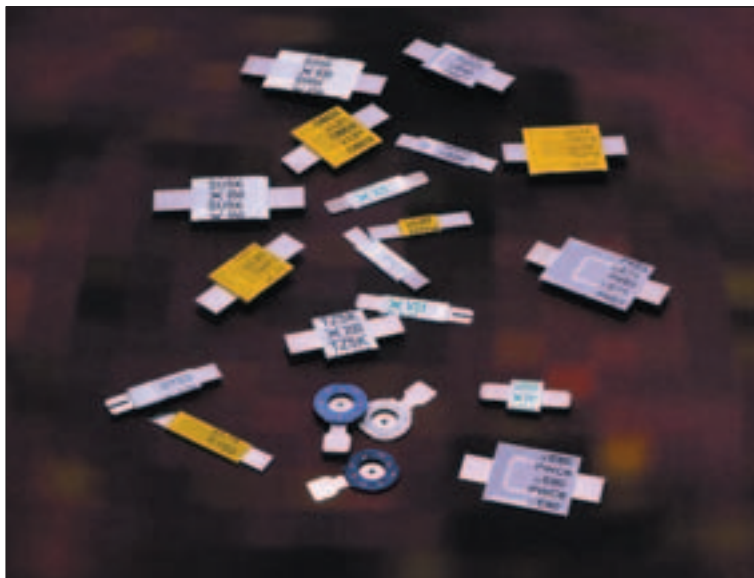


# PolySwitch Strap Battery

## Resettable Devices

Raychem Circuit Protection, pioneer of polymeric PTC resettable devices, has developed several material platforms specifically tailored to help protect battery applications. Each of these material platforms offers different performance characteristics, allowing the engineer greater design flexibility. Raychem Circuit Protection's battery protection family includes SRP, LTP, LR4, VTP, VLP, and VLR series, disc, and special application strap devices.



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### Benefits:

- Many material platforms and device form factors give engineers more design flexibility
- Compatible with high-volume electronics assembly
- Assists in meeting regulatory requirements
- Low resistance devices increase battery operating time

### Features:

- Lead free versions of all devices are available upon request
- Broad range of resettable devices available
- Current ratings from 0.7A to 14.1A
- Voltage ratings from 12V to 30V
- Agency recognition, UL, CSA, TÜV
- Fast time-to-trip
- Low resistance

### Applications:

- Mobile phone battery packs
- Cordless phone battery packs
- Mobile radio packs
- Computer battery packs
- Camcorder battery packs
- PDA battery packs

**Devices in this section are grouped by:**

**Activation Temperature, Device Series, Hold Current**



**Step 1. Determine the circuit’s operating parameters.**

Fill in the following information about the circuit:

Maximum ambient operating temperature \_\_\_\_\_

Normal operating current \_\_\_\_\_

Maximum operating voltage  
(i.e., VTP210G is 16V max.) \_\_\_\_\_

Maximum interrupt current \_\_\_\_\_

**Step 2. Select the PolySwitch device that will accommodate the circuit’s maximum ambient temperature and normal operating current.**

Look across the top of Table B2 to find the temperature that most closely matches the circuit’s maximum operating temperature. Look down the column to find the value equal to or greater than the circuit’s normal operating current. Now look to the far left of that row to find the part number for the PolySwitch strap device that will best accommodate the circuit. Devices in this section are grouped by typical activation temperature; therefore, your operating current requirement may be found in more than one grouping.

The thermal derating curves located in Figure B3 are the normalized representations of the data in Table B2.

**Step 3. Compare the selected device’s electrical ratings with the circuit’s maximum operating voltage and maximum interrupt current.**

Look down the first column of Table B3 to find the part number you selected in Step 2. Look to the right in that row to find the device’s maximum operating voltage ( $V_{MAX}$ ) and maximum interrupt current ( $I_{MAX}$ ). Ensure that  $V_{MAX}$  and  $I_{MAX}$  are greater than or equal to the circuit’s maximum operating voltage and maximum interrupt current.

**Step 4. Determine time-to-trip.**

Time-to-trip is the amount of time it takes for a device to switch to a high-resistance state once a fault current has been applied across the device. Identifying the PolySwitch device’s time-to-trip is important in order to provide the desired protection capabilities. If the device you choose trips too fast, undesired or nuisance tripping will occur. If the device trips too slowly, the components being protected may be damaged before the device switches to a high resistance state.

## Selection Guide for Strap Battery Devices

Figures B19-25 show the typical time-to-trip at 20°C for each of the PolySwitch devices.

If the PolySwitch device time-to-trip is too fast or too slow for the circuit, go back to Step 2 and choose an alternate device.

### Step 5. Match Thermal Cut-Off to Cell Chemistry.

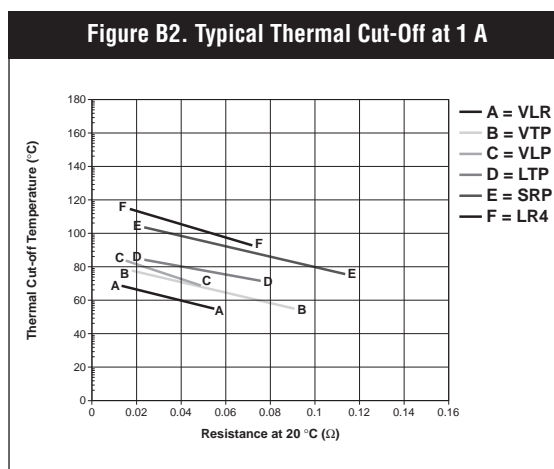
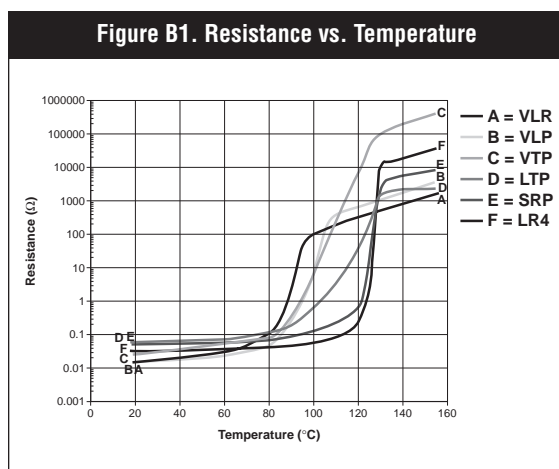
Thermal cut-off is the temperature at which a PolySwitch device will trip when sourced with a specific current. Figure B1 demonstrates how the resistance-versus-temperature characteristics of various PolySwitch strap device series differ by use of different material platforms. Figure B2 shows the thermal cut-off behavior for each strap battery series device. Actual device performance can vary depending on the application environment, and users should independently test and evaluate each product in their application. Thermally sensitive cell chemistries such as Li-ion and NiMH typically use devices with lower thermal cut-off, which can provide enhanced thermal protection (VLR, VLP, and VTP series). Less sensitive chemistries, like NiCd, typically use devices with higher thermal cut-off temperatures (LR4, SRP series).

### Step 6. Verify ambient operating conditions.

Ensure that your application's minimum and maximum ambient temperatures are within the operating temperature range of -40°C to 85°C (except for VLR series, which is -40°C to 70°C).

### Step 7. Verify the PolySwitch device dimensions.

Using dimensions in Table B4, compare the dimensions of the PolySwitch device you selected with the application's space considerations.



## Protection Application Selection Guide for Strap Battery Devices

The guide below lists PolySwitch devices which are typically used in these applications. The following

pages contain the specifications for the part numbers recommended below. Once a device is selected,

the user should evaluate and test each product for its intended application.

Protection Application	Additional Comments	PolySwitch Resettable Devices—Key Device Selection Criteria		
		Installation Method	Lowest Resistance	Lowest Thermal Cut-off
Mobile phone battery packs	NiMH	Cylindrical (AAA cell)	VLP210 TAC170-09	VTP170
		Flexprint	miniSMDE190	—
		Prismatic	VLP270 VTP210G LR4-260	VLR230
	Li-ion	Flexprint	miniSMDE190	—
		Surface Mount	refer to Surface Mount section of this Databook	
		Prismatic	VLP270 VTP210G	VLR175
Cordless phone battery packs	NiMH	Cylindrical	VLP210 TAC170-09 SRP175	VTP170
			Mobile radio packs	NiMH
Computer battery packs	NiMH	Cylindrical	LR4-900	—
	Li-ion	Cylindrical	LR4-1410	—
		Prismatic	Consult local Rep	Consult local Rep
Camcorder battery packs	NiMH or Li-ion	Prismatic	VLP270 LR4-380	VTP210G —
			PDA	Li-ion
Power tools (charge line)	NiCd or NiMH	Cylindrical	custom LR4	custom VTP

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**Table B1. Product Series – Current Rating, Voltage Rating/Typical Resistance for Strap Battery Devices**

Hold Current (A)	VLR	VLP	VTP	LTP	SRP	LR4	TAC		miniSMDE
	Typical Activation Temperature								
	85°C	90°C	90°C	110°C	125°C	125°C	110°C	125°C	110°C
0.70	—	—	—	15V/0.15Ω	—	—	—	—	—
1.00	—	—	—	24V/0.100Ω	—	—	15V/0.120Ω	—	—
1.10	—	—	16V/0.054Ω	—	—	—	—	—	—
1.20	—	—	—	—	15V/0.123Ω	—	—	—	—
1.70	12V/0.025Ω	—	16V/0.041Ω	—	—	15V/0.061Ω	—	15V/0.074Ω	—
1.75	12V/0.024Ω	—	16V/0.040Ω	—	15V/0.070Ω	—	—	—	—
1.80	—	—	—	24V/0.054Ω	—	—	—	—	—
1.90	—	—	—	24V/0.044Ω	—	15V/0.056Ω	—	—	16V/0.032Ω
2.00	—	—	16V/0.031Ω	—	30V/0.045Ω	—	—	—	—
2.10	—	16V/0.024Ω	16V/0.024Ω	—	—	—	—	15V/0.049Ω	—
2.20	—	16V/0.023Ω	—	—	—	—	—	—	—
2.30	12V/0.015Ω	—	—	—	—	—	—	—	—
2.40	—	—	16V/0.020Ω	—	—	—	—	—	—
2.60	—	—	—	24V/0.034Ω	—	15V/0.031Ω	—	—	—
2.70	—	16V/0.015Ω	—	—	—	—	—	—	—
3.00	—	—	—	24V/0.023Ω	—	—	—	—	—
3.40	—	—	—	24V/0.022Ω	—	—	—	—	—
3.50	—	—	—	—	30V/0.024Ω	—	—	—	—
3.80	—	—	—	—	—	15V/0.020Ω	—	—	—
4.20	—	—	—	—	30V/0.018Ω	—	—	—	—
4.50	—	—	—	—	—	20V/0.016Ω	—	—	—
5.50	—	—	—	—	—	20V/0.013Ω	—	—	—
6.00	—	—	—	—	—	20V/0.011Ω	—	—	—
7.30	—	—	—	—	—	20V/0.009Ω	—	—	—
8.80	—	—	—	—	—	20V/0.085Ω	—	—	—
9.00	—	—	—	—	—	20V/0.008Ω	—	—	—
13.00	—	—	—	—	—	20V/0.006Ω	—	—	—
14.10	—	—	—	—	—	20V/0.004Ω	—	—	—

**Table B2. Thermal Derating for Strap Battery Devices [Hold Current (A) at Ambient Temperature (°C)]**

Part Number	Maximum Ambient Temperature										
	-40°C Amps	-20°C	0°C	20°C	25°C	40°C	50°C	60°C	70°C	80°C	85°C
<b>85°C Typical Activation</b>											
<b>VLR†</b>											
VLR170	3.5	2.9	2.4	1.84	1.7	1.2	1.0	0.7	0.3	—	—
VLR170L	3.5	2.9	2.4	1.84	1.7	1.2	1.0	0.7	0.3	—	—
VLR170U	3.5	2.9	2.4	1.84	1.7	1.2	1.0	0.7	0.3	—	—
VLR170UF	3.5	2.9	2.4	1.84	1.7	1.2	1.0	0.7	0.3	—	—
VLR175	3.5	2.9	2.4	1.87	1.75	1.3	1.0	0.8	0.3	—	—
VLR175L	3.5	2.9	2.4	1.87	1.75	1.3	1.0	0.8	0.3	—	—
VLR175UF	3.5	2.9	2.4	1.87	1.75	1.3	1.0	0.8	0.3	—	—
VLR230	5.0	4.2	3.4	2.52	2.3	1.7	1.3	0.9	0.4	—	—
VLR230-C36	5.0	4.2	3.4	2.52	2.3	1.7	1.3	0.9	0.4	—	—
VLR230S	5.0	4.2	3.4	2.52	2.3	1.7	1.3	0.9	0.4	—	—
VLR230SU	5.0	4.2	3.4	2.52	2.3	1.7	1.3	0.9	0.4	—	—
VLR230U	5.0	4.2	3.4	2.52	2.3	1.7	1.3	0.9	0.4	—	—

† = Product electrical characteristics determined at 25°C

**Table B2. Thermal Derating for Strap Battery Devices [Hold Current (A) at Ambient Temperature (°C)]**  
*continued*

Part Number	Maximum Ambient Temperature										
	-40°C Amps	-20°C	0°C	20°C	25°C	40°C	50°C	60°C	70°C	80°C	85°C
<b>90°C Typical Activation</b>											
<b>VLP†</b>											
VLP210	4.3	3.6	2.9	2.31	2.1	1.6	1.3	1.0	0.6	0.3	0.1
VLP220	4.5	3.8	3.0	2.45	2.2	1.7	1.4	1.1	0.7	0.3	0.1
VLP270	5.6	4.7	4.0	3.05	2.7	2.2	1.7	1.4	0.9	0.4	0.1

† = Product electrical characteristics determined at 25°C

**90°C Typical Activation**  
**VTP†**

VTP110	2.0	1.7	1.4	1.02	1.1	0.8	0.6	0.5	0.3	0.2	0.1
VTP170	3.2	2.7	2.2	1.80	1.7	1.3	1.0	0.8	0.5	0.3	0.1
VTP170SS	3.2	2.7	2.2	1.80	1.7	1.3	1.0	0.8	0.5	0.3	0.1
VTP170X	3.2	2.7	2.2	1.80	1.7	1.3	1.0	0.8	0.5	0.3	0.1
VTP170XS	3.2	2.7	2.2	1.80	1.7	1.3	1.0	0.8	0.5	0.3	0.1
VTP175	3.2	2.7	2.2	1.84	1.75	1.3	1.0	0.8	0.5	0.3	0.1
VTP175L	3.2	2.7	2.2	1.84	1.75	1.3	1.0	0.8	0.5	0.3	0.1
VTP175U	3.2	2.7	2.2	1.84	1.75	1.3	1.0	0.8	0.5	0.3	0.1
VTP200G	3.7	3.2	2.6	2.12	2.0	1.5	1.2	0.9	0.5	0.3	0.1
VTP200U	3.7	3.2	2.6	2.12	2.0	1.5	1.2	0.9	0.5	0.3	0.1
VTP210G	4.1	3.5	2.9	2.26	2.1	1.6	1.3	1.0	0.7	0.4	0.1
VTP210L	4.1	3.5	2.9	2.26	2.1	1.6	1.3	1.0	0.7	0.4	0.1
VTP210S	4.1	3.5	2.9	2.26	2.1	1.6	1.3	1.0	0.7	0.4	0.1
VTP210SF	4.1	3.5	2.9	2.26	2.1	1.6	1.3	1.0	0.7	0.4	0.1
VTP210SL	4.1	3.5	2.9	2.26	2.1	1.6	1.3	1.0	0.7	0.4	0.1
VTP210SL-19.2/5.8	4.1	3.5	2.9	2.26	2.1	1.6	1.3	1.0	0.7	0.4	0.1
VTP210SS	4.1	3.5	2.9	2.26	2.1	1.6	1.3	1.0	0.7	0.4	0.1
VTP210ULD	4.1	3.5	2.9	2.26	2.1	1.6	1.3	1.0	0.7	0.4	0.1
VTP240	4.4	3.7	3.1	2.54	2.4	1.8	1.5	1.2	0.9	0.5	0.1

† = Product electrical characteristics determined at 25°C

**110°C Typical Activation**  
**LTP**

LTP070	1.1	1.0	0.8	0.7	0.65	0.5	0.4	0.3	0.2	0.2	0.1
LTP070S	1.1	1.0	0.8	0.7	0.65	0.5	0.4	0.3	0.2	0.2	0.1
LTP100	1.8	1.6	1.4	1.0	0.99	0.8	0.7	0.6	0.4	0.3	0.2
LTP100S	1.8	1.6	1.4	1.0	0.99	0.8	0.7	0.6	0.4	0.3	0.2
LTP100SL	1.8	1.6	1.4	1.0	0.99	0.8	0.7	0.6	0.4	0.3	0.2
LTP100SS	1.8	1.6	1.4	1.0	0.99	0.8	0.7	0.6	0.4	0.3	0.2
LTP180	3.1	2.6	2.2	1.8	1.67	1.3	1.1	0.9	0.6	0.4	0.3
LTP180L	3.1	2.6	2.2	1.8	1.67	1.3	1.1	0.9	0.6	0.4	0.3
LTP180S	3.1	2.6	2.2	1.8	1.67	1.3	1.1	0.9	0.6	0.4	0.3
LTP190	3.3	2.8	2.4	1.9	1.79	1.4	1.2	1.1	0.7	0.5	0.4
LTP260	4.3	3.7	3.1	2.6	2.42	1.9	1.6	1.4	1.1	0.8	0.6
LTP300	5.1	4.4	3.7	3.0	2.82	2.3	1.9	1.6	1.2	0.9	0.7
LTP340	5.5	4.7	4.0	3.4	3.17	2.6	2.2	1.9	1.5	1.1	0.9

**Table B2. Thermal Derating for Strap Battery Devices [Hold Current (A) at Ambient Temperature (°C)]**  
*continued*

Part Number	Maximum Ambient Temperature										
	-40°C Amps	-20°C	0°C	20°C	25°C	40°C	50°C	60°C	70°C	80°C	85°C
<b>miniSMDE</b>											
miniSMDE190	3.0	2.6	2.2	1.9	1.74	1.4	1.2	1.1	0.7	0.5	0.4
<b>TAC</b>											
TAC100-09	1.6	1.4	1.2	1.0	0.92	0.7	0.6	0.5	0.4	0.2	0.2
<b>125°C Typical Activation</b>											
<b>LR4</b>											
LR4-170U	2.5	2.2	2.0	1.7	1.64	1.4	1.3	1.2	1.0	0.9	0.8
LR4-190	2.8	2.5	2.3	1.9	1.86	1.6	1.5	1.4	1.2	1.1	1.0
LR4-190S	2.8	2.5	2.3	1.9	1.86	1.6	1.5	1.4	1.2	1.1	1.0
LR4-260	3.8	3.4	3.1	2.6	2.54	2.2	2.0	1.9	1.7	1.4	1.3
LR4-260S	3.8	3.4	3.1	2.6	2.54	2.2	2.0	1.9	1.7	1.4	1.3
LR4-380	5.4	4.9	4.4	3.8	3.64	3.3	3.0	2.8	2.5	2.3	2.1
LR4-380X	5.4	4.9	4.4	3.8	3.64	3.3	3.0	2.8	2.5	2.3	2.1
LR4-450	6.5	5.8	5.3	4.5	4.38	3.9	3.6	3.3	2.9	2.6	2.4
LR4-550	7.6	6.9	6.2	5.5	5.32	4.7	4.3	4.0	3.6	3.2	3.0
LR4-600	8.7	7.8	7.1	6.0	5.86	5.2	4.7	4.4	3.9	3.4	3.2
LR4-600X	8.7	7.8	7.1	6.0	5.86	5.2	4.7	4.4	3.9	3.4	3.2
LR4-730	10.5	9.5	8.6	7.3	7.13	6.3	5.7	5.4	4.7	4.2	4.0
LR4-880SS	12.3	11.0	9.8	8.8	8.3	7.4	6.8	6.2	5.5	4.8	4.5
LR4-900	12.7	11.4	10	9.0	8.5	7.5	6.8	6.2	5.5	4.9	4.5
LR4-1300SS	17.9	16.2	14.5	13.0	12.4	11.1	10.3	9.5	8.6	7.7	7.2
LR4-1410	19.9	17.8	15.7	14.1	13.3	11.8	10.8	9.7	8.7	7.7	7.2
<b>SRP</b>											
SRP120	1.9	1.7	1.5	1.2	1.17	1.0	0.9	0.8	0.6	0.5	0.4
SRP120L	1.9	1.7	1.5	1.2	1.17	1.0	0.9	0.8	0.6	0.5	0.4
SRP120S	1.9	1.7	1.5	1.2	1.17	1.0	0.9	0.8	0.6	0.5	0.4
SRP175	2.5	2.2	2.0	1.75	1.68	1.4	1.3	1.2	1.0	0.9	0.8
SRP175L	2.5	2.2	2.0	1.75	1.68	1.4	1.3	1.2	1.0	0.9	0.8
SRP175S	2.5	2.2	2.0	1.75	1.68	1.4	1.3	1.2	1.0	0.9	0.8
SRP175SS	2.5	2.2	2.0	1.75	1.68	1.4	1.3	1.2	1.0	0.9	0.8
SRP200	3.1	2.8	2.5	2.0	1.97	1.7	1.5	1.4	1.2	1.0	0.9
SRP350	5.3	4.8	4.3	3.5	3.44	3.0	2.7	2.5	2.1	1.8	1.7
SRP420	6.3	5.7	5.1	4.2	4.11	3.6	3.3	3.0	2.6	2.2	2.1
<b>TAC</b>											
TAC170-09	2.4	2.2	2.0	1.7	1.67	1.5	1.4	1.3	1.1	1.0	1.0
TAC210	2.8	2.6	2.3	2.1	2.03	1.7	1.6	1.5	1.3	1.2	1.1

Figure B3. Thermal Derating

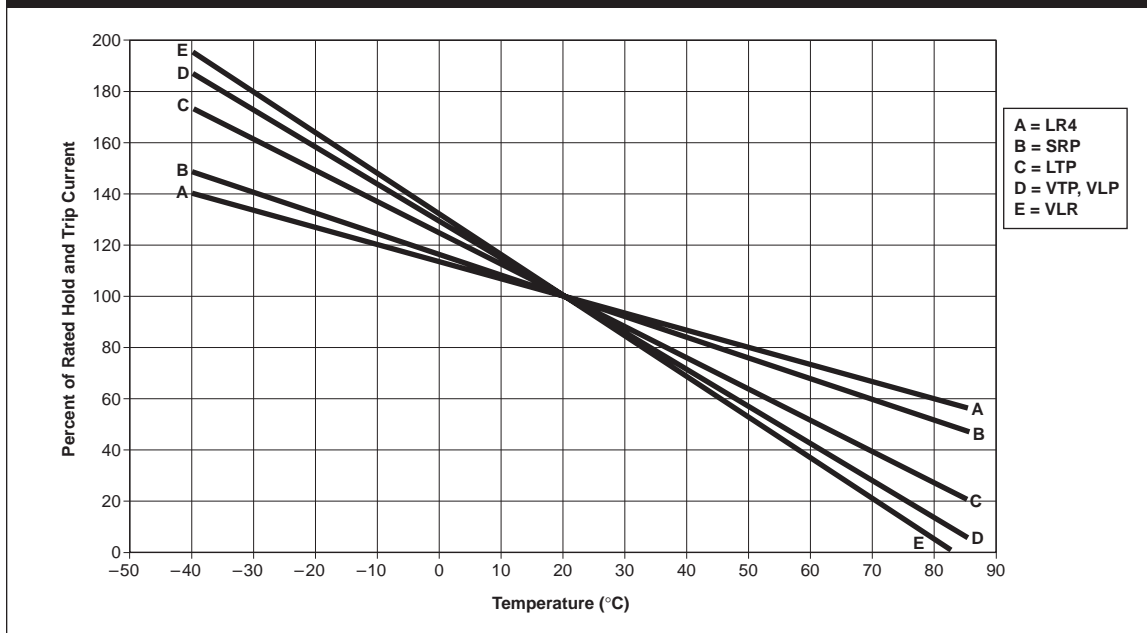


Table B3. Product Electrical Characteristics for Strap Battery Devices

Part Number	$I_H$ (A)	$I_T$ (A)	$V_{MAX}$ ( $V_{DC}$ )	$I_{MAX}$ (A)	$P_{D\ TYP}$ (W)	Max. Time-to-Trip (A) (s)		$R_{MIN}$ ( $\Omega$ )	$R_{TYP}$ ( $\Omega$ )	$R_{MAX}$ ( $\Omega$ )	$R_{Tripped\ TYP}$ ( $\Omega$ )	$R_{T\ MAX}$ ( $\Omega$ )	Figure for Dimensions	
<b>85°C Typical Activation</b>														
<b>VLR</b>														
VLR170	†	1.7	4.1	12	100	1.4	8.5	5.0	0.018	0.025	0.032	0.050	0.064	B5
VLR170L	†	1.7	4.1	12	100	1.4	8.5	5.0	0.018	0.025	0.032	0.050	0.064	B5
VLR170U	†	1.7	4.1	12	100	1.4	8.5	5.0	0.018	0.025	0.032	0.050	0.064	B8
VLR170UF	†	1.7	4.1	12	100	1.4	8.5	5.0	0.018	0.025	0.032	0.050	0.064	B8
VLR175	†	1.75	4.2	12	100	1.4	8.75	5.0	0.017	0.024	0.031	0.048	0.062	B5
VLR175L	†	1.75	4.2	12	100	1.4	8.75	5.0	0.017	0.024	0.031	0.048	0.062	B5
VLR175UF	†	1.8	4.2	12	100	1.4	8.75	5.0	0.017	0.024	0.031	0.048	0.620	B8
VLR230	†	2.3	5.0	12	100	1.4	10.0	5.0	0.012	0.015	0.018	0.030	0.036	B5
VLR230-C36	†	2.3	5.0	12	100	1.4	10.0	5.0	0.012	0.015	0.018	0.030	0.036	B5
VLR230S	†	2.3	5.0	12	100	1.4	10.0	5.0	0.012	0.015	0.018	0.030	0.036	B6
VLR230SU	†	2.3	5.0	12	100	1.4	10.0	5.0	0.012	0.015	0.018	0.030	0.036	B6
VLR230U	†	2.3	5.0	12	100	1.4	10.0	5.0	0.012	0.015	0.018	0.030	0.036	B8
<b>90°C Typical Activation</b>														
<b>VLP</b>														
VLP210	†	2.1	5.0	16	60	0.8	10.5	5.0	0.018	0.024	0.030	0.048	0.060	B4
VLP220	†	2.1	5.3	16	60	0.8	11.0	5.0	0.017	0.023	0.029	0.046	0.058	B5
VLP270	†	2.7	6.5	16	60	1.2	13.5	5.0	0.012	0.015	0.018	0.030	0.036	B5
<b>90°C Typical Activation</b>														
<b>VTP</b>														
VTP110	†	1.1	2.7	16	100	0.7	7.0	5.0	0.038	0.054	0.070	0.108	0.140	B8
VTP170	†	1.7	3.4	16	100	1.0	8.5	5.0	0.030	0.041	0.052	0.082	0.105	B4



Table B3. Product Electrical Characteristics for Strap Battery Devices *continued*

Part Number	I <sub>H</sub> (A)	I <sub>T</sub> (A)	V <sub>MAX</sub> (V <sub>DC</sub> )	I <sub>MAX</sub> (A)	P <sub>D TYP</sub> (W)	Max. Time-to-Trip (A) (s)		R <sub>MIN</sub> (Ω)	R <sub>TYP</sub> (Ω)	R <sub>MAX</sub> (Ω)	R <sub>TRIPPED TYP</sub> (Ω)	R <sub>1 MAX</sub> (Ω)	Figure for Dimensions	
<b>90°C Typical Activation</b>														
<b>VTP continued</b>														
VTP170X	†	1.7	3.4	16	100	0.7	8.5	5.0	0.030	0.041	0.052	0.082	0.105	B5
VTP170XS	†	1.7	3.4	16	100	0.7	8.5	5.0	0.030	0.041	0.052	0.082	0.105	B6
VTP175	†	1.75	3.6	16	100	0.8	8.75	5.0	0.029	0.040	0.051	0.080	0.102	B5
VTP175L	†	1.75	3.6	16	100	0.8	8.75	5.0	0.029	0.040	0.051	0.080	0.102	B5
VTP175U	†	1.75	3.6	16	100	0.8	8.75	5.0	0.029	0.040	0.051	0.080	0.102	B8
VTP200G	†	2.0	4.7	16	100	0.9	10.0	5.0	0.022	0.031	0.039	0.062	0.078	B5
VTP200U	†	2.0	4.7	16	100	0.9	10.0	5.0	0.022	0.031	0.039	0.062	0.078	B8
VTP210G	†	2.1	4.7	16	100	1.2	10.0	5.0	0.018	0.024	0.030	0.048	0.060	B5
VTP210L	†	2.1	4.7	16	100	1.2	10.0	5.0	0.018	0.024	0.030	0.048	0.060	B5
VTP210S	†	2.1	4.7	16	100	1.2	10.0	5.0	0.018	0.024	0.030	0.048	0.060	B6
VTP210SF	†	2.1	4.7	16	100	1.2	10.0	5.0	0.018	0.024	0.030	0.048	0.060	B6
VTP210SL	†	2.1	4.7	16	100	1.2	10.0	5.0	0.018	0.024	0.030	0.048	0.060	B6
VTP210SL-19.2/5.8	†	2.1	4.7	16	100	1.2	10.0	5.0	0.018	0.024	0.030	0.048	0.060	B6
VTP210SS	†	2.1	4.7	16	100	1.2	10.0	5.0	0.018	0.024	0.030	0.048	0.060	B7
VTP210ULD	†	2.1	4.7	16	100	1.2	10.0	5.0	0.018	0.024	0.030	0.048	0.060	B8
VTP240	†	2.4	5.9	16	100	1.2	12.0	5.0	0.014	0.020	0.026	0.040	0.052	B5
<b>110°C Typical Activation</b>														
<b>LTP</b>														
LTP070		0.7	1.45	15	100	0.7	3.5	5.0	0.100	0.150	0.200	0.300	0.340	B9
LTP070S		0.7	1.45	15	100	0.7	3.5	5.0	0.100	0.150	0.200	0.300	0.340	B10
LTP100		1.0	2.50	24	100	0.9	5.0	7.0	0.070	0.100	0.130	0.200	0.260	B9
LTP100S		1.0	2.50	24	100	0.9	5.0	7.0	0.070	0.100	0.130	0.200	0.260	B10
LTP100SL		1.0	2.50	24	100	0.9	5.0	7.0	0.070	0.100	0.130	0.200	0.260	B10
LTP100SS		1.0	2.50	24	100	0.9	5.0	7.0	0.070	0.100	0.130	0.200	0.260	B11
LTP180		1.8	3.80	24	100	1.0	9.0	2.9	0.040	0.054	0.068	0.108	0.120	B9
LTP180L		1.8	3.80	24	100	1.0	9.0	2.9	0.040	0.054	0.068	0.108	0.120	B9
LTP180S		1.8	3.80	24	100	1.0	9.0	2.9	0.040	0.054	0.068	0.108	0.120	B10
LTP190		1.9	4.20	24	100	1.9	10.0	3.0	0.030	0.044	0.057	0.088	0.100	B9
LTP260		2.6	5.20	24	100	1.3	13.0	5.0	0.025	0.034	0.042	0.068	0.076	B9
LTP300		3.0	6.30	24	100	1.7	15.0	4.0	0.015	0.023	0.031	0.046	0.055	B9
LTP340		3.4	6.80	24	100	1.6	17.0	5.0	0.016	0.022	0.027	0.044	0.050	B9
<b>miniSMDE</b>														
miniSMDE190		1.9	3.8	16	100	1.5	10.0	2.0	0.024	0.032	0.040	0.060	0.080*	B18
<b>TAC</b>														
TAC100-09		1.0	2.4	15	50	1.2	5.0	5.0	0.085	0.120	0.155	0.240	0.300	B12
<b>125°C Typical Activation</b>														
<b>LR4</b>														
LR4-170U		1.7	3.4	15	100	0.8	8.5	5.0	0.044	0.061	0.078	0.089	0.114	B15
LR4-190		1.9	3.9	15	100	0.8	9.5	5.0	0.039	0.056	0.072	0.079	0.102	B13
LR4-190S		1.9	3.9	15	100	0.8	9.5	5.0	0.039	0.056	0.072	0.079	0.102	B14
LR4-260		2.6	5.8	15	100	1.0	13.0	5.0	0.020	0.031	0.042	0.046	0.063	B13
LR4-260S		2.6	5.8	15	100	1.0	13.0	5.0	0.020	0.031	0.042	0.046	0.063	B14
LR4-380		3.8	8.3	15	100	1.2	19.0	5.0	0.013	0.020	0.026	0.028	0.037	B13
LR4-380X		3.8	8.3	15	100	1.2	19.0	5.0	0.013	0.020	0.026	0.028	0.037	B13
LR4-450		4.5	8.9	20	100	1.4	22.5	5.0	0.011	0.016	0.020	0.022	0.028	B13
LR4-550		5.5	10.5	20	100	2.0	27.5	5.0	0.009	0.013	0.016	0.018	0.022	B13
LR4-600		6.0	11.7	20	100	1.7	30.0	5.0	0.007	0.011	0.014	0.015	0.019	B13

**Table B3. Product Electrical Characteristics for Strap Battery Devices *continued***

Part Number	$I_H$	$I_T$	$V_{MAX}$	$I_{MAX}$	$P_{D\ TYP}$	Max. Time-to-Trip		$R_{MIN}$	$R_{TYP}$	$R_{MAX}$	$R_{Tripped\ TYP}$	$R_{1\ MAX}$	Figure for Dimensions
	(A)	(A)	(V <sub>DC</sub> )	(A)	(W)	(A)	(s)	( $\Omega$ )	( $\Omega$ )	( $\Omega$ )	( $\Omega$ )	( $\Omega$ )	
<b>125°C Typical Activation</b>													
<b>LR4 <i>continued</i></b>													
LR4-600X	6.0	11.7	20	100	1.7	30.0	5.0	0.0075	0.012	0.014	0.015	0.019	B13
LR4-730	7.3	14.1	20	100	1.9	30.0	5.0	0.006	0.009	0.012	0.011	0.015	B13
LR4-880SS	8.8	16.0	20	100	2.0	44.0	5.0	0.0065	0.0085	0.0105	0.012	0.0145	B14
LR4-900	9.0	16.7	20	100	3.0	45.0	5.0	0.006	0.008	0.010	0.011	0.014	B13
LR4-1300SS	13.0	21.2	20	100	2.2	50.0	10.0	0.004	0.006	0.007	0.008	0.009	B14
LR4-1410	14.1	26.2	20	100	2.2	70.0	5.0	0.003	0.004	0.005	0.060	0.007	B13
<b>SRP</b>													
SRP120	1.2	2.7	15	100	0.8	6.0	5.0	0.085	0.123	0.160	0.170	0.220	B9
SRP120L	1.2	2.7	15	100	0.8	6.0	5.0	0.085	0.123	0.160	0.170	0.220	B9
SRP120S	1.2	2.7	15	100	0.8	6.0	5.0	0.085	0.123	0.160	0.170	0.220	B16
SRP175	1.75	3.8	15	100	0.9	8.75	5.0	0.050	0.070	0.090	0.093	0.120	B9
SRP175L	1.75	3.8	15	100	0.9	8.75	5.0	0.050	0.070	0.090	0.093	0.120	B9
SRP175S	1.75	3.8	15	100	0.9	8.75	5.0	0.050	0.070	0.090	0.093	0.120	B16
SRP175SS	1.75	3.8	15	100	0.9	8.75	5.0	0.050	0.070	0.090	0.093	0.120	B17
SRP200	2.0	4.4	30	100	1.6	10.0	4.0	0.030	0.045	0.060	0.075	0.100	B9
SRP350	3.5	6.3	30	100	1.9	20.0	3.0	0.017	0.024	0.031	0.040	0.050	B9
SRP420	4.2	7.6	30	100	2.2	20.0	6.0	0.012	0.018	0.024	0.030	0.040	B9
<b>TAC</b>													
TAC170-09	1.7	3.7	15	50	1.2	8.5	5.0	0.05	0.074	0.098	0.106	0.140	B12
TAC210	2.1	4.7	15	50	1.3	10.5	5.0	0.035	0.049	0.062	0.089	0.113	B12

**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.

 $R_{TYP}$  = Typical resistance of device as supplied at 20°C unless otherwise specified.

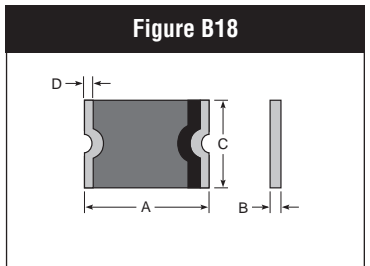
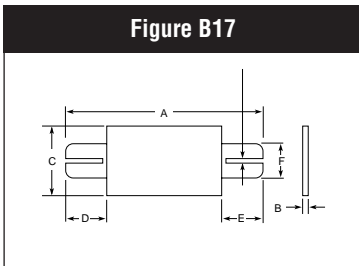
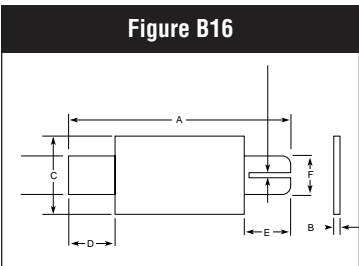
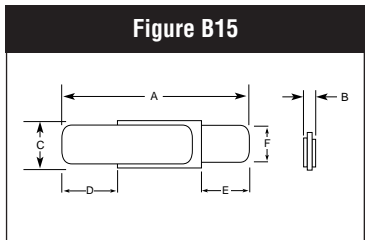
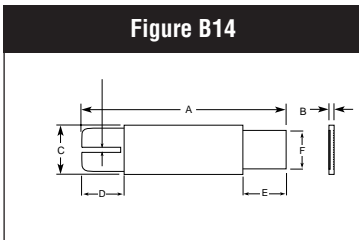
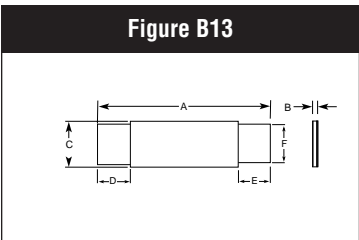
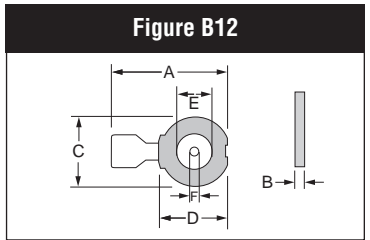
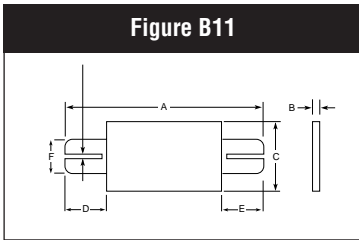
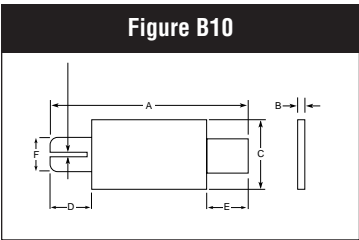
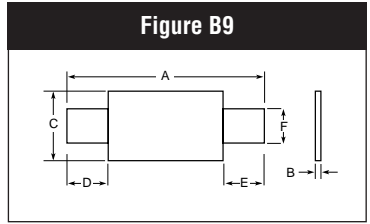
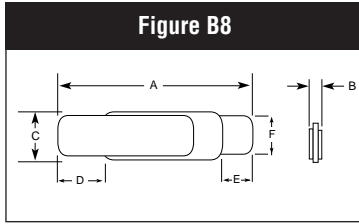
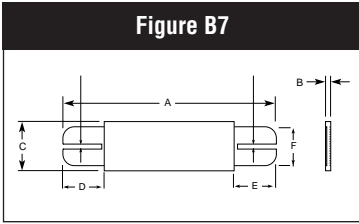
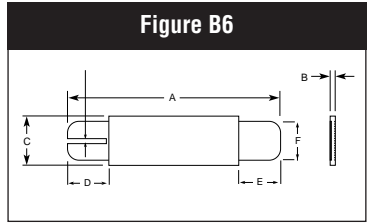
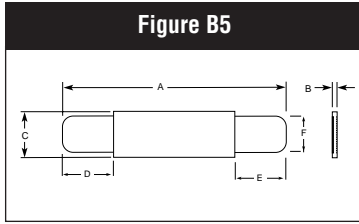
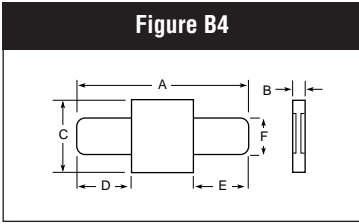
 $R_{Tripped\ TYP}$  = Typical resistance, measured at 20°C unless otherwise specified, of device one hour after being tripped the first time.

 $R_{1\ MAX}$  = Maximum resistance of device as supplied at 20°C unless otherwise specified.

† = Product electrical characteristics determined at 25°C.

\* =  $R_{1\ MAX}$  value for this device is the maximum resistance of the device at 20°C one hour after reflow.

Figures B4–B18. Physical Description for Dimensions



Note: All slit parts are 0.5mm x 4.0mm nom. (0.02 in x 0.16 in)

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**Table B4. Dimensions for Strap Battery Devices in Millimeters (Inches)**

Part Number	Dimension												Figure
	A		B		C		D		E		F		
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
<b>85°C Typical Activation</b>													
<b>VLR</b>													
VLR170	20.8 (0.82)	23.2 (0.91)	—	0.8 (0.03)	3.5 (0.14)	3.9 (0.15)	4.5 (0.18)	6.5 (0.26)	4.5 (0.18)	6.5 (0.26)	2.4 (0.09)	2.6 (0.10)	B5 —
VLR170L	38.8 (1.53)	41.2 (1.62)	—	0.8 (0.03)	3.5 (0.14)	3.9 (0.15)	8.7 (0.34)	10.3 (0.41)	18.7 (0.74)	20.3 (0.80)	2.4 (0.09)	2.6 (0.10)	B5 —
VLR170U	20.8 (0.82)	23.2 (0.91)	—	0.7 (0.03)	3.5 (0.14)	3.7 (0.15)	5.3 (0.21)	6.7 (0.26)	5.3 (0.21)	6.7 (0.26)	2.4 (0.09)	2.6 (0.10)	B8 —
VLR170UF	20.8 (0.81)	23.2 (0.91)	—	0.07 (0.03)	3.5 (0.14)	3.7 (0.15)	5.3 (0.21)	6.7 (0.26)	5.3 (0.21)	6.7 (0.26)	2.4 (0.09)	2.6 (0.10)	B8 —
VLR175	23.0 (0.91)	24.5 (0.96)	—	0.8 (0.03)	2.9 (0.11)	3.3 (0.13)	4.7 (0.19)	7.2 (0.28)	3.8 (0.15)	5.4 (0.21)	2.4 (0.09)	2.6 (0.10)	B5 —
VLR175L	29.3 (1.15)	31.7 (1.25)	—	0.8 (0.03)	2.9 (0.11)	3.3 (0.13)	5.2 (0.21)	6.8 (0.27)	10.0 (0.39)	12.5 (0.49)	2.4 (0.09)	2.6 (0.10)	B5 —
VLR175UF	23.0 (0.91)	24.5 (0.96)	—	0.7 (0.03)	2.9 (0.11)	3.1 (0.12)	5.2 (0.20)	7.5 (0.30)	4.3 (0.17)	5.7 (0.22)	2.4 (0.09)	2.6 (0.10)	B8 —
VLR230	20.9 (0.82)	23.1 (0.91)	—	0.8 (0.03)	4.9 (0.19)	5.3 (0.21)	4.1 (0.16)	5.8 (0.23)	4.1 (0.16)	5.8 (0.23)	3.9 (0.15)	4.1 (0.16)	B5 —
VLR230-C36	25.3 (0.10)	27.7 (1.09)	—	0.8 (0.03)	3.5 (0.14)	3.9 (0.15)	3.5 (0.14)	5.7 (0.22)	3.5 (0.14)	5.7 (0.22)	2.9 (0.11)	3.1 (0.12)	B13 —
VLR230S	20.9 (0.82)	23.1 (0.91)	—	0.8 (0.03)	4.9 (0.19)	5.3 (0.21)	4.1 (0.16)	5.8 (0.23)	4.1 (0.16)	5.8 (0.23)	3.9 (0.15)	4.1 (0.16)	B6 —
VLR230SU	20.9 (0.82)	23.1 (0.91)	—	0.7 (0.03)	4.9 (0.19)	5.1 (0.20)	4.1 (0.16)	6.0 (0.24)	4.1 (0.16)	6.0 (0.24)	3.9 (0.15)	4.1 (0.16)	B6 —
VLR230U	20.9 (0.82)	23.1 (0.91)	—	0.7 (0.03)	4.9 (0.19)	5.1 (0.20)	4.1 (0.16)	6.0 (0.24)	4.1 (0.16)	6.0 (0.24)	3.9 (0.15)	4.1 (0.16)	B8 —
<b>90°C Typical Activation</b>													
<b>VLP</b>													
VLP210	15.4 (0.606)	17.5 (0.689)	0.6 (0.02)	0.8 (0.03)	6.9 (0.27)	7.3 (0.287)	4.0 (0.157)	6.2 (0.244)	4.0 (0.157)	6.2 (0.244)	3.9 (0.15)	4.1 (0.16)	B4 —
VLP220	21.1 (0.83)	23.3 (0.92)	0.6 (0.02)	0.8 (0.03)	3.5 (0.13)	3.9 (0.15)	5.1 (0.20)	6.8 (0.27)	5.1 (0.20)	6.8 (0.27)	2.9 (0.11)	3.1 (0.12)	B5 —
VLP270	20.9 (0.82)	23.1 (0.91)	0.6 (0.02)	0.8 (0.03)	4.9 (0.19)	5.3 (0.21)	4.1 (0.16)	5.8 (0.23)	4.1 (0.16)	5.8 (0.23)	3.9 (0.15)	4.1 (0.16)	B5 —
<b>90°C Typical Activation</b>													
<b>VTP</b>													
VTP110	23.6 (0.93)	25.6 (1.01)	—	0.7 (0.03)	2.7 (0.11)	2.9 (0.11)	7.0 (0.28)	8.0 (0.32)	7.0 (0.28)	8.0 (0.32)	2.3 (0.09)	2.5 (0.10)	B8 —
VTP170	15.4 (0.606)	17.5 (0.689)	0.5 (0.02)	0.8 (0.03)	7.0 (0.275)	7.4 (0.292)	4.0 (0.157)	6.2 (0.244)	4.0 (0.157)	6.2 (0.244)	3.9 (0.15)	4.1 (0.16)	B4 —
VTP170SS	15.4 (0.606)	17.5 (0.689)	0.5 (0.02)	0.8 (0.03)	7.0 (0.275)	7.4 (0.292)	4.0 (0.157)	6.2 (0.244)	4.0 (0.157)	6.2 (0.244)	3.9 (0.154)	4.1 (0.161)	B11 —
VTP170X	20.9 (0.82)	22.9 (0.90)	0.5 (0.02)	0.8 (0.03)	4.9 (0.19)	5.3 (0.21)	6.0 (0.23)	8.6 (0.34)	6.0 (0.23)	8.6 (0.34)	3.9 (0.15)	4.1 (0.16)	B5 —
VTP170XS	20.9 (0.82)	22.9 (0.90)	0.5 (0.02)	0.8 (0.03)	4.9 (0.19)	5.3 (0.21)	6.0 (0.23)	8.6 (0.34)	6.0 (0.23)	8.6 (0.34)	3.9 (0.15)	4.1 (0.16)	B6 —
VTP175	21.2 (0.83)	23.2 (0.91)	—	0.8 (0.03)	3.5 (0.14)	3.9 (0.15)	4.6 (0.18)	6.6 (0.26)	4.6 (0.18)	6.6 (0.26)	2.9 (0.11)	3.1 (0.12)	B5 —
VTP175L	25.8 (1.02)	28.2 (1.11)	—	0.8 (0.03)	3.5 (0.13)	3.9 (0.15)	5.7 (0.22)	7.3 (0.29)	8.7 (0.34)	10.3 (0.41)	2.4 (0.09)	2.6 (0.10)	B5 —
VTP175U	21.2 (0.83)	23.2 (0.91)	—	0.7 (0.03)	3.5 (0.13)	3.7 (0.15)	5.6 (0.22)	6.8 (0.27)	5.6 (0.22)	6.8 (0.27)	2.9 (0.11)	3.1 (0.12)	B8 —

Table B4. Dimensions for Strap Battery Devices in Millimeters (Inches) *continued*

Part Number	Dimension												Figure
	A		B		C		D		E		F		
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
<b>90°C Typical Activation</b>													
<b>VTP <i>continued</i></b>													
VTP200G	20.9 (0.82)	23.1 (0.91)	—	0.8 (0.03)	4.1 (0.16)	4.5 (0.18)	3.0 (0.11)	4.8 (0.19)	3.0 (0.11)	4.8 (0.19)	2.9 (0.11)	3.1 (0.12)	B5 —
VTP200U	20.9 (0.82)	23.1 (0.91)	—	0.7 (0.03)	4.1 (0.16)	4.3 (0.17)	4.0 (0.16)	5.4 (0.21)	4.0 (0.16)	5.4 (0.21)	2.9 (0.11)	3.1 (0.12)	B8 —
VTP210G	20.9 (0.82)	23.1 (0.91)	0.6 (0.02)	0.8 (0.03)	4.9 (0.19)	5.3 (0.21)	4.1 (0.16)	5.8 (0.23)	4.1 (0.16)	5.8 (0.23)	3.9 (0.15)	4.1 (0.16)	B5 —
VTP210L	24.0 (0.94)	26.0 (1.02)	0.6 (0.02)	0.8 (0.03)	4.9 (0.19)	5.3 (0.21)	5.0 (0.20)	7.1 (0.28)	5.0 (0.20)	7.1 (0.28)	3.9 (0.15)	4.1 (0.16)	B5 —
VTP210S	20.9 (0.82)	23.1 (0.91)	0.6 (0.02)	0.8 (0.03)	4.9 (0.19)	5.3 (0.21)	4.1 (0.16)	5.8 (0.28)	4.1 (0.16)	5.8 (0.23)	3.9 (0.15)	4.1 (0.16)	B6 —
VTP210SF	20.9 (0.82)	23.1 (0.91)	0.6 (0.02)	0.8 (0.03)	4.9 (0.19)	5.3 (0.21)	4.1 (0.16)	5.8 (0.23)	4.1 (0.16)	5.8 (0.23)	3.9 (0.15)	4.1 (0.16)	B6 —
VTP210SL	29.0 (1.14)	32.0 (1.26)	0.6 (0.02)	0.8 (0.03)	4.9 (0.19)	5.3 (0.21)	3.5 (0.13)	5.8 (0.23)	12.5 (0.49)	14.5 (0.57)	3.9 (0.15)	4.1 (0.16)	B6 —
VTP210SL-19.2/5.8	34.0 (1.33)	37.0 (1.46)	—	0.8 (0.03)	4.9 (0.19)	5.3 (0.21)	16.8 (0.66)	19.2 (0.76)	4.1 (0.16)	5.8 (0.23)	3.9 (0.15)	4.1 (0.16)	B6 —
VTP210SS	20.9 (0.82)	23.1 (0.91)	0.6 (0.02)	0.8 (0.03)	4.9 (0.19)	5.3 (0.21)	4.1 (0.16)	5.8 (0.23)	4.1 (0.16)	5.8 (0.23)	3.9 (0.15)	4.1 (0.16)	B7 —
VTP210ULD	22.8 (0.89)	25.2 (1.00)	—	0.8 (0.03)	4.9 (0.19)	5.1 (0.20)	7.8 (0.30)	9.2 (0.37)	2.9 (0.11)	4.1 (0.17)	2.9 (0.11)	3.1 (0.13)	B8 —
VTP240	23.8 (0.93)	26.2 (1.03)	—	0.8 (0.03)	4.9 (0.19)	5.3 (0.21)	3.5 (0.13)	5.7 (0.23)	3.5 (0.13)	5.7 (0.23)	3.9 (0.15)	4.1 (0.16)	B5 —
<b>110°C Typical Activation</b>													
<b>LTP</b>													
LTP070	19.9 (0.783)	22.1 (0.870)	0.7 (0.027)	1.2 (0.048)	4.9 (0.192)	5.2 (0.205)	5.5 (0.216)	7.5 (0.296)	5.5 (0.216)	7.5 (0.296)	3.9 (0.153)	4.1 (0.162)	B9 —
LTP070S	19.9 (0.783)	22.1 (0.870)	0.7 (0.027)	1.2 (0.048)	4.9 (0.192)	5.2 (0.205)	5.5 (0.216)	7.5 (0.296)	5.5 (0.216)	7.5 (0.296)	3.9 (0.153)	4.1 (0.162)	B10 —
LTP100	20.9 (0.82)	23.1 (0.91)	0.6 (0.02)	1.0 (0.04)	4.9 (0.19)	5.2 (0.20)	4.1 (0.16)	5.5 (0.22)	4.1 (0.16)	5.5 (0.22)	3.9 (0.15)	4.1 (0.16)	B9 —
LTP100S	20.9 (0.82)	23.1 (0.91)	0.6 (0.02)	1.0 (0.04)	4.9 (0.19)	5.2 (0.20)	4.1 (0.16)	5.5 (0.22)	4.1 (0.16)	5.5 (0.22)	3.9 (0.15)	4.1 (0.16)	B10 —
LTP100SL	29.0 (1.14)	32.0 (1.26)	0.6 (0.02)	1.0 (0.04)	4.9 (0.19)	5.2 (0.20)	3.5 (0.13)	5.5 (0.22)	12.5 (0.49)	14.5 (0.57)	3.9 (0.15)	4.1 (0.16)	B10 —
LTP100SS	20.9 (0.82)	23.1 (0.91)	0.6 (0.02)	1.0 (0.04)	4.9 (0.19)	5.2 (0.20)	4.1 (0.16)	5.5 (0.22)	4.1 (0.16)	5.5 (0.22)	3.9 (0.15)	4.1 (0.16)	B11 —
LTP180	24.0 (0.94)	26.0 (1.02)	0.6 (0.02)	1.0 (0.04)	4.9 (0.19)	5.2 (0.20)	4.1 (0.16)	5.5 (0.22)	4.1 (0.16)	5.5 (0.22)	3.9 (0.15)	4.1 (0.16)	B9 —
LTP180L	35.5 (1.40)	37.5 (1.48)	0.6 (0.02)	1.0 (0.04)	4.9 (0.19)	5.2 (0.20)	9.7 (0.38)	11.0 (0.44)	9.7 (0.38)	11.0 (0.44)	3.9 (0.15)	4.1 (0.16)	B9 —
LTP180S	24.0 (0.94)	26.0 (1.02)	0.6 (0.02)	1.0 (0.04)	4.9 (0.19)	5.2 (0.20)	4.1 (0.16)	5.5 (0.22)	4.1 (0.16)	5.5 (0.22)	3.9 (0.15)	4.1 (0.16)	B10 —
LTP190	21.3 (0.84)	23.4 (0.92)	0.5 (0.02)	1.1 (0.04)	10.2 (0.40)	11.0 (0.43)	5.0 (0.20)	7.6 (0.30)	5.0 (0.20)	7.6 (0.30)	4.8 (0.19)	5.4 (0.21)	B9 —
LTP260	24.0 (0.94)	26.0 (1.02)	0.6 (0.02)	1.0 (0.04)	10.8 (0.43)	11.9 (0.47)	5.0 (0.20)	7.0 (0.28)	5.0 (0.20)	7.0 (0.28)	5.9 (0.23)	6.1 (0.24)	B9 —
LTP300	28.4 (1.12)	31.8 (1.25)	0.5 (0.02)	1.1 (0.04)	13.0 (0.51)	13.5 (0.53)	6.3 (0.25)	8.9 (0.35)	6.3 (0.25)	8.9 (0.35)	6.0 (0.24)	6.6 (0.26)	B9 —
LTP340	24.0 (0.94)	26.0 (1.02)	0.6 (0.02)	1.0 (0.04)	14.8 (0.58)	15.9 (0.63)	4.0 (0.16)	5.0 (0.20)	4.0 (0.16)	5.0 (0.20)	5.9 (0.23)	6.1 (0.24)	B9 —

**Table B4. Dimensions for Strap Battery Devices in Millimeters (Inches) *continued***

Part Number	Dimension												Figure
	A		B		C		D		E		F		
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
<b>miniSMDE</b>													
miniSMDE190	11.15 (0.439)	11.51 (0.453)	0.33 (0.013)	0.53 (0.021)	4.83 (0.19)	5.33 (0.21)	0.51 (0.02)	1.02 (0.04)	—	—	—	—	B18 —
<b>TAC</b>													
TAC100-09	16.5 (0.65)	17.5 (0.69)	—	0.9 (0.036)	9.5 (0.37)	10.5 (0.45)	9.4 (0.37)	10.0 (0.040)	5.0 (0.19)	5.2 (0.21)	0.8 (0.03)	1.2 (0.05)	B12 —
<b>125°C Typical Activation</b>													
<b>LR4</b>													
LR4-170U	19.0 (0.75)	21.0 (0.83)	0.5 (0.02)	0.7 (0.03)	3.8 (0.15)	4.0 (0.16)	5.3 (0.21)	6.5 (0.26)	5.3 (0.21)	6.5 (0.26)	2.9 (0.11)	3.1 (0.12)	B15 —
LR4-190	19.9 (0.78)	22.1 (0.87)	0.6 (0.02)	1.0 (0.04)	4.9 (0.19)	5.5 (0.22)	5.5 (0.22)	7.5 (0.30)	5.5 (0.22)	7.5 (0.30)	3.9 (0.15)	4.1 (0.16)	B13 —
LR4-190S	19.9 (0.78)	22.1 (0.87)	0.6 (0.02)	1.0 (0.04)	4.9 (0.19)	5.5 (0.22)	5.5 (0.22)	7.5 (0.30)	5.5 (0.22)	7.5 (0.30)	3.9 (0.15)	4.1 (0.16)	B14 —
LR4-260	20.9 (0.82)	23.1 (0.91)	0.6 (0.02)	1.0 (0.04)	4.9 (0.19)	5.5 (0.22)	4.1 (0.16)	5.5 (0.22)	4.1 (0.16)	5.5 (0.22)	3.9 (0.15)	4.1 (0.16)	B13 —
LR4-260S	20.9 (0.82)	23.1 (0.91)	0.6 (0.02)	1.0 (0.04)	4.9 (0.19)	5.5 (0.22)	4.1 (0.16)	5.5 (0.22)	4.1 (0.16)	5.5 (0.22)	3.9 (0.15)	4.1 (0.16)	B14 —
LR4-380	24.0 (0.94)	26.0 (1.02)	0.6 (0.02)	1.0 (0.04)	6.9 (0.27)	7.5 (0.30)	4.1 (0.16)	5.5 (0.22)	4.1 (0.16)	5.5 (0.22)	4.9 (0.19)	5.1 (0.20)	B13 —
LR4-380X	32.2 (1.27)	35.8 (1.41)	0.6 (0.02)	1.0 (0.04)	4.9 (0.19)	5.5 (0.22)	5.5 (0.22)	7.5 (0.30)	5.5 (0.22)	7.5 (0.30)	3.9 (0.15)	4.1 (0.16)	B13 —
LR4-450	24.0 (0.94)	26.0 (1.02)	0.6 (0.02)	1.0 (0.04)	9.9 (0.41)	10.5 (0.39)	5.3 (0.21)	6.7 (0.26)	5.3 (0.21)	6.7 (0.26)	5.9 (0.23)	6.1 (0.24)	B13 —
LR4-550	35.0 (1.38)	37.0 (1.46)	0.6 (0.02)	1.0 (0.04)	6.9 (0.27)	7.5 (0.30)	5.3 (0.21)	6.7 (0.26)	5.3 (0.21)	6.7 (0.26)	4.9 (0.19)	5.1 (0.20)	B13 —
LR4-600	24.0 (0.95)	26.0 (1.02)	0.6 (0.02)	1.0 (0.04)	13.9 (0.55)	14.5 (0.57)	4.1 (0.16)	5.5 (0.22)	4.1 (0.16)	5.5 (0.22)	5.9 (0.23)	6.1 (0.24)	B13 —
LR4-600X	40.5 (1.59)	42.7 (1.68)	0.6 (0.02)	1.0 (0.04)	6.9 (0.27)	7.5 (0.30)	5.2 (0.20)	6.8 (0.27)	5.2 (0.20)	6.8 (0.27)	4.9 (0.19)	5.1 (0.20)	B13 —
LR4-730	27.1 (1.06)	29.1 (1.15)	0.6 (0.02)	1.0 (0.04)	13.9 (0.54)	14.5 (0.57)	4.1 (0.16)	5.5 (0.22)	4.1 (0.16)	5.5 (0.22)	5.9 (0.23)	6.1 (0.24)	B13 —
LR4-880S	62.8 (2.47)	65.2 (2.57)	0.6 (0.02)	1.0 (0.04)	7.9 (0.31)	8.5 (0.33)	10.0 (0.39)	12.0 (0.47)	10.0 (0.39)	12.0 (0.47)	5.9 (0.23)	6.1 (0.24)	B17 —
LR4-900	45.4 (1.79)	47.6 (1.87)	0.9 (0.04)	1.3 (0.05)	7.9 (0.31)	8.5 (0.33)	4.6 (0.18)	6.2 (0.24)	4.6 (0.18)	6.2 (0.24)	5.9 (0.23)	6.1 (0.24)	B13 —
LR4-1300SS	61.5 (0.42)	66.5 (2.62)	0.9 (0.04)	1.3 (0.05)	9.4 (0.37)	10.0 (0.39)	5.0 (0.20)	7.5 (0.30)	5.0 (0.20)	7.5 (0.30)	5.9 (0.23)	6.1 (0.24)	B17 —
LR4-1410	58.0 (2.28)	60.0 (2.36)	0.9 (0.04)	1.3 (0.05)	13.4 (0.53)	14.0 (0.55)	4.2 (0.17)	5.8 (0.23)	4.2 (0.17)	5.8 (0.23)	5.9 (0.23)	6.1 (0.24)	B13 —
<b>SRP</b>													
SRP120	19.9 (0.78)	22.1 (0.87)	0.6 (0.02)	1.0 (0.04)	4.9 (0.19)	5.2 (0.20)	5.5 (0.22)	7.5 (0.30)	5.5 (0.22)	7.5 (0.30)	3.9 (0.15)	4.1 (0.16)	B9 —
SRP120L	24.9 (0.98)	27.1 (1.07)	0.6 (0.02)	1.0 (0.04)	4.9 (0.19)	5.2 (0.20)	5.5 (0.22)	7.5 (0.30)	10.5 (0.41)	12.5 (0.49)	3.9 (0.15)	4.1 (0.16)	B9 —
SRP120S	19.9 (0.78)	22.1 (0.87)	0.6 (0.02)	1.0 (0.04)	4.9 (0.19)	5.2 (0.20)	5.5 (0.22)	7.5 (0.30)	5.5 (0.22)	7.5 (0.30)	3.9 (0.15)	4.1 (0.16)	B16 —
SRP175	20.9 (0.82)	23.1 (0.91)	0.6 (0.02)	1.0 (0.04)	4.9 (0.19)	5.2 (0.20)	4.1 (0.16)	5.5 (0.22)	4.1 (0.16)	5.5 (0.22)	3.9 (0.15)	4.1 (0.16)	B9 —
SRP175L	29.9 (1.18)	32.1 (1.26)	0.6 (0.02)	1.0 (0.04)	4.9 (0.19)	5.2 (0.20)	5.5 (0.22)	7.5 (0.30)	10.5 (0.41)	12.5 (0.49)	3.9 (0.15)	4.1 (0.16)	B9 —



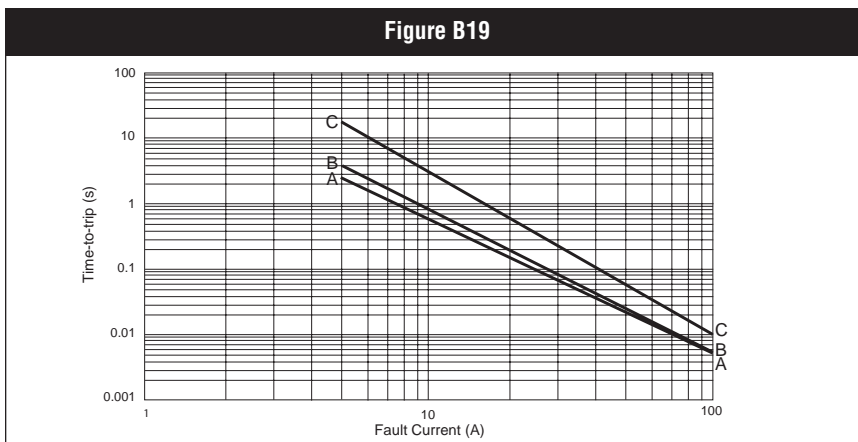
**Table B4. Dimensions for Strap Battery Devices in Millimeters (Inches) *continued***

Part Number	Dimension												Figure
	A		B		C		D		E		F		
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
<b>SRP <i>continued</i></b>													
SRP175S	20.9 (0.82)	23.1 (0.91)	0.6 (0.02)	1.0 (0.04)	4.9 (0.19)	5.2 (0.20)	4.1 (0.16)	5.5 (0.22)	4.1 (0.16)	5.5 (0.22)	3.9 (0.15)	4.1 (0.16)	B16
SRP175SS	20.9 (0.82)	23.1 (0.91)	0.6 (0.02)	1.0 (0.04)	4.9 (0.19)	5.2 (0.20)	4.1 (0.16)	5.5 (0.22)	4.1 (0.16)	5.5 (0.22)	3.9 (0.15)	4.1 (0.16)	B17
SRP200	21.3 (0.84)	23.4 (0.92)	0.5 (0.02)	1.1 (0.04)	10.2 (0.40)	11.0 (0.43)	5.0 (0.20)	7.6 (0.30)	5.0 (0.20)	7.6 (0.30)	4.8 (0.19)	5.4 (0.21)	B9
SRP350	28.4 (1.12)	31.8 (1.25)	0.5 (0.02)	1.1 (0.04)	13.0 (0.53)	13.5 (0.51)	6.3 (0.25)	8.9 (0.35)	6.3 (0.25)	8.9 (0.35)	6.0 (0.24)	6.6 (0.26)	B9
SRP420	30.6 (1.20)	32.4 (1.28)	0.5 (0.02)	1.1 (0.04)	12.9 (0.51)	13.6 (0.54)	5.0 (0.20)	7.5 (0.30)	5.0 (0.20)	7.5 (0.30)	6.0 (0.24)	6.7 (0.26)	B9
<b>TAC</b>													
TAC170-09	16.5 (0.65)	17.5 (0.69)	—	0.9 (0.036)	9.5 (0.37)	10.5 (0.42)	9.4 (0.37)	10.0 (0.40)	5.0 (0.19)	5.2 (0.21)	0.8 (0.03)	1.2 (0.05)	B12
TAC210	16.5 (0.65)	17.5 (0.69)	—	0.9 (0.036)	9.5 (0.37)	10.5 (0.42)	9.4 (0.37)	10.0 (0.40)	5.0 (0.19)	5.2 (0.21)	0.8 (0.03)	1.2 (0.05)	B12

**Figures B19–B25. Typical Time-to-trip Curves at 20°C for Strap Battery Devices**

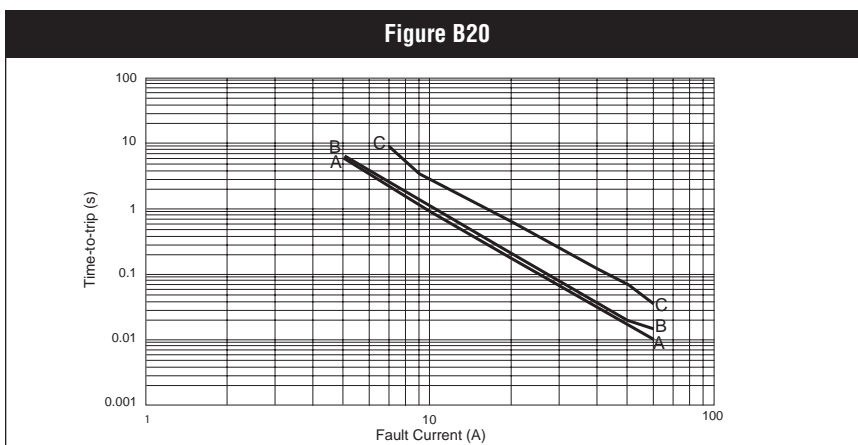
**VLR (data at 25°C)**

- A = VLR170
- B = VLR175
- C = VLR230



**VLP (data at 25°C)**

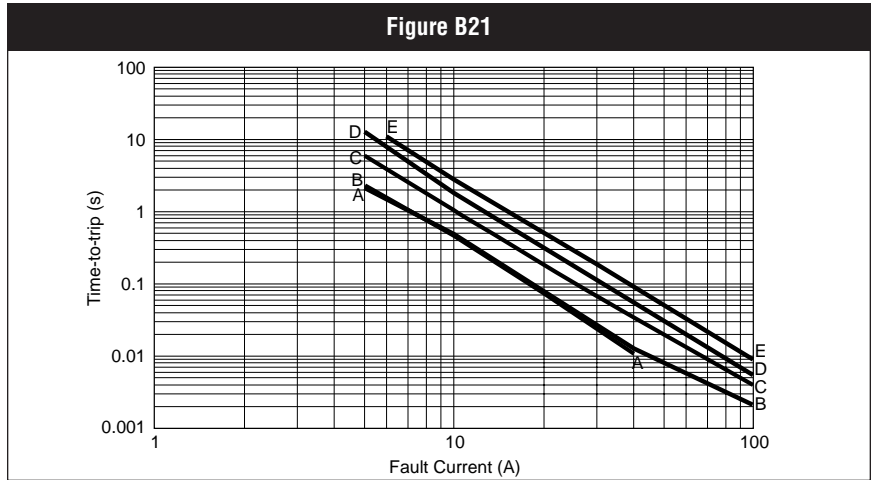
- A = VLP210
- B = VLP220
- C = VLP270



**Figures B19–B25. Typical Time-to-trip Curves at 20°C for Strap Battery Devices *continued***

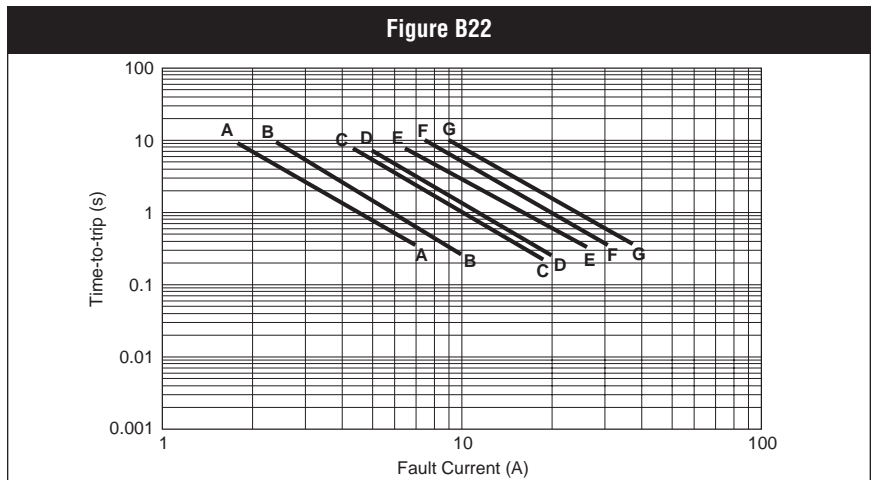
**VTP (data at 25°C)**

- A = VTP170
- B = VTP175
- C = VTP200
- D = VTP210G
- E = VTP240



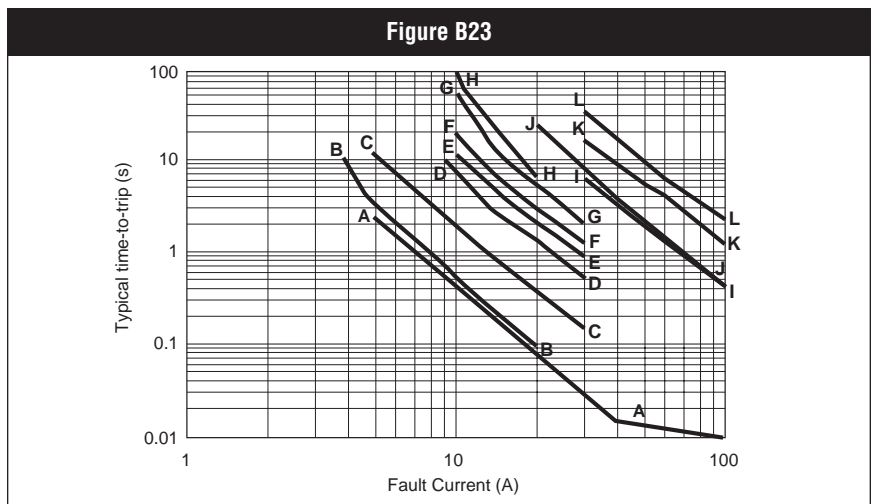
**LTP**

- A = LTP070
- B = LTP100
- C = LTP180
- D = LTP190
- E = LTP260
- F = LTP300
- G = LTP340



**LR4**

- A = LR4-170U
- B = LR4-190
- C = LR4-260
- D = LR4-380
- E = LR4-450
- F = LR4-550
- G = LR4-600
- H = LR4-730
- I = LR4-880
- J = LR4-900
- K = LR4-1300
- L = LR4-1410



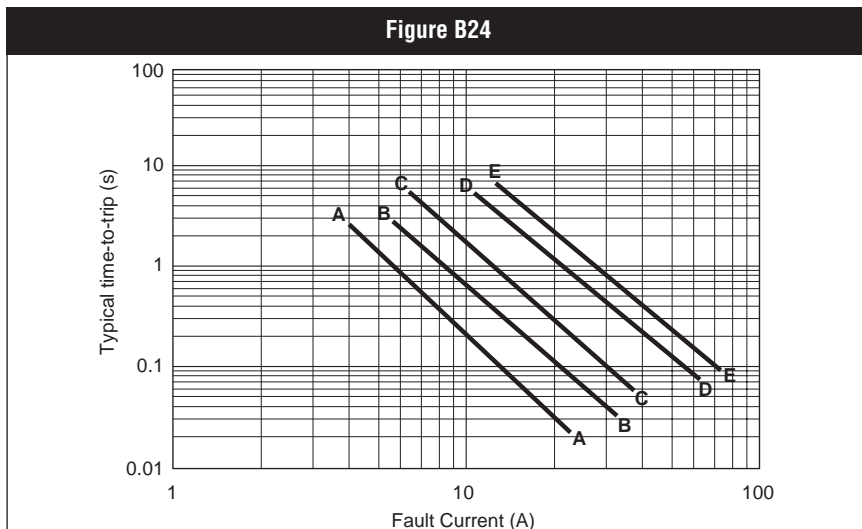
4



Figures B19–B25. Typical Time-to-trip Curves at 20°C for Strap Battery Devices *continued*

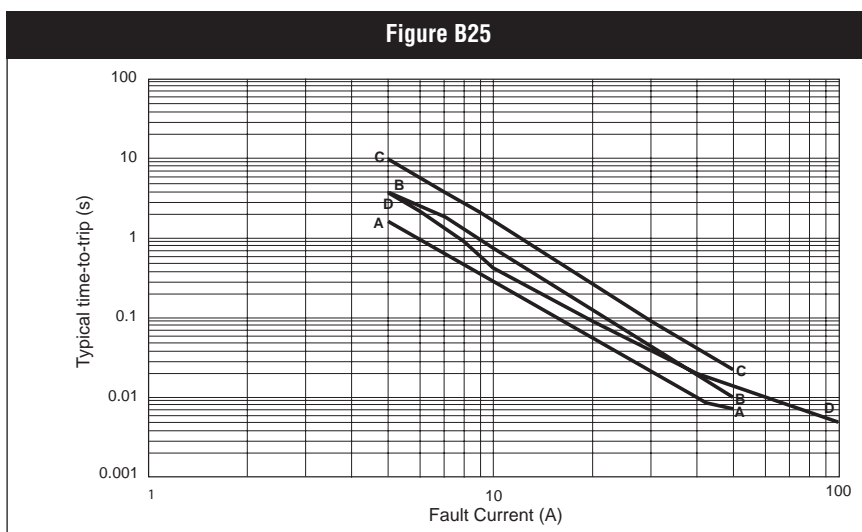
**SRP**

- A = SRP120
- B = SRP175
- C = SRP200
- D = SRP350
- E = SRP420



**TAC & miniSMDE**

- A = TAC100-09
- B = TAC170-09
- C = TAC210
- D = miniSMDE190



**Table B5. Physical Characteristics and Environmental Specifications for Strap Battery Devices**

<b>VLR</b>	
<b>Physical Characteristics</b>	
Lead material	0.125mm nominal thickness, quarter-hard nickel
Tape material	Polyester

<b>Environmental Specifications</b>		
<b>Test</b>	<b>Conditions</b>	<b>Resistance Change</b>
Passive aging	-40°C, 1000 hours	±5%
	60°C, 1000 hours	±20%
Humidity aging	60°C/95% RH, 1000 hours	±30%
Thermal shock	85°C, -40°C (10 times)	±5%
Vibration	MIL-STD-883D, Method 2026	No change

<b>VLP and VTP</b>	
<b>Physical Characteristics</b>	
Lead material	0.125mm nominal thickness, quarter-hard nickel
Tape material	Polyester

<b>Environmental Specifications</b>		
<b>Test</b>	<b>Conditions</b>	<b>Resistance Change</b>
Passive aging	-40°C, 1000 hours	±5%
	60°C, 1000 hours	±10%
Humidity aging	60°C/95% RH, 1000 hours	±10%
Thermal shock	85°C, -40°C (10 times)	±5%
Vibration	MIL-STD-883D, Method 2026	No change

<b>LTP</b>	
<b>Physical Characteristics</b>	
Lead material	0.125mm nominal thickness, quarter-hard nickel
Tape material	Polyester

<b>Environmental Specifications</b>		
<b>Test</b>	<b>Conditions</b>	<b>Resistance Change</b>
Passive aging	70°C, 1000 hours	±10%
Humidity aging	85°C/85% RH, 7 days	±15%
Vibration	MIL-STD-883C, Test Condition A	No change

<b>LR4</b>	
<b>Physical Characteristics</b>	
Lead material	0.125mm nominal thickness, quarter-hard nickel
Tape material	Polyester

<b>Environmental Specifications</b>		
<b>Test</b>	<b>Conditions</b>	<b>Resistance Change</b>
Passive aging	70°C, 1000 hours	±10%
Humidity aging	85°C/85% RH, 7 days	±5%
Vibration	MIL-STD-883D, Method 2026	No change

Table B5. Physical Characteristics and Environmental Specifications for Strap Battery Devices *continued*

<b>SRP</b>	
<b>Physical Characteristics</b>	
Lead material	0.125mm nominal thickness, quarter-hard nickel
Tape material	Polyester

<b>Environmental Specifications</b>		
<b>Test</b>	<b>Conditions</b>	<b>Resistance Change</b>
Passive aging	70°C, 1000 hours	±10%
Humidity aging	85°C/85% RH, 7 days	±5%
Vibration	MIL-STD-883C, Test Condition A	No change

<b>TAC</b>	
<b>Physical Characteristics</b>	
Lead material	0.15mm nominal thickness, nickel-plated steel
Molding material	liquid crystal polymer

<b>Environmental Specifications</b>		
<b>Test</b>	<b>Conditions</b>	<b>Resistance Change</b>
Passive aging	70°C, 1000 hours	±10%
Humidity aging	85°C/85% RH, 7 days	±15%
Vibration	MIL-STD-883D, Method 2026	No change

<b>miniSMDE</b>	
<b>Physical Characteristics</b>	
Termination pad materials	Solder-plated copper
Termination pad solderability	Meets EIA specification RS186-9E, ANSI/J-STD-002 Category 3

<b>Environmental Specifications</b>		
<b>Test</b>	<b>Conditions</b>	<b>Resistance Change</b>
Passive aging	60°C, 1000 hours	±5% typical
	85°C, 1000 hours	±5% typical
Humidity aging	85°C/85% RH, 100 days	±15% typical
Thermal shock	85°C, -40°C (20 times)	-33% typical
	125°C, -55°C (10 times)	-33% typical
Vibration	MIL-STD-883D, Method 2026	No change
Reflow conditions	260°C for 10-20 seconds	Less than R <sub>max</sub>
Tape and reel specifications	Per EIA 481-1	N/A

Note: 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.

**Table B6. Packaging and Marking Information/Agency Recognition for Strap Battery Devices**

Part Number	Bag Quantity	Tape & Reel Quantity	Standard Package	Part Marking	Agency Recognition
<b>85°C Typical Activation—VLR</b>					
VLR170	1,000	—	10,000	R17	UL, CSA, TÜV
VLR170L	1,000	—	10,000	R17	UL, CSA, TÜV
VLR170U	1,000	—	10,000	—	UL, CSA, TÜV
VLR170UF	1,000	—	10,000	—	UL, CSA, TÜV
VLR175	1,000	—	10,000	R1X	UL, CSA, TÜV
VLR175L	1,000	—	10,000	R1X	UL, CSA, TÜV
VLR175UF	1,000	—	10,000	—	UL, CSA, TÜV
VLR230	1,000	—	10,000	R23	UL, CSA, TÜV
VLR230-C36	1,000	—	10,000	R23	UL, CSA, TÜV
VLR230S	1,000	—	10,000	R23	UL, CSA, TÜV
VLR230SU	1,000	—	10,000	—	UL, CSA, TÜV
VLR230U	1,000	—	10,000	—	UL, CSA, TÜV
<b>90°C Typical Activation—VLP</b>					
VLP210	1,000	—	10,000	W21	UL, CSA, TÜV
VLP220	1,000	—	10,000	W22	UL, CSA, TÜV
VLP270	1,000	—	10,000	W27	UL, CSA, TÜV
<b>90°C Typical Activation—VTP</b>					
VTP110	1,000	—	10,000	—	UL, CSA, TÜV
VTP170	1,000	—	10,000	V17	UL, CSA, TÜV
VTP170SS	1,000	—	10,000	V17	UL, CSA, TÜV
VTP170X	1,000	—	10,000	V17	UL, CSA, TÜV
VTP170XS	1,000	—	10,000	V17	UL, CSA, TÜV
VTP175	1,000	—	10,000	V1X	UL, CSA, TÜV
VTP175U	1,000	—	10,000	—	UL, CSA, TÜV
VTP175L	1,000	—	10,000	V1X	UL, CSA, TÜV
VTP200G	1,000	—	10,000	V20	UL, CSA, TÜV
VTP200U	1,000	—	10,000	—	UL, CSA, TÜV
VTP210G	1,000	—	10,000	V21	UL, CSA, TÜV
VTP210GU	1,000	—	10,000	—	UL, CSA, TÜV
VTP210G-2	—	4,000	20,000	V21	UL, CSA, TÜV
VTP210L	1,000	—	10,000	V21	UL, CSA, TÜV
VTP210L-2	—	4,000	20,000	V21	UL, CSA, TÜV
VTP210S	1,000	—	10,000	V21	UL, CSA, TÜV
VTP210SF	1,000	—	10,000	V21	UL, CSA, TÜV
VTP210S-2	—	4,000	20,000	V21	UL, CSA, TÜV
VTP210SL	1,000	—	10,000	V21	UL, CSA, TÜV
VTP210SL-2	—	4,000	20,000	V21	UL, CSA, TÜV
VTP210SL-19.2/5.8	1,000	—	10,000	V21	UL, CSA, TÜV
VTP210SL-19.2/5.8-2	—	4,000	20,000	V21	UL, CSA, TÜV
VTP210SS	1,000	—	10,000	V21	UL, CSA, TÜV
VTP210ULD	1,000	—	10,000	—	UL, CSA, TÜV
VTP240	1,000	—	10,000	V24	UL, CSA, TÜV
<b>110°C Typical Activation—LTP, TAC, miniSMDE</b>					
LTP070	2,000	—	10,000	L07	UL, CSA, TÜV
LTP070S	2,000	—	10,000	L07	UL, CSA, TÜV
LTP100	2,000	—	10,000	L10	UL, CSA, TÜV
LTP100S	2,000	—	10,000	L10	UL, CSA, TÜV
LTP100S-2	—	4,000	20,000	L10	UL, CSA, TÜV
LTP100SL	2,000	—	40,000	L10	UL, CSA, TÜV
LTP100SL-2	—	4,000	20,000	L10	UL, CSA, TÜV
LTP100SS	2,000	—	10,000	L10	UL, CSA, TÜV

Table B6. Packaging and Marking Information/Agency Recognition for Strap Battery Devices *continued*

Part Number	Bag Quantity	Tape & Reel Quantity	Standard Package	Part Marking	Agency Recognition
<b>110°C Typical Activation—LTP, TAC, miniSMDE, <i>continued</i></b>					
LTP180	2,000	—	10,000	L18	UL, CSA, TÜV
LTP180L	500	—	10,000	L18	UL, CSA, TÜV
LTP180L-2	—	4,000	20,000	L18	UL, CSA, TÜV
LTP180S	2,000	—	10,000	L18	UL, CSA, TÜV
LTP180S-2	—	4,000	20,000	L18	UL, CSA, TÜV
LTP190	500	—	10,000	L19	UL, CSA, TÜV
LTP260	1,000	—	10,000	L26	UL, CSA, TÜV
LTP300	500	—	10,000	L30	UL, CSA, TÜV
LTP340	500	—	10,000	L34	UL, CSA, TÜV
miniSMDE190-2	—	5,000	5,000	19	UL, CSA, TÜV
TAC100-09	2,000	—	10,000	Black*	UL
<b>125°C Typical Activation—LR4, SRP, TAC</b>					
LR4-170U	2,000	—	10,000	NA	UL, CSA, TÜV
LR4-190	2,000	—	10,000	E19	UL, CSA, TÜV
LR4-190S	2,000	—	10,000	E19	UL, CSA, TÜV
LR4-190S-2	—	4,000	20,000	E19	UL, CSA, TÜV
LR4-260	1,000	—	10,000	E26	UL, CSA, TÜV
LR4-260S	1,000	—	10,000	E26	UL, CSA, TÜV
LR4-380	1,000	—	10,000	E38	UL, CSA, TÜV
LR4-380X	1,000	—	10,000	E3X	UL, CSA, TÜV
LR4-450	1,000	—	10,000	E45	UL, CSA, TÜV
LR4-550	1,000	—	10,000	E55	UL, CSA, TÜV
LR4-600	1,000	—	10,000	E60	UL, CSA, TÜV
LR4-600X	1,000	—	10,000	E60	UL, CSA, TÜV
LR4-730	1,000	—	10,000	E73	UL, CSA, TÜV
LR4-73X	500	—	10,000	E7X	UL, CSA, TÜV
LR4-880SS	250	—	8,000	E88	(UL, CSA, TÜV pending)
LR4-900	500	—	10,000	E90	UL, CSA, TÜV
LR4-1300SS	250	—	10,000	EX3	UL, CSA, TÜV
LR4-1410	250	—	10,000	E141	UL, CSA, TÜV
SRP120	2,000	—	10,000	120	UL, CSA, TÜV
SRP120L	1,000	—	10,000	120	UL, CSA, TÜV
SRP120S	2,000	—	10,000	120	UL, CSA, TÜV
SRP175	2,000	—	10,000	175	UL, CSA, TÜV
SRP175-2	—	4,000	20,000	175	UL, CSA, TÜV
SRP175L	1,000	—	10,000	175	UL, CSA, TÜV
SRP175S	2,000	—	10,000	175	UL, CSA, TÜV
SRP175SS	2,000	—	10,000	175	UL, CSA, TÜV
SRP200	500	—	10,000	200	UL, CSA, TÜV
SRP200-2	—	4,000	20,000	200	UL, CSA, TÜV
SRP350	500	—	10,000	350	UL, CSA, TÜV
SRP420	500	—	10,000	420	UL, CSA, TÜV
TAC170-09	2,000	—	10,000	Black*	UL, CSA
TAC210	2,000	—	10,000	White*	UL, CSA, TÜV
TAC210-2	—	4,000	20,000	White*	UL, CSA, TÜV

\*Color indicated is mold ring material color.

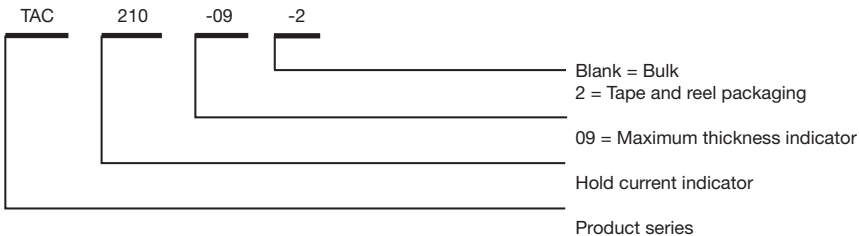
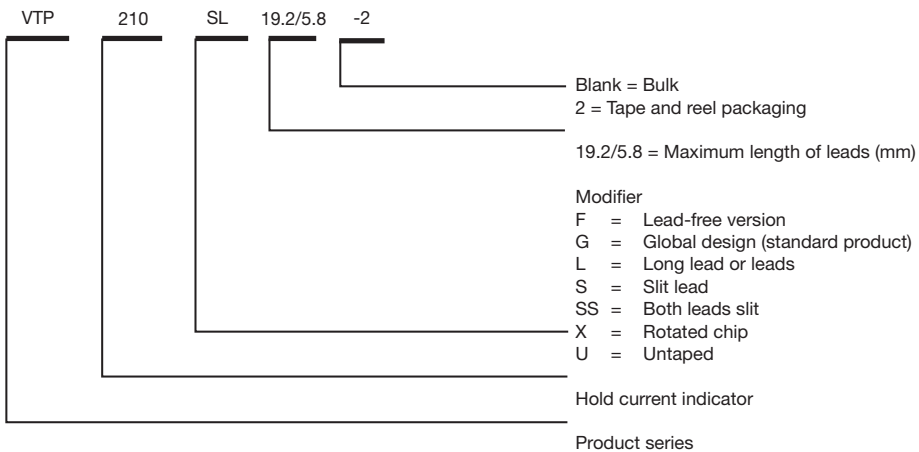
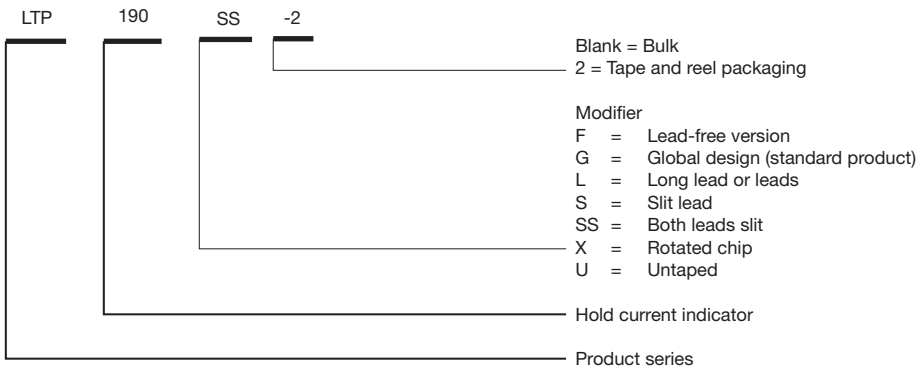
## Agency Recognition for Strap Battery Devices

UL File # E74889

CSA File #78165C

TÜV Certificate number available on request

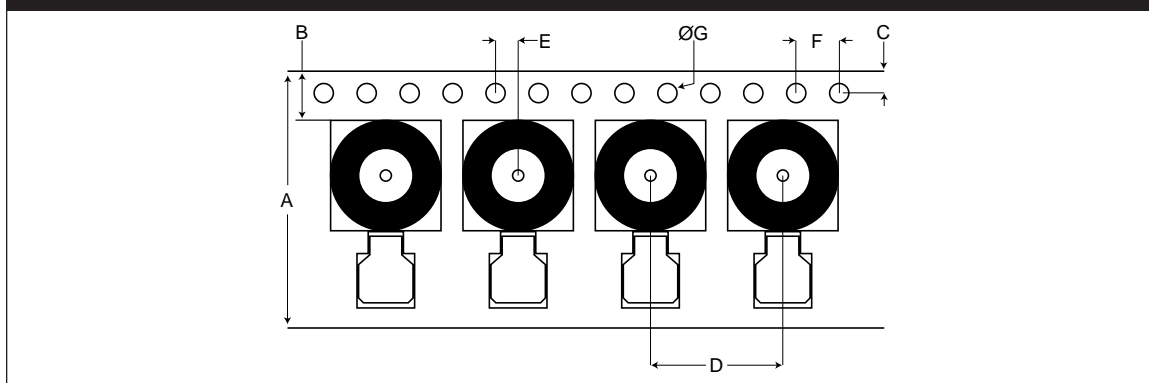
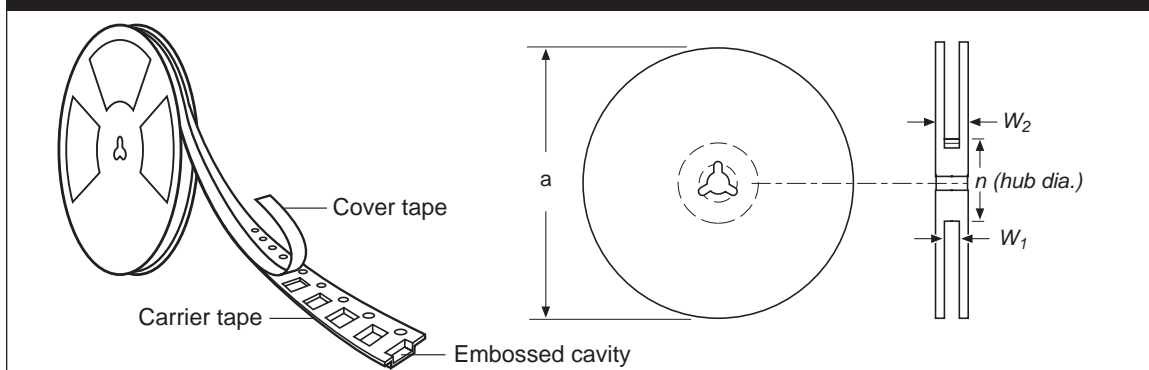
## Part Numbering System for Strap Battery Devices



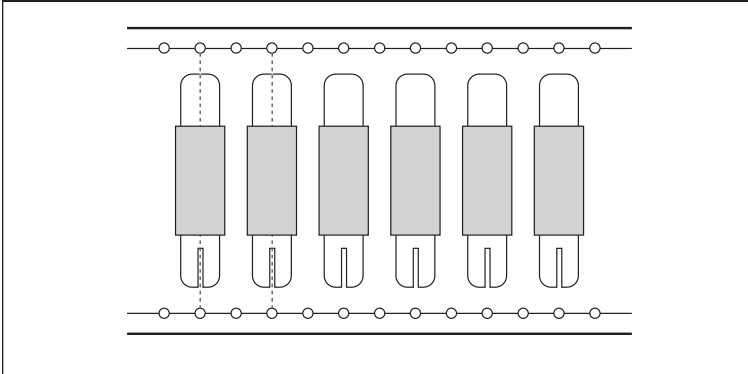
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**Table B7. Tape and Reel Specifications for TAC Series Devices (in Millimeters)**

Description	Mark	Dimensions (mm)	Tolerance (mm)
Carrier tape width	A	24.0	±0.5
Sprocket hole pitch	F	4.0	±0.10
Embossed cavity pitch	D	12.0	±0.10
Ordinate to embossed cavity center	E	2.0	±0.2
Embossed cavity length (inside)	—	17.5	—
Embossed cavity width (inside)	—	10.4	—
Embossed cavity length (outside)	—	17.6	—
Sprocket hole diameter	G	1.55	±0.05
Abscissa to embossed cavity center	—	11.5	±0.15
Sprocket hole location	C	1.75	±0.15
Carrier tape thickness	—	0.3	±0.05
Cover tape thickness	—	0.055	—
Embossed cavity depth (inside)	—	1.35	±0.1
Leader min.	—	800	—
Trailer min.	—	800	—
Reel diameter	a	420	±2
Hub diameter	n	80	±1
Reel width measured at inside hub	$W_1$	24.4	+2, -0
Reel width measured at outside hub	$W_2$	30.4	+3, -1

**Figure B26. Taped Component Dimensions for TAC Series****Figure B27. Reel Dimensions for TAC Series**

**Figure B28. Typical Taped Component Layout for Strap Battery Products**



Note: Contact your local Raychem Circuit Protection representative for dimensions and availability.

### Installation Guidelines for the Strap Family

- Polymeric PTC 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 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 electrical faults. No residual force should remain on device after installation. Mechanical damage to PPTC chip 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 designed 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 chip, weld splatter must not touch the PPTC chip, and welding conditions must not heat the PPTC device above its maximum operating temperature.
- PPTC strap devices are not designed for applications where reflow onto flex circuits or rigid circuit boards is required.
- The polyester tape on PolySwitch strap devices is intended for marking and identification purposes only, not for electrical insulation.

### Latest Information

- Please visit us at [www.circuitprotection.com](http://www.circuitprotection.com) or contact your local representative for the latest information.
- The information in this Databook may contain some preliminary information. Raychem Circuit Protection, a division of Tyco Electronics, reserves the right to change any of the specifications without notice. In addition, Tyco Electronics reserves the right to make changes—without notification to Buyer—to materials or processing that do not affect compliance with any applicable specification.



**WARNING:**

- Operation beyond the maximum ratings or improper use may result in device damage and possible electrical arcing and flame.
- The devices are intended for protection against occasional overcurrent or overtemperature fault conditions and should not be used when repeated fault conditions or prolonged trip events are anticipated.
- Contamination of the PPTC material with certain silicon based oils or some aggressive solvents can adversely impact the performance of the devices.
- Device performance can be impacted negatively if devices are handled in a manner inconsistent with recommended electronic, thermal, and mechanical procedures for electronic components.
- Operation in circuit with a large inductance can generate a circuit voltage ( $L \frac{di}{dt}$ ) above the rated voltage of the PolySwitch resettable device.

