

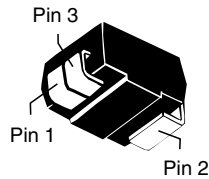
**Pxxx1Cx2L Series - Fixed Voltage TwinSLIC™ in Modified DO-214AA**



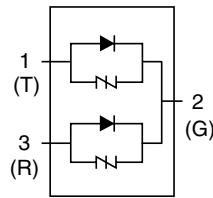
**Agency Approvals**

| Agency | Agency File Number |
|--------|--------------------|
|        | E133083            |

**Pinout Designation**



**Schematic Symbol**



**Description**

This fixed voltage, unidirectional, modified DO-214 SIDACtor thyristor series is designed to protect SLICs (Subscriber Line Interface Circuit) from damaging overvoltage transients.

These components provide single port protection implementing voltage switching characteristics for negative polarity surges and a clamping diode for positive polarity surges.

**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
- Integrated diodes for
- positive voltage surges
- Single-port protection
- 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-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
- Lightning, 150A (8/20 as defined in IEC 61000-4-5 2<sup>nd</sup> edition)
- YD/T 1082
- YD/T 993
- YD/T 950

\* Series resistance required

**Additional Information**



**Datasheet**



**Resources**



**Samples**

### Electrical Characteristics

| Part Number | Marking | $V_{DRM}$<br>@ $I_{DRM} = 5\mu A$ | $V_S$<br>@ $100V/\mu s$ | $I_H$  | $I_S$  | $I_T$ | $V_T$<br>@ $I_T = 2.2$ Amps | $V_F$ | Capacitance                        |
|-------------|---------|-----------------------------------|-------------------------|--------|--------|-------|-----------------------------|-------|------------------------------------|
|             |         | V min                             | V max                   | mA min | mA max | A max | V max                       | V max |                                    |
|             |         | Pin 1-2, 3-2                      |                         |        |        |       |                             |       |                                    |
| P0641CA2LRP | P62A    | 58                                | 77                      | 120    | 800    | 2.2   | 4                           | 5     | See<br>Capacitance<br>Values table |
| P0721CA2LRP | P72A    | 65                                | 88                      | 120    | 800    | 2.2   | 4                           | 5     |                                    |
| P0901CA2LRP | P92A    | 75                                | 98                      | 120    | 800    | 2.2   | 4                           | 5     |                                    |
| P1101CA2LRP | P02A    | 95                                | 130                     | 120    | 800    | 2.2   | 4                           | 5     |                                    |
| P1301CA2LRP | P131A   | 120                               | 160                     | 120    | 800    | 2.2   | 4                           | 5     |                                    |
| P1501CA2LRP | P151A   | 140                               | 185                     | 120    | 800    | 2.2   | 4                           | 5     |                                    |
| P1701CA2LRP | P17A    | 160                               | 200                     | 120    | 800    | 2.2   | 4                           | 5     |                                    |
| P0641CB2LRP | P62B    | 58                                | 77                      | 120    | 800    | 2.2   | 4                           | 5     |                                    |
| P0721CB2LRP | P72B    | 65                                | 88                      | 120    | 800    | 2.2   | 4                           | 5     |                                    |
| P0901CB2LRP | P92B    | 75                                | 98                      | 120    | 800    | 2.2   | 4                           | 5     |                                    |
| P1101CB2LRP | P02B    | 95                                | 130                     | 120    | 800    | 2.2   | 4                           | 5     |                                    |
| P1301CB2LRP | P131B   | 120                               | 160                     | 120    | 800    | 2.2   | 4                           | 5     |                                    |
| P1501CB2LRP | P151B   | 140                               | 185                     | 120    | 800    | 2.2   | 4                           | 5     |                                    |
| P1701CB2LRP | P17B    | 160                               | 200                     | 120    | 800    | 2.2   | 4                           | 5     |                                    |

Notes:  
 - Absolute maximum ratings measured at  $T_A = 25^\circ C$  (unless otherwise noted).  
 - Components are not appropriate for positive ringing systems.

### Capacitance Values

| Part Number | pF<br>Pin 1-2 / 3-2<br>Tip-Ground, Ring-Ground |     | pF<br>Pin 1-3<br>Tip-Ring |     |
|-------------|--|-----|---------------------------|-----|
|             | MIN  | MAX | MIN                       | MAX |
|             | P0641CA2LRP                                    | 40  | 70                        | 20  |
| P0721CA2LRP | 35   | 70  | 20                        | 45  |
| P0901CA2LRP | 30   | 65  | 20                        | 40  |
| P1101CA2LRP | 25   | 55  | 15                        | 35  |
| P1301CA2LRP | 25   | 45  | 15                        | 30  |
| P1701CA2LRP | 25   | 40  | 15                        | 25  |
| P1501CA2LRP | 25   | 45  | 15                        | 30  |
| P0641CB2LRP | 40   | 70  | 20                        | 45  |
| P0721CB2LRP | 35   | 70  | 20                        | 45  |
| P0901CB2LRP | 30   | 65  | 20                        | 40  |
| P1101CB2LRP | 25   | 55  | 15                        | 35  |
| P1301CB2LRP | 25   | 45  | 15                        | 30  |
| P1501CB2LRP | 25   | 45  | 15                        | 30  |
| P1701CB2LRP | 25   | 40  | 15                        | 25  |

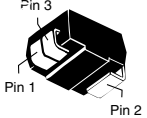
Note: Off-state capacitance ( $C_o$ ) is measured at 1 MHz with a 2 V bias.

**Surge Ratings**

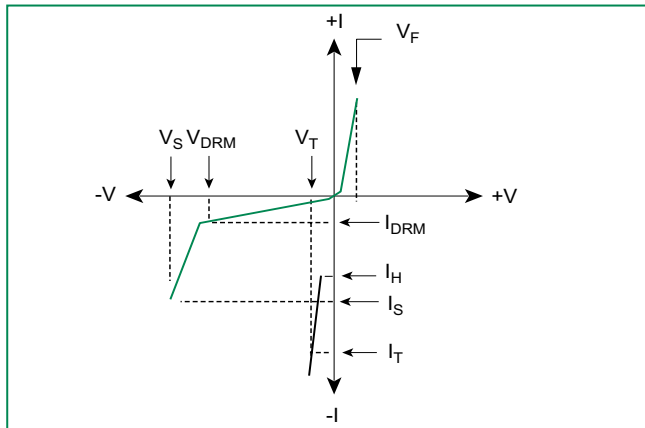
| Series | $I_{PP}$             |                   |                     |                     |                     |                    |                     |                      |                     | $I_{TSM}$ | di/dt    |
|--------|----------------------|-------------------|---------------------|---------------------|---------------------|--------------------|---------------------|----------------------|---------------------|-----------|----------|
|        | 0.2/310 <sup>1</sup> | 2/10 <sup>1</sup> | 8/20 <sup>1</sup>   | 10/160 <sup>1</sup> | 10/560 <sup>1</sup> | 5/320 <sup>1</sup> | 10/360 <sup>1</sup> | 10/1000 <sup>1</sup> | 5/310 <sup>1</sup>  |           |          |
|        | 0.5/700 <sup>2</sup> | 2/10 <sup>2</sup> | 1.2/50 <sup>2</sup> | 10/160 <sup>2</sup> | 10/560 <sup>2</sup> | 9/720 <sup>2</sup> | 10/360 <sup>2</sup> | 10/1000 <sup>2</sup> | 10/700 <sup>2</sup> |           |          |
|        | 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                  | 20        | 500      |
| B      | 25                   | 250               | 250                 | 150                 | 100                 | 100                | 125                 | 80                   | 100                 | 30        | 500      |

Notes:  
 - Peak pulse current rating ( $I_{pp}$ ) is repetitive and guaranteed for the life of the product that remains in thermal equilibrium.  
 1 Current waveform in μs -  $I_{pp}$  ratings applicable over temperature range of -40°C to +85°C  
 2 Voltage waveform in μs - The component must initially be in thermal equilibrium with -40°C ≤  $T_j$  ≤ +150°C

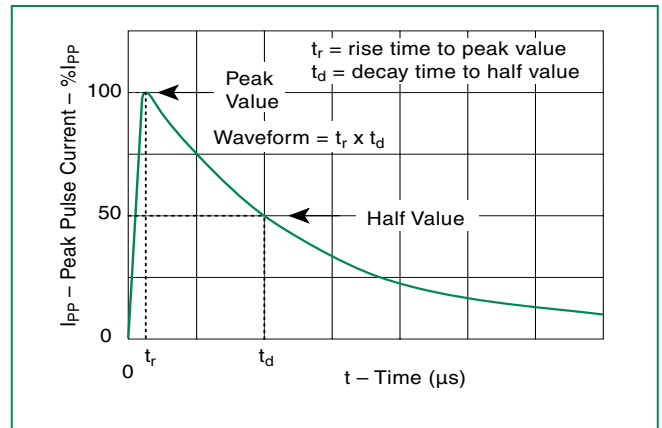
**Thermal Considerations**

| Package   | Symbol    | Parameter                               | Value       | Unit |
|---|-----------|---|-------------|------|
| Modified DO-214AA<br>Pin 3<br><br>Pin 1<br>Pin 2 | $T_J$     | Operating Junction Temperature Range    | -40 to +150 | °C   |
|   | $T_S$     | Storage Temperature Range               | -65 to +150 | °C   |
|   | $R_{θJA}$ | Thermal Resistance: Junction to Ambient | 85          | °C/W |

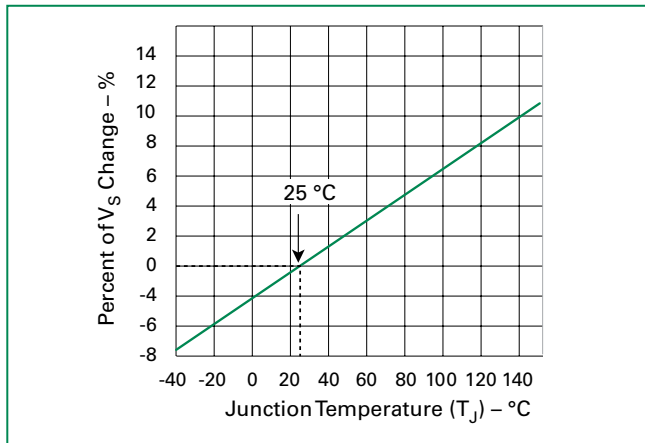
**V-I Characteristics**



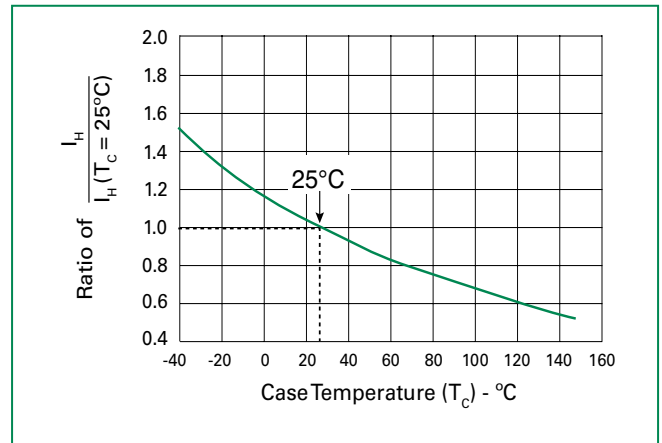
**$t_r \times t_d$  Pulse Waveform**



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

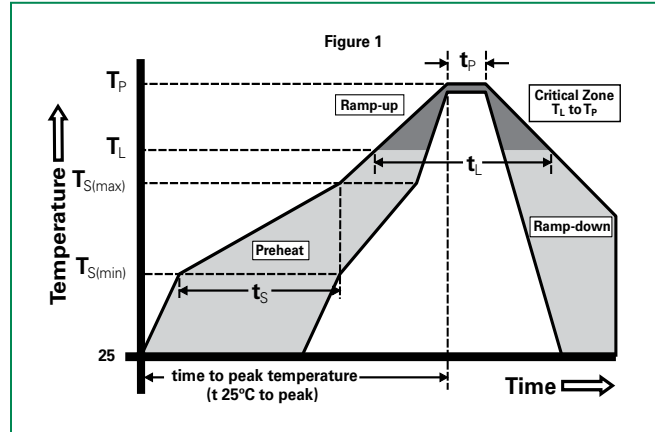


**Normalized DC Holding Current vs. Case Temperature**



**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                        |



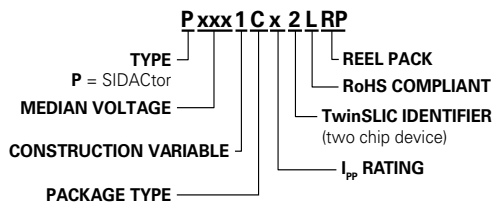
**Physical Specifications**

|                        |   |
|------------------------|---|
| <b>Lead Material</b>   | Copper Alloy  |
| <b>Terminal Finish</b> | 100% Matte-Tin Plated                                   |
| <b>Body Material</b>   | UL Recognized compound meeting flammability rating V-0. |

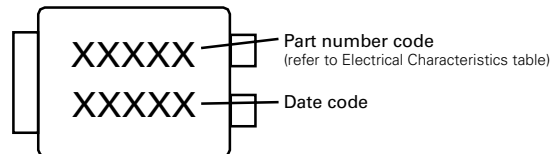
**Environmental Specifications**

|   |   |
|---|---|
| <b>High Temp Voltage Blocking</b>       | 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 |
| <b>Temp Cycling</b>                     | -65°C to +150°C, 15 min. dwell, 10 up to 100 cycles. MIL-STD-750 (Method 1051) EIA/JEDEC, JESD22-A104                 |
| <b>Biased Temp &amp; Humidity</b>       | 52 $V_{DC}$ (+85°C) 85%RH, 504 up to 1008 hrs. EIA/JEDEC, JESD22-A-101  |
| <b>High Temp Storage</b>                | +150°C 1008 hrs. MIL-STD-750 (Method 1031) JEDEC, JESD22-A-101  |
| <b>Low Temp Storage</b>                 | -65°C, 1008 hrs.  |
| <b>Thermal Shock</b>                    | 0°C to +100°C, 5 min. dwell, 10 sec. transfer, 10 cycles. MIL-STD-750 (Method 1056) JEDEC, JESD22-A-106               |
| <b>Autoclave (Pressure Cooker Test)</b> | +121°C, 100%RH, 2atm, 24 up to 168 hrs. EIA/JEDEC, JESD22-A-102   |
| <b>Resistance to Solder Heat</b>        | +260°C, 30 secs. MIL-STD-750 (Method 2031)  |
| <b>Moisture Sensitivity Level</b>       | 85%RH, +85°C, 168 hrs., 3 reflow cycles (+260°C peak). JEDEC-J-STD-020, Level 1                                       |

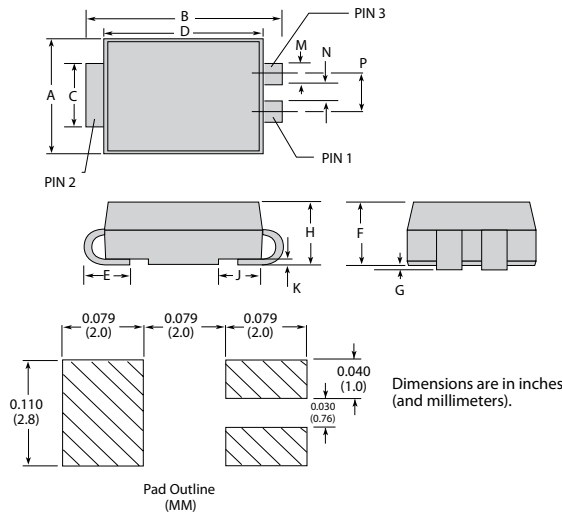
**Part Numbering**



**Part Marking**



**Dimensions — Modified DO-214AA**

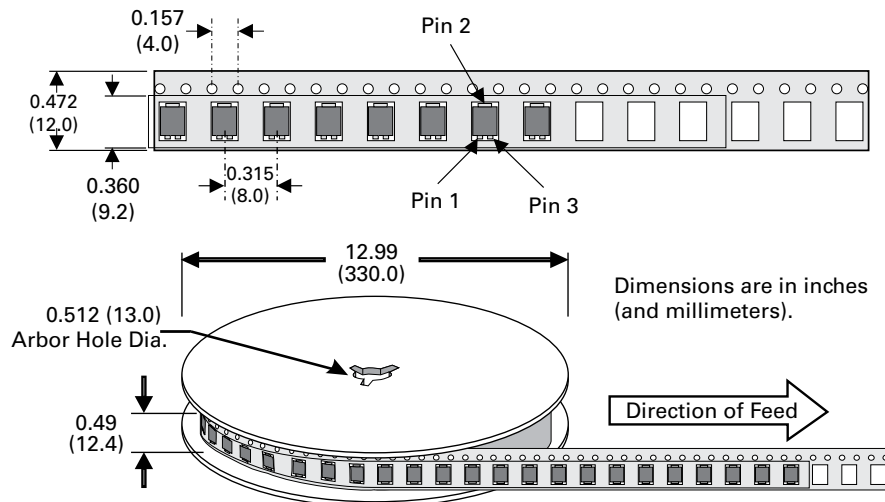


| Dimensions | Inches |       | Millimeters |      |
|------------|--------|-------|-------------|------|
|            | Min    | Max   | Min         | Max  |
| <b>A</b>   | 0.130  | 0.156 | 3.30        | 3.95 |
| <b>B</b>   | 0.201  | 0.220 | 5.10        | 5.60 |
| <b>C</b>   | 0.077  | 0.087 | 1.95        | 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 |
| <b>M</b>   | 0.022  | 0.028 | 0.56        | 0.71 |
| <b>N</b>   | 0.027  | 0.033 | 0.69        | 0.84 |
| <b>P</b>   | 0.052  | 0.058 | 1.32        | 1.47 |

**Packing Options**

| Package Type | Description                                   | Quantity | Added Suffix | Industry Standard |
|--------------|---|----------|--------------|-------------------|
| C            | Modified DO-214AA 3-leaded Tape and Reel Pack | 2500     | RP           | EIA-481-D         |

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



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