

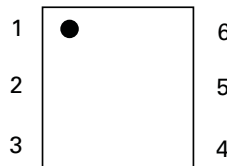
RoHS Battrax® Series - Single Port Negative - MS-013



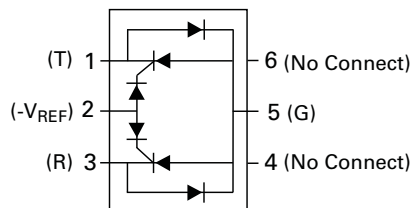
Agency Approvals

Agency	Agency File Number
	E133083

Pinout Designation



Schematic Symbol



Description

The Battrax® series offers programmable SIDACtor® overvoltage protection devices for SLIC applications. The Single Port Negative Battrax Series provides a programmable device that is referenced to a negative voltage source while internal diodes provide protection from positive surge events.

Features and Benefits

- Low voltage overshoot
- Low on-state voltage
- Does not degrade with use
- Fails short circuit when surged in excess of ratings
- Single-port protection
- Gate triggered tracking device
- Integrated diodes for positive voltage

Applicable Global Standards

- TIA-968-A
- TIA-968-B
- ITU K.20/21 Enhanced Level
- ITU K.20/21 Basic Level
- GR 1089 Intra-building
- IEC 61000-4-5
- YD/T 1082
- YD/T 993
- YD/T 950

Electrical Characteristics

Part Number	Marking	V_{DRM} @ $I_{DRM}=5\mu A$	V_S @ $100V/\mu s$	I_H	I_S	I_T	V_T @ $I_T=2.2$ Amps	V_F	Capacitance*	
		V min	V max	mA min	mA max	A max	V max	V max	pF min	pF max
B1101UCLxx	B1101UC	$-V_{REF} - I + I-1.2VI$	$-V_{REF} - I + I-10VI$	100	100	2.2	4	5	30	200
B1161UCLxx	B1161UC	$-V_{REF} - I + I-1.2VI$	$-V_{REF} - I + I-10VI$	160	100	2.2	4	5	30	200
B1201UCLxx	B1201UC	$-V_{REF} - I + I-1.2VI$	$-V_{REF} - I + I-10VI$	200	100	2.2	4	5	30	200

Notes:
 - Absolute maximum ratings measured at $T_A = 25^\circ C$ (unless otherwise noted).
 - Devices are uni-directional
 - All electrical characteristics shown are defined from Tip (pin 1) to Ground (pin 5), and Ring (pin 3) to Ground (pin 5)

- V_{REF} Max Value for the negative Battrax is -200 V.
 - **XX** = Part Number Suffix: **'TP'** (Tube Pack) or **'RP'** (Reel Pack).
 * Off-state capacitance (C_o) is measured across pins 1 & 5 and 3 & 5 at 1 MHz with a 2V bias.

Surge Ratings

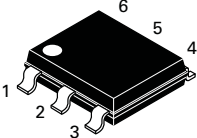
Series	I_{PP}									I_{TSM} 50/60 Hz	di/dt
	0.2x310 ¹ 0.5x700 ²	2x10 ¹ 2x10 ²	8x20 ¹ 1.2x50 ²	10x160 ¹ 10x160 ²	10x560 ¹ 10x560 ²	5x320 ¹ 9x720 ²	10x360 ¹ 10x360 ²	10x1000 ¹ 10x1000 ²	5x310 ¹ 10x700 ²		
	A min	A min	A min	A min	A min	A min	A min	A min	A min		
C	50	500	400	200	150	200	175	100	200	50	500

Notes:

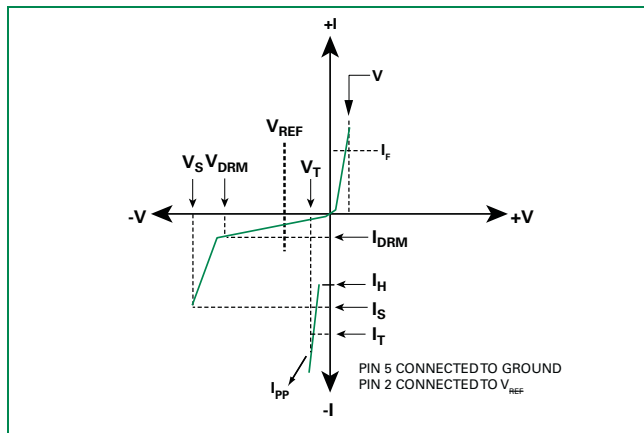
1 Current waveform in μs
2 Voltage waveform in μs

- Peak pulse current rating (I_{PP}) is repetitive and guaranteed for the life of the product.
- I_{PP} ratings applicable over temperature range of -40°C to +85°C (I_{PP} rating assumes V_{REF} equals +/- 48 V)
- The device must initially be in thermal equilibrium with -40°C $\leq T_J \leq$ +150°C

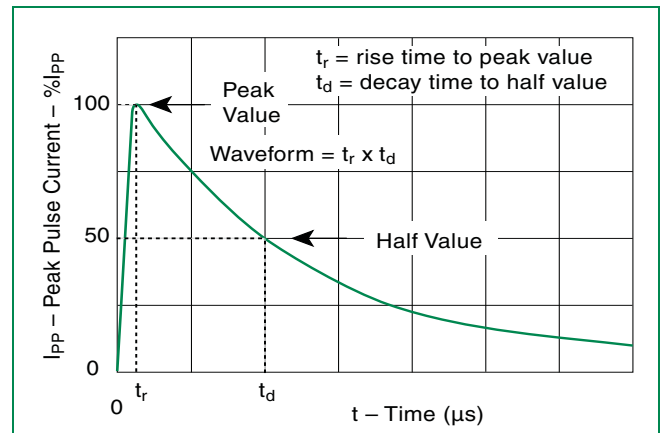
Thermal Considerations

Package	Symbol	Parameter	Value	Unit
Modified MS-013 	T_J	Operating Junction Temperature Range	-40 to +125	°C
	T_S	Storage Temperature Range	-65 to +150	°C
	$R_{\theta JA}$	Thermal Resistance: Junction to Ambient	60	°C/W

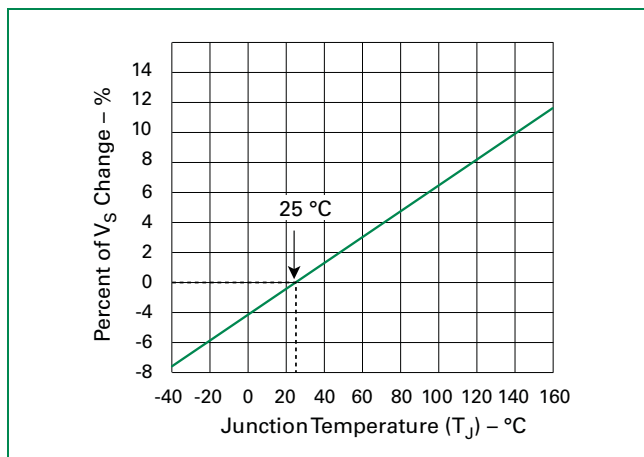
V-I Characteristics



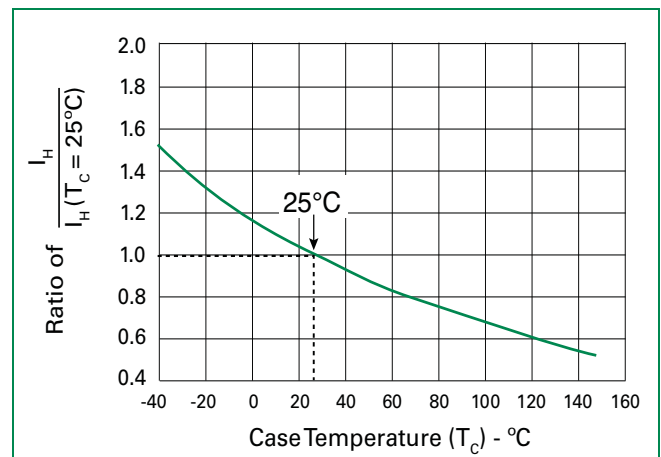
$t_r \times t_d$ Pulse Waveform



Normalized V_S Change vs. Junction Temperature

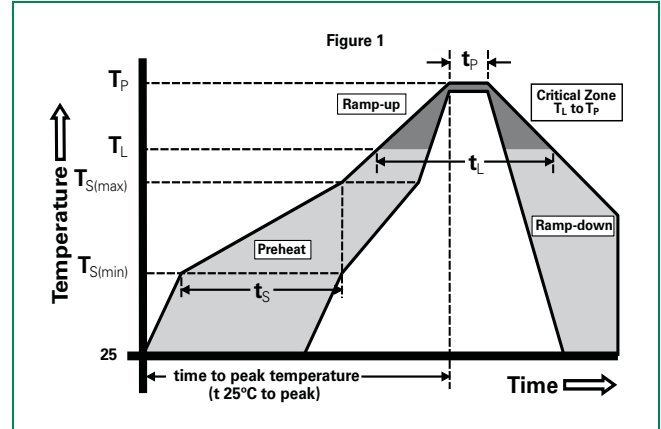


Normalized DC Holding Current vs. Case Temperature



Soldering Parameters

Reflow Condition		Pb-Free assembly (see Fig. 1)
Pre Heat	-Temperature Min ($T_{s(min)}$)	+150°C
	-Temperature Max ($T_{s(max)}$)	+200°C
	-Time (Min to Max) (t_s)	60-180 secs.
Average ramp up rate (Liquidus Temp (T_L) to peak)		3°C/sec. Max.
$T_{s(max)}$ to T_L - Ramp-up Rate		3°C/sec. Max.
Reflow	-Temperature (T_L) (Liquidus)	+217°C
	-Temperature (t_L)	60-150 secs.
Peak Temp (T_P)		+260(+0/-5)°C
Time within 5°C of actual Peak Temp (t_p)		30 secs. Max.
Ramp-down Rate		6°C/sec. Max.
Time 25°C to Peak Temp (T_P)		8 min. Max.
Do not exceed		+260°C



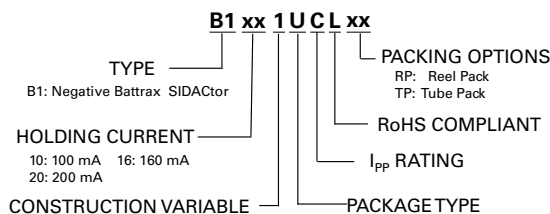
Physical Specifications

Lead Material	Copper Alloy
Terminal Finish	100% Matte-Tin Plated
Body Material	UL recognized epoxy meeting flammability classification 94V-0

Environmental Specifications

High Temp Voltage Blocking	80% Rated V_{REF} Max. (V_{DC} Peak) +125°C or +150°C, 504 or 1008 hrs. MIL-STD-750 (Method 1040) JEDEC, JESD22-A-101
Temp Cycling	-65°C to +150°C, 15 min. dwell, 10 up to 100 cycles. MIL-STD-750 (Method 1051) EIA/JEDEC, JESD22-A-104
Biased Temp & Humidity	52 V_{DC} (+85°C) 85%RH, 504 up to 1008 hrs. EIA/JEDEC, JESD22-A-101
High Temp Storage	+150°C 1008 hrs. MIL-STD-750 (Method 1031) JEDEC, JESD22-A-101
Low Temp Storage	-65°C, 1008 hrs.
Thermal Shock	0°C to +100°C, 5 min. dwell, 10 sec. transfer, 10 cycles. MIL-STD-750 (Method 1056) JEDEC, JESD22-A-106
Autoclave (Pressure Cooker Test)	+121°C, 100%RH, 2atm, 24 up to 168 hrs. EIA/JEDEC, JESD22-A-102
Resistance to Solder Heat	+260°C, 30 secs. MIL-STD-750 (Method 2031)
Moisture Sensitivity Level	85%RH, +85°C, 168 hrs., 3 reflow cycles (+260°C Peak). JEDEC-J-STD-020, Level 1

Part Numbering



Part Marking

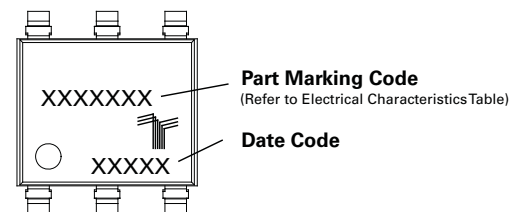


Figure 1 illustrates the dimensions and details of the mold split line. The top view shows the mold assembly with dimensions A, B, C, D, E, and F. The side view shows the mold split line with dimensions G, H, J, K, and L. The detail view shows the mold split line with dimensions M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z, and AA. Dimensions are given in inches and millimeters.

Top View Dimensions:

- A: 0.138 (3.50)
- B: 0.065 (1.65)
- C: 0.460 (11.68)
- D: 0.059 (1.50)
- E: 0.065 (1.65)
- F: 0.059 (1.50)

Side View Dimensions:

- G: 0.138 (3.50)
- H: 0.065 (1.65)
- J: 0.460 (11.68)
- K: 0.059 (1.50)
- L: 0.065 (1.65)

Detail View Dimensions:

- M: 0.138 (3.50)
- N: 0.065 (1.65)
- O: 0.460 (11.68)
- P: 0.059 (1.50)
- Q: 0.065 (1.65)
- R: 0.059 (1.50)
- S: 0.065 (1.65)
- T: 0.059 (1.50)
- U: 0.065 (1.65)
- V: 0.059 (1.50)
- W: 0.065 (1.65)
- X: 0.059 (1.50)
- Y: 0.065 (1.65)
- Z: 0.059 (1.50)
- AA: 0.065 (1.65)

Notes:

- 7° TYP: Typical angle of 7 degrees.
- Mold Split Line: Indicated by a dashed line.
- Burr Side: Indicated by a dashed line.
- MIN Length of Flat: Minimum length of flat surface.
- Detail A: Indicated by a dashed line.

* BSC = **B**asic **S**pacing between **C**enters

Package Type	Description	Quantity	Added Suffix	Industry Standard
U	Modified MS-013 6-pin Tape and Reel Pack	1500	RP	EIA-481-D
	Modified MS-013 6-pin Tube Pack	500 (50 per tube)	TP	N/A

Technical drawing of a circular grinding wheel. The drawing includes the following dimensions and labels:

- Top View (Circular):**
 - Overall diameter: 12.99 (330)
 - Arbor Hole Dia.: .512 (13.0)
 - Distance from arbor hole to the outer edge: .630 (16.0)
 - Distance between the center of the arbor hole and the center of the first grinding segment: .157 (4.0)
 - Distance between the centers of adjacent grinding segments: .472 (12.0)
- Side View (Cross-section):**
 - Overall thickness: 0.700 (17.8)
- Direction of Feed:** Indicated by a large arrow pointing to the right.
- Text:** "Dimensions are in inches (and millimeters)"

Technical drawing of a tube with a message location. The drawing shows a cross-section of a tube with a 90-degree bend. Dimensions are given in inches and millimeters. A message location is indicated by a dashed line and a label "Message Location". The drawing includes a detail view of the tube wall showing a 20.000 ± .030 (508.00 ± 0.76) dimension. The drawing also includes a label "WALL TYP." and a note "Dimensions are in inches (and millimeters)".