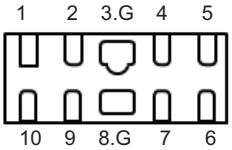
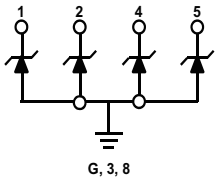
SC1004U-ULC-04UTG

Ultra Low Capacitance Diode Arrays

Pinout



Functional Block Diagram



Pin 6,7,9,10 are NC

Description

The SC1004U-ULC-04UTG provides signal integrity preserving unidirectional ESD protection for the world's most challenging high speed serial interfaces. Compelling packaging options including the standard 2.5mmx1.0mm layout, trace layout complexity, saves significant PCB space. Providing in excess of 12kV contact ESD protection (IEC 61000-4-2) while maintaining extremely low leakage and dynamic resistance, offered in the industry's most progressive and soon to be popular footprints, it sets higher standards for signal integrity and usability.

Features

- 0.20pF TYP capacitance
- ESD, IEC 61000-4-2, +12kV / -12kV contact, +15kV / -15kV air
- Low clamping voltage of 11.0V @ I_{PP}=2.0A (t_P=8/20µs)
- Low profile DFN array packages
- Facilitates excellent signal integrity
- ELV Compliant
- Moisture Sensitivity Level(MSL -1)
- Halogen free, Lead free and RoHS compliant

Applications

- USB 3.1, 3.0, 2.0
- HDMI 2.0, 1.4a, 1.3
- DisplayPort(TM)
- V-by-One®)
- Thunderbolt (Light Peak)
- LVDS interfaces
- Consumer, mobile and portable electronics
- Tablet PC and external storage with high speed interfaces
- Applications requiring high ESD performance in small packages

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.

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Absolute Maximum Ratings

Symbol	Parameter	Value	Units
I_{PP}	Peak Current (t_p=8/20µs)	2	A
T_{OP}	Operating Temperature	-40 to 125	°C
T_{STOR}	Storage Temperature	-55 to 150	°C

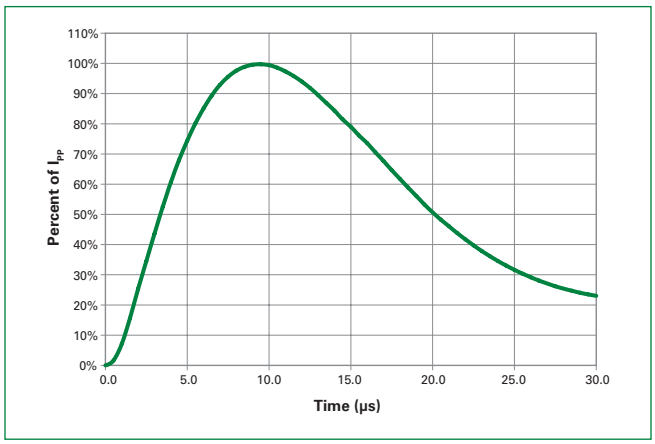
Caution: Stresses above those listed in "Absolute Maximum Ratings" may cause permanent damage to the component. This is a stress only rating and operation of the component at these or any other conditions above those indicated in the operational sections of this specification is not implied.

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

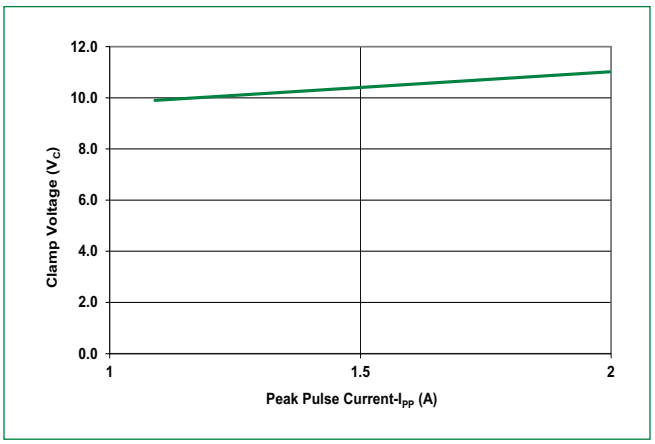
Parameter	Test Conditions	Min	Typ	Max	Units
Input Capacitance	@ V_R = 0V, f = 3GHz		0.20	0.22	pF
Breakdown Voltage	V_{BR} @ I_T=1mA	7.5	8.5		V
Reverse Standoff Voltage				7.0	V
Reverse Leakage Current	I_L @ V_{RWM}=5.0V		25	50	nA
Clamping Voltage	V_{CL} @ I_{PP}=2.0A		11		V
Dynamic Resistance2	TLP, t_P=100ns		0.55		Ω
Peak Pulse Current	t_P=8/20µs			2.0	A
ESD Withstand Voltage	IEC 61000-4-2 (Contact)	±12			kV
	IEC 61000-4-2 (Air)	±15			kV

Note:
1. Parameter is guaranteed by design and/or component characterization.
2.Transmission Line Pulse (TLP) with 100ns width, 0.2ns rise time, and average window t1=70ns to t2= 90ns

8/20µs Pulse Waveform



Clamping Voltage vs I_{PP}



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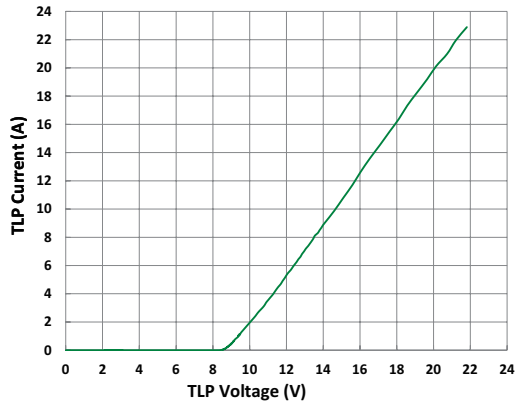
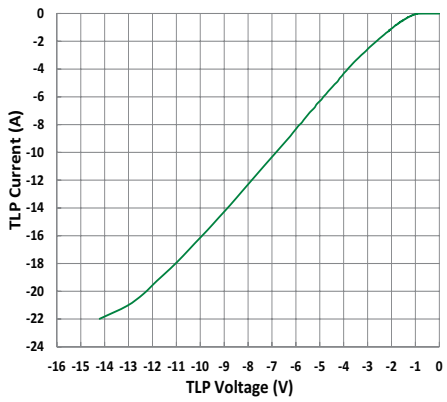
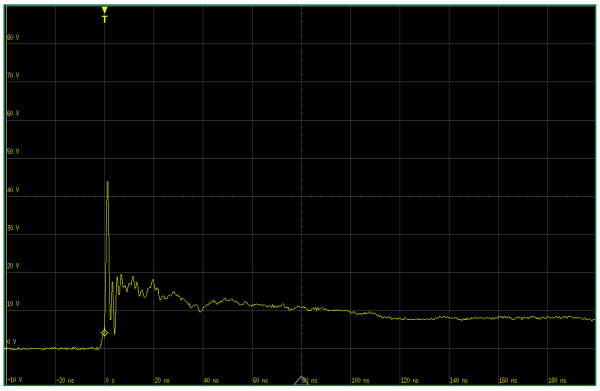
Positive Transmission Line Pulsing (TLP) Plot



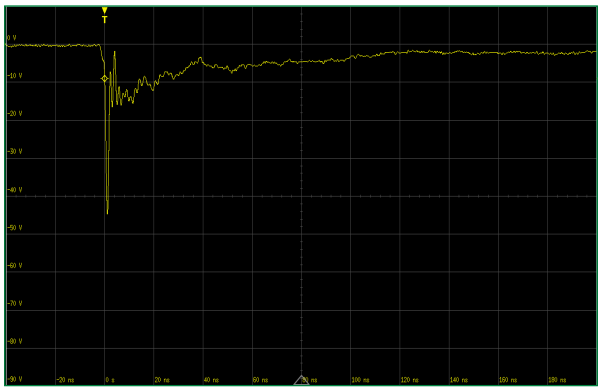
Negative Transmission Line Pulsing (TLP) Plot



IEC 61000-4-2 +8 kV Contact ESD Clamping Voltage



IEC 61000-4-2 -8 kV Contact ESD Clamping Voltage



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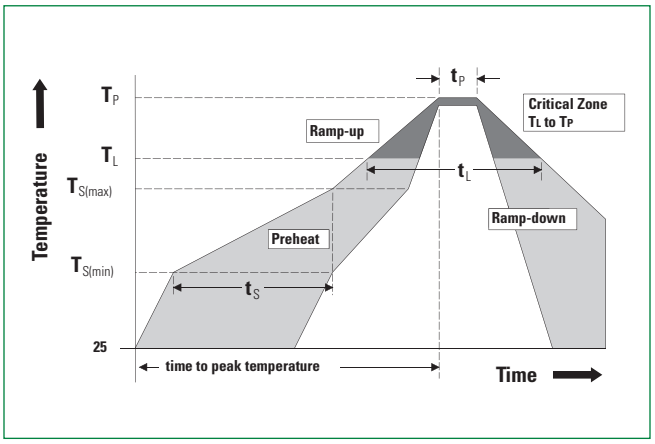
Ultra Low Capacitance Diode Arrays

Soldering Perameters

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 – 120 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)		$260^{+0/-5}$ °C
Time within 5°C of actual peak Temperature (t_p)		30 seconds
Ramp-down Rate		6°C/second max
Time 25°C to peak Temperature (T_P)		8 minutes Max.
Do not exceed		260°C



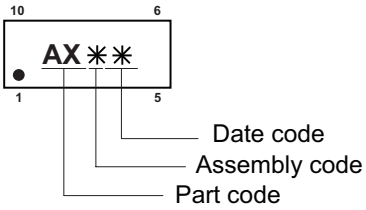
Ordering Information

Part Number	Package	Min. Order Qty.
SC1004U-ULC-04UTG	1004 DFN Array	3000

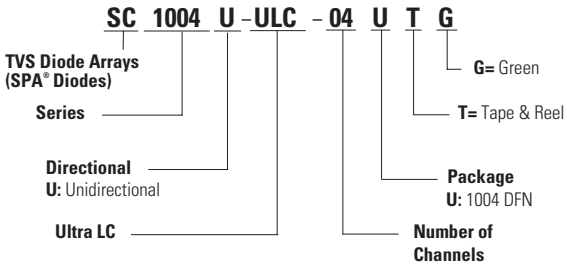
Product Characteristics

Lead Plating	Pre-Plated Frame or Matte Tin
Lead material	Copper Alloy
Substrate Material	Silicon
Body Material	Molded Compound
Flammability	UL Recognized compound meeting flammability rating V-0

Part Marking System



Part Numbering System



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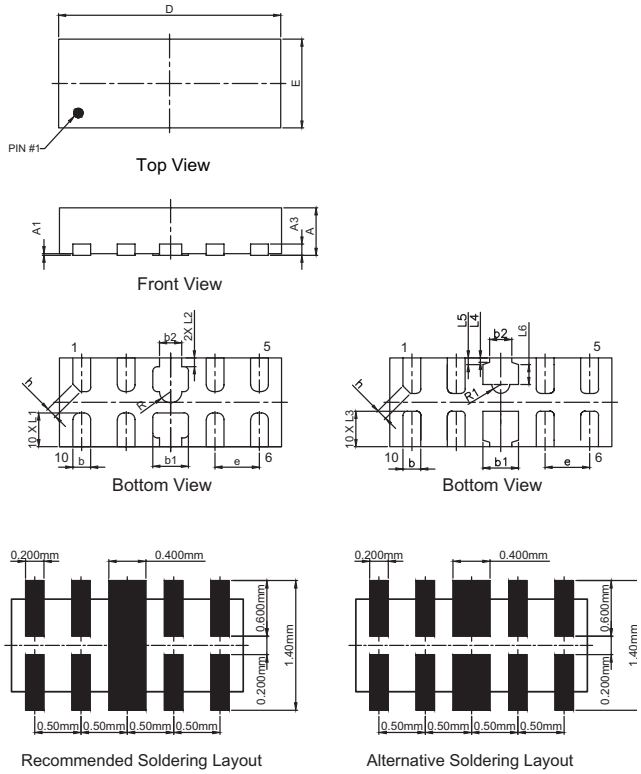
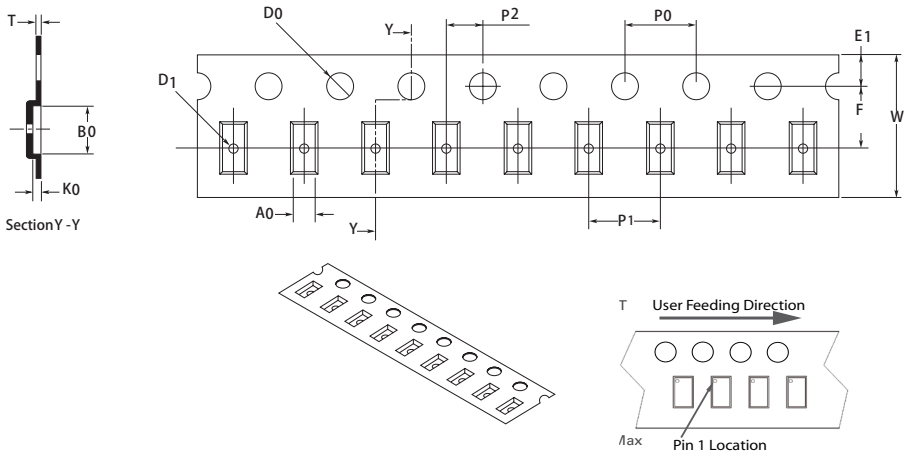
Ultra Low Capacitance Diode Arrays

Package Dimensions — 1004 DFN Array



Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	0.45	0.60	0.0177	0.0236
A1	0.00	0.05	0.0000	0.0020
A3	0.120	0.175	0.0047	0.0069
b	0.15	0.25	0.0059	0.0098
b1	0.35	0.45	0.0138	0.0177
b2	0.20	0.30	0.0079	0.0118
D	2.40	2.60	0.0945	0.1024
E	0.90	1.10	0.0354	0.0433
L1	0.28	0.48	0.0110	0.0189
L2	0.05	0.15	0.0020	0.0059
L3	0.35	0.45	0.0138	0.0177
L4	0.050 REF		0.0020 REF	
L5	0.075 REF		0.0030 REF	
L6	0.225 REF		0.0089 REF	
e	0.500 BASIC		0.0197 BASIC	
R	0.125 REF		0.0049 REF	
R1	0.100 REF		0.0039 REF	
h	0.08	0.16	0.0031	0.0063

Embossed Carrier Tape & Reel Specification — 1004 DFN Array



Symbol	Millimeters
A0	1.15 min/1.30 max
B0	2.70+/-0.05
D0	ø 1.50 min/1.65 max
D1	ø 0.50 min/1.05 max
E1	1.75+/-0.10
F	3.50+/-0.10
K0	0.46 min/0.75 max
P0	4.00+/-0.10
P1	4.00+/-0.10
P2	2.00+/-0.05
W	8.00+0.30/-0.10
T	0.17 min/0.30 max

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