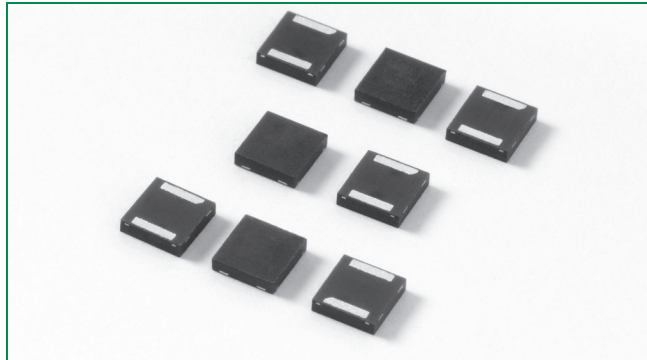


HF **RoHS** **SDP TwinChip™ Series - 3x3 QFN**



Agency Approvals

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

Pinout Designation

Not Applicable

Schematic Symbol



Description

The SDP TwinChip™ Series provides overvoltage protection on the secondary side of the coupling transformer used in xDSL driver circuits. This SDP0242Q12F provides a fast switching, robust, solution that is referenced to neither ground nor power. This prevents the surge events from the being dumped into these rails. The integrated TwinChip™ design reduces any negative solid-state effects on the broadband signals.

Features & Benefits

- Differential protection
- Low insertion loss
- Low capacitance
- Low profile
- Small 3x3mm footprint
- Designed for 16-24 V line drivers
- 80A 8/20µs surge rating

Applicable Global Standards

- TIA-968-A
- ITU K.20/21 Enhanced Level
- ITU K.20/21 Basic Level
- GR 1089 Inter-building
- GR 1089 Intra-building
- IEC 61000-4-5
- 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 | Capacitance @ 1MHz, 2V bias | |
|----------------|---------|---------------------------------|-------------------------|--------|--------|-------|---------------------------|--------------------------------|--------|
| | | V min | V max | mA min | mA max | A max | V max | pF min | pF max |
| SDP0242Q12FLRP | DP24F | 16 | 43 | 30 | 800 | 2.2 | 8 | 10 | 15 |

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


SDP TwinChip Series

Surge Ratings

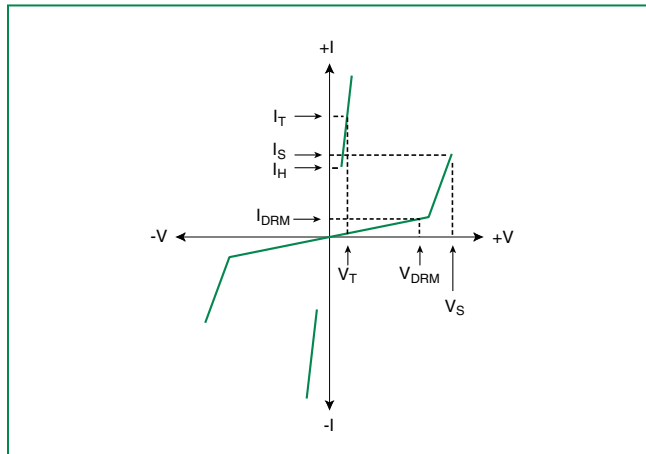
| Series | I_{PP} | | | | I_{TSM} |
|--------|----------|-----------------|----------------|-----------|------------|
| | 2x10µs | 1.2x50µs/8x20µs | 10x700/5x310µs | 10x1000µs | 50 / 60 Hz |
| | A min | A min | A min | A min | A min |
| F | 100 | 80 | 37.5 | 30 | 15 |

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 -40°C to +85°C
 - The device must initially be in thermal equilibrium with -40°C ≤ T_J ≤ +150°C

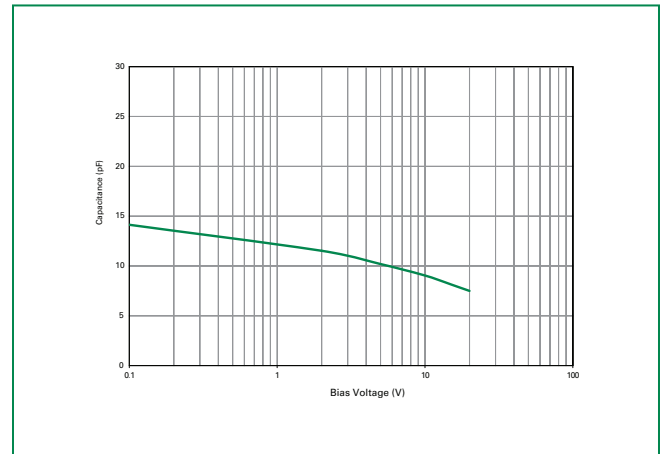
Thermal Considerations

| Package | Symbol | Parameter | Value | Unit |
|--|-----------------|---|-------------|------|
|  3x3 QFN | T_J | Junction Temperature | -40 to +150 | °C |
| | T_{STG} | Storage Temperature Range | -65 to +150 | °C |
| | $R_{\theta JA}$ | Thermal Resistance: Junction to Ambient | 100 | °C/W |

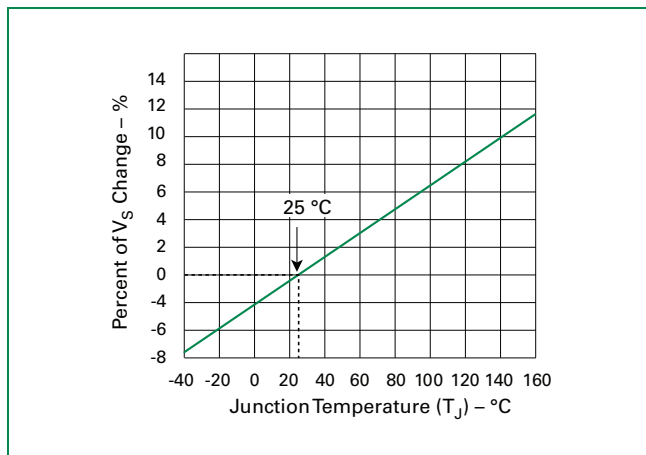
V-I Characteristics



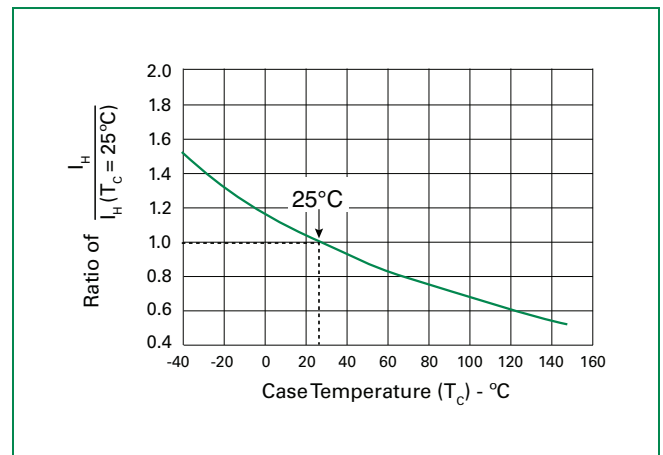
Capacitance and Bias Voltage



Normalized V_S Change vs. Junction Temperature

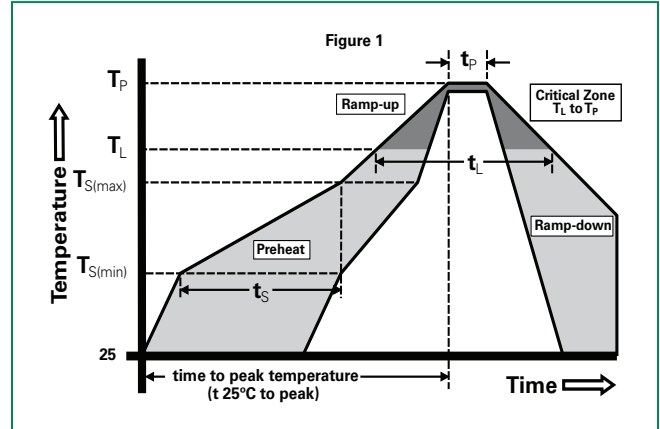


Normalized DC Holding Current vs. Case Temperature



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 (LiquidusTemp (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 PeakTemp (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 |



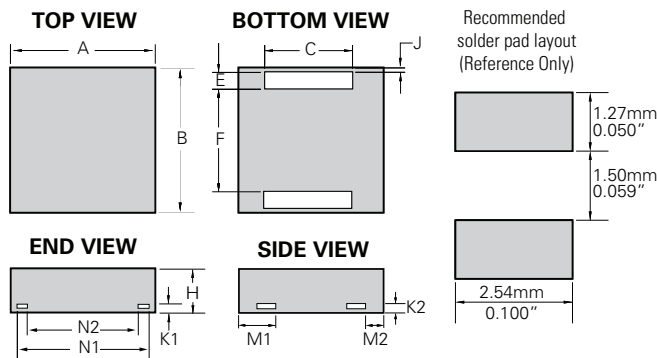
Physical Specifications

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

Environmental Specifications

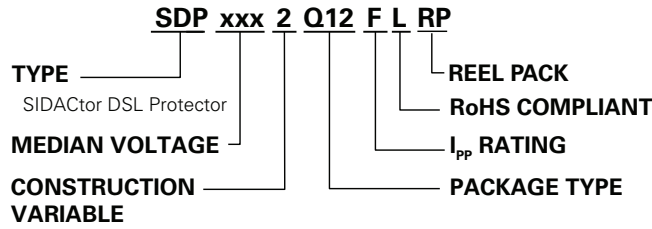
| | |
|-----------------------------------|--|
| High Temp Voltage Blocking | 80% Rated V_{DRM} ($V_{AC Peak}$) +125°C or +150°C, 504 or 1008 hrs. MIL-STD-750 (Method 1040) JEDEC, JESD22-A-101 |
| Temp Cycling | -65°C to +150°C, 15 min. dwell, 10 up to 100 cycles. MIL-STD-750 (Method 1051) EIA/JEDEC, 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 |
| 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 |

Dimensions — 3x3 QFN

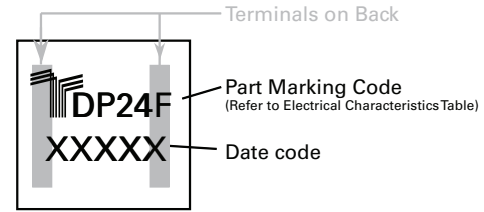


| Dimensions | Inches | | Millimeters | |
|------------|--------|-------|-------------|-------|
| | Min | Max | Min | Max |
| A | 0.116 | 0.120 | 2.950 | 3.050 |
| B | 0.116 | 0.120 | 2.950 | 3.050 |
| C | 0.077 | 0.081 | 1.950 | 2.050 |
| E | 0.013 | 0.017 | 0.335 | 0.435 |
| F | 0.078 | 0.082 | 1.980 | 2.080 |
| H | 0.037 | 0.041 | 0.950 | 1.050 |
| J | 0.002 | 0.006 | 0.050 | 0.150 |
| K1 | 0.006 | 0.001 | 0.150 | 0.250 |
| K2 | 0.006 | 0.001 | 0.150 | 0.250 |
| M1 | 0.028 | 0.031 | 0.700 | 0.800 |
| M2 | 0.013 | 0.017 | 0.330 | 0.430 |
| N1 | 0.097 | 0.101 | 2.470 | 2.570 |
| N2 | 0.084 | 0.088 | 2.130 | 2.230 |

Part Numbering



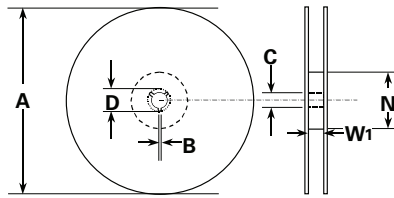
Part Marking



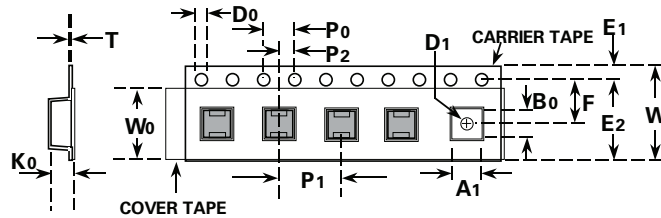
Packing Options

| Package Type | Description | Quantity | Added Suffix | Industry Standard |
|--------------|-----------------------|----------|--------------|-------------------|
| Q12 | 3x3 QFN Tape and Reel | 5000 | RP | EIA-481-D |

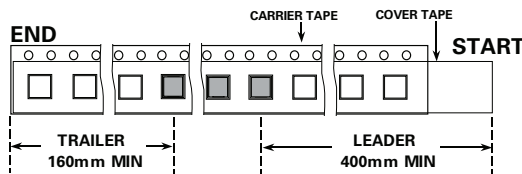
Tape and Reel Specifications — 3x3 QFN



Reel Dimension



Tape Dimension Items



Leader and Trailer dimension of the tape

| Symbols | Description | Inches | | Millimeters | |
|----------------|---|--------|--------|-------------|-------|
| | | Min | Max | Min | Max |
| A | Reel Diameter | N/A | 12.992 | N/A | 330.0 |
| B | Drive Spoke Width | 0.059 | N/A | 1.50 | N/A |
| C | Arbor Hole Diameter | 0.504 | 0.531 | 12.80 | 13.50 |
| D | Drive Spoke Diameter | 0.795 | N/A | 20.20 | N/A |
| N | Hub Diameter | 1.969 | N/A | 50.00 | N/A |
| W ₁ | Reel Inner Width at Hub | 0.488 | 0.567 | 12.40 | 14.40 |
| A ₀ | Pocket Width at Bottom | 0.126 | 0.134 | 3.20 | 3.40 |
| B ₀ | Pocket Length at Bottom | 0.126 | 0.134 | 3.20 | 3.40 |
| D ₀ | Feed Hole Diameter | 0.059 | 0.063 | 1.50 | 1.60 |
| D ₁ | Pocket Hole Diameter | 0.059 | N/A | 1.50 | N/A |
| E ₁ | Feed Hole Position 1 | 0.065 | 0.073 | 1.65 | 1.85 |
| E ₂ | Feed Hole Position 2 | 0.400 | 0.408 | 10.15 | 10.35 |
| F | Feed Hole Center - Pocket Hole Center 2 | 0.215 | 0.219 | 5.45 | 5.55 |
| K ₀ | Pocket Depth | 0.039 | 0.051 | 1.00 | 1.30 |
| P ₀ | Feed Hole Pitch | 0.153 | 0.161 | 3.90 | 4.10 |
| P ₁ | Component Spacing | 0.311 | 0.319 | 7.90 | 8.10 |
| P ₂ | Feed Hole Center - Pocket Hole Center 1 | 0.077 | 0.081 | 1.90 | 2.06 |
| T | Carrier Tape Thickness | 0.010 | 0.014 | 0.25 | 0.35 |
| W | Embossed Carrier Tape Width | 0.453 | 0.484 | 11.50 | 12.30 |
| W ₀ | Cover Tape Width | 0.358 | 0.366 | 9.10 | 9.30 |

SDP TwinChip Series