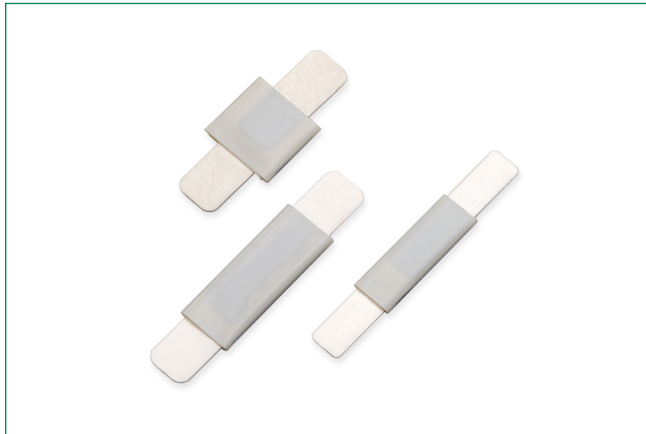


PolySwitch® Resettable PPTCs

Battery Strap > VLP Series



Description

Littelfuse PolySwitch, a pioneer of polymeric positive temperature coefficient (PPTC) resettable devices, offers several material platforms to help protect battery applications. The low trip temperature and broad range of hold current ratings combined with a broad range of form-factors are a unique combination for the VLP series.

Features & Benefits

- Low trip temperature
- Current ratings from 1.2A to 2.7A
- Voltage ratings from 16V
- Multiple form factors for added design flexibility
- Low-resistance devices increase battery operating time
- RoHS compliant and Halogen free
- Compatible with high-volume electronics assembly
- UL Recognized to UL 1434
CSA Certified to CSA TIL No. CA-3A TUV Certified to EN 60730-

Additional Information



Resources



Accessories






Samples

Applications

- Rechargeable batteries for mobile devices
- Video game controller
- Electronic tooth brush
- Battery-powered shaver
- Portable medical devices

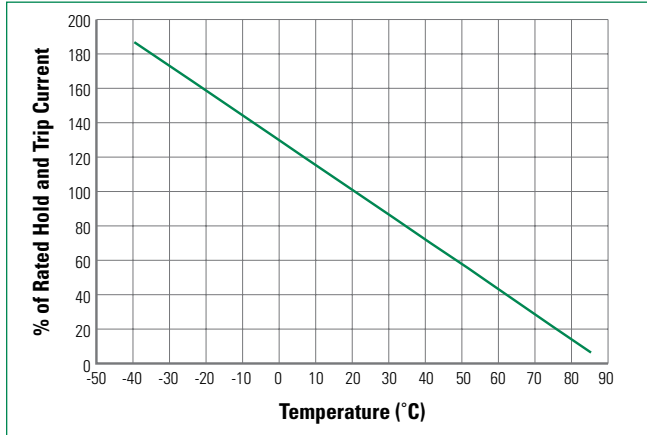
Agency Approvals

Agency	Agency File/Certificate Number
	E74889
	78165C
	72161797

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Thermal Derating Curve



Thermal Derating [Hold Current (A) at Ambient Temperature (°C)]

Part Description	Ordering Part Number	Maximum Ambient Temperature										
		-40°C	-20°C	0°C	20°C	25°C	40°C	50°C	60°C	70°C	80°C	85°C
VLP120UF	RF1387-000	2.4	2.1	1.8	1.30	1.20	1.0	0.7	0.6	0.3	0.2	0.1
VLP175UAF	RF3527-000	3.2	2.7	2.3	1.70	1.75	1.2	1.0	0.9	0.5	0.2	0.1
VLP220F	RF0515-000	4.5	3.8	3.0	2.45	2.20	1.7	1.4	1.1	0.7	0.3	0.1
VLP270F	RF3523-000	5.6	4.7	4.0	3.05	2.70	2.2	1.7	1.4	0.9	0.4	0.1

* Product electrical characteristics determined at 25°C.

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Electrical Characteristics

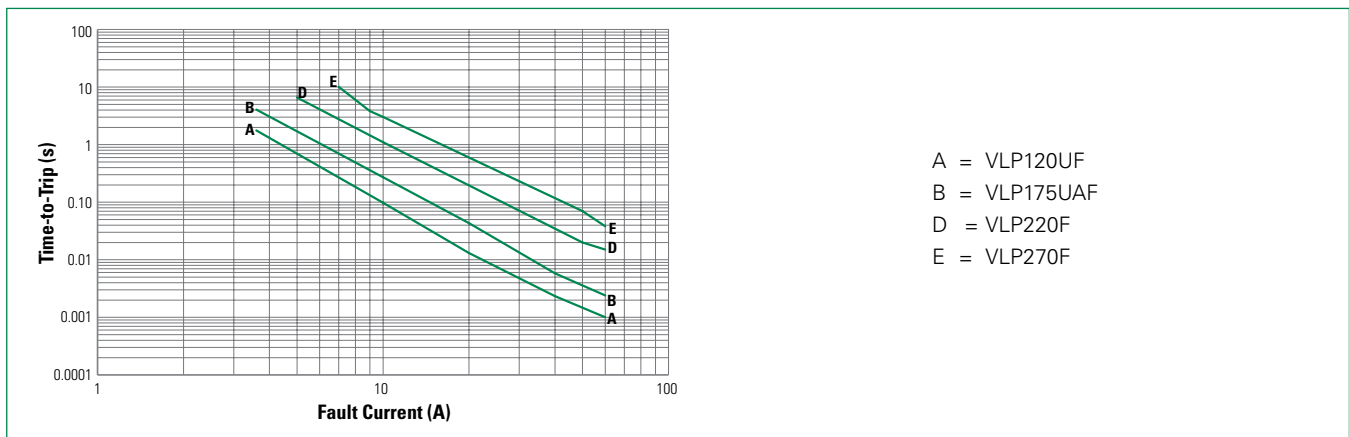
Part Description	Ordering Part Number	I_H	I_T	V_{MAX}	I_{MAX}	$P_{D MAX}$	Max Time-to-trip		R_{MIN}	R_{MAX}	R_{1MAX}	Typical Activation temperature	Typical resistance
		(A)	(A)	(V _{DC})	(A)	(W)	(A)	(s)	(Ω)	(Ω)	(Ω)		
VLP120UF	RF1387-000	1.20	3.6	16	60	1.6	7.00	5.0	0.039	0.067	0.134	90 °C	0.053
VLP175UAF	RF3527-000	1.75	3.9	16	60	1.8	8.75	5.0	0.023	0.041	0.082	90 °C	0.032
VLP220F	RF0515-000	2.20	5.3	16	60	1.8	11.00	5.0	0.017	0.029	0.058	90 °C	0.023
VLP270F	RF3523-000	2.70	6.5	16	60	2.5	13.50	5.0	0.012	0.018	0.036	90 °C	0.015

* Product electrical characteristics determined at 25°C.

Notes

- I_H : Hold current: maximum current device will pass without interruption in 20°C still air unless otherwise specified.
- I_T : Trip current: minimum current that will switch the device from low-resistance to high-resistance in 20°C still air unless otherwise specified.
- V_{MAX} : Maximum voltage device can withstand without damage at rated current.
- I_{MAX} : Maximum fault current device can withstand without damage at rated voltage.
- P_D : Power dissipated from device when in the tripped state in 20°C still air unless otherwise specified.
- R_{MIN} : Minimum resistance of device as supplied at 20°C unless otherwise specified.
- R_{MAX} : Maximum resistance of device as supplied at 20°C unless otherwise specified.
- R_{1MAX} : Maximum resistance, measured at 20°C unless otherwise specified, of device one hour after being tripped the first time.

Typical Time-to-Trip Curve at 25°C



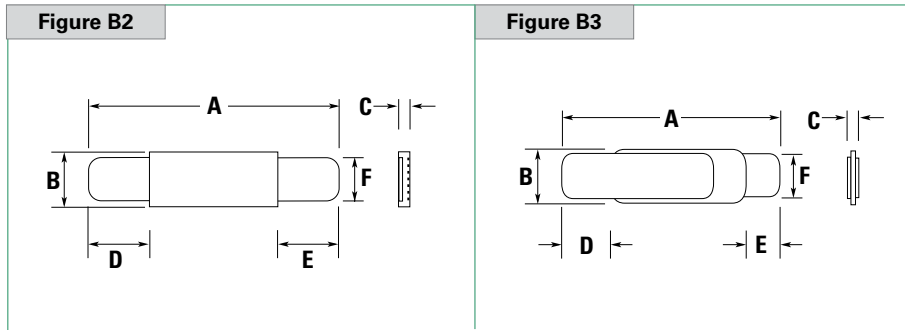
PolySwitch® Resettable PPTCs

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Dimensions in Millimeters (Inches)

Part Description	Ordering Part Number	A		B		C		D		E		F		Figure
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	
VLP120UF	RF1387-000	10.9 (0.430)	11.8 (0.460)	4.4 (0.170)	4.6 (0.180)	—	0.7 (0.028)	5.5 (0.220)	6.5 (0.260)	1.65 (0.065)	1.9 (0.075)	2.3 (0.091)	2.5 (0.098)	B3
VLP175UAF	RF3527-000	23.6 (0.944)	25.6 (1.024)	2.7 (0.108)	2.9 (0.116)	—	0.7 (0.028)	7.0 (0.280)	8.0 (0.320)	7.0 (0.280)	8.0 (0.320)	2.3 (0.092)	2.5 (0.100)	B3
VLP220F	RF0515-000	21.1 (0.844)	23.3 (0.932)	3.5 (0.140)	3.9 (0.156)	0.6 (0.024)	0.8 (0.032)	5.1 (0.204)	6.8 (0.272)	5.1 (0.204)	6.8 (0.272)	2.9 (0.116)	3.1 (0.124)	B2
VLP270F	RF3523-000	20.9 (0.836)	23.1 (0.924)	4.9 (0.196)	5.3 (0.212)	0.6 (0.024)	0.8 (0.032)	4.1 (0.164)	5.8 (0.232)	4.1 (0.164)	5.8 (0.232)	3.9 (0.156)	4.1 (0.164)	B2

Dimension Figures



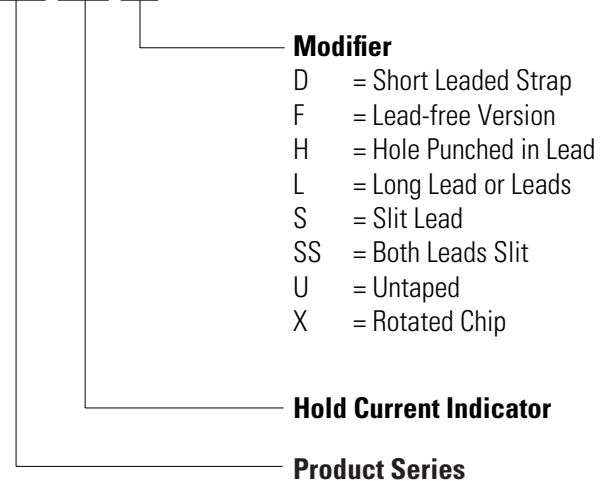
Physical Characteristics and Environmental Specifications

Physical Characteristics	Lead Material	0.125mm Nominal Thickness, Quarter-hard Nickel		
	Tape Material	Polyester		
Environmental Specifications	Test	Conditions	Resistance Change	
	Passive Aging	-40°C, 1000 hrs	±5% typ	
		60°C, 1000 hrs	±10% typ	
	Humidity Aging	60°C/95% RH, 1000 hrs	±10% typ	
	Thermal Shock	85°C, -40°C (10 Times)	±5% typ	
Vibration	MIL-STD-883D, Method 2026	No Change		

Notes
Storage conditions: 40°C max., 70% RH max.; devices should remain in original sealed bags prior to use. Devices may not meet specified values if these storage conditions are exceeded.

Part Naming System

VLP 120 UF



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Packaging and Marking Information/Agency Recognition

Part Description	Ordering Part Number	Bag Quantity	Standard Package Quantity	Part Marking	Agency Recognition
VLP120UF	RF1387-000	1,000	10,000	—	UL, CSA, TÜV
VLP175UAF	RF3527-000	1,000	10,000	—	UL, CSA, TÜV
VLP220F	RF0515-000	1,000	10,000	W22	UL, CSA, TÜV
VLP270F	RF3523-000	1,000	10,000	W27	UL, CSA, TÜV

Installation Guidelines for the Strap Family

- PPTC devices operate by thermal expansion of the conductive polymer. If devices are placed under pressure or installed in spaces that would prevent thermal expansion, they may not properly protect against damage caused by fault conditions. Designs must be selected in such a manner that adequate space is maintained over the life of the product.
- Twisting, bending, or placing the PPTC device in tension will decrease the ability of the device to protect against damage caused by electrical faults. No residual force should remain on device after installation. Mechanical damage to the PPTC device may affect device performance and should be avoided.
- Chemical contamination of PPTC devices should be avoided. Certain greases, solvents, hydraulic fluids, fuels, industrial cleaning agents, volatile components of adhesives, silicones, and electrolytes can have an adverse effect on device performance.
- PPTC strap devices are intended to be resistance welded to battery cells or to pack interconnect straps, yet some precautions must be taken when doing so. In order for the PPTC device to exhibit its specified performance, weld placement should be a minimum of 2mm from the edge of the PPTC device, weld splatter must not touch the PPTC device, and welding conditions must not heat the PPTC device above its maximum operating temperature.
- PPTC strap devices are not intended for applications where reflow onto flex circuits or rigid circuit boards is required.
- The polyester tape on PPTC strap devices is intended for marking and identification purposes only, not for electrical insulation.

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