

VTD-Axial Leaded Strap Lead(Pb) Free PTC Devices

- The new VTD Axial Leaded Strap Lead(Pb) Free PTC device are designed based on a proprietary conductive polymer material, to provide both overcurrent and overtemperature protection for rechargeable battery cells.
- The VTD 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, VTD 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 QS9000, TL9000
ISO9001 (version 2000), and ISO 14001
CERTIFICATE NO. A8727 and A18971



ELECTRICAL CHARACTERISTICS

Part Number	I _{hold} (A)	I _{trip} (A)	V _{max} (Vdc)	I _{max} (A)	P _d ^{max.} (W)	Maximum Time To Trip		Resistance			Agency Approval
						Current (A)	Time (Sec.)	R _{min} (Ω)	R _{max} (Ω)	R _{Imax} (Ω)	
VTD170F	1.70	3.40	16	100	1.4	8.50	3.00	0.030	0.052	0.105	UL/CSA/TÜV
VTD170XSF	1.70	3.40	16	100	1.4	8.50	3.00	0.030	0.052	0.105	UL/CSA/TÜV
VTD170XSDF	1.70	3.40	16	100	1.4	8.50	3.00	0.030	0.052	0.105	UL/CSA/TÜV
VTD175F	1.75	3.80	16	100	1.4	9.00	3.00	0.025	0.045	0.090	UL/CSA/TÜV
VTD175SF	1.75	3.80	16	100	1.4	9.00	3.00	0.025	0.045	0.090	UL/CSA/TÜV
VTD175LF	1.75	3.80	16	100	1.4	9.00	3.00	0.025	0.045	0.090	UL/CSA/TÜV
VTD175XLF	1.75	3.80	16	100	1.4	8.75	5.00	0.029	0.051	0.102	UL/CSA/TÜV
VTD175ELF	1.75	3.60	16	100	1.4	8.75	5.00	0.029	0.051	0.102	UL/CSA/TÜV
VTD175NELF	1.75	3.60	16	100	1.4	8.75	5.00	0.029	0.051	0.102	UL/CSA/TÜV
VTD200F	2.00	4.50	16	100	1.5	10.00	4.00	0.021	0.039	0.080	UL/CSA/TÜV
VTD200SF	2.00	4.50	16	100	1.5	10.00	4.00	0.021	0.039	0.080	UL/CSA/TÜV
VTD200ULF	2.00	4.70	16	100	1.5	10.00	5.00	0.022	0.039	0.076	UL/CSA/TÜV
VTD210F	2.10	4.70	16	100	1.5	10.00	5.00	0.018	0.030	0.060	UL/CSA/TÜV
VTD210SF	2.10	4.70	16	100	1.5	10.00	5.00	0.018	0.030	0.060	UL/CSA/TÜV
VTD210SSF	2.10	4.70	16	100	1.5	10.00	5.00	0.018	0.030	0.060	UL/CSA/TÜV
VTD210LF	2.10	4.70	16	100	1.5	10.00	5.00	0.018	0.030	0.060	UL/CSA/TÜV
VTD210NLF	2.10	4.70	16	100	1.5	10.00	5.00	0.018	0.035	0.065	UL/CSA/TÜV
VTD210ULF	2.10	4.70	16	100	1.5	10.00	5.00	0.018	0.035	0.065	UL/CSA/TÜV
VTD240F	2.40	5.40	16	100	1.5	12.00	4.00	0.015	0.026	0.052	UL/CSA/TÜV

Note: I_{hold} = Hold current: maximum current device will pass without tripping in 25°C still air.

I_{trip} = Trip current: minimum current at which the device will trip in 25°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 25°C still air.

R_{min} = Minimum resistance of device in initial (un-soldered) state.

R_{Imax} = Maximum resistance of device at 25°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.

© Specifications are subject to change without notice.

12/3/2006

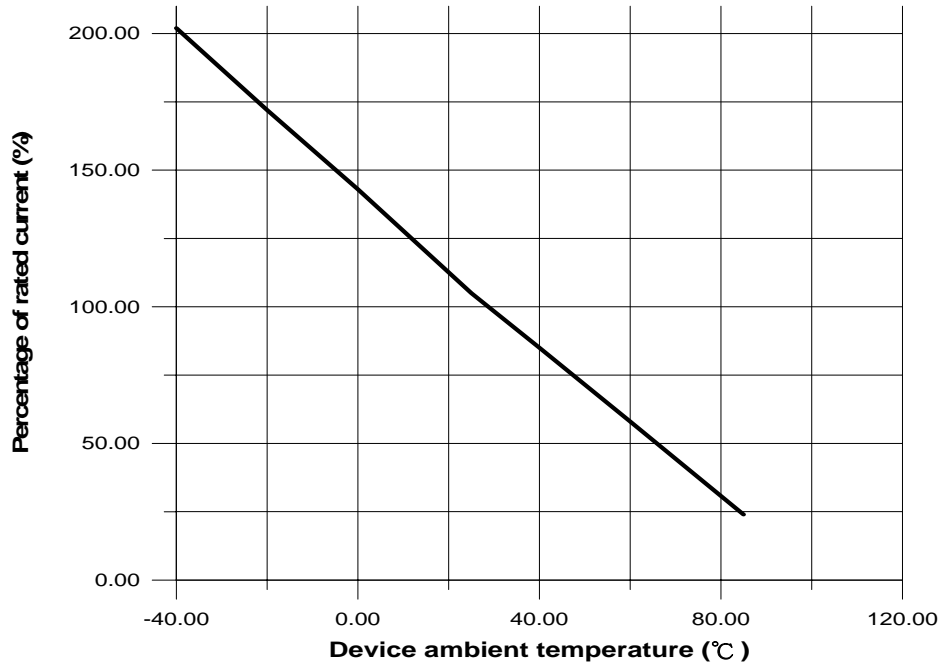
VTD-Axial Leaded Strap Lead(Pb) Free PTC Devices**How to Select a Polymer PTC fuse:**

- (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^{°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, VTD, 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.

12/3/2006

VTD-Axial Leaded Strap Lead(Pb) Free PTC Devices

THERMAL DERATING CURVE FOR VTD SERIES



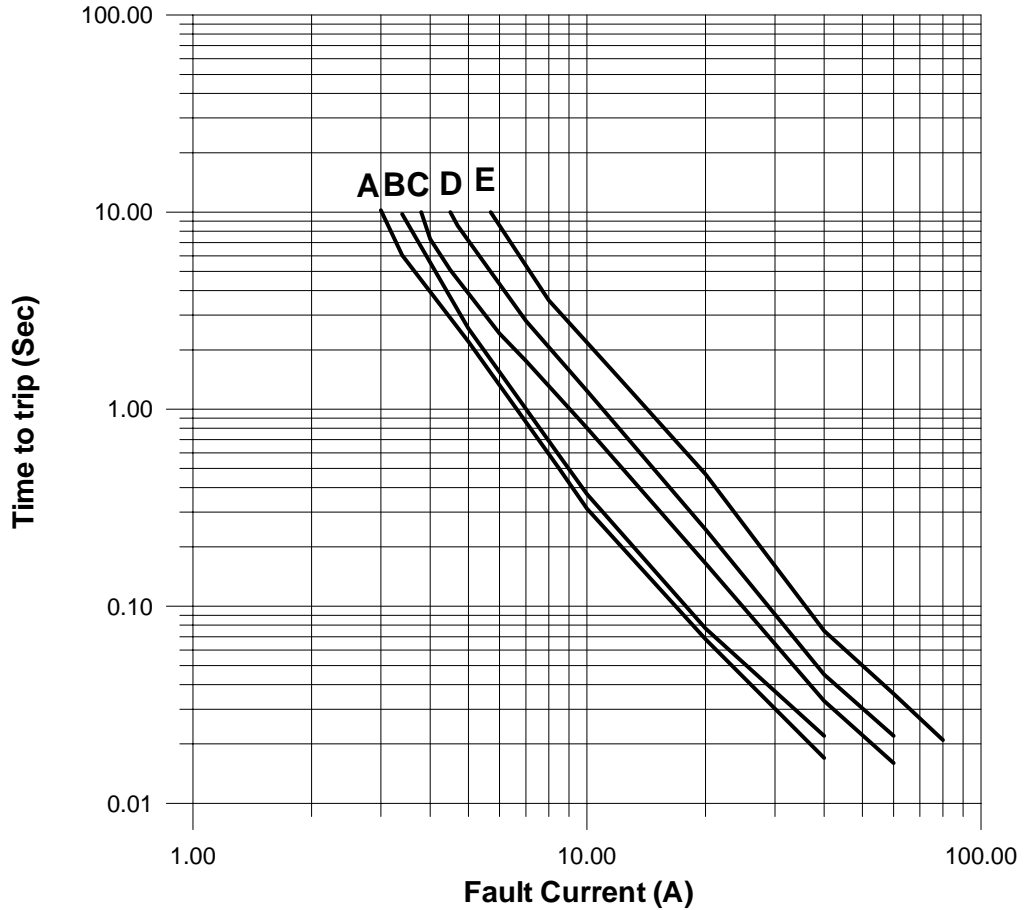
THERMAL DERATING CHART FOR VTD SERIES - Ihold (Amps)

Model	Ambient Operation Temperature								
	-40°C	-20°C	0°C	25°C	40°C	50°C	60°C	70°C	85°C
VTD170F	3.20	2.70	2.20	1.70	1.30	1.00	0.80	0.50	0.10
VTD170XSF	3.20	2.70	2.20	1.70	1.30	1.00	0.80	0.50	0.10
VTD170XSDF	3.20	2.70	2.20	1.70	1.30	1.00	0.80	0.50	0.10
VTD175F	3.20	2.70	2.20	1.75	1.30	1.00	0.80	0.50	0.10
VTD175SF	3.20	2.70	2.20	1.75	1.30	1.00	0.80	0.50	0.10
VTD175LF	3.20	2.70	2.20	1.75	1.30	1.00	0.80	0.50	0.10
VTD175XLF	3.20	2.70	2.20	1.75	1.30	1.00	0.80	0.50	0.10
VTD175ELF	3.20	2.70	2.20	1.75	1.30	1.00	0.80	0.50	0.10
VTD175NELF	3.20	2.70	2.20	1.75	1.30	1.00	0.80	0.50	0.10
VTD200F	3.70	3.20	2.60	2.00	1.50	1.20	0.90	0.50	0.10
VTD200SF	3.70	3.20	2.60	2.00	1.50	1.20	0.90	0.50	0.10
VTD200ULF	3.70	3.20	2.60	2.00	1.50	1.20	0.90	0.50	0.10
VTD210F	4.10	3.50	2.90	2.10	1.60	1.30	1.00	0.70	0.10
VTD210SF	4.10	3.50	2.90	2.10	1.60	1.30	1.00	0.70	0.10
VTD210SSF	4.10	3.50	2.90	2.10	1.60	1.30	1.00	0.70	0.10
VTD210LF	4.10	3.50	2.90	2.10	1.60	1.30	1.00	0.70	0.10
VTD210NLF	4.10	3.50	2.90	2.10	1.60	1.30	1.00	0.70	0.10
VTD210ULF	4.10	3.50	2.90	2.10	1.60	1.30	1.00	0.70	0.10
VTD240F	4.40	3.70	3.10	2.40	1.80	1.50	1.20	0.90	0.10

12/3/2006

VTD-Axial Leaded Strap Lead(Pb) Free PTC Devices

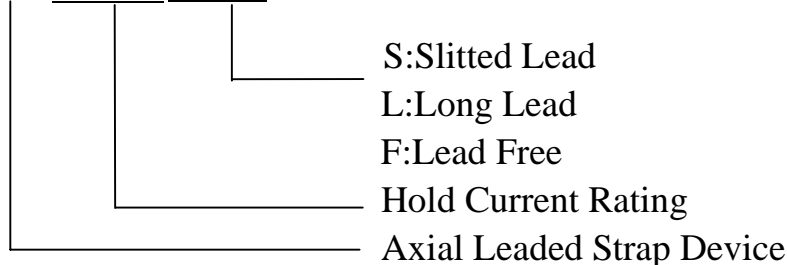
AVERAGE TIME-CURRENT CURVE FOR VTD SERIES



- A=VTD170F
- B=VTD175F
- C=VTD200F
- D=VTD210SF
- E=VTD240F

PART NUMBERING SYSTEM

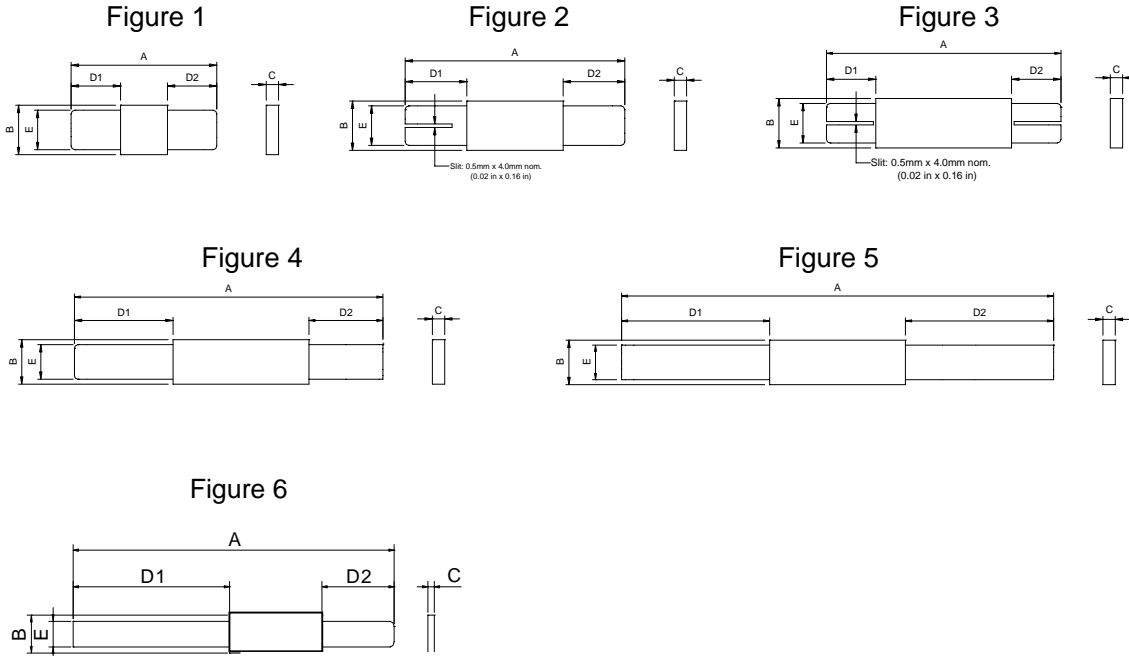
VTD □□□ (□□)



12/3/2006



VTD-Axial Leaded Strap Lead(Pb) Free PTC Devices



PHYSICAL DIMENSIONS (mm)

Part Number	Fig.	A		B		C		D1		D2		E	
		Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
VTD170F	1	15.4	17.5	7.0	7.4	0.5	0.8	4.0	6.2	4.0	6.2	3.9	4.1
VTD170XSf	2	20.9	22.9	4.9	5.3	0.5	0.8	4.0	8.6	4.0	8.6	3.9	4.1
VTD170XSDF	2	18.3	20.3	4.9	5.3	0.5	0.8	6.0	8.6	3.4	6.0	3.9	4.1
VTD175F	1	20.9	22.2	3.5	3.8	0.5	0.8	4.0	5.0	4.0	5.0	2.9	3.1
VTD175SF	2	20.9	22.2	3.5	3.8	0.5	0.8	4.0	5.0	4.0	5.0	2.9	3.1
VTD175LF	1	26.0	28.0	3.5	3.8	0.5	0.8	6.0	-	6.0	-	2.9	3.1
VTD175XLF	4	25.5	28.2	3.5	3.9	0.5	0.8	8.7	10.3	5.7	7.3	2.4	2.6
VTD175ELF	6	38.8	41.2	3.5	3.9	0.6	0.8	18.7	20.3	8.7	10.3	2.4	2.6
VTD175NELF	6	38.8	41.2	2.9	3.3	0.6	0.8	20.0	22.0	5.2	6.8	2.4	2.6
VTD200F	1	20.9	23.1	3.8	4.3	0.6	0.7	4.0	5.0	4.0	5.0	2.9	3.1
VTD200SF	2	20.9	23.1	3.8	4.3	0.6	0.7	4.0	5.0	4.0	5.0	2.9	3.1
VTD200ULF	4	36.0	39.0	4.1	4.3	0.5	0.8	3.9	5.3	19.7	21.5	2.9	3.1
VTD210F	1	20.9	23.1	4.9	5.3	0.6	0.8	4.1	5.8	4.1	5.8	3.9	4.1
VTD210SF	2	20.9	23.1	4.9	5.3	0.6	0.8	4.1	5.8	4.1	5.8	3.9	4.1
VTD210SSF	3	20.9	23.1	4.9	5.3	0.6	0.8	4.1	5.8	4.1	5.8	3.9	4.1
VTD210LF	1	24.0	26.0	4.9	5.3	0.6	0.8	5.0	7.1	5.0	7.1	3.9	4.1
VTD210NLF	5	70.5	71.5	3.8	4.3	0.6	0.8	25.0	-	25.0	-	2.9	3.1
VTD210ULF	5	70.5	71.5	4.9	5.3	0.6	0.8	28.5	-	28.5	-	3.9	4.1
VTD240F	1	24.2	26.2	4.9	5.3	0.6	0.8	5.0	5.7	5.0	5.7	3.9	4.1

12/3/2006



VTD-Axial Leaded Strap Lead(Pb) Free PTC Devices**ENVIRONMENTAL SPECIFICATIONS**

Operating/Storage Temperature	-40°C to +85°C	
Passive Aging	+60°C, 1000 hours	±10% typical resistance change
Humidity Aging	+60°C, 95%R.H. 1000 hours	±10% typical resistance change
Thermal Shock	MIL-STD-202G, Method 107G +85°C to -40°C 10 times ±5% typical resistance change	
Vibration	MIL-STD-883E, Method 2026	No change

PHYSICAL SPECIFICATIONS

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

◎Specifications are subject to change without notice.

12/3/2006

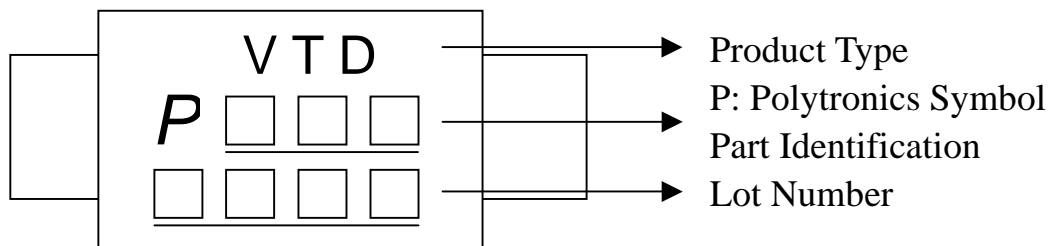
VTD-Axial Leaded Strap Lead(Pb) Free PTC Devices

PACKAGING INFORMATION

Product Description	Part I.D.	Bag Quantity(ea)	Standard Package(ea)
VTD170F	170F	500	10000
VTD170XSF	170XSF	500	10000
VTD175F	175F	500	10000
VTD175SF	175SF	500	10000
VTD175LF	175LF	500	10000
VTD175XLF	175XLF	500	10000
VTD175ELF	175ELF	500	10000
VTD175NELF	175NELF	500	10000
VTD200F	200F	500	10000
VTD200SF	200SF	500	10000
VTD200ULF	200ULF	500	10000
VTD210F	210F	500	10000
VTD210SF	210SF	500	10000
VTD210SSF	210SSF	500	10000
VTD210LF	210LF	500	10000
VTD210NLF	210NLF	500	10000
VTD210ULF	210ULF	500	10000
VTD240F	240F	500	10000

*All models are packaged in bulk.

PART MARKING SYSTEM



12/3/2006

VTD-Axial Leaded Strap Lead(Pb) Free PTC Devices

CROSS REFERENCE

Polytronics/ EVERFUSE™	Cross Reference	
	Raychem/ PolySwitch®	Bourns/ Multifuse®
VTD170F	VTP170F	MF-VS170
VTD170XSF	VTP170XSF	N/A
VTD175F	VTP175UF	N/A
VTD175SF	N/A	N/A
VTD175LF	N/A	N/A
VTD175XLF	N/A	N/A
VTD175ELF	N/A	N/A
VTD175NELF	N/A	N/A
VTD200F	VTP200GF	N/A
VTD200SF	N/A	N/A
VTD200ULF	VTP200ULF	N/A
VTD210F	VTP210GF	MF-VS210G
VTD210SF	N/A	N/A
VTD210SSF	VTP210SSF	N/A
VTD210LF	VTP210LF	MF-VS210L
VTD210NLF	N/A	N/A
VTD210ULF	N/A	N/A
VTD240F	VTP240F	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.

12/3/2006