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CMESDF10V2R5C3R8DFE

### Low Capacitance ESD/Surge Protection for Gigabit Ethernet Interfaces

◆ DESCRIPTIONS

CMESDF10V2R5C3R8DFE 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 3.8pF only, CMESDF10V2R5C3R8DFE 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 (±15kV air, ±8kV contact discharge), IEC 61000-4-4 (electrical fast transient - EFT) (40A, 5/50 ns), IEC 61000-4-5 (Surge) (25A,8/20μs), very fast charged device model (CDM) ESD and cable discharge event (CDE), etc.

CMESDF10V2R5C3R8DFE is in a DFN2.6 × 2.6-10L package. Each CMESDF10V2R5C3R8DFE device can protect two high-speed line pairs. The combined features of low capacitance and high ESD robustness make CMESDF10V2R5C3R8DFE ideal for high-speed data port and high-frequency line (e.g.,Gigabit Ethernet Ports) applications. The low clamping voltage of the CMESDF10V2R5C3R8DFE guarantees a minimum stress on the protected IC.

◆ FEATURES

1、Transient protection for high-speed data lines
   IEC 61000-4-2 (ESD) ±15kV (Air)
                      ±8kV (Contact)
   IEC 61000-4-4 (EFT) 40A (5/50 ns)
   IEC 61000-4-5 (Surge) 25A (8/20μs)
2、Package optimized for high-speed lines
3、Provides protection for two line pairs
4、Low capacitance: 3.8pF @ 0V (Typical)
5、Low leakage current: 0.1 μA @ V_{RWM} (Typical)
6、Low operating and clamping voltage
7、Each I/O pin can withstand over 1000 ESD strikes for ±8kV contact discharge

◆ Circuit Diagram
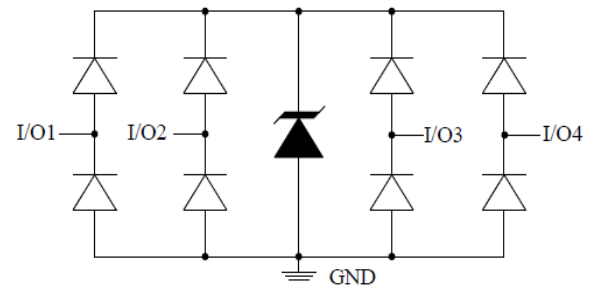
◆ Pin Configuration
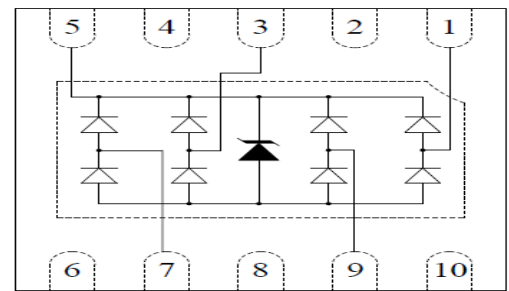
DFN2.6×2.6-10L (Top View)

◆ 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、DFN2.6×2.6-10L 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 (8/20μs)	25	A
P_{PK}	Peak Pulse Power (8/20μs)	450	W
V_{ESD}	ESD per IEC 61000-4-2 (Air)	±25	kV
	ESD per IEC 61000-4-2 (Contact)	±15	
T_{OPT}	Operating Temperature	-55/+125	℃
T_{STG}	Storage Temperature	-55/+150	℃

◆ **Electrical Characteristics (T = 25℃)**

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

Uni-Directional TVS
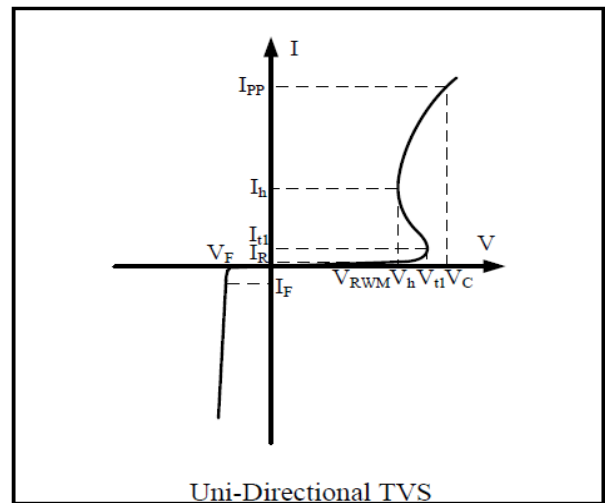
Symbol	Test Condition	Minimum	Typical	Maximum	Units
V_{RWM}		-	-	2.5	V
I_R	V_{RWM} = 2.5V, T = 25℃		0.1	1.0	μA
V_{t1}	I_{t1} = 1μA	3.0	3.7	4.5	V
V_h	I_h = 1mA	3.0		4.0	V
V_C	I_{PP} = 1A, tp = 8/20μs (Each Line)	-	-	4.5	V
V_C	I_{PP} = 10A, tp = 8/20μs (Each Line)	-	-	7.5	V
V_C	I_{PP} = 25A, tp = 8/20μs (Each Line)	-	-	15.0	V
C_{ESD}	Between I/O Pins and Ground V_R = 0V, f = 1MHz	-	3.8	5.0	pF
C_{ESD}	Between I/O Pins V_R = 0V, f = 1MHz	-	2.0	2.5	pF

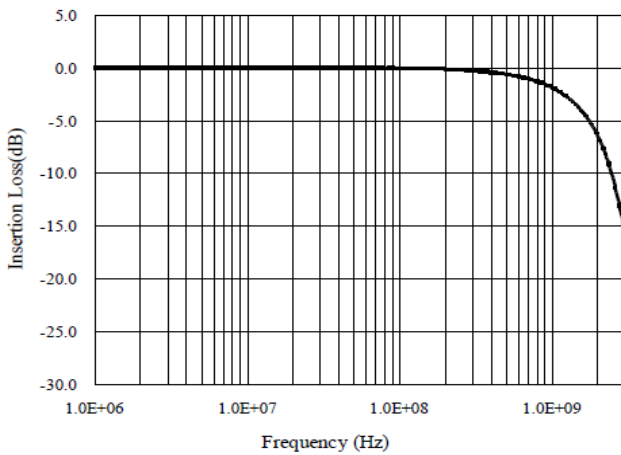## ◆ TYPICAL ELECTRICAL CHARACTERISTICS CURVE

8/20µs Pulse Waveform
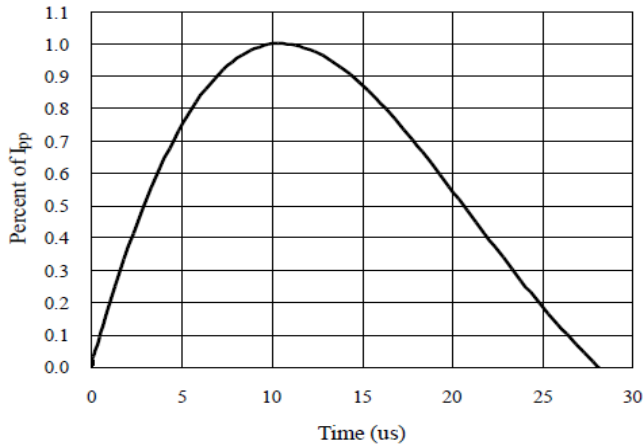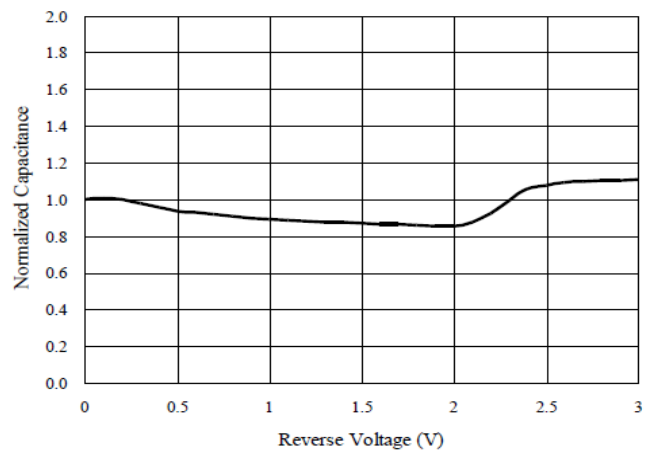
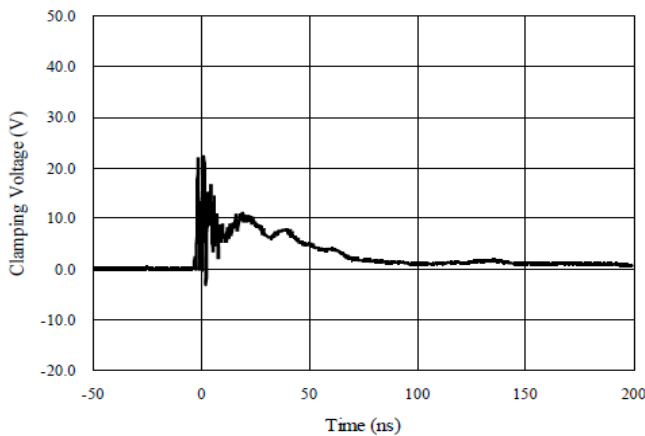### Clamping Voltage V_C vs. Current I_{PP}
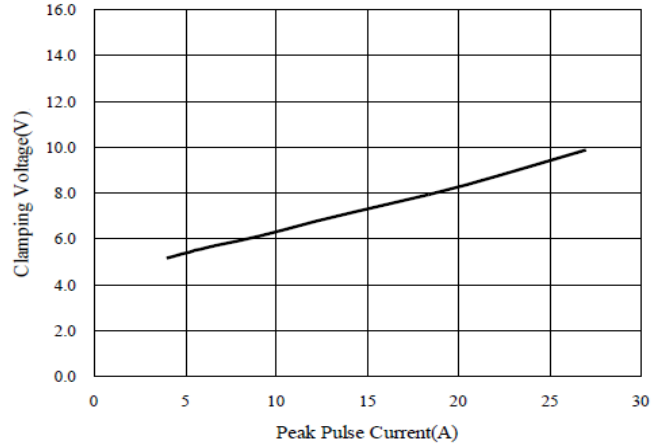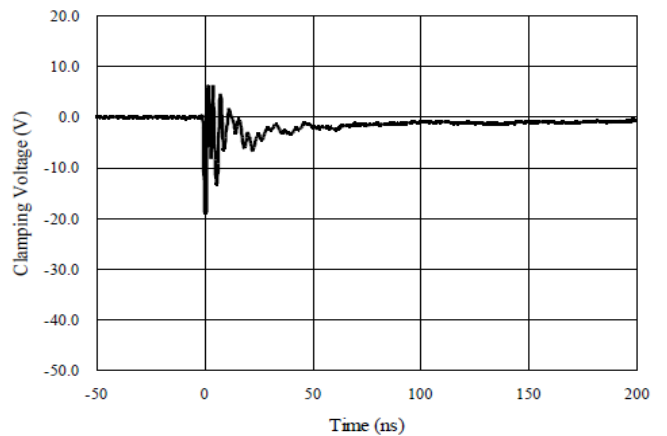
Insertion Loss S21

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 CMESDF10V2R5C3R8DFE was designed to protect the sensitive equipment from damage which may be induced by such transient events. This product can be configured in different connections to meet the requirement of common-mode and differential-mode as follows:
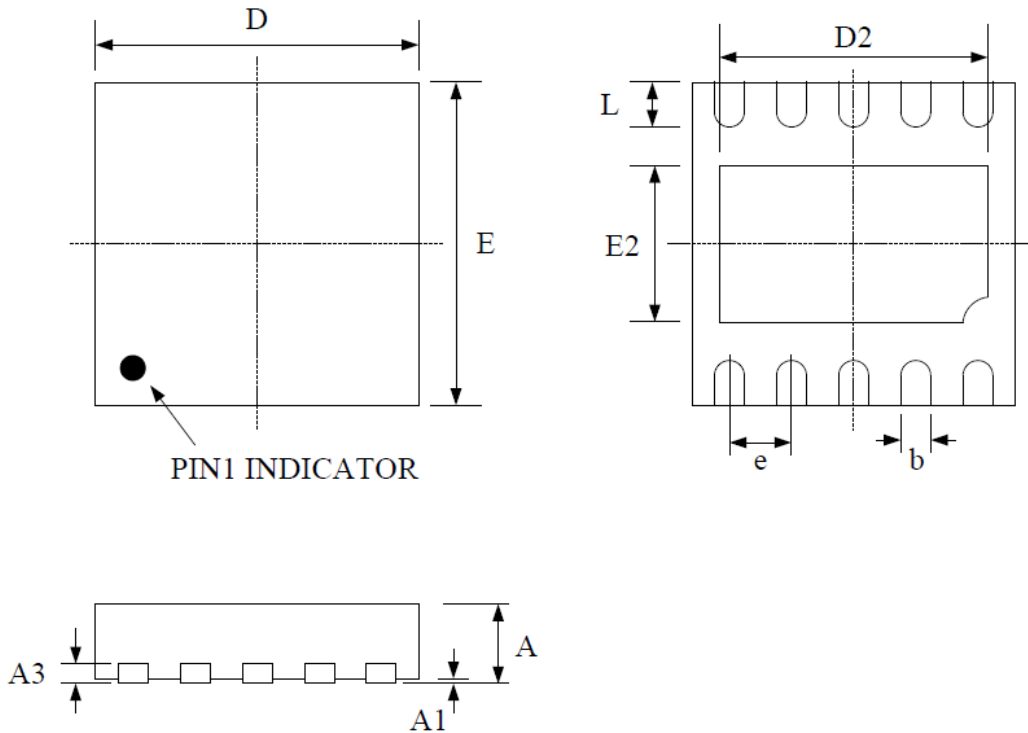
◆ **Gigabit Ethernet Protection**
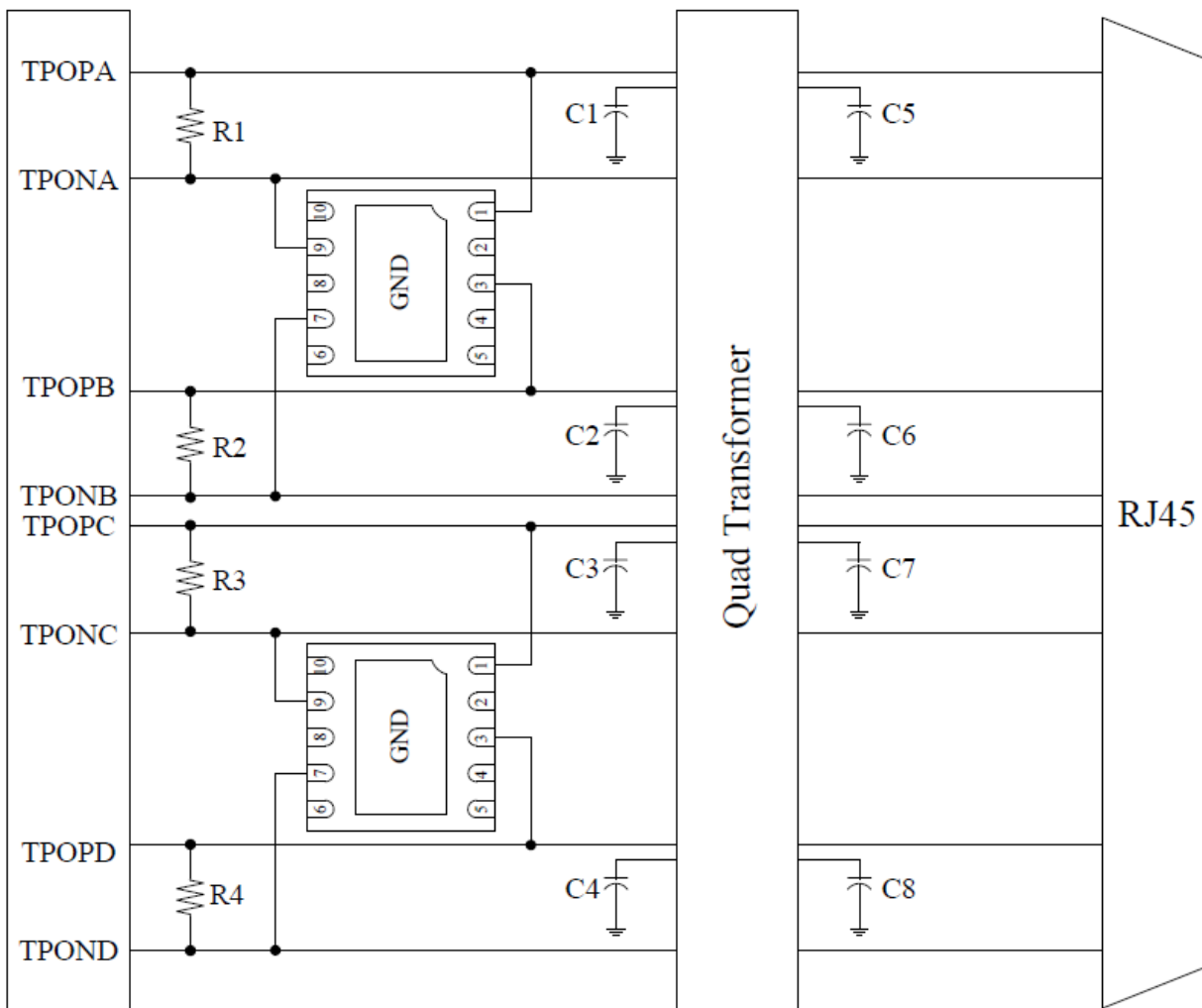
Schematic Diagram for Gigabit Ethernet ESD/Surge Protection using CMESDF10V2R5C3R8DFE

NOTE:
DO NOT connect pin5 of CMESDF10V2R5C3R8DFE to a DC supply.

◆ **PACKAGE OUTLINE**

D

E

PIN1 INDICATOR

D2

L

E2

e

b

A3

A

A1

Package Dimensions (Controlling dimensions are in millimeters)

Symbol	Dimensions (mm)			Dimensions (Inches)		
	Minimum	Typical	Maximum	Minimum	Typical	Maximum
A	0.500	0.550	0.600	0.020	0.022	0.024
A1	0.000	—	0.050	0.000	—	0.002
A3	0.15 REF			0.006 REF		
b	0.200	0.250	0.300	0.008	0.010	0.012
D	2.550	2.600	2.650	0.100	0.102	0.104
D2	2.000	2.150	2.250	0.079	0.085	0.089
e	0.500 BSC			0.020 BSC		
E	2.550	2.600	2.650	0.100	0.102	0.104
E2	1.110	1.260	1.360	0.044	0.050	0.054
L	0.250	0.350	0.450	0.010	0.014	0.018