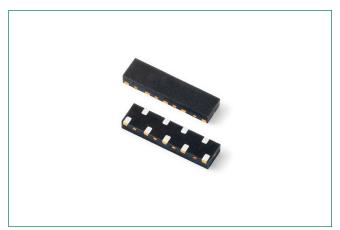
### 0.3pF Diode Array, Low Capacitance ESD Protection





**Note**: This package image is for example and reference only. for detail package drawing, please refer to the package section in this datasheet.

#### **Pinout**

# Line-2 Line-4 Line-5 Line-7 9 8 7 6 1 2 3 4 5 Line-1 Line-3 GND Line-6 Line-8

**Top View** 

Line-1	Line-3	GND	Line-6	Line-8
1	2	3	4	5
g	8	]	7 6	5

Line-2 Line-4 Line-5 Line-7

Bottom View

#### **Description**

The SC7538 integrates 8 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 above the maximum level maximum level, ±8kV contact discharge, as specified in the international standard IEC 61000-4-2, without performance degradation standard (±8kV contact discharge) without performance degradation. The extremely low loading capacitance also makes it ideal for protecting high speed signal pins such as V-By-One, HDMI, USB3.0, USB2.0, and IEEE 1394.

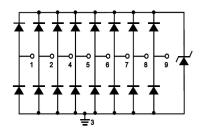
#### **Features & Benefits**

- ESD, IEC 61000-4-2, ±22kV contact, ±30kV air
- EFT, IEC 61000-4-4, 40A (t<sub>p</sub>=5/50ns)
- Surge Tolerance, IEC 61000-4-5 2nd edition, 3A (t<sub>p</sub>=8/20µs)
- Low capacitance of 0.3pF@0V, 3GHz (TYP) per I/O
- Low leakage current of 0.5μA (MAX) at 5V
- Halogen free, Lead free and RoHS compliant

#### **Applications**

- V-By-One
- Embedded DisplayPort
- USB 2.0/3.0 Ports
- HDMI
- Flat Panel Displays
- LCD/LED TVs
- Smartphones
- Mobile Computing

#### **Functional Block Diagram**



#### 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.



## 0.3pF Diode Array, Low Capacitance ESD Protection

#### **Absolute Maximum Ratings**

Symbol	Parameter	Value	Units
l <sub>pp</sub>	Peak Current (t <sub>p</sub> =8/20µs)	3.0	А
T <sub>op</sub>	Operating Temperature	-40 to 125	°C
T <sub>STOR</sub>	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.

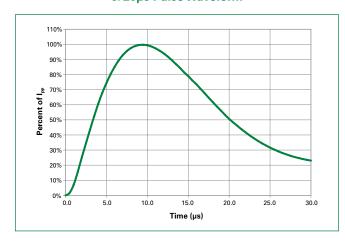
#### Electrical Characteristics (T<sub>OP</sub>=25°C)

Parameter	Symbol	Test Conditions	Min	Тур	Max	Units
Reverse Standoff Voltage	V <sub>RWM</sub>	Pin-1,-2,-4,-5,-6,-7,-8,-9 to pin-3			5	V
Breakdown Voltage	$V_{\mathtt{BR}}$	I <sub>R</sub> =1mA	6			V
Reverse Leakage Current	I <sub>LEAK</sub>	$V_R$ =5V, I/O to GND			0.5	μΑ
Clamp Voltage <sup>1</sup> V <sub>0</sub>	\/	$I_{pp} = 1A$ , $t_{p} = 8/20 \mu s$ , Fwd		9.9		\/
	v <sub>c</sub>	$I_{pp} = 2A$ , $t_{p} = 8/20 \mu s$ , Fwd		10.9		V
Dynamic Resistance <sup>2</sup>	R <sub>DYN</sub>	TLP, t <sub>P</sub> =100ns, I/O to GND		0.42		Ω
ESD Withstand Voltage <sup>1,3</sup>	\/	IEC 61000-4-2 (Contact Discharge)	±22			kV
	V <sub>ESD</sub>	IEC 61000-4-2 (Air Discharge)	±30			kV
Diode Capacitance <sup>1</sup>	C <sub>I/O-GND</sub>	Reverse Bias=0V, f=3GHz		0.3		pF

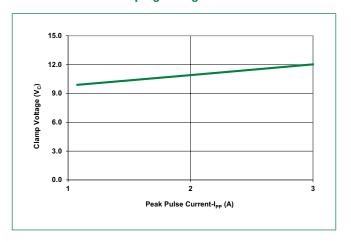
#### Notes:

- ${\it 1. Parameter is guaranteed by design and/or component characterization}.$
- 2. Transmission Line Pulse (TLP) test setting: Std.TDR(50Ω),tp=100ns, tr=0.2ns ITLP and VTLP averaging window: start t1=70ns to end t2=90ns
- 3. Device stressed with ten non-repetitive ESD pulses.

#### 8/20µs Pulse Waveform



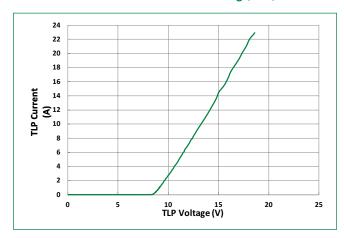
#### **Clamping Voltage vs IPP**



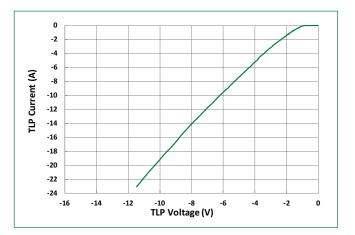


## 0.3pF Diode Array, Low Capacitance ESD Protection

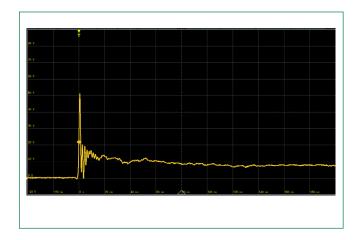
#### Positive Transmission Line Pulsing (TLP) Plot



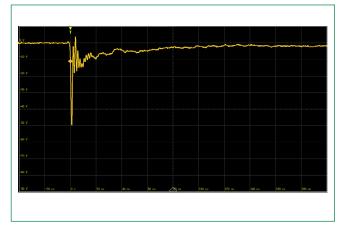
#### **Negative Transmission Line Pulsing (TLP) Plot**



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



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

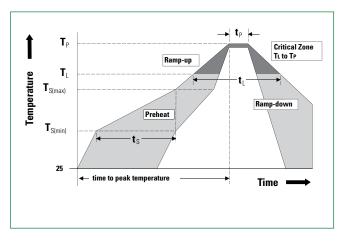




## 0.3pF Diode Array, Low Capacitance ESD Protection

#### **Soldering Parameters**

Reflow Cond	dition	Pb – Free assembly		
	-Temperature Min (T <sub>s(min)</sub> )	150°C		
Pre Heat	-Temperature Max (T <sub>s(max)</sub> )	200°C		
	-Time (min to max) (t <sub>s</sub> )	60 – 120 secs		
Average ran peak	np up rate (Liquidus) Temp (T <sub>L</sub> ) to	3°C/second max		
T <sub>S(max)</sub> to T <sub>L</sub> -	Ramp-up Rate	3°C/second max		
Reflow	-Temperature (T <sub>L</sub> ) (Liquidus)	217°C		
	-Temperature (t <sub>L</sub> )	60 - 150 seconds		
Peak Tempe	rature (T <sub>p</sub> )	260 <sup>+0/-5</sup> °C		
Time within	5°C of actual peak Temperature (t <sub>p</sub> )	30 seconds		
Ramp-down	ı Rate	6°C/second max		
Time 25°C to	o peak Temperature (T <sub>P</sub> )	8 minutes Max.		
Do not exce	ed	260°C		



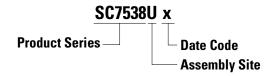
#### **Ordering Information**

Part Number	Package	Min. Order Qty.
SC7538-08UTG	μDFN-9	3000

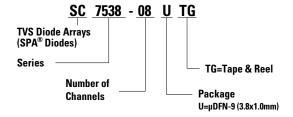
#### **Product Characteristics**

Lead Plating	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**



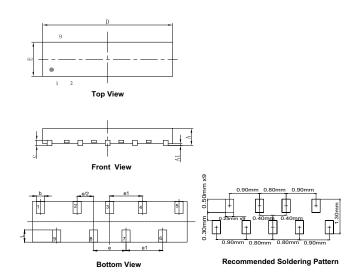
#### **Part Numbering System**





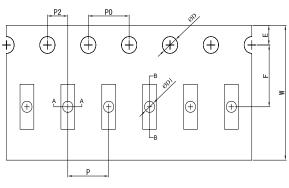
## 0.3pF Diode Array, Low Capacitance ESD Protection

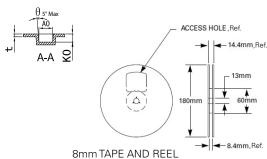
#### **Package Dimensions**

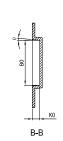


μDFN-9 (3.8x1.0mm)						
	Millimeters			Inches		
Symbol	Min	Nom	Max	Min	Nom	Max
Α	0.45	0.50	0.55	0.018	0.020	0.022
<b>A</b> 1	-	0.02	0.05	-	0.001	0.002
b	0.15	0.20	0.25	0.006	0.008	0.010
C	0.10	0.15	0.20	0.004	0.006	0.008
D	3.70	3.80	3.90	0.146	0.150	0.154
е	0.80 BSC		0.	031 BSC		
e1	0.90 BSC		0.	035 BSC		
E	0.90	1.00	1.10	0.035	0.039	0.043
L	0.20	0.30	0.40	0.008	0.012	0.016

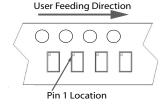
#### **Embossed Carrier Tape & Reel Specification**







Symbol	Millimeters		
Α0	1.35 +/- 0.10		
В0	4.00 +/- 0.05		
D	Ø 1.50 + 0.1/-0		
D1	Ø 1.00 +/-0.05		
E	1.75 +/- 0.10		
F	5.50 +/- 0.05		
K0	0.72 +/- 0.05		
<b>P</b> 4.00 +/- 0.10			
P0	4.00 +/- 0.10		
P2	2.00 +/- 0.05		
T	0.25 +/- 0.02		
<b>W</b> 12.00 + 0.30 /- 0.10			



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