

**TwinChip™ Series - DO-214**



**Agency Approvals**

Agency	Agency File Number
	E133083

**Pinout Designation**

NOT APPLICABLE

**Schematic Symbol**



**Description**

TwinChip™ Series DO-214 are very low capacitance SIDACtor® devices designed to protect broadband equipment such as VoIP, DSL modems and DSLAMs from damaging overvoltage transients. This 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.
- Low distortion
- Fails short circuit when surged in excess of ratings
- 40% lower than comparable product
- 2nd level interconnect is Pb-free per IPC/JEDEC J-STD-609A.01

**Applicable Global Standards**

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

**Electrical Characteristics**

Part Number	Marking	$V_{DRM}$ @ $I_{DRM} = 5\mu A$	$V_S$ @ 100V/ $\mu s$	$I_H$	$I_S$	$I_T$	$V_T$ @ $I_T = 2.2$ Amps	@ 1MHz, 2V bias	
		V min	V max	mA min	mA max	A max	V max	pF min	pF max
P0642SALRP	P062A	58	77	120	800	2.2	8	25	45
P0722SALRP	P072A	65	88	120	800	2.2	8	20	45
P0902SALRP	P092A	75	98	120	800	2.2	8	20	40
P1102SALRP	P112A	90	130	120	800	2.2	8	15	35
P1302SALRP	P132A	120	160	120	800	2.2	8	15	35
P1502SALRP	P152A	140	180	120	800	2.2	8	15	30
P1802SALRP	P182A	170	220	120	800	2.2	8	10	30
P2302SALRP	P232A	190	260	120	800	2.2	8	10	25
P2602SALRP	P262A	220	300	120	800	2.2	8	10	25
P3002SALRP	P302A	280	360	120	800	2.2	8	10	25
P3502SALRP	P352A	320	400	120	800	2.2	8	10	20
P4202SALRP	P422A	380	500	120	800	2.2	8	10	20
P4802SALRP	P482A	440	600	120	800	2.2	8	5	20
P6002SALRP	P602A	550	700	120	800	2.2	8	5	20

Table continues on next page.

**Electrical Characteristics (continued)**

Part Number	Marking	$V_{DRM}$ @ $I_{DRM}=5\mu A$	$V_S$ @ 100V/ $\mu s$	$I_H$	$I_S$	$I_T$	$V_T$ @ $I_T=2.2 A$	@ 1MHz, 2V bias	
		V min	V max	mA min	mA max	A max	V max	pF min	pF max
P0642SBLRP	P062B	58	77	120	800	2.2	8	25	45
P0722SBLRP	P072B	65	88	120	800	2.2	8	20	45
P0902SBLRP	P092B	75	98	120	800	2.2	8	20	40
P1102SBLRP	P112B	90	130	120	800	2.2	8	15	35
P1302SBLRP	P132B	120	160	120	800	2.2	8	15	35
P1502SBLRP	P152B	140	180	120	800	2.2	8	15	30
P1802SBLRP	P182B	170	220	120	800	2.2	8	10	30
P2302SBLRP	P232B	190	260	120	800	2.2	8	10	25
P2602SBLRP	P262B	220	300	120	800	2.2	8	10	25
P3002SBLRP	P302B	280	360	120	800	2.2	8	10	25
P3502SBLRP	P352B	320	400	120	800	2.2	8	10	20
P4202SBLRP	P422B	380	500	120	800	2.2	8	10	20
P4802SBLRP	P482B	440	600	120	800	2.2	8	5	20
P6002SBLRP	P602B	550	700	120	800	2.2	8	5	20
P3002SCLRP	P302C	280	360	120	800	2.2	8	20	35
P3502SCLRP	P352C	320	400	120	800	2.2	8	20	30
P4202SCLRP	P422C	380	500	120	800	2.2	8	15	30
P4802SCLRP	P482C	440	600	120	800	2.2	8	15	30
P6002SCLRP	P602C	550	700	120	800	2.2	8	10	25

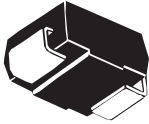
Notes:  
 - Absolute maximum ratings measured at  $T_A = 25^\circ C$  (unless otherwise noted).  
 - Devices are bi-directional (unless otherwise noted).

**Surge Ratings**

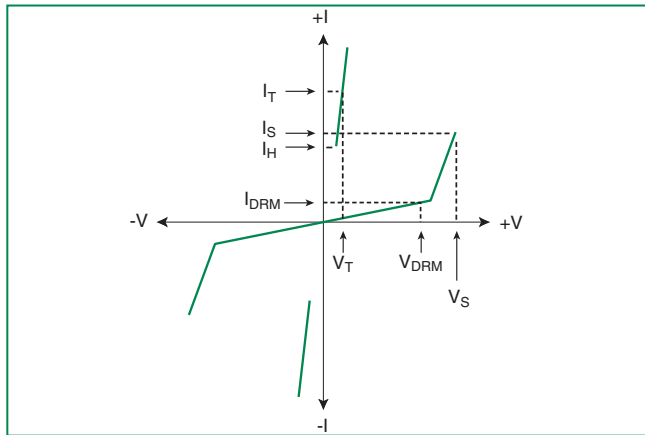
Series	$I_{PP}$									$I_{TSM}$ 50/60 Hz	di/dt
	0.2x310 <sup>1</sup> 0.5x700 <sup>2</sup>	2x10 <sup>1</sup> 2x10 <sup>2</sup>	8x20 <sup>1</sup> 1.2x50 <sup>2</sup>	10x160 <sup>1</sup> 10x160 <sup>2</sup>	10x560 <sup>1</sup> 10x560 <sup>2</sup>	5x320 <sup>1</sup> 9x720 <sup>2</sup>	10x360 <sup>1</sup> 10x360 <sup>2</sup>	10x1000 <sup>1</sup> 10x1000 <sup>2</sup>	5x310 <sup>1</sup> 10x700 <sup>2</sup>		
	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
B	25	250	250	150	100	100	125	80	100	25	500
C	50	500	400	200	150	200	175	100	200	30	500

Notes:  
 1 Current waveform in  $\mu s$   
 2 Voltage waveform in  $\mu s$   
 - 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  $-40^\circ C \leq T_j \leq +150^\circ C$

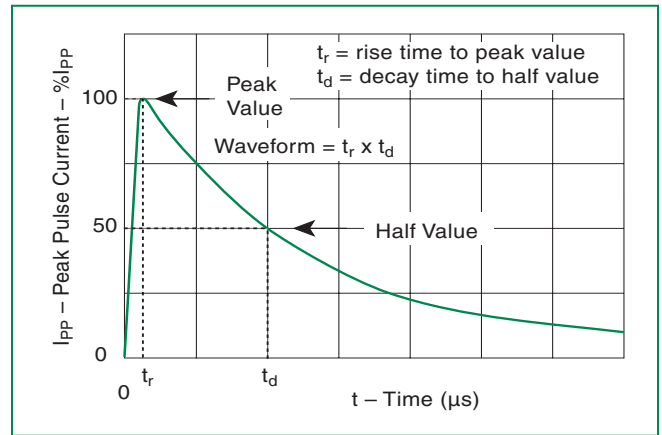
**Thermal Considerations**

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

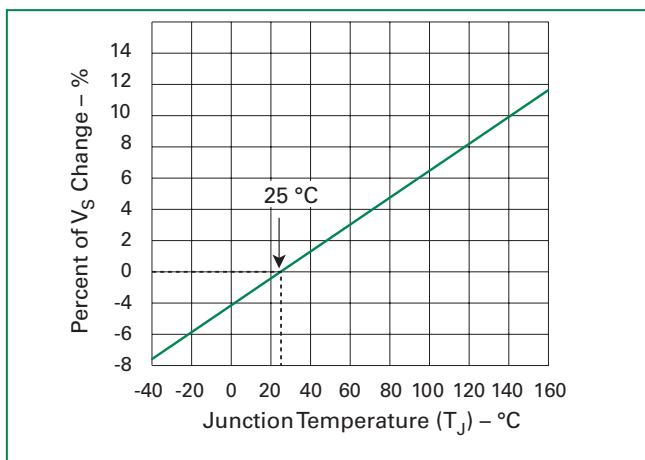
**V-I Characteristics**



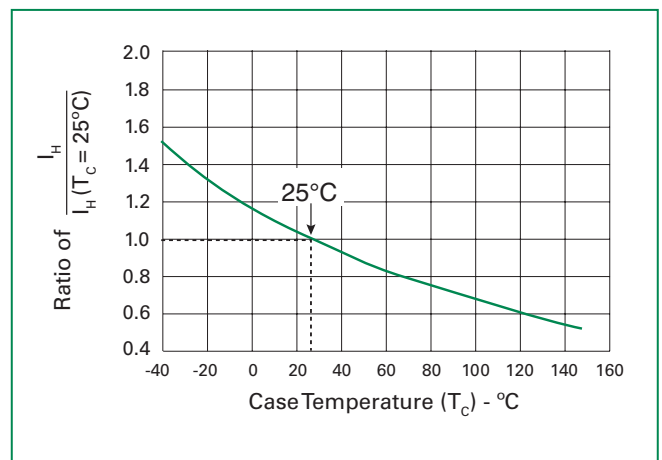
**$t_r \times t_d$  Pulse Waveform**



**Normalized  $V_S$  Change vs. Junction Temperature**

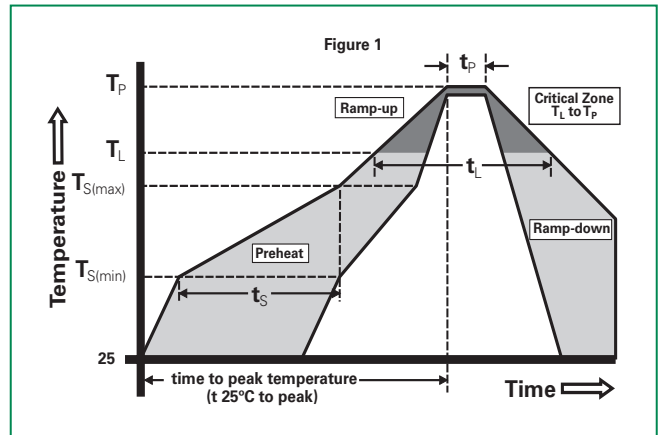


**Normalized DC Holding Current vs. Case Temperature**



**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 (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 ( $t_t$ )	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	



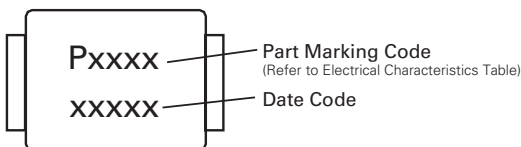
**Physical Specifications**

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

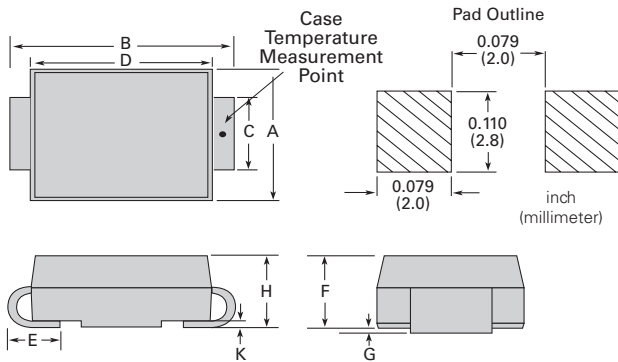
**Environmental Specifications**

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 Marking**

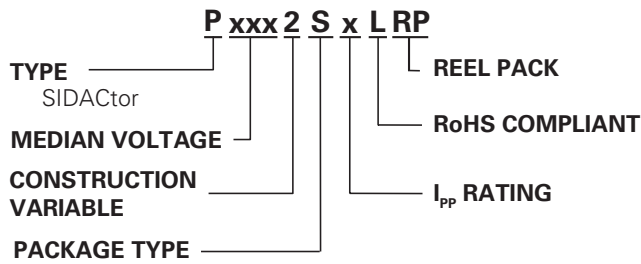


**Dimensions — DO-214AA**



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

**Part Numbering**



**Packing Options**

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

**Tape and Reel Specification — DO-214AA**

