



Expertise Applied | Answers Delivered

Mar 31st , 2015

RE: LFPCN41228

To: Our Valued Customers.

From: Littelfuse Product Management Team

Subject: B and C-rated DO-214AA SIDACtor® Devices Optimization

Littelfuse would like to notify you of die grid design optimization only for B and C-rated SIDACtor® Devices in DO-214AA Package, there is NO change in active area of silicon, therefore the actual electrical performance stays identical to existing design , Littelfuse also would like to take this chance to update some Capacitance and ITSM value in datasheet to more accurately reflect the actual performance of the products.

Please refer to third page for summary of datasheet update highlight, and refer to attachment for the affected Part number List

There are no changes to fit, form, and function of the finished product and electrical parameter.

Form, Fit, Function Changes: None

Part Number Changes: None

Effective Date: July, 1st , 2015

Migration period: July 1st 2015 to Oct 1st 2015

Replacement Products: N/A

Last Time Buy: N/A

If you have any other question or concerns, please contact Littelfuse® local sales representative, or Meng Wang, Assistant Product Manager for further assistance.

We highly value your business and look forward to assisting you whenever possible.

Best Regards,

Meng Wang

Assistant Product Manager

Commodity TVS and SIDACtor

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Mwang3@littelfuse.com



800 E. Northwest Highway Des Plaines, IL 60016

Product/Process Change Notice (PCN)

PCN#: LFPCN41228 **Date:** Mar 31st 2015

Product Identification:

DO-214AA SIDACtor®

B and C-rated Products

Implementation Date for Change:

July 1st 2015

Contact Information

Name: Meng Wang

Title: Assistant Product Manager

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Category of Change:

- Assembly Process
- Data Sheet
- Technology
- Discontinuance/Obsolescence
- Equipment
- Manufacturing Site
- Raw Material
- Testing
- Fabrication Process
- Other: _____

Description of Change:

Littelfuse would like to notify you of die grid design optimization only for B and C-rated SIDACtor® Devices in DO-214AA Package , there is NO change in active area of silicon, therefore the actual electrical performance stays identical to existing design.

Important Dates:

- Qualification Samples Available: Mar 31st 2015 Last Time Buy: N/A
- Final Qualification Data Available: Mar 31st 2015
- Date of Final Product Shipment: N/A

Method of Distinguishing Changed Product

- Product Mark, N/A
- Date Code, 5Gxxx
- Other,

Demonstrated or Anticipated Impact on Form, Fit, Function or Reliability:

N/A

LF Qualification Plan/Results:

available , see attached next page

Customer Acknowledgement of Receipt: Littelfuse requests you acknowledge receipt of this PCN. In your acknowledgement, you can grant approval or request additional information. Littelfuse will assume the change is acceptable if no acknowledgement is received within 30 days of this notice. Lack of any additional response within 90 days of PCN issuance further constitutes acceptance of the change.

Datasheet change Summary

Commercial B rated

Part Number	Capacitance				ITSM	
	before		after		before	after
	pF min	pF max	pF min	pF max	A min	A min
P0080SBLRP	25	150	30	50	25	30
P0220SBLRP	25	150	30	50	25	30
P0300SBLRP	15	140	20	50	25	30
P0640SBLRP	40	80	20	50	25	30
P0720SBLRP	35	75	20	50	25	30
P0900SBLRP	35	70	20	50	25	30
P1100SBLRP	30	70	20	50	25	30
P1200SBLRP	30	65	20	50	25	30
P1300SBLRP	25	60	20	50	25	30
P1500SBLRP	25	55	20	50	25	30
P1800SBLRP	25	50	20	50	25	30
P2000SBLRP	25	90	20	50	25	30
P2100SBLRP	20	35	20	50	25	30
P2300SBLRP	25	50	20	50	25	30
P2500SBLRP	35	95	20	50	25	30
P2600SBLRP	20	45	20	50	25	30
P3100SBLRP	20	45	20	50	25	30
P3500SBLRP	20	40	20	50	25	30
P4500SBLRP	20	65	20	50	25	30
P4500SCLHLRP	20	65	20	50	30	30
SMTBJ050A	n/a	n/a	20	50	20	30
SMTBJ056A	n/a	n/a	20	50	20	30
SMTBJ120A	n/a	n/a	20	50	20	30
SMTBJ170A	n/a	n/a	20	50	20	30
SMTBJ200A	n/a	n/a	20	50	20	30
SMTBJ240A	n/a	n/a	20	50	20	30

Commercial C rated

	Capacitance				ITSM	
	before		after		before	after
Part Number	pF min	pF max	pF min	pF max	A min	A min
P0080SCMCLRP	25	75	30	60	30	35
P0220SCMCLRP	30	65	30	60	30	35
P0300SCMCLRP	25	45	15	40	30	35
P1500SCMCLRP	35	55	30	60	30	35
P1800SCMCLRP	35	50	30	60	30	35
P2100SCMCLRP	30	50	30	60	30	35
P2300SCMCLRP	30	50	30	60	30	35
P2600SCMCLRP	30	45	30	60	30	35
P3100SCMCLRP	30	45	30	60	30	35
P3500SCMCLRP	25	50	30	60	30	35
P4500SCMCLRP	20	45	30	60	30	35
P0080SCLRP	45	260	40	70	30	35
P0220SCLRP	30	240	40	70	30	35
P0300SCLRP	25	250	20	50	30	35
P1500SCLRP	35	95	40	70	30	35
P1800SCLRP	35	90	40	70	30	35
P2100SCLRP	30	90	40	70	30	35
P2300SCLRP	30	80	40	70	30	35
P2500SCLRP	30	85	40	70	30	35
P2600SCLRP	30	80	40	70	30	35
P3100SCLRP	30	70	40	70	30	35
P3500SCLRP	25	65	40	70	30	35
P4500SCLRP	25	65	40	70	30	35
P2000SCLRP	25	30	40	70	30	35

Littelfuse electronic(Wuxi)Co., Ltd
East #3, Zhenfa 6 Road, Shuofang Industrial Park,
Jiangsu, China

Memorandum

To: Those who may concern
From: Gimmy Shi, Senior Product Engineer, Littelfuse.
Date: Feb 27, 2015
Subject: **Qualification test result for Littelfuse DO-214AA B and C rated series SIDACTor[®] parts**

This report is to summarize the qualification result of P0300SCLRP; P0080SCLRP; P1800SCLRP; P3100SCLRP; P3500SCLRP; P0300SBLRP; P0080SBLRP; P3100SBLRP.

This test result covers most of DO-214AA B and C rated SIDACTor[®] series their special devices.

1. Qualification sample

Part Number	Assy Lot	Remark
P3100SCLRP	TEST LOT	DC/AC Blocking/TC/PCT/H3TRB/RSH

2. Reliability test items and result summary

Reliability Part Number: P0080SCLRP; P0300SCLRP; P1800SCLRP; P3100SCLRP; P3500SCLRP; P0080SBLRP; P0300SBLRP; P3100SBLRP.

Test Category	Description	Condition	Part	Lot type	SS/lot	Lot Size	Result	ETR
Reliability	Pre-condition	24 hours bake at 125°C, 168hrs 85°C/85% RH storage,	P3100SCLRP	Control lot	120	1 lot	passed	69123
			P3100SCLRP	Test lot				
	HTRB	125C, DC/AC bias(peak)=80% Rated VDRM, 1008hrs	P3100SCLRP	Control lot	77	1 lot	passed	
			P3100SCLRP	Test lot				
	HTSL	168/500/1000 hours at TA = 150C	P3100SCLRP	Control lot	40	1 lot	passed	
			P3100SCLRP	Test lot				
	TC	100cycles, -65°C & +150°C,	P3100SCLRP	Control lot	40	1 lot	passed	
			P3100SCLRP	Test lot				
	H3TRB	168/500/1000 hours at Tj = 85C/85% RH	P3100SCLRP	Control lot	40	1 lot	passed	
			P3100SCLRP	Test lot				
	TST	0°C & 100°C, 10 cycles	P3100SCLRP	Control lot	40	1 lot	passed	
			P3100SCLRP	Test lot				

Test Category	Description	Condition	Part	Lot type	SS/lot	Lot Size	Result	ETR	
Parametric	Surge out 2x10us	test from 90% IPP, 10% per step till damage	P3500SCLRP	Test lot	10	1 lot	Passed		
			P3100SCLRP	Test lot	10	1 lot			
			P1800SCLRP	Test lot	10	1 lot			
			P0300SCLRP	Test lot	10	1 lot			
			P0080SCLRP	Test lot	10	1 lot			
			P0300SBLRP	Test lot	10	1 lot			
			P0080BCLRP	Test lot	10	1 lot			
	Surge out 8x20us	test from 90% IPP, 10% per step till damage	P3500SCLRP	Test lot	10	1 lot	Passed		
			P3100SCLRP	Test lot	10	1 lot			
			P1800SCLRP	Test lot	10	1 lot			
			P0300SCLRP	Test lot	10	1 lot			
			P0080SCLRP	Test lot	10	1 lot			
			P3100SBLRP	Test lot	10	1 lot			
			P0300SBLRP	Test lot	10	1 lot			
	Surge out 10x700us	test from 90% IPP, 10% per step till damage	P3500SCLRP	Test lot	10	1 lot	Passed		
			P3100SCLRP	Test lot	10	1 lot			
			P1800SCLRP	Test lot	10	1 lot			
			P0300SCLRP	Test lot	10	1 lot			
			P0080SCLRP	Test lot	10	1 lot			
			P3100SBLRP	Test lot	10	1 lot			
			P0300SBLRP	Test lot	10	1 lot			
	Surge out 10x1000us	test from 90% IPP, 10% per step till damage	P3500SCLRP	Test lot	10	1 lot	Passed		
			P3100SCLRP	Test lot	10	1 lot			
			P1800SCLRP	Test lot	10	1 lot			
			P0300SCLRP	Test lot	10	1 lot			
			P0080SCLRP	Test lot	10	1 lot			
			P3100SBLRP	Test lot	10	1 lot			
P0300SBLRP			Test lot	10	1 lot				
P0080BCLRP			Test lot	10	1 lot				
Capacitance			Bias 1MHZ,2V	P3500SCLRP	Test lot	10		1 lot	Passed
				P3100SCLRP	Test lot	10		1 lot	
	P1800SCLRP	Test lot		10	1 lot				
	P0300SCLRP	Test lot		10	1 lot				
	P0080SCLRP	Test lot		10	1 lot				
	P3100SBLRP	Test lot		10	1 lot				
	P0300SBLRP	Test lot		10	1 lot				
Vs	100V/us	P3500SCLRP	Test lot	10	1 lot	Passed			
		P3100SCLRP	Test lot	10	1 lot				
		P1800SCLRP	Test lot	10	1 lot				
		P0300SCLRP	Test lot	10	1 lot				
		P0080SCLRP	Test lot	10	1 lot				
		P3100SBLRP	Test lot	10	1 lot				
		P0300SBLRP	Test lot	10	1 lot				
ITSM	1.0ipp start,50/60HZ	P3500SCLRP	Test lot	10	1 lot	Passed			
		P3100SCLRP	Test lot	10	1 lot				
		P1800SCLRP	Test lot	10	1 lot				
		P0300SCLRP	Test lot	10	1 lot				
		P0080SCLRP	Test lot	10	1 lot				
		P3100SBLRP	Test lot	10	1 lot				
		P0300SBLRP	Test lot	10	1 lot				

ETR#68409
 ETR#68410
 ETR#68731
 ETR#69104
 ETR#69105

3. FAB Process & Material Differences/Changes:

3.1 Wafer and Process Changes

There is grid size optimization to 5mil/side from 7.5mil/side in FAB process method

4. Assembly, Process & Material Differences/Changes:

4.1 Assembly and Process Changes

There are no significant changes in the assembly and process method.

5. Packaging Method

There will be no changes in the packing method.

6. Marking Method

There will be no changes in the marking method.

7. Physical Differences/Changes

There is no change in mechanical specification or package outline dimension (POD).

8. Electrical Characteristic Summary:

There is no change in electrical characteristics. Characterization data is available upon request. But datasheet has been re-characterized to reflect the real product performance.

9. Changed Part Identification

There is no change in Part Identification.

10. Recommendations & Conclusions:

Based on the test results, it was determined that optimization of B and C-rated DO-214AA SIDACTor were qualified and certified for mass production

Asymmetrical Discrete Series - DO-214



Agency Approvals

Agency	Agency File Number
	E133083

Pinout Designation

Not Applicable

Schematic Symbol



Description

The Asymmetrical Discrete Series are SIDACtor® devices designed to protect LCAS (Line Circuit Access Switch) devices from damaging overvoltage transients.

The series provides a specialized asymmetrical overvoltage protection solution that enables equipment to comply with various global regulatory standards.

Features and Benefits

- 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 ratings
- LCAS specific tip and ring thresholds
- 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 Inter-building*
- GR 1089 Intra-building
- IEC 61000-4-5
- YD/T 1082
- YD/T 993
- YD/T 950

*A/B-rated parts require series resistance

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 @ $I_T = 2.2 A$	Capacitance @ 1MHz, 2V bias	
		V min	V max	mA min	mA max	A max	V max	pF min	pF max
P1200SALRP	P12A	100	130	120	800	2.2	4	15	40
P2000SALRP	P20A	180	220	120	800	2.2	4	15	40
P2500SALRP	P25A	230	290	120	800	2.2	4	15	40
P1200SBLRP	P12B	100	130	120	800	2.2	4	20	50
P2000SBLRP	P20B	180	220	120	800	2.2	4	20	50
P2500SBLRP	P25B	230	290	120	800	2.2	4	20	50
P1200SCLRP	P12C	100	130	120	800	2.2	4	20	35
P2000SCLRP	P20C	180	220	120	800	2.2	4	40	70
P2500SCLRP	P25C	230	290	120	800	2.2	4	40	70

Notes:
- Absolute maximum ratings measured at $T_A = 25^\circ C$ (unless otherwise noted).
- Devices are bi-directional.

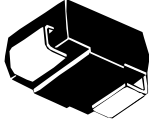
Surge Ratings

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	25	500
B	25	250	250	150	100	100	125	80	100	30	500
C	50	500	400	200	150	200	175	100	200	35	500

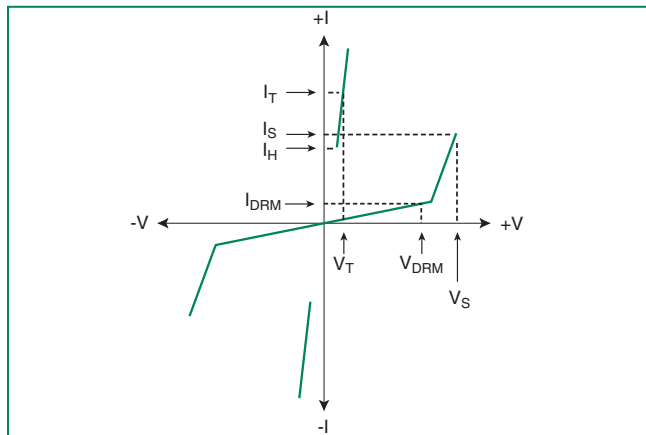
Notes:

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

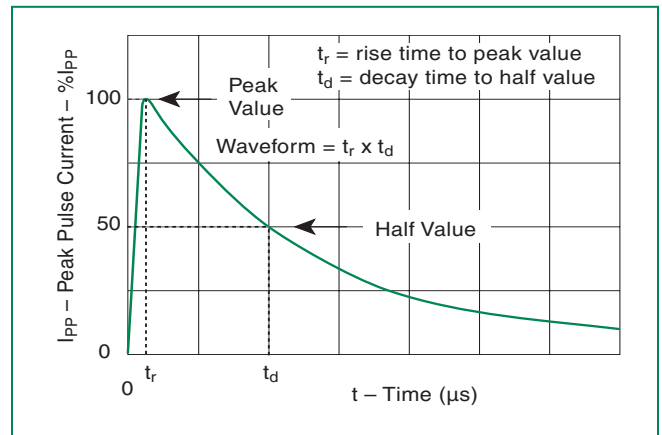
Thermal Considerations

Package	Symbol	Parameter	Value	Unit
 DO-214AA	T_J	Operating Junction Temperature Range	-40 to +150	$^{\circ}C$
	T_S	Storage Temperature Range	-65 to +150	$^{\circ}C$
	$R_{\theta JA}$	Thermal Resistance: Junction to Ambient	90	$^{\circ}C/W$

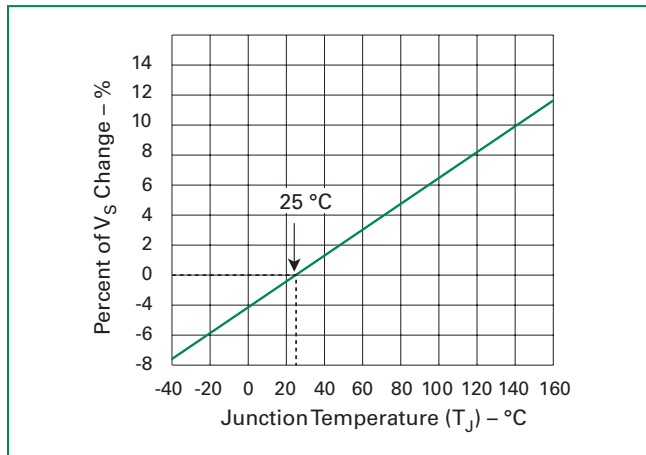
V-I Characteristics



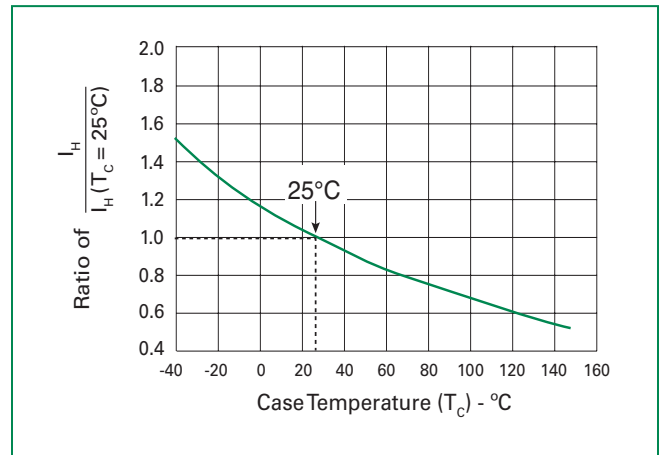
$t_r \times t_d$ Pulse Waveform



Normalized V_S Change vs. Junction Temperature

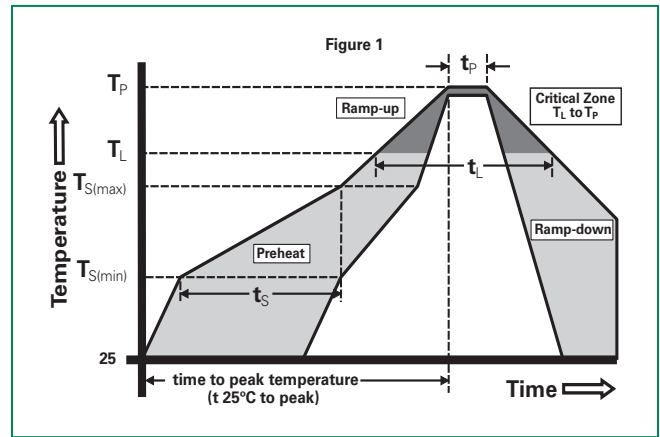


Normalized DC Holding Current vs. Case Temperature



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



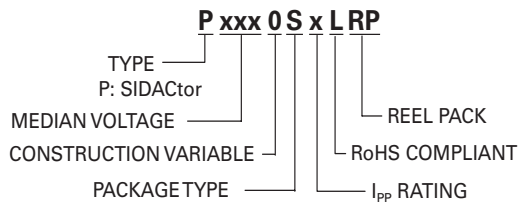
Physical Specifications

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

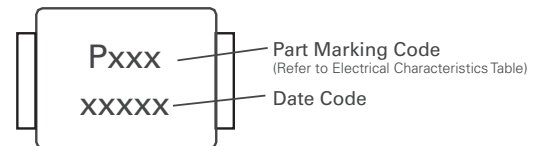
Environmental Specifications

High Temp Voltage Blocking	80% Rated V_{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
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

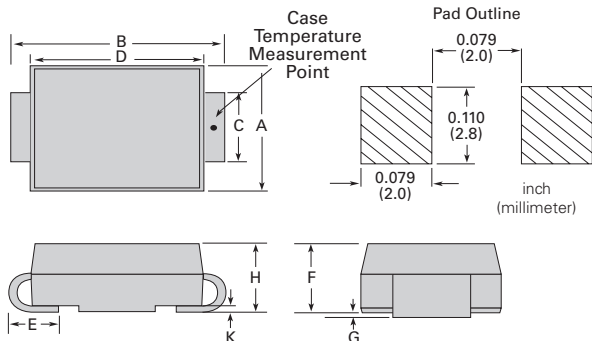
Part Numbering



Part Marking



Dimensions — DO-214AA

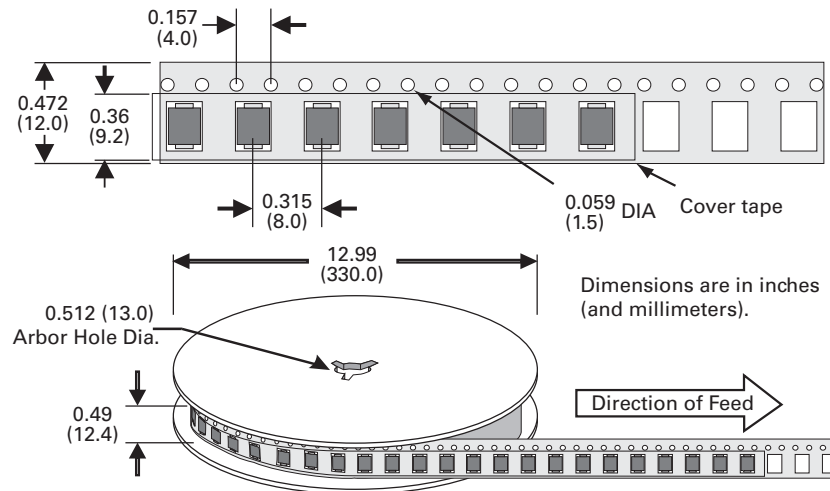


Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	0.130	0.156	3.30	3.95
B	0.201	0.220	5.10	5.60
C	0.077	0.087	1.95	2.20
D	0.159	0.181	4.05	4.60
E	0.030	0.063	0.75	1.60
F	0.075	0.096	1.90	2.45
G	0.002	0.008	0.05	0.20
H	0.077	0.104	1.95	2.65
K	0.006	0.016	0.15	0.41

Packing Options

Package Type	Description	Quantity	Added Suffix	Industry Standard
S	DO-214AA Tape & Reel Pack	2500	RP	EIA-481-D

Tape and Reel Specification — DO-214AA



SIDACTor® Series - DO-214



Agency Approvals

AGENCY	AGENCY FILE NUMBER
	E133083

Pinout Designation

Not Applicable

Schematic Symbol



Description

SIDACTor® Series DO-214AA are designed to protect baseband equipment such as modems, line cards, CPE and DSL from damaging overvoltage transients.

The series provides a surface mount solution that enables equipment to comply with global regulatory standards.

Features and Benefits

- 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 ratings
- Low capacitance
- 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 Inter-building*
- GR 1089 Intra-building
- IEC 61000-4-5
- YD/T 1082
- YD/T 993
- YD/T 950

*A/B-rated parts require series resistance

Electrical Characteristics

Part Number	Marking	V_{DRM} @ $I_{DRM}=5\mu A$	V_S @ 100V/ μs	I_H	I_S	I_T	V_T @ $I_T=2.2$ Amps	Capacitance @ 1MHz, 2V bias	
		V min	V max	mA min	mA max	A max	V max	pF min	pF max
P0080SALRP	P-8A	6	25	50	800	2.2	4	20	40
P0220SALRP	P22A	15	32	50	800	2.2	4	20	40
P0300SALRP	P03A	25	40	50	800	2.2	4	20	40
P0640SALRP	P06A	58	77	150	800	2.2	4	15	40
P0720SALRP	P07A	65	88	150	800	2.2	4	15	40
P0900SALRP	P09A	75	98	150	800	2.2	4	15	40
P1100SALRP	P11A	90	130	150	800	2.2	4	15	40
P1300SALRP	P13A	120	160	150	800	2.2	4	15	40
P1500SALRP	P15A	140	180	150	800	2.2	4	15	40
P1800SALRP	P18A	170	220	150	800	2.2	4	15	40
P2100SALRP	P21A	180	240	150	800	2.2	4	15	40
P2300SALRP	P23A	190	260	150	800	2.2	4	15	40
P2600SALRP	P26A	220	300	150	800	2.2	4	15	40
P3100SALRP	P31A	275	350	150	800	2.2	4	15	40
P3500SALRP	P35A	320	400	150	800	2.2	4	15	40
P0080SBLRP	P-8B	6	25	50	800	2.2	4	30	50
P0220SBLRP	P22B	15	32	50	800	2.2	4	30	50
P0300SBLRP	P03B	25	40	50	800	2.2	4	20	50
P0640SBLRP	P06B	58	77	150	800	2.2	4	20	50
P0720SBLRP	P07B	65	88	150	800	2.2	4	20	50

Table continues on next page.

Electrical Parameters (continued)

Part Number	Marking	V_{DRM} @ $I_{DRM}=5\mu A$	V_S @ 100V/ μs	I_H	I_S	I_T	V_T @ $I_T=2.2$ Amps	Capacitance @ 1MHz, 2V bias	
		V min	V max	mA min	mA max	A max	V max	pF min	pF max
P0900SBLRP	P09B	75	98	150	800	2.2	4	20	50
P1100SBLRP	P11B	90	130	150	800	2.2	4	20	50
P1300SBLRP	P13B	120	160	150	800	2.2	4	20	50
P1500SBLRP	P15B	140	180	150	800	2.2	4	20	50
P1800SBLRP	P18B	170	220	150	800	2.2	4	20	50
P2100SBLRP	P21B	180	240	150	800	2.2	4	20	50
P2300SBLRP	P23B	190	260	150	800	2.2	4	20	50
P2600SBLRP	P26B	220	300	150	800	2.2	4	20	50
P3100SBLRP	P31B	275	350	150	800	2.2	4	20	50
P3500SBLRP	P35B	320	400	150	800	2.2	4	20	50
P4500SBLRP	P45B	400	530	150	800	2.2	4	20	50
P0080SCLRP	P-8C	6	25	50	800	2.2	4	40	70
P0220SCLRP	P22C	15	32	50	800	2.2	4	40	70
P0300SCLRP	P03C	25	40	50	800	2.2	4	20	50
P0640SCLRP	P06C	58	77	150	800	2.2	4	45	100
P0720SCLRP	P07C	65	88	150	800	2.2	4	45	100
P0900SCLRP	P09C	75	98	150	800	2.2	4	45	100
P1100SCLRP	P11C	90	130	150	800	2.2	4	45	90
P1300SCLRP	P13C	120	160	150	800	2.2	4	40	85
P1500SCLRP	P15C	140	180	150	800	2.2	4	40	70
P1800SCLRP	P18C	170	220	150	800	2.2	4	40	70
P2100SCLRP	P21C	180	240	150	800	2.2	4	40	70
P2300SCLRP	P23C	190	260	150	800	2.2	4	40	70
P2600SCLRP	P26C	220	300	150	800	2.2	4	40	70
P3100SCLRP	P31C	275	350	150	800	2.2	4	40	70
P3500SCLRP	P35C	320	400	150	800	2.2	4	40	70
P4500SCLRP	P45C	400	530	150	800	2.2	4	40	70
P4500SCLHLRP*	P45L	400	530	50	800	2.2	4	20	50

Notes:

- Absolute maximum ratings measured at $T_A=25^\circ C$ (unless otherwise noted).
- Devices are bi-directional.
- * P4500SCLHLRP is low IH product

Surge Ratings

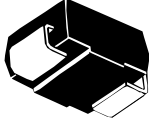
Series	I_{PP}									I_{TSM} 50/60 Hz	di/dt
	0.2x310 ¹ 0.5x700 ²	2x10 ¹ 2x10 ²	8x20 ¹ 1.2x50 ²	10x160 ¹ 10x160 ²	10x560 ¹ 10x560 ²	5x320 ¹ 9x720 ²	10x360 ¹ 10x360 ²	10x1000 ¹ 10x1000 ²	5x310 ¹ 10x700 ²		
	A min	A min	A min	A min	A min	A min	A min	A min	A min		
A	20	150	150	90	50	75	75	45	75	25	500
B	25	250	250	150	100	100	125	80	100	30	500
C	50	500	400	200	150	200	175	100	200 ³	35	500

Notes:

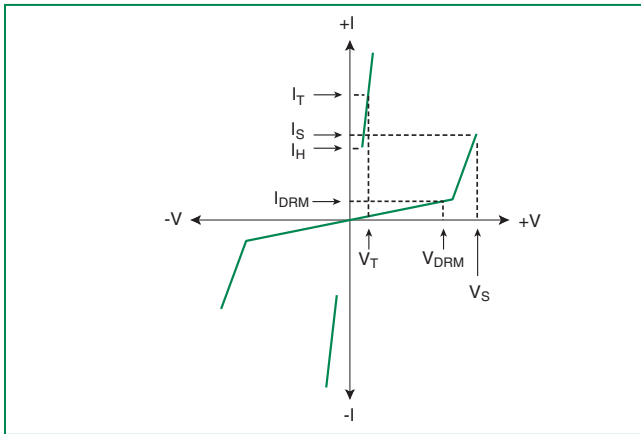
- 1 Current waveform in μs
- 2 Voltage waveform in μs
- 3 For surge rating of P4500SCLRP 10x700 μs min=150A & typical=180A
For surge rating of P4500SCLHLRP 10x700 μs min=150A

- 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 device must initially be in thermal equilibrium with $-40^\circ C \leq T_j \leq +150^\circ C$

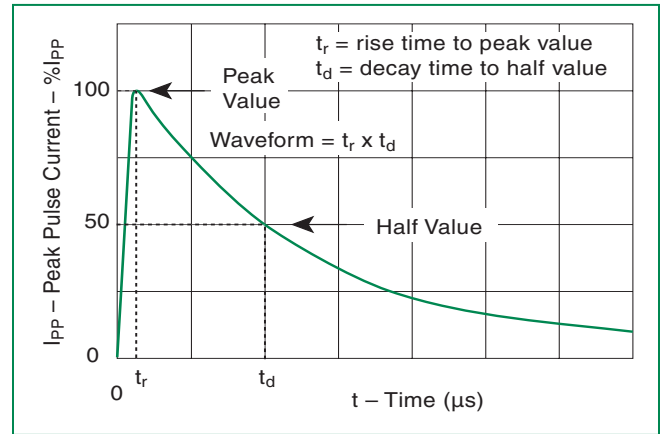
Thermal Considerations

Package	Symbol	Parameter	Value	Unit
 DO-214AA	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	90	°C/W

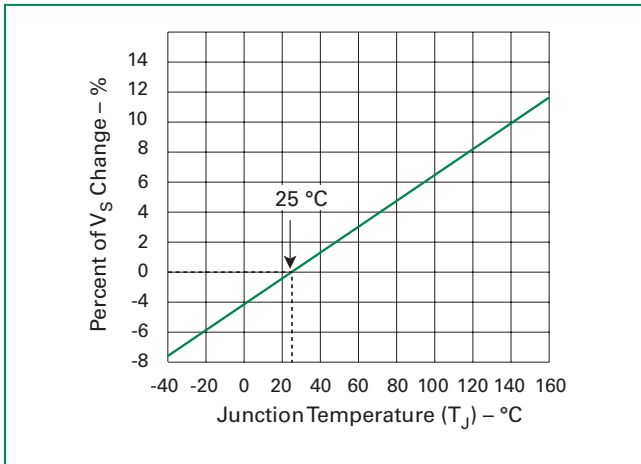
V-I Characteristics



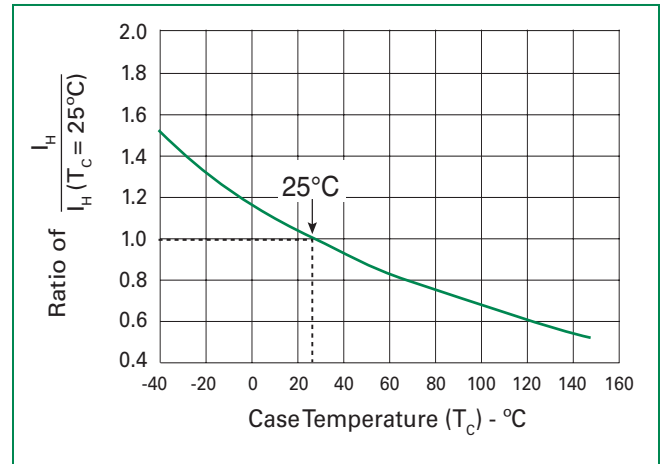
$t_r \times t_d$ Pulse Waveform



Normalized V_S Change vs. Junction Temperature

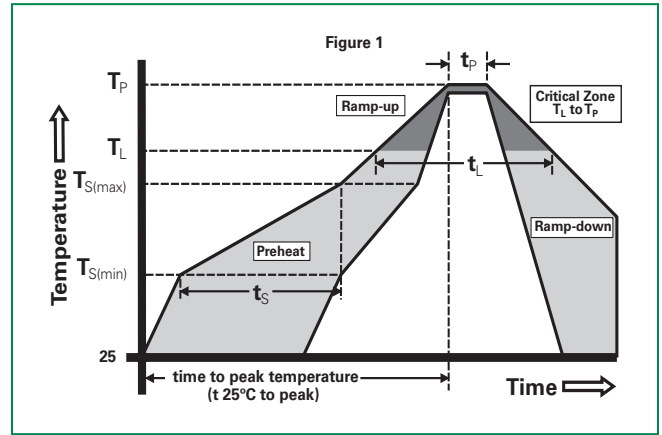


Normalized DC Holding Current vs. Case Temperature



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 (LiquidusTemp (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 PeakTemp (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	



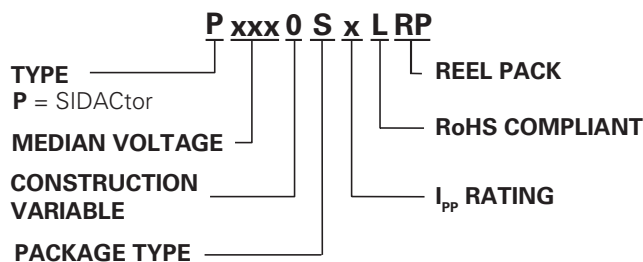
Physical Specifications

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

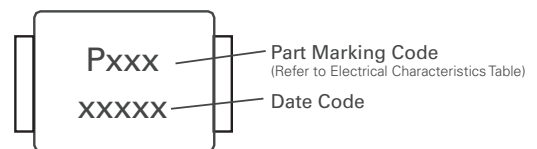
Environmental Specifications

High Temp Voltage Blocking	80% Rated V_{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
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

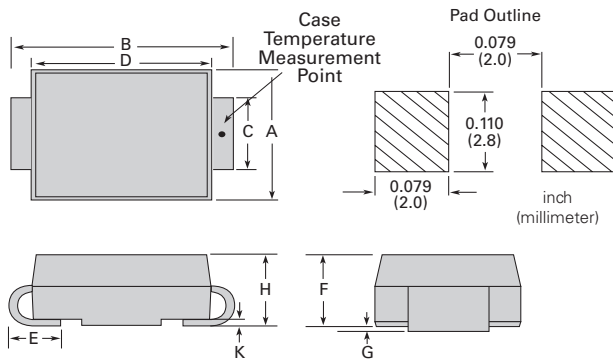
Part Numbering



Part Marking



Dimensions — DO-214AA

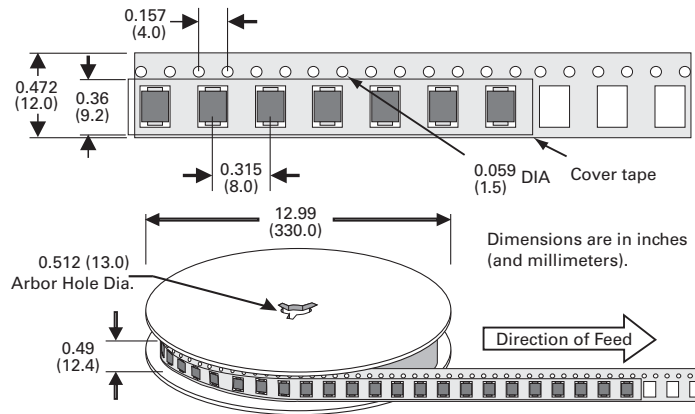


Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	0.130	0.156	3.30	3.95
B	0.201	0.220	5.10	5.60
C	0.077	0.087	1.95	2.20
D	0.159	0.181	4.05	4.60
E	0.030	0.063	0.75	1.60
F	0.075	0.096	1.90	2.45
G	0.002	0.008	0.05	0.20
H	0.077	0.104	1.95	2.65
H- P4500SCLHLRP	0.077	0.096	1.95	2.43
K	0.006	0.016	0.15	0.41

Packing Options

Package Type	Description	Quantity	Added Suffix	Industry Standard
S	DO-214AA Tape & Reel Pack	2500	RP	EIA-481-D

Tape and Reel Specification — DO-214AA



MC Series - DO-214



Agency Approvals

Agency	Agency File Number
	E133083

Pinout Designation

NOT APPLICABLE

Schematic Symbol



Description

MC Series DO-214 are low capacitance SIDACtor® devices designed to protect broadband equipment such as VOIP, DSL modems and DSLAMs from damaging overvoltage transients.

The series provides a surface mount solution that enables equipment to comply with global regulatory standards while limiting the impact to broadband signals.

Features and Benefits

- 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 ratings
- 40% lower capacitance than our Baseband Protectors, for applications that demand greater signal integrity
- 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

*A-rated parts require series resistance

Electrical Characteristics

Part Number	Marking	V_{DRM} @ $I_{DRM}=5\mu A$	V_S @ 100V/ μs	I_H	I_S	I_T	V_T @ $I_T=2.2$ Amps	Capacitance @ 1MHz, 2V bias	
		V min	V max	mA min	mA max	A max	V max	pF min	pF max
P0080SAMCLRP	P-8AM	6	25	50	800	2.2	4	10	35
P0220SAMCLRP	P02AM	15	32	50	800	2.2	4	10	35
P0300SAMCLRP	P03AM	25	40	50	800	2.2	4	10	35
P0080SCMCLRP	P-8CM	6	25	50	800	2.2	4	30	60
P0220SCMCLRP	P02CM	15	32	50	800	2.2	4	30	60
P0300SCMCLRP	P03CM	25	40	50	800	2.2	4	15	40
P0640SCMCLRP	P06CM	58	77	150	800	2.2	4	50	80
P0720SCMCLRP	P07CM	65	88	150	800	2.2	4	50	75
P0900SCMCLRP	P09CM	75	98	150	800	2.2	4	40	70
P1100SCMCLRP	P11CM	90	130	150	800	2.2	4	40	70
P1300SCMCLRP	P13CM	120	160	150	800	2.2	4	35	60
P1500SCMCLRP	P15CM	140	180	150	800	2.2	4	30	60
P1800SCMCLRP	P18CM	170	220	150	800	2.2	4	30	60
P2100SCMCLRP	P21CM	180	240	150	800	2.2	4	30	60
P2300SCMCLRP	P23CM	190	260	150	800	2.2	4	30	60
P2600SCMCLRP	P26CM	220	300	150	800	2.2	4	30	60
P3100SCMCLRP	P31CM	275	350	150	800	2.2	4	30	60
P3500SCMCLRP	P35CM	320	400	150	800	2.2	4	30	60
P4500SCMCLRP	P45CM	400	530	50	800	2.2	4	30	60

Notes:
- Absolute maximum ratings measured at $T_a = 25^\circ C$ (unless otherwise noted).
- Devices are bi-directional (unless otherwise noted).

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Specifications are subject to change without notice.
Revised: 03/25/15

Surge Ratings

Series	I_{PP}										I_{TSM} 50/60 Hz	di/dt
	0.2x310 ¹	2x10 ¹	8x20 ¹	10x160 ¹	10x560 ¹	5x320 ¹	10x360 ¹	10x1000 ¹	5x310 ¹	10x700 ²		
	0.5x700 ²	2x10 ²	1.2x50 ²	10x160 ²	10x560 ²	9x720 ²	10x360 ²	10x1000 ²	10x700 ²	10x700 ²		
	A min	A min	A min	A min	A min	A min	A min	A min	A min	A min	A min	A/μs max
A	20	150	150	90	50	75	75	45	75	25	500	
C	50	500	400	200	150	200	175	100	200 ³	35	500	

Notes:

1 Current waveform in μs

2 Voltage waveform in μs

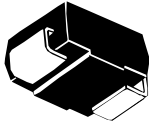
3 For surge rating of P4500SCMCLRP 10x700μs min=150A

- Peak pulse current rating (I_{pp}) is repetitive and guaranteed for the life of the product.

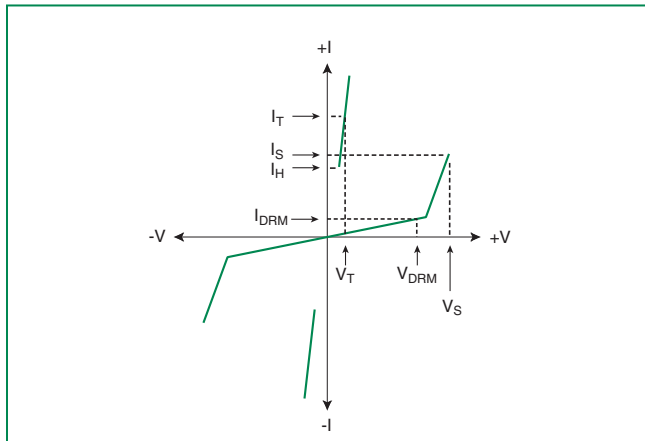
- I_{pp} ratings applicable over temperature range of -40°C to +85°C

- The device must initially be in thermal equilibrium with -40°C ≤ T_J ≤ +150°C

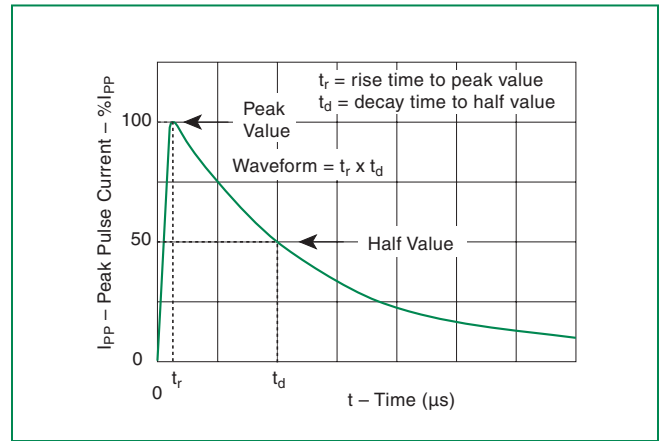
Thermal Considerations

Package	Symbol	Parameter	Value	Unit
 DO-214AA	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	90	°C/W

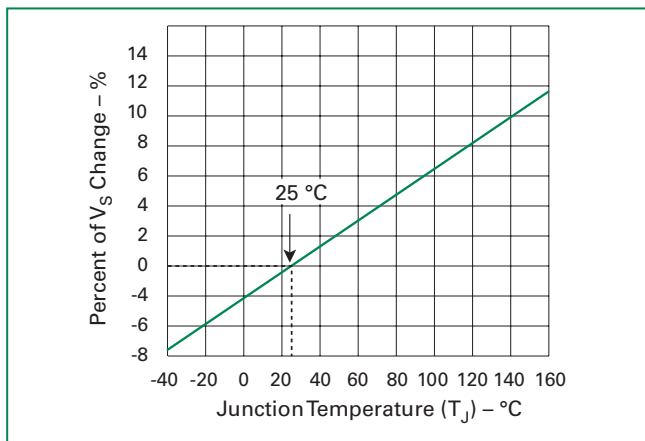
V-I Characteristics



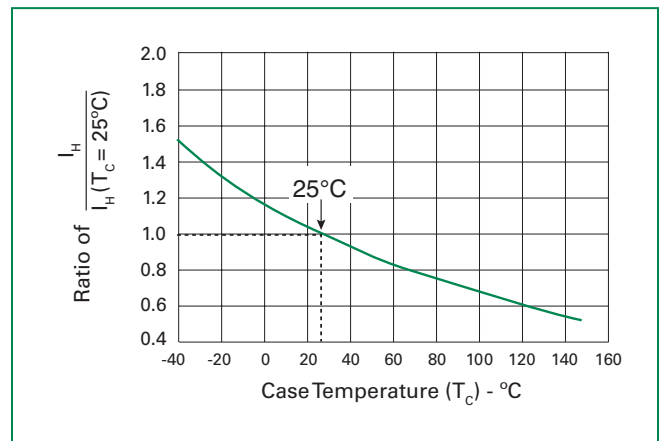
$t_r \times t_d$ Pulse Waveform



Normalized V_S Change vs. Junction Temperature

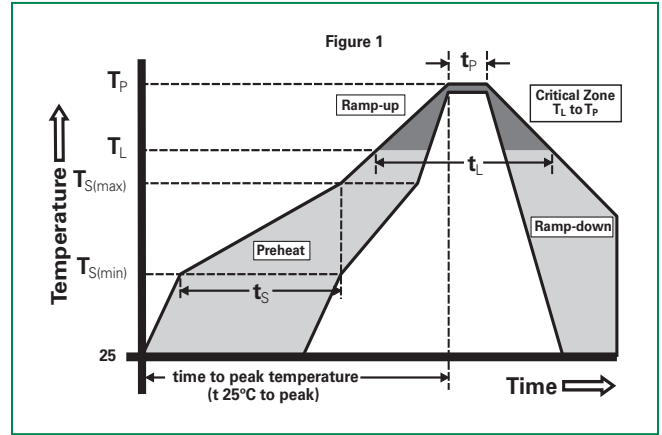


Normalized DC Holding Current vs. Case Temperature



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 PeakTemp (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	



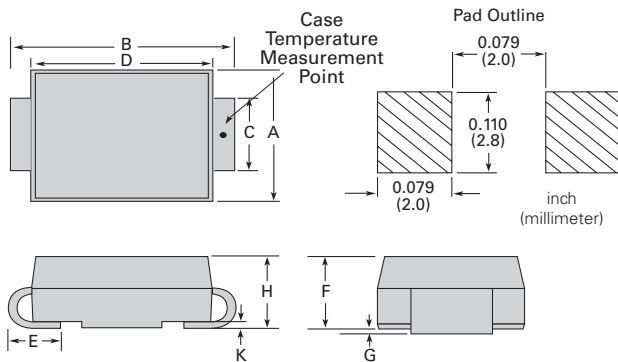
Physical Specifications

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

Environmental Specifications

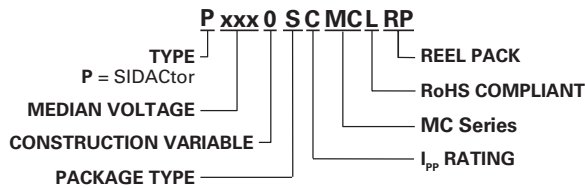
High Temp Voltage Blocking	80% Rated V_{DRM} ($V_{AC Peak}$) +125°C or +150°C, 504 or 1008 hrs. MIL-STD-750 (Method 1040) JEDEC, JESD22-A-101
Temp Cycling	-65°C to +150°C, 15 min. dwell, 10 up to 100 cycles. MIL-STD-750 (Method 1051) EIA/JEDEC, JESD22-A104
Biased Temp & Humidity	52 V_{DC} (+85°C) 85%RH, 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
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

Dimensions – DO-214AA

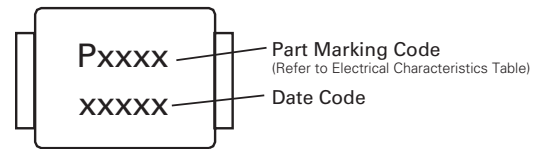


Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	0.130	0.156	3.30	3.95
B	0.201	0.220	5.10	5.60
C	0.077	0.087	1.95	2.20
D	0.159	0.181	4.05	4.60
E	0.030	0.063	0.75	1.60
F	0.075	0.096	1.90	2.45
G	0.002	0.008	0.05	0.20
H	0.077	0.104	1.95	2.65
K	0.006	0.016	0.15	0.41

Part Numbering



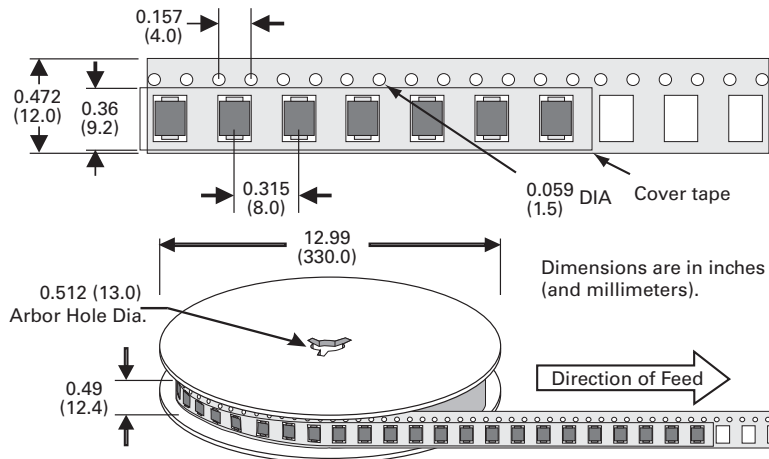
Part Marking



Packing Options

Package Type	Description	Quantity	Added Suffix	Industry Standard
S	DO-214AA Tape & Reel Pack	2500	N/A	EIA-481-D

Tape and Reel Specification – DO-214AA



AFFECTED MPNS

P0080SBLRP
P0220SBLRP
P0300SBLRP
P0640SBLRP
P0720SBLRP
P0900SBLRP
P1100SBLRP
P1200SBLRP
P1300SBLRP
P1500SBLRP
P1800SBLRP
P2000SBLRP
P2100SBLRP
P2300SBLRP
P2500SBLRP
P2600SBLRP
P3100SBLRP
P3100SBLRPH
P3500SBLRP
P4500SBLRP
P0080SBMCLRP
P0220SBMCLRP
P0300SBMCLRP
SPH0004CRP
P4500SCLHLRP
P3100SXLRP
P1500SBLRP-N
P2300SBLRP-N
P678P0080SBRP
P792P0080SBLRP
P686P2300SBRP
P708P2300SBRP
P591P2600SBLRP
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P486P3100SBRP
P640P3100SBRP
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P654P3100SBRPHF
P809P3100SBLRP
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P784P3500SBLRP
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SMTBJ056A
SMTBJ056A-006
SMTBJ108A-006

SMTBJ120A
SMTBJ162A-006
SMTBJ170A
SMTBJ180A-006
SMTBJ200A
SMTBJ216A-006
SMTBJ240A
TSMBJ0510C-7P
TSMBJ0516C-TP
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P839P4500SCLRP
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P0080SCLRP
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P0300SCLRP
P1500SCLRP
P1800STLRP
P1800SCLRP
P2100SCLRP
P2300SCLRP
P2300STLRP
P2500SCLRP
P2600SCLRP
P2600STLRP
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P3100SCLRP
P3500SCLRP
P3500STLRP
P4500SCLRP
P0080SCLRP-N1
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P0300SCLRP-N1
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P753AP1500SCLRP
P753BP1500SCLRP
P753CP1500SCLRP
P753DP1500SCLRP
P677P1800SCR
P777P2000SCLRP
P762P2300SCLRP
P762AP2300SCLRP
P469P2600SCLRP
P774P2600SCLRP
P759P2600SCLRP
P759AP2600SCLRP
P766P2600SCLRP
P766AP2600SCLRP
P820P2600SCLRP
P440P3100SCR
P618P3100SCR
P641P3100SCR
P754P3100SCLRP
P754AP3100SCLRP
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P754DP3100SCLRP
P827P3100SCLRP
P794P3500SCLRP
P681P3500SCR
TSMBJ1022C-TP
SMTBJ200B
P931WRP
P0640SCLRP
P0640SCLRP-N1
P0640SCLRP-N2
P0720SCLRP
P0720SCLRP-N
P0900SCLRP
P1100SCLRP
P1200SCLRP
P1200SCLRP-N
P1300SCLRP
P0640SCMCLRP
P0720SCMCLRP
P0900SCMCLRP

P1100SCMCLRP
P1200SCMCLRP
P1300SCMCLRP
P676P0640SCR
P764P0640SCLRP
P764AP0640SCLRP
P832P0640SCLRP
P755P0720SCLRP
P755AP0720SCLRP
P755BP0720SCLRP
P626P0900SCLRP
P689P1100SCR
P698WRP
P923WRP
P925WRP
P926WRP
P927WRP
P465P1500SCR
SMTBJ050B
SMTBJ070B
SMTBJ100B
P376P1500SCR