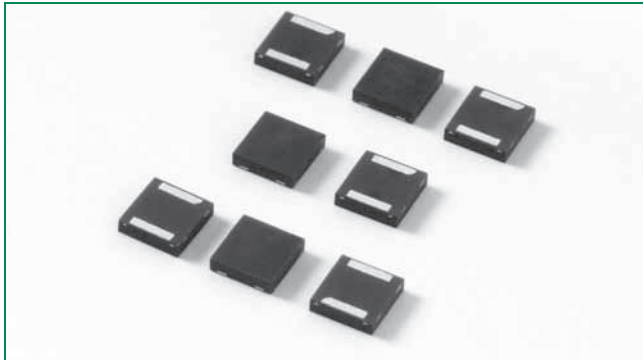


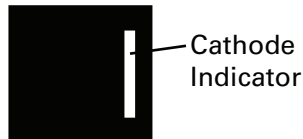
HF RoHS Fixed Voltage Q2L Series 3.3x3.3 QFN



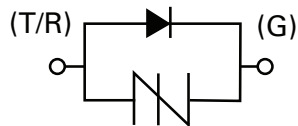
Agency Approvals

Agency	Agency File Number
	E133083

Pinout Designation



Schematic Symbol



Description

Fixed Voltage Q2L Series are uni-directional SIDACTor® devices designed to protect SLICs (Subscriber Line Interface Circuit) from damaging overvoltage transients.

The series provides single line protection using a fixed voltage switching device for negative surges. All positive surges are routed through an internal diode to a ground reference. The small size of the Q2L makes it ideal for high density applications.

Features and Benefits

- Integrated diode for positive voltage surges
- Low on-state voltage
- Low profile
- Does not degrade with use
- Small footprint QFN Package
- Fails short circuit when surged in excess of ratings

Applicable Global Standards

- TIA-968-A
- TIA-968-B
- 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 950
- YD/T 993
- YD/T 1082

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	V_F	Capacitance @ 1MHz @ 2V bias	
		V min	V max	mA min	mA max	A max	V max	V max	pF min	pF max
P0641Q22CLRP	P61C	58	77	150	800	2.2	4	5	35	75
P0721Q22CLRP	P71C	65	88	150	800	2.2	4	5	25	45
P0901Q22CLRP	P91C	75	98	150	800	2.2	4	5	55	85
P1101Q22CLRP	P10C	95	130	150	800	2.2	4	5	50	75
P1301Q22CLRP	P13C	120	160	150	800	2.2	4	5	45	70
P1701Q22CLRP	P17C	160	200	150	800	2.2	4	5	45	70

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

Surge Ratings

Series	I_{PP}					I_{TSM}	di/dt
	2x10 μ s	1.2x50 μ s/8x20 μ s	10x160 μ s	10x560 μ s	10x1000 μ s	50 / 60Hz	
	A min	A min	A min	A min	A min	A min	Amps/ μ s max
C	500	400	200	150	100	30	500

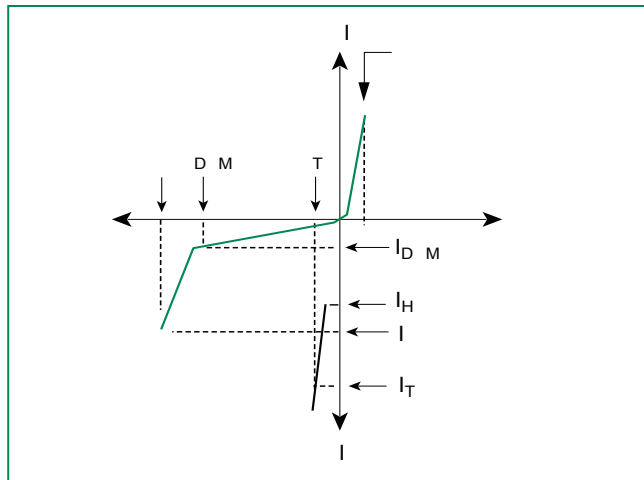
Notes:

- 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

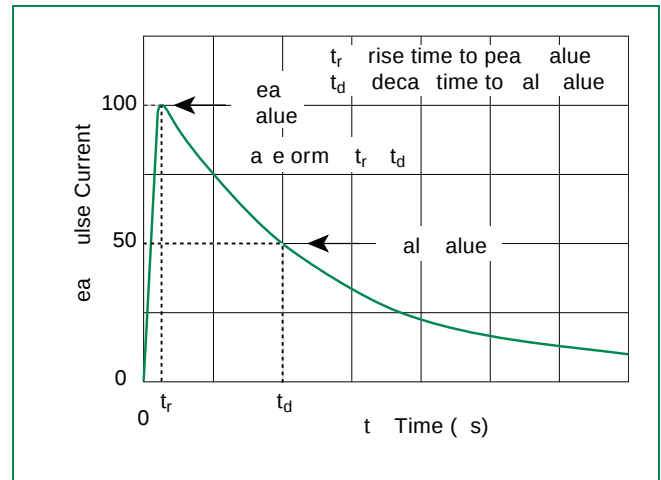
Thermal Considerations

Package	Symbol	Parameter	Value	Unit
3.3x3.3 QFN 	T_J	Operating Junction Temperature Range	-40 to +150	°C
	T_S	Storage Temperature Range	-65 to +150	°C
	$R_{\theta JA}$	Thermal Resistance: Junction to Ambient	120	°C/W

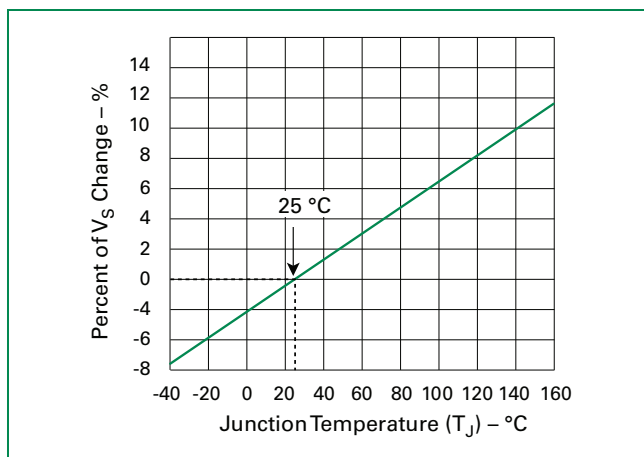
V-I Characteristics



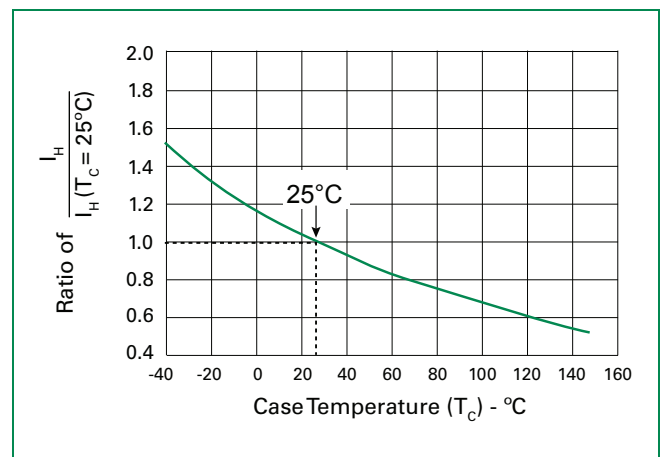
$t_r \times t_d$ Pulse Waveform



Normalized V_S Change vs. Junction Temperature

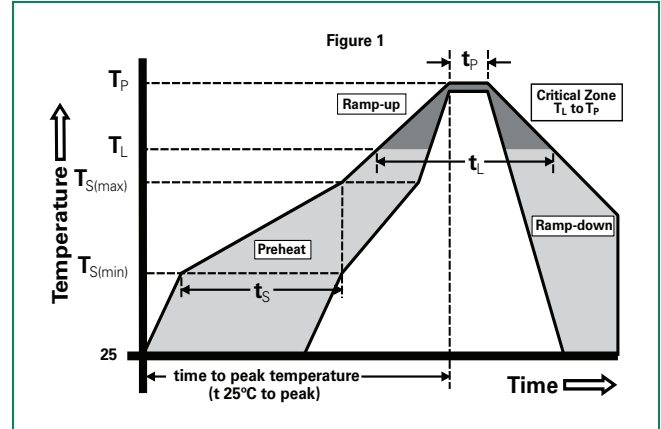


Normalized DC Holding Current vs. Case Temperature



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

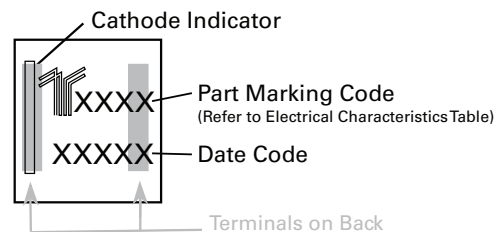
Environmental Specifications

High Temp Voltage Blocking	80% Rated V_{DRM} (V_{DC}) +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-A-104
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

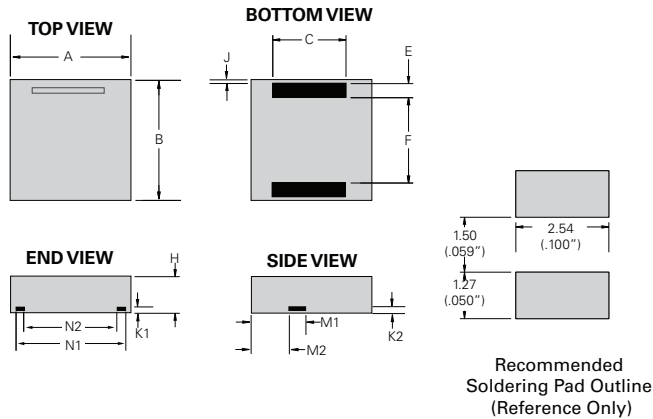
Part Numbering

P	xxx	1	Q22	C	L	RP	
TYPE							
P=SIDACtor							
MEDIAN VOLTAGE							
CONSTRUCTION							
VARIABLE							
PACKAGE TYPE							
							REEL PACK
							RoHS COMPLIANT
							I_{PP} RATING

Part Marking



Dimensions — 3.3x3.3 QFN



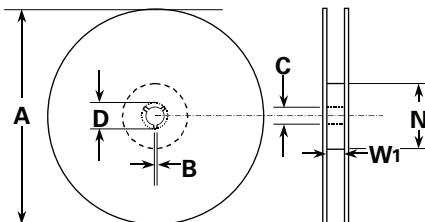
Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	0.126	0.134	3.200	3.400
B	0.126	0.134	3.200	3.400
C	0.075	0.083	1.900	2.100
E	0.011	0.019	0.285	0.485
F	0.088	0.096	2.230	2.430
H	0.035	0.043	0.900	1.100
J	0.000	0.008	0.000	0.200
K1	0.004	0.012	0.100	0.300
K2	0.004	0.012	0.100	0.300
M1	0.063	0.071	1.610	1.810
M2	0.045	0.053	1.153	1.353
N1	0.095	0.103	2.420	2.620
N2	0.082	0.090	2.080	2.280

Packing Options

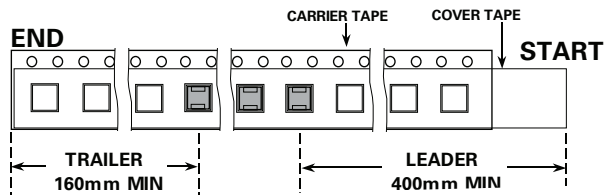
Package Type	Description	Quantity	Added Suffix	Industry Standard
Q22	3.3x3.3 QFN Tape and Reel Pack	5000	RP	EIA-481-D

Tape and Reel Dimension — 3.3x3.3 QFN

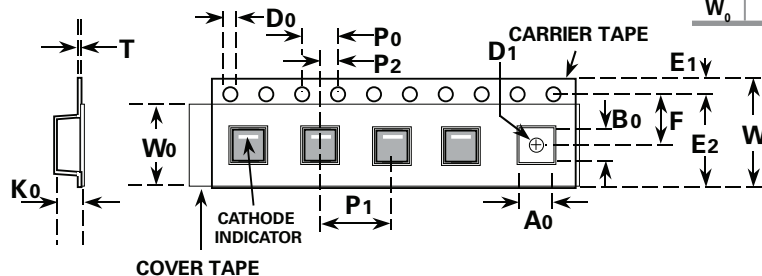
Reel Dimension



Tape Leader and Trailer Dimensions



Tape Dimension Items



	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
W₁	Reel Inner Width at Hub	0.488	0.567	12.40	14.40
A₀	Pocket Width at bottom	0.138	0.146	3.50	3.70
B₀	Pocket Length at bottom	0.138	0.146	3.50	3.70
D₀	Feed Hole Diameter	0.059	0.063	1.50	1.60
D₁	Pocket Hole Diameter	0.059	N/A	1.50	N/A
E₁	Feed hole position 1	0.065	0.073	1.65	1.85
E₂	Feed hole position 2	0.400	0.408	10.15	10.35
F	Feed hole center-Pocket hole	0.215	0.219	5.45	5.55
K₀	Pocket Depth	0.039	0.051	1.00	1.30
P₀	Feed Hole Pitch	0.153	0.161	3.90	4.10
P₁	Component Spacing	0.311	0.319	7.90	8.10
P₂	Feed hole center-Pocket hole	0.077	0.081	1.95	2.05
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
W₀	Cover Tape Width	0.358	0.366	9.10	9.30