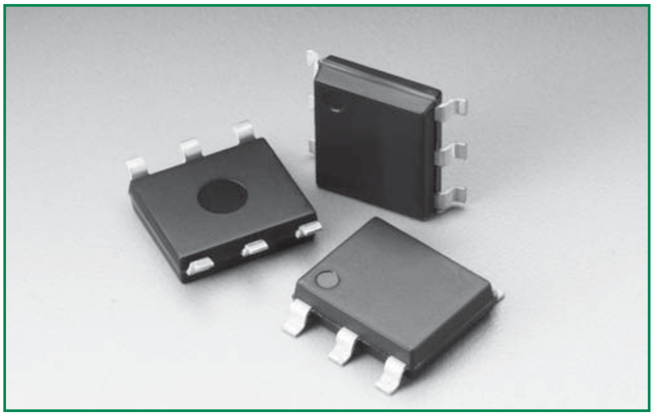
RoHS Battrax® Series - Single Port Negative - MS-013



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 souce while internal diodes provide protection from positive surge events.

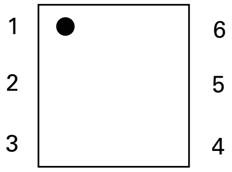
Features and Benefits

- 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

Agency Approvals

Agency	Agency File Number
UL	E133083

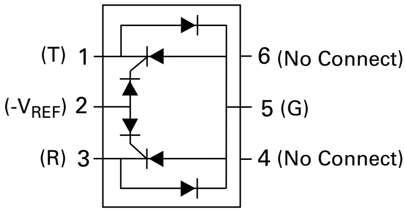
Pinout Designation



Applicable Global Standards

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

Schematic Symbol



Electrical Characteristics

Part Number	Marking	V_{DRM} @I_{DRM}=5μA	V_S @100V/μs	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	$\|-V_{REF}\| + \|-1.2V\|$	$\|-V_{REF}\| + \|-10V\|$	100	100	2.2	4	5	30	200
B1161UCLxx	B1161UC	$\|-V_{REF}\| + \|-1.2V\|$	$\|-V_{REF}\| + \|-10V\|$	160	100	2.2	4	5	30	200
B1201UCLxx	B1201UC	$\|-V_{REF}\| + \|-1.2V\|$	$\|-V_{REF}\| + \|-10V\|$	200	100	2.2	4	5	30	200

Notes:
- Absolute maximum ratings measured at T_A = 25ºC (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

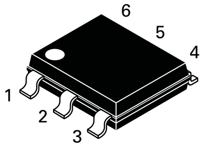
Series	I_{PP}									I_{TSM} 50/60 Hz	di/dt
	0.2x310 [1] 0.5x700 [2]	2x10 [1] 2x10 [2]	8x20 [1] 1.2x50 [2]	10x160 [1] 10x160 [2]	10x560 [1] 10x560 [2]	5x320 [1] 9x720 [2]	10x360 [1] 10x360 [2]	10x1000 [1] 10x1000 [2]	5x310 [1] 10x700 [2]		
	A min	A min	A min	A min	A min	A min	A min	A min	A min	A min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

Notes:

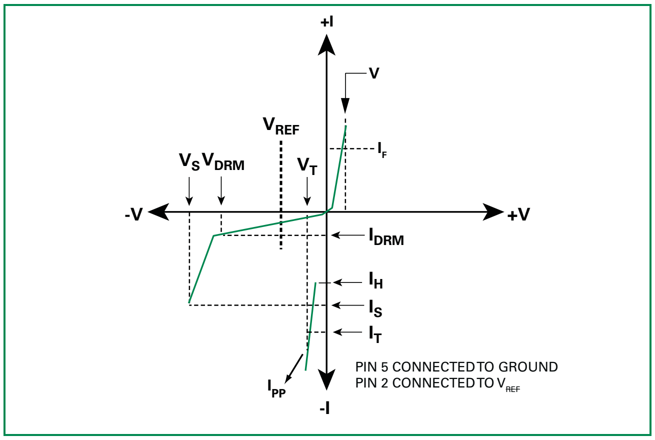
1 Current waveform in µs
2 Voltage waveform in µs

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

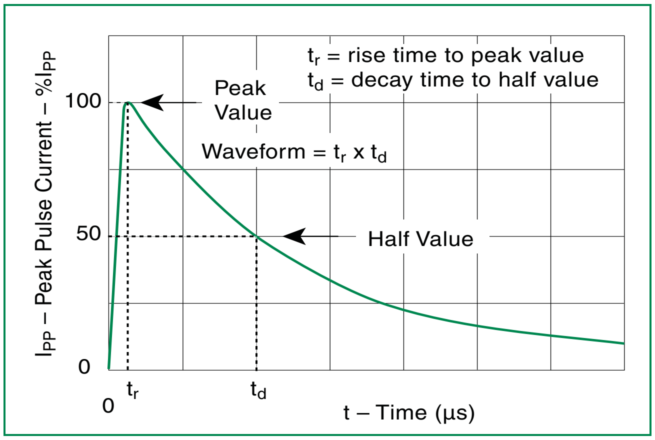
Thermal Considerations

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

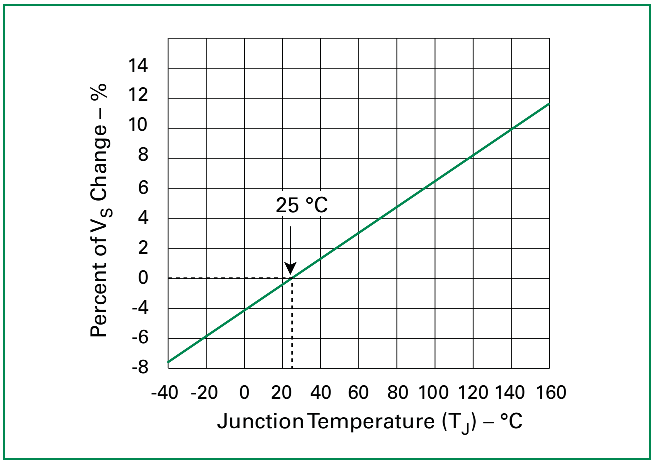
V-I Characteristics



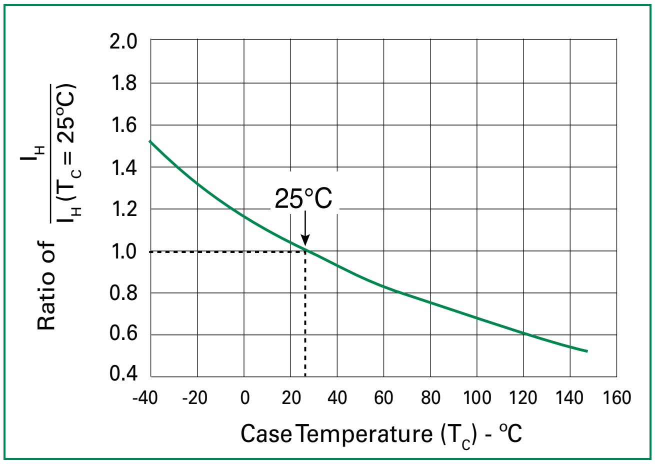
t_r x t_d Pulse Waveform



Normalized V_S Change vs. Junction Temperature



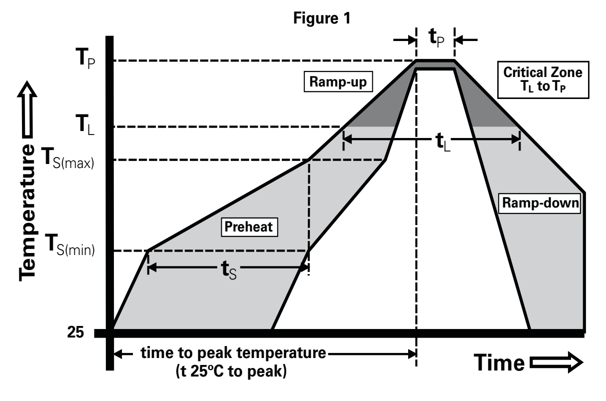
Normalized DC Holding Current vs. Case Temperature



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

Figure 1



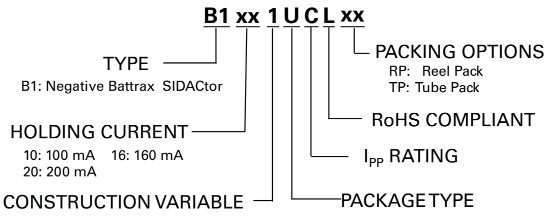
Physical Specifications

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

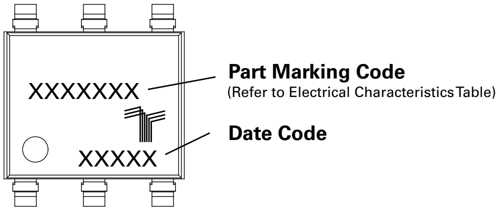
Environmental Specifications

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-A104
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

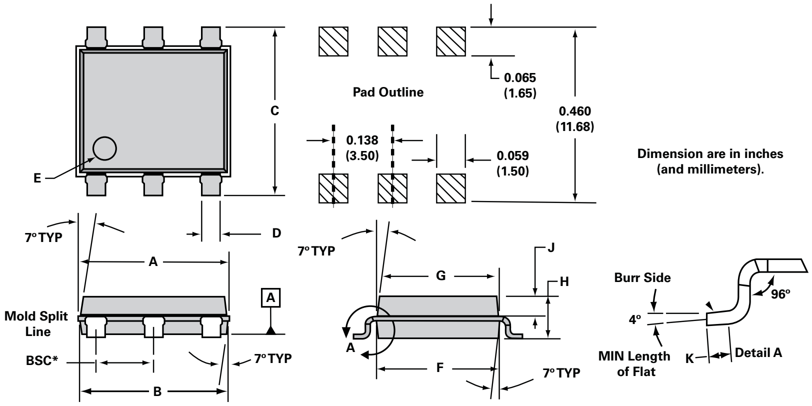
Part Numbering



Part Marking



Dimensions — MS-013



Dimension are in inches (and millimeters).

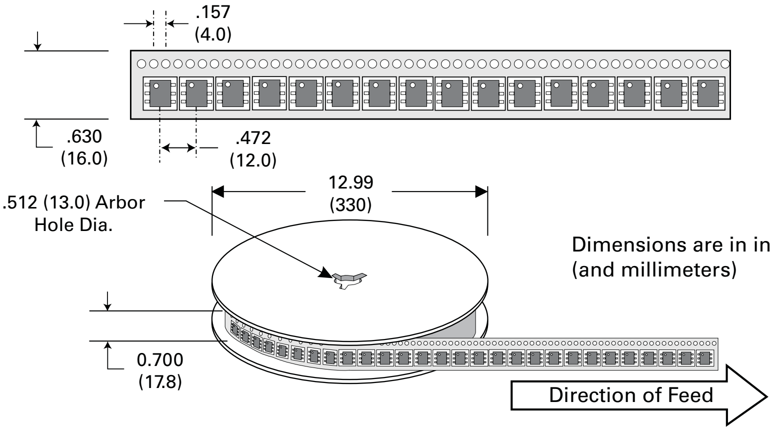
Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	0.360	0.364	9.14	9.25
B	0.352	0.356	8.94	9.04
C	0.400	0.412	10.16	10.46
D	0.043	0.045	1.09	1.13
E	0.047	0.055	1.19	1.40
F	0.293	0.297	7.44	7.54
G	0.289	0.293	7.34	7.44
H	0.089	0.093	2.26	2.36
J	0.041	0.049	1.04	1.24
K	0.020		0.51	
BSC*	0.133	0.143	3.38	3.63

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

Packing Options

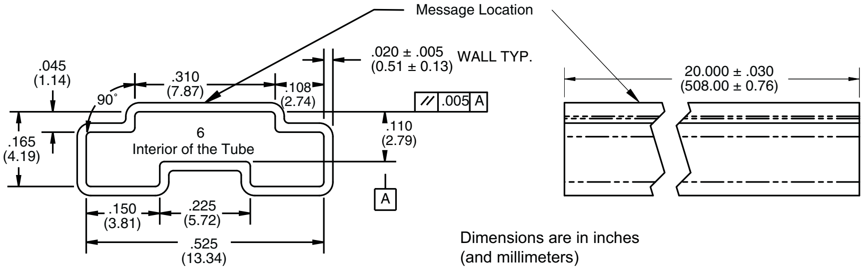
Package Type	Description	Quantity	Added Suffix	Industry Standard
U	Modified MS-013 6-pin Tape and Reel Pack	1500	RP	EIA-481-D
	Modified MS-013 6-pin Tube Pack	500 (50 per tube)	TP	N/A

Tape and Reel Specification — MS-013



Dimensions are in inches (and millimeters)

Tube Pack Specification — MS-013



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