

# LRD-Axial Leaded Strap Lead(Pb) Free PTC Devices

- The new LRD Axial Leaded Strap Lead(Pb) Free PTC device are designed based on a proprietary conductive polymer material, to provide overcurrent and protection for rechargeable battery cells.
- The LRD Axial Leaded Strap Lead(Pb) Free devices featuring a slim, low profile and low resistance design and are ideal to install directly on the latest generations of battery cells for longer battery run time.
- Similar to the Everfuse STD Axial Strap devices, LRD products provide reliable, noncycling protection against overcharging and short circuits events and increase the battery safety level.
- Agency Approval: UL/ CSA File # E201431

TÜV File Certificate # 9956421



Polytronics Technology Corp  
REGISTERED TO 089905, TL8209  
ISO9001 (version 2000), and ISO 14001  
CERTIFICATE NO.A9727 and A19971



## 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> <sup>max.</sup> (W)	Maximum Time To Trip		Resistance			Agency Approval
						Current (A)	Time (Sec.)	R <sub>min</sub> (Ω)	R <sub>max</sub> (Ω)	R <sub>1max</sub> (Ω)	
LRD190F	1.9	3.9	15	100	1.2	9.50	5.00	0.039	0.072	0.102	UL TÜV CSA
LRD190SF	1.9	3.9	15	100	1.2	9.50	5.00	0.039	0.072	0.102	UL TÜV CSA
LRD260F	2.6	5.8	15	100	2.5	13.00	5.00	0.020	0.042	0.063	UL TÜV CSA
LRD260SF	2.6	5.8	15	100	2.5	13.00	5.00	0.020	0.042	0.063	UL TÜV CSA
LRD380F	3.8	8.3	15	100	2.5	19.00	5.00	0.013	0.026	0.037	UL TÜV CSA
LRD450F	4.5	8.9	20	100	2.5	22.50	5.00	0.011	0.020	0.028	UL TÜV CSA
LRD550F	5.5	10.5	20	100	2.8	27.50	5.00	0.009	0.016	0.022	UL TÜV CSA
LRD600F	6.0	11.7	20	100	2.8	30.00	5.00	0.007	0.014	0.019	UL TÜV CSA
LRD730F	7.3	14.1	20	100	3.3	30.00	5.00	0.006	0.012	0.015	UL TÜV CSA
LRD900F	9.0	16.7	20	100	3.8	45.00	5.00	0.006	0.010	0.014	UL TÜV CSA
LRD1000F	10.0	19.0	20	100	3.6	50.00	5.00	0.004	0.009	0.013	UL TÜV CSA

**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 for 20 sec.

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

**Recognitions: UL, CSA, TÜV recognized.**

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## LRD-Axial Leaded Strap Lead(Pb) Free PTC Devices

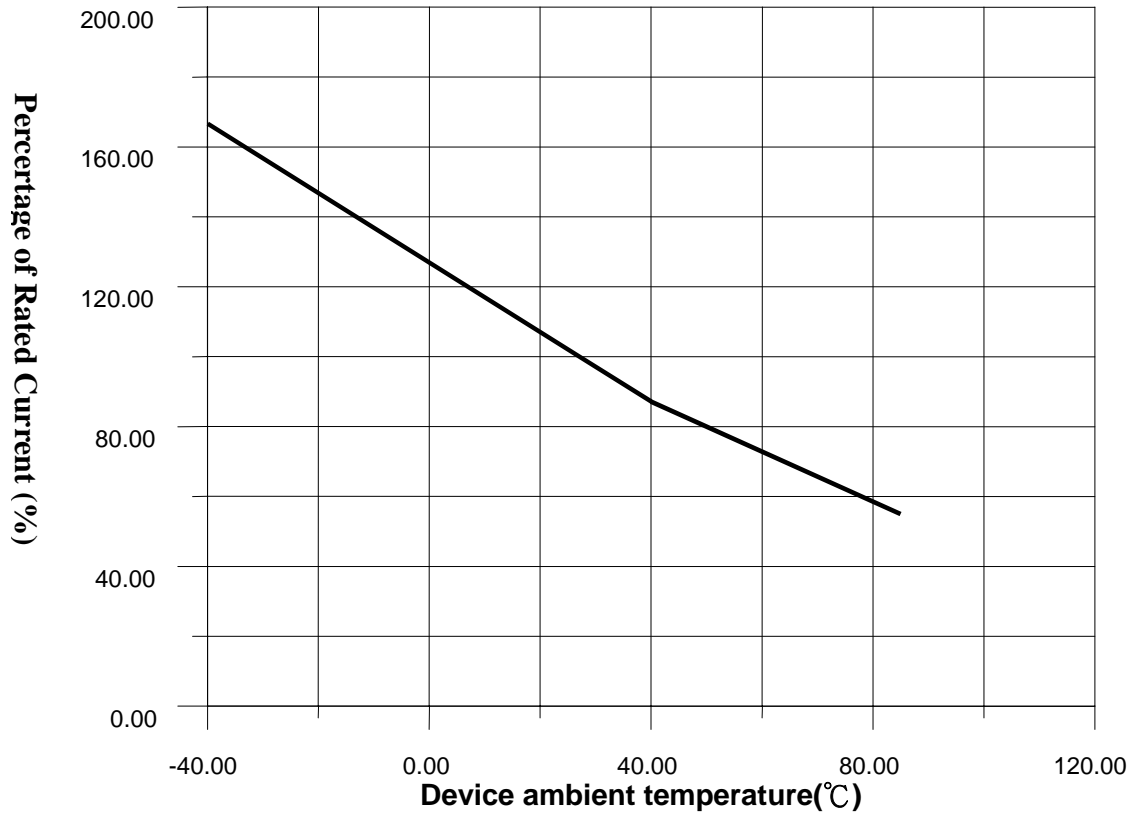
### How to Select a Polymer PTC fuse:

- (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<sup>°C</sup>/max<sup>°C</sup>)
- (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, VTD, VLD, LTD, LRD 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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# LRD-Axial Leaded Strap Lead(Pb) Free PTC Devices

## THERMAL DERATING CURVE FOR LRD LF SERIES



## THERMAL DERATING CHART FOR LRD LF SERIES - I<sub>hold</sub> (Amps)

Model	Ambient Operation Temperature								
	-40°C	-20°C	0°C	20°C	40°C	50°C	60°C	70°C	85°C
LRD190F	2.8	2.5	2.3	1.9	1.6	1.5	1.4	1.2	1.0
LRD190SF	2.8	2.5	2.3	1.9	1.6	1.5	1.4	1.2	1.0
LRD260F	3.8	3.4	3.1	2.6	2.2	2.0	1.9	1.7	1.4
LRD260SF	3.8	3.4	3.1	2.6	2.2	2.0	1.9	1.7	1.4
LRD380F	5.5	4.9	4.4	3.8	3.3	3.0	2.8	2.5	2.1
LRD450F	6.5	5.8	5.3	4.5	3.9	3.6	3.3	2.9	2.5
LRD550F	8.0	7.1	6.2	5.5	4.7	4.3	4.0	3.6	3.0
LRD600F	8.7	7.8	7.1	6.0	5.2	4.7	4.4	3.9	3.3
LRD730F	10.6	9.5	8.6	7.3	6.3	5.7	5.4	4.7	4.0
LRD900F	12.7	11.4	10.0	9.0	7.5	6.8	6.2	5.5	4.5
LRD1000F	14.0	12.6	11.1	10.0	8.3	7.6	6.9	6.2	5.2

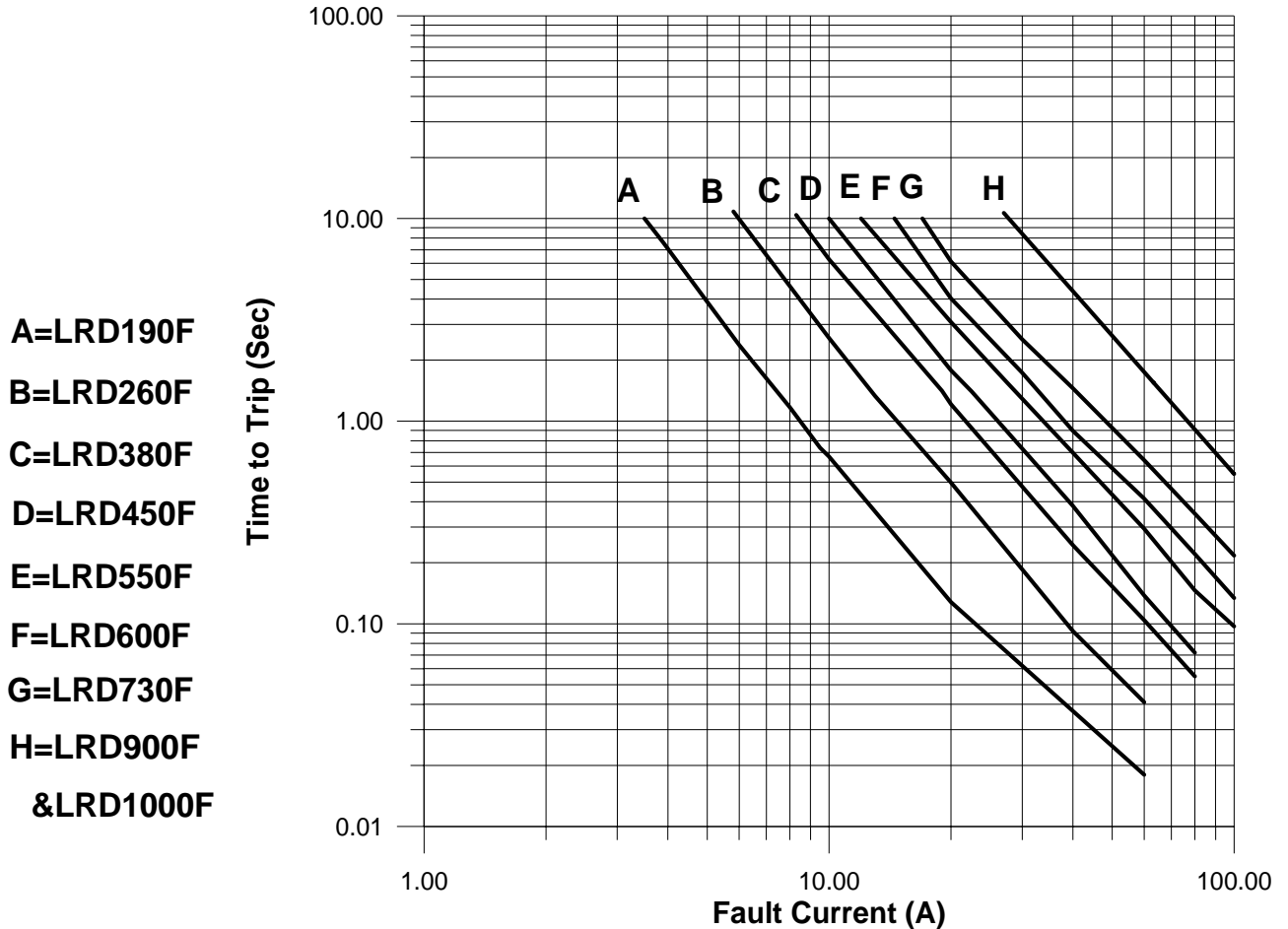
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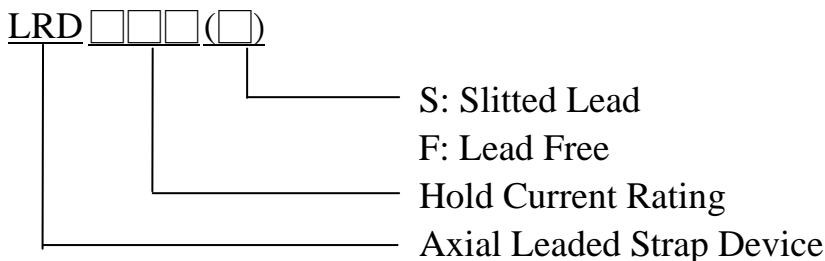
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**LRD-Axial Leaded Strap Lead(Pb) Free PTC Devices**

**AVERAGE TIME-CURRENT CURVE FOR LRD LF SERIES**



**PART NUMBERING SYSTEM**



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## LRD-Axial Leaded Strap Lead(Pb) Free PTC Devices

Figure 1

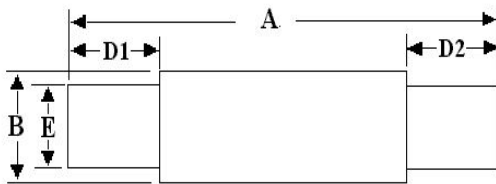
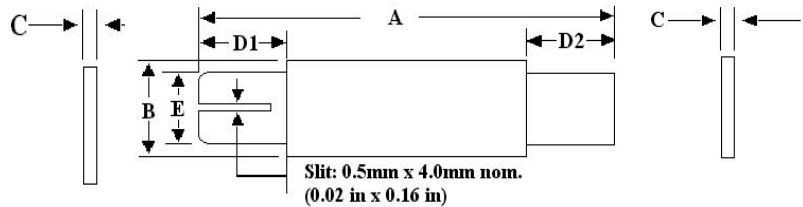


Figure 2



Part Number	A		B		C		D1	D2	E		
	Fig.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Min.	Min.	Max.
LRD190F	1	19.9	22.1	4.9	5.5	0.6	1.0	5.5	5.5	3.9	4.1
LRD190SF	2	19.9	22.1	4.9	5.5	0.6	1.0	5.5	5.5	3.9	4.1
LRD260F	1	20.9	23.1	4.9	5.5	0.6	1.0	4.1	4.1	3.9	4.1
LRD260SF	2	20.9	23.1	4.9	5.5	0.6	1.0	4.1	4.1	3.9	4.1
LRD380F	1	24.0	26.0	6.9	7.5	0.6	1.0	4.1	4.1	4.9	5.1
LRD450F	1	24.0	26.0	9.9	10.5	0.6	1.0	5.3	5.3	5.9	6.1
LRD550F	1	35.0	37.0	6.9	7.5	0.6	1.0	5.3	5.3	4.9	5.1
LRD600F	1	24.0	26.0	13.9	14.5	0.6	1.0	4.1	4.1	5.9	6.1
LRD730F	1	27.1	29.1	13.9	14.5	0.6	1.0	4.1	4.1	5.9	6.1
LRD900F	1	45.4	47.6	7.9	8.5	-	1.3	4.6	4.6	5.9	6.1
LRD1000F	1	50.0	52.0	7.9	8.5	-	1.3	5.2	5.2	5.9	6.1

### ENVIRONMENTAL SPECIFICATIONS

Operating/Storage Temperature	-40°C to +85°C	
Maximum Device Surface Temperature in Tripped State	125°C	
Passive Aging	+70°C, 1000 hours	±10% typical resistance change
Humidity Aging	+85°C, 85% R.H. 7days	±5% typical resistance change
Vibration	MIL-LRD-883C, Condition A	No change

### PHYSICAL SPECIFICATIONS

Lead Material	0.13mm nominal thickness, quarter-hard nickel
Insulating Material	Polyester tape

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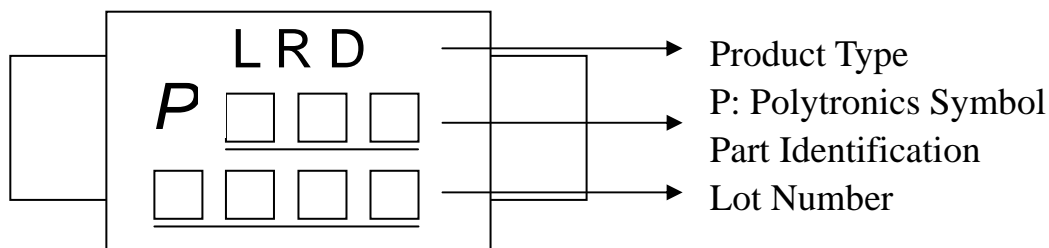
# LRD-Axial Leaded Strap Lead(Pb) Free PTC Devices

## PACKAGING INFORMATION

Product Description	Part I.D.	Bag Quantity(ea)	Standard Package(ea)
LRD190F	190F	500	10000
LRD190SF	190SF	500	10000
LRD260F	260F	500	10000
LRD260SF	260SF	500	10000
LRD380F	380F	500	10000
LRD450F	450F	500	10000
LRD550F	550F	500	10000
LRD600F	600F	500	10000
LRD730F	730F	500	10000
LRD900F	900F	500	10000
LRD1000F	1000F	500	10000

\*All models are packaged in bulk.

## PART MARKING SYSTEM



## CROSS REFERENCE

Polytronics/ EVERFUSE™	Cross Reference	
	Raychem/ PolySwitch®	Bourns/ Multifuse®
LRD190F	LR4-190F	MF-LR190
LRD190SF	LR4-190SF	MF-LR190S
LRD260F	LR4-260F	MF-LR260
LRD260SF	LR4-260SF	MF-LR260S
LRD380F	LR4-380F	MF-LR380
LRD450F	LR4-450F	MF-LR450
LRD550F	LR4-550F	MF-LR550
LRD600F	LR4-600F	MF-LR600
LRD730F	LR4-730F	MF-LR730
LRD900F	LR4-900F	N/A
LRD1000F	N/A	N/A

“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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