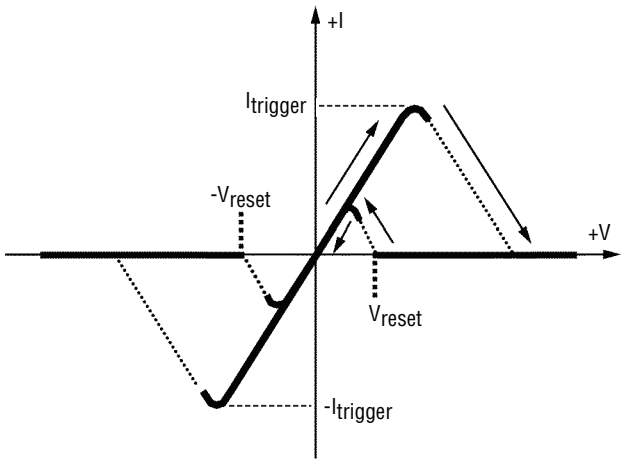
Applications

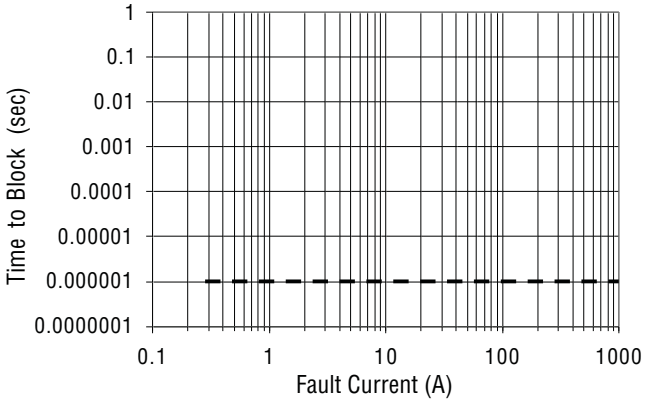
- Sensor protection
- Signal line protection

Typical Performance Characteristics

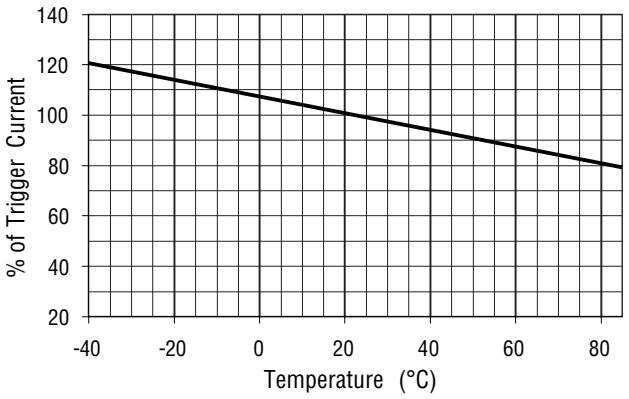
V-I Characteristics



Time to Block vs. Fault Current



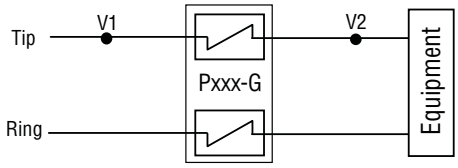
Trigger Current Temperature



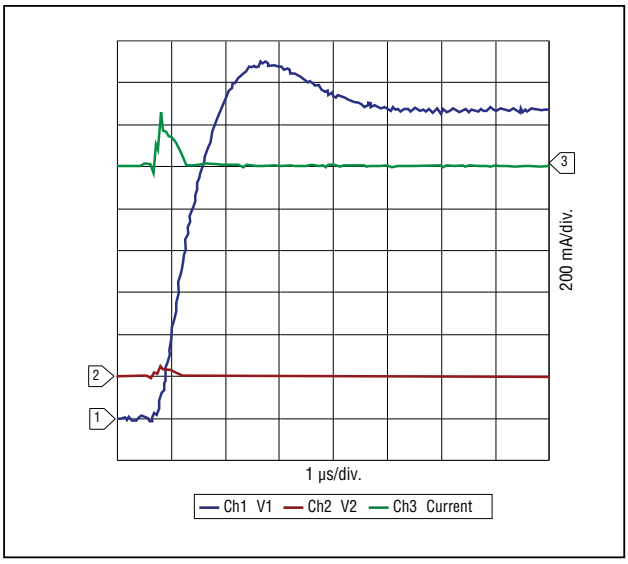
Operational Characteristics

The graphs below demonstrate the operational characteristics of the TBU® device. For each graph the fault voltage, protected side voltage, and current is presented.

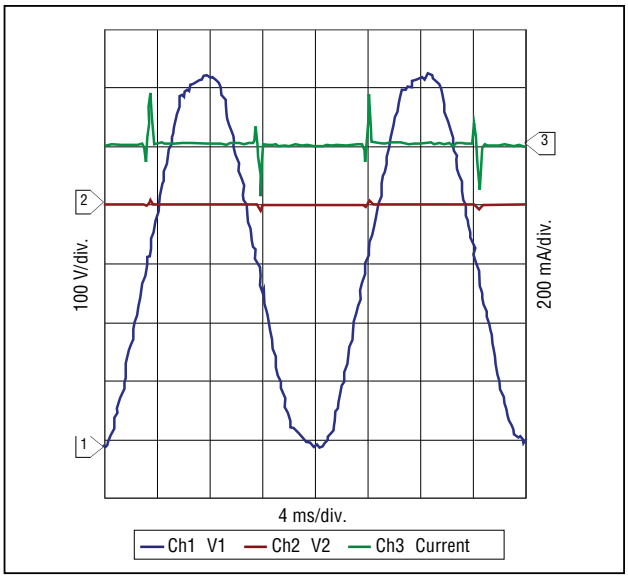
TEST CONFIGURATION DIAGRAM



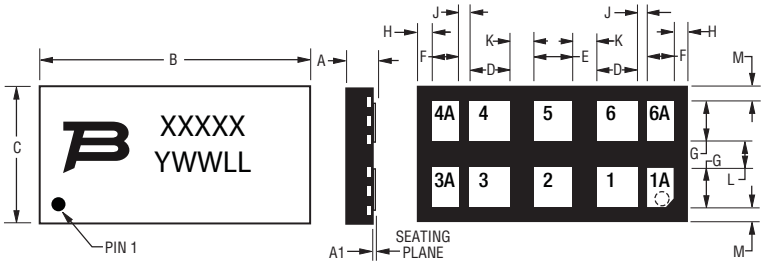
P850-G Lightning, 850 V



P850-G Power Fault, 230 Vrms, 25 A



Product Dimensions



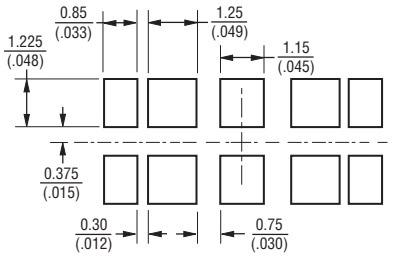
TOP VIEW SIDE VIEW BOTTOM VIEW

Pads 1A and 1 are internally connected; the same for pads 3A with 3, 4A with 4, and 6A with 6. This allows for one PCB layout to accommodate the Model P850.

Dim.	P850-G		
	Min.	Typ.	Max.
A	0.80 (.031)	0.90 (.035)	1.00 (.039)
A1	0.00 (.000)	0.025 (.001)	0.05 (.002)
B	8.15 (.321)	8.25 (.325)	8.35 (.329)
C	3.90 (0.154)	4.00 (0.157)	4.10 (0.161)
D	1.15 (.045)	1.25 (.049)	1.35 (.053)
E	1.05 (.041)	1.15 (.045)	1.25 (.049)
F	0.725 (.029)	0.825 (.032)	0.925 (.036)
G	1.10 (.043)	1.20 (.047)	1.30 (.051)
H	0.375 (.015)	0.425 (.017)	0.475 (.019)
J	0.25 (.010)	0.30 (.012)	0.35 (.014)
K	0.70 (.028)	0.75 (.030)	0.80 (.031)
L	0.70 (.028)	0.75 (.030)	0.80 (.031)
M	0.375 (.015)	0.425 (.017)	0.475 (.018)

DIMENSIONS: MM / (INCHES)

Recommended Pad Layout



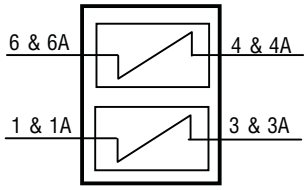
Pad Designation

Pad #	Apply	Pad #	Apply
1A	Tip In	4A	Ring Out
1	Tip In	4	Ring Out
2	NC	5	NC
3	Tip Out	6	Ring In
3A	Tip Out	6A	Ring In

NC = Solder to PCB; do not make electrical connection, do not connect to ground.

TBU® devices have matte-tin termination finish. Suggested layout should use non-solder mask define (NSMD). Recommended stencil thickness is 0.10-0.12 mm (.004-.005 in.) with stencil opening size 0.025 mm (.0010 in.) less than the device pad size. As when heat sinking any power device, it is recommended that, wherever possible, extra PCB copper area is allowed. For minimum parasitic capacitance, do not allow any signal, ground or power signals beneath any of the pads of the device.

Block Diagram

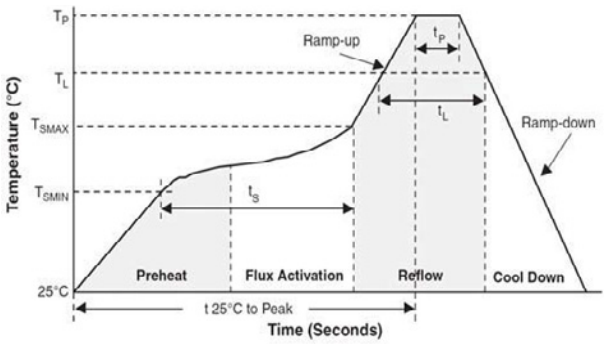


Thermal Resistances

Part #	Symbol	Parameter	Value	Unit
P850-G	$R_{th(j-a)}$	Junction to leads (package)	119	°C/W
		Junction to leads (per TBU® device)	215	°C/W

Reflow Profile

Profile Feature	Pb-Free Assembly
Average Ramp-Up Rate (Tsmax to Tp)	3 °C/sec. max.
Preheat - Temperature Min. (Tsmin) - Temperature Max. (Tsmax) - Time (tsmin to tsmax)	 150 °C 200 °C 60-180 sec.
Time maintained above: - Temperature (TL) - Time (tL)	 217 °C 60-150 sec.
Peak/Classification Temperature (Tp)	260 °C
Time within 5 °C of Actual Peak Temp. (tp)	20-40 sec.
Ramp-Down Rate	6 °C/sec. max.
Time 25 °C to Peak Temperature	8 min. max.



How to Order

P 850 - G 120 - WH

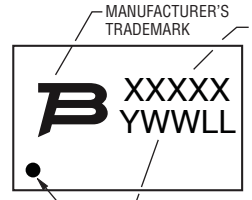
Form Factor
P = Two TBU® protectors in one device

Impulse Voltage Rating
850 = 850 V

Directional Indication for Paired Devices
G = Bidirectional

Iop Indicator
120 = 100 mA
200 = 200 mA

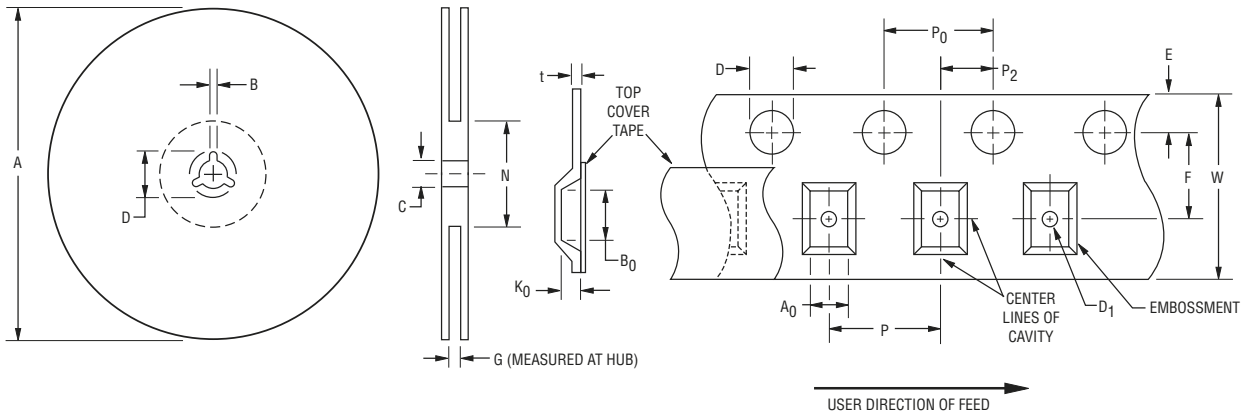
Typical Part Marking



5 DIGIT PRODUCT CODE:
- 1ST DIGIT INDICATES PRODUCT FAMILY.
  8 = P850-G SERIES
- 2ND & 3RD DIGITS INDICATE IMPULSE VOLTAGE.
- 4TH & 5TH DIGITS INDICATE TRIGGER CURRENT.

MANUFACTURING DATE CODE:
- 1ST DIGIT INDICATES THE YEAR.
- 2ND & 3RD DIGITS INDICATE THE WEEK NUMBER.
- 4TH & 5TH DIGITS INDICATE LOT CODE.

Packaging Specifications (per EIA468-B)



QUANTITY: 3000 PIECES PER REEL

A		B		C		D		G	N
Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Ref.	Ref.
326 (12.835)	330.25 (13.002)	1.5 (.059)	2.5 (.098)	12.8 (.504)	13.5 (.531)	20.2 (.795)	-	16.5 (.650)	102 (4.016)

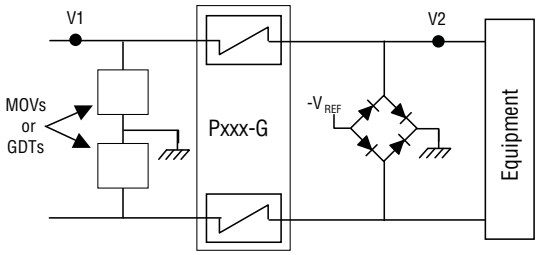
A_0		B_0		D		D_1		E		F	
Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	max.
4.2 (.165)	4.4 (.173)	8.45 (.333)	8.65 (.341)	1.5 (.059)	1.6 (.063)	1.5 (.059)	-	1.65 (.065)	1.85 (.073)	7.4 (.291)	7.6 (.299)
K_0		P		P_0		P_2		t		W	
Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
1.1 (.043)	1.3 (.051)	7.9 (.311)	8.1 (.319)	3.9 (.159)	4.1 (.161)	1.9 (.075)	2.1 (.083)	0.25 (.010)	0.35 (.014)	15.7 (.618)	16.3 (.642)

DIMENSIONS: MM (INCHES)

Reference Designs

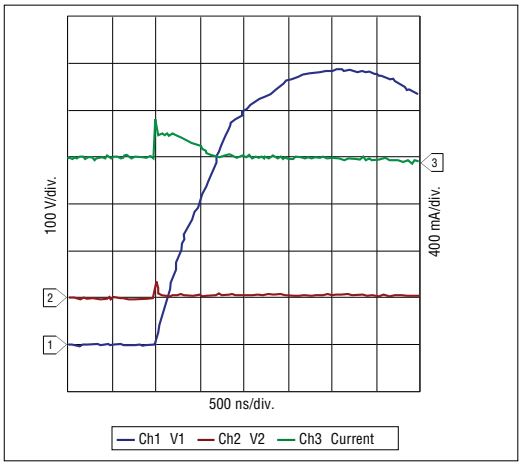
A cost-effective protection solution combines the Bourns® TBU® protection device with a pair of MOVs or Bourns® GDTs and a diode bridge. The diagram below illustrates a common configuration of these components. The graphs to the right demonstrate the operational characteristics of the circuit.

For new SLIC applications, we recommend that customers evaluate our new TBU-PL series.



Common Configuration Diagram

P850-G Configuration (ITU-T K.20, K.21, K.20E, K.21E, K.45)			
Product	**Qty.**	**Part Number**	**Source**
TBU® Device	1	P850-G120-WH	Bourns, Inc.
MOV	2	MOV-10D361K	Bourns, Inc.
Diode bridge	2	GSD2004S-V MMBD2004S	Vishay Diodes Inc.



P850-G Solution: 4000 V Lightning 10/700 µsec, 100 A

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