

**RoHS T10A Series - DO-15**



**Agency Approvals**

| Agency | Agency File Number |
|--------|--------------------|
|        | E128662            |

**Pinout Designation**

Not Applicable

**Schematic Symbol**



**Description**

T10A Series are SIDACTor® devices designed protect baseband equipment such as modems, line cards, CPE and DSL from damaging overvoltage transients.

The series provides a cost effective through-hole solution that enables equipment to comply with global regulatory standards.

**Features and Benefits**

- Low voltage overshoot
- Low on-state voltage
- Does not degrade with use
- Fails short circuit when surged in excess of ratings
- Low Capacitance

**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  | $V_{DRM}$<br>@ $I_{DRM}=5\mu A$ | $V_S$<br>@ 100V/ $\mu s$ | $I_H$  | $I_S$  | $I_T$ | $V_T$<br>@ $I_T=2.2$ Amp | Capacitance<br>@ 1MHz, 2V Bias |
|-------------|----------|---------------------------------|--------------------------|--------|--------|-------|--------------------------|--------------------------------|
|             |          | V Min                           | V Max                    | mA Min | mA Max | A Max | V Max                    | pF Typ                         |
| T10A060Bxx  | T10A060B | 50                              | 84                       | 120    | 800    | 2.2   | 4                        | 50                             |
| T10A060Exx  | T10A060E | 50                              | 84                       | 180    | 800    | 2.2   | 4                        | 50                             |
| T10A062xx   | T10A062  | 56                              | 86                       | 150    | 800    | 2.2   | 4                        | 50                             |
| T10A068xx   | T10A068  | 61                              | 94                       | 150    | 800    | 2.2   | 4                        | 50                             |
| T10A080Bxx  | T10A080B | 70                              | 125                      | 120    | 800    | 2.2   | 4                        | 43                             |
| T10A080Exx  | T10A080E | 70                              | 125                      | 180    | 800    | 2.2   | 4                        | 43                             |
| T10A100xx   | T10A100  | 90                              | 140                      | 150    | 800    | 2.2   | 4                        | 43                             |
| T10A110Bxx  | T10A110B | 100                             | 142                      | 120    | 800    | 2.2   | 4                        | 38                             |
| T10A110Exx  | T10A110E | 100                             | 142                      | 180    | 800    | 2.2   | 4                        | 38                             |
| T10A120xx   | T10A120  | 108                             | 168                      | 150    | 800    | 2.2   | 4                        | 38                             |
| T10A130xx   | T10A130  | 117                             | 178                      | 150    | 800    | 2.2   | 4                        | 38                             |
| T10A140Bxx  | T10A140B | 120                             | 178                      | 120    | 800    | 2.2   | 4                        | 34                             |
| T10A140Exx  | T10A140E | 120                             | 178                      | 180    | 800    | 2.2   | 4                        | 34                             |
| T10A180xx   | T10A180  | 170                             | 220                      | 150    | 800    | 2.2   | 4                        | 34                             |
| T10A180Bxx  | T10A180B | 170                             | 220                      | 120    | 800    | 2.2   | 4                        | 32                             |
| T10A180Exx  | T10A180E | 170                             | 220                      | 180    | 800    | 2.2   | 4                        | 32                             |
| T10A200xx   | T10A200  | 180                             | 275                      | 150    | 800    | 2.2   | 4                        | 30                             |
| T10A220xx   | T10A220  | 200                             | 275                      | 150    | 800    | 2.2   | 4                        | 30                             |

Table continues on next page.

### Electrical Characteristics (continued)

| 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>@ $I_T=2.2$ Amp | Capacitance<br>@ 1MHz, 2V Bias |
|-------------|----------|---------------------------------|-------------------------|--------|--------|-------|--------------------------|--------------------------------|
|             |          | V Min                           | V Max                   | mA Min | mA Max | A Max | V Max                    | pF Typ                         |
| T10A220Bxx  | T10A220B | 200                             | 275                     | 120    | 800    | 2.2   | 4                        | 30                             |
| T10A220Exx  | T10A220E | 200                             | 275                     | 180    | 800    | 2.2   | 4                        | 30                             |
| T10A240xx   | T10A240  | 216                             | 330                     | 150    | 800    | 2.2   | 4                        | 30                             |
| T10A270xx   | T10A270  | 245                             | 370                     | 150    | 800    | 2.2   | 4                        | 30                             |
| T10A270Bxx  | T10A270B | 245                             | 370                     | 120    | 800    | 2.2   | 4                        | 30                             |
| T10A270Exx  | T10A270E | 245                             | 370                     | 180    | 800    | 2.2   | 4                        | 30                             |

Notes:

- Absolute maximum ratings measured at  $T_A = 25^\circ C$  (unless otherwise noted).
- Devices are bi-directional (unless otherwise noted).
- **XX** Part Number Suffix: "**RP**" (Reel Pack) or **Blank** (Bulk Pack)

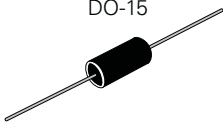
### Surge Ratings

| Series | $I_{PP}$                                 |                                           |                                              | $I_{TSM}$<br>50/60 Hz | di/dt |
|--------|------------------------------------------|-------------------------------------------|----------------------------------------------|-----------------------|-------|
|        | 8x20 <sup>1</sup><br>1.2x50 <sup>2</sup> | 5x310 <sup>1</sup><br>10x700 <sup>2</sup> | 10x1000 <sup>1</sup><br>10x1000 <sup>2</sup> |                       |       |
|        | A min                                    | A min                                     | A min                                        |                       |       |
| A      | 100                                      | 37.5                                      | 50                                           | 20                    | 100   |

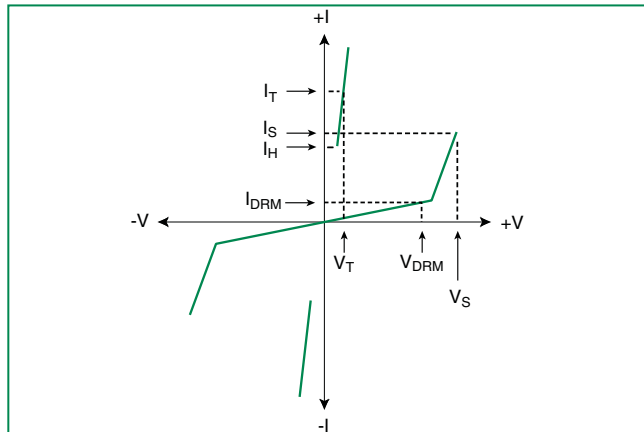
Notes:

- 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  $-40^\circ C \leq T_J \leq +150^\circ C$

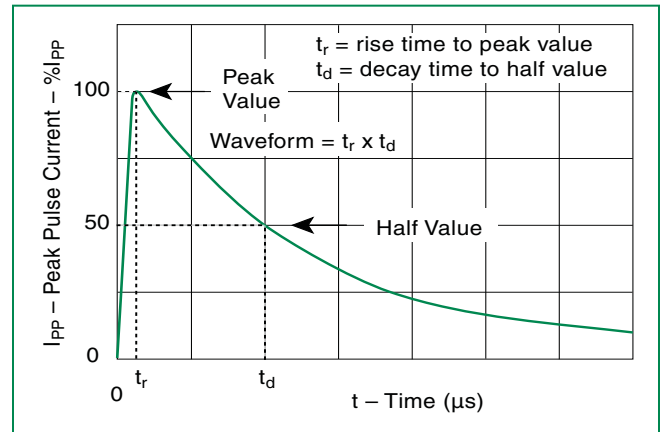
### Thermal Considerations

| Package                                                                                      | Symbol          | Parameter                               | Value       | Unit         |
|----------------------------------------------------------------------------------------------|-----------------|-----------------------------------------|-------------|--------------|
| <br>DO-15 | $T_J$           | 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 | 120         | $^\circ C/W$ |

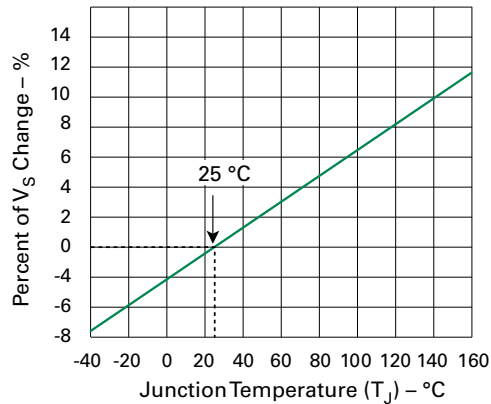
### V-I Characteristics



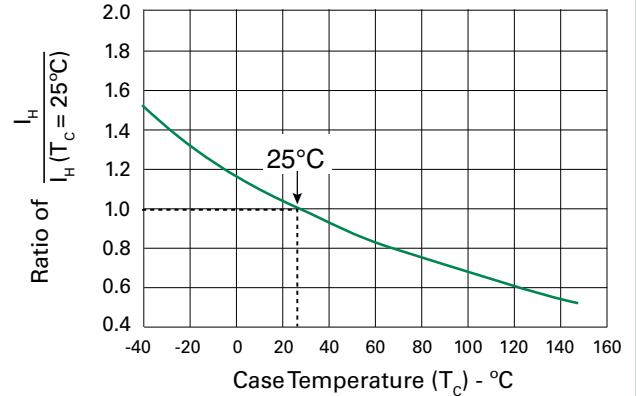
### $t_r \times t_d$ Pulse Waveform



### Normalized $V_s$ Change vs. Junction Temperature

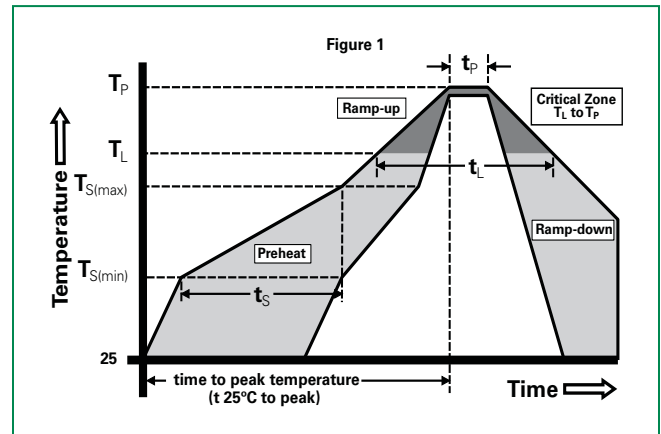


### Normalized DC Holding Current vs. Case Temperature



### 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) ( $t_p$ )      | 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-A-104                  |
| 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

**T10A xxx x xx**

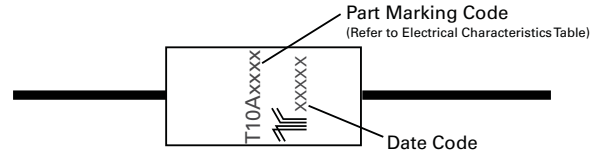
**TYPE**  
T10A = SIDACtor T10A series

**MEDIAN VOLTAGE**

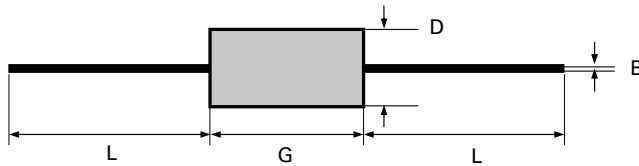
**PACKING OPTIONS**  
Blank: Bulk  
RP: Reel Pack

**HOLDING CURRENT:**  
Blank: 150mA  
B: 120mA  
E: 180mA

## Part Marking



## Dimensions — DO-15

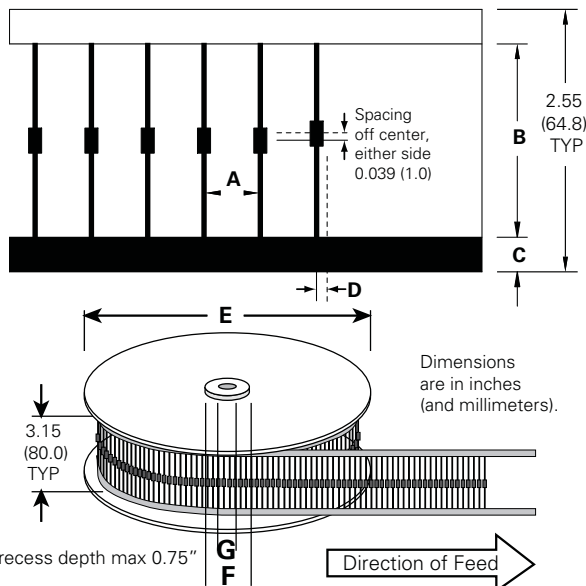


| Dimension | Inches |       | Millimeters |       |
|-----------|--------|-------|-------------|-------|
|           | MIN    | MAX   | MIN         | MAX   |
| <b>B</b>  | 0.028  | 0.034 | 0.711       | 0.864 |
| <b>D</b>  | 0.12   | 0.14  | 3.048       | 3.556 |
| <b>G</b>  | 0.235  | 0.27  | 5.969       | 6.858 |
| <b>L</b>  | 1      |       | 25.4        |       |

## Packing Options

| Package Type | Description              | Packaging Quantity | Added Suffix | Industry Standard |
|--------------|--------------------------|--------------------|--------------|-------------------|
| T10A         | DO-15 Tape and Reel Pack | 1000               | RP           | EIA-RS-296-D      |
|              | DO-15 Bulk Pack          | 500                | N/A          | N/A               |

## Tape and Reel Specification — DO-15



| Symbols  | Description                      | Inches         | MM            |
|----------|----------------------------------|----------------|---------------|
| <b>A</b> | Component Spacing (lead to lead) | 0.200 ± 0.020" | 5.08 ± 0.508  |
| <b>B</b> | Inner Tape Pitch                 | 2.062 ± 0.059" | 52.37 ± 1.498 |
| <b>C</b> | Tape Width                       | 0.250"         | 6.35          |
| <b>D</b> | Max. Off Alignment               | 0.048"         | 1.219         |
| <b>E</b> | Reel Dimension                   | 13"            | 330.2         |
| <b>F</b> | Max. Hub Recess                  | 3"             | 76.19         |
| <b>G</b> | Max. Abor Hole                   | 0.68"          | 17.27         |