

Radial Leaded HVR600P Devices

- The High Voltage HVR600P devices, a Polymer Positive Temperature Coefficient (PPTC) combined with ceramic element as a device is suitable to protect telephony equipment against lightning and power cross strike, that is fully compatible with telecommunication standards.
- The High Voltage HVR600P devices are designed to provide various hold current product series offering 600Vac (Vmax interrupting) and 60Vdc (Vmax operating) and with very stable resistance stability after every over-current event caused by power strike.
- Applications: The High Voltage HVR600P product series are ideal for telecommunication and networking, central office, ISDN and XSDN equipments. It also help networking equipment manufacturers pass ITU K20, K21, FCC part 68 and Telcordia GR-1089 requirements.
- agency Approval: UL/CSA File # E201431.
TÜV Certificate # R9956421.

ELECTRICAL CHARACTERISTICS

HVR600P Series

Part Number	I hold (A)	Itrip (A)	Vmax (Vrms)	I max(A)	Pd max. (W)	Time To Trip (sec)@1A		Resistance			Agency Approval*
						typ	max	R min(Ω)	R max(Ω)	R lmax (Ω)	
HVR600P150CF	0.15	0.30	600	3	1.00	5.0	8.0	6	12	22	UL,CSA,TUV
HVR600P150CF-RA	0.15	0.30	600	3	1.00	5.0	7.5	7	10	20	UL,CSA,TUV
HVR600P150CF-RB	0.15	0.30	600	3	1.00	4.5	-	9	12	22	UL,CSA,TUV
HVR600P160CF	0.16	0.32	600	3	1.00	7.5	18	4	10	18	UL,CSA,TUV
HVR600P160CF-RA	0.16	0.32	600	3	1.00	9.5	-	4	7	16	UL,CSA,TUV
HVR600P160CF-R1	0.16	0.32	600	3	1.00	9.0	-	4	8	17	UL,CSA,TUV

◎ Specifications are subject to change without notice

◎ HVR600P series there are contain lead and lead free two kind of devices

Agency Specification

Product	Lightning	Power Cross
HVR600P150CF	FCC part 68 – 1.0kV 10/160 μs	UL60950, 3rd Ed – 600Vac, 40A
HVR600P160CF	800V 10/560 μs	Telcordia GR – 1089 – 600Vac, 60A
	Telcordia GR –1089–1.0kV 10/1000 μs	

*Select a specific part number for each application based on the agency request

*Customer should verify the device performance in their specified conditions.

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Protection Application Guide

Region/Specification	Application	Device Selection
North America Telcordia GR-1089	*Access network equipment Remote terminal Repeaters WAN equipment Cross -connect	HVR600P150CF HVR600P160CF
North America FCC part68, UL60950	Customer and IT equipment Analog modems ADSL, XDSL modems Phone sets, PBX systems Internet appliances POS terminals	HVR600P150CF HVR600P160CF
North America Telcordia GR-1089	Central office POTS/ISDN linecards T1/E1 linecards ADSL/VDSL splitters CSU/DSU	HVR600P150CF HVR600P160CF
North America Telcordia GR-1089	*Intrabuilding communication systems	HVR600P150CF HVR600P160CF
South America/Asia/Europe ITU K.21	LAN, VOIP cards Local loop handsets	

*resistance binned parts are recommended

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How to select a high voltage PPTC 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)
 - The High Voltage Radial devices (HVR Series)
 - The High Voltage Surface Mount Device(HVS series)
- (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 PPTC device's trip time (time-to-trip) will protect the circuit.
- (5) Verify that the circuit operating temperatures are within the PPTC device's normal operating temperature range.
- (6) Verify the performance and suitability of the chosen PPTC device in the application.
- (7) Verify the final equipment have to enclose which telecom standard requirement.

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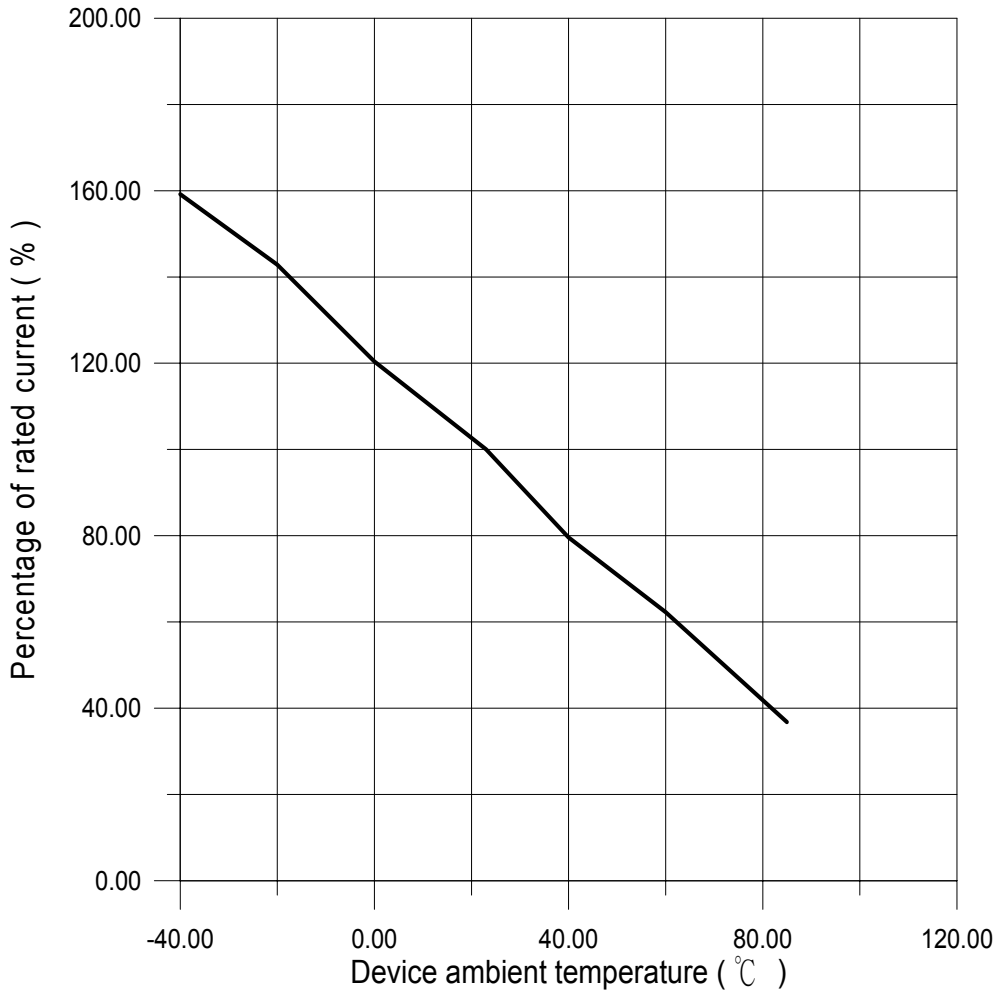
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THERMAL DERATING CURVE FOR HVR600P SERIES



THERMAL DERATING CHART FOR HVR600P SERIES – Ihold (Amps) (RECOMMENDED DATA)

Model	Ambient Operation Temperature						
	-40°C	-20°C	0°C	23°C	40°C	60°C	85°C
HVR600P150CF	0.232	0.21	0.187	0.15	0.124	0.096	0.050
HVR600P160CF	0.254	0.228	0.192	0.16	0.125	0.099	0.055

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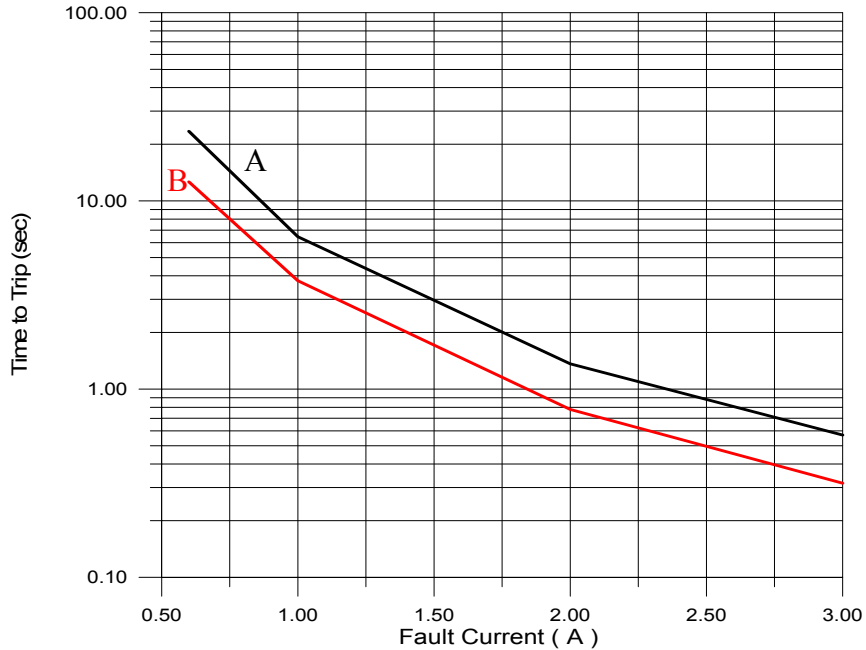
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Radial Leaded HVR600P Devices

AVERAGE TIME-CURRENT CURVE FOR HVR600P SERIES

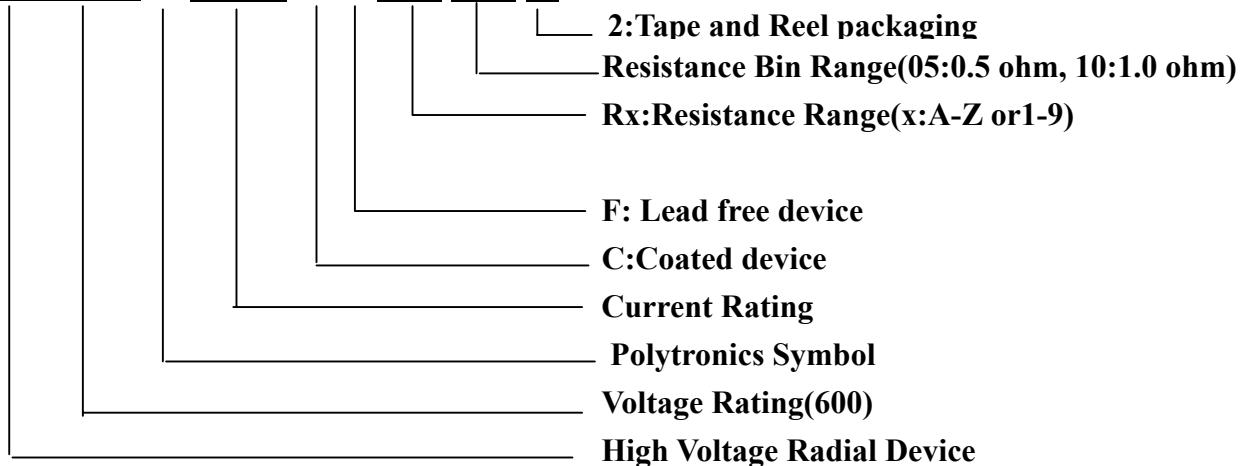
A : HVR600P160CF

B : HVR600P150CF



PART NUMBERING SYSTEM

HVR□□□ P □□□ □□-□□-□□-□



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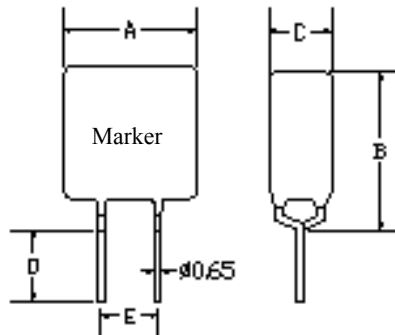


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Radial Leaded HVR600P Devices

HVR600P Series Figure

Figure 1



Center to Center

PHYSICAL DIMENSIONS (mm)

Part Number	A (max.)	B (max.)	C (max.)	D (min.)	E (typ.)	Physical Characteristics		
						Lead	Material	Figure
HVR600P150CF	13.5	12.6	6.0	4.7	5.1	0.65 dia.	Sn/Cu	1
HVR600P150CF-RA	13.5	12.6	6.0	4.7	5.1	0.65 dia.	Sn/Cu	1
HVR600P150CF-RB	13.5	12.6	6.0	4.7	5.1	0.65 dia.	Sn/Cu	1
HVR600P160CF	16	12.6	6.0	4.7	5.1	0.65 dia.	Sn/Cu	1
HVR600P160CF-RA	16	12.6	6.0	4.7	5.1	0.65 dia.	Sn/Cu	1
HVR600P160CF-R1	16	12.6	6.0	4.7	5.1	0.65 dia.	Sn/Cu	1

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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
Humidity Aging	+85°C, 85%R.H. 1000 hours
Thermal Shock	MIL-STD-202F Method 107G +125°C to -55°C 10 times
Solvent Resistance	MIL-STD-202, Method 215F

PHYSICAL SPECIFICATIONS

Lead Material	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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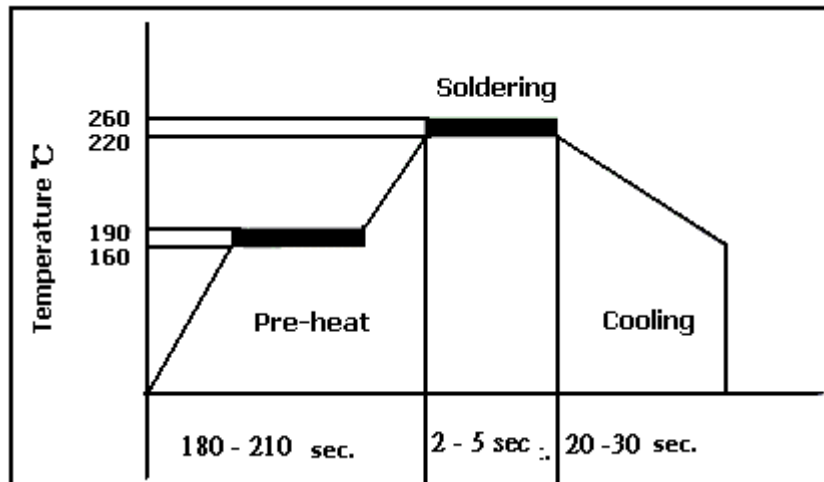


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Radial Leaded HVR600P Devices

● SOLDERING CONDITION

1. Wave soldering



RECOMMENDED CONDITIONS

Condition	Wave Soldering
Peak Temp/Time	260°C ≤ 5 Sec
≥ 220°C	2 Sec ~ 5 Sec
Preheat 140°C ~ 180°C	180 Sec ~ 210 Sec
Storage Condition	0°C ~ 35°C, ≤ 70%RH

- Recommended soldering methods: heat element oven or N₂ environment for lead-free
- Devices are designed to be wave soldered to the bottom side of the board.
- Devices can be cleaned using standard industry methods and solvents.
- This profile can use for lead free device

Note: If soldering temperatures exceed the recommended profile, devices may not meet the performance requirements.

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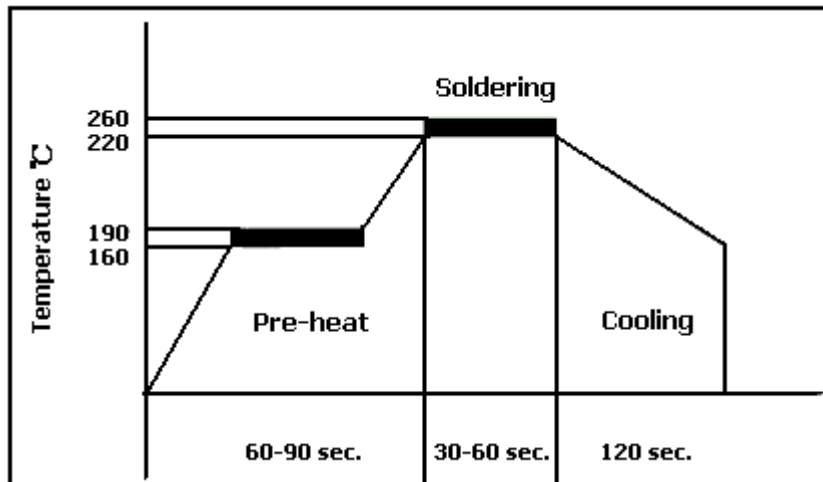


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Radial Leaded HVR600P Devices

● SOLDERING CONDITION

2. Solder reflow



RECOMMENDED CONDITIONS

Condition	Reflow
Peak Temp/Time	260°C ≥ 5 Sec
≥ 220°C	30 Sec ~ 60 Sec
Preheat 160°C ~ 190°C	60 Sec ~ 90 Sec
Storage Condition	0°C ~ 35°C, ≤ 70%RH

- Recommended reflow methods: IR, vapor phase oven, hot air oven, N₂ environment for lead-free
- Devices are not designed to be wave soldered to the bottom side of the board.
- Devices can be cleaned using standard industry methods and solvents.

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

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Radial Leaded HVR600P Devices

TAPE AND REEL SPECIFICATIONS

Product availability: HVR600150CF and HVR600P160CF

Devices taped using EIA468-B/IE286-2 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 ₄	W ₀	11	min.
Top distance between tape edges	W ₆	W ₂	3	max.
Sprocket hole position	W ₅	W ₁	9	-0.5+0.75
Sprocket hole diameter*	D ₀	D ₀	4	-0.32/+0.2
Abscissa to plane(straight lead)	H	H	18.5	+3.0
Abscissa to plane(kinked lead)	H ₀	H ₀	16	+0.5
Abscissa to top	H ₁	H ₁	32.2	max.
Overall width w/o lead protrusion	C ₁		42.5	max.
Overall width w/ lead protrusion	C ₂		43.2	max.
Lead protrusion	L ₁	l ₁	1.0	max.
Protrusion of cut out	L	L	11	max.
Protrusion beyond hold-down tape	l ₂	l ₂	Not specified	
Sprocket hole pitch: P150CF & P160CF	P ₀	P ₀	25.4	+0.5
Device pitch :P150CF & P160CF			25.4	
Pitch tolerance			20 consecutive.	+1
Tape thickness	t	t	0.9	max.
Tape thickness with splice	t ₁		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*	P ₁	P ₁	3.81	+0.7
Lead spacing:	F	F	5.08	+0.8
Reel width	w ₂	w	56	max.
Reel diameter	a	d	370	max.
Space between flanges less device*	w ₁		4.75	3.25/+8.25
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.	

*Differs from EIA specification

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TAPE AND REEL SPECIFICATIONS

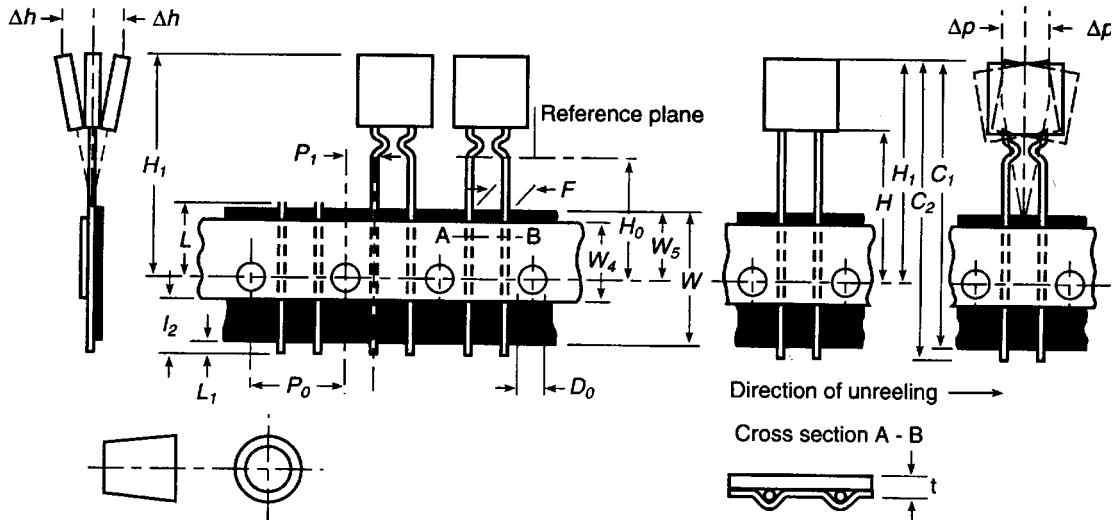


Figure 1

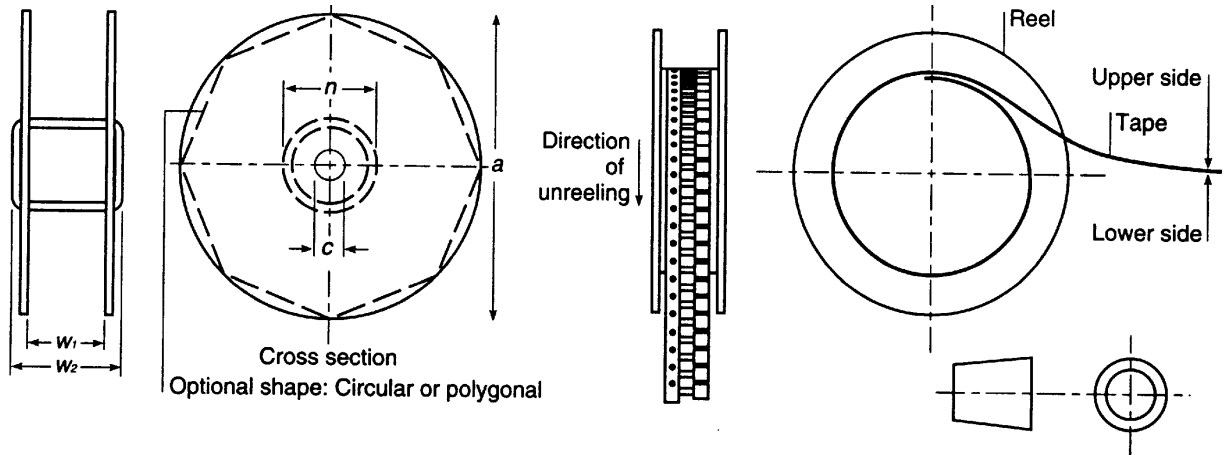


Figure 2

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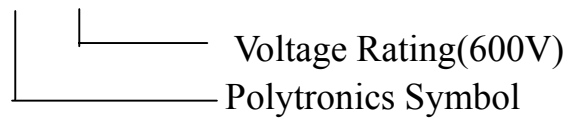
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PACKAGING INFORMATION

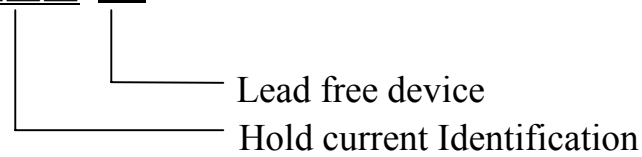
Product Description	Part I.D.	Bag Quantity	Reelpack Quantity	Ammopack Quantity
HVR600P150CF	150F	200	600	600
HVR600P160CF	160F	200	500	500

PART MARKING SYSTEM

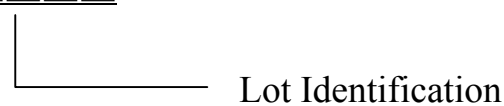
P 600



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CROSS REFERENCE

Polytronics/ EVERFUSE™	Cross Reference	
	Raychem/ PolySwitch®	Bourns/ Multifuse®
HVR600P150C HVR600P160C HVR600P150CF HVR600P160CF	TR600-150 TR600-160 TRF600-150 TRF600-160	MF-R015/600 MF-R016/600 N/A N/A

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

“PolySwitch” is a registered trademark of Raychem Corporation.

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