

TR Series

TO-220 and TO-247 Style Power Resistor

Features:

- TR20/30/35/50/50H comes in TO-220 style power package
- TR100 available in TO-247 style power package
- TR30/35/50H/100 has single screw mounting to heat sink
- Molded case for environmental protection
- Electrically isolated case
- Non-inductive package
- RoHS compliant and halogen free



Electrical Specifications									
Type / Code	Package Style	Power Rating (W) @ 25°C with Heat Sink ⁽³⁾	Power Rating (W) @ 25°C	Maximum Working Voltage (V) ⁽¹⁾	TCR (ppm/°C)	Ohmic Range (Ω) and Tolerance			
						0.5%	1%	5%	10%
TR20	TO-220	20	3	350	± 50	10 - 1 M			
					± 100	5.05 - 1 M	3.01 - 1 M	3.3 - 1 M	
					± 200	10 - 1 M	3.01 - 1 M	3.3 - 1 M	
					± 300	-	1.02 - 3.01	1.1 - 3	
					Unspecified ⁽²⁾	-		0.05 - 1	
TR30	TO-220	30	2.25	350	± 50	10 - 100 K			
					± 100	5.05 - 100 K	3.01 - 100 K	3.3 - 100 K	
					± 200	10 - 100 K	3.01 - 100 K	3.3 - 100 K	
					± 300	-	1.02 - 3.01	1.1 - 3	
					Unspecified ⁽²⁾	-		0.05 - 1	
TR35	TO-220	35	2.5	350	± 50	10 - 10 K			
					± 100	5.05 - 10 K	3.01 - 10 K	3.3 - 10 K	
					± 200	10 - 10 K	3.01 - 10 K	3.3 - 10 K	
					± 300	-	1.02 - 3.01	1.1 - 3	
					Unspecified ⁽²⁾	-		0.05 - 1	
TR50	TO-220	50	3	350	± 50	10 - 10 K			
					± 100	5.05 - 10 K	3.01 - 10 K	3.3 - 10 K	
					± 200	10 - 10 K	3.01 - 10 K	3.3 - 10 K	
					± 300	-	1.02 - 3.01	1.1 - 3	
					Unspecified ⁽²⁾	-		0.1 - 1	
TR50H	TO-220	50	2.25	420	± 50	10 - 10 K			
					± 100	5.05 - 10 K	3.01 - 10 K	3.3 - 10 K	
					± 200	10 - 10 K	3.01 - 10 K	3.3 - 10 K	
					± 300	-	1.02 - 3.01	1.1 - 3	
					Unspecified ⁽²⁾	-		0.1 - 1	
TR100	TO-247	100	3.5	750	± 50	10 - 100 K			
					± 100	5.05 - 100 K	3.01 - 100 K	3.3 - 100 K	
					± 200	10 - 100 K	3.01 - 100 K	3.3 - 100 K	
					± 300	-	1.02 - 3.01	1.1 - 3	
					Unspecified ⁽²⁾	-		0.05 - 1	

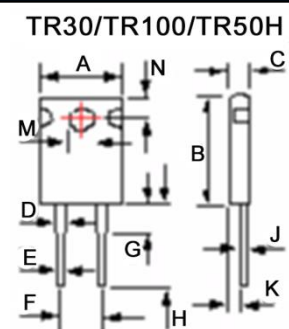
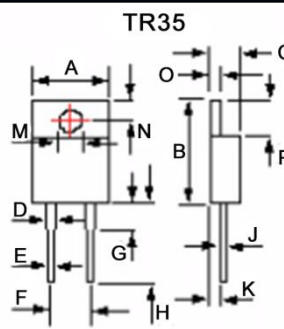
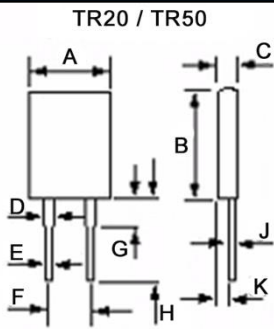
(1) Lesser of $\sqrt{P \cdot R}$ or maximum working voltage

(2) Unspecified TCR. Contact Stackpole.

(3) The case temperature is to be used for the definition of the applied power limit. Refer to Power Derating Curve.

Thermal resistance: $((T @ P0\%) - (T_{max} @ P10\%))$

Mechanical Specifications



Type Code	TR20	TR30	TR35	TR50	TR50H	TR100	Unit
A	0.410 ± 0.010 10.41 ± 0.26	0.410 ± 0.010 10.41 ± 0.26	0.400 ± 0.010 10.16 ± 0.25	0.410 ± 0.010 10.41 ± 0.26	0.410 ± 0.010 10.41 ± 0.26	0.620 ± 0.010 15.75 ± 0.26	inches mm
B	0.640 ± 0.010 16.26 ± 0.26	0.640 ± 0.010 16.26 ± 0.26	0.581 ± 0.010 14.75 ± 0.25	0.640 ± 0.010 16.26 ± 0.26	0.640 ± 0.010 16.26 ± 0.26	0.815 ± 0.010 20.70 ± 0.26	inches mm
C	0.125 ± 0.010 3.18 ± 0.26	0.125 ± 0.010 3.18 ± 0.26	0.175 ± 0.015 4.44 ± 0.38	0.125 ± 0.010 3.18 ± 0.26	0.125 ± 0.010 3.18 ± 0.26	0.195 ± 0.010 4.95 ± 0.26	inches mm
D	0.050 ± 0.005 1.27 ± 0.13	0.050 ± 0.005 1.27 ± 0.13	0.050 ± 0.005 1.27 ± 0.13	0.050 ± 0.005 1.27 ± 0.13	0.050 ± 0.005 1.27 ± 0.13	0.143 ± 0.007 3.63 ± 0.18	inches mm
E	0.030 ± 0.004 0.76 ± 0.10	0.030 ± 0.004 0.76 ± 0.10	0.031 ± 0.003 0.78 ± 0.08	0.030 ± 0.004 0.76 ± 0.10	0.030 ± 0.004 0.76 ± 0.10	0.060 ± 0.004 1.52 ± 0.10	inches mm
F	0.200 ± 0.010 5.08 ± 0.26	0.200 ± 0.010 5.08 ± 0.26	0.200 ± 0.010 5.08 ± 0.26	0.200 ± 0.010 5.08 ± 0.26	0.200 ± 0.010 5.08 ± 0.26	0.400 ± 0.010 10.16 ± 0.26	inches mm
G	0.130 ± 0.030 3.30 ± 0.76	0.130 ± 0.030 3.30 ± 0.76	0.130 ± 0.030 3.30 ± 0.76	0.130 ± 0.030 3.30 ± 0.76	0.130 ± 0.030 3.30 ± 0.76	0.110 ± 0.030 2.79 ± 0.76	inches mm
H	0.500 ± 0.050 12.70 ± 1.27	0.500 ± 0.050 12.70 ± 1.27	0.539 ± 0.039 13.70 ± 1.00	0.500 ± 0.050 12.70 ± 1.27	0.500 ± 0.050 12.70 ± 1.27	0.570 ± 0.050 14.48 ± 1.27	inches mm
J	0.020 ± 0.004 0.50 ± 0.10	0.020 ± 0.004 0.50 ± 0.10	0.024 ± 0.003 0.62 ± 0.08	0.020 ± 0.004 0.50 ± 0.10	0.020 ± 0.004 0.50 ± 0.10	0.032 ± 0.010 0.81 ± 0.26	inches mm
K	0.070 ± 0.010 1.78 ± 0.26	0.070 ± 0.010 1.78 ± 0.26	0.090 ± 0.010 2.28 ± 0.25	0.070 ± 0.010 1.78 ± 0.26	0.070 ± 0.010 1.78 ± 0.26	0.095 ± 0.010 2.41 ± 0.26	inches mm
M	-	0.125 ± 0.004 3.18 ± 0.10	0.144 ± 0.004 3.65 ± 0.10	-	0.125 ± 0.004 3.18 ± 0.10	0.143 ± 0.007 3.63 ± 0.18	inches mm
N	-	0.125 ± 0.010 3.18 ± 0.26	0.116 ± 0.004 2.95 ± 0.10	-	0.125 ± 0.010 3.18 ± 0.26	0.210 ± 0.010 5.33 ± 0.26	inches mm
O	-	-	0.051 ± 0.004 1.30 ± 0.10	-	-	-	inches mm
P	-	-	0.240 ± 0.004 6.10 ± 0.10	-	-	-	inches mm

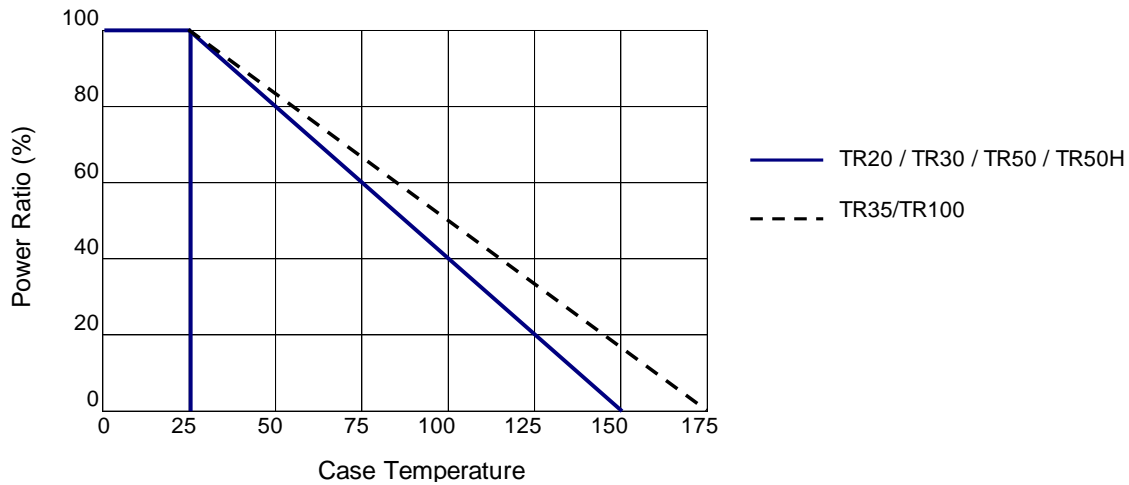
Mounting Note:

- (1) When mounting ensure entire ceramic portion of case is mounted on a clean, flat heat sink with an appropriate thermal interface, such as thermal grease. For screw mounting use of a compression washer at a force of 150 to 300 lbs (665 to 1330 N) is recommended without exceeding mounting torque of 8 in-lbs (0.9 N-m) to avoid package damage. For clip mounting use of a round or smooth clip in contact area is recommended to avoid a concentrated hot spot on package.
- (2) TR50/100 must be mounted to heat sink using proper mounting clip for efficient heat dissipation.

Performance Characteristics			
Test	Test Method	Test Specification	
		TR20/30/35/50/50H	TR100
Short Time Overload	2 times rated power with applied voltage not to exceed 1.5 times maximum continuous operating voltage for 5 seconds	$\Delta R \pm (0.3\% + 0.001 \Omega)$	$\Delta R \pm (0.5\% + 0.001 \Omega)$
Load Life	MIL-R-39009, 2000 hours at rated power	$\Delta R \pm (1\% + 0.001 \Omega)$	$\Delta R \pm (1\% + 0.001 \Omega)$
Moisture Resistance	MIL-STD-202, Method 103B	$\Delta R \pm (0.5\% + 0.001 \Omega)$	$\Delta R \pm (0.5\% + 0.001 \Omega)$
Thermal Shock	MIL-STD-202, Method 107G	$\Delta R \pm (0.3\% + 0.001 \Omega)$	$\Delta R \pm (0.5\% + 0.001 \Omega)$
Terminal Strength	MIL-STD-202, Method 211, Condition A (Pull Test) 2.4N	$\Delta R \pm (0.2\% + 0.001 \Omega)$	$\Delta R \pm (0.2\% + 0.001 \Omega)$
Vibration, High Frequency	MIL-STD-202, Method 204, Condition D	$\Delta R \pm (0.2\% + 0.001 \Omega)$	$\Delta R \pm (0.4\% + 0.001 \Omega)$
Dielectric Strength		1800 VAC	
Insulation Resistance		10 G Ω min.	

Operating Temperature Range: -65°C to + 150°C (TR20/TR30/TR50/TR50H)
-65°C to + 175°C (TR35/TR100)

Power Derating Curve:



Recommended Solder Profile

This information is intended as a reference for solder profiles for Stackpole resistive components. These profiles should be compatible with most soldering processes. These are only recommendations. Actual numbers will depend on board density, geometry, packages used, etc., especially those cells labeled with “*”.

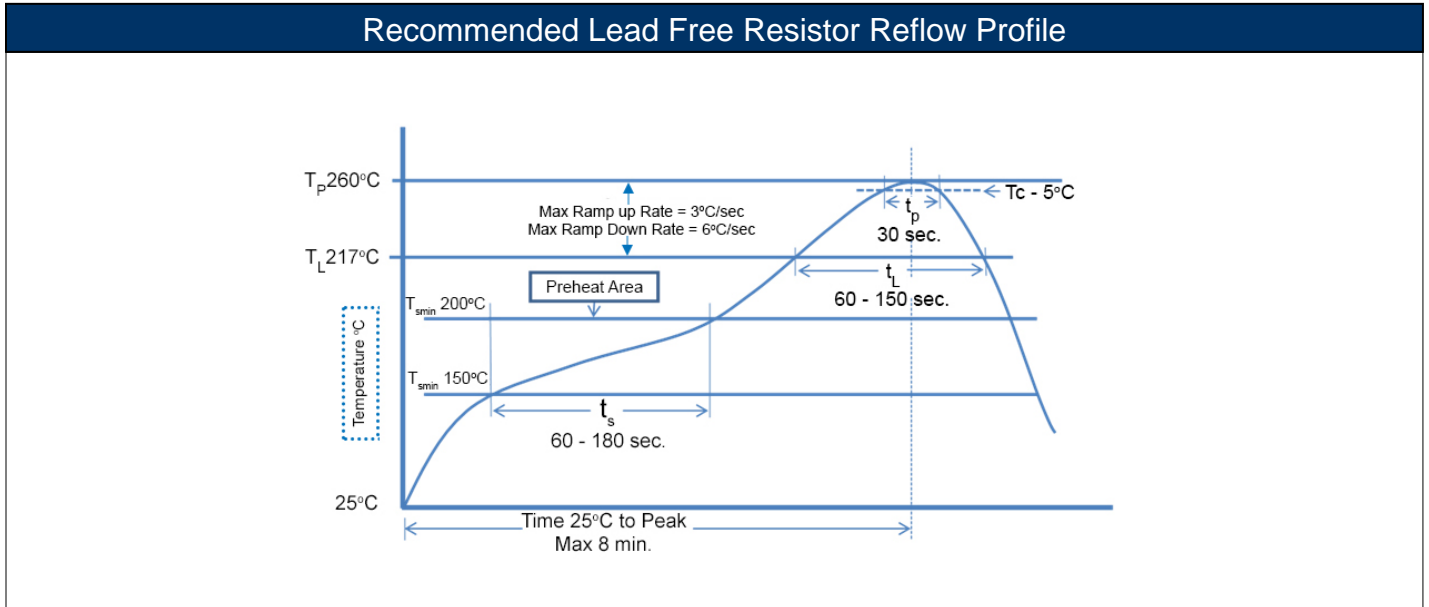
100% Matte Tin / RoHS Compliant Terminations

Soldering iron recommended temperatures: 330°C to 350°C with minimum duration.
Maximum number of reflow cycles: 3.

Wave Soldering			
Description	Maximum	Recommended	Minimum
Preheat Time	80 seconds	70 seconds	60 seconds
Temperature Diff.	140°C	120°C	100°C
Solder Temp.	260°C	250°C	240°C
Dwell Time at Max.	10 seconds	5 seconds	*
Ramp DN (°C/sec)	N/A	N/A	N/A

Temperature Diff. = Difference between final preheat stage and soldering stage.

Convection IR Reflow			
Description	Maximum	Recommended	Minimum
Ramp Up (°C/sec)	3°C/sec	2°C/sec	*
Dwell Time > 217°C	150 seconds	90 seconds	60 seconds
Solder Temp.	260°C	245°C	*
Dwell Time at Max.	30 seconds	15 seconds	10 seconds
Ramp DN (°C/sec)	6°C/sec	3°C/sec	*



RoHS Compliance

Stackpole Electronics has joined the worldwide effort to reduce the amount of lead in electronic components and to meet the various regulatory requirements now prevalent, such as the European Union’s directive regarding “Restrictions on Hazardous Substances” (RoHS 3). As part of this ongoing program, we periodically update this document with the status regarding the availability of our compliant components. All our standard part numbers are compliant to EU Directive 2011/65/EU of the European Parliament as amended by Directive (EU) 2015/863/EU as regards the list of restricted substances.

RoHS Compliance Status						
Standard Product Series	Description	Package / Termination Type	Standard Series RoHS Compliant	Lead-Free Termination Composition	Lead-Free Mfg. Effective Date (Std Product Series)	Lead-Free Effective Date Code (YY/WW)
TR	TO-220 and TO-247 Style Power Leaded Resistor	Radial Special	YES ⁽¹⁾	100% Matte Sn	Always	Always

Note (1): RoHS Compliant by means of exemption 7c-I.

“Conflict Metals” Commitment

We at Stackpole Electronics, Inc. are joined with our industry in opposing the use of metals mined in the “conflict region” of the Eastern Democratic Republic of the Congo (DRC) in our products. Recognizing that the supply chain for metals used in the electronics industry is very complex, we work closely with our own suppliers to verify to the extent possible that the materials and products we supply do not contain metals sourced from this conflict region. As such, we are in compliance with the requirements of Dodd-Frank Act regarding Conflict Minerals.

Compliance to “REACH”

We certify that all passive components supplied by Stackpole Electronics, Inc. are SVHC (Substances of Very High Concern) free and compliant with the requirements of EU Directive 1907/2006/EC, “The Registration, Evaluation, Authorization and Restriction of Chemicals”, otherwise referred to as REACH. Contact us for complete list of REACH Substance Candidate List.

Environmental Policy

It is the policy of Stackpole Electronics, Inc. (SEI) to protect the environment in all localities in which we operate. We continually strive to improve our effect on the environment. We observe all applicable laws and regulations regarding the protection of our environment and all requests related to the environment to which we have agreed. We are committed to the prevention of all forms of pollution.

How to Order

