

◆ **DESCRIPTIONS**

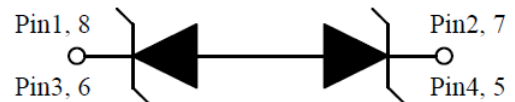
CMESDF08V2R5C4R5DFE is a low-capacitance Transient Voltage Suppressor (TVS) array designed to provide electrostatic discharge (ESD) protection for high-speed data interfaces. With typical capacitance of 4.5pF only, CMESDF08V2R5C4R5DFE is designed to protect parasitic-sensitive systems against over-voltage and over-current transient events. It complies with IEC 61000-4-2 (ESD), Level 4 ($\pm 15\text{kV}$ air, $\pm 8\text{kV}$ contact discharge), IEC 61000-4-4 (electrical fast transient - EFT) (40A, 5/50 ns), IEC 61000-4-5 (Surge) (10A, 8/20 μs), very fast charged device model (CDM) ESD and cable discharge event (CDE), etc.

CMESDF08V2R5C4R5DFE is in a DFN-8L package. Each CMESDF08V2R5C4R5DFE device can protect two high-speed line pairs. The “flow-thru” design minimizes trace inductance and reduces voltage overshoot associated with ESD events. The combined features of low capacitance and high ESD robustness make CMESDF08V2R5C4R5DFE ideal for high-speed data port and high-frequency line (e.g., Gigabit Ethernet Ports) applications. The low clamping voltage of the CMESDF08V2R5C4R5DFE guarantees a minimum stress on the protected IC.

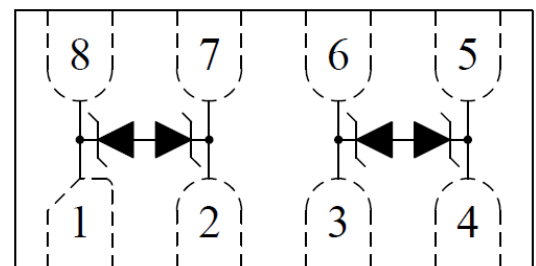
◆ **FEATURES**

- 1、Transient protection for high-speed data lines
IEC 61000-4-2 (ESD) $\pm 30\text{kV}$ (Air)
 $\pm 30\text{kV}$ (Contact)
IEC 61000-4-4 (EFT) 40A (5/50 ns)
IEC 61000-4-5 (Surge) 10A (8/20 μs)
- 2、Package optimized for high-speed lines
- 3、Provides protection for two line pairs
- 4、Low capacitance: 4.5pF @ 2.5V (Typical)
- 5、Low leakage current: 10nA @ V_{RWM} (Typical)
- 6、Low operating and clamping voltage
- 7、Each I/O pin can withstand over 1000 ESD strikes for $\pm 8\text{kV}$ contact discharge

◆ **Circuit Diagram**



◆ **Pin Configuration**



**DFN-8L
(Top View)**

◆ **Applications**

- 1、10/100/1000M Ethernet Ports
- 2、WAN/LAN Equipment
- 3、Desktops, Servers and Notebooks
- 4、Cellular Phones
- 5、Switching Systems
- 6、Audio/Video Inputs

◆ **Mechanical Characteristics**

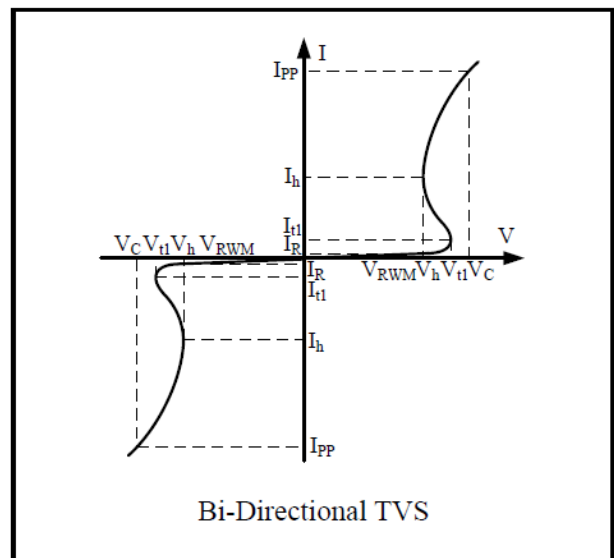
- 1、DFN-8L package
- 2、Flammability Rating: UL 94V-0
- 3、Marking: Part number, Date
- 4、Packaging: Tape and Reel

◆ **Absolute Maximum Rating**

| Symbol | Parameter | Value | Units |
|-----------|--|----------------------|--------------|
| I_{PP} | Peak Pulse Current (8/20 μ s) | 10 | A |
| P_{PK} | Peak Pulse Power (8/20 μ s) | 100 | W |
| V_{ESD} | ESD per IEC 61000-4-2 (Air) ESD per IEC 61000-4-2 (Contact) | ± 30 ± 30 | kV |
| T_{OPT} | Operating Temperature | -45/+85 | $^{\circ}$ C |
| T_{STG} | Storage Temperature | -55/+150 | $^{\circ}$ C |

◆ **Electrical Characteristics (T = 25 $^{\circ}$ C)**

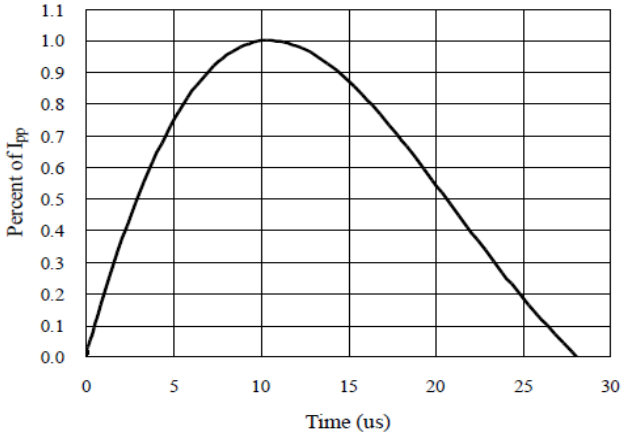
| Symbol | Parameter |
|--------------|--|
| I_R | Reverse Leakage Current @ V_{RWM} |
| V_{t1} | Trigger Voltage |
| I_{t1} | Trigger Current @ V_{t1} |
| V_h | Holding Voltage |
| I_h | Holding Current @ V_h |
| V_C | Clamping Voltage @ I_{PP} |
| I_{PP} | Maximum Peak Pulse Current |
| V_F | Forward Voltage @ I_F |
| C_{ESD} | Parasitic Capacitance |
| C_{Δ} | Variation in C_{ESD} with Reverse Bias |



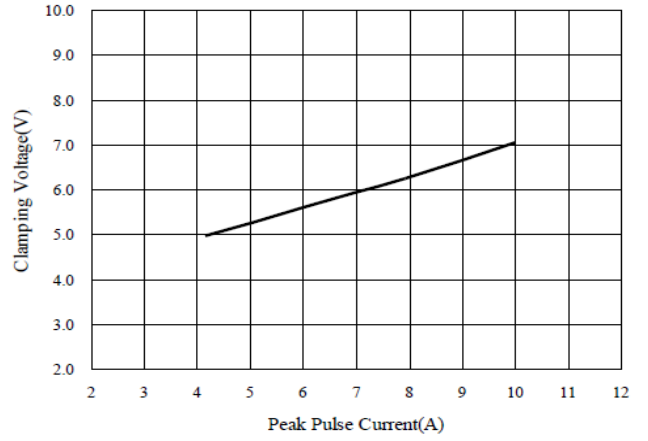
| Symbol | Test Condition | Minimum | Typical | Maximum | Units |
|-----------|---|---------|---------|---------|-------|
| V_{RWM} | | - | - | 2.5 | V |
| I_R | $V_{RWM} = 2.5V, T = 25^{\circ}C$ | | 10 | 50 | nA |
| V_{t1} | $I_{t1} = 1\mu A$ | 3.0 | 3.7 | 4.5 | V |
| V_h | $I_h = 1mA$ | 3.0 | | 4.0 | V |
| V_C | $I_{PP} = 1A, t_p = 8/20\mu s$ (Each Line) | - | - | 5.0 | V |
| V_C | $I_{PP} = 10A, t_p = 8/20\mu s$ (Each Line) | - | - | 8.0 | V |
| V_C | $I_{PP} = 25A, t_p = 8/20\mu s$ (Each Line) | - | - | 15.0 | V |
| C_{ESD} | Between I/O Pins and Ground $V_R = 0V, f = 1MHz$ | - | 4.5 | 6.0 | pF |
| C_{ESD} | Between I/O Pins $V_R = 0V, f = 1MHz$ | - | 1.3 | - | pF |

◆ **TYPICAL ELECTRICAL CHARACTERISTICS CURVE**

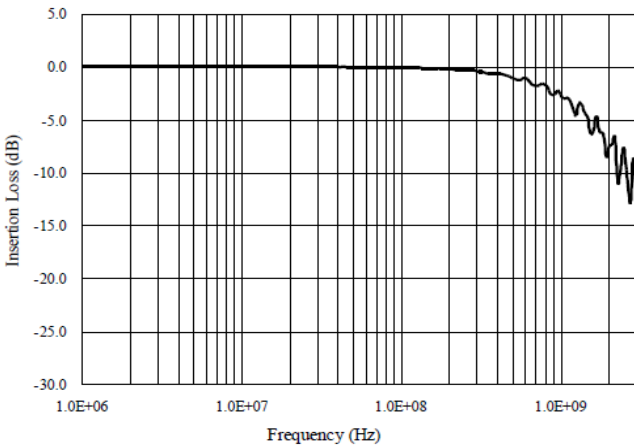
8/20 μ s Pulse Waveform



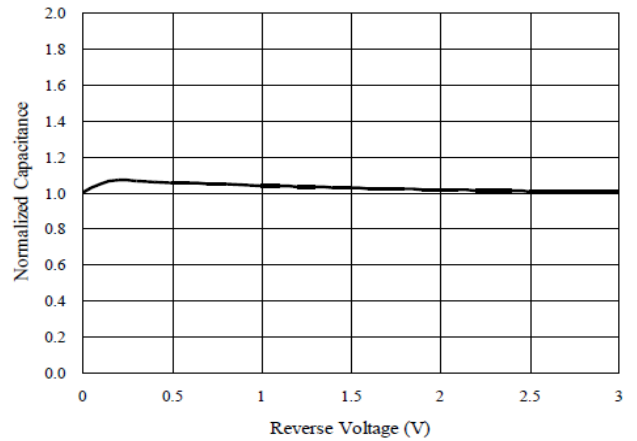
Clamping Voltage V_C vs. Current I_{PP}



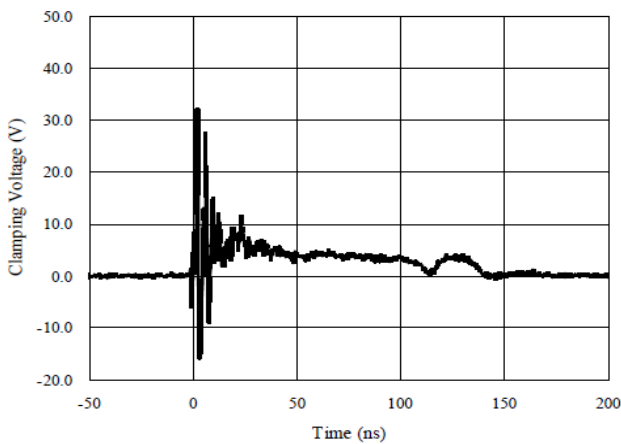
Insertion Loss S21



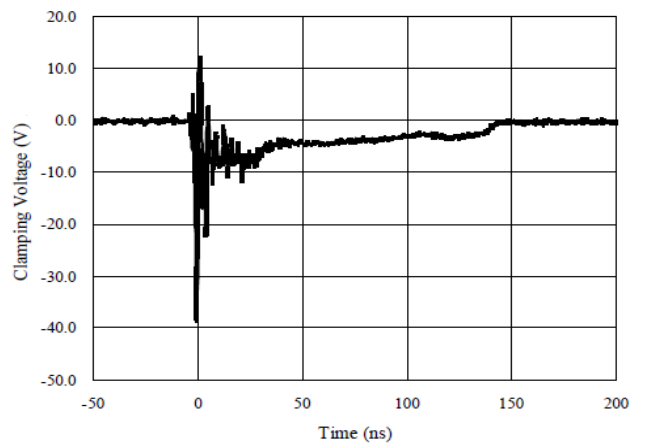
Normalized Capacitance vs. Voltage



**ESD Clamping of I/O to GND
(+8kV Contact per IEC 61000-4-2)**



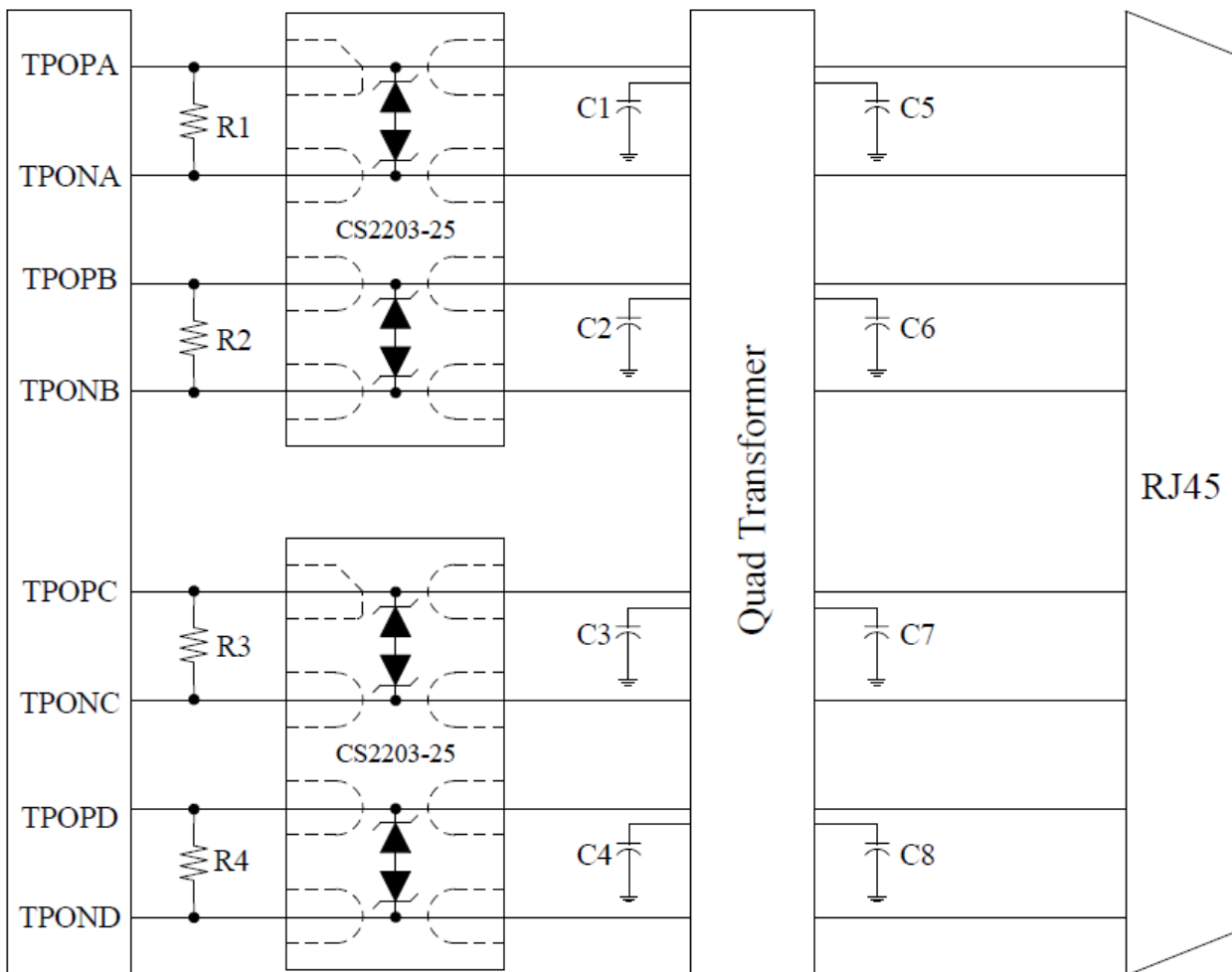
**ESD Clamping of I/O to GND
(-8kV Contact per IEC 61000-4-2)**



◆ **Application Information**

Electronic equipment is susceptible to damage caused by a variety of sources, including Electrostatic Discharge (ESD), Electrical Fast Transients (EFT) and Lightning strikes. The CMESDF08V2R5V4R5DFE was designed to protect the sensitive equipment from damage which may be induced by such transient events. This product can be configured in a connection to meet the requirement of differential line pairs as follows:

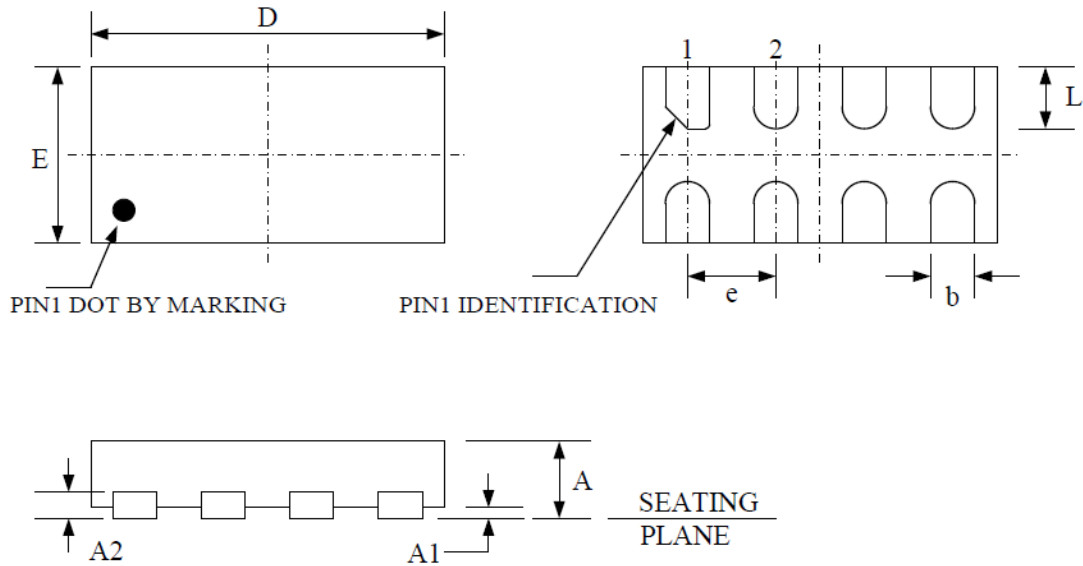
◆ **Gigabit Ethernet Protection**



Schematic Diagram for Gigabit Ethernet ESD/Surge Protection

◆ **PACKAGE OUTLINE**

- 1、DFN-8L Package
- 2、Flow-Through
- 3、MSL 1 & Thermally-Enhanced



Package Dimensions (Controlling dimensions are in millimeters)

| Symbol | Dimensions (mm) | | | Dimensions (Inches) | | |
|--------|-----------------|---------|---------|---------------------|---------|---------|
| | Minimum | Typical | Maximum | Minimum | Typical | Maximum |
| A | 0.370 | 0.400 | 0.430 | 0.015 | 0.016 | 0.017 |
| A1 | 0.000 | 0.020 | 0.050 | 0.000 | 0.001 | 0.002 |
| A2 | 0.130 | | | 0.005 | | |
| b | 0.200 | 0.250 | 0.300 | 0.008 | 0.010 | 0.012 |
| D | 1.900 | 2.000 | 2.100 | 0.075 | 0.079 | 0.083 |
| E | 0.900 | 1.000 | 1.100 | 0.035 | 0.039 | 0.043 |
| e | 0.500 BSC | | | 0.020 BSC | | |
| L | 0.300 | 0.350 | 0.400 | 0.012 | 0.014 | 0.016 |
| R | 0.050 | 0.100 | 0.150 | 0.002 | 0.004 | 0.006 |