RESETTABLE PTCs

SURFACE MOUNT PTC

1812L Series

- The 1812 Series Resettable devices utilize a unique polymer-based, Positive Temperature Coefficient (PTC) material to protect electrical circuits against overcurrent conditions.
- The 1812 Series PTC provides surface mount overcurrent protection in a compact package. The 1812 is ideal for computer applications including: hard disc drives, USB ports, PC cards and printers.

AGENCY APPROVALS: Recognized under the Components Program of Underwriters Laboratory and the Component Acceptance Program of CSA. TUV approved.

AGENCY FILE NUMBERS: UL FILE E183209, CSA LR 108832, TUV B 98 12 30766006

PHYSICAL SPECIFICATIONS:

Terminal Material: Tin-Lead Plated Copper

Lead Solderability: Meets EIA specification RS186-9E

Device Labeling: Device is marked with E and amperage rating.

Packaging: 12mm tape on 7 inch reel per EIA-RS481-2 (equivalent to IEC 286, part 3). 2,000 devices per reel, add packaging suffix, PR.

ENVIRONMENTAL SPECIFICATIONS:

Passive Aging: 85°C, 1000 Hours. ±5% typical resistance change.

Humidity Aging: 85°C, 85% R.H., 1000 hours. ±5% typical resistance change.

Thermal Shock: 85°C / –40°C, 20 times. ±10% typical resistance change.

Vibration: MIL-STD 202, Method 201, MIL-STD-883C, Method 2007.1. No change.

Mechanical Shock: MIL-STD-202, Method 213 test condition I (100 g's, 6 sec.). No resistance change.

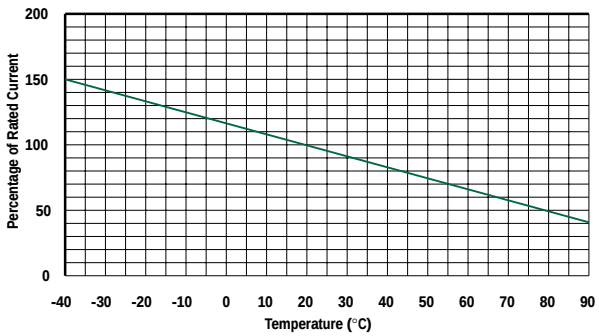
Solvent Resistance: MIL-STD-202, Method 215. No change.

Max. Surface Temperature: 125°C

Operating/Storage Temperature: –40°C to 85°C

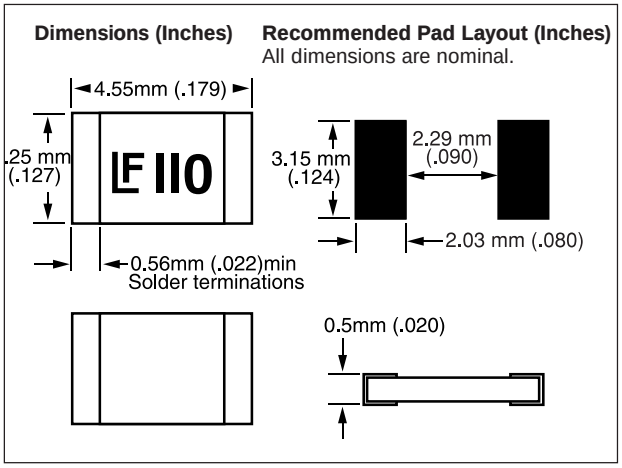
Device should remain in sealed bags prior to use.

Rerating Curve for 1812 Series



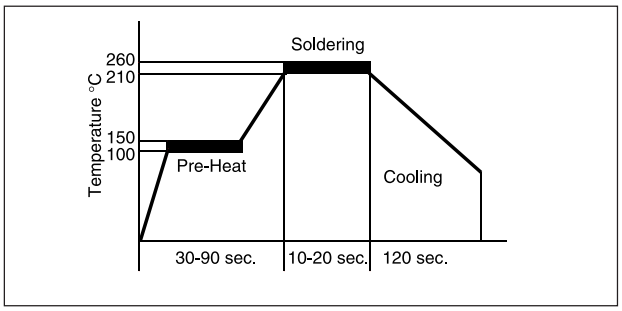
SURFACE MOUNT PTC

1812L Series

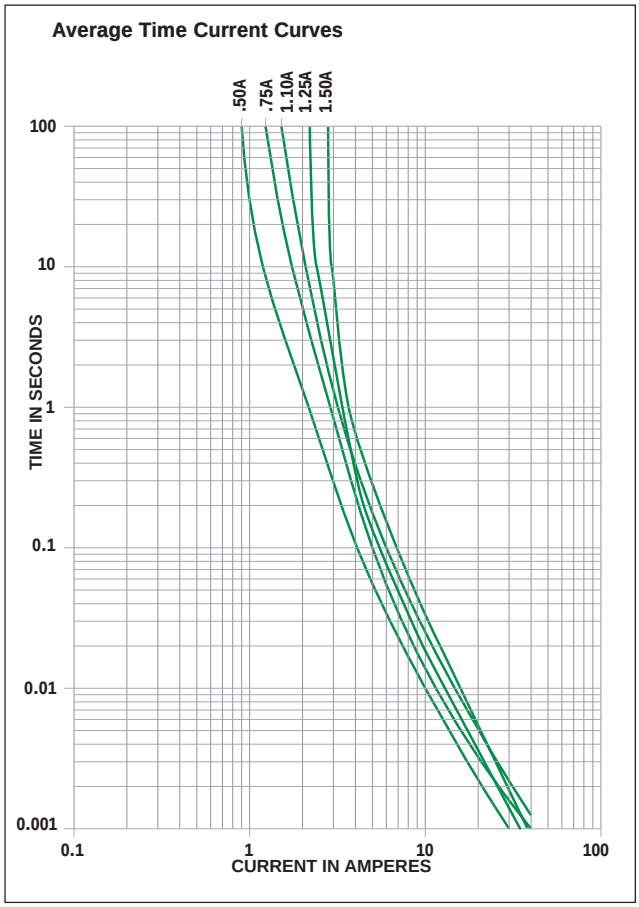


Devices can be reflow or wave soldered.

RECOMMENDED REFLOW CONDITIONS:
(IR, Forced Air Convection, Vapor Phase)



If reflow temperatures exceed the recommended profile, devices may not meet the performance requirements.



ORDERING INFORMATION:

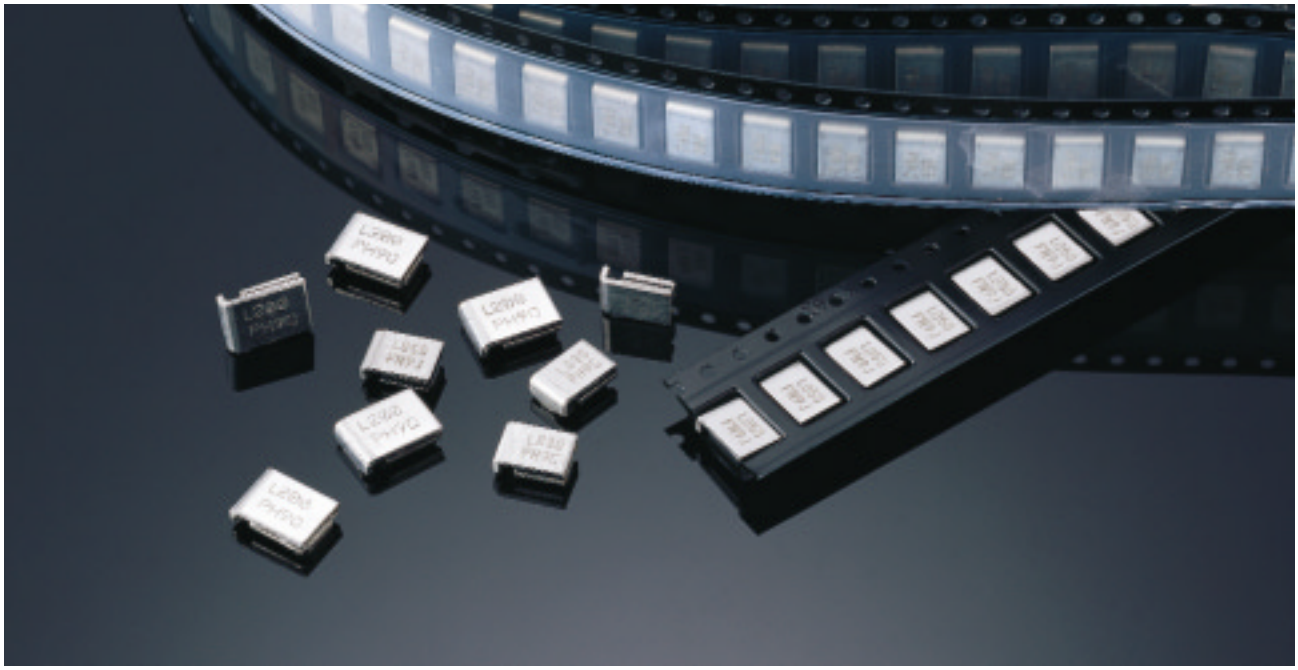
Part Number	I_{hold} (A)	I_{trip} (A)	V_{max} (Vdc)	I_{max} (A)	P_d max. (W)	Maximum Time To Trip Current (A)	Maximum Time To Trip Time (Sec)	Resistance R_{IL} (Ω)	Resistance R_{AT} (Ω)	Dimension A
1812L050	0.50	1.00	15.0	40	0.8	8.0	0.15	0.15	1.0	0.50(.020)
1812L075	0.75	1.50	13.2	40	0.8	8.0	0.20	0.11	0.45	0.50(.020)
1812L110	1.10	2.20	6.0	40	0.8	8.0	0.30	0.04	0.21	0.50(.020)
NEW 1812L125	1.25	2.50	6.0	40	0.8	8.0	0.25	0.035	0.14	0.40(.016)
NEW 1812L150	1.50	3.00	6.0	40	0.8	8.0	0.30	0.030	0.12	0.40(.016)

I_{hold} = Hold Current: maximum current device will sustain for 4 hours without tripping in 20°C still air.
I_{trip} = Trip Current: minimum current at which the device will trip in 20°C still air.
V_{max} = Maximum voltage device can withstand without damage at rated current (I_{max})
I_{max} = Maximum fault current device can withstand without damage at rated voltage (V_{max})
P_d = Power dissipated from device when in the tripped state at 20°C still air.
R_{IL} = Minimum resistance of device in initial (un-soldered) state.
R_{AT} = Maximum resistance of device at 20°C measured one hour after tripping or reflow soldering of 260°C for 20 sec.

CAUTION: Operation beyond the specified ratings may result in damage and possible arcing and flame.

SURFACE MOUNT PTC

2029L/3425L Series



- The 2029L/3425L Series Resettable devices utilize a unique polymer-based, Positive Temperature Coefficient (PTC) material to protect electrical circuits against over-current conditions.
- In normal operation, the 2029L/3425L Series PTC has many conductive paths and a very low resistance. In an overcurrent condition, the temperature of the polymer material rises. This dramatically reduces the conductive paths resulting in an immediate rise in resistance. In this condition, the device provides circuit protection by significantly limiting the flow of current. However, once the cause of the initial overcurrent condition is eliminated, the 2029L/3425L Series PTC cools down and resets to a low resistance value permitting the normal current flow to resume.
- The 2029L/3425L Series are surface mountable.

AGENCY APPROVALS: Recognized under the Components Program of Underwriters Laboratory and the Component Acceptance Program of CSA. TUV approved.

AGENCY FILE NUMBERS: UL E183209, CSA LR 108832

PHYSICAL SPECIFICATIONS:

Materials: Terminal Material: Tin Plated Brass to MIL-T-10727B

Lead Solderability: Meets EIA specification RS186-9E

Device Labeling: Device is marked with the letter 'L', amperage rating and date code.

Packaging: Packaged in tape and reel carrier per EIA 481-2 standard

Standard reel quantities:

Part Number	Reel Quantity	Packaging Suffix
2029L Series	2000	PR
3425L Series	1500	DR

ENVIRONMENTAL SPECIFICATIONS:

Passive Aging: 85°C, 1000 Hours. ±5% typical resistance change.

Humidity Aging: 85°C, 85% R.H., 1000 hours. ±5% typical resistance change.

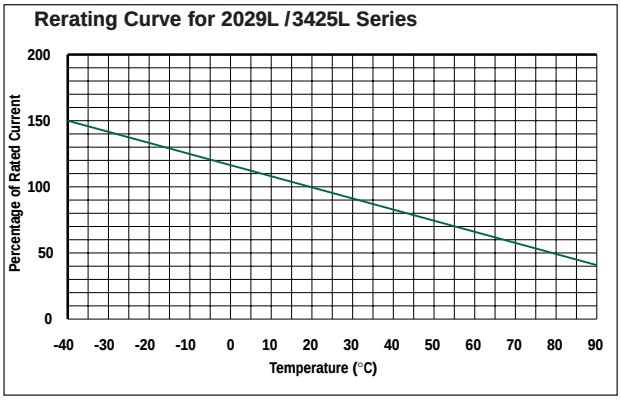
Thermal Shock: 85°C / –40°C, 20 times. ±10% typical resistance change.

Vibration: MIL-STD 202, Method 201. No resistance change.

Mechanical Shock: MIL-STD-202, Method 213 test condition I (100 g's, 6 sec.). No resistance change.

Max. Surface Temperature: 125°C

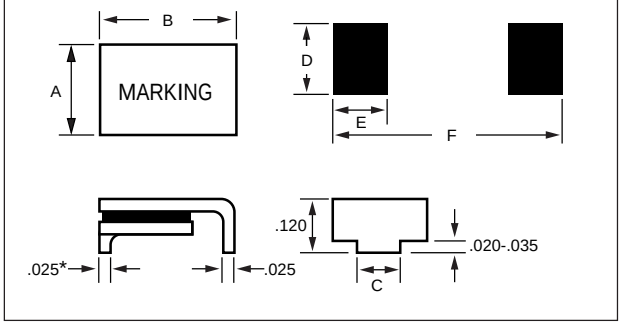
Operating/Storage Temperature: –40°C to 85°C



SURFACE MOUNT PTC

2029L/3425L Series

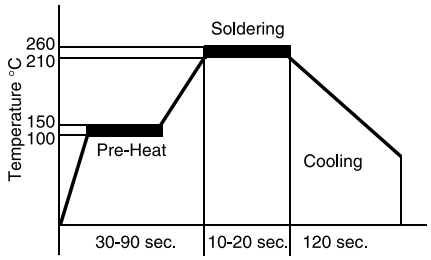
Dimensions (Inches) **Recommended Pad Layout (Inches)**
All dimensions are nominal.



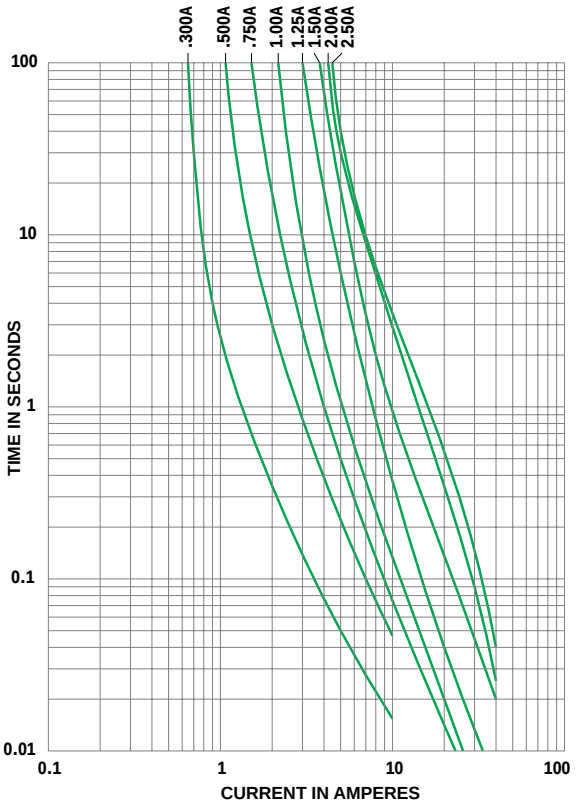
*0.010 for 2029L050

Series	A	B	C	D	E	F
2029L	.214 max.	.314 max.	.090	.120	.090	.380
3425L	.264 max.	.374 max.	.145	.180	.090	.420

RECOMMENDED REFLOW CONDITIONS:
(IR, Forced Air Convection, Vapor Phase)
Devices are not designed to be wave soldered.



Average Time Current Curves



ORDERING INFORMATION:

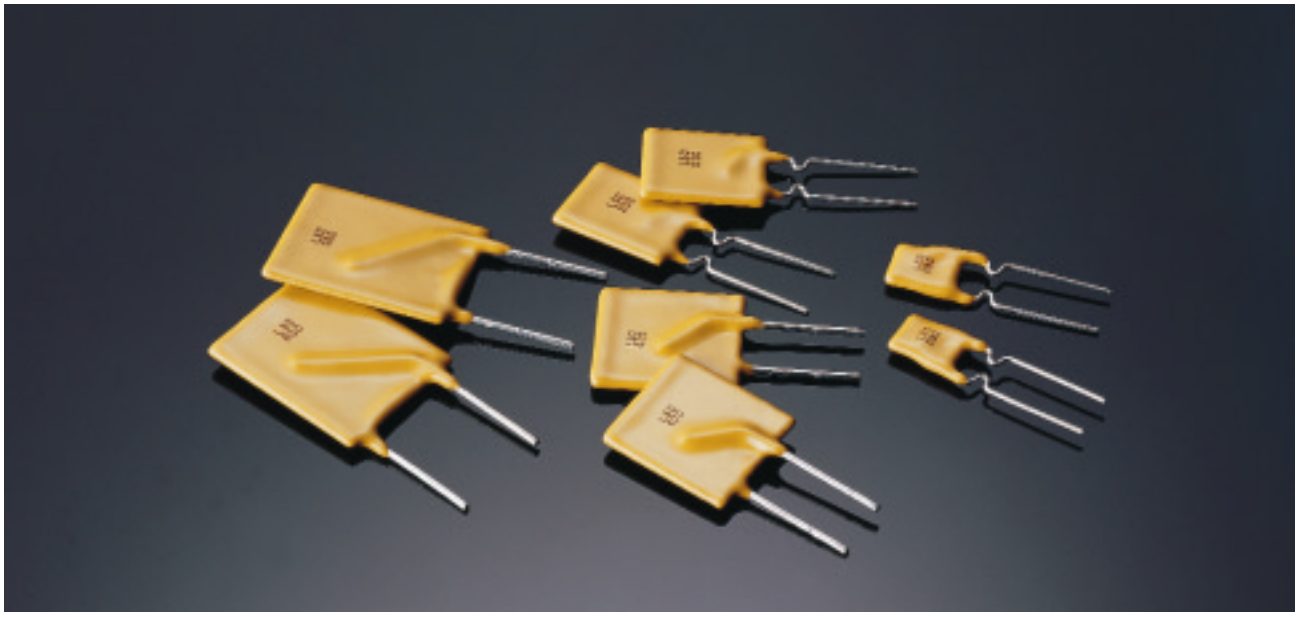
Catalog Number	I_{hold} (A)	I_{trip} (A)	V_{max} (Vdc)	I_{max} (A)	P_d max. (W)	Maximum Time To Trip		Resistance	
						Current (A)	Time (Sec)	R_{IL} (Ω)	R_{AT} (Ω)
2029L030	0.30	0.6	60	10	1.7	1.5	3.0	1.200	4.80
2029L050	0.50	1.0	60	10	1.7	2.5	4.0	0.350	1.40
2029L075	0.75	1.5	30	40	1.7	8.0	0.3	0.350	1.00
2029S100	1.10	2.2	15	40	1.7	8.0	0.5	0.120	0.48
2029L100	1.10	2.2	30	40	1.7	8.0	0.5	0.120	0.48
2029L125	1.25	2.5	15	40	1.7	8.0	2.0	0.070	0.25
3425L150	1.50	3.0	15	40	1.9	8.0	5.0	0.060	0.25
3425L200	2.00	4.0	15	40	1.9	8.0	12.0	0.050	0.13
3425L250	2.50	5.0	15	40	1.9	8.0	25.0	0.035	0.09
2029L260	2.60	5.2	6.0	40	1.7	8.0	20.0	0.025	0.075

I_{hold} = Hold Current: maximum current device will sustain for 4 hours without tripping in 20°C still air.
I_{trip} = Trip Current: minimum current at which the device will trip in 20°C still air.
V_{max} = Maximum voltage device can withstand without damage at rated current (I_{max})
I_{max} = Maximum fault current device can withstand without damage at rated voltage (V_{max})
P_d = Power dissipated from device when in the tripped state at 20°C still air.
R_{IL} = Minimum resistance of device in initial (un-soldered) state.
R_{AT} = Maximum resistance of device at 20°C measured one hour after tripping or reflow soldering of 260°C for 20 sec.

CAUTION: Operation beyond the specified ratings may result in damage and possible arcing and flame.

RADIAL LEADED PTC

30R Series



- The 30R Series Resettable devices utilize a unique polymer-based, Positive Temperature Coefficient (PTC) material to protect electrical circuits against overcurrent conditions.
- In normal operation, the 30R Series PTC has many conductive paths and a very low resistance. In an overcurrent condition, the temperature of the polymer material rises. This dramatically reduces the conductive paths resulting in an immediate rise in resistance. In this condition, the device provides circuit protection by significantly limiting the flow of current. However, once the cause of the initial overcurrent condition is eliminated, the 30R Series PTC cools down and resets to a low resistance value permitting the normal current flow to resume.
- The 30R Series is a 30V Radial Leaded Device with a 40A Short Circuit Rating.

AGENCY APPROVALS: Recognized under the Components Program of Underwriters Laboratory and the Component Acceptance Program of CSA. TUV approved.

AGENCY FILE NUMBERS: UL E183209, CSA LR 108832

PHYSICAL SPECIFICATIONS:

Materials: Leads

30R090-250: Tin plated copper-clad steel, 24 AWG (0.020" Dia.)

30R300-900: Tin plated copper, 20 AWG (0.032" Dia.)

Lead Solderability: MIL-STD-202, Method 208E

Coating: Thermoset Coating

Device Labeling: Device is marked with the letter 'L', amperage rating, voltage rating & date code.

Packaging: Standard bulk packaging is 500 pieces per container. Optional tape and reel packaging per EIA 486-B is also available.

Standard reel quantities:

Part Number	Reel Quantity	Part Number	Reel Quantity
R30R090 R30R110 R30R135 R30R160 R30R185 R30R250	3000	R30R300 R30R400	1500
		30R500 30R600 30R700 30R800 30R900	Bulk Only 500 Per Container

ENVIRONMENTAL SPECIFICATIONS:

Passive Aging: 85°C, 1000 Hours. ±5% typical resistance change.

Humidity Aging: 85°C, 85% R.H., 1000 hours. ±5% typical resistance change.

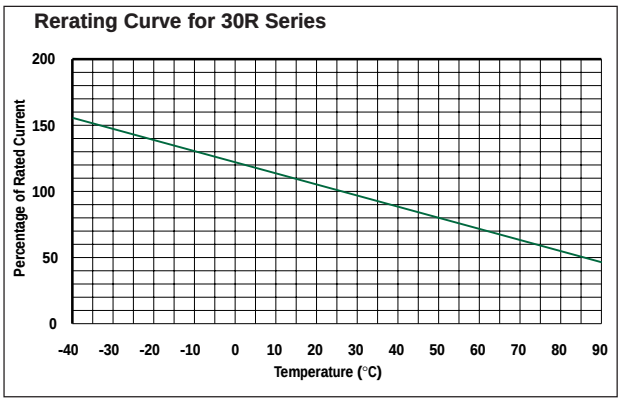
Thermal Shock: 85°C / –40°C, 20 times. ±10% typical resistance change.

Vibration: MIL-STD 202, Method 201. No resistance change.

Mechanical Shock: MIL-STD-202, Method 213 test condition I (100 g's, 6 sec.). No resistance change.

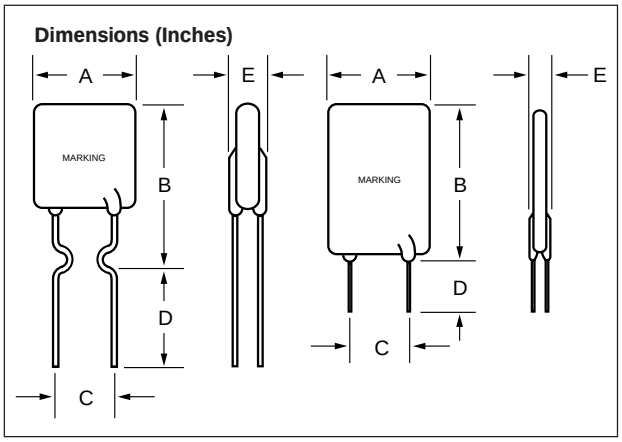
Max. Surface Temperature: 125°C

Operating/Storage Temperature: –40°C to 85°C



RADIAL LEADED PTC

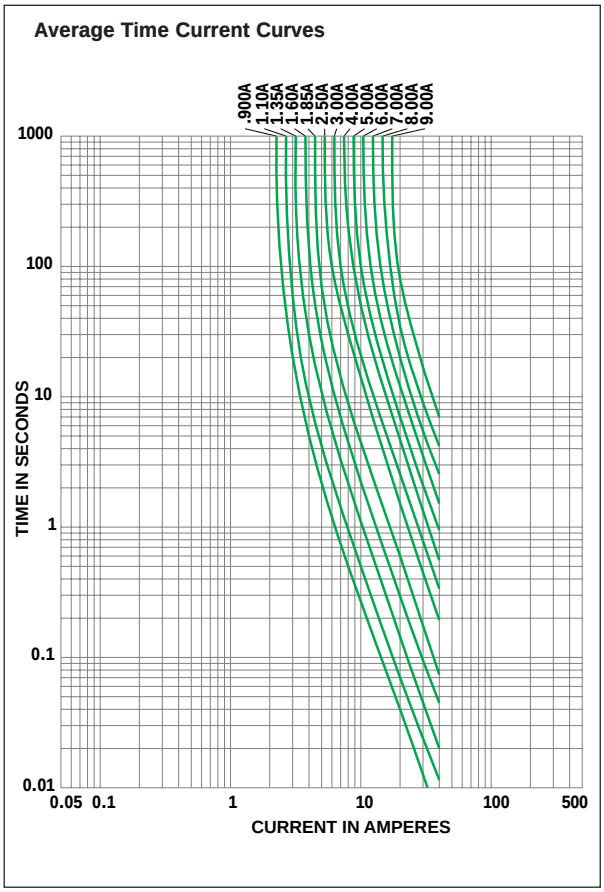
30R Series



Note: Stand-offs only used for 30R090-30R250

Part Number	'A' (Max.)	'B' (Max.)	'C' (Typ.)
30R090	0.26	0.48	0.20
30R110	0.26	0.56	0.20
30R135	0.35	0.53	0.20
30R160	0.35	0.60	0.20
30R185	0.40	0.62	0.20
30R250	0.45	0.72	0.20
30R300	0.45	0.68	0.20
30R400	0.55	0.79	0.20
30R500	0.55	0.98	0.40
30R600	0.65	0.98	0.40
30R700	0.75	1.05	0.40
30R800	0.85	1.15	0.40
30R900	0.95	1.17	0.40

Dimension 'D' is 0.30" Minimum
Dimension 'E' is 0.12" Maximum



ORDERING INFORMATION:

Part Number	I_{hold} (A)	I_{trip} (A)	V_{max} (Vdc)	I_{max} (A)	P_d max. (W)	Maximum Time To Trip		Resistance	
						Current (A)	Time (Sec)	R_{IL} (Ω)	R_{AT} (Ω)
30R090	0.90	1.80	30	40	0.6	4.50	5.9	0.070	0.22
30R110	1.10	2.20	30	40	0.7	5.50	6.6	0.050	0.17
30R135	1.35	2.70	30	40	0.8	6.75	7.3	0.040	0.13
30R160	1.60	3.20	30	40	0.9	8.00	8.0	0.030	0.11
30R185	1.85	3.70	30	40	1.0	9.25	8.7	0.030	0.09
30R250	2.50	5.00	30	40	1.2	12.5	10.3	0.020	0.07
30R300	3.00	6.00	30	40	2.0	15.0	10.8	0.020	0.08
30R400	4.00	8.00	30	40	2.5	20.0	12.7	0.010	0.05
30R500	5.00	10.00	30	40	3.0	25.0	14.5	0.010	0.05
30R600	6.00	12.00	30	40	3.5	30.0	16.0	0.005	0.04
30R700	7.00	14.00	30	40	3.8	35.0	17.5	0.005	0.03
30R800	8.00	16.00	30	40	4.0	40.0	18.8	0.005	0.02
30R900	9.00	18.00	30	40	4.2	40.0	20.0	0.005	0.02

I_{hold} = Hold Current: maximum current device will sustain for 4 hours without tripping in 20°C still air.
I_{trip} = Trip Current: minimum current at which the device will trip in 20°C still air.
V_{max} = Maximum voltage device can withstand without damage at rated current (I_{max})
I_{max} = Maximum fault current device can withstand without damage at rated voltage (V_{max})
P_d = Power dissipated from device when in the tripped state at 20°C still air.
R_{IL} = Minimum resistance of device in initial (un-soldered) state.
R_{AT} = Maximum resistance of device at 20°C measured one hour after tripping.

CAUTION: Operation beyond the specified ratings may result in damage and possible arcing and flame.

RADIAL LEADED PTC

60R Series

- The 60R Series Resettable devices utilize a unique polymer-based, Positive Temperature Coefficient (PTC) material to protect electrical circuits against overcurrent conditions.
- In normal operation, the 60R Series PTC has many conductive paths and a very low resistance. In an overcurrent condition, the temperature of the polymer material rises. This dramatically reduces the conductive paths resulting in an immediate rise in resistance. In this condition, the device provides circuit protection by significantly limiting the flow of current. However, once the cause of the initial overcurrent condition is eliminated, the 60R Series PTC cools down and resets to a low resistance value permitting the normal current flow to resume.
- The 60R Series is a 60V Radial Leaded Device with a 40A Short Circuit Rating.

AGENCY APPROVALS: Recognized under the Components Program of Underwriters Laboratory and the Component Acceptance Program of CSA. TUV approved.

AGENCY FILE NUMBERS: UL E183209, CSA LR 108832

PHYSICAL SPECIFICATIONS:

Materials: Leads

60R010: Tin coated constantan, 24 AWG (0.020" Dia.)
60R017-040: Tin plated copper-clad steel, 24 AWG (0.020" Dia.)
60R050-090: Tin plated copper, 24 AWG (0.020" Dia.)
60R110-375: Tin plated copper, 20 AWG (0.032" Dia.)

Lead Solderability: MIL-STD-202, Method 208E

Coating: Thermoset Coating

Device Labeling: Device is marked with the letter 'L', amperage rating, voltage rating & date code.

Packaging: Standard bulk packaging is 500 pieces per container. Optional tape and reel packaging per EIA 486-B is also available.

Standard reel quantities:

Part Number	Reel Quantity	Part Number	Reel Quantity
R60R010 R60R020 R60R025 R60R030 R60R040 R60R050 R60R065 R60R075 R60R090	3000	R60R017	2500
		R60R110 R60R135 R60R160	1500
		R60R185	1000
		60R250 60R300 60R375	Bulk Only 500 Per Container

ENVIRONMENTAL SPECIFICATIONS:

Passive Aging: 85°C, 1000 Hours. ±5% typical resistance change.

Humidity Aging: 85°C, 85% R.H., 1000 hours. ±5% typical resistance change.

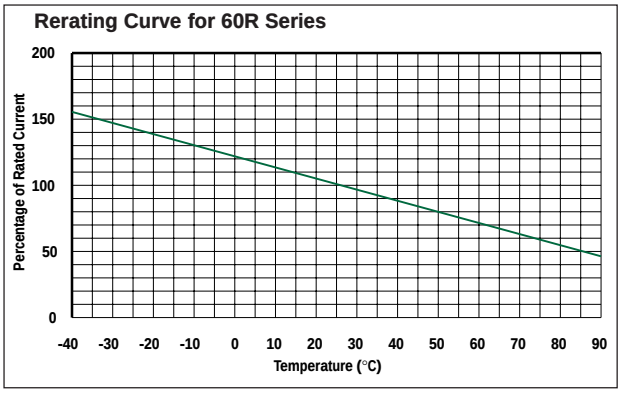
Thermal Shock: 85°C / –40°C, 20 times. ±10% typical resistance change.

Vibration: MIL-STD 202, Method 201. No resistance change.

Mechanical Shock: MIL-STD-202, Method 213 test condition I (100 g's, 6 sec.). No resistance change.

Max. Surface Temperature: 125°C

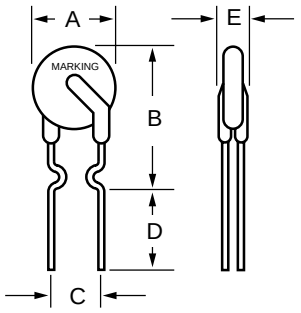
Operating/Storage Temperature: –40°C to 85°C



RADIAL LEADED PTC

60R Series

Dimensions (Inches)

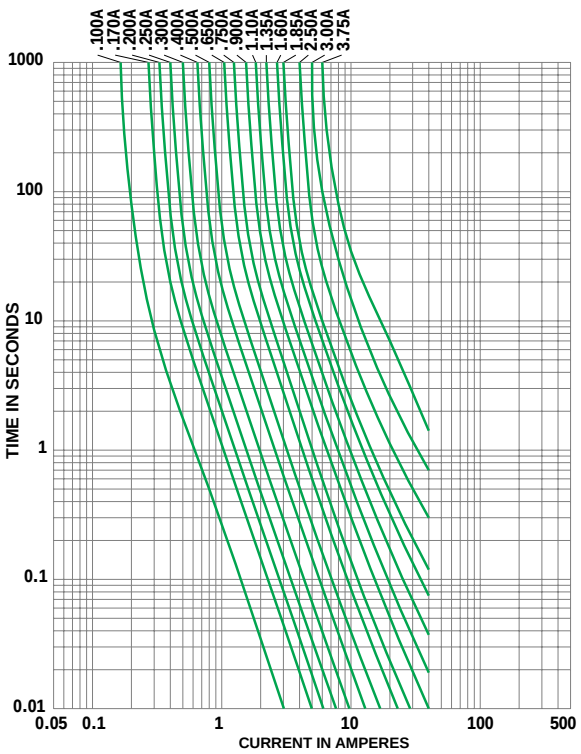


Note: Stand-offs only used for 60R010-60R090

Part Number	'A' (Max.)	'B' (Max.)	'C' (Typ.)
60R010	0.29	0.50	0.20
60R017	0.29	0.50	0.20
60R020	0.29	0.48	0.20
60R025	0.29	0.50	0.20
60R030	0.29	0.51	0.20
60R040	0.30	0.53	0.20
60R050	0.30	0.54	0.20
60R065	0.38	0.57	0.20
60R075	0.41	0.60	0.20
60R090	0.46	0.62	0.20
60R110	0.51	0.71	0.20
60R135	0.57	0.77	0.20
60R160	0.64	0.84	0.20
60R185	0.70	0.90	0.20
60R250	0.84	1.04	0.40
60R300	0.98	1.18	0.40
60R375	1.12	1.32	0.40

Dimension 'D' is 0.30" Minimum
Dimension 'E' is 0.12" Maximum

Average Time Current Curves



ORDERING INFORMATION:

Part Number	I_{hold} (A)	I_{trip} (A)	V_{max} (Vdc)	I_{max} (A)	P_d max. (W)	Maximum Time To Trip		Resistance	
						Current (A)	Time (Sec)	R_{IL} (Ω)	R_{AT} (Ω)
60R010	0.10	0.20	60	40	0.38	0.50	4.0	2.50	7.50
60R017	0.17	0.34	60	40	0.48	0.85	3.0	3.30	8.00
60R020	0.20	0.40	60	40	0.41	1.00	2.2	1.83	4.40
60R025	0.25	0.50	60	40	0.45	1.25	2.5	1.25	3.00
60R030	0.30	0.60	60	40	0.49	1.50	3.0	0.88	2.10
60R040	0.40	0.80	60	40	0.56	2.00	3.8	0.55	1.29
60R050	0.50	1.00	60	40	0.77	2.50	4.0	0.50	1.17
60R065	0.65	1.30	60	40	0.88	3.25	5.3	0.31	0.72
60R075	0.75	1.50	60	40	0.92	3.75	6.3	0.25	0.60
60R090	0.90	1.80	60	40	0.99	4.50	7.2	0.20	0.47
60R110	1.10	2.20	60	40	1.50	5.50	8.2	0.15	0.38
60R135	1.35	2.70	60	40	1.70	6.75	9.6	0.12	0.30
60R160	1.60	3.20	60	40	1.90	8.00	11.4	0.09	0.22
60R185	1.85	3.70	60	40	2.10	9.25	12.6	0.08	0.19
60R250	2.50	5.00	60	40	2.50	12.50	15.6	0.05	0.13
60R300	3.00	6.00	60	40	2.80	15.00	19.8	0.04	0.10
60R375	3.75	7.50	60	40	3.20	18.75	24.0	0.03	0.08

I_{hold} = Hold Current: maximum current device will sustain for 4 hours without tripping in 20°C still air.
I_{trip} = Trip Current: minimum current at which the device will trip in 20°C still air.
V_{max} = Maximum voltage device can withstand without damage at rated current (I_{max})
I_{max} = Maximum fault current device can withstand without damage at rated voltage (V_{max})
P_d = Power dissipated from device when in the tripped state at 20°C still air.
R_{IL} = Minimum resistance of device in initial (un-soldered) state.
R_{AT} = Maximum resistance of device at 20°C measured one hour after tripping.

CAUTION: Operation beyond the specified ratings may result in damage and possible arcing and flame.