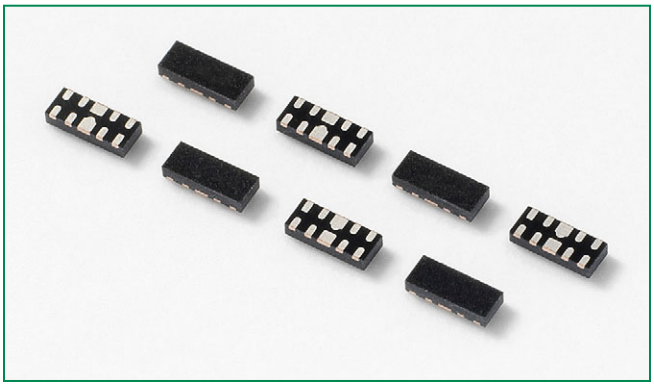
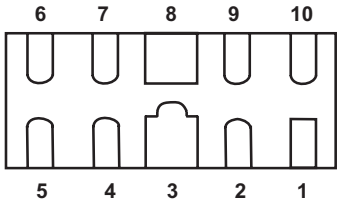
HF RoHS Pb GREEN SP3010 Lead-Free/Green Series



Description

The SP3010 integrates 4 channels of ultra-low capacitance rail-to-rail diodes and an additional zener diode to provide protection for electronic equipment that may experience destructive electrostatic discharges (ESD). This robust device can safely absorb repetitive ESD strikes at the maximum level specified in the IEC61000-4-2 international standard (Level 4, ±8kV contact discharge) without performance degradation. The extremely low loading capacitance also makes it ideal for protecting high speed signal pins such as HDMI, USB3.0, USB2.0, and IEEE 1394.

Pinout

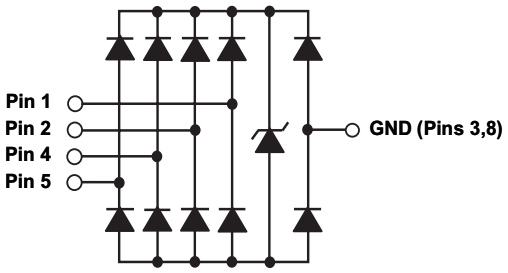


*Pins 6, 7, 9, 10 are not internally connected but should be connected to the trace.

Features

- ESD, IEC61000-4-2, ±8kV contact, ±15kV air
- EFT, IEC61000-4-4, 40A (5/50ns)
- Lightning, IEC61000-4-5, 3A (t_p=8/20μs)
- Low capacitance of 0.45pF (TYP) per I/O
- Low leakage current of 0.1μA (TYP) at 5V
- Small form factor uDFN package saves board space

Functional Block Diagram



Applications

- LCD/PDP TVs
- DVD Players
- Desktops
- MP3/PMP
- Set Top Boxes
- Mobile Phones
- Notebooks
- Digital Cameras

Life Support Note:
Not Intended for Use in Life Support or Life Saving Applications
The products shown herein are not designed for use in life sustaining or life saving applications unless otherwise expressly indicated.

www.DataSheet.in

Absolute Maximum Ratings

Symbol	Parameter	Value	Units
I_{PP}	Peak Current (t_p=8/20µs)	3.0	A
T_{OP}	Operating Temperature	-40 to 85	°C
T_{STOR}	Storage Temperature	-60 to 150	°C

CAUTION: Stresses above those listed in "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress only rating and operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied.

Electrical Characteristics (T_{OP}=25°C)

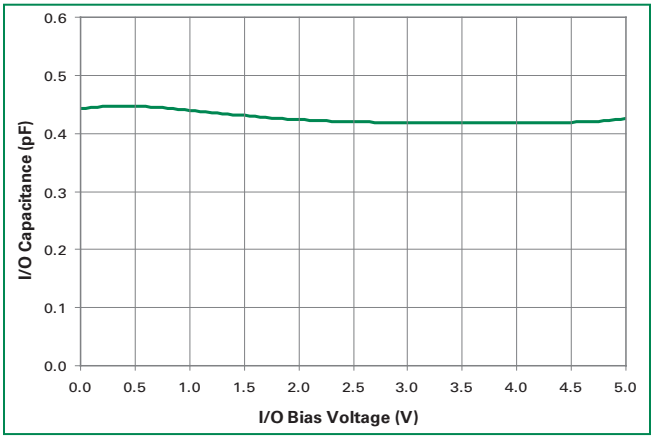
Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Reverse Standoff Voltage	V_{RWM}	$I_R \leq 1\mu A$			6.0	V
Reverse Leakage Current	I_{LEAK}	V_R=5V, Any I/O to GND		0.1	0.5	µA
Clamp Voltage[1]	V_C	I_{PP}=1A, t_p=8/20µs, Fwd		10.8		V
		I_{PP}=2A, t_p=8/20µs, Fwd		12.3		V
Dynamic Resistance	R_{DYN}	$(V_{C2} - V_{C1}) / (I_{PP2} - I_{PP1})$		1.5		Ω
ESD Withstand Voltage[1]	V_{ESD}	IEC61000-4-2 (Contact)	±8			kV
		IEC61000-4-2 (Air)	±15			kV
Diode Capacitance[1]	$C_{I/O-GND}$	Reverse Bias=0V		0.45		pF

Notes: [1] Parameter is guaranteed by design and/or device characterization.

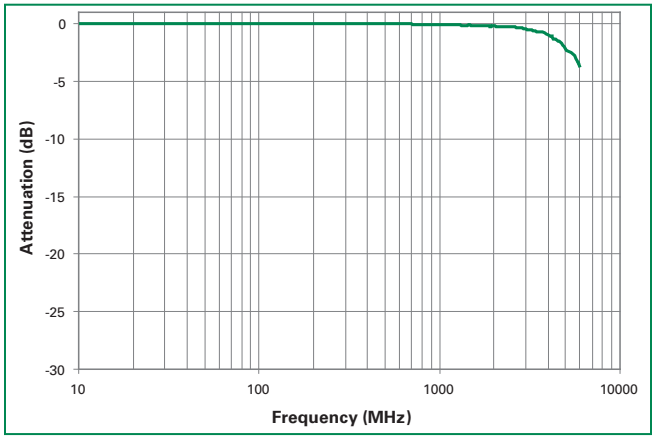
©2010 Littelfuse, Inc.
Specifications are subject to change without notice.
Please refer to http://www.littelfuse.com for current information.

www.DataSheet.in

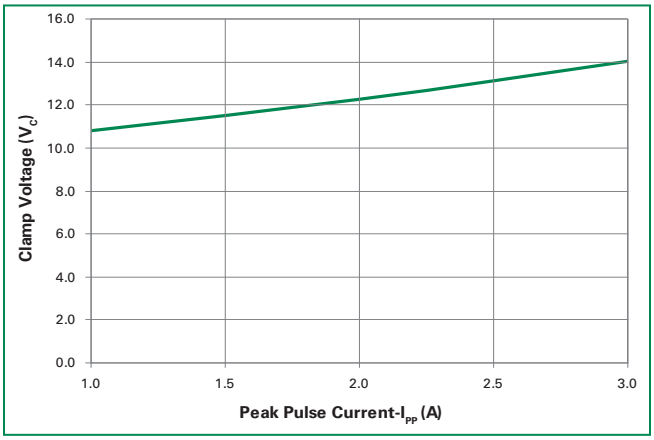
Capacitance vs. Bias Voltage



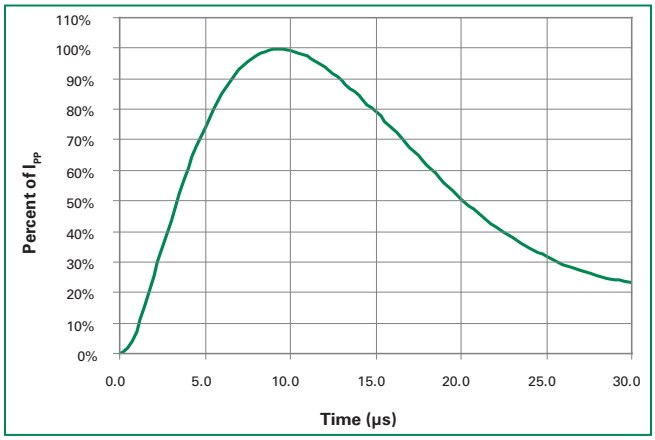
Insertion Loss (S21) I/O to GND



Clamping Voltage vs. I_{PP}



Pulse Waveform

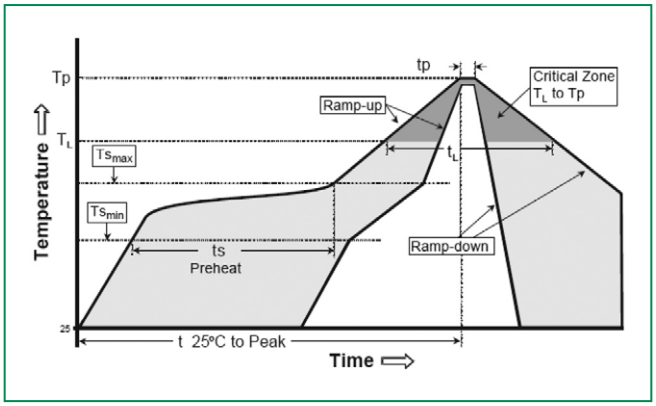


©2010 Littelfuse, Inc.
Specifications are subject to change without notice.
Please refer to http://www.littelfuse.com for current information.

www.DataSheet.in

Soldering Parameters

Reflow Condition		Pb – Free assembly
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/second max
$T_{S(max)}$ to T_L - Ramp-up Rate		3°C/second max
Reflow	-Temperature (T_L) (Liquidus)	217°C
	-Temperature (t_L)	60 – 150 seconds
Peak Temperature (T_P)		$250^{+0/-5}$ °C
Time within 5°C of actual peak Temperature (t_p)		20 – 40 seconds
Ramp-down Rate		6°C/second max
Time 25°C to peak Temperature (T_P)		8 minutes Max.
Do not exceed		260°C



Part Numbering System

SP 3010 - 0x U T G

- SP 3010 — Silicon Protection Array
- 3010 — Series
- 0x — Number of Channels
  - -04 = 4 Channel
- U — Package
  - UDFN-10 (2.5x1.0mm)
- T — T= Tape & Reel
- G — G= Green

Part Marking System

QH4

- Q — Product Series
  - Q = SP3010
- H — Assembly Site
- 4 — Number of Channels

Product Characteristics

Lead Plating	Pre-Plated Frame
Lead Material	Copper Alloy
Lead Coplanarity	0.0004 inches (0.102mm)
Subsitute Material	Silicon
Body Material	Molded Epoxy
Flammability	UL94-V-0

Notes :

1. All dimensions are in millimeters
2. Dimensions include solder plating.
3. Dimensions are exclusive of mold flash & metal burr.
4. All specifications comply to JEDEC SPEC MO-223 Issue A
5. Blo is facing up for mold and facing down for trim/form, i.e. reverse trim/form.
6. Package surface matte finish VDI 11-13.

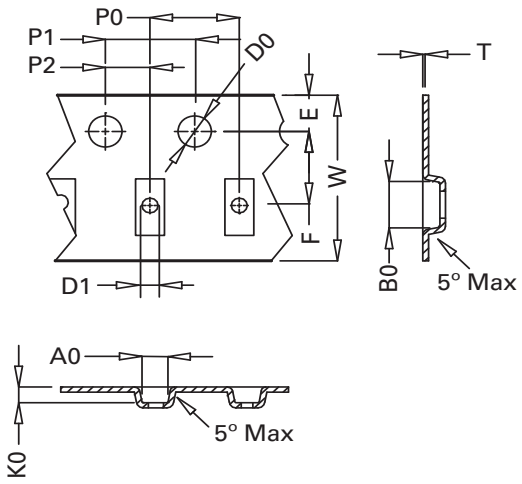
Ordering Information

Part Number	Package	Marking	Min. Order Qty.
SP3010-04UTG	uDFN-10	QH4	3000

©2010 Littelfuse, Inc.
Specifications are subject to change without notice.
Please refer to http://www.littelfuse.com for current information.

www.DataSheet.in

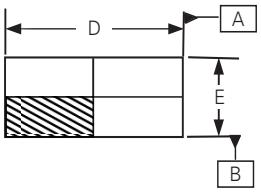
Embossed Carrier Tape & Reel Specification – UDFN-10



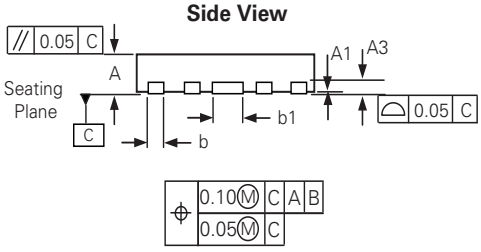
Package	uDFN-10 (2.5x1.0x0.5mm)
Symbol	Millimeters
A0	1.30 +/- 0.10
B0	2.83 +/- 0.10
D0	Ø 1.50 + 0.10
D1	Ø 1.00 + 0.25
E	1.75 +/- 0.10
F	3.50 +/- 0.05
K0	0.65 +/- 0.10
P0	4.00 +/- 0.10
P1	4.00 +/- 0.10
P2	2.00 +/- 0.05
T	0.254 +/- 0.02
W	8.00 + 0.30 /- 0.10

Package Dimensions - uDFN-10 (2.5x1.0x0.5mm)

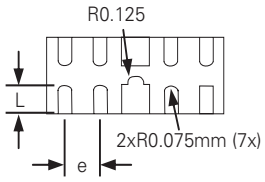
Top View



Side View

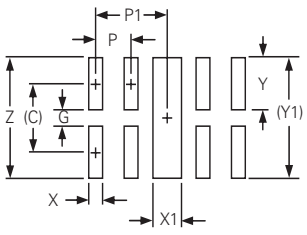


Bottom View



Symbol	uDFN-10 (2.5x1.0x0.5mm)					
	Millimeters			Inches		
	Min	Nom	Max	Min	Nom	Max
A	0.48	0.515	0.55	0.019	0.020	0.021
A1	0.00	--	0.05	0.000		0.022
A3		0.125 Ref			0.005 Ref	
b	0.15	0.20	0.25	0.006	0.008	0.012
b1	0.35	0.40	0.45	0.014	0.016	0.018
D	2.40	2.50	2.60	0.094	0.098	0.102
E	0.90	1.00	1.10	0.035	0.039	0.043
e		0.50 BSC			0.020 BSC	
L	0.30	0.365	0.43	0.012	0.014	0.016

Soldering Pad Layout



Soldering Pad Layout Dimensions		
	Inch	Millimeter
C	(0.034)	(0.875)
G	0.008	0.20
P	0.020	0.50
P1	0.039	1.00
X	0.008	0.20
X1	0.016	0.40
Y	0.027	0.675
Y1	(0.061)	(1.55)
Z	0.061	1.55

Lead-Free/Green SP3010

©2010 Littelfuse, Inc.
Specifications are subject to change without notice.
Please refer to http://www.littelfuse.com for current information.

www.DataSheet.in