



**THE DATASHEET OF
ESD7124MUTBG**



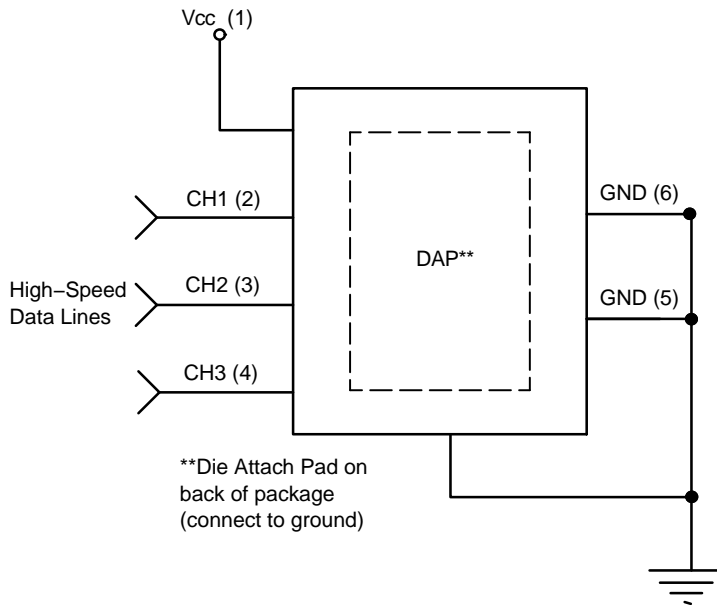
ESD7124

4-Channel Low Capacitance Dual-Voltage ESD and Surge Protection Array

Features

- 3 Channels of Low Voltage ESD Protection
- 1 Channel of High Voltage ESD Protection
- Provides ESD Protection to IEC61000-4-2 Level 4: ± 25 kV Contact Discharge
- IEC 61000-4-5 (lighting)
- Low Channel Input Capacitance
- High Voltage Zener Diode Protects Supply Rail up to 100 A (8/20 μ s)
- These Devices are Pb-Free and are RoHS Compliant

APPLICATION DIAGRAM



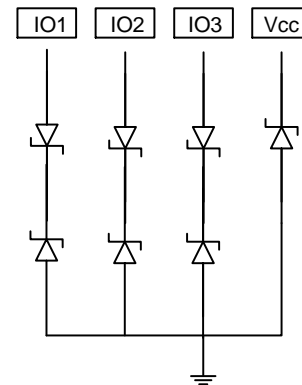
ON Semiconductor®

<http://onsemi.com>



UDFN-6
D4 SUFFIX
CASE 517CS

BLOCK DIAGRAM



MARKING DIAGRAM



AD = Specific Device Code
M = Date Code
■ = Pb-Free Package

ORDERING INFORMATION

Device	Package	Shipping†
ESD7124MUTBG	UDFN-6 (Pb-Free)	3000/Tape & Reel

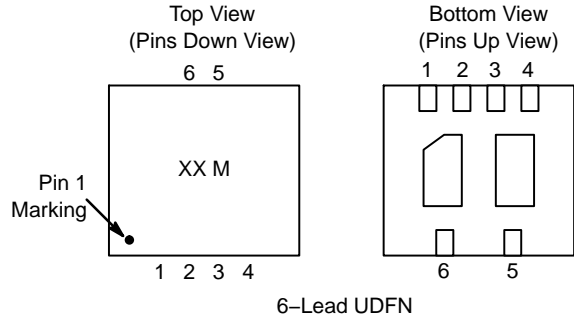
†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specification Brochure, BRD8011/D.

ESD7124

Table 1. PIN DESCRIPTIONS

4-Channel, 6-Lead, UDFN-8 Package			
Pin	Name	Type	Description
1	V _{CC}	HV V _{DD}	HV ESD Channel
2	CH1	I/O	LV Low-capacitance ESD Channel
3	CH2	I/O	LV Low-capacitance ESD Channel
4	CH3	I/O	LV Low-capacitance ESD Channel
5	GND		Ground
6	GND		Ground

PACKAGE / PINOUT DIAGRAMS



SPECIFICATIONS

Table 2. ABSOLUTE MAXIMUM RATINGS

Parameter	Rating	Units
Operating Temperature Range	-55 to +125	°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.

Table 3. ELECTRICAL CHARACTERISTICS

Device Name	Reverse Working Voltage	Breakdown Voltage V _{br} (V)		Reverse Current Leakage I _r (μA)	R _{dyn}	Junction Capacitance C _j (pF)	
	V _{rwm} (V)	at 1 mA		at V _{rwm}	Ω	V _r = 0 V, f = 1 MHz	
	Max	Min	Typ	Max	Typ	Typ	Max
Pin2-4 (LV)	3.3	5.5	6.5	1	1	0.35	0.5
Pin1 (HV)	12	13.3	14	1			

Device Name	Clamping Voltage V _c (V) tp = 8 x 20 μs		Max Ratings tp = 8 x 20 μs	
	I _{pp} = 1 A	I _{pp} = 16 A	I _{pp} (A)	V _c @ Max I _{pp} (V)
	Typ	Typ	Max	Max
Pin1 (HV)	15	16	100	27
Pin2-4 (LV)	9.5			

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Clamping Voltage TLP (Note 1) All Devices Pin2-4(LV) See Figures 3 – 6	V _C	I _{PP} = ±8 A } IEC 61000-4-2 Level 2 equivalent (±4 kV Contact, ±4 kV Air) I _{PP} = ±16 A } IEC 61000-4-2 Level 4 equivalent (±8 kV Contact, ±15 kV Air)		16.8		V
				24.9		

1. ANSI/ESD STM5.5.1 – Electrostatic Discharge Sensitivity Testing using Transmission Line Pulse (TLP) Model.
TLP conditions: Z₀ = 50 Ω, t_p = 100 ns, t_r = 4 ns, averaging window; t₁ = 30 ns to t₂ = 60 ns.

ESD7124

TYPICAL CHARACTERISTICS

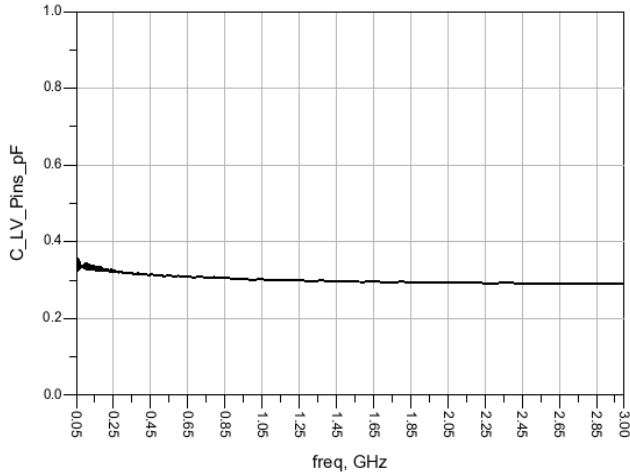


Figure 1. Capacitance Over Frequency

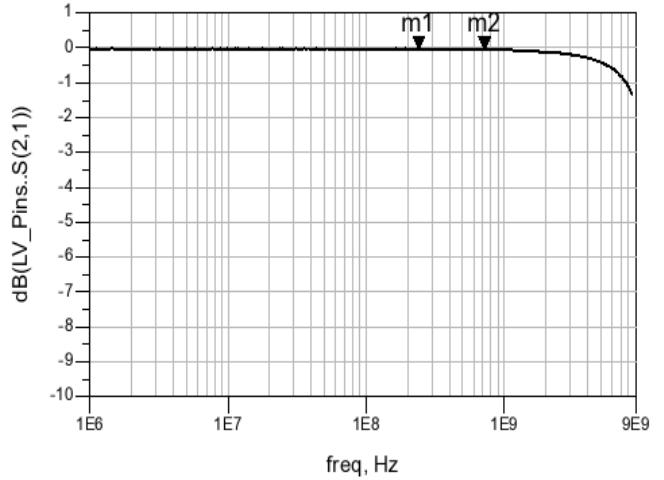


Figure 2. Insertion Loss

Interface	Data Rate (Mb/s)	Fundamental Frequency (MHz)	3 rd Harmonic Frequency (MHz)	ESD7124 Insertion Loss (dB)
USB 2.0	480	240 (m1)	720 (m2)	m1 = 0.031 m2 = 0.047

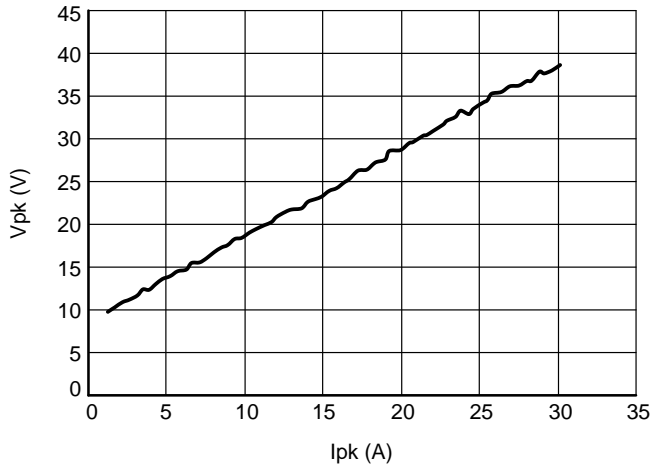


Figure 3. Positive TLP I-V Curve

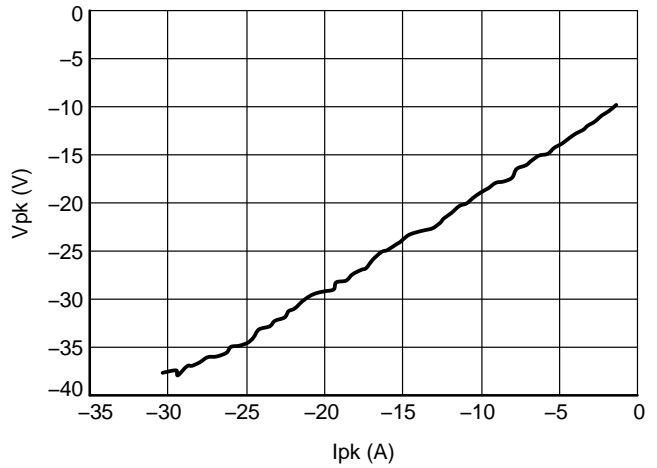


Figure 4. Negative TLP I-V Curve

Transmission Line Pulse (TLP) Measurement

Transmission Line Pulse (TLP) provides current versus voltage (I–V) curves in which each data point is obtained from a 100 ns long rectangular pulse from a charged transmission line. A simplified schematic of a typical TLP system is shown in Figure 5. TLP I–V curves of ESD protection devices accurately demonstrate the product’s ESD capability because the 10s of amps current levels and under 100 ns time scale match those of an ESD event. This is illustrated in Figure 6 where an 8 kV IEC 61000–4–2 current waveform is compared with TLP current pulses at 8 A and 16 A. A TLP I–V curve shows the voltage at which the device turns on as well as how well the device clamps voltage over a range of current levels. For more information on TLP measurements and how to interpret them please refer to AND9007/D.

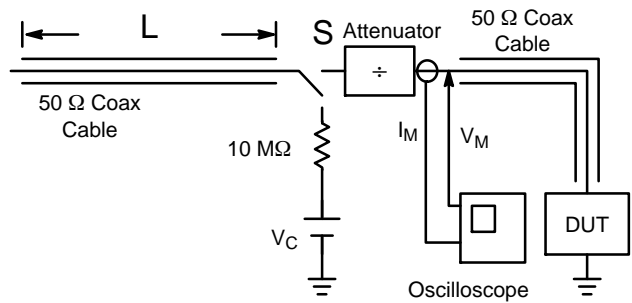


Figure 5. Simplified Schematic of a Typical TLP System

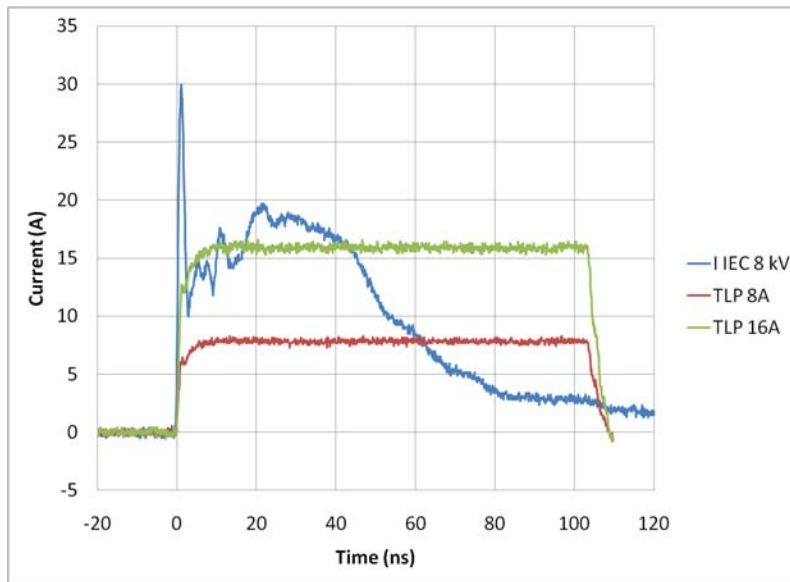
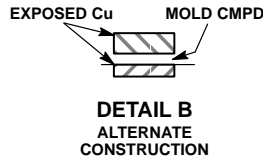
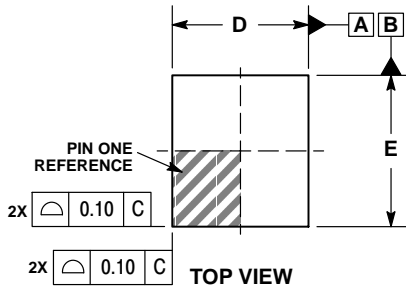


Figure 6. Comparison Between 8 kV IEC 61000–4–2 and 8 A and 16 A TLP Waveforms

ESD7124

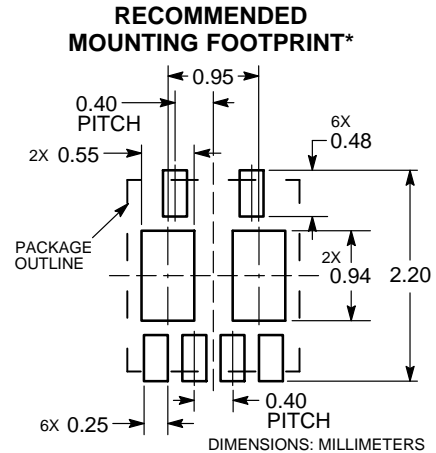
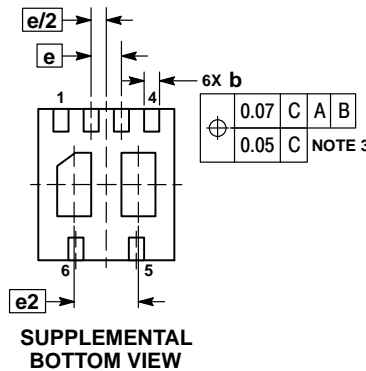
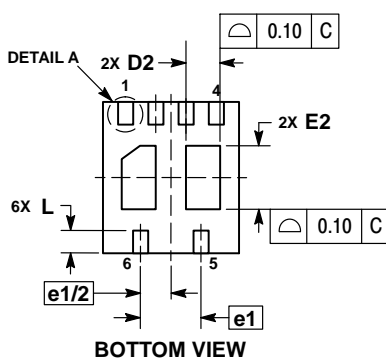
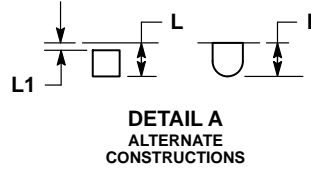
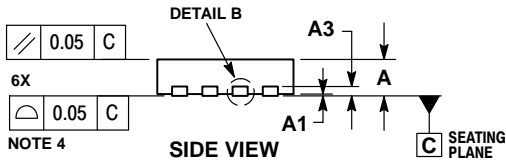
PACKAGE DIMENSIONS

UDFN6, 1.8x2, 0.4P
CASE 517CS
ISSUE O



- NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
 2. CONTROLLING DIMENSION: MILLIMETERS.
 3. DIMENSION b APPLIES TO PLATED TERMINALS AND IS MEASURED BETWEEN 0.15 AND 0.30mm FROM THE TERMINAL TIP.
 4. COPLANARITY APPLIES TO THE EXPOSED PAD AS WELL AS THE TERMINALS.

DIM	MILLIMETERS	
	MIN	MAX
A	0.45	0.55
A1	0.00	0.05
A3	0.125 REF	
b	0.15	0.25
D	1.80 BSC	
D2	0.35	0.55
E	2.00 BSC	
E2	0.74	0.94
e	0.40 BSC	
e1	0.80 BSC	
e2	0.95 BSC	
L	0.20	0.40
L1	---	0.15



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

ON Semiconductor and are registered trademarks of Semiconductor Components Industries, LLC (SCILLC). SCILLC owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of SCILLC's product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marking.pdf. SCILLC reserves the right to make changes without further notice to any products herein. SCILLC makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does SCILLC assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. "Typical" parameters which may be provided in SCILLC data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. SCILLC does not convey any license under its patent rights nor the rights of others. SCILLC products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the SCILLC product could create a situation where personal injury or death may occur. Should Buyer purchase or use SCILLC products for any such unintended or unauthorized application, Buyer shall indemnify and hold SCILLC and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that SCILLC was negligent regarding the design or manufacture of the part. SCILLC is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
Literature Distribution Center for ON Semiconductor
P.O. Box 5163, Denver, Colorado 80217 USA
Phone: 303-675-2175 or 800-344-3860 Toll Free USA/Canada
Fax: 303-675-2176 or 800-344-3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

N. American Technical Support: 800-282-9855 Toll Free
USA/Canada
Europe, Middle East and Africa Technical Support:
Phone: 421 33 790 2910
Japan Customer Focus Center
Phone: 81-3-5817-1050

ON Semiconductor Website: www.onsemi.com
Order Literature: <http://www.onsemi.com/orderlit>
For additional information, please contact your local Sales Representative

Looking for pricing, stock, or lifecycle information?

Click below to explore more details on WIN SOURCE:

 [View ESD7124MUTBG on WIN SOURCE](#)

 [ON Semiconductor](#) Information

Optimize Your Supply Chain with WIN SOURCE Solutions

-  Global Sourcing Solution
-  Obsolete Management
-  Cost Control Management
-  Shortage Management
-  Alternative Solution
-  Excess Inventory Management