ppm/°C	150W	700V
TPAN0247J10K0K9	TO-247	±5%	10KΩ	±100ppm/°C	150W	700V

Popular Part Numbers

Part Number	Package	Tolerance	Resistance	TCR	Rated Power	Max. Operating Voltage
TPAN0247J100KK9	TO-247	±5%	100KΩ	±100ppm/°C	150W	700V
TPAN0247J500KK9	TO-247	±5%	500KΩ	±100ppm/°C	150W	700V
TPAN0247J1M00K9	TO-247	±5%	1MΩ	±100ppm/°C	150W	700V

Revision

Version	Revised Content	Date	Approver
V0	Initial Issue	2026.02.26	LWW

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