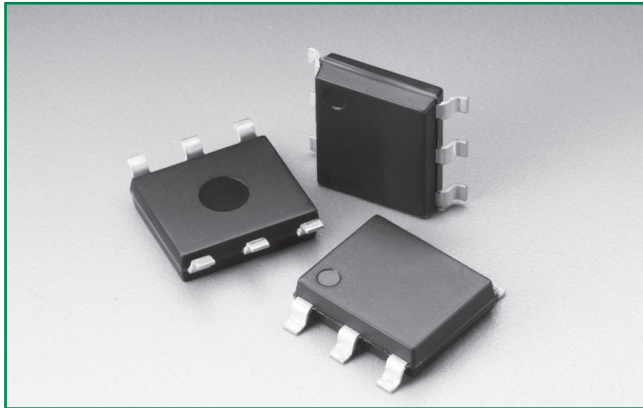


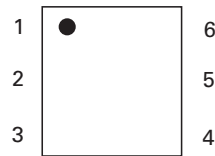
SIDACTor® Balanced Series - MS-013



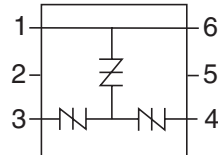
Agency Approvals

Agency	Agency File Number
	E133083

Pinout Designation



Schematic Symbol



Description

The SIDACTor® Balanced Series MS-013 are designed to protect baseband equipment from overvoltage transients. The patented “Y” configuration ensures balanced overvoltage protection.

The series provides a single port surface mount solution that enables voice through DS-1 equipment to comply with various global regulatory standards.

Features and Benefits

- Balanced overvoltage protection ratings
- Low voltage overshoot
- Low on-state voltage
- Does not degrade surge capability after multiple surge events within limit.
- Fails short circuit when surged in excess of
- Replaces three discrete devices
- Meets UL/IEC 60950-1 creepage and clearance
- 2nd level interconnect is Pb-free per IPC/JEDEC J-STD-609A.01

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
- GR 1089 Inter-building

Electrical Characteristics

Part Number	Part Marking	V_{DRM} @ $I_{DRM}=5\mu A$	V_S @ 100V/ μs	V_{DRM} @ $I_{DRM}=5\mu A$	V_S @ 100V/ μs	V_T	I_S	I_T	I_H	Capacitance	
		V min	V max	V min	V max	V max	mA max	A max	mA min		
		Pins 1 & 6-3, 1 & 6-4		Pins 3-4							
P1553UALxx	P1553UA	130	180	130	180	8	800	2.2	150	See Capacitance Values table	
P18											

Electrical Characteristics (continued)

Part Number	Part Marking	V_{DRM} @ $I_{DRM}=5\mu A$	V_S @ 100V/ μs	V_{DRM} @ $I_{DRM}=5\mu A$	V_S @ 100V/ μs	V_T	I_S	I_T	I_H	Capacitance	
		V min	V max	V min	V max	V max	mA max	A max	mA min		
		Pins 1 & 6-3, 1 & 6-4		Pins 3-4							
P1553UBLxx	P1553UB	130	180	130	180	8	800	2.2	150	See Capacitance Values table	
P1803UBLxx	P1803UB	150	210	150	210	8	800	2.2	150		
P2103UBLxx	P2103UB	170	250	170	250	8	800	2.2	150		
P2353UBLxx	P2353UB	200	270	200	270	8	800	2.2	150		
P2703UBLxx	P2703UB	230	300	230	300	8	800	2.2	150		
P3203UBLxx	P3203UB	270	350	270	350	8	800	2.2	150		
P3403UBLxx	P3403UB	300	400	300	400	8	800	2.2	150		
P5103UBLxx	P5103UB	420	600	420	600	8	800	2.2	150		
P1553UCLxx	P1553UC	130	180	130	180	8	800	2.2	150		
P1803UCLxx	P1803UC	150	210	150	210	8	800	2.2	150		
P2103UCLxx	P2103UC	170	250	170	250	8	800	2.2	150		
P2353UCLxx	P2353UC	200	270	200	270	8	800	2.2	150		
P2703UCLxx	P2703UC	230	300	230	300	8	800	2.2	150		
P3203UCLxx	P3203UC	270	350	270	350	8	800	2.2	150		
P3403UCLxx	P3403UC	300	400	300	400	8	800	2.2	150		
P5103UCLxx	P5103UC	420	600	420	600	8	800	2.2	150		

Surge Ratings

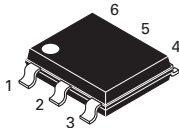
Series	I_{PP}									I_{TSM} 50/60 Hz	di/dt
	0.2x310 ¹ 0.5x700 ²	2x10 ¹ 2x10 ²	8x20 ¹ 1.2x50 ²	10x160 ¹ 10x160 ²	10x560 ¹ 10x560 ²	5x320 ¹ 9x720 ²	10x360 ¹ 10x360 ²	10x1000 ¹ 10x1000 ²	5x310 ¹ 10x700 ²		
	A min	A min	A min	A min	A min	A min	A min	A min	A min		
A	20	150	150	90	50	75	75	45	75	20	500
B	25	250	250	150	100	100	125	80	100	25	500
C	50	500	400	200	150	200	175	100	200	50	500

Notes:

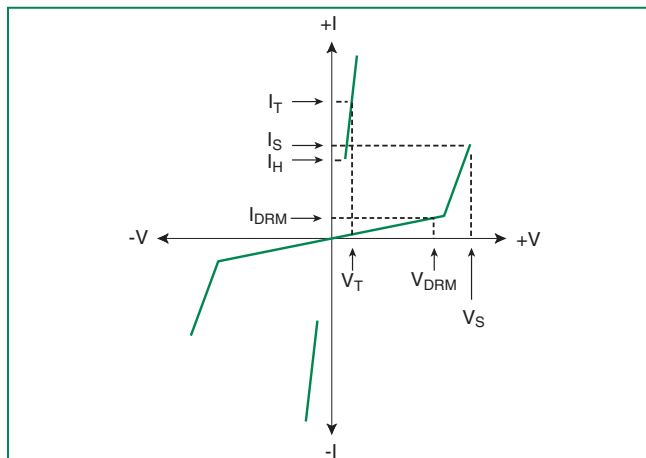
1 Current waveform in μs
2 Voltage waveform in μs

- 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 to +85°C
- The device must initially be in thermal equilibrium with -40°C $\leq T_J \leq$ +150°C

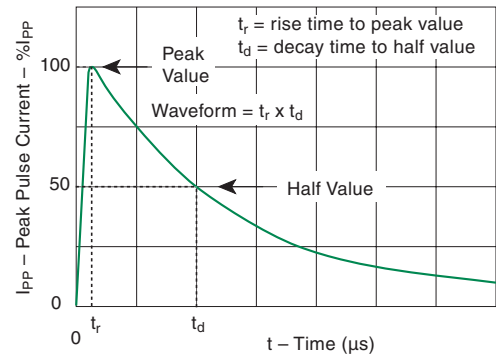
Thermal Considerations

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

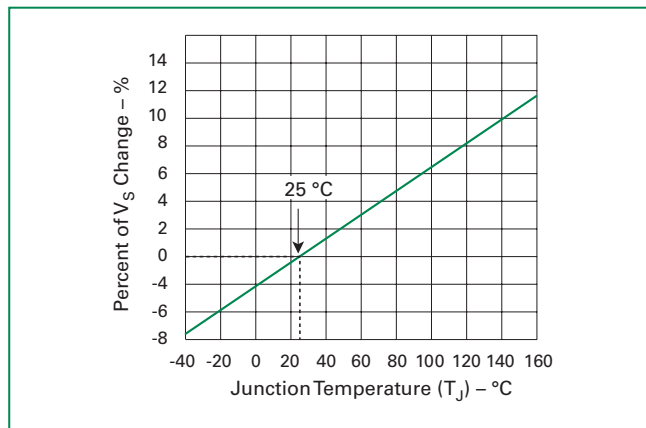
V-I Characteristics



$t_r \times t_d$ Pulse Waveform

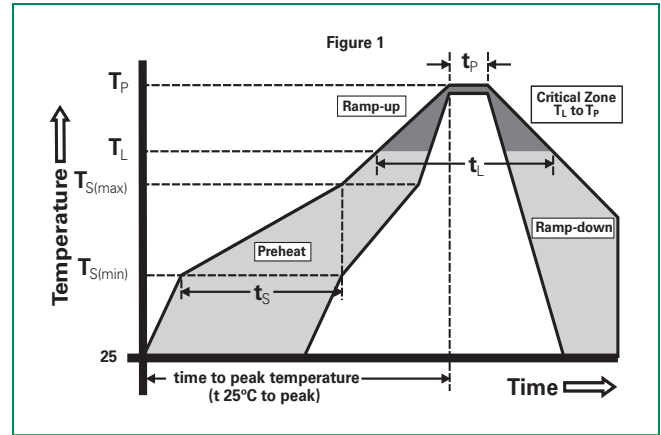


Normalized V_S Change vs. Junction Temperature



Soldering Parameters

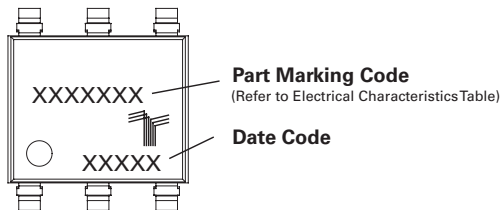
Reflow Condition		Pb-Free assembly (see Fig. 1)
Pre Heat	-Temperature Min ($T_{s(min)}$)	+150°C
	-Temperature Max ($T_{s(max)}$)	+200°C
	-Time (Min to Max) (t_s)	60-180 secs.
Average ramp up rate (Liquidus Temp (T_L) to peak)		3°C/sec. Max.
$T_{s(max)}$ to T_L - Ramp-up Rate		3°C/sec. Max.
Reflow	-Temperature (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



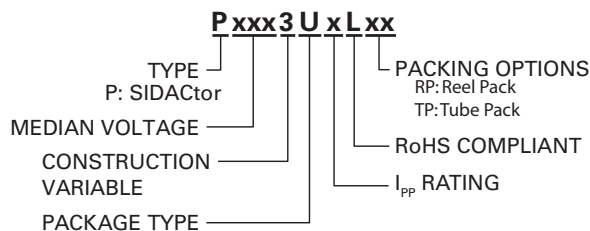
Physical Specifications

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

Part Marking



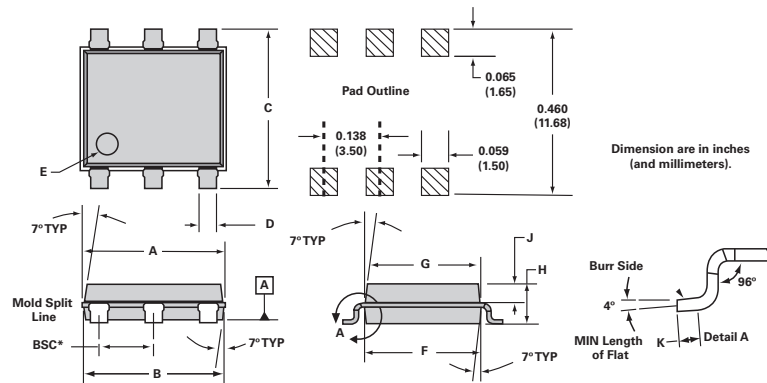
Part Numbering



Environmental Specifications

High Temp Voltage Blocking	80% Rated V_{DRM} ($V_{AC Peak}$) +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	

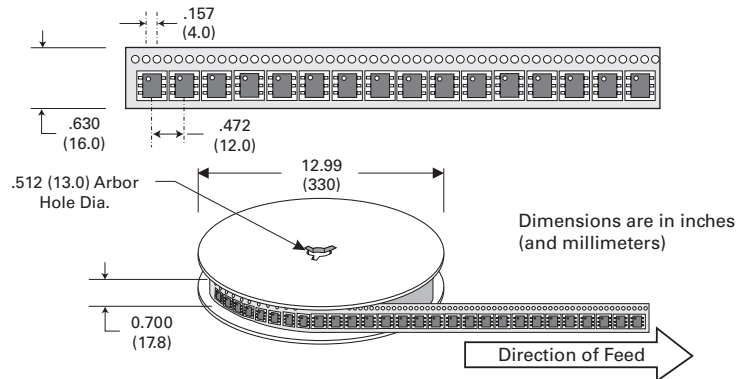
Dimensions — MS-013



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 = Basic Spacing between Centers

Tape and Reel Specification — MS-013



Tube Pack Specification — MS-013

