

#### **Additional Information**



Resources





Accessories

Samples

#### **Agency Approvals**

Agency	Agency File/Certificatge Number
<i>511</i>	E74889
<b>⊕</b> ;	78165C
$\triangle$	72161797

#### **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**

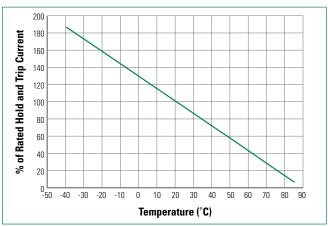
- Low trip temperature
- Current ratings from 1.2A to 2.7A
- Voltage ratings from 16V
- Multiple form factors for added design flexibility
- Low-resistance devices increase battery operating time
- RoHS compliant and Halogen free
- Compatible with high-volume electronics assembly
- UL Recognized to UL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

#### **Applications**

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



#### **Thermal Derating Curve**



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

		Maximum Ambient Temperature											
Part Description	Ordering Part Number	-40°C	-20°C	0°C	20°C	25°C	40°C	50°C	60°C	70°C	80°C	85°C	
		Hold Current (A)											
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	

<sup>\*</sup> Product electrical characteristics determined at 25°C.



#### **Electrical Characteristics**

Part	Ordering Part	I <sub>H</sub>	I <sub>T</sub>	V <sub>MAX</sub>	I <sub>MAX</sub>	P <sub>D MAX</sub>	MaxTim	e-to-trip	R <sub>MIN</sub>	R <sub>MAX</sub>	R <sub>1MAX</sub>	Typical	Typical
Description	Number	(A)	(A)	(V <sub>DC</sub> )	(A)	(W)	(A)	(s)	(Ω)	(Ω)	(Ω)	Activation temperature	resistance
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

<sup>\*</sup> Product electrical characteristics determined at 25°C.

#### Notes

: Hold current: maximum current device will pass without interruption in 20°C still air unless otherwise specified.

 $I_{\rm H}$  : Hold current: maximum current device will pass without interruption in 20 trip current: minimum current that will switch the device from low-resistar  $V_{\rm MAX}$ : Maximum voltage device can withstand without damage at rated current. Trip current: minimum current that will switch the device from low-resistance to high-resistance in 20°C still air unless otherwise specified.

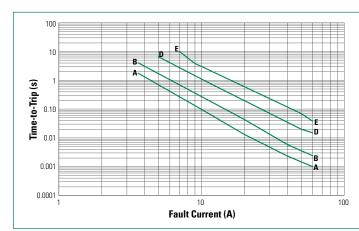
 $I_{MAX}$ : Maximum fault current device can withstand without damage at rated current. P<sub>D</sub>: Power dissipated from device when in the tripped state is 6000.

: Power dissipated from device when in the tripped state in 20°C still air unless otherwise specified.

 $R_{MIN}^{U}$ : 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<sub>1MAX</sub>: 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



A = VLP120UF

B = VLP175UAF

D = VLP220F

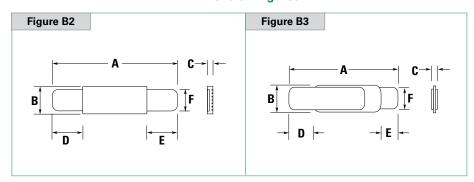
E = VLP270F



#### **Dimensions in Millimeters (Inches)**

Part Description	Ordering Part	-	4		3	(	C	ı	)	ı	E	ı	=	Figure
	Number	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	rigure
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)	В3
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)	В3
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**



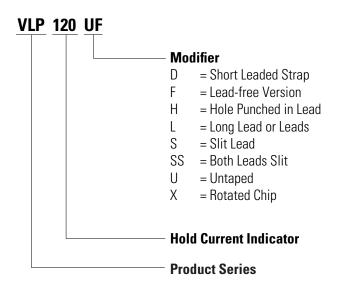
#### Physical Characteristics and Environmental Specifications

Physical Characteristics	Lead Material	0.125mm Nominal Thickness, Quarter-hard Nickel						
Citatacteristics	Tape Material	Polyester						
	Test	Conditions	Resistance Change					
	Passive Aging	-40°C, 1000 hrs	±5% typ					
		60°C, 1000 hrs	±10% typ					
Environmental Specifications	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**





#### **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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