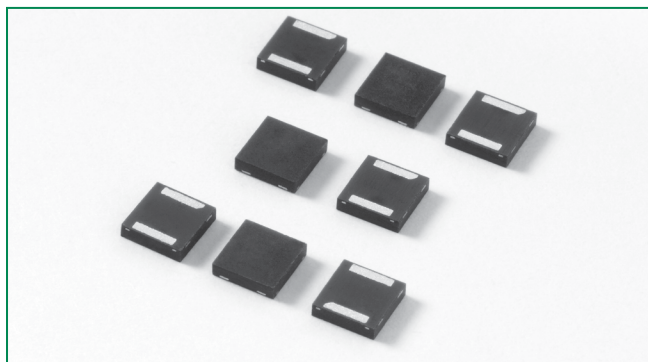


**SDP TwinChip™ Series - 3x3 QFN**



**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**



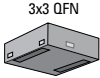
**Samples**

### Surge Ratings

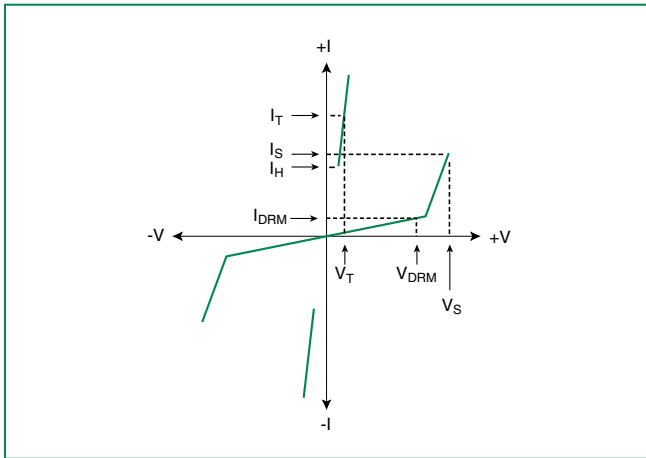
Series	$I_{PP}$				$I_{TSM}$
	2x10 $\mu$ s	1.2x50 $\mu$ s/8x20 $\mu$ s	10x700/5x310 $\mu$ s	10x1000 $\mu$ s	50 / 60 Hz
	A min	A min	A min	A min	A min
F	100	80	37.5	30	15

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

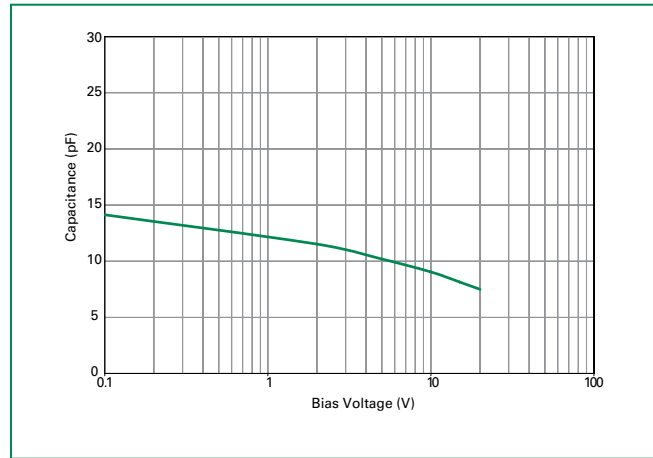
### Thermal Considerations

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

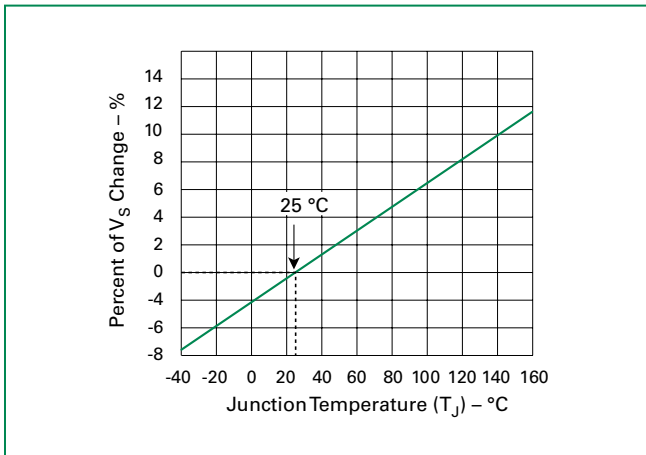
### V-I Characteristics



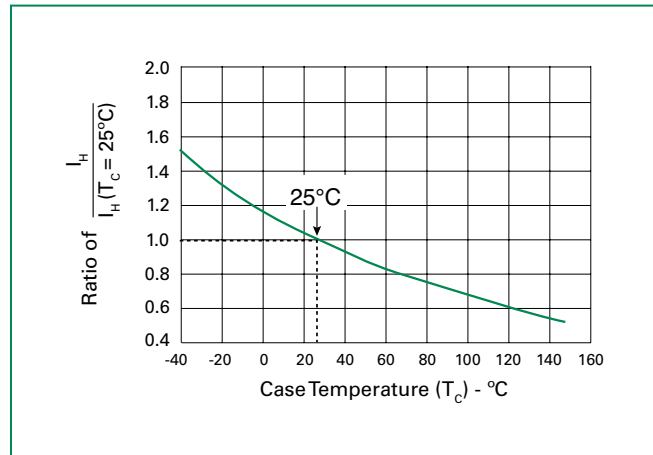
### Capacitance and Bias Voltage



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

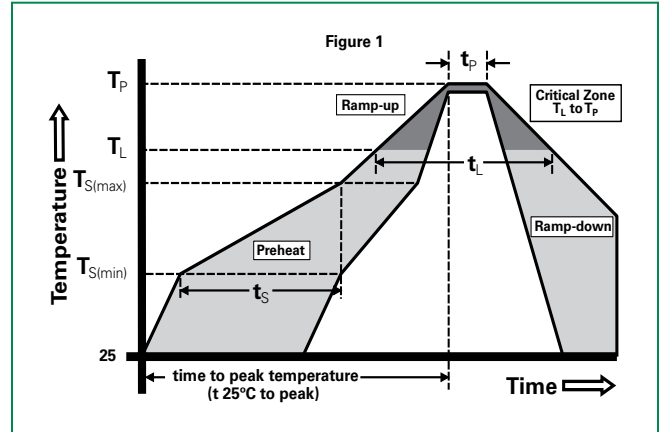


### Normalized DC Holding Current vs. Case Temperature



**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 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



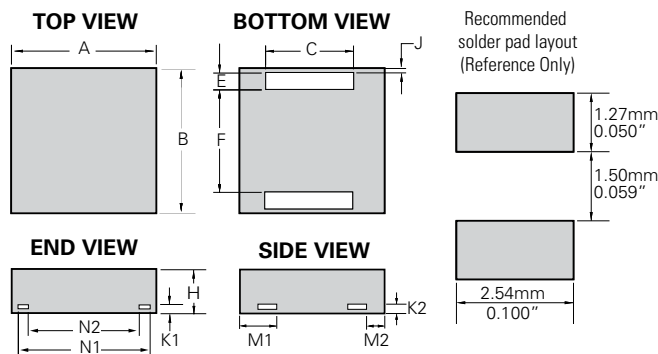
**Physical Specifications**

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

**Environmental Specifications**

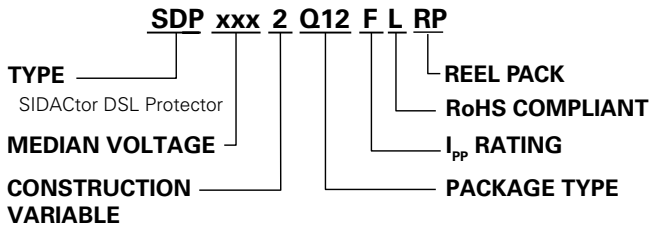
<b>High Temp Voltage Blocking</b>	80% Rated $V_{DRM}$ ( $V_{AC}$ Peak) +125°C or +150°C, 504 or 1008 hrs. MIL-STD-750 (Method 1040) JEDEC, JESD22-A-101
<b>Temp Cycling</b>	-65°C to +150°C, 15 min. dwell, 10 up to 100 cycles. MIL-STD-750 (Method 1051) EIA/JEDEC, JESD22-A104
<b>Biased Temp &amp; Humidity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

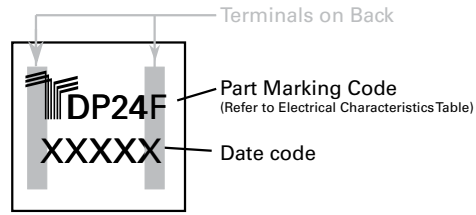


Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
<b>A</b>	0.114	0.122	2.900	3.100
<b>B</b>	0.114	0.122	2.900	3.100
<b>C</b>	0.077	0.081	1.950	2.050
<b>E</b>	0.013	0.017	0.335	0.435
<b>F</b>	0.078	0.082	1.980	2.080
<b>H</b>	0.037	0.041	0.950	1.050
<b>J</b>	0.002	0.006	0.050	0.150
<b>K1</b>	0.006	0.001	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**



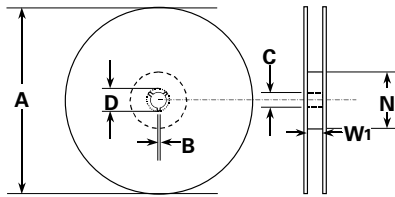
**Part Marking**



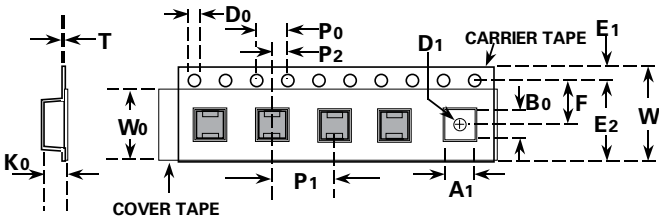
**Packing Options**

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

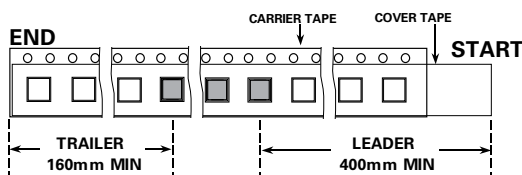
**Tape and Reel Specifications — 3x3 QFN**



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

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