

Pxxx0S3N-A Series

High Surge Current SIDACtor® - DO-214AB



Agency Approvals

Agency	Agency File Number
	E133083

Schematic Symbol



Description

The automotive grade Pxxx0S3N-A series DO-214AB protection thyristors are components designed to protect AC power line located in hostile environments from overvoltage transients.

The Pxxx0S3N-A series protect exposed interfaces in industrial and ICT applications, such as RS-485 data interfaces or AC and DC power supplies. These components switching voltage V_S are much lower than alternative component.

This Pxxx0S3N-A series are rated 3000 A 8/20 μ s, enabling equipment compliance with regulatory and customer surge requirements.

Features and Benefits

- High reliability application and automotive grade AEC-Q101 qualified
- High surge rating 8/20 μ s 3000 A protection
- High surge SIDACtor designed in a surface mount and compact DO-214AB package
- Low voltage overshoot
- Low on-state voltage
- Fails short circuit when surged in excess of ratings
- Component properties do not degrade after multiple surge events within its limits
- Fast response in microseconds
- RoHS compliant and Halogen-free
- Pb-free E3 means 2nd level interconnect is Pb-free and the terminal finish material is tin (Sn) (IPC/JEDEC J-STD609A.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, 2nd edition
- YD/T 1082
- YD/T 993
- YD/T 950

Electrical Characteristics

Part Number	Marking	V_{DRM} @ $I_{DRM} = 5 \mu A$	V_S @ 100 V/ μ s	I_H	I_S	I_T	V_T @ $I_T = 2.2 A$	Capacitance @ 1 MHz, 2V bias	
		V min	V max	mA min	mA max	A max	V max	pf min	pF max
P0640S3NLRP-A	P06N	58	77	50	800	2.2	4	150	550
P0720S3NLRP-A	P07N	65	88	50	800	2.2	4	150	550
P0900S3NLRP-A	P09N	75	98	50	800	2.2	4	150	550
P1100S3NLRP-A	P11N	90	130	50	800	2.2	4	150	450
P1300S3NLRP-A	P13N	120	160	50	800	2.2	4	150	450
P1500S3NLRP-A	P15N	140	180	50	800	2.2	4	150	450
P1900S3NLRP-A	P19N	155	220	50	800	2.2	4	150	450
P2100S3NLRP-A	P21N	170	240	50	800	2.2	4	150	450
P2300S3NLRP-A	P23N	180	260	50	800	2.2	4	150	450
P2600S3NLRP-A	P26N	220	300	50	800	2.2	4	150	450
P3100S3NLRP-A	P31N	275	350	50	800	2.2	4	150	450
P3500S3NLRP-A	P35N	320	400	50	800	2.2	4	150	450
P3800S3NLRP-A	P38N	350	430	50	800	2.2	4	150	450

Notes:

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

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Surge Ratings

Series	I_{PP}	I_{TSM} 50 / 60 Hz	di/dt
	8/20 ¹ 1.2/50 ²		
	A min	A min	A/μs max
N	3000	250	420

Notes:

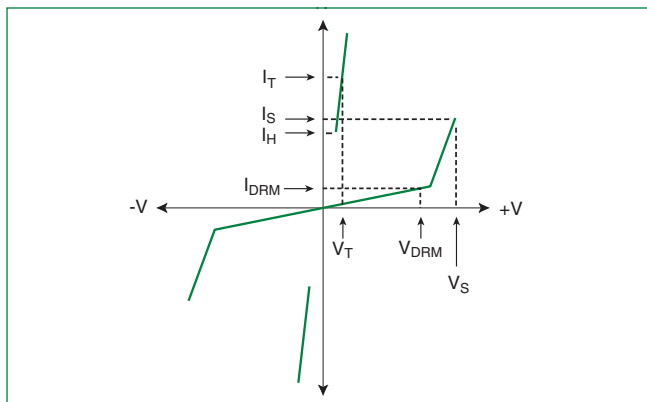
1. Current waveform in μs
2. Voltage waveform in μs

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

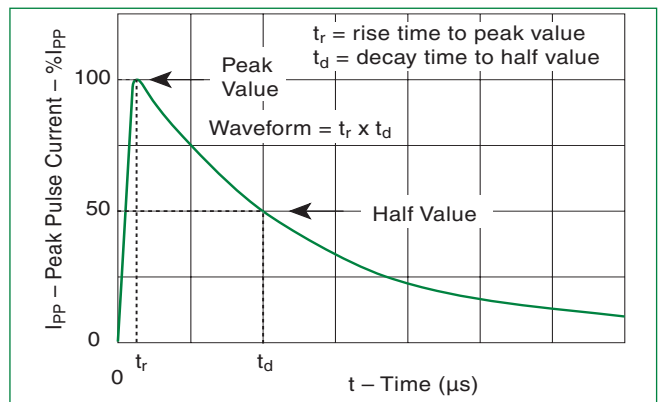
Thermal Considerations

Package	Symbol	Parameter	Value	Unit
DO-214AB 	T_J	Operating Junction Temperature Range	-65 to +125	°C
	T_S	Storage Temperature Range	-65 to +150	°C
	$R_{\theta JA}$	Thermal Resistance: Junction to Ambient	75	°C/W

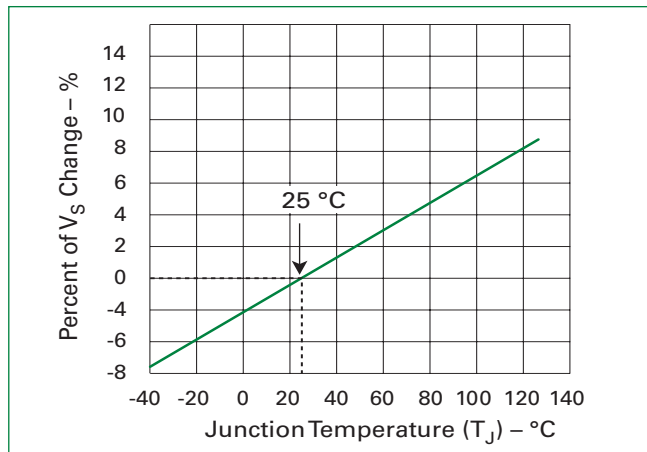
V-I Characteristics



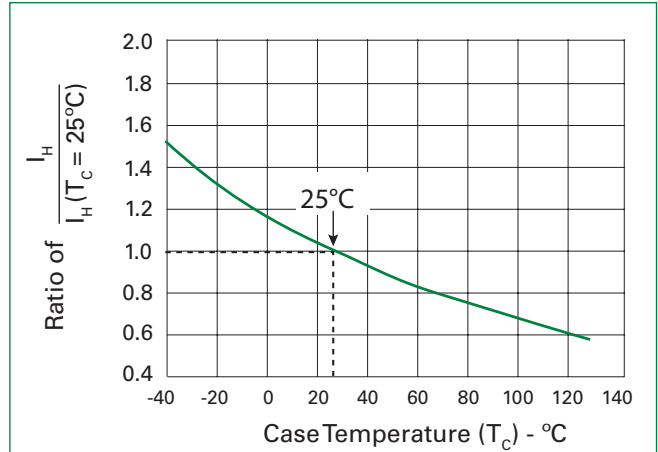
tr x td Pulse Waveform



Normalized V_S Change vs. Junction Temperature



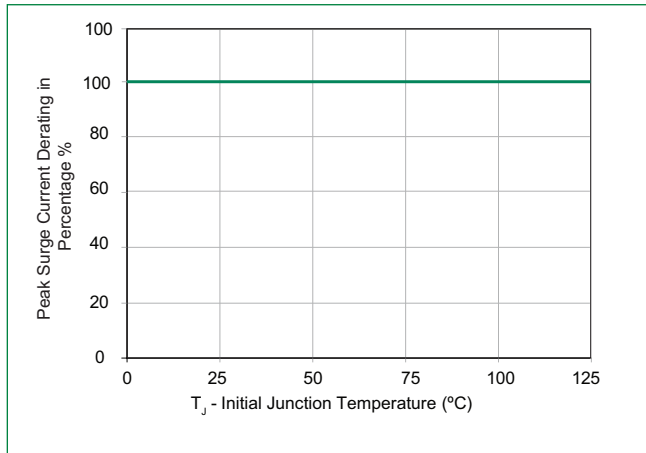
Normalized DC Holding Current vs. Case Temperature



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Peak Surge Current Derating Curve

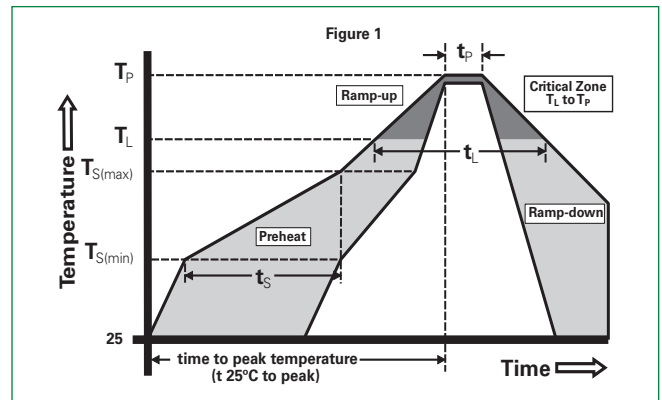


Physical Specifications

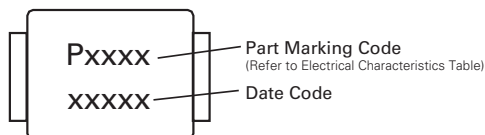
Lead Material	Copper alloy
Terminal Finish	100 % Matte-tin plated
Body Material	UL recognized epoxy meeting flammability classification V-0

Soldering Parameters

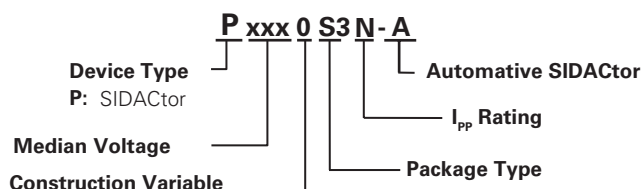
Reflow Condition		Pb-free assembly (see Fig. 1)
Pre Heat	- Temperature Min ($T_{s(min)}$)	+150 °C
	- Temperature Max ($T_{s(max)}$)	+200 °C
	- Time (Min to Max) (t_s)	60-120 secs.
Average Ramp Up Rate (Liquidus Temp (T_L) to Peak)		3 °C/sec. max.
$T_{s(max)}$ to T_L - Ramp-up Rate		3 °C/sec. max.
Reflow	- 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



Part Marking



Part Numbering



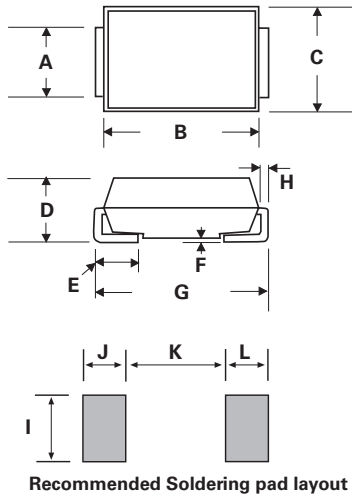
Environmental Specifications

High Temp Voltage Blocking	80 % rated V_{DRM} (V_{AC} Peak) +125 °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	80 % rated V_{DRM} (+85 °C) 85 %RH, and not exceed 100 V or limit of chamber. 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 HAST	96 hrs. at $T_A = 130$ °C/85 %RH or 264 hrs. at $T_A = 110$ °C/85 %RH. TEST before and after UHAST, JEDEC, 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

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Dimensions — DO-214AB

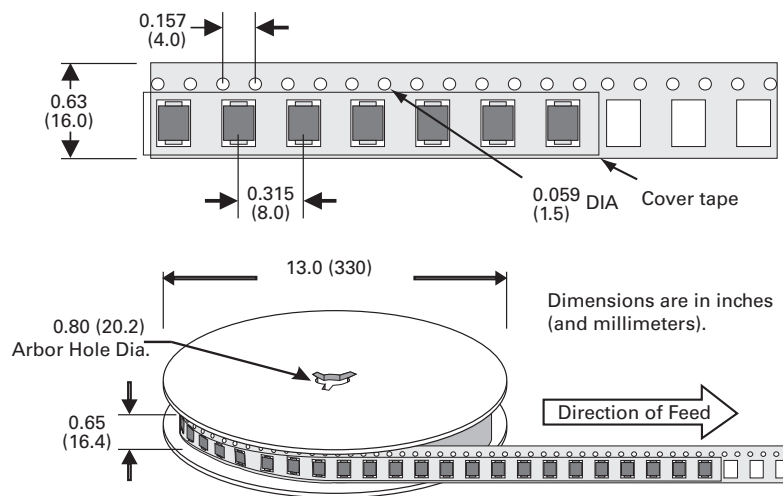


Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	0.114	0.126	2.900	3.200
B	0.260	0.280	6.600	7.110
C	0.220	0.245	5.590	6.220
D	0.079	0.103	2.060	2.620
E	0.030	0.060	0.760	1.520
F	-	0.008	-	0.203
G	0.305	0.320	7.750	8.130
H	0.006	0.012	0.152	0.305
I	0.129	-	3.300	-
J	0.094	-	2.400	-
K	-	0.165	-	4.200
L	0.094	-	2.400	-

Packing Options

Package Type	Description	Quantity	Industry Standard
S3	DO-214AB tape and reel pack	3000	EIA-481-D tape and reel specification

Tape and Reel Specification — DO-214AB



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