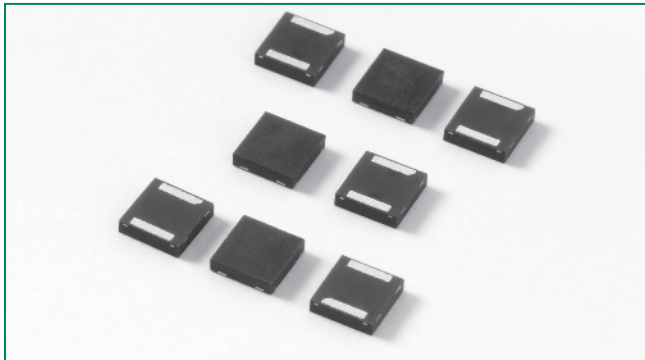


SDP TwinChip™ Series - 3x3 QFN



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



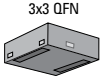
Samples

Surge Ratings

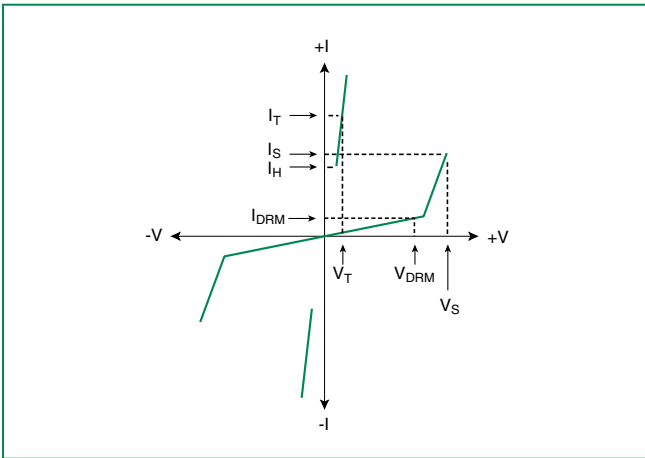
Series	I_{PP}				I_{TSM}
	2x10 μ s	1.2x50 μ s/8x20 μ s	10x700/5x310 μ s	10x1000 μ s	50 / 60 Hz
	A min	A min	A min	A min	A min
F	100	80	37.5	30	15

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

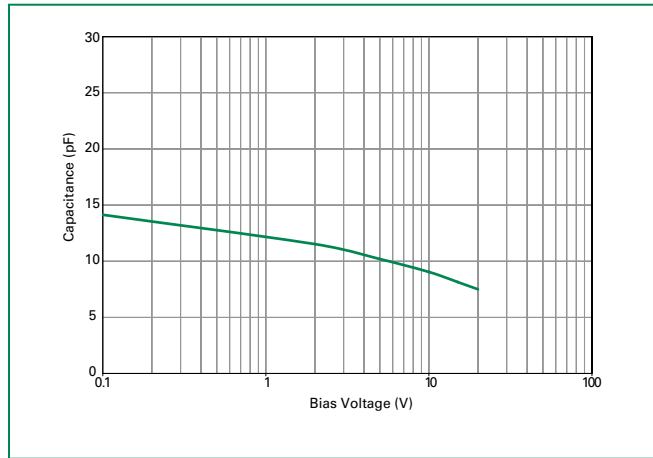
Thermal Considerations

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

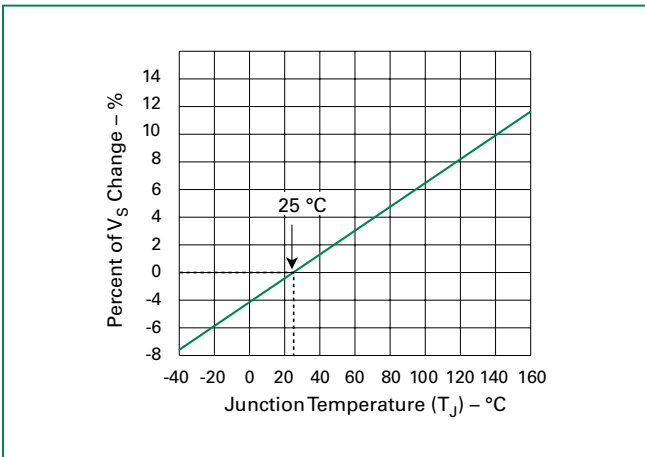
V-I Characteristics



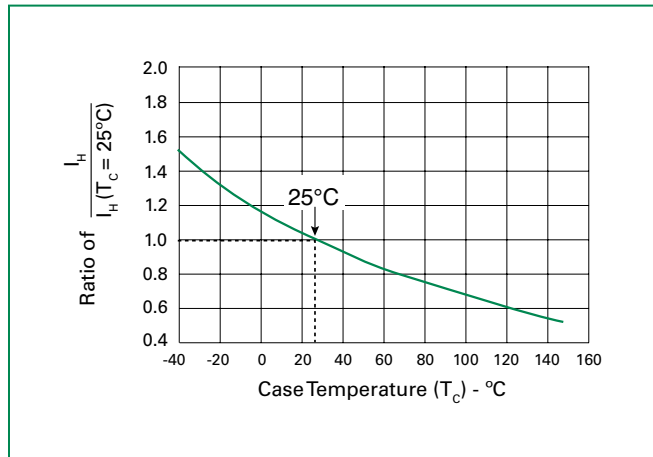
Capacitance and Bias Voltage



Normalized V_S Change vs. Junction Temperature

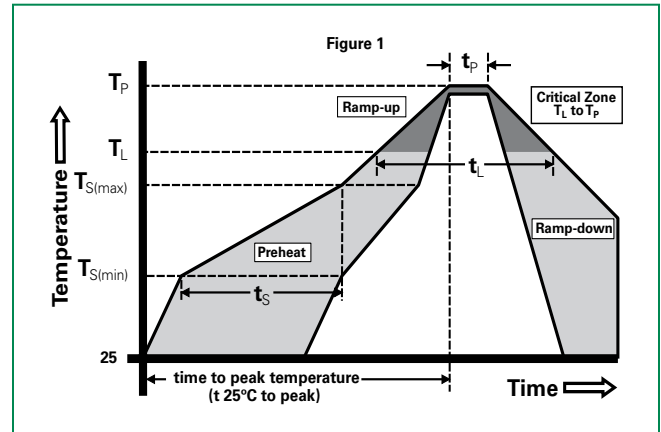


Normalized DC Holding Current vs. Case Temperature



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	



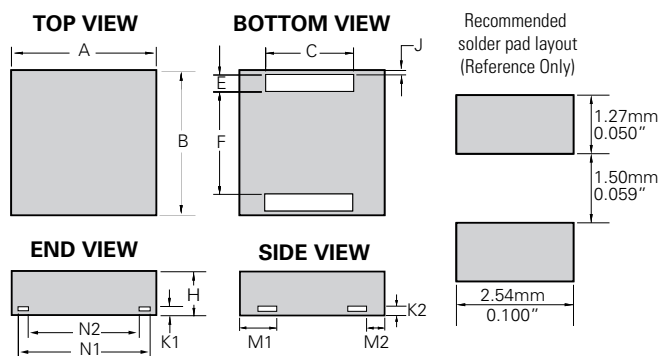
Physical Specifications

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

Environmental Specifications

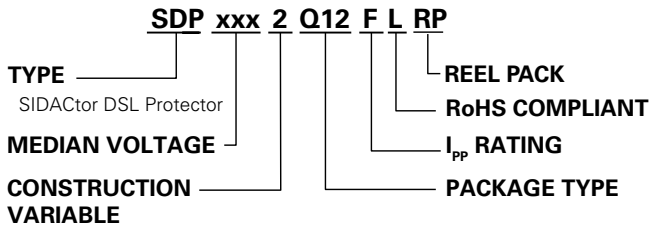
High Temp Voltage Blocking	80% Rated V_{DRM} (V_{AC} Peak) +125°C or +150°C, 504 or 1008 hrs. MIL-STD-750 (Method 1040) JEDEC, JESD22-A-101
Temp Cycling	-65°C to +150°C, 15 min. dwell, 10 up to 100 cycles. MIL-STD-750 (Method 1051) EIA/JEDEC, JESD22-A104
Biased Temp & Humidity	52 V_{DC} (+85°C) 85%RH, 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

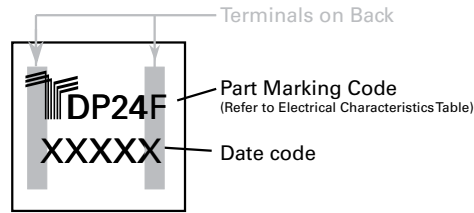


Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	0.114	0.122	2.900	3.100
B	0.114	0.122	2.900	3.100
C	0.077	0.081	1.950	2.050
E	0.013	0.017	0.335	0.435
F	0.078	0.082	1.980	2.080
H	0.037	0.041	0.950	1.050
J	0.002	0.006	0.050	0.150
K1	0.006	0.001	0.150	0.250
K2	0.006	0.001	0.150	0.250
M1	0.028	0.031	0.700	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



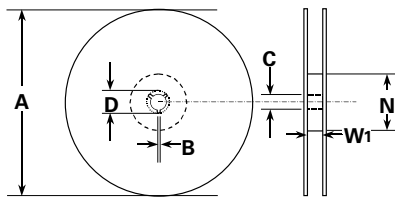
Part Marking



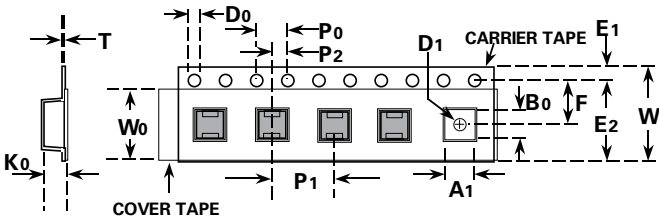
Packing Options

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

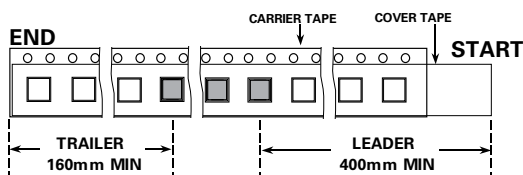
Tape and Reel Specifications — 3x3 QFN



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

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