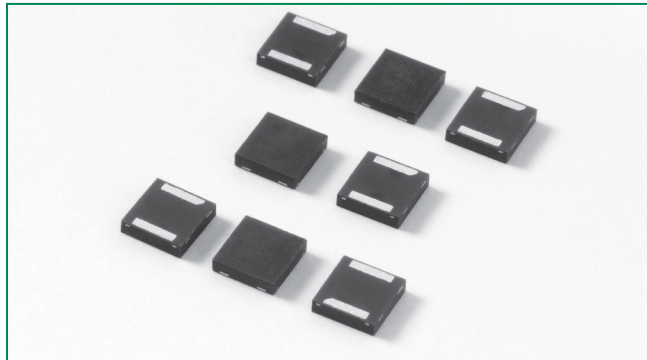


**SDP TwinChip™ Series - 3x3 QFN**



**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
- Low profile
- Small 3x3mm footprint
- Designed for 16-24 V line drivers
- 80A 8/20µs surge rating
- 2nd level interconnect is Pb-free per 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 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/µs	$I_H$	$I_S$	$I_T$	$V_T$ @ $I_T=2.2$ amps	@ 1MHz, 2V bias	
		V min	V max	mA min	mA max	A max	V max	pF min	pF max
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).

**Additional Information**



**Datasheet**



**Resources**



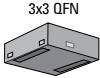
**Samples**

### Surge Ratings

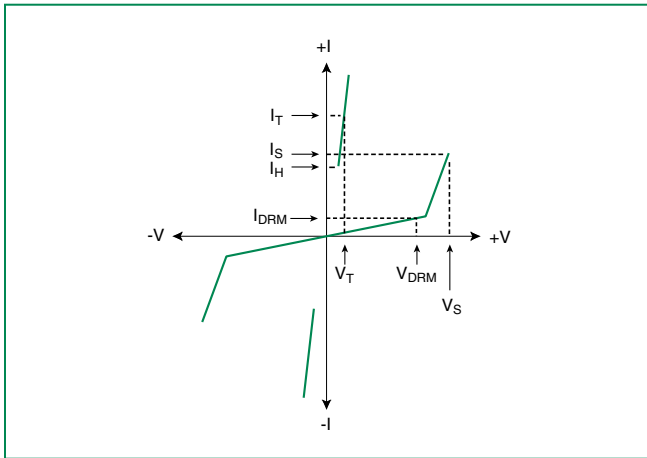
Series	$I_{PP}$				$I_{TSM}$
	2x10 $\mu$ s	1.2x50 $\mu$ s/8x20 $\mu$ s	10x700/5x310 $\mu$ s	10x1000 $\mu$ s	50 / 60 Hz
	A min	A min	A min	A min	A min
F	100	80	37.5	30	15

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  $\leq$   $T_J$   $\leq$  +150°C

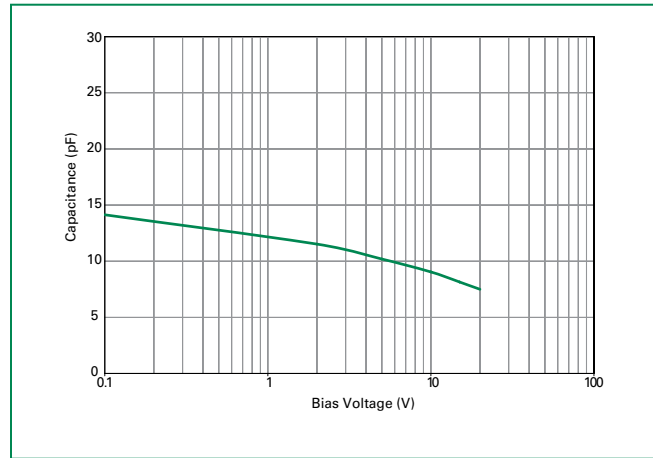
### Thermal Considerations

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

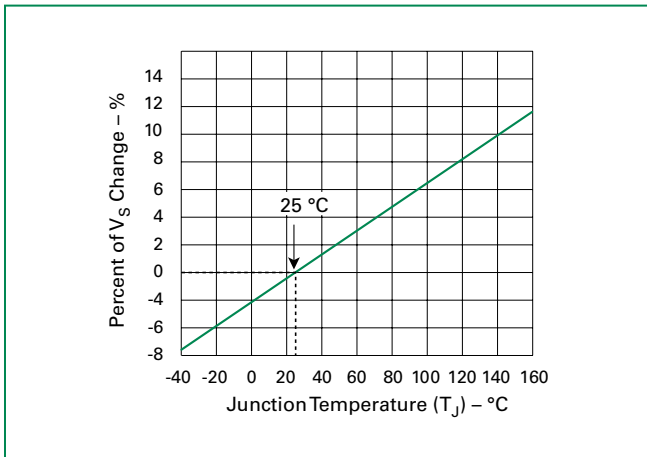
### V-I Characteristics



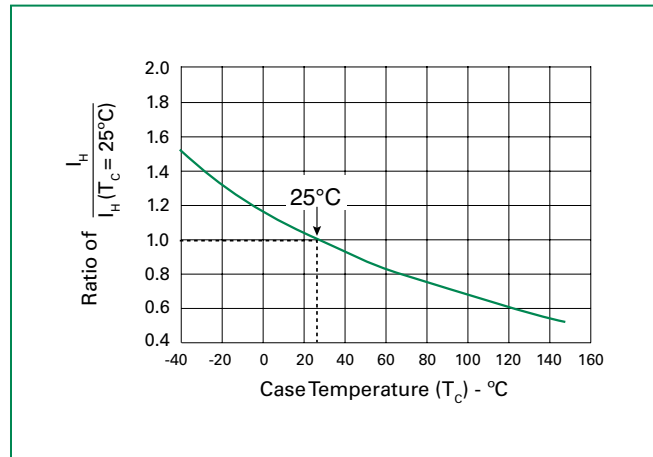
### Capacitance and Bias Voltage



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

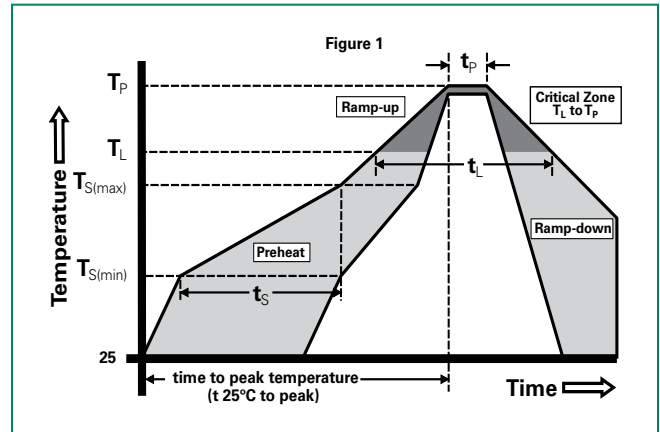


### Normalized DC Holding Current vs. Case Temperature



**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 (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 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



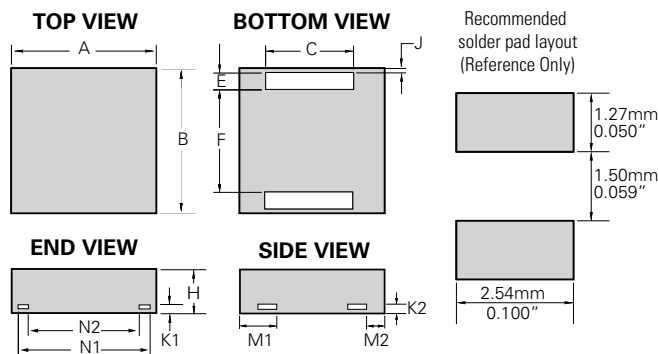
**Physical Specifications**

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

**Environmental Specifications**

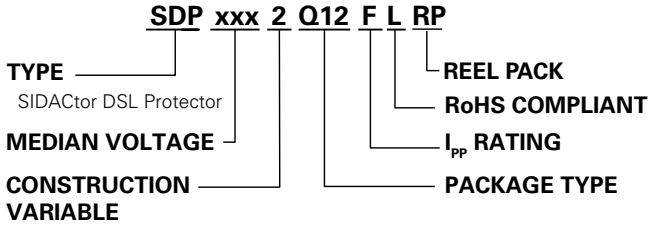
<b>High Temp Voltage Blocking</b>	80% Rated $V_{DRM}$ ( $V_{AC}$ Peak) +125°C or +150°C, 504 or 1008 hrs. MIL-STD-750 (Method 1040) JEDEC, JESD22-A-101
<b>Temp Cycling</b>	-65°C to +150°C, 15 min. dwell, 10 up to 100 cycles. MIL-STD-750 (Method 1051) EIA/JEDEC, JESD22-A104
<b>Biased Temp &amp; Humidity</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>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

**Dimensions — 3x3 QFN**

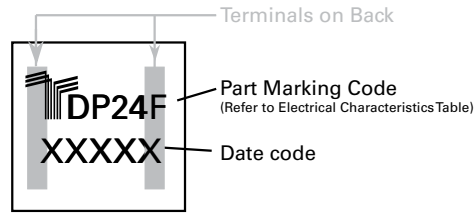


Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
<b>A</b>	0.114	0.122	2.900	3.100
<b>B</b>	0.114	0.122	2.900	3.100
<b>C</b>	0.077	0.081	1.950	2.050
<b>E</b>	0.013	0.017	0.335	0.435
<b>F</b>	0.078	0.082	1.980	2.080
<b>H</b>	0.037	0.041	0.950	1.050
<b>J</b>	0.002	0.006	0.050	0.150
<b>K1</b>	0.006	0.001	0.150	0.250
<b>K2</b>	0.006	0.001	0.150	0.250
<b>M1</b>	0.028	0.031	0.700	0.800
<b>M2</b>	0.013	0.017	0.330	0.430
<b>N1</b>	0.097	0.101	2.470	2.570
<b>N2</b>	0.084	0.088	2.130	2.230

**Part Numbering**



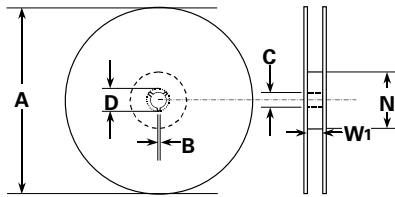
**Part Marking**



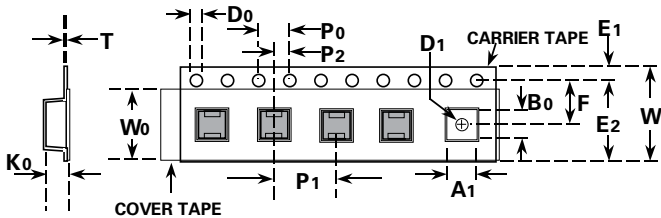
**Packing Options**

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

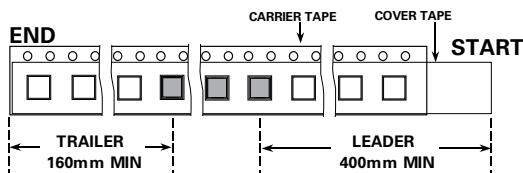
**Tape and Reel Specifications — 3x3 QFN**



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 <sub>1</sub>	Reel Inner Width at Hub	0.488	0.567	12.40	14.40
A <sub>0</sub>	Pocket Width at Bottom	0.126	0.134	3.20	3.40
B <sub>0</sub>	Pocket Length at Bottom	0.126	0.134	3.20	3.40
D <sub>0</sub>	Feed Hole Diameter	0.059	0.063	1.50	1.60
D <sub>1</sub>	Pocket Hole Diameter	0.059	N/A	1.50	N/A
E <sub>1</sub>	Feed Hole Position 1	0.065	0.073	1.65	1.85
E <sub>2</sub>	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 <sub>0</sub>	Pocket Depth	0.039	0.051	1.00	1.30
P <sub>0</sub>	Feed Hole Pitch	0.153	0.161	3.90	4.10
P <sub>1</sub>	Component Spacing	0.311	0.319	7.90	8.10
P <sub>2</sub>	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 <sub>0</sub>	Cover Tape Width	0.358	0.366	9.10	9.30

Disclaimer Notice - Information furnished is believed to be accurate and reliable. However, users should independently evaluate the suitability of and test each product selected for their own applications. Littelfuse products are not designed for, and may not be used in, all applications. Read complete Disclaimer Notice at [www.littelfuse.com/disclaimer-electronics](http://www.littelfuse.com/disclaimer-electronics).