

# ON Semiconductor

## Is Now

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To learn more about onsemi™, please visit our website at  
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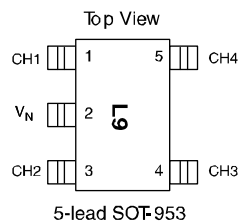
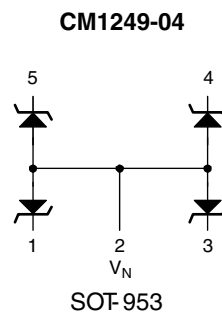
### Features

- Low I/O capacitance at 5pF typical
- In-system ESD protection to  $\pm 8\text{kV}$  contact discharge, per the IEC 61000-4-2 international standard
- Four channels of ESD protection
- Compact SOT-953 package saves board space and facilitates layout in space-critical applications
- Each I/O pin can withstand over 1000 ESD strikes
- RoHS (Restriction of Hazard Substances) compliant

### Applications

- High-speed consumer electronic ports
- ESD protection of PC ports, including USB ports, serial ports, parallel ports, IEEE1394 ports, docking ports, proprietary ports, etc.
- Protection of interface ports or IC pins which are exposed to high ESD levels

### Electrical Schematic



Note: This drawing is not to scale.

**PIN DESCRIPTIONS**

LEADS	NAME	DESCRIPTION
(Refer to package / pinout diagrams)	CHx	The cathode of the respective TVS diode, which should be connected to the node requiring transient voltage protection.
(Refer to package / pinout diagrams)	V <sub>N</sub>	The anode of the TVS diodes.

**Ordering Information**

**PART NUMBERING INFORMATION**

Leads	Package	Lead-free Finish	
		Ordering Part Number <sup>1</sup>	Part Marking
5	SOT953	CM1249-04S9	L9

Note 1: Parts are shipped in Tape & Reel form unless otherwise specified.

**Specifications**

**ABSOLUTE MAXIMUM RATINGS**

PARAMETER	RATING	UNITS
Storage Temperature Range	-65 to +150	°C

**STANDARD OPERATING CONDITIONS**

PARAMETER	RATING	UNITS
Operating Temperature	-40 to +85	°C

**ELECTRICAL OPERATING CHARACTERISTICS** (NOTE 1)

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
$C_{IN}$	Channel Input Capacitance	$T_A = 25^\circ\text{C}$ , 0VDC, 1MHz		5	7	pF
$\Delta C_{IN}$	Differential Channel I/O to GND Capacitance	$T_A = 25^\circ\text{C}$ , 2.5VDC, 1MHz		0.14		pF
$I_{LEAK}$	Leakage Current	$V_{IN} = 3.5\text{VDC}$ , $T_A = 25^\circ\text{C}$			0.75	$\mu\text{A}$
$V_{SIG}$	Small Signal Clamp Voltage Positive Clamp Negative Clamp	$I = 5\text{mA}$ , $T_A = 25^\circ\text{C}$ $I = -5\text{mA}$ , $T_A = 25^\circ\text{C}$	6.1 -1.5		8.5 -0.4	V V
$V_{ESD}$	ESD Withstand Voltage Contact Discharge per IEC 61000-4-2 standard Human Body Model, MIL-STD-883, Method 3015	Notes 3 and 4; $T_A = 25^\circ\text{C}$ Notes 2 and 4; $T_A = 25^\circ\text{C}$	$\pm 8$ $\pm 15$			kV kV
$R_D$	Diode Dynamic Resistance Forward Conduction Reverse Conduction	$T_A = 25^\circ\text{C}$ ; Note 2		0.7 2.1		$\Omega$ $\Omega$

Note 1: All parameters specified at  $T_A = -40^\circ\text{C}$  to  $+85^\circ\text{C}$  unless otherwise noted.

Note 2: Human Body Model per MIL-STD-883, Method 3015,  $C_{Discharge} = 100\text{pF}$ ,  $R_{Discharge} = 1.5\text{K}\Omega$ ,  $V_N$  grounded.

Note 3: Standard IEC 61000-4-2 with  $C_{Discharge} = 150\text{pF}$ ,  $R_{Discharge} = 330\Omega$ ,  $V_N$  grounded.

Note 4: These measurements performed with no external capacitor on CH.

## Performance Information

### Diode Capacitance

Typical diode capacitance with respect to positive TVS cathode voltage (reverse voltage across the diode) is given in Diode Capacitance vs. Reverse Voltage .

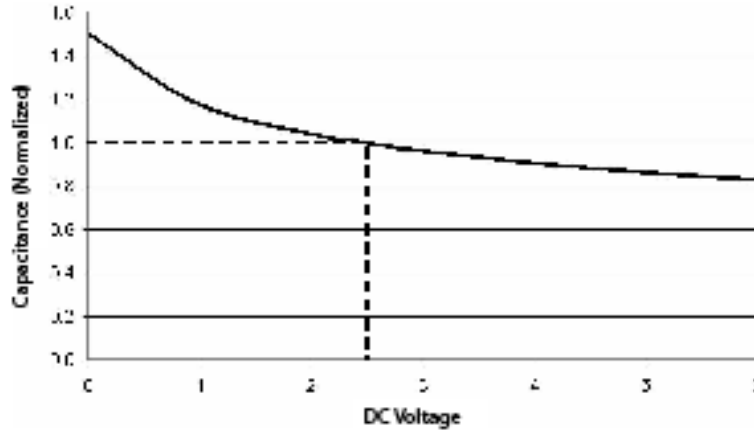
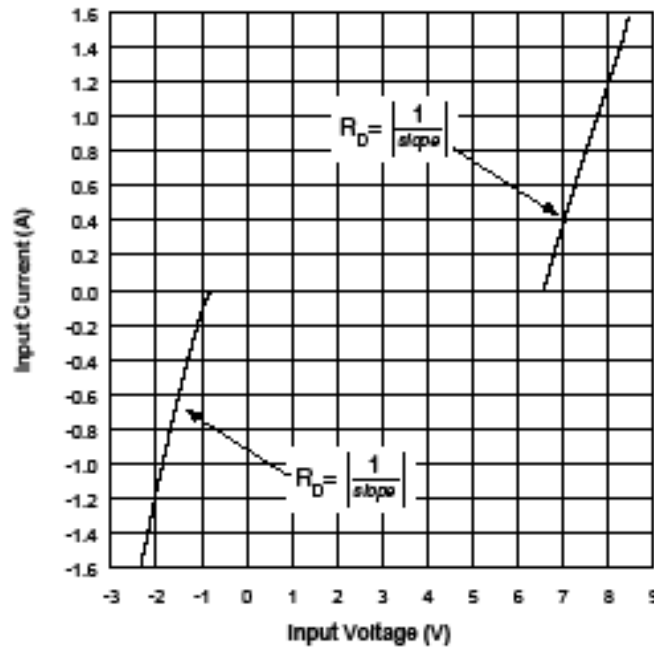


Figure 1. Diode Capacitance vs. Reverse Voltage

### Typical High Current Diode Characteristics

Measurements are made in pulsed mode with a nominal pulse width of 0.7ms.

Typical Input VI Characteristics  
(Pulse-mode measurements, pulse width = 0.7ms nominal)



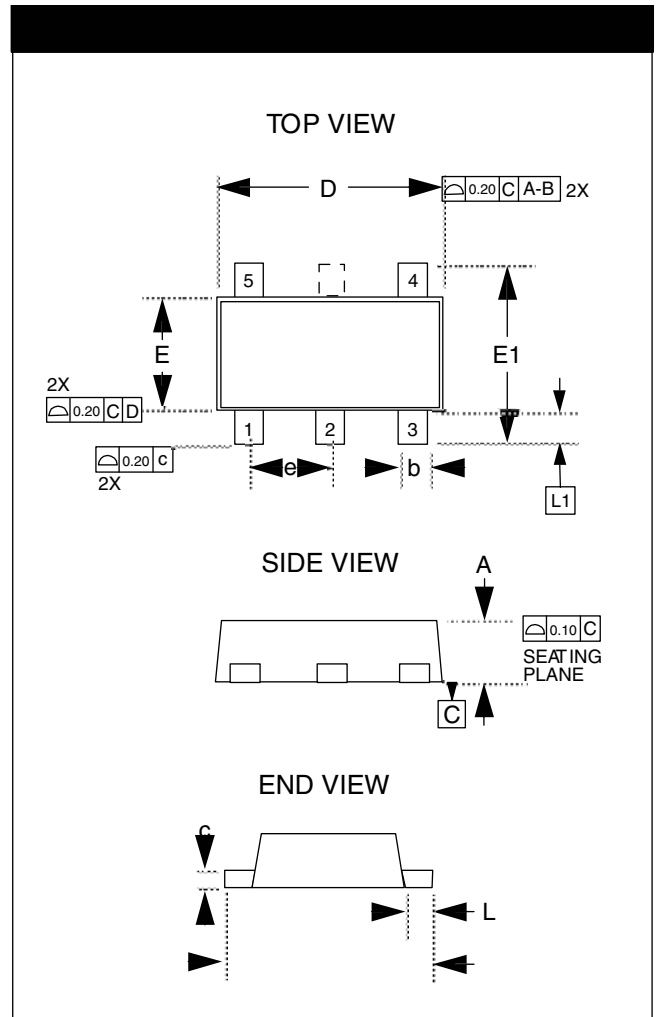
# CM1248-04S9

## Mechanical Details

### SOT-953 Mechanical Specifications

The 5-pin SOT-953 package dimensions are shown below.

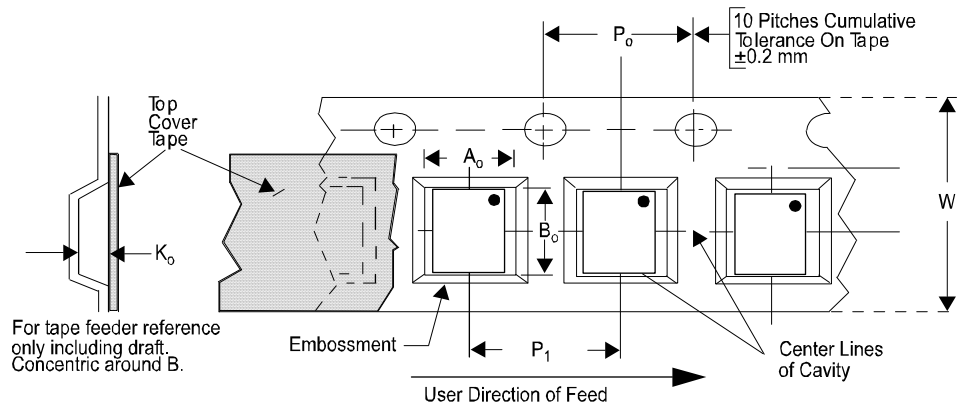
PACKAGE DIMENSIONS						
Package	SOT-953/963					
Leads	5					
Dim.	Millimeters			Inches		
	Min	Nom	Max	Min	Nom	Max
A	0.400	0.450	0.500	0.016	0.018	0.020
b	0.100	0.150	0.200	0.004	0.006	0.008
c	0.050	0.100	0.150	0.002	0.004	0.006
D	0.950	1.000	1.050	0.037	0.039	0.041
E	0.750	0.800	0.850	0.029	0.031	0.033
E1	0.950	1.000	1.050	0.037	0.039	0.041
e	0.350 BSC			0.014 BSC		
L	0.050	0.100	0.150	0.002	0.004	0.006
L1	0.125	0.150	0.175	0.005	0.006	0.007
# per tape and reel	8000 pieces					
Controlling dimension: millimeters						




Package Dimensions for SOT-953

**Tape and Reel Specifications**

PART NUMBER	PACKAGE SIZE (mm)	POCKET SIZE (mm) $B_o \times A_o \times K_o$	TAPE WIDTH W	REEL DIAMETER	QTY PER REEL	$P_o$	$P_1$
CM1249-04S9	1.00 X 0.80 X 0.45	1.16 X 1.16 X 0.63	8mm	178mm (7")	8000	4mm	4mm



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