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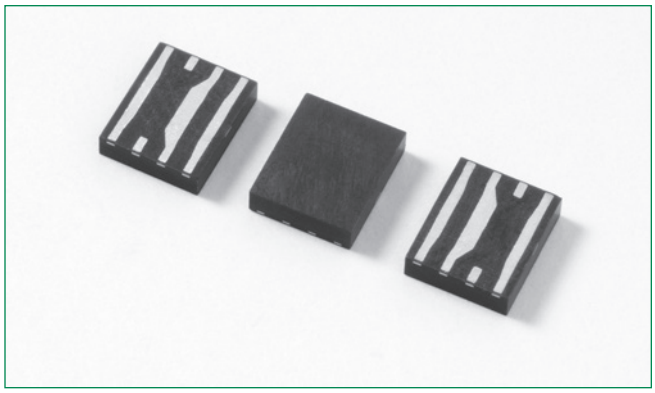
# SIDACtor® Protection Thyristors
## Broadband Optimized™ Protection

## SDPXXX0Q38CX -SDP Biased Series - 5x6 QFN for DSL Protection



## Description

This new SDP (SIDACtor DSL Protector) Biased series provides overvoltage protection for applications such as VDSL2, ADSL2, and ADSL2+ with minimal effect on data signals. This latest silicon design innovation results in a capacitive loading characteristic that is compatible with these high bandwidth applications. This surface mount QFN package provides a surge capability that exceeds most worldwide standards and recommendations for lightning surge withstand capability of secondary protectors.

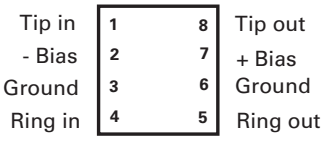
## Features & Benefits

- Compatible with VDSL2 (30MHz)
- Balanced overvoltage protection
- Low distortion
- Low insertion loss
- Low profile
- SO-8 footprint compatible
- Fails short circuit when surged in excess of ratings
- 2nd level interconnect is Pb-free per IPC/JEDEC J-STD-609A.01
- Recognized to UL 497B as an Isolated Loop Circuit Protector
- Halogen-free and RoHS compliant

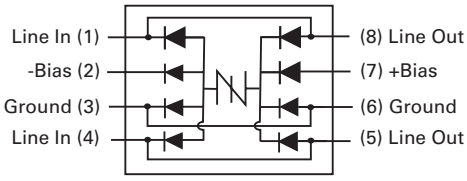
## Agency Approvals

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

## Pinout Designation




## Schematic Symbol




## Applicable Global Standards

- TIA-968-A
- TIA-968-B
- ITU K.20/21 Enhanced Level
- ITU K.20/21 Basic Level
- IEC 61000-4-5, 2nd Edition
- GR 1089 Inter-building
- GR 1089 Intra-building
- YD/T 1082
- YD/T 993
- YD/T 950

## Electrical Characteristics

| Part Number | Marking | $V_{DRM}$@$I_{DRM}$=5µA | $V_S$@100V/µs | $I_H$ | $I_S$ | $I_T$ | $V_T$@$I_T$=2.2 Amps | Capacitance |
|---|---|---|---|---|---|---|---|---|
| | | V min | V max | mA min | mA max | A max | V max | |
| SDP0080Q38CB | SDP-8C | 6 | 25 | 50 | 800 | 2.2 | 8 | See Capacitance vs Voltage Chart |
| SDP0220Q38CB | SDP02C | 16 | 30 | 50 | 800 | 2.2 | 8 | |
| SDP0640Q38CB | SDP06C | 58 | 77 | 150 | 800 | 2.2 | 8 | |
| SDP0720Q38CB | SDP07C | 65 | 88 | 150 | 800 | 2.2 | 8 | |
| SDP0900Q38CB | SDP09C | 75 | 98 | 150 | 800 | 2.2 | 8 | |
| SDP1100Q38CB | SDP11C | 90 | 130 | 150 | 800 | 2.2 | 8 | |
| SDP1300Q38CB | SDP13C | 120 | 160 | 150 | 800 | 2.2 | 8 | |
| SDP1800Q38CB | SDP18C | 170 | 220 | 150 | 800 | 2.2 | 8 | |
| SDP2600Q38CB | SDP26C | 220 | 300 | 150 | 800 | 2.2 | 8 | |
| SDP3100Q38CB | SDP31C | 275 | 350 | 150 | 800 | 2.2 | 8 | |
| SDP3500Q38CB | SDP35C | 320 | 400 | 150 | 800 | 2.2 | 8 | |

**Notes:**
- Absolute maximum ratings measured at $T_A$= 25°C (unless otherwise noted).
- Devices are bi-directional (unless otherwise noted).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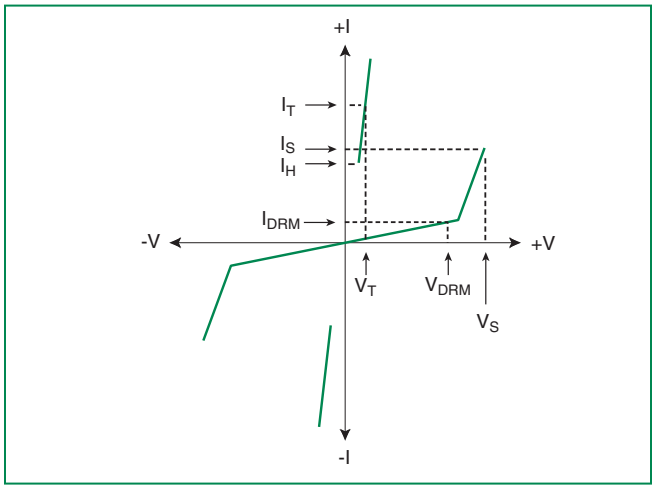
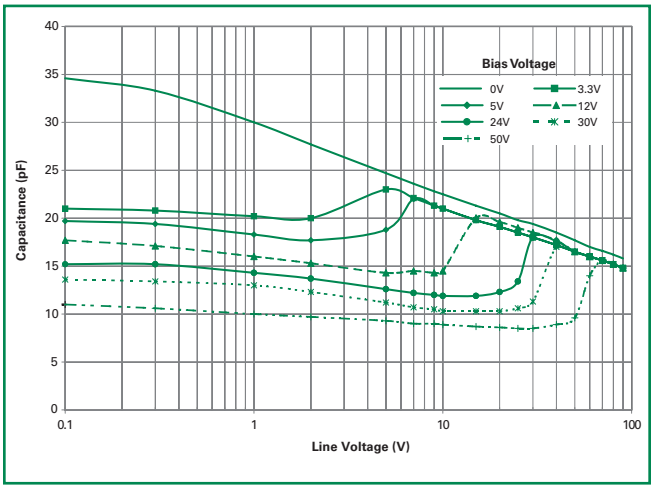
## V-I: Characteristics




## Capacitance vs. Voltage*




* Bias voltage must be lower than $V_{DRM}$

## 50/60Hz Ratings

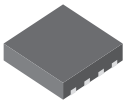
| Parameter Name | Test Conditions | Value | Units |
|---|---|---|---|
| $I_{TSM}$ Maximum non-reptitive on-state current, 50/60Hz | 0.5s | 6.5 | A |
| | 1s | 4.6 | |
| | 2s | 3.4 | |
| | 5s | 2.3 | |
| | 30s | 1.3 | |
| | 900s | 0.73 | |

## Surge Ratings

| Series | $I_{PP}$ | | | | $I_{TSM}$ |
|---|---|---|---|---|---|
| | 2x10µs | 1.2x50µs/8x20µs | 10x700/5x310µs | 10x1000µs | 600$V_{RMS}$ 1 cycle |
| | A min | A min | A min | A min | $A_{RMS}$ |
| C | 500 | 400 | 200 | 100 | 30 |

**Notes:**
- Peak pulse current rating ($I_{PP}$) is repetitive and guaranteed for the life of the product.
- $I_{PP}$ ratings applicable over temperature range of -40ºC to +85ºC
- The device must initially be in thermal equilibrium with -40°C ≤ $T_J$ ≤ +150°C

## Thermal Considerations

| Package | Symbol | Parameter | Value | Unit |
|---|---|---|---|---|
|  5x6 QFN | $T_J$ | Junction Temperature | -40 to +150 | °C |
| | $T_{STG}$ | Storage Temperature Range | -40 to +150 | °C |
| | $R_{\theta JA}$ | Thermal Resistance: Junction to Ambient | 100 | °C/W |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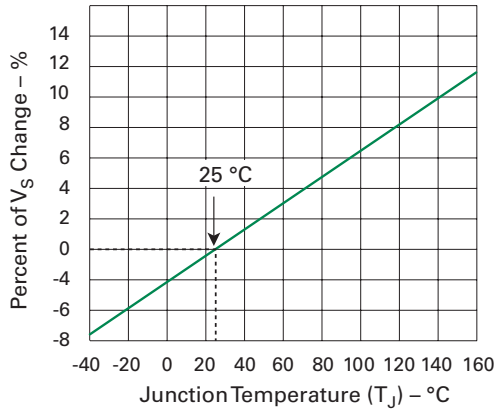
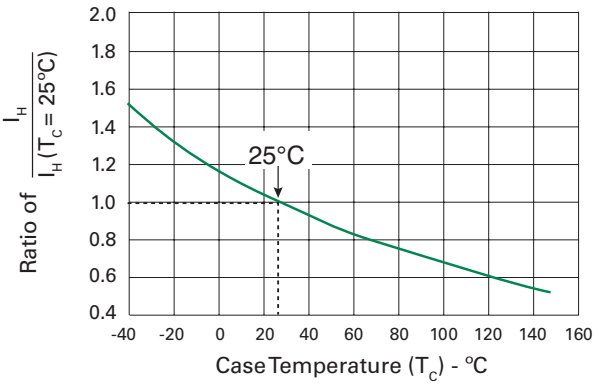
### Normalized $V_S$ Change vs. Junction Temperature



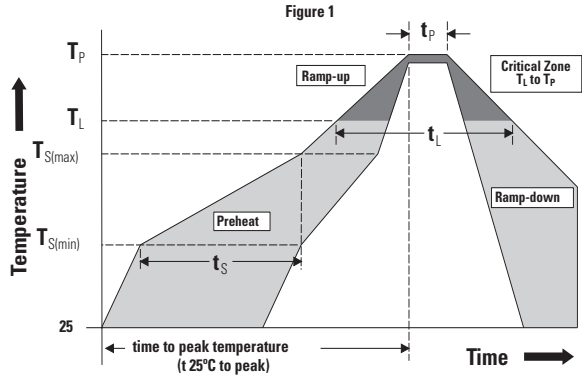

### Normalized DC Holding Current vs. Case Temperature




### 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 |

Figure 1




### 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 |
| **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 |

### Additional Information

Datasheet | Resources | Samples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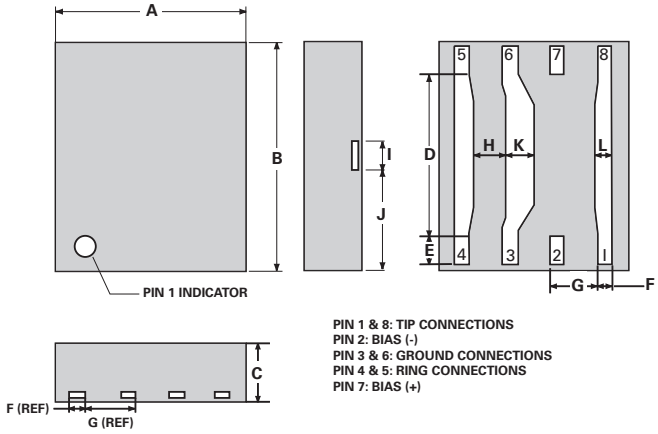
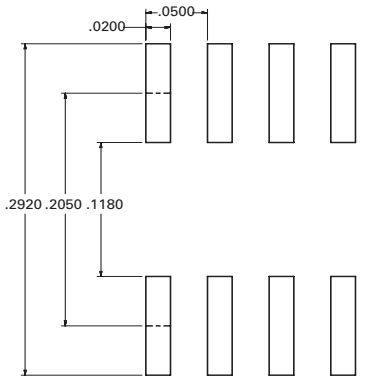
## Dimensions — 5x6 QFN

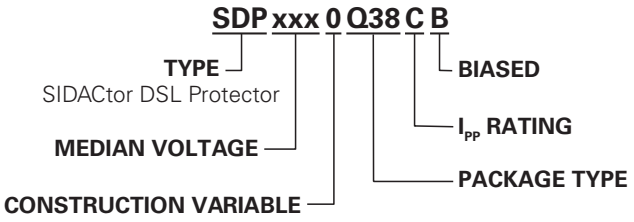



| Dimension | Inches | | Millimeters | |
|---|---|---|---|---|
| | Min | Max | Min | Max |
| A | 0.187 | 0.207 | 4.745 | 5.253 |
| B | 0.226 | 0.246 | 5.745 | 6.253 |
| C | 0.054 | 0.064 | 1.374 | 1.628 |
| D | 0.165 | 0.171 | 4.199 | 4.351 |
| E | 0.027 | 0.033 | 0.686 | 0.838 |
| F | 0.011 | 0.017 | 0.279 | 0.432 |
| G | 0.047 | 0.053 | 1.194 | 1.346 |
| H | 0.032 | 0.038 | 0.800 | 0.953 |
| I | 0.027 | 0.033 | 0.686 | 0.838 |
| J | 0.100 | 0.106 | 2.540 | 2.692 |
| K | 0.027 | 0.033 | 0.686 | 0.838 |
| L | 0.015 | 0.021 | 0.381 | 0.533 |

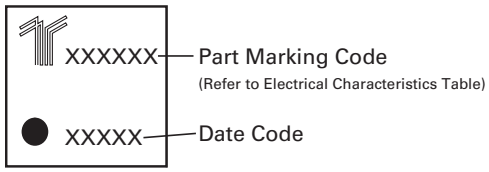
**5x6 QFN Solder Pad Layout**




## Part Numbering




## Part Marking




## Packing Options

| Package Type | Description | Quantity | Added Suffix | Industry Standard |
|---|---|---|---|---|
| Q38 | 5x6x1.5 QFN<br>Tape and Reel Pack | 4000 | N/A | EIA-481-D |


Revised: JC.12/28/20