

AxxxxUx4 Series

Asymmetrical Multiport SIDACtor® MS-013

OBSOLETE DATE: 12/28/2021 PCN/ECN# LFPCN41410
 REPLACED BY: N/A



Description

AxxxxUx4 Series are SIDACtor® components designed to protect LCAS (Line Circuit Access Switch) devices from damaging overvoltage transients. The series provides robust peak surge current capability that enables equipment to comply with various global regulatory standards.

Features and Benefits

- Low voltage overshoot
- Low on-state voltage
- Surge capability does not degrade after multiple surge events within limit
- Fails short circuit when surged in excess of ratings
- Replaces four discrete components
- Two-port protection
- RoHS Compliant, Lead-Free and Halogen Free
- LCAS specific tip and ring thresholds
- Pb-free E3 means 2nd level interconnect is Pb-free and the terminal finish material is tin (Sn) (IPC/JEDEC J-STD-609A.01)

Additional Information



Resources



Accessories



Samples

Agency Approvals

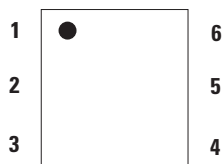
Agency	Agency File Number
	E133083

Applicable Global Standards

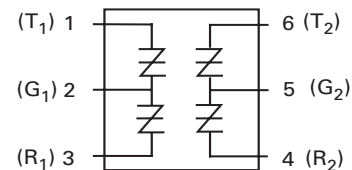
- TIA-968-A
- TIA-968-B
- ITU K.20/21 Enhanced Level*
- ITU K.20/21 Basic Level
- GR 1089 Inter-building*
- GR 1089 Intra-building
- IEC 61000-4-5 2nd Edition
- YD/T 1082
- YD/T 993
- YD/T 950

*A-rated parts require series resistance

Pinout Designation



Schematic Symbol



Electrical Characteristics

Part Number	Part Marking	$V_{DRM} @ I_{DRM} = 5\mu A$	$V_s @ 100V/\mu s$	$V_{DRM} @ I_{DRM} = 5\mu A$	$V_s @ 100V/\mu s$	$V_T @ I_T = 2.2 \text{ Amps}$	I_s mA	I_T A	I_H mA
		V	V	V	V	V			
		Pins 2-3, 5-6		Pins 1-2, 4-5		Pins 1-2, 2-3, 4-5, 5-6			
A1220UA4Lxx	A1220UA4	100	130	180	220	4	800	2.2	120
A1225UA4Lxx	A1250UA4	100	130	230	290	4	800	2.2	120
A1220UC4Lxx	A1220UC4	100	130	180	220	4	800	2.2	120
A1225UC4Lxx	A1250UC4	100	130	230	290	4	800	2.2	120

Notes:
 - Absolute maximum ratings measured at $T_A = 25^\circ C$ (unless otherwise noted).
 - Components are bi-directional.
 - All electrical characteristics shown are defined from Tip to Ground (pin 1 to pin 2 and pin 6 to pin 5) and Ring to Ground (pin 3 to pin 2 and pin 4 to pin 5).
 - XX = Part Number Suffix: 'TP' (Tube Pack) or 'RP' (Reel Pack).

AxxxxUx4 Series

Asymmetrical Multiport SIDACtor® MS-013

Capacitance Values

Part Number	pF Pin 1-2 / 4-5 Ring-Ground		pF Pin 3-2 / 6-5 Tip-Ground		pF Pin 1-3 (4-6) Tip-Ring	
	MIN	MAX	MIN	MAX	MIN	MAX
A1220UA4Lxx	15	25	30	50	5	20
A1225UA4Lxx	15	25	30	50	5	20
A1220UC4Lxx	35	50	60	90	20	35
A1225UC4Lxx	35	50	60	90	20	35

Note: Off-state capacitance (C_{ij}) is measured at 1 MHz with a 2 V bias.

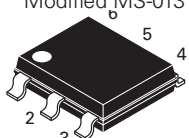
Surge Ratings

Series	I_{PP}										I_{TSM} 50/60 Hz	di/dt
	0.2/310 ¹ 0.5/700 ²	2/10 ¹ 2/10 ²	8/20 ¹ 1.2/50 ²	10/160 ¹ 10/160 ²	10/560 ¹ 10/560 ²	5/320 ¹ 9/720 ²	10/360 ¹ 10/360 ²	10/1000 ¹ 10/1000 ²	5/310 ¹ 10/700 ²			
	A min	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	
C	50	500	400	200	150	200	175	100	200	30	500	

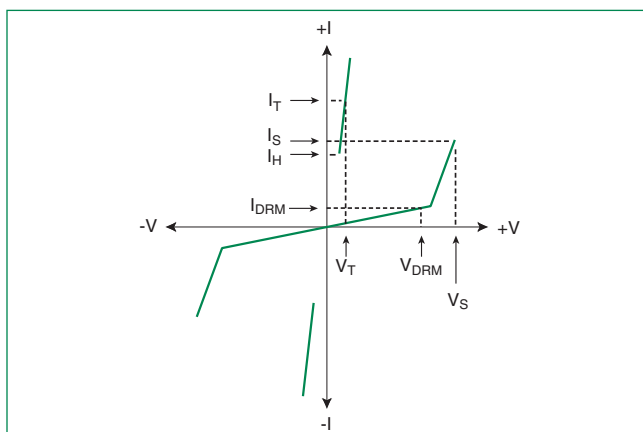
Notes:

- 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 $-40^{\circ}C$ to $+85^{\circ}C$
- The component must initially be in thermal equilibrium with $-40^{\circ}C \leq T_j \leq +150^{\circ}C$

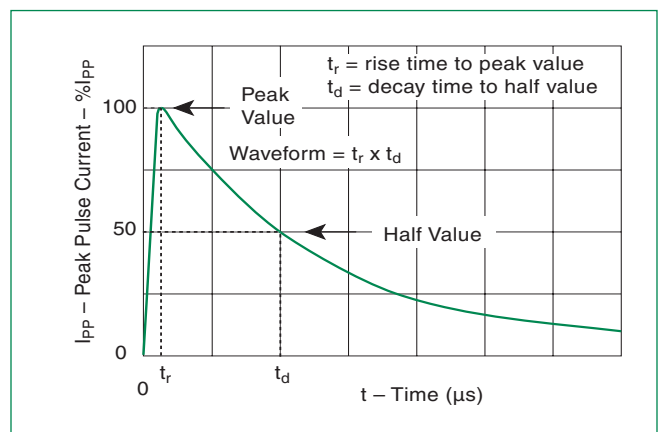
Thermal Considerations

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

V-I Characteristics



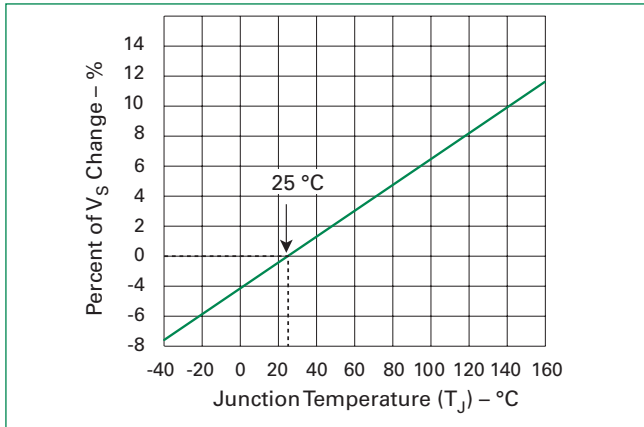
$t_r \times t_d$ Pulse Waveform



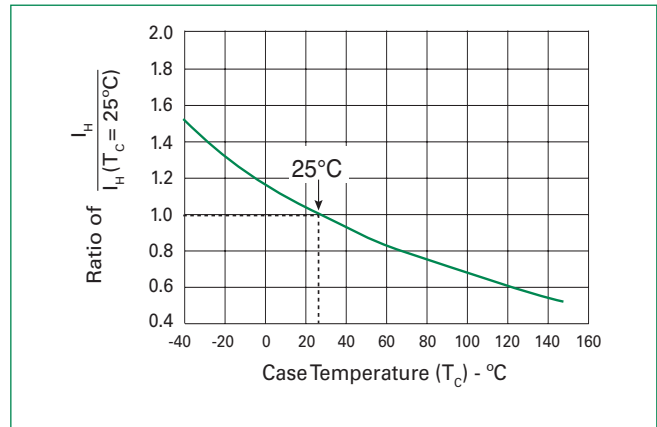
AxxxxUx4 Series

Asymmetrical Multiport SIDACtor® MS-013

Normalized VS Change vs. Junction Temperature

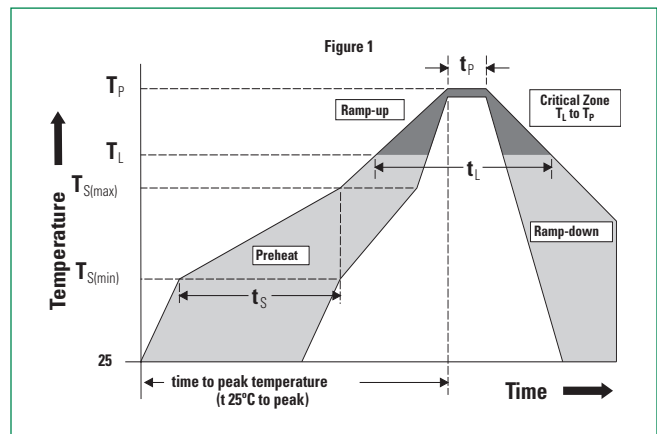


Normalized DC Holding Current vs. Case Temperature



Soldering Parameters

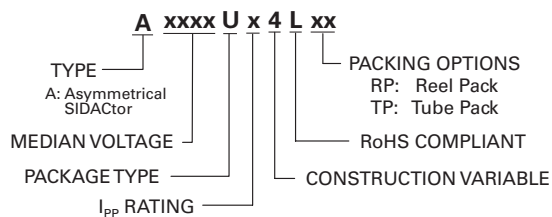
Reflow Condition	Pb-Free assembly (see Fig. 1)	
Pre Heat	- Temperature Min ($T_{s(min)}$)	+150°C
	- Temperature Max ($T_{s(max)}$)	+200°C
	- Time (Min to Max) (t_s)	60-180 secs.
Average ramp up rate (Liquidus Temp (T_L) to peak)	3°C/sec. Max.	
$T_{s(max)}$ to T_L - Ramp-up Rate	3°C/sec. Max.	
Reflow	- 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 V-0

Part Numbering



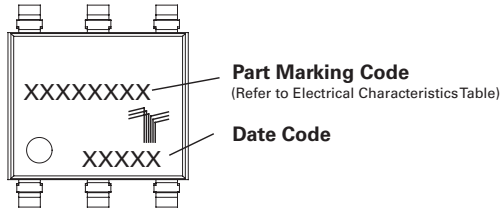
Environmental Specifications

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-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
Unbiased Highly Accelerated Stress Test	+130°C, 85%RH, 2atm, 96 hrs. JESD22-A-118
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

AxxxxUx4 Series

Asymmetrical Multiport SIDACtor® MS-013

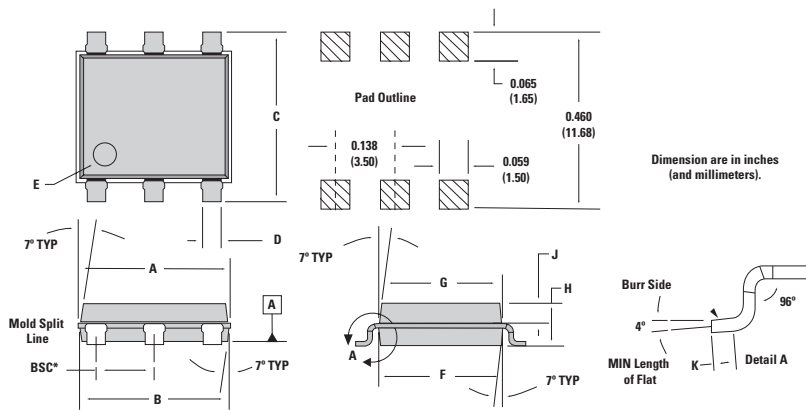
Part Marking



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

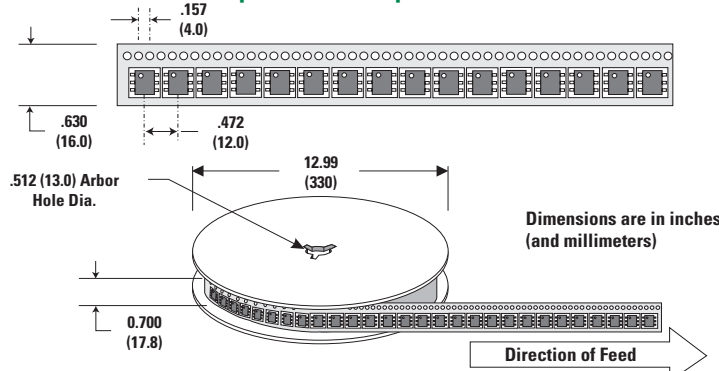
Dimensions – MS-013



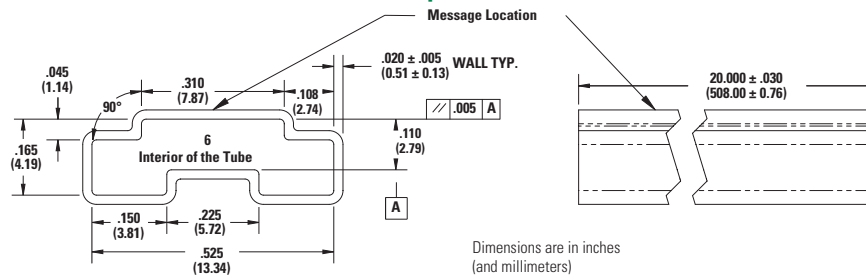
Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	0.360	0.364	9.14	9.25
B	0.352	0.356	8.94	9.04
C	0.400	0.412	10.16	10.46
D	0.043	0.045	1.09	1.13
E	0.047	0.055	1.19	1.40
F	0.293	0.297	7.44	7.54
G	0.289	0.293	7.34	7.44
H	0.089	0.093	2.26	2.36
J	0.041	0.049	1.04	1.24
K	0.020		0.51	
BSC*	0.133	0.143	3.38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

* BSC = Basic Spacing between Centers

Tape and Reel Specification – MS-013



Tube Pack Specification – MS-013



Disclaimer Notice - Littelfuse products are not designed for, and shall not be used for, any purpose (including, without limitation, automotive, military, aerospace, medical, life-saving, life-sustaining or nuclear facility applications, devices intended for surgical implant into the body, or any other application in which the failure or lack of desired operation of the product may result in personal injury, death, or property damage) other than those expressly set forth in applicable Littelfuse product documentation. Warranties granted by Littelfuse shall be deemed void for products used for any purpose not expressly set forth in applicable Littelfuse documentation. Littelfuse shall not be liable for any claims or damages arising out of products used in applications not expressly intended by Littelfuse as set forth in applicable Littelfuse documentation. The sale and use of Littelfuse products is subject to Littelfuse Terms and Conditions of Sale, unless otherwise agreed by Littelfuse. "Littelfuse" includes Littelfuse, Inc., and all of its affiliate entities. <http://www.littelfuse.com/disclaimer-electronics>