

## Radial Leaded PTC Devices

- The Radial Leaded devices (RLD Series), a polymer-based Positive Temperature Coefficient (PTC) device to protect electrical circuits against over-current conditions with resettable feature, is fully compatible with current industrial standards.
- The Radial Leaded devices designed to provide different product series offer 30Vdc and 60Vdc voltage with a maximum 40A short circuit rating.
- Applications: The radial leaded product series is ideal for computers and peripherals, general electronics and can be applied to almost anywhere there is a low voltage power supply and a load to be protected.
- Agency Approval: UL/CSA File # E201431  
TÜV Certificate # R9956421



Polytronics Technology Corp.  
REGISTERED TO 009085, T13006,  
E200011 (version 2001), and E201431  
CERTIFICATE NO. A8717 and 41871

## 60Vdc Series

### ELECTRICAL CHARACTERISTICS

Part Number	I <sub>hold</sub> (A)	I <sub>trip</sub> (A)	V <sub>max</sub> (Vdc)	I <sub>max</sub> (A)	P <sub>d</sub> typ. (W)	Maximum Time To Trip		Resistance		Agency Approval
						Current (A)	Time (Sec.)	R <sub>min</sub> (Ω)	R <sub>1max</sub> (Ω)	
RLD60P010X	0.10	0.20	60	40	0.38	0.50	4.00	2.500	7.500	UL/CSA
RLD60P017X	0.17	0.34	60	40	0.48	0.85	3.00	3.300	8.000	UL/CSA
RLD60P020X	0.20	0.40	60	40	0.41	1.00	2.20	1.830	4.400	UL/CSA/TÜV
RLD60P025X	0.25	0.50	60	40	0.45	1.25	2.50	1.250	3.000	UL/CSA/TÜV
RLD60P030X	0.30	0.60	60	40	0.49	1.50	3.00	0.880	2.100	UL/CSA/TÜV
RLD60P040X	0.40	0.80	60	40	0.56	2.00	3.80	0.550	1.290	UL/CSA/TÜV
RLD60P050X	0.50	1.00	60	40	0.77	2.50	4.00	0.500	1.170	UL/CSA/TÜV
RLD60P065X	0.65	1.30	60	40	0.88	3.25	5.30	0.310	0.720	UL/CSA/TÜV
RLD60P075X	0.75	1.50	60	40	0.92	3.75	6.30	0.250	0.600	UL/CSA/TÜV
RLD60P090X	0.90	1.80	60	40	0.99	4.50	7.20	0.200	0.470	UL/CSA/TÜV
RLD60P110X	1.10	2.20	60	40	1.50	5.50	8.20	0.150	0.380	UL/CSA/TÜV
RLD60P135X	1.35	2.70	60	40	1.70	6.75	9.60	0.120	0.300	UL/CSA/TÜV
RLD60P160X	1.60	3.20	60	40	1.90	8.00	11.40	0.090	0.220	UL/CSA/TÜV
RLD60P185X	1.85	3.70	60	40	2.10	9.25	12.60	0.080	0.190	UL/CSA/TÜV
RLD60P250X	2.50	5.00	60	40	2.50	12.50	15.60	0.050	0.130	UL/CSA/TÜV
RLD60P300X	3.00	6.00	60	40	2.80	15.00	19.80	0.040	0.100	UL/CSA/TÜV
RLD60P375X	3.75	7.50	60	40	3.20	18.75	24.00	0.030	0.080	UL/CSA/TÜV

\* The additional suffix "F" means lead free product.

Note: I<sub>hold</sub> = Hold current: maximum current device will pass without tripping in 20°C still air.

I<sub>trip</sub> = Trip current: minimum current at which the device will trip in 20°C still air.

V<sub>max</sub> = Maximum voltage device can withstand without damage at rated current (I<sub>max</sub>)

I<sub>max</sub> = Maximum fault current device can withstand without damage at rated voltage (V<sub>max</sub>)

P<sub>d</sub> = Power dissipated from device when in the tripped state at 20°C still air.

R<sub>min</sub> = Minimum resistance of device in initial (un-soldered) state.

R<sub>1max</sub> = Maximum resistance of device at 20°C measured one hour after tripping.

**Caution: Operation beyond the specified rating may result in damage and possible arcing and flame.**

**Recognitions: UL, CSA, TUV recognized**

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## Radial Leaded PTC Devices

### **How to Select a Polymer PTC fuse:**

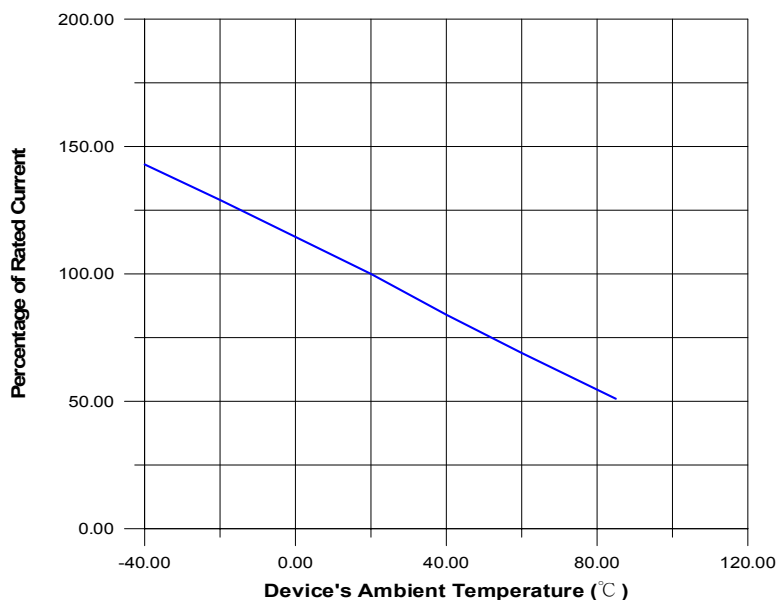
- (1) Determine the following operating parameters for the circuits:
  - (A) Normal Operating Current (I hold)
  - (B) Maximum Circuit Voltage (V max)
  - (C) Maximum Interrupt Current (I max)
  - (D) Normal Operating Temperature (min°C/max°C)
- (2) Select the device form factor and dimension suitable for the application:
  - Surface Mount Device (SMD Series)
  - Radial Leaded Device (RLD Series)
  - Axial Leaded Strap Device (STD Series)
  - Other Custom-designed Device (Disc/Chip)
- (3) Compare the maximum ratings for V max and I max of the PTC device with the circuit in application and make sure that the circuit's requirement does not exceed the device ratings.
- (4) Check that the PTC device's trip time (time-to-trip) will protect the circuit.
- (5) Verify that the circuit operating temperatures are within the PTC device's normal operating temperature range.
- (6) Verify the performance and suitability of the chosen PTC device in the application.

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# Radial Leaded PTC Devices

## THERMAL DERATING CURVE FOR RLD 60Vdc SERIES



## THERMAL DERATING CHART FOR RLD60V SERIES – $I_{hold}$ (Amps)

Model	Ambient Operation Temperature								
	-40°C	-20°C	0°C	23°C	40°C	50°C	60°C	70°C	85°C
RLD60P010X	0.16	0.14	0.12	0.10	0.08	0.7	0.06	0.05	0.04
RLD60P017X	0.26	0.23	0.20	0.17	0.14	0.12	0.11	0.09	0.07
RLD60P020X	0.31	0.27	0.24	0.20	0.16	0.14	0.13	0.11	0.08
RLD60P025X	0.39	0.34	0.30	0.25	0.20	0.18	0.16	0.14	0.10
RLD60P030X	0.47	0.41	0.36	0.30	0.24	0.22	0.19	0.16	0.12
RLD60P040X	0.62	0.54	0.48	0.40	0.32	0.29	0.25	0.22	0.16
RLD60P050X	0.78	0.68	0.60	0.50	0.41	0.36	0.32	0.27	0.20
RLD60P065X	1.01	0.88	0.77	0.65	0.53	0.47	0.41	0.35	0.26
RLD60P075X	1.16	1.02	0.89	0.75	0.61	0.54	0.47	0.41	0.30
RLD60P090X	1.40	1.22	1.07	0.90	0.73	0.65	0.57	0.49	0.36
RLD60P110X	1.71	1.50	1.31	1.10	0.89	0.79	0.69	0.59	0.44
RLD60P135X	2.09	1.84	1.61	1.35	1.09	0.97	0.85	0.73	0.54
RLD60P160X	2.48	2.18	1.90	1.60	1.30	1.15	1.01	0.86	0.64
RLD60P185X	2.87	2.52	2.20	1.85	1.50	1.33	1.17	1.00	0.74
RLD60P250X	3.88	3.40	2.98	2.50	2.03	1.80	1.58	1.35	1.00
RLD60P300X	4.65	4.08	3.57	3.00	2.43	2.16	1.89	1.62	1.20
RLD60P375X	5.81	5.10	4.46	3.75	3.04	2.70	2.36	2.03	1.50

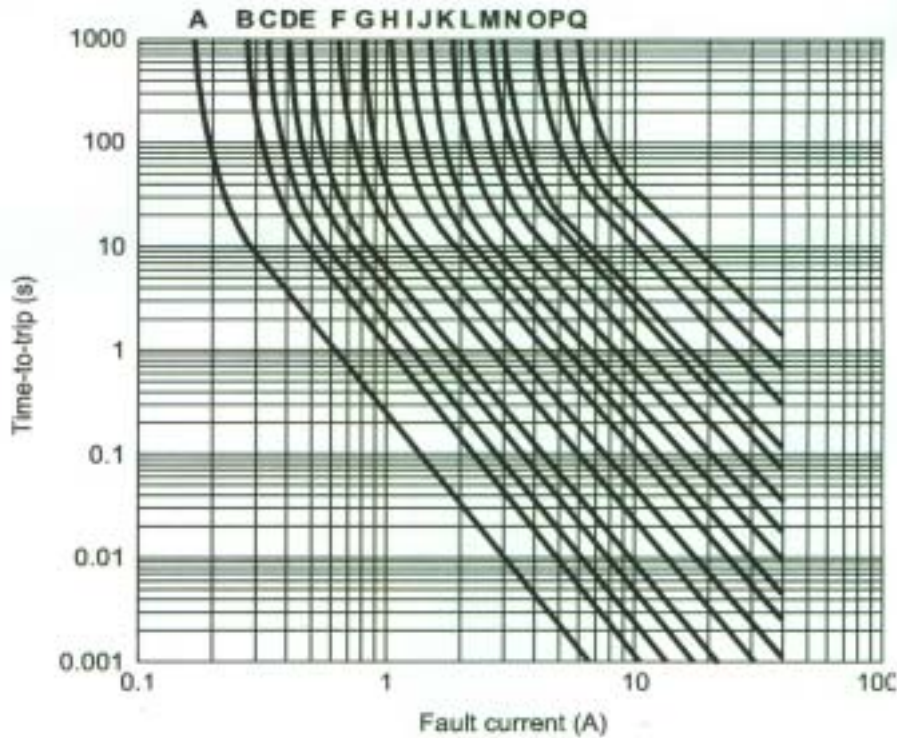
\* The additional suffix “F” means lead free product.

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## Radial Leaded PTC Devices

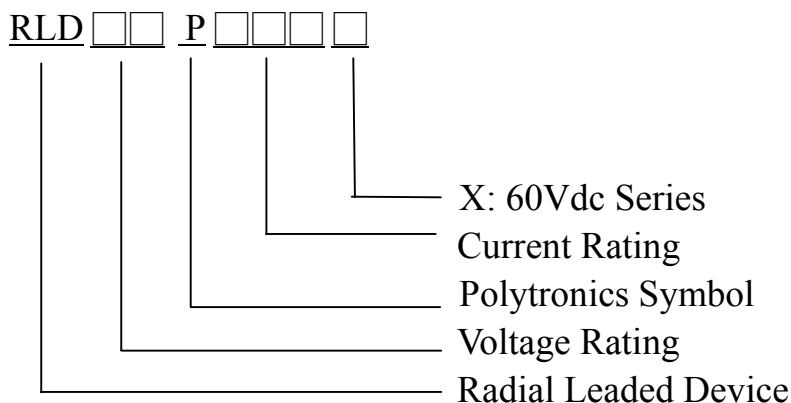
### AVERAGE TIME-CURRENT CURVE FOR RLD 60Vdc SERIES



A=RLD60P010X  
 B=RLD60P017X  
 C=RLD60P020X  
 D=RLD60P025X  
 E=RLD60P030X  
 F=RLD60P040X  
 G=RLD60P050X  
 H=RLD60P065X  
 I=RLD60P075X  
 J=RLD60P090X  
 K=RLD60P110X  
 L=RLD60P135X  
 M=RLD60P160X  
 N=RLD60P185X  
 O=RLD60P250X  
 P=RLD60P300X  
 Q=RLD60P375X

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### PART NUMBERING SYSTEM

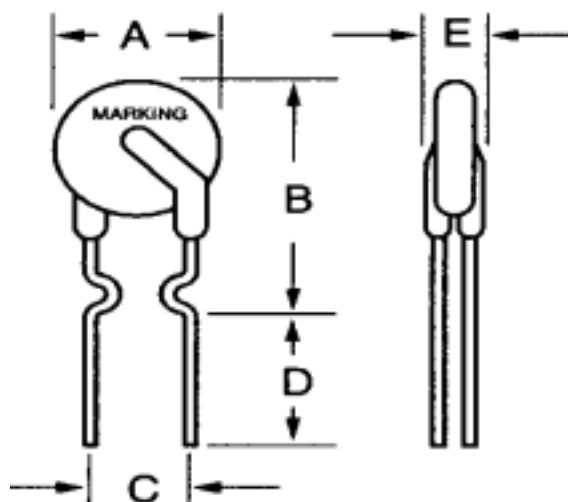


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## Radial Leaded PTC Devices

60Vdc Series Figure



### PHYSICAL DIMENSIONS (mm)

Part Number	A (max.)	B (max.)	C (typ.)	D (min.)	E (max.)	Physical Characteristics Lead Material
RLD60P010X	7.4	11.6	5.1	7.6	3.1	0.51 dia. Sn/CuFe
RLD60P017X	7.4	12.7	5.1	7.6	3.1	0.51 dia. Sn/CuFe
RLD60P020X	7.4	11.7	5.1	7.6	3.1	0.51 dia. Sn/CuFe
RLD60P025X	7.4	12.7	5.1	7.6	3.1	0.51 dia. Sn/CuFe
RLD60P030X	7.4	12.7	5.1	7.6	3.1	0.51 dia. Sn/CuFe
RLD60P040X	7.6	13.5	5.1	7.6	3.1	0.51 dia. Sn/CuFe
RLD60P050X	7.9	13.7	5.1	7.6	3.1	0.51 dia. Sn/Cu
RLD60P065X	9.4	14.5	5.1	7.6	3.1	0.51 dia. Sn/Cu
RLD60P075X	10.2	15.0	5.1	7.6	3.1	0.51 dia. Sn/Cu
RLD60P090X	11.2	15.8	5.1	7.6	3.1	0.51 dia. Sn/Cu
RLD60P110X	13.0	18.2	5.1	7.6	3.1	0.81 dia. Sn/Cu
RLD60P135X	13.58	19.8	5.1	7.6	3.1	0.81 dia. Sn/Cu
RLD60P160X	15.36	21.6	5.1	7.6	3.1	0.81 dia. Sn/Cu
RLD60P185X	16.76	23.0	5.1	7.6	3.1	0.81 dia. Sn/Cu
RLD60P250X	19.93	26.2	10.2	7.6	3.1	0.81 dia. Sn/Cu
RLD60P300X	23.11	29.3	10.2	7.6	3.1	0.81 dia. Sn/Cu
RLD60P375X	26.3	31.1	10.2	7.6	3.1	0.81 dia. Sn/Cu

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## Radial Leaded PTC Devices

### ENVIRONMENTAL SPECIFICATIONS

Operating/Storage Temperature	-40°C to +85°C	
Maximum Device Surface Temperature in Tripped State	125°C	
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 to -40°C 10 times	±5% typical resistance change
Solvent Resistance	MIL-STD-202, Method 215F	No change

### PHYSICAL SPECIFICATIONS

Lead Material	P020X-P040X: Tin-plated copper clad steel P050X-P375X: Tin-plated copper
Soldering Characteristics	Solderability per MIL-STD-202, Method 208E
Insulating Material	Cured, flame retardant epoxy polymer meets UL94V-0 requirements.
Device Labeling	Marked with the letter “P”, voltage, amperage rating, and lot number.

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# Radial Leaded PTC Devices

## TAPE AND REEL SPECIFICATIONS

Product availability: RLD60P010X-RLD60P300X

Devices taped using EIA468-B/IEC286-2 standards. See table below and Figures 1 and 2 for details.

Dimension Description	EIA Mark	IEC Mark	Dimensions	
			Dim.(mm)	Tol.(mm)
Carrier tape width	W	W	18	-0.5/+1.0
Hold down tape width	W <sub>4</sub>	W <sub>0</sub>	11	min.
Top distance between tape edges	W <sub>6</sub>	W <sub>2</sub>	3	max.
Sprocket hole position	W <sub>5</sub>	W <sub>1</sub>	9	-0.5+0.75
Sprocket hole diameter*	D <sub>0</sub>	D <sub>0</sub>	4	-0.32/+0.2
Abscissa to plane(straight lead)	H	H	18.5	+3.0
Abscissa to plane(kinked lead)	H <sub>0</sub>	H <sub>0</sub>	16	+0.5
Abscissa to top P010X-P090X	H <sub>1</sub>	H <sub>1</sub>	32.2	max.
Abscissa to top P110X-P300X	H <sub>1</sub>		47.5	max.
Overall width without lead protrusion:P010X-P090X	C <sub>1</sub>		42.5	max.
Overall width without lead protrusion:P110X-P300X			57	
Overall width with lead protrusion:P010X-P090X	C <sub>2</sub>		43.2	max.
Overall width with lead protrusion:P110X-P300X			58	
Lead protrusion	L <sub>1</sub>	l <sub>1</sub>	1.0	max.
Protrusion of cut out	L	L	11	max.
Protrusion beyond hold-down tape	l <sub>2</sub>	l <sub>2</sub>	Not specified	
Sprocket hole pitch:P010X-P090X	P <sub>0</sub>	P <sub>0</sub>	12.7	+0.3
Sprocket hole pitch:P110X-P300X	P <sub>0</sub>	P <sub>0</sub>	25.4	+0.5
Pitch tolerance			20 consecutive.	+1
Device pitch:P010X-P090X			12.7	
Device pitch:P110X-P300X			25.4	
Tape thickness	t	t	0.9	max.
Tape thickness with splice	t <sub>1</sub>		2.0	max.
Splice sprocket hole alignment			0	+0.3
Body lateral deviation	Δh	Δh	0	+1.0
Body tape plane deviation	Δp	Δp	0	+1.3
Ordinate to adjacent component lead*:P010X-P090X	P <sub>1</sub>	P <sub>1</sub>	3.81	+0.7
Ordinate to adjacent component lead*:P110X-P300X			7.62	+0.7
Lead spacing:P010X-P185X	F	F	5.08	+0.8
Lead spacing:P250-P300X	F	F	10.18	+0.8
Reel width P010X-P065X	w <sub>2</sub>	w	56	max.
Reel width P075X-P300X	w <sub>2</sub>	w	63.5	max.
Reel diameter	a	d	370	max.
Space between flanges less device*	w <sub>1</sub>		4.75	-3.25/+9.25
Arbor hole diameter	c	f	26	+12.0
Core diameter*	n	h	91	max.
Box			56/372/372	max.
Consecutive missing places			None	
Empty places per reel			0.1%max.	

\* The additional suffix "F" means lead free product.

\* Differs from EIA specification

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## Radial Leaded PTC Devices

### TAPE AND REEL SPECIFICATIONS

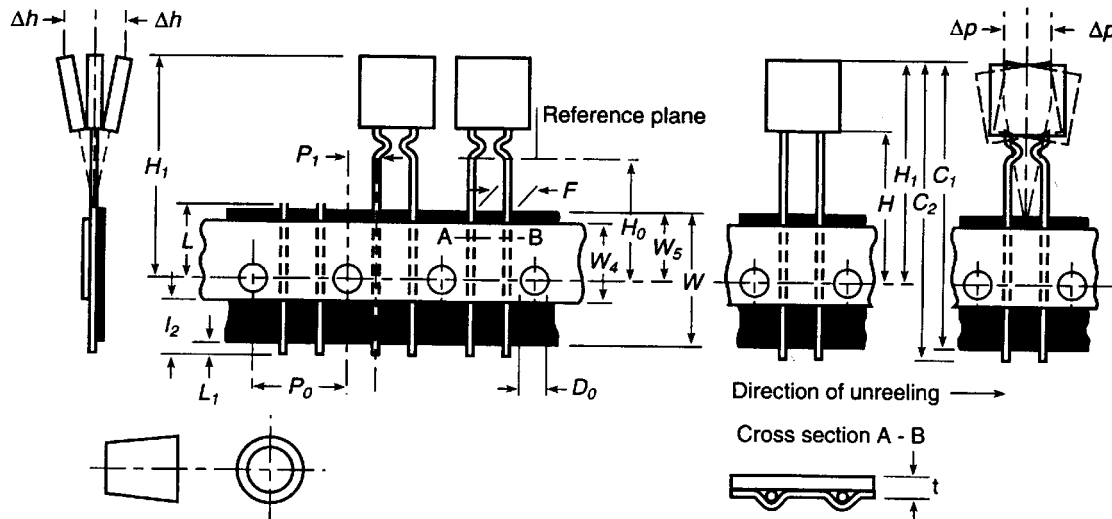


Figure 1

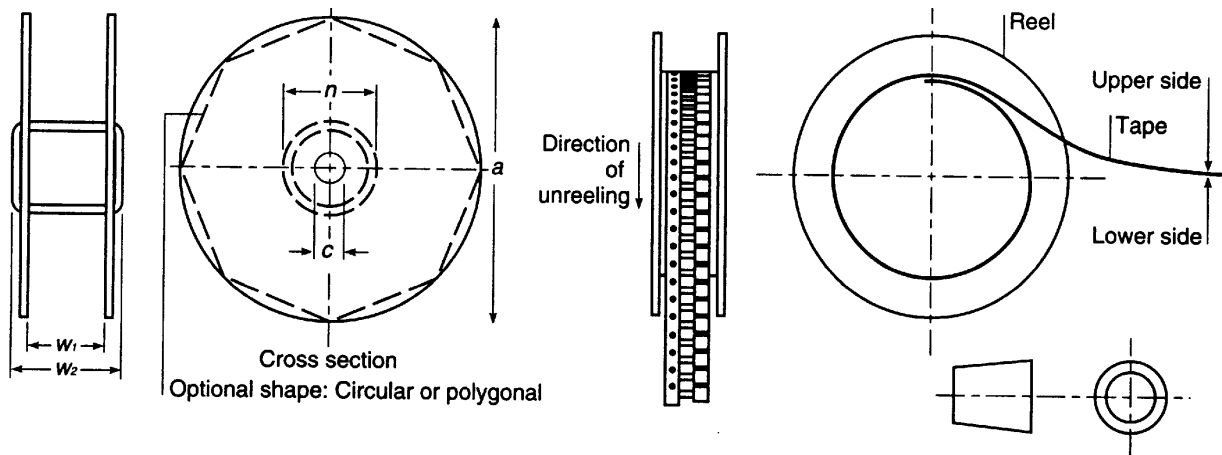


Figure 2

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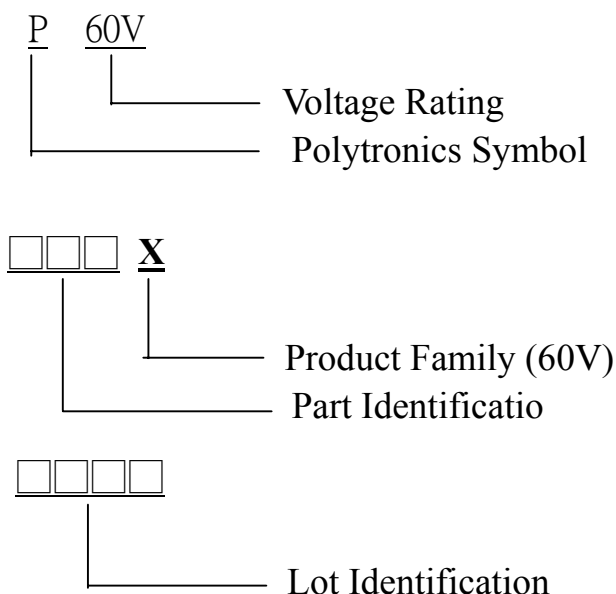
# Radial Leaded PTC Devices

## PACKAGING INFORMATION

Product Description	Part I.D.	Bag Quantity	Reelpack Quantity	Ammopack Quantity
RLD60P010X	010	500	2000	2000
RLD60P017X	017	500	2000	2000
RLD60P020X	020	500	2000	2000
RLD60P025X	025	500	2000	2000
RLD60P030X	030	500	2000	2000
RLD60P040X	040	500	2000	2000
RLD60P050X	050	500	2000	2000
RLD60P065X	065	500	2000	2000
RLD60P075X	075	500	2000	2000
RLD60P090X	090	500	2000	2000
RLD60P110X	110	500	1000	1000
RLD60P135X	135	100	1000	1000
RLD60P160X	160	100	1000	1000
RLD60P185X	185	100	1000	1000
RLD60P250X	250	100	1000	1000
RLD60P300X	300	100	1000	1000
RLD60P375X	375	100	N/A	N/A

\* The additional suffix "F" means lead free product.

## PART MARKING SYSTEM



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# Radial Leaded PTC Devices

## CROSS REFERENCE

Polytronics/ EVERFUSE™	Cross Reference	
	Raychem/ PolySwitch®	Bourns/ Multifuse®
RLD60P010X / RLD60P010X-S	RXE010 / RXE010S	MF-R010
RLD60P017X / RLD60P017X-S	RXE017 / RXE017S	MF-R017
RLD60P020X / RLD60P020X-S	RXE020 / RXE020S	MF-R020
RLD60P025X / RLD60P025X-S	RXE025 / RXE025S	MF-R025
RLD60P030X / RLD60P030X-S	RXE030 / RXE030S	MF-R030
RLD60P040X / RLD60P040X-S	RXE040 / RXE040S	MF-R040
RLD60P050X / RLD60P050X-S	RXE050 / RXE050S	MF-R050
RLD60P065X / RLD60P065X-S	RXE065 / RXE065S	MF-R065
RLD60P075X / RLD60P075X-S	RXE075 / RXE075S	MF-R075
RLD60P090X / RLD60P090X-S	RXE090 / RXE090S	MF-R090
RLD60P110X / RLD60P110X-S	RXE110K / RXE110	MF-RX110
RLD60P135X / RLD60P135X-S	RXE135K / RXE135	MF-RX135
RLD60P160X / RLD60P160X-S	RXE160K / RXE160	MF-RX160
RLD60P185X / RLD60P185X-S	RXE185K / RXE185	MF-RX185
RLD60P250X / RLD60P250X-S	RXE250K / RXE250	MF-RX250
RLD60P300X / RLD60P300X-S	RXE300K / RXE300	MF-RX300
RLD60P375X / RLD60P375X-S	RXE375K / RXE375	MF-RX375

\* The additional suffix “F” means lead free product.

“EVERFUSE” is a registered trademark of Polytronics Technology Corp.

“Multifuse” is a registered trademark of Bourns , Inc.

“PolySwitch” is a registered trademark of Raychem Corporation.

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