ESD7554

4-Channel Low Capacitance Dual-Voltage ESD Protection Array

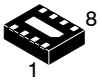
ON Semiconductor®

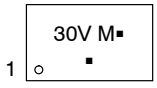
http://onsemi.com

Features

- 3 Channels of Low Voltage ESD Protection
- 1 Channel of High Voltage ESD Protection
- Provides ESD Protection to IEC61000−4−2 Level 4:
  ±8 kV Contact Discharge (Pins 1−3)
  ±15 kV Contact Discharge (Pin 4)
- Low Channel Input Capacitance
- Minimal Capacitance Change with Temperature and Voltage
- High Voltage Zener Diode Protects Supply Rail
- No Need for External Bypass Capacitors
- Each I/O Pin Can Withstand Over 1000 ESD Strikes*
- These Devices are Pb−Free, Halogen Free/BFR Free and are RoHS Compliant

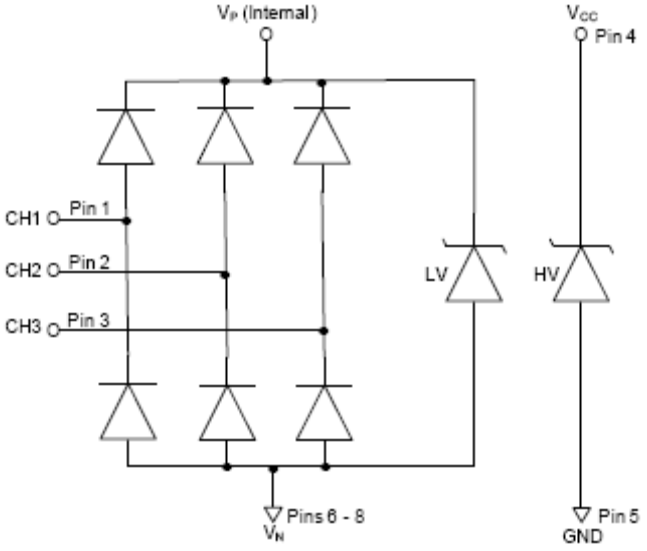
MARKING DIAGRAM





WDFN8
CASE 517BC

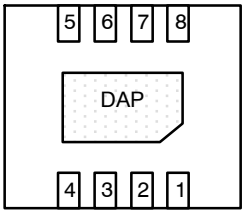
30V = Specific Device Code
M = Date Code
▪ = Pb−Free Package



NOTE: Note: Pins 5, and 6 to 8 are connected to a common substrate.

Figure 1. Electrical Schematic

PINOUT



Bottom View
(Pins up View)

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 2 of this data sheet.

*Standard test condition is IEC61000−4−2 level 4 test circuit with each pin subjected to ±8 kV contact discharge for 1000 pulses. Discharges are timed at 1 second intervals and all 1000 strikes are completed in one continuous test run. The part is then subjected to standard production test to verify that all of the tested parameters are within spec after the 1000 strikes.

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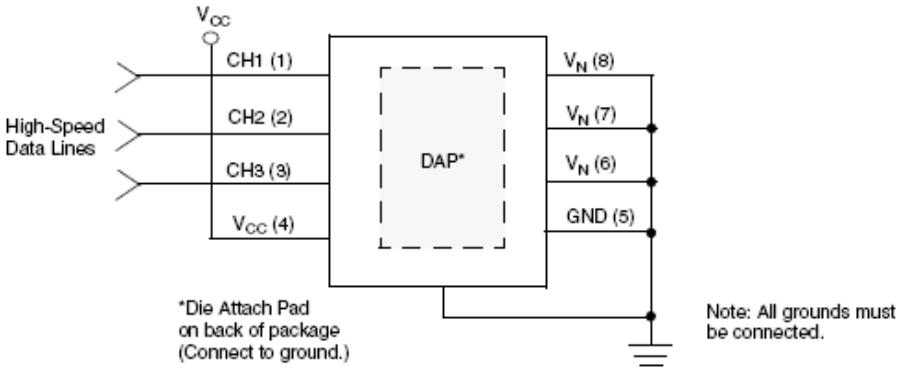


Figure 2. Typical Application

PIN DESCRIPTIONS

4−CHANNEL, 8−LEAD, uDFN−8 PACKAGE			
Pin	**Name**	**Type**	**Description**
1	CH1	I/0	LV Low−capacitance ESD Channel
2	CH2	I/0	LV Low−capacitance ESD Channel
3	CH3	I/0	LV Low−capacitance ESD Channel
4	V_{CC}	HV V_{DD}	HV ESD Channel
5	GND		Ground
6	V_N		Negative Voltage Supply Rail
7	V_N		Negative Voltage Supply Rail
8	V_N		Negative Voltage Supply Rail
DAP	GND		Die Attach Pad (Ground)

ORDERING INFORMATION

Device (Note 1)	# of Channels	Leads	Part Marking	Package	Shipping†
ESD7554MUT2G	4	8	30V	uDFN−8, 0.4 mm (Pb−Free)	Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

1. Parts are shipped in Tape and Reel form unless otherwise specified.

SPECIFICATIONS

ABSOLUTE MAXIMUM RATINGS

Parameter	Rating	Unit
DC Voltage on Low−voltage Pins	6	V
DC Voltage on High−voltage Pins (V_{CC} pin)	29	V
Operating Temperature Range	−40 to +85	°C
Storage Temperature Range	−65 to +150	°C

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

STANDARD OPERATING CONDITIONS

Parameter	Rating	Unit
Operating Temperature Range	−40 to +85	°C

ELECTRICAL OPERATING CHARACTERISTICS (See Note 2)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_F	LV Diode Reverse Voltage (Positive Voltage)	I_F = 10 mA; T_A = 25°C	6.8	8.2	9.2	V
	LV Diode Forward Voltage (Negative Voltage)	I_F = 10 mA; T_A = 25°C	−1.05	−0.9	−0.6	V
I_{LEAK}	LV Channel Leakage Current (Pins 1 and 2)	T_A = −30°C to 65°C; V_{IN} = 3.3V, V_N =0V			100	nA
	LV Channel Leakage Current (Pin 3 only)	T_A = −30°C to 65°C; V_{IN} = 3.3 V, V_N = 0 V			100	nA
C_{IN}	LV Channel Input Capacitance	At 1 MHz, V_N = 0 V, V_{IN} = 1.65 V		1.2	1.5	pF
ΔC_{IN}	LV Channel Input Capacitance Matching	At 1 MHz, V_N = 0 V, V_{IN} = 1.65 V		0.02		pF
I_{LEAK_HV}	HV Channel Leakage Current	T_A = 25°C; V_{CC} = 28 V, V_N = 0 V		0.1	1.0	mA
C_{IN_HV}	HV Channel Input Capacitance	At 1 MHz, V_N = 0V , V_{IN} = 2.5 V		30		pF
V_{F_HV}	HV Diode Breakdown Voltage Positive Voltage	I_F = 10 mA; T_A = 25°C	30		35	V
V_{ESD}	ESD Protection Peak Discharge Voltage at any channel input, in system Contact discharge per IEC 61000−4−2 standard	T_A = 25°C	±8 (Pin 1−3) ±15 (Pin 4)			kV
V_{CL}	LV Channel Clamp Voltage (Pin 1−3) Positive Transients Negative Transients	T_A = 25°C, I_{PP} = 1 A, t_P = 8/20 μS		+9.64 −1.75		V V
R_{DYN}	Dynamic Resistance LV Channel Positive Transients LV Channel Negative Transients HV Channel Positive Transients HV Channel Negative Transients	I_{PP} = 1 A, t_P = 8/20 μS Any I/O pin to Ground		0.72 0.59 4.00 0.20		Ω

2. All parameters specified at T_A = −40°C to +85°C unless otherwise noted.

PERFORMANCE INFORMATION

Input channel capacitance performance curves for low voltage pins

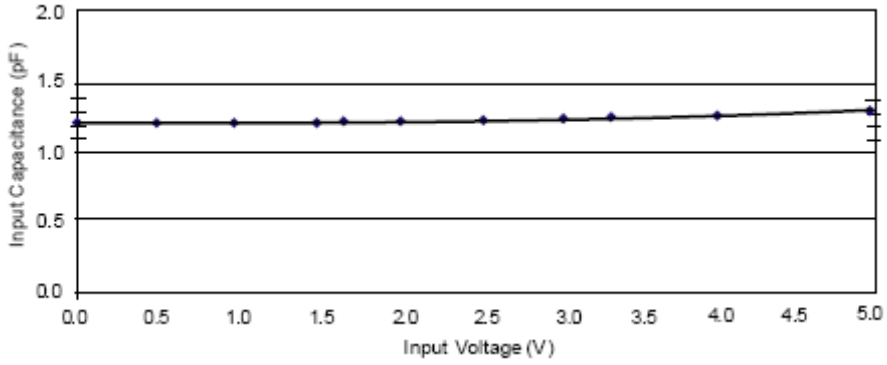


Figure 3. Typical Variation of C_{IN} vs. V_{IN} (Low Voltage Inputs, f = 1 MHz, V_N = 0 V)

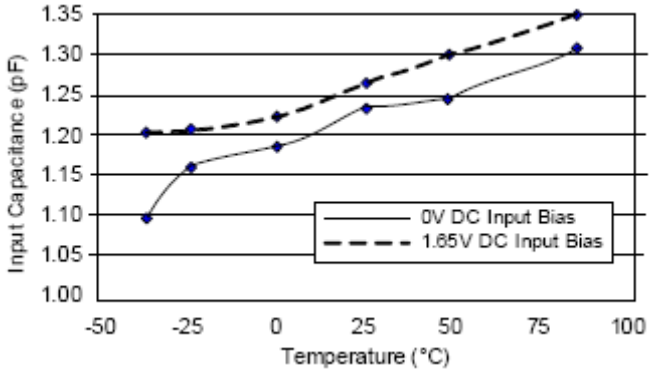


Figure 4. Typical Variation of C_{IN} vs. Temp (Low Voltage Inputs, f = 1 MHz, V_N = 0 V)

PERFORMANCE INFORMATION

Typical filter performance for low voltage pins

Nominal conditions unless specified; otherwise, 50 Ω environment

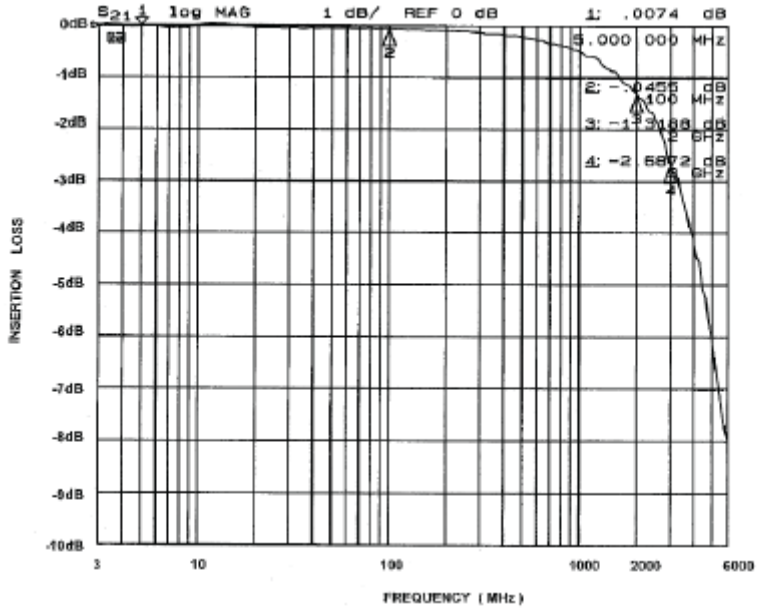


Figure 5. Channel 1 vs. All GND Pins (0 V DC Bias)

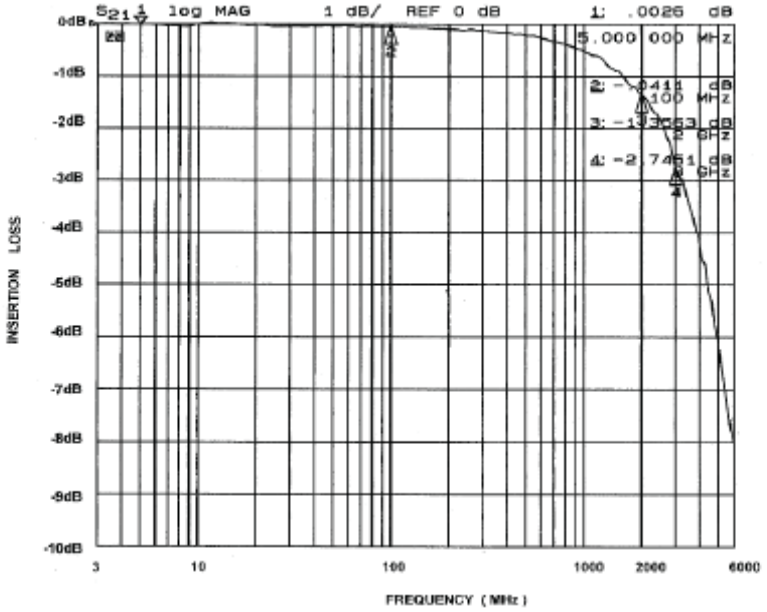


Figure 6. Channel 2 vs. All GND Pins (0 V DC Bias)

PERFORMANCE INFORMATION

Typical filter performance for low voltage pins

Nominal conditions unless specified; otherwise, 50 Ω environment

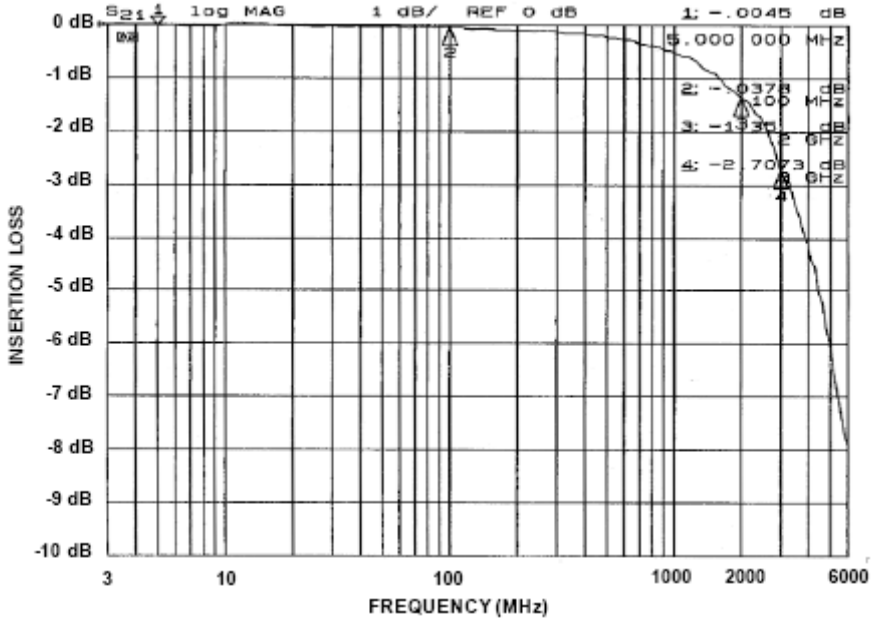
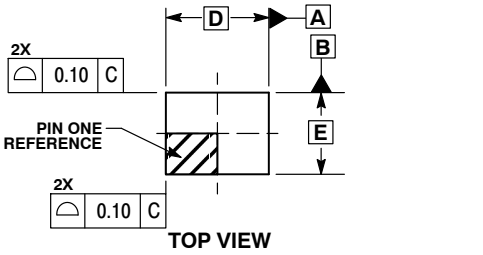


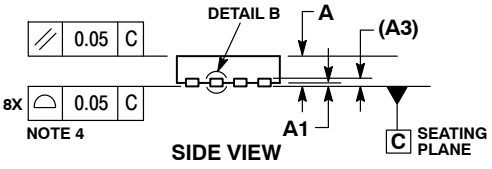
Figure 7. Channel 3 vs. All GND Pins (0 V DC Bias)

PACKAGE DIMENSIONS

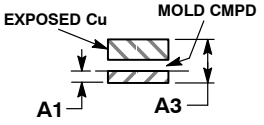
UDFN8, 1.7x1.35, 0.4P
CASE 517BC−01
ISSUE O



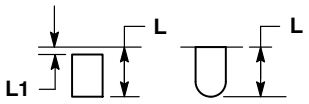
TOP VIEW



SIDE VIEW



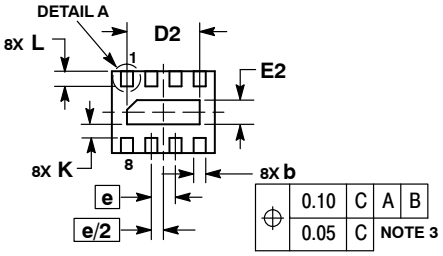
DETAIL B
ALTERNATE CONSTRUCTIONS



DETAIL A
ALTERNATE TERMINAL CONSTRUCTIONS

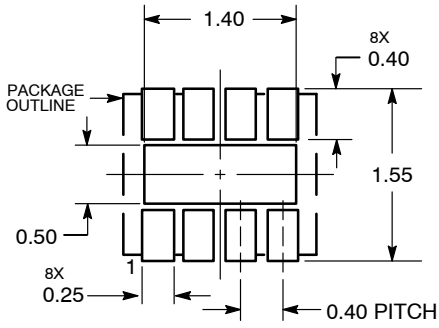
NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. DIMENSION b APPLIES TO PLATED TERMINAL AND IS MEASURED BETWEEN 0.15 AND 0.25 mm FROM THE TERMINAL TIP.
4. COPLANARITY APPLIES TO THE EXPOSED PAD AS WELL AS THE TERMINALS.

	MILLIMETERS	
DIM	MIN	MAX
A	0.45	0.55
A1	0.00	0.05
A3	0.13 REF	
b	0.15	0.25
D	1.70 BSC	
D2	1.10	1.30
E	1.35 BSC	
E2	0.30	0.50
e	0.40 BSC	
K	0.15	−−−
L	0.20	0.30
L1	−−−	0.05



BOTTOM VIEW

RECOMMENDED SOLDERING FOOTPRINT*



DIMENSIONS: MILLIMETERS

*For additional information on our Pb−Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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