

Ultra Low Capacitance ESD Protection Diodes

- PRELIMINARY -

INTRODUCTION

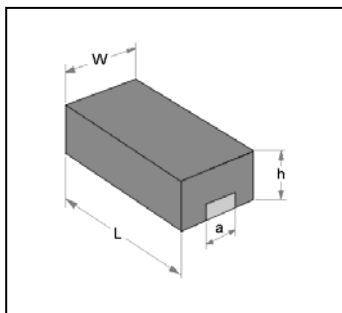
DESCRIPTION

The MN4230 is a transient suppressor designed to protect voltage sensitive components that require ultra-low capacitance from ESD and transient voltage events. Excellent clamping capability, low capacitance, low leakage, and fast response time make these parts ideal for ESD protection on designs where board space is at a premium. Because of its low capacitance, it is suited for use in high frequency designs such as USB 2.0 high speed and antenna line applications.

APPLICATIONS

- General purpose high-speed data line ESD protection including USB 2.0
- DVI ports, HDMI ports in note books, set top box, digital TVs, LCD Displays

PHYSICAL CHARACTERISTICS



2-lead DFN (0402)

DIM	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
L		1.00			0.039	
W		0.50			0.020	
h		0.40			0.016	
a		0.30			0.012	

FEATURES

- Ultra-low Low capacitance: 0.5 pF
- IEC61000-4-2(ESD) Level 4
- Fast time operation response < 1.0nS
- Stand-off Voltage: 5V
- Low leakage current
- Robustness to drive
- Absorbs repetitive ESD conditions
- Small Body Outline Dimensions:
- 0.039" x 0.020" (1.00mm x 0.50mm)
- Low Body Height: 0.016" (0.4 mm)
- Bidirectional devices
- Available in wafer form and Pb-Free 2-lead DFN

ELECTRICAL SCHEMATIC



MECHANICAL CHARACTERISTICS

- Case: Void free, transfer molded, thermosetting plastic
- Epoxy Meets UL 94 V-0
- Lead Finish: 100% Matte Sn (Tin)
- Mounting Position: Any Qualified Max Reflow
- Temperature: 260°C Device Meets MSL 1 Requirements

ORDERING INFORMATION

MN4230"T"- "P"-TR

"T" for temperature= "C" for commercial (0 - 70°C) or "I" for industrial (-20°C - +85°C) - Default or no indication means "C"

"P" for packaging= "DF" for DFN, "WF" for wafer* form "TR" for Tape and Reel - No indication means delivery in tube

* Minimum quantity= 1 wafer

MAXIMUM RATINGS

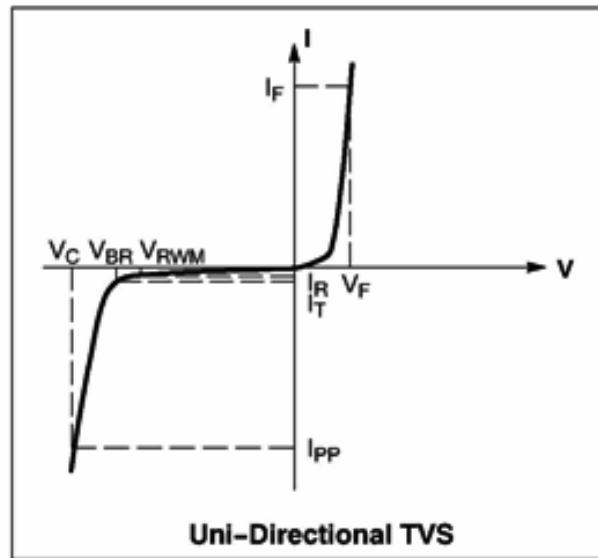
Rating	Symbol	Value	Unit
IEC 61000-4-2 (ESD)		±10	kV
Total Power Dissipation on FR-5 Board (Note 1) @ $T_A = 25^\circ\text{C}$	P_D	150	mW
Storage Temperature Range	T_{stg}	-55 to +150	$^\circ\text{C}$
Junction Temperature Range	T_J	-55 to +125	$^\circ\text{C}$
Lead Solder Temperature - Maximum (10 Second Duration)	T_L	260	$^\circ\text{C}$

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.

DIODE ELECTRICAL CHARACTERISTICS

E

Symbol	Parameter
I_{PP}	Maximum Reverse Peak Pulse Current
V_C	Clamping Voltage @ I_{PP}
V_{RWM}	Working Peak Reverse Voltage
I_R	Maximum Reverse Leakage Current @ $V_{RWM} = 5\text{V}$
V_{BR}	Breakdown Voltage @ $I_T = 1\text{mA}$
I_T	Test Current
I_F	Forward Current
V_F	Forward Voltage @ $I_F = 8\text{mA}$
p_k	Peak Power Dissipation
C	Max. Capacitance @ $V_R = 0$ and $f = 1.0\text{ MHz}$



MN4230 ELECTRICAL CHARACTERISTICS

($T_A = 25^\circ\text{C}$ unless otherwise noted, $V_F = 1.0\text{ V Max.}$ @ $I_F = 10\text{ mA}$ for all types)

Device	Device Marking	V_{RWM}	$I_R (\mu\text{A}) @ V_{RWM}$	$V_{BR} (\text{V}) @ I_T$	I_T	$C (\text{pF})$		VC
		Max	Max	Min		mA	Typ	
MN4230		5.0	1.0	5.8	1.0	0.7	0.9	Per IEC61000-4-2 (Note 3) Figures 1 and 2 See Below

- V_{BR} is measured with a pulse test current I_T at an ambient temperature of 25°C .
- For test procedure see Figures 3 and 4.

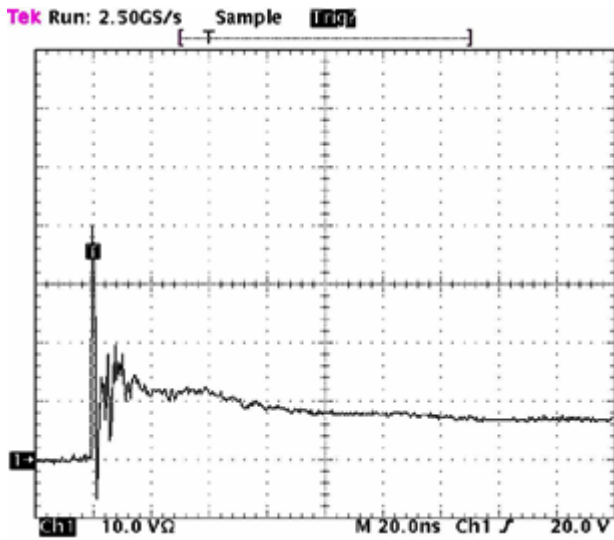


Figure 1. ESD Clamping Voltage Screenshot Positive 8 kV Contact per IEC61000-4-2

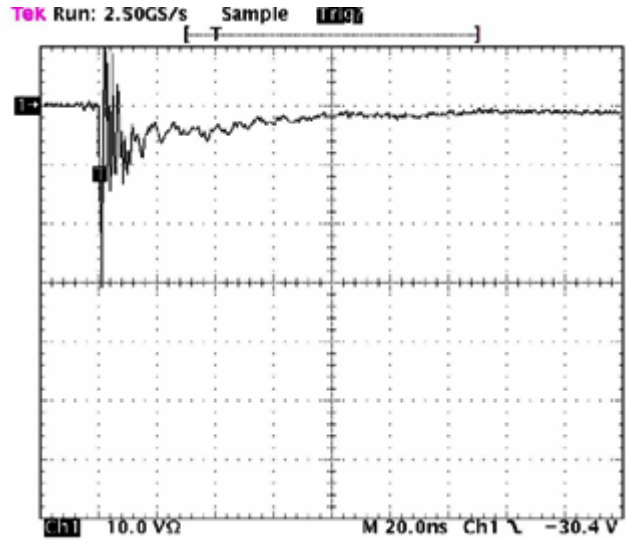


Figure 2. ESD Clamping Voltage Screenshot Negative 8 kV Contact per IEC61000-4-2

IEC 61000-4-2 Spec.

Level	Test Voltage (kV)	First Peak Current (A)	Current at 30 ns (A)	Current at 60 ns (A)
1	2	7.5	4	2
2	4	15	8	4
3	6	22.5	12	6
4	8	30	16	8

Figure 3. IEC61000-4-2 Spec

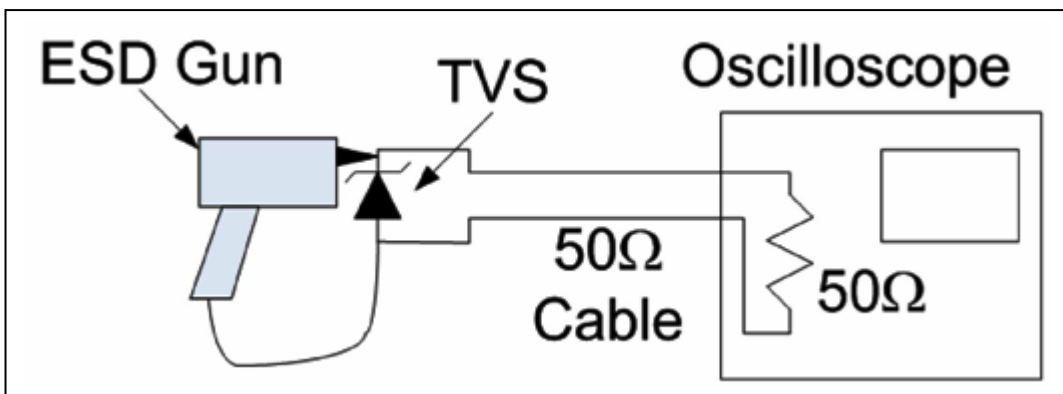
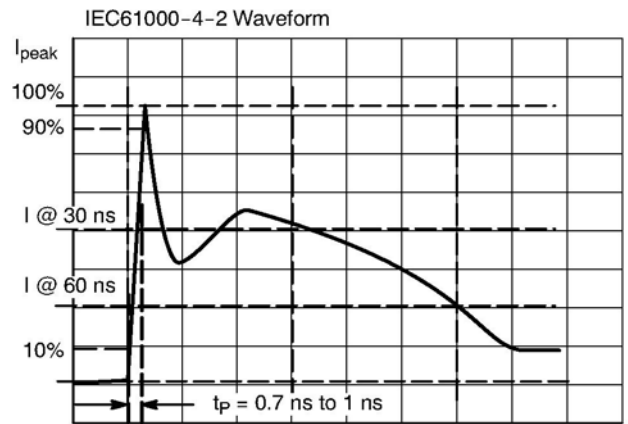


Figure 4. Diagram of ESD Test Setup