



Revision: M

HVR 250P Series Devices

2009.09.21

- The High Voltage Radial devices (HVR Series), a Polymer-based Positive Temperature Coefficient (PPTC) device is suitable to protect telephony equipment against lightning and power cross strike, that is fully compatible with telecommunication standards.
- The High Voltage Radial devices are designed to provide different hold current product series offering 250Vac (Vmax interrupting) and 60Vdc (Vmax operating) and with low resistance.
- Applications: The High Voltage Radial product series is ideal for telecommunication and networking, ISDN and XSDN equipments. It also help networking equipment manufacturers pass ITU K20, K21 and Telcordia requirements.
- agency Approval: UL/CSA File # E201431

TÜV Certificate # R 50103297.



ELECTRICAL CHARACTERISTICS

Part Number	I hold (A)	Itrip (A)	Vmax (Vdc) Vint/Vop	I max (A)	Pd typ. (W)	Max Time To Trip		Resistance			Agency Approval*
						Current (A)	Time (Sec.)	R min (Ω)	R max (Ω)	R lmax (Ω)	
HVR250P080CF	0.08	0.16	250/60	3	1	0.35	4.0	15	22	33	UL,CSA,TUV
HVR250P080CFT	0.08	0.16	250/60	3	1	0.35	4.0	15	22	33	UL,CSA,TUV
HVR250P120CF	0.12	0.24	250/60	3	1	1	2.5	4	8	16	UL,CSA,TUV
HVR250P120CF-RA	0.12	0.24	250/60	3	1	1	2.5	7	9	16	UL,CSA,TUV
HVR250P120CF-RC	0.12	0.24	250/60	3	1	1	3.0	5.4	7.5	14	UL,CSA,TUV
HVR250P120CF-RF	0.12	0.24	250/60	3	1	1	2.5	6	10.5	16	UL,CSA,TUV
HVR250P120CF-R1	0.12	0.24	250/60	3	1	1	2.5	6	9	16	UL,CSA,TUV
HVR250P120CF-R2	0.12	0.24	250/60	3	1	1	2.5	8	10.5	16	UL,CSA,TUV
HVR250P120CF-R3	0.12	0.24	250/60	3	1	1	2.5	8	10	16	UL,CSA,TUV
HVR250P120CFT	0.12	0.24	250/60	3	1	1	2.5	7	12	16	UL,CSA,TUV
HVR250P145CF	0.145	0.29	250/60	3	1	1	2.5	3	6	14	UL,CSA,TUV
HVR250P145CF-RA	0.145	0.29	250/60	3	1	1	2.5	3	5.5	12	UL,CSA,TUV
HVR250P145CF-RB	0.145	0.29	250/60	3	1	1	2.5	4.5	6	14	UL,CSA,TUV
HVR250P145CFT	0.145	0.29	250/60	3	1	1	2.5	5.4	7.5	14	UL,CSA,TUV
HVR250P180CF	0.18	0.65	250/60	10	1.8	1	20	0.8	2.2	4	UL,CSA,TUV
HVR250P180CFT	0.18	0.65	250/60	10	1.8	1	21	1.4	3.9	4.5	UL,CSA,TUV

* Typical value C: coated device F: lead-free device T: pre-tripped device

© Specifications are subject to change without notice.

聚鼎科技股份有限公司 Polytronics Technology Corp.

新竹市科學工業園區工業東四路 24-1 號 24-1, Industry E.4th Rd. Science Park, Hsinchu, Taiwan. TEL:+886-3-5643931 FAX:+886-3-5644624E-mail: sales@pttc.com.tw [Http://www.pttc.com.tw](http://www.pttc.com.tw)

HVR 250P Series Devices

2009.09.21

Agency Specification

Product	Lightning	Power Cross
HVR250P120C/CF/UF HVR250P145C/CF/UF	ITU K.20/21/45 – 4kV 10/700 μ s*	ITU K.20/21/45 – 600Vac, 600 Ω
HVR250P180C HVR250P180CF/UF	ITU K.20/21/45 – 1.5kV 10/700 μ s ITU K.20/21/45 – 4kV 10/700 μ s* Telcordia GR – 974 – 1.0kV 10/1000 μ s	ITU K.20/21/45 – 230Vac, 10 Ω ITU K.20/21/45 – 600Vac, 600 Ω Telcordia GR – 974- 283Vac, 10A

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

Protection Application Guide

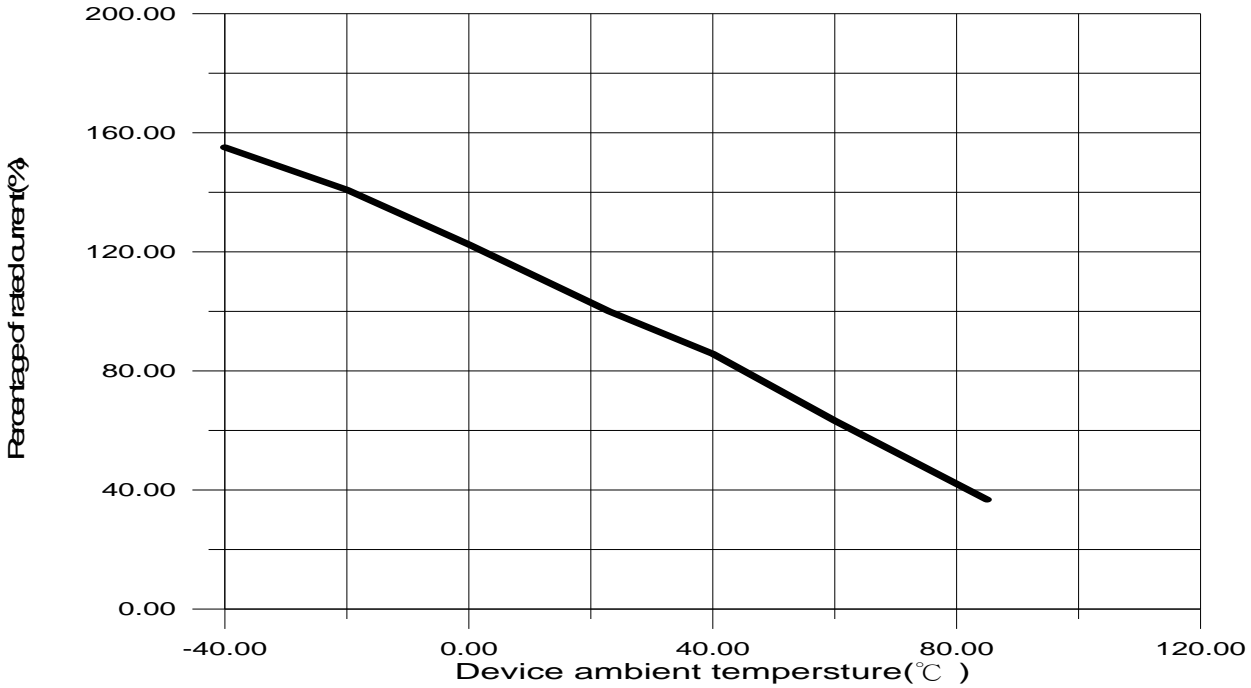
Region/Specification	Application	Device Selection
South America/Asia/Europe ITU K.45	*Access network equipment Remote terminal Repeaters WAN equipment Cross –connect	HVR250P180CF/UF HVR250P180CFT HVR250P145CF/CFT/UF HVR250P120CF/CFT/UF
South America/Asia/Europe ITU K.21	Customer and IT equipment Analog modems ADSL, XDSL modems Phone sets, PBX systems Internet appliances POS terminals	HVR250P180CF/UF HVR250P180CFT HVR250P145CF/CFT/UF HVR250P120CF/CFT/UF
South America/Asia/Europe ITU K.20	Central office POTS/ISDN linecards T1/E1 linecards ADSL/VDSL splitters CSU/DSU	HVR250P180CF/UF HVR250P180CFT HVR250P145CF/CFT/UF HVR250P120CF/CFT/UF
North America Telcordia GR-974	*Primary protection modules MDF modules	HVR250P180CF/UF HVR250P180CFT
South America/Asia/Europe ITU K.20	Network interface	HVR250P145CF/CFT/UF HVR250P120CF/CFT/UF
North America Telcordia GR-1089	*Intrabuilding communication systems	HVR250P180CF/UF HVR250P180CFT
South America/Asia/Europe ITU K.21	LAN, VOIP cards Local loop handsets	HVR250P145CF/CFT/UF HVR250P120CF/CFT/UF
	LAN Intrabuilding power cross Protection LAN equipment, IP phone	HVR250P080CF/UF

*Resistance binned parts are recommended



How to select a high voltage PPTC fuse:

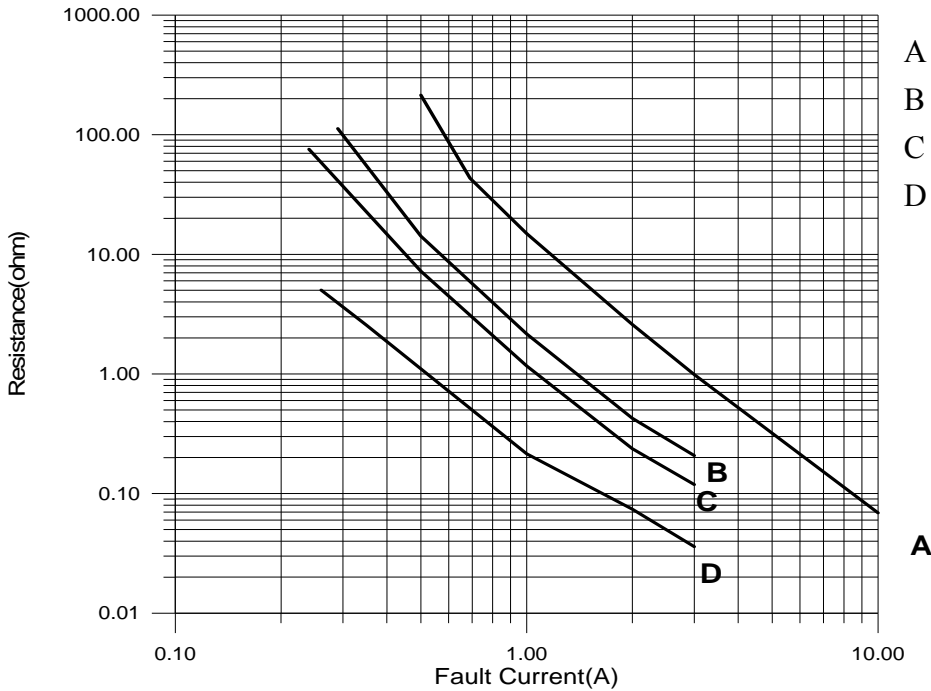
- (1) Determine the following operating parameters for the circuits:
 - (A) Normal Operating Current (I hold)
 - (B) Maximum Circuit Voltage (V max)
 - (C) Maximum Interrupt Current (I max)
 - (D) Normal Operating Temperature (min^{°C}/max^{°C})
- (2) Select the device form factor and dimension suitable 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 Devices(HVS series)
 - The High Voltage Chip Device(HVC 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 devices 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.

THERMAL DERATING CURVE FOR HVR SERIES

THERMAL DERATING CHART FOR HVR SERIES – Ihold (Amps)

Model	Ambient Operation Temperature								
	-40°C	-20°C	0°C	23°C	40°C	50°C	60°C	70°C	85°C
HVR250P080CF/CFT/UF	0.12	0.11	0.09	0.08	0.06	0.05	0.05	0.04	0.03
HVR250P120CF/CFT/UF	0.18	0.16	0.14	0.12	0.10	0.09	0.08	0.06	0.05
HVR250P145CF/CFT/UF	0.26	0.20	0.17	0.145	0.12	0.11	0.09	0.08	0.06
HVR250P180CF/CFT/UF	0.28	0.23	0.21	0.18	0.16	0.13	0.10	0.11	0.083

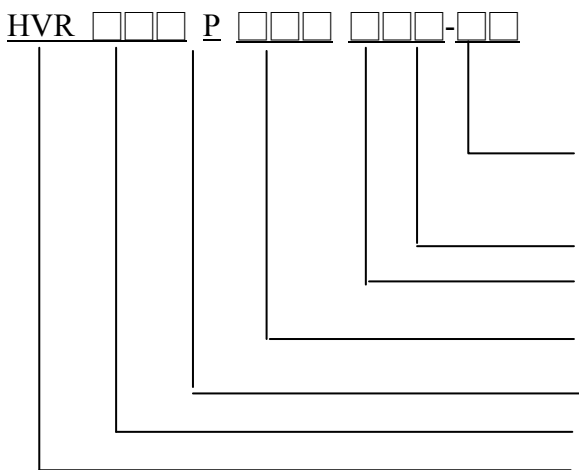
©Specifications are subject to change without notice.

AVERAGE TIME-CURRENT CURVE FOR HVR 250Vac SERIES



A : HVR250P180CF/CFT/UF
 B : HVR250P145CF/CFT/UF
 C : HVR250P120CF/CFT/UF
 D : HVR250P080CF/CFT/UF

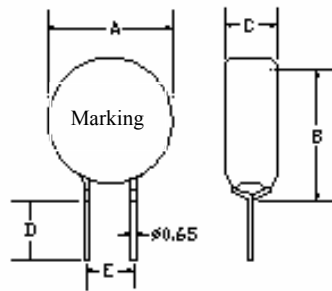
NUMBERING SYSTEM



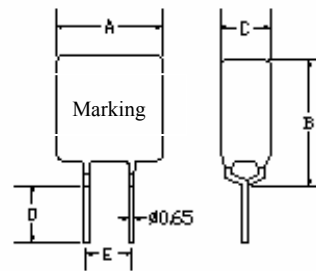
RX : Resirance Range (X : A-Z or 1-9)
RA, RB, RC... (optional)
T : Pre-tripped Device (optional)
C : Coated Device F : Lead Free Device
Current Rating
Polytronics Symbol
Voltage Rating
High Voltage Radial Device

HVR 250P Series Devices

2009.09.21

HVR : High Voltage Radial Leaded Device
250Vac Series Figure


Center to Center

Figure 1


Center to Center

Figure 2
PHYSICAL DIMENSIONS (mm)

Part Number	A (max.)	B (max.)	C (max.)	D (min.)	E (typ.)	Physical Characteristics		
						Max	Material	Figure
HVR250P080CF	5.8	9.9	4.6	4.7	5.1±0.7	0.65 dia	Sn/Cu	1
HVR250P080CFT	5.8	9.9	4.6	4.7	5.1±0.7	0.65 dia	Sn/Cu	1
HVR250P120CF	6.8	11.0	4.6	4.7	5.1±0.7	0.65 dia	Sn/Cu	2
HVR250P120CF-RA	6.8	11.0	4.6	4.7	5.1±0.7	0.65 dia	Sn/Cu	2
HVR250P120CF-RC	6.8	11.0	4.6	4.7	5.1±0.7	0.65 dia	Sn/Cu	2
HVR250P120CF-RF	6.8	11.0	4.6	4.7	5.1±0.7	0.65 dia	Sn/Cu	2
HVR250P120CF-R1	6.8	11.0	4.6	4.7	5.1±0.7	0.65 dia	Sn/Cu	2
HVR250P120CF-R2	6.8	11.0	4.6	4.7	5.1±0.7	0.65 dia	Sn/Cu	2
HVR250P120CF-R3	6.8	11.0	4.6	4.7	5.1±0.7	0.65 dia	Sn/Cu	2
HVR250P120CFT	6.8	11.0	4.6	4.7	5.1±0.7	0.65 dia	Sn/Cu	2
HVR250P145CF	6.8	11.0	4.6	4.7	5.1±0.7	0.65 dia	Sn/Cu	2
HVR250P145CF-RA	6.8	11.0	4.6	4.7	5.1±0.7	0.65 dia	Sn/Cu	2
HVR250P145CF-RB	6.8	11.0	4.6	4.7	5.1±0.7	0.65 dia	Sn/Cu	2
HVR250P145CFT	6.8	11.0	4.6	4.7	5.1±0.7	0.65 dia	Sn/Cu	2
HVR250P180CF	9.5	12.0	4.6	4.7	5.1±0.7	0.65 dia	Sn/Cu	1
HVR250P180CFT	9.5	12.0	4.6	4.7	5.1±0.7	0.65 dia	Sn/Cu	1

©Specifications are subject to change without notice.



聚鼎科技股份有限公司 Polytronics Technology Corp.

 新竹市科學工業園區工業東四路 24-1 號 24-1, Industry E.4th Rd. Science Park, Hsinchu, Taiwan. TEL:+886-3-5643931 FAX:+886-3-5644624

 E-mail: sales@pttc.com.tw [Http://www.pttc.com.tw](http://www.pttc.com.tw)



ENVIRONMENTAL SPECIFICATIONS

Operating/Storage Temperature	-40°C to +85°C
Maximum Device Surface Temperature in Tripped State	125°C
Passive Aging	65°C/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.

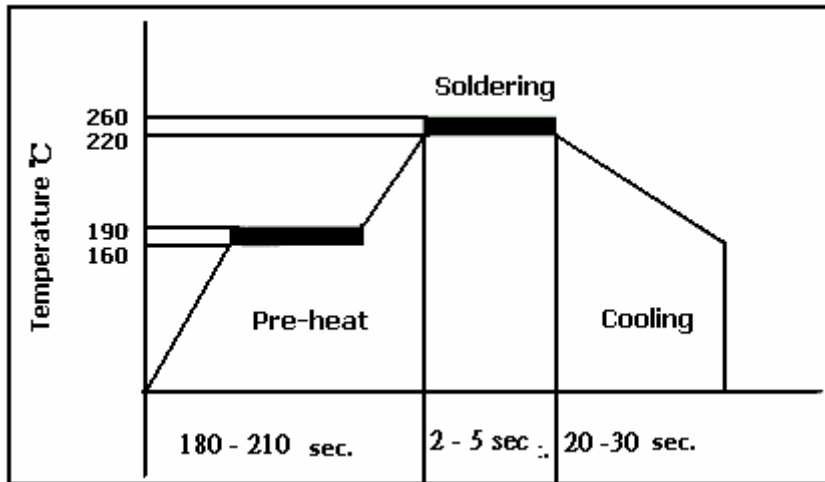
©Specifications are subject to change without notice.



HVR 250P Series Devices

● SOLDERING CONDITION

1. Wave soldering



RECOMMENDED CONDITIONS

Condition	Wave Soldering
Peak Temp/Time	260°C ≤ 5 Sec
≥ 220°C	2 Sec ~ 20 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.

HVR 250P Series Devices

2009.09.21

TAPE AND REEL SPECIFICATIONS

Product availability: HVR250P008CF, HVR250P120CF, HVR250145CF and HVR250180CF

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 P080CF-P145CF	P ₀	P ₀	12.7	+0.3
Sprocket hole pitch: P180CF	P ₀	P ₀	25.4	+0.5
Device pitch: P080CF-P145CF			12.7	
Device pitch: P180CF			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	5.1	+0.7
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



聚鼎科技股份有限公司 Polytronics Technology Corp.

新竹市科學工業園區工業東四路 24-1 號 24-1, Industry E.4th Rd. Science Park, Hsinchu, Taiwan. TEL:+886-3-5643931 FAX:+886-3-5644624

E-mail: sales@pttc.com.tw [Http://www.pttc.com.tw](http://www.pttc.com.tw)

TAPE AND REEL SPECIFICATIONS

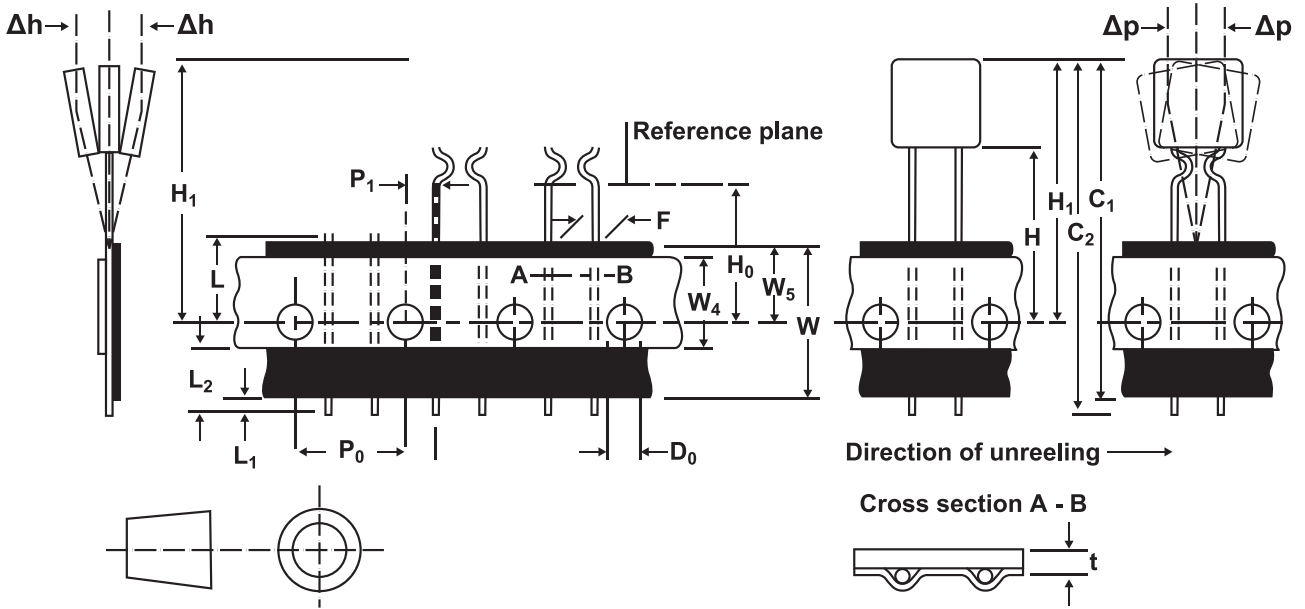


Figure 1

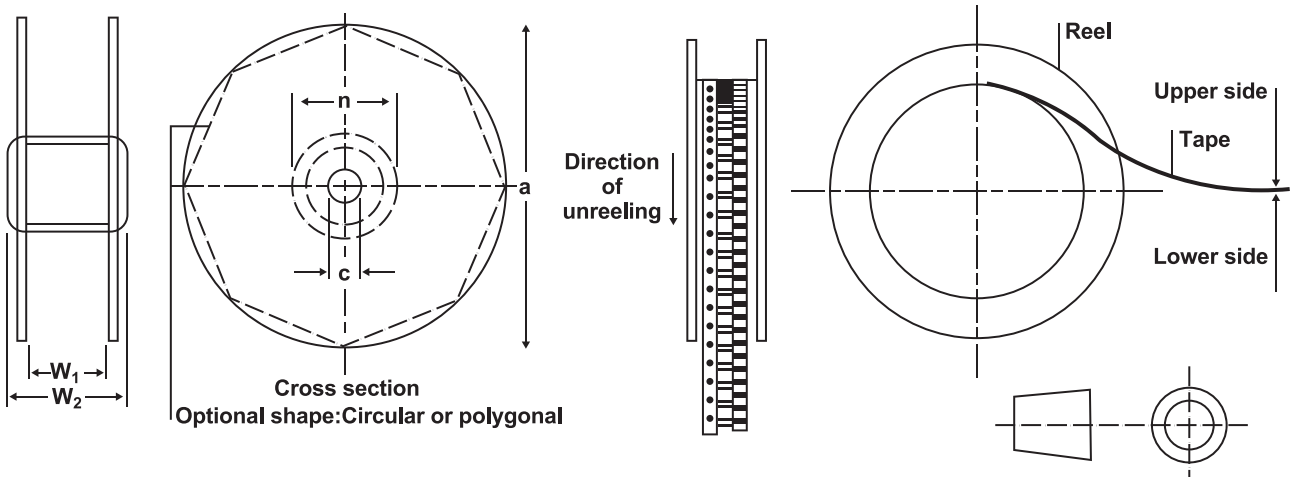


Figure 2

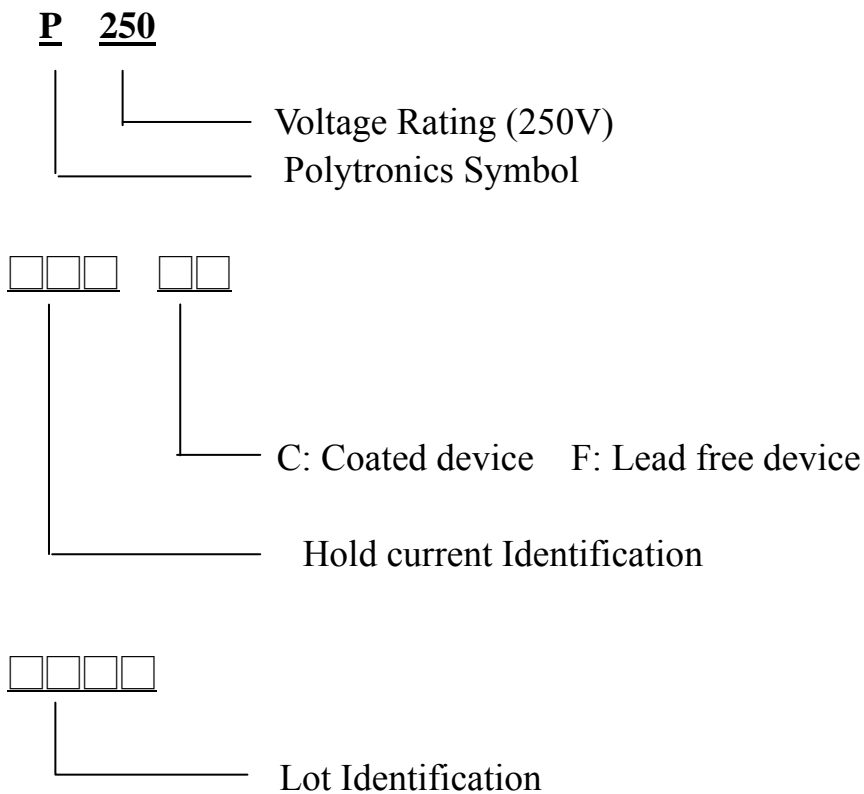
HVR 250P Series Devices

2009.09.21

PACKAGING INFORMATION

Product Description	Part I.D.	Bag Quantity	Reelpack Quantity	Ammopack Quantity
HVR250P080CF/CFT/UF	080CF	500	1200	1200
HVR250P120CF/CFT/UF	120CF	500	1200	1200
HVR250P145CF/CFT/UF	145CF	500	1200	1200
HVR250P180CF/CFT/UF	180CF	200	1000	1000

PART MARKING SYSTEM





CROSS REFERENCE

Polytronics/ EVERFUSE®	Cross Reference	
	Raychem/ PolySwitch®	Bourns/ Multifuse®
HVR250P080C	TR250-080	MF-R008/250
HVR250P080CF/UF	TRF250-080	N/A
HVR250P120C	TR250-120	MF-R012/250
HVR250P120CF/UF	TRF250-120	N/A
HVR250P145C	TR250-145	MF-R014/250
HVR250P145CF/UF	TRF250-145	N/A
HVR250P180C	N/A	MF-R018/250
HVR250P180CF/UF	TRF250-180	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.

© Specifications are subject to change without notice.

