

### Description

The new VL Series device provides reliable, noncycling protection against overcharging and short circuits events for rechargeable battery cells where resettable protection is desired.



### Features

- RoHS compliant and lead-free
- Compact design saves board space
- Weldable Nickel terminals
- Low resistance
- Slim, low profile design



### Applications

- Rechargeable battery cell protection

### Agency Approvals

AGENCY	AGENCY FILE NUMBER
	E183209
	R50119583

### Electrical Characteristics

Part Number	I <sub>hold</sub> (A)	I <sub>trip</sub> (A)	V <sub>max</sub> (Vdc)	I <sub>max</sub> (A)	P <sub>d max.</sub> (W)	Maximum Time To Trip		Resistance			Agency Approvals	
						Current (A)	Time (Sec.)	R <sub>min</sub> (Ω)	R <sub>typ</sub> (Ω)	R <sub>1max</sub> (Ω)		
12VL170	1.70	4.10	12	100	1.4	8.50	5.00	0.018	0.032	0.064	X	X
12VL175L	1.75	4.20	12	100	1.4	8.75	5.00	0.017	0.031	0.062	X	X
12VL175XL	1.75	4.20	12	100	1.4	8.75	5.00	0.017	0.031	0.062	X	X
12VL230	2.30	5.00	12	100	1.5	10.00	5.00	0.012	0.018	0.036	X	X

I<sub>hold</sub> = Hold current: maximum current device will pass without tripping in 20°C still air.

I<sub>trip</sub> = Trip current: minimum current at which the device will trip in 20°C still air.

V<sub>max</sub> = Maximum voltage device can withstand without damage at rated current (I<sub>max</sub>)

I<sub>max</sub> = Maximum fault current device can withstand without damage at rated voltage (V<sub>max</sub>)

P<sub>d</sub> = Power dissipated from device when in the tripped state at 20°C still air.

R<sub>min</sub> = Minimum resistance of device in initial (un-soldered) state.

R<sub>typ</sub> = Typical resistance of device in initial (un-soldered) state.

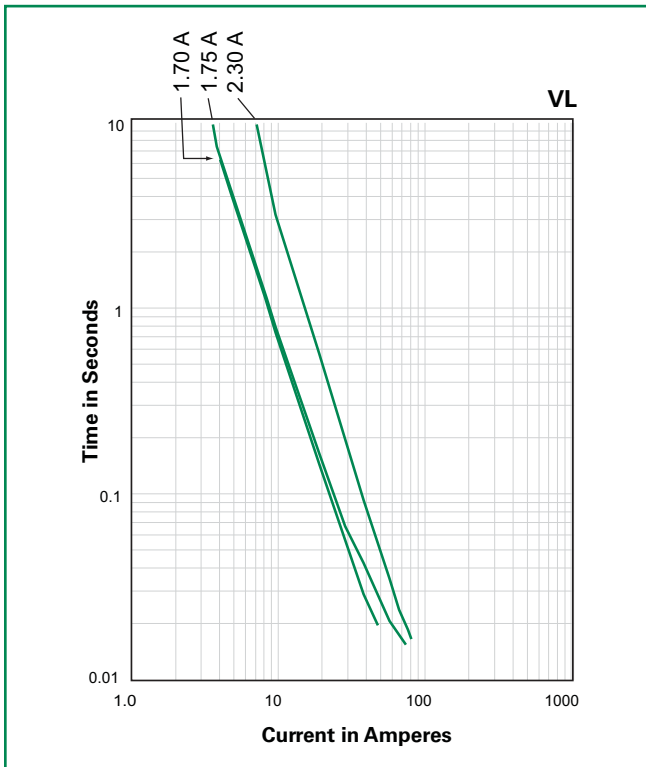
R<sub>1max</sub> = Maximum resistance of device at 20°C measured one hour after tripping or reflow soldering of 260°C for 20 sec.

**Caution:** Operation beyond the specified rating may result in damage and possible arcing and flame.

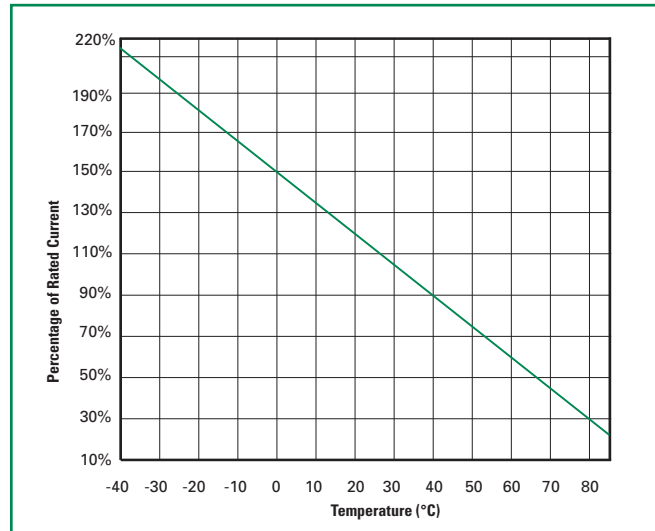
**Temperature Derating**

Part Number	Ambient Operation Temperature							
	-40°C	-20°C	0°C	25°C	40°C	50°C	60°C	70°C
12VL170	3.5	2.9	2.4	1.70	1.2	1.0	0.7	0.3
12VL175L	3.5	2.9	2.4	1.75	1.3	1.0	0.8	0.3
12VL175XL	3.5	2.9	2.4	1.75	1.3	1.0	0.8	0.3
12VL230	5.0	4.2	3.4	2.30	1.7	1.3	0.9	0.4

**Average Time Current Curves**



**Temperature Derating Curve**



The average time current curves and Temperature Derating curve performance is affected by a number of variables, and these curves provided as guidance only. Customer must verify the performance in their application.

**Physical Specifications**

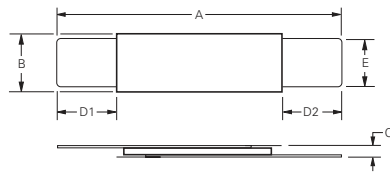
<b>Terminal Material</b>	0.13mm nominal thickness, quarter-hard Nickel
<b>Insulating Material</b>	Polyester tape

**Environmental Specifications**

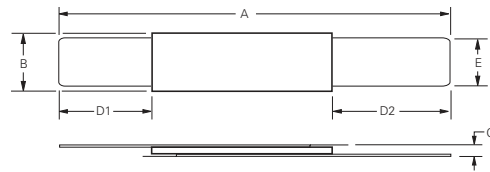
<b>Operating/Storage Temperature</b>	-40°C to +85°C
<b>Passive Aging</b>	+60°C, 1000 hours -/+20% typical resistance change -40°C, 1000 hours -/+5% typical resistance change
<b>Humidity Aging</b>	+60°C, 95% R.H., 1000 hours, -/+10% typical resistance change
<b>Thermal Shock</b>	MIL-STD-202F, Method 107G, +85°C to -40°C 10 times -/+5% typical resistance change
<b>Vibration</b>	MIL-STD-883C, Method 2026, No change

**Dimensions**

**Figure 1**



**Figure 2**

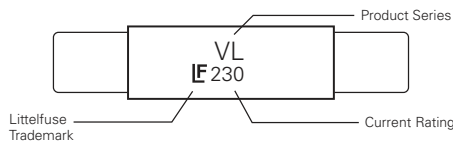


Part Number	Figure	A		B				C		D1		D2		E											
		Inches	mm	Inches	mm	Inches	mm	Inches	mm	Inches	mm	Inches	mm	Inches	mm	Inches	mm								
		Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.						
12VL170	1	0.82	0.91	20.80	23.20	0.14	0.15	3.50	3.90	--	0.03	--	0.80	0.18	0.26	4.50	6.50	0.18	0.26	4.50	6.50	0.09	0.10	2.40	2.60
12VL175L	2	1.15	1.25	29.30	31.70	0.11	0.13	2.90	3.30	--	0.03	--	0.80	0.20	0.27	5.20	6.80	0.39	0.49	10.00	12.50	0.09	0.10	2.40	2.60
12VL175XL	2	1.00	1.11	25.50	28.20	0.14	0.15	3.50	3.90	--	0.03	--	0.80	0.34	0.41	8.70	10.30	0.22	0.29	5.70	7.30	0.09	0.10	2.40	2.60
12VL230	1	0.82	0.91	20.90	23.10	0.19	0.21	4.90	5.30	--	0.03	--	0.80	0.16	0.23	4.10	5.80	0.16	0.23	4.10	5.80	0.15	0.16	3.90	4.10

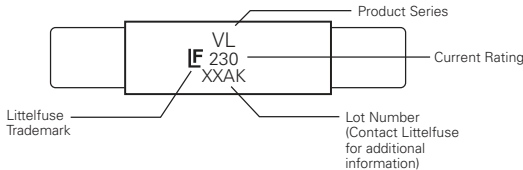
**Part Marking System**

**Double Sided Marking**

**Top Side**

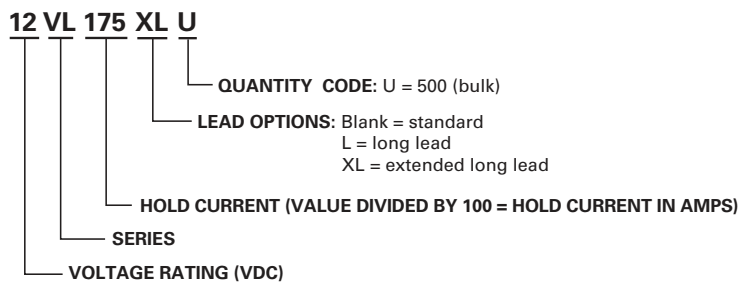


**Bottom Side**



**VL Series**

**Part Ordering Number System**



**Packaging**

Part Number	Ordering Number	$I_{hold}$ (A)	$I_{hold}$ Codes	Packaging Option	Quantity	Quantity & Packaging Codes
12VL170	12VL170U	1.70	170	Bulk	500	U
12VL175L	12VL175LU	1.75	175	Bulk	500	U
12VL175XL	12VL175XLU	1.75	175	Bulk	500	U
12VL230	12VL230U	2.30	230	Bulk	500	U