MODEL SMHP

OBSOLETE

SMHP Series (Combined BI & IRC Datasheets)

- **20W High Power Resistors**
- **TO-263 Surface Mount**
- **RoHS Compliant.**

- **Non-Inductive, Small, 20 watt high power resistor.**
- **TO-263 surface mount package offering a very low thermal resistance.**
- **Small thin package for high density PCB installation.**
- **Suitable for board mounting with either solder or clip.**

- **High frequency emitter resistors in switching power supplies.**
- **High precision CRT colour video amplifiers.**
- **High frequency snubber and pulse handling circuits.**
- **Pulse generator load resistors.**
- **In-rush current protection.**
- **Bleeder Resistors.**

Electrical

ITEMS	SPECIFICATION			TEST CONDITIONS
Power Rating	20 watt			-55°C to +25°C Flange Temperature
	2.0 watt			Without Heatsink
Thermal Resistance	3.3°C/ W			Resistor Hotspot to Flange
Resistance Range	0.01 - 0.09Ω	0.1 - 9.1Ω	10 - 220Ω	Up to 51KΩ also available
Nominal Resistance Series	E6	E24	E24	Including 2.5Ω and 5.0Ω
TCR (ppm/°C)	250	100	50	For -55°C to +155°C
Tolerance	±5%	±1% & ±5%	±1%	
Operation Temperature Range	-55°C to +155°C			
Maximum Operating Voltage	500V or √PR			
Dielectric Withstanding Voltage	2000 Vdc			60 Seconds
Load Life	ΔR = ±1% +0.5Ω			25°C, 90 min ON, 30 min OFF, 1000 Hours
Humidity	ΔR = ±1% +0.5Ω			40°C, 90 - 95%RH,DC 0.1W, 1000 Hours
Temperature Cycle	ΔR = ±1% +0.5Ω			-55°C, 30 min, +155°C, 30 min, 5 cycles
Soldering Heat (Max.)	ΔR = ±1% +0.5Ω			250 ± 5°C, 3 seconds
Solderability	Minimum 90% Coverage			230 ± 5°C, 3 seconds
Insulation Resistance	Over 1,000 MegΩ			Between Terminals and Tab
Vibration	ΔR = ±0.25% +0.5Ω			

Notes:
1. Electrically isolated metal tab.
2. Contact Factory for custom products, non-standard values and tolerances
3. Current Rating: 25A Maximum.

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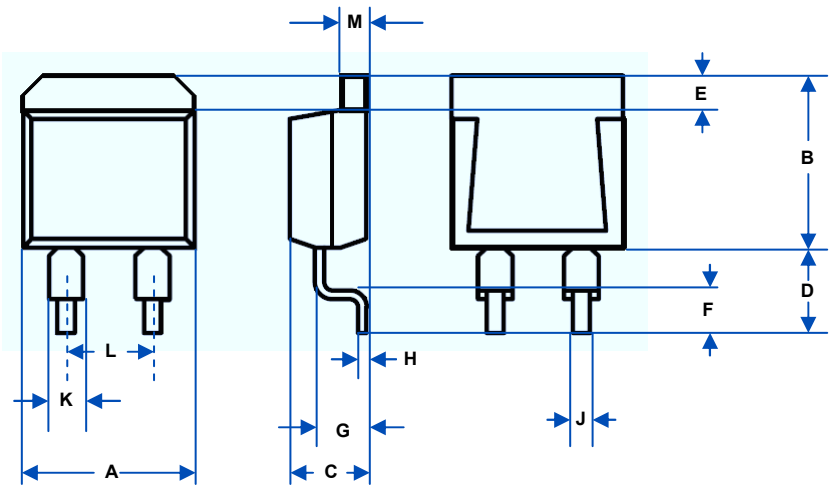
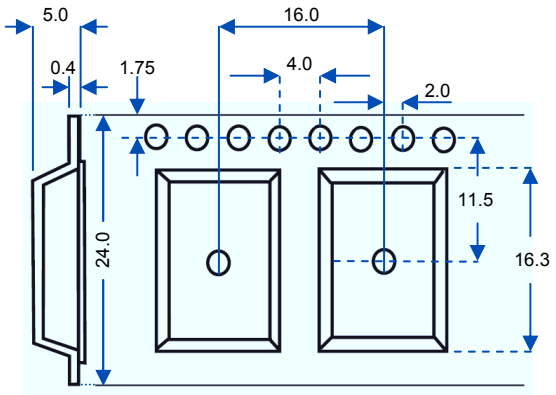
Dimensions (mm)



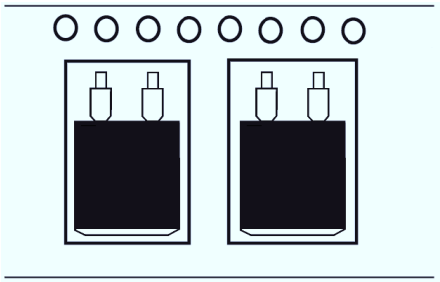
	SMHP	
A	10.1	± 0.2
B	10.3	± 0.2
C	4.5	± 0.2
D	5.0	± 1.0
E	2.2	± 0.2
F	2.5	± 0.5
G	2.75	± 0.2
H	0.5	± 0.05
J	0.75	± 0.05
K	1.5	± 0.05
L	5.08	± 0.10
M	1.5	± 0.05

Tape Dimensions & Orientation



Reel Dimension:

Outer Diameter: 300mm
Inner Diameter: 100mm
Width: 23.9mm Min. - 27.4mm Max.
Quantity: 500 pcs/Reel



Reel Orientation:

Units to be orientated with Pins facing Sprocket Holes.

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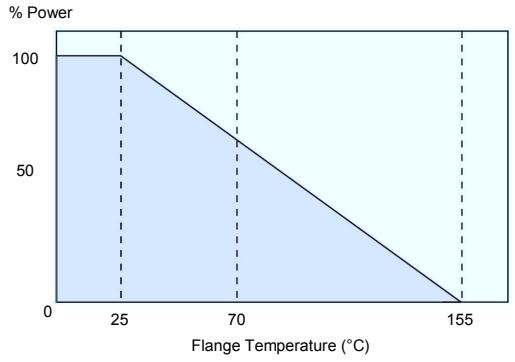
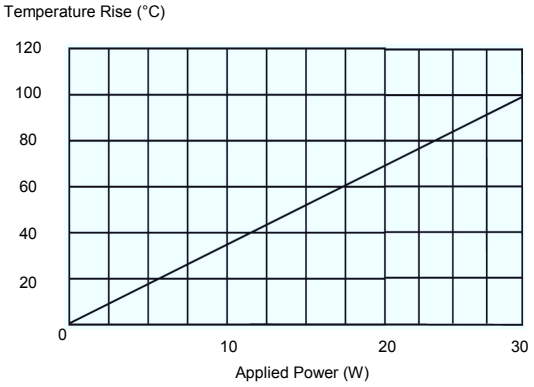
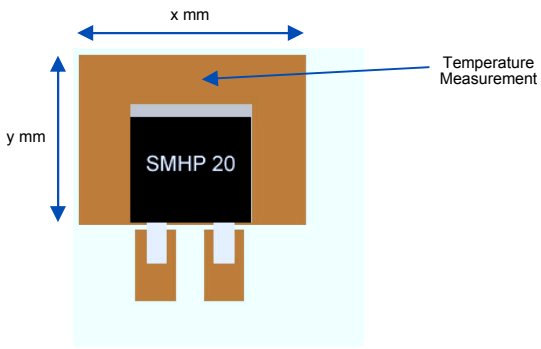
Derating Curve



Temperature Rise



FR4 Thermal PCB Characterisation



Pad Dimensions (x,y mm)	$P^{90°C,\ 35\mu m}$ (W)
50,40	4.5
45,35	4
40,30	3.5
35,25	3
20,10	2

Notes:
Characterisation carried out using 35µm PCB Copper pad weights, with the temperature of 90°C used as a maximum reference on the PCB. P90°C, 35µm (W) is power when the measurement point reaches 90°C.

Ordering Information

SMHP 20 500 F T13

Model

Resistance Code:
0.1Ω : 0R100
50Ω : 500

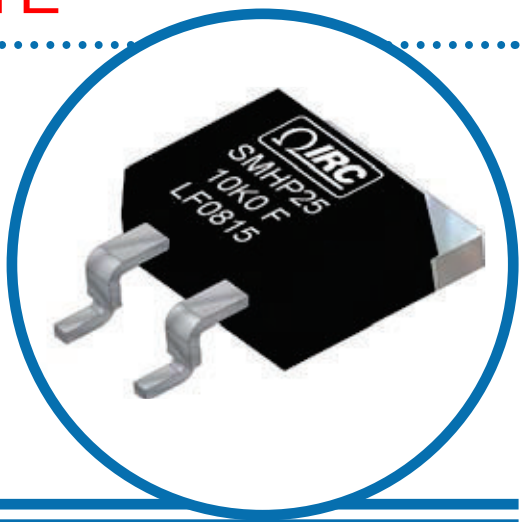
First two digits significant, last digit denotes number of trailing zeros

Tape & Reel:
13" Reel (500 pcs per reel)

Tolerance:
J = 5% Tolerance
F = 1% Tolerance

SMHP25 Series Power Resistor OBSOLETE

SMHP25 Series



- **245°C reflow compatible**
- **TO-263 housing**
- **Low inductance and capacitance for high frequency circuits**
- **25W power rating**
- **High stability film resistance elements**
- **RoHS compliant**

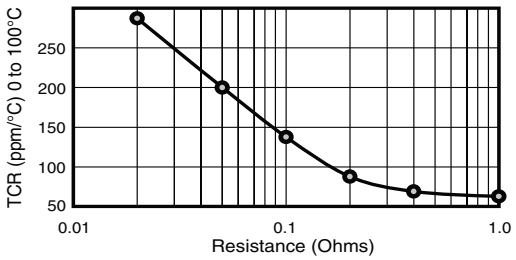
IRC's SMHP series resistors satisfy demanding applications for accurate and stable power resistors housed in the convenient TO-263 case. The resistance element is isolated from the mounting tab by an alumina ceramic layer, providing very low thermal resistance and ensuring high insulation resistance between terminals and metal back plate. The non-inductive design makes these products especially useful in high frequency and high speed pulse applications.

Electrical Data

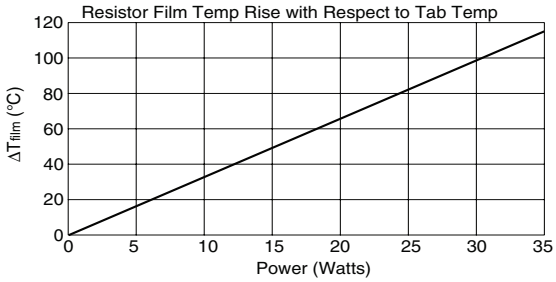
Power Rating[1]		Voltage Rating[4]	Thermal Resistance	Resistance Range		Tolerances	Nominal Resistance Series[5]	Typ. TCR (ppm/°C)	Inductance	Capacitance
Heatsink[2]	Free Air[3]			Min	Max					
25W	2.5W	500 V	3.3°C/W	0.01Ω 0.1Ω 10Ω	0.09Ω 9.1Ω 51KΩ	±1%, ±5%	E24 Includes 2.5 & 5.0 multiplier	See Chart	<10nH	<2pF

[1]Maximum current 25 amps
[2]Power rating based on 25°C case temperature
[3]Power rating based on 25°C ambient temperature
[4]Maximum voltage 500V or $\sqrt{P \times R}$
[5]Contact factory for availability of resistance or tolerance values outside this range

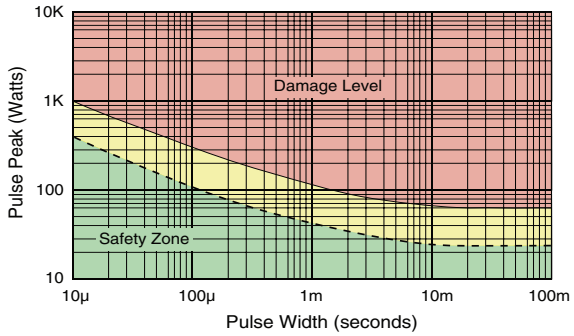
Typical TCR For Low Values



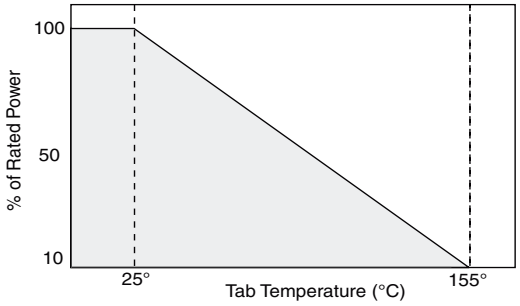
Temperature Rise Data



Pulse Energy Durability



Power Derating Data



General Note

TT electronics reserves the right to make changes in product specification without notice or liability.
All information is subject to TT electronics' own data and is considered accurate at time of going to print.

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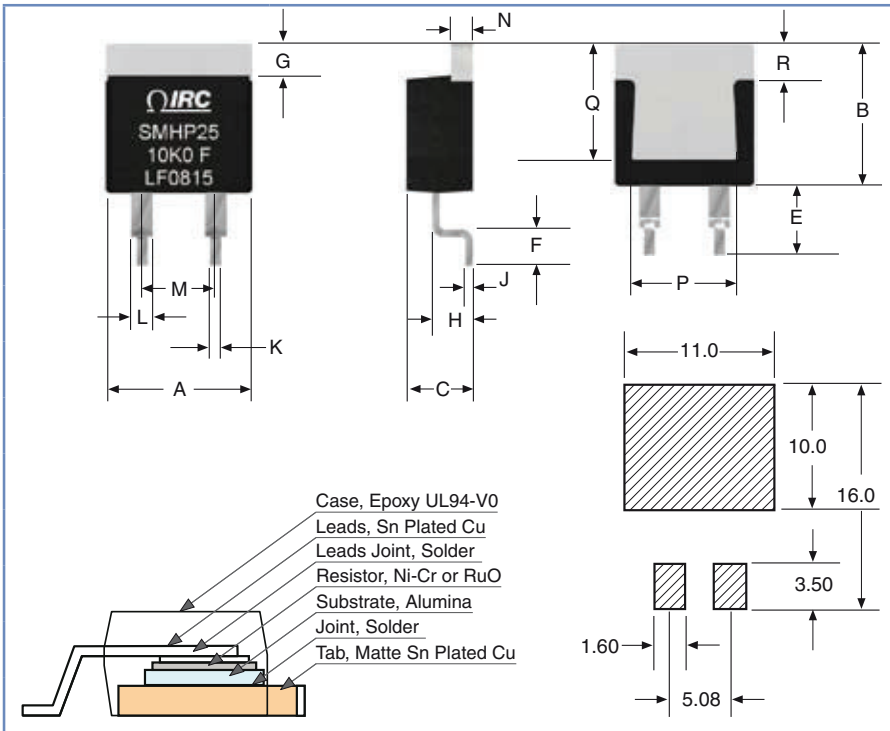
Physical Data



Insulated Between Tab and Resistor

Recommended minimum footprint dimensions.
All dimensions are in millimeters (mm).

Lead & Tab Material	Tin Plated Copper
Part Weight	1.5g

Dim	In (nom)	mm
A	0.398	10.1 ±0.2
B	0.406	10.3 ±0.2
C	0.177	4.5 ±0.2
E	0.197	5.0 ±1.0
F	0.098	2.5 ±0.5
G	0.087	2.2 ±0.2
H	0.108	2.75 ±0.2
J	0.020	0.5 ±0.05
K	0.030	0.75 ±0.05
L	0.059	1.5 ±0.05
M	0.200	5.08 ±0.1
N	0.059	1.5 ±0.05
P	0.291	7.4 ±0.1
Q	0.325	8.3 ±0.2
R	0.100	2.5 ±0.2

Environmental Data

Test	Method	Specification - Performance
Load Life	1,000 Hours @ 25°C; 90 minutes on, 30 minutes off	±(1.0% + 1mΩ)
Humidity	1000 hours; 40°C, 90-95% RH, 0.1W DC	±(1.0% + 1mΩ)
Temperature Cycle	5 cycles; 30 minutes @ -55°C, 30 minutes at +155°C	±(0.25% + 1mΩ)
Short Time Overload	2X Rated Power, not to exceed 1.5X Rated Voltage for 5 seconds, 25° w/ Heat Sink	±(0.25% + 1mΩ)
Vibration	10 cycles; X, Y, Z axis, amplitude 0.75mm, 100-2000Hz sweep/min	±(0.25% + 1mΩ)
Insulation Resistance	Between terminals and tab	>1000MΩ
Dielectric Withstanding Voltage	Terminals to tab; 60sec, 1mA	2000 volts AC
Resistance to Solder Heat	350 ± 5°C for 3 seconds	±(0.10% + 1mΩ)
Solderability	230 ± 5°C, 3sec.	>95% coverage
Operating Temperature Range		-55°C to +155°C

Surface Mount TO-263
25W Power Resistor

SMHP25 Series

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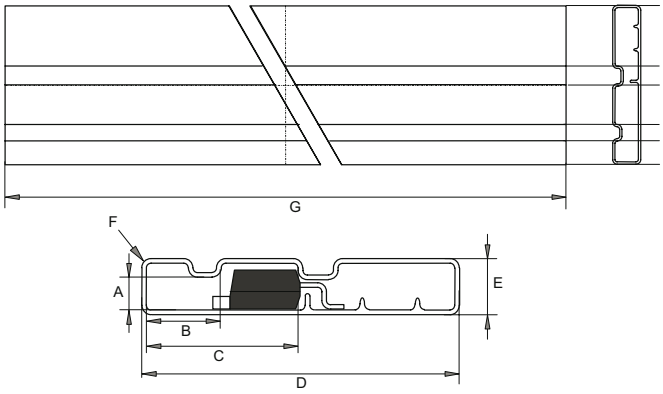
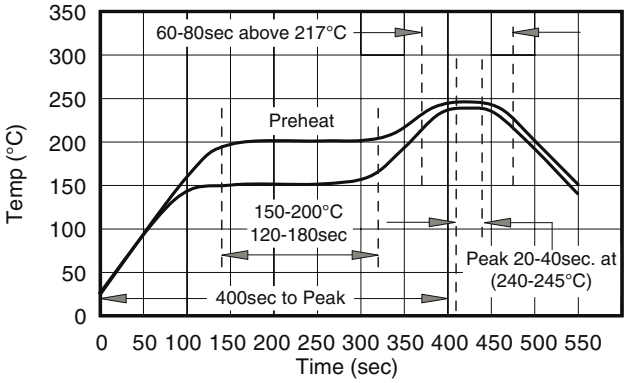
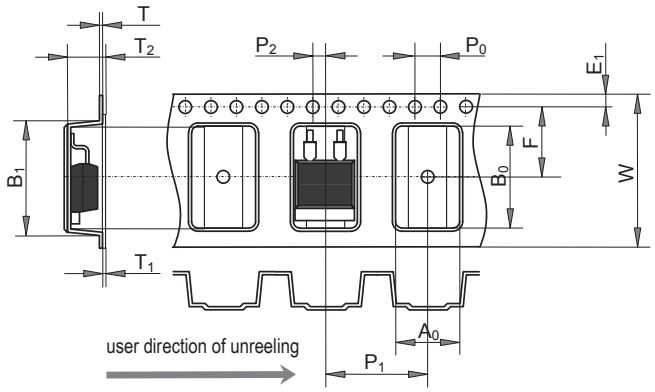
Tube Packaging Data



Solder Reflow Profile



Reel Packaging Data



Tape dimensions meet EIA-481 requirements

Tape Dimensions		
Dim	Nom. (mm)	Tol. (mm)
A_0	10.77	0.1
B_0	16.33	0.1
B_1	17.0	0.1
E_1	1.75	0.1
F	11.5	0.1
P_0	4.0	0.1
P_1	16.0	0.1
P_2	2.0	0.1
T	0.4	0.05
T_1	0.05	---
T_2	6.07	0.1
W	24.0	+0.3/-0.1

Tube Dimensions		
Dim	Nom. (mm)	Tol. (mm)
A	3.25	0.15
B	8.0	0.15
C	16.25	0.15
D	34.4	(34.0)
E	6.4	(6.0)
F	R0.7	(R0.5)
G	535.0	1.0

Reel Dimensions	
Outer Diam.	330 mm
Inner Diam.	100 mm
Width	27.4 mm max
Qty.	500pcs/reel

Ordering Data

Prefix ..... TFP - SMHP25LF - 1R50 - J - L01

Style
SMHP25LF = 25W, TO-263 style power resistor

Resistance Code
4-digit resistance code.
Ex: 0R05 = 0.05Ω, 10R0 = 10Ω, 1K00 = 1KΩ

Absolute Tolerance Code
J = ±5%; F = ±1%

Packaging Code
L01 = RoHS compliant tube (50 pcs per tube)
L05 = RoHS compliant reel (500 pcs per reel)

For additional information or to discuss your specific requirements, please contact our Applications Team using the contact details below.

Application Notes

1. Resistance measurement shall be made at the terminal foot.

2. Thermal design should satisfy the following equation: Tab Temperature (T_T) + [Thermal Resistance ($R_{\theta JT}$) x Power applied (Watts)] ≤ 155°C over the full operating temperature of the application.

3. Resistor film temperature is not to exceed 155°C during operation.

4. This product is RoHS compliant by exemption according to RoHS directive 2002/95/EC exemptions 5 & 7, as they apply to lead in glass and internal solder connections.