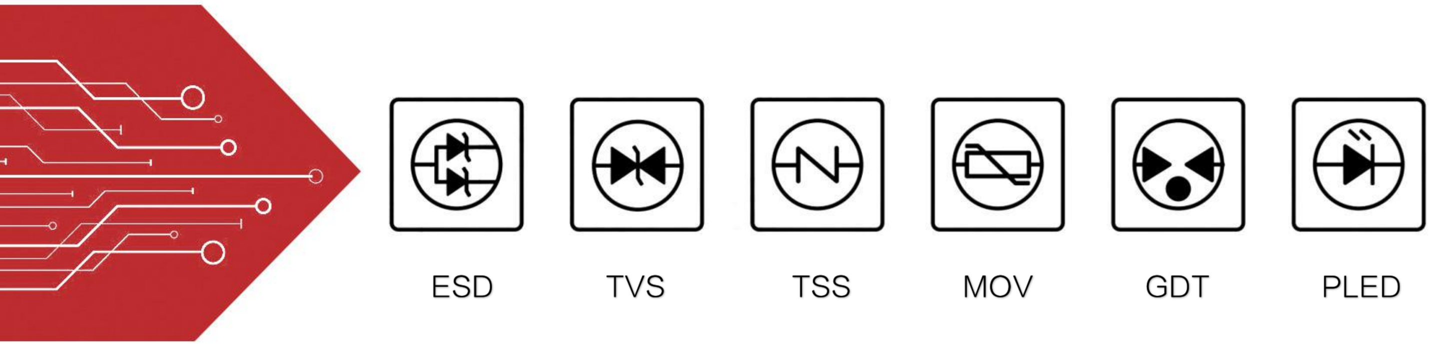
MSKSEMI
SEMICONDUCTOR



Product data sheet

www.msksemi.com

Description

MSESDxxCI a 3.3V ~24V bi-directional TVS diode, utilizing leading monolithic silicon technology to provide fast response time and low ESD clamping voltage, making this device an ideal solution for protecting voltage sensitive high-speed data lines. The MSESDxxCI has a low capacitance with a typical value at 1pF,and complies with the IEC 61000-4-2 (ESD) standard with ±30kV air and ±30kV contact discharge. It is assembled into a lead-free SOD-323 package. The small size, low capacitance and high ESD surge protection make MSESDxxCI an ideal choice to protect cell phone, wireless systems, and communication equipment.

Features

- 350W peak pulse power (8/20μs)
- Ultra low capacitance : 1.0pF typical
- Ultra low leakage: nA level
- Low Operating: 3.3V,5V,8V,12V,15V,24V
- Low clamping voltage
- Protects one power line or data line
- Complies with following standards:
  - – IEC 61000-4-2 (ESD) immunity test
    Air discharge: ±30kV
    Contact discharge: ±30kV
  - – IEC61000-4-4 (EFT) 40A (5/50ns)
- RoHS Compliant

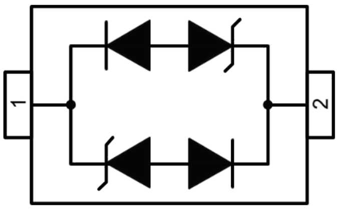
Mechanical Characteristics

- Package: SOD-323
- Lead Finish: Matte Tin
- Case Material: “Green” Molding Compound.
- UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 3 per J-STD-020
- Terminal Connections: See Diagram Below
- Marking Information: See Below

Applications

- USB Ports
- Smart Phones
- Wireless Systems
- Ethernet 10/100/1000 Base T

Dimensions and Pin Configuration



Circuit and Pin Schematic

Ordering Information

Part Number	Packaging	Reel Size
MSESDxxCI	3000/Tape & Reel	7 inch

Absolute Maximum Ratings (T_A=25°C unless otherwise specified)

Parameter	Symbol	Value	Unit
ESD per IEC 61000−4−2 (Air) ESD per IEC 61000−4−2 (Contact)	V_{ESD}	±30 ±30	kV
Operating Temperature Range	T_J	−40 to +85	°C
Storage Temperature Range	Tstg	−55 to +150	°C

Electrical Characteristics (T_A=25°C unless otherwise specified)

MSESD03CI

Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	V_{RWM}			3.3	V	
Breakdown Voltage	V_{BR}	4			V	I_T = 1mA
Reverse Leakage Current	I_R		1	100	nA	V_{RWM} = 3.3V
Clamping Voltage	V_C			7	V	I_{PP} = 1A (8 x 20μs pulse)
Clamping Voltage	V_C			16	V	I_{PP} = 20A (8 x 20μs pulse)
Peak Pulse Current	I_{PP}			20	A	tp=8/20μs
Junction Capacitance	C_J		1		pF	VR = 0V, f = 1MHz

MSESD05CI

Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	V_{RWM}			5	V	
Breakdown Voltage	V_{BR}	6			V	I_T = 1mA
Reverse Leakage Current	I_R		1	100	nA	V_{RWM} = 5V
Clamping Voltage	V_C			10	V	I_{PP} = 1A (8 x 20µs pulse)
Clamping Voltage	V_C			18	V	I_{PP} = 18A (8 x 20µs pulse)
Peak Pulse Current	I_{PP}			18	A	tp=8/20µs
Junction Capacitance	C_J		1		pF	VR = 0V, f = 1MHz

MSESD08CI

Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	V_{RWM}			8	V	
Breakdown Voltage	V_{BR}	8.5			V	I_T = 1mA
Reverse Leakage Current	I_R		1	100	nA	V_{RWM} = 8V
Clamping Voltage	V_C			14	V	I_{PP} = 1A (8 x 20µs pulse)
Clamping Voltage	V_C			19	V	I_{PP} = 13A (8 x 20µs pulse)
Peak Pulse Current	I_{PP}			13	A	tp=8/20µs
Junction Capacitance	C_J		1		pF	VR = 0V, f = 1MHz

MSESD12CI

Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	V_{RWM}			12	V	
Breakdown Voltage	V_{BR}	13.3			V	I_T = 1mA
Reverse Leakage Current	I_R		1	100	nA	V_{RWM} = 12V
Clamping Voltage	V_C			19	V	I_{PP} = 1A (8 x 20μs pulse)
Clamping Voltage	V_C			25	V	I_{PP} = 10A (8 x 20μs pulse)
Peak Pulse Current	I_{PP}			10	A	tp=8/20μs
Junction Capacitance	C_J		1		pF	VR = 0V, f = 1MHz

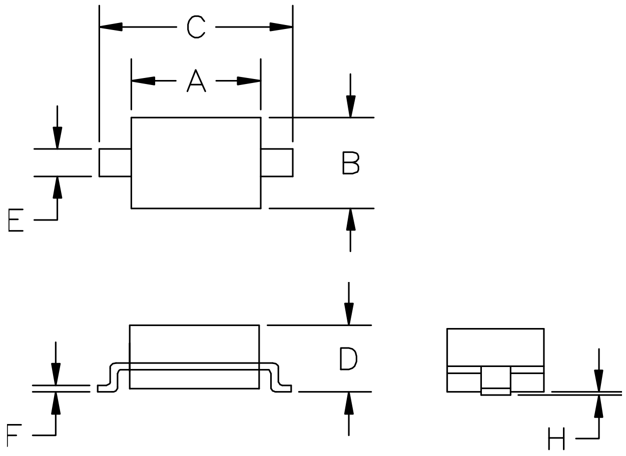
MSESD15CI

Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	V_{RWM}			15	V	
Breakdown Voltage	V_{BR}	16.7			V	I_T = 1mA
Reverse Leakage Current	I_R		1	100	nA	V_{RWM} = 15V
Clamping Voltage	V_C			20	V	I_{PP} = 1A (8 x 20μs pulse)
Clamping Voltage	V_C			31	V	I_{PP} = 8A (8 x 20μs pulse)
Peak Pulse Current	I_{PP}			8	A	tp=8/20μs
Junction Capacitance	C_J		1		pF	VR = 0V, f = 1MHz

MSESD24CI

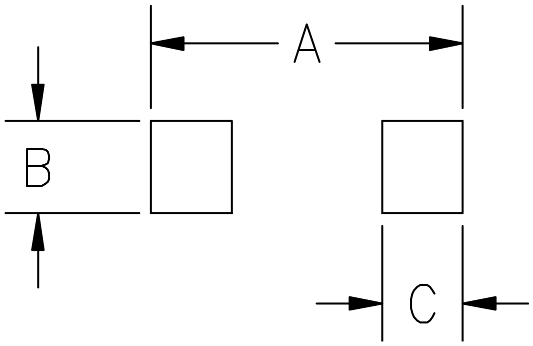
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Unit**	**Test Condition**
Reverse Working Voltage	V_{RWM}			24	V	
Breakdown Voltage	V_{BR}	26.7			V	I_T = 1mA
Reverse Leakage Current	I_R		1	100	nA	V_{RWM} = 24V
Clamping Voltage	V_C			40	V	I_{PP} = 1A (8 x 20μs pulse)
Clamping Voltage	V_C			71	V	I_{PP} = 3.5A (8 x 20μs pulse)
Peak Pulse Current	I_{PP}			3.5	A	tp=8/20μs
Junction Capacitance	C_J		1		pF	VR = 0V, f = 1MHz

SOD-323 Package Outline Drawing



SYM	DIMENSIONS			
	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.50	1.80	0.060	0.071
B	1.20	1.40	0.045	0.054
C	2.30	2.70	0.090	0.107
D	-	1.10	-	0.043
E	0.30	0.40	0.012	0.016
F	0.10	0.25	0.004	0.010
H	-	0.10	-	0.004

Suggested Land Pattern



SYM	DIMENSIONS	
	MILLIMETERS	INCHES
A	3.15	0.120
B	0.80	0.031
C	0.80	0.031

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