

ESD7108

ESD Protection Diode

Low Capacitance Array for High Speed Data Lines

The ESD7108 transient voltage suppressor is designed specifically to protect four high speed differential pairs. Ultra-low capacitance and low ESD clamping voltage make this device an ideal solution for protecting voltage sensitive high speed data lines. The flow-through style package allows for easy PCB layout and matched trace lengths necessary to maintain consistent impedance for the high speed lines.

Features

- Integrated 4 Pairs (8 Lines) High Speed Data
- Single Connect, Flow through Routing
- Low Capacitance (0.25 pF Max, I/O to GND)
- Protection for the Following IEC Standards:
IEC 61000-4-2 Level 4
- UL Flammability Rating of 94 V-0
- This is a Pb-Free Device

Typical Applications

- V-by-One HS
- LVDS

MAXIMUM RATINGS (T_J = 25°C unless otherwise noted)

| Rating | Symbol | Value | Unit |
|---|------------------|-------------|------|
| Operating Junction Temperature Range | T _J | -55 to +125 | °C |
| Storage Temperature Range | T _{stg} | -55 to +150 | °C |
| Lead Solder Temperature – Maximum (10 Seconds) | T _L | 260 | °C |
| IEC 61000-4-2 Contact (ESD) | ESD | ±15 | kV |
| IEC 61000-4-2 Air (ESD) | ESD | ±15 | kV |

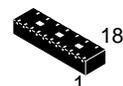
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

See Application Note AND8308/D for further description of survivability specs.



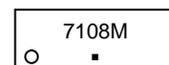
ON Semiconductor®

<http://onsemi.com>



UDFN18
CASE 517BV

MARKING DIAGRAM



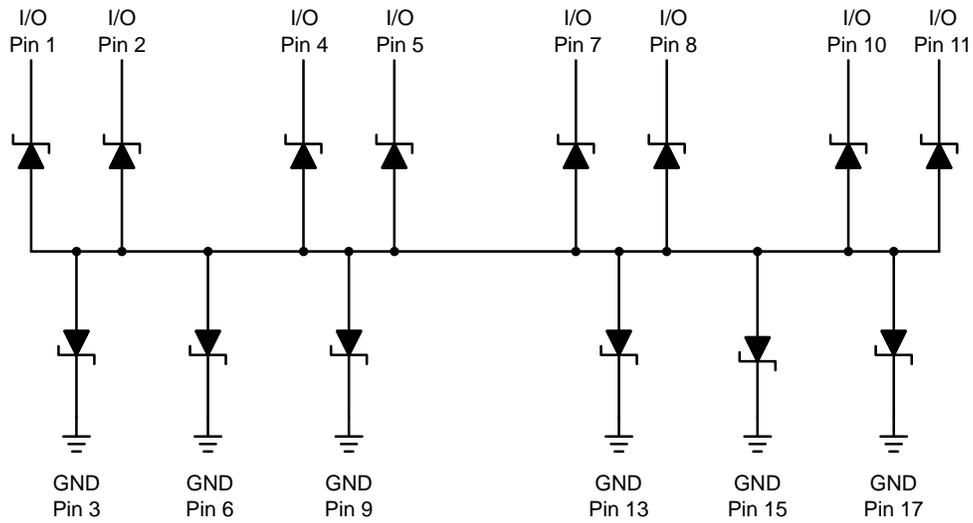
- 7108 = Specific Device Code
- M = Date Code
- = Pb-Free Package

ORDERING INFORMATION

| Device | Package | Shipping |
|--------------|---------------------|--------------------|
| ESD7108MUTAG | UDFN18 (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.

ESD7108



Note: Only Minimum of 1 GND connection required

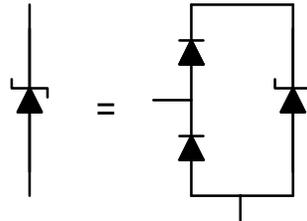


Figure 1. Pin Schematic

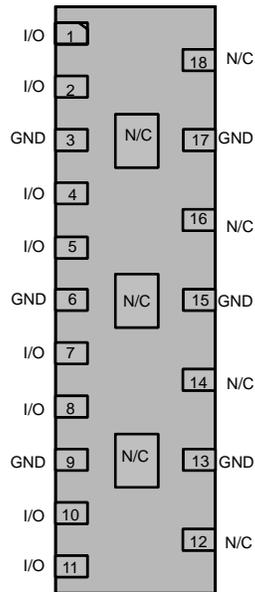


Figure 2. Pin Configuration

Note: Only minimum of one pin needs to be connected to ground for functionality of all pins. All pins labeled "N/C" should have no electrical connection.

ESD7108

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise specified)

| Parameter | Symbol | Conditions | Min | Typ | Max | Unit |
|------------------------------------|--------------|--|-----|--------------|------|---------------|
| Reverse Working Voltage | V_{RWM} | I/O Pin to GND | | | 5.0 | V |
| Breakdown Voltage | V_{BR} | $I_T = 1\text{ mA}$, I/O Pin to GND | 5.5 | | 8.5 | V |
| Reverse Leakage Current | I_R | $V_{RWM} = 5\text{ V}$, I/O Pin to GND | | | 1.0 | μA |
| Clamping Voltage TLP (Note 1) | V_C | $I_{PP} = \pm 8\text{ A}$ $I_{PP} = \pm 16\text{ A}$ | | 14.5 19.5 | | |
| Junction Capacitance | C_J | $V_R = 0\text{ V}$, $f = 1\text{ MHz}$ between I/O Pins and GND | | | 0.25 | pF |
| Junction Capacitance Difference | ΔC_J | $V_R = 0\text{ V}$, $f = 1\text{ MHz}$ between I/O Pins and GND | | 0.02 | | pF |

- ANSI/ESD STM5.5.1 – Electrostatic Discharge Sensitivity Testing using Transmission Line Pulse (TLP) Model.
TLP conditions: $Z_0 = 50\ \Omega$, $t_p = 100\text{ ns}$, $t_r = 4\text{ ns}$, averaging window; $t_1 = 30\text{ ns}$ to $t_2 = 60\text{ ns}$.

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 3. 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 4 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.

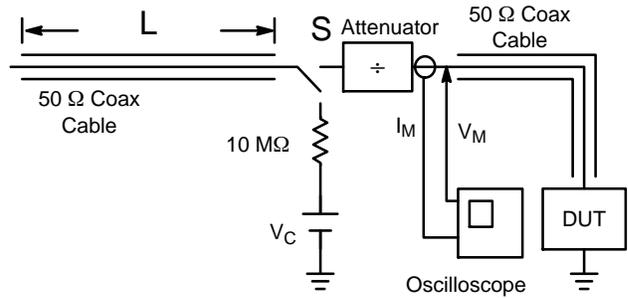


Figure 3. Simplified Schematic of a Typical TLP System

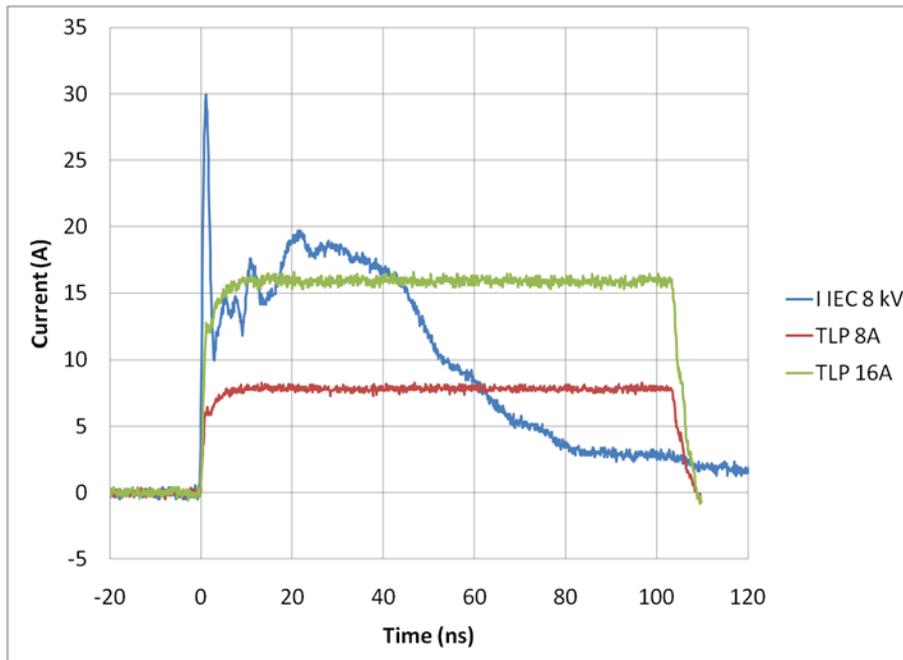


Figure 4. Comparison Between 8 kV IEC 61000–4–2 and 8 A and 16 A TLP Waveforms

ESD7108

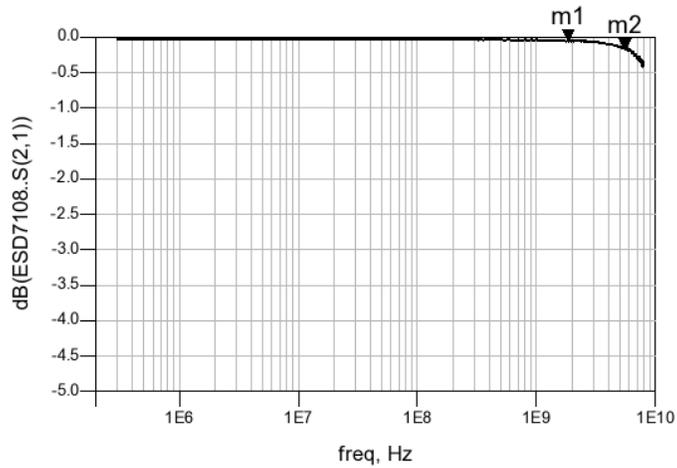


Figure 5. ESD7108 Insertion Loss

| Interface | Data Rate (Gbps) | Fundamental Frequency (GHz) | 3 rd Harmonic Frequency (GHz) | ESD7108 Insertion Loss (-dB) |
|--|------------------|-----------------------------|--|------------------------------|
| V-by-One HS Full HD (1920 x 1080p) 240 Hz, 36bit color depth | 3.71 | 1.854 (m1) | 5.562 (m2) | M1 = 0.058 M2 = 0.175 |

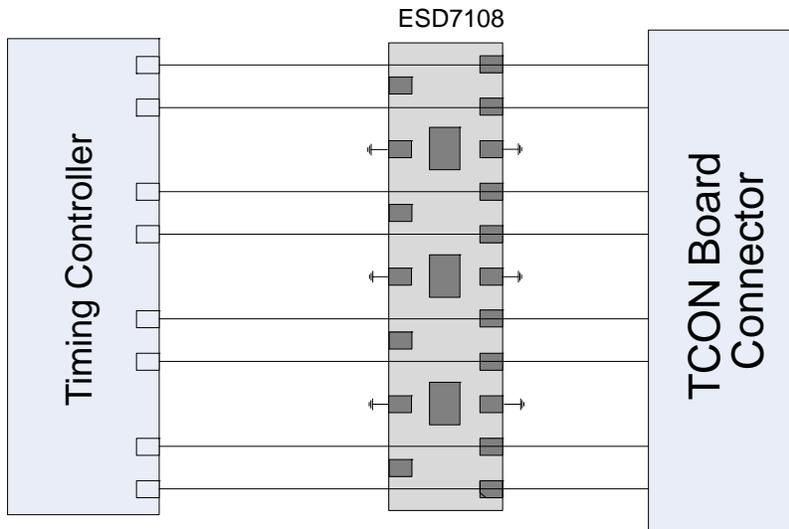
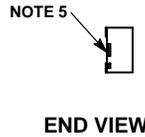
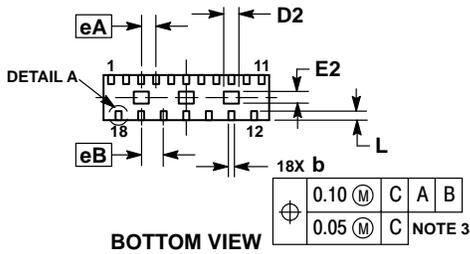
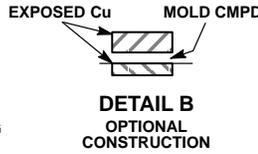
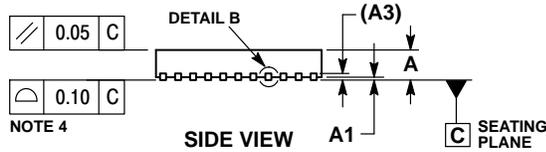
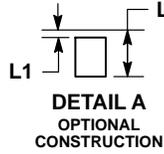
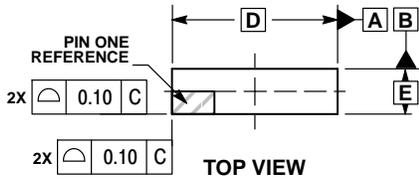


Figure 6. V-by-One HS Layout Diagram (for LCD Panel)

ESD7108

PACKAGE DIMENSIONS

UDFN18, 5.5x1.5, 0.5P
CASE 517BV
ISSUE O

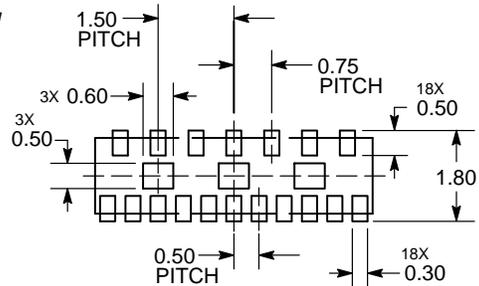


NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. DIMENSION b APPLIES TO PLATED TERMINAL AND IS MEASURED BETWEEN 0.10 AND 0.20 MM FROM TERMINAL TIP.
4. COPLANARITY APPLIES TO THE EXPOSED PAD AS WELL AS THE TERMINALS.
5. EXPOSED ENDS OF TERMINALS ARE ELECTRICALLY ACTIVE.

| DIM | MILLIMETERS | |
|-----|-------------|------|
| | MIN | MAX |
| A | 0.45 | 0.55 |
| A1 | 0.00 | 0.05 |
| A3 | 0.13 | REF |
| b | 0.15 | 0.25 |
| D | 5.50 | BSC |
| D2 | 0.45 | 0.55 |
| E | 1.50 | BSC |
| E2 | 0.35 | 0.45 |
| eA | 0.50 | BSC |
| eB | 0.75 | BSC |
| L | 0.20 | 0.40 |
| L1 | 0.00 | 0.05 |

**RECOMMENDED
SOLDERING FOOTPRINT***



DIMENSION: 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.

ON Semiconductor and are registered trademarks of Semiconductor Components Industries, LLC (SCILLC). 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