

MSKSEMI

SEMICONDUCTOR



ESD



TVS



TSS



MOV



GDT



PLED

Product data sheet

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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

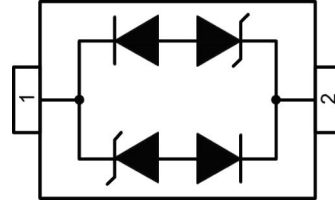
Applications

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

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

Dimensions and Pin Configuration



Circuit and Pin Schematic

SOD-323

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

| Parameter | Symbol | Value | Unit |
|---------------------------------|------------------|-------------|------|
| ESD per IEC 61000-4-2 (Air) | V _{ESD} | ±30 | kV |
| ESD per IEC 61000-4-2 (Contact) | | ±30 | |
| Operating Temperature Range | T _J | -40 to +85 | °C |
| Storage Temperature Range | T _{stg} | -55 to +150 | °C |

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

| MSESD03CI | | | | | | |
|-------------------------|----------|-----|-----|-----|------|--|
| Parameter | Symbol | Min | Typ | Max | Unit | Test Condition |
| Reverse Working Voltage | VRWM | | | 3.3 | V | |
| Breakdown Voltage | VBR | 4 | | | V | $I_T = 1\text{mA}$ |
| Reverse Leakage Current | I_R | | 1 | 100 | nA | $V_{RWM} = 3.3\text{V}$ |
| Clamping Voltage | V_C | | | 7 | V | $I_{PP} = 1\text{A}$ (8 x 20 μs pulse) |
| Clamping Voltage | V_C | | | 16 | V | $I_{PP} = 20\text{A}$ (8 x 20 μs pulse) |
| Peak Pulse Current | I_{PP} | | | 20 | A | $t_p=8/20\mu\text{s}$ |
| Junction Capacitance | C_J | | 1 | | pF | $V_R = 0\text{V}$, $f = 1\text{MHz}$ |

| MSESD05CI | | | | | | |
|-------------------------|----------|-----|-----|-----|------|--|
| Parameter | Symbol | Min | Typ | Max | Unit | Test Condition |
| Reverse Working Voltage | VRWM | | | 5 | V | |
| Breakdown Voltage | VBR | 6 | | | V | $I_T = 1\text{mA}$ |
| Reverse Leakage Current | I_R | | 1 | 100 | nA | $V_{RWM} = 5\text{V}$ |
| Clamping Voltage | V_C | | | 10 | V | $I_{PP} = 1\text{A}$ (8 x 20 μs pulse) |
| Clamping Voltage | V_C | | | 18 | V | $I_{PP} = 18\text{A}$ (8 x 20 μs pulse) |
| Peak Pulse Current | I_{PP} | | | 18 | A | $t_p=8/20\mu\text{s}$ |
| Junction Capacitance | C_J | | 1 | | pF | $V_R = 0\text{V}$, $f = 1\text{MHz}$ |

| MSESD08CI | | | | | | |
|-------------------------|-----------------|-----|-----|-----|------|--|
| Parameter | Symbol | Min | Typ | Max | Unit | Test Condition |
| Reverse Working Voltage | VRWM | | | 8 | V | |
| Breakdown Voltage | VBR | 8.5 | | | V | IT = 1mA |
| Reverse Leakage Current | IR | | 1 | 100 | nA | VRWM = 8V |
| Clamping Voltage | VC | | | 14 | V | I _{PP} = 1A (8 x 20μs pulse) |
| Clamping Voltage | VC | | | 19 | V | I _{PP} = 13A (8 x 20μs pulse) |
| Peak Pulse Current | I _{PP} | | | 13 | A | tp=8/20μs |
| Junction Capacitance | CJ | | 1 | | pF | VR = 0V, f = 1MHz |

| MSESD12CI | | | | | | |
|-------------------------|-----------------|------|-----|-----|------|--|
| Parameter | Symbol | Min | Typ | Max | Unit | Test Condition |
| Reverse Working Voltage | VRWM | | | 12 | V | |
| Breakdown Voltage | VBR | 13.3 | | | V | IT = 1mA |
| Reverse Leakage Current | IR | | 1 | 100 | nA | VRWM = 12V |
| Clamping Voltage | VC | | | 19 | V | I _{PP} = 1A (8 x 20μs pulse) |
| Clamping Voltage | VC | | | 25 | V | I _{PP} = 10A (8 x 20μs pulse) |
| Peak Pulse Current | I _{PP} | | | 10 | A | tp=8/20μs |
| Junction Capacitance | CJ | | 1 | | pF | VR = 0V, f = 1MHz |

| MSESD15CI | | | | | | |
|-------------------------|-----------------|------|-----|-----|------|---------------------------------------|
| Parameter | Symbol | Min | Typ | Max | Unit | Test Condition |
| Reverse Working Voltage | VRWM | | | 15 | V | |
| Breakdown Voltage | VBR | 16.7 | | | V | IT = 1mA |
| Reverse Leakage Current | IR | | 1 | 100 | nA | VRWM = 15V |
| Clamping Voltage | VC | | | 20 | V | I _{PP} = 1A (8 x 20μs pulse) |
| Clamping Voltage | VC | | | 31 | V | I _{PP} = 8A (8 x 20μs pulse) |
| Peak Pulse Current | I _{PP} | | | 8 | A | tp=8/20μs |
| Junction Capacitance | CJ | | 1 | | pF | VR = 0V, f = 1MHz |

| MSESD24CI | | | | | | |
|-------------------------|-----------------|------|-----|-----|------|---|
| Parameter | Symbol | Min | Typ | Max | Unit | Test Condition |
| Reverse Working Voltage | VRWM | | | 24 | V | |
| Breakdown Voltage | VBR | 26.7 | | | V | IT = 1mA |
| Reverse Leakage Current | IR | | 1 | 100 | nA | VRWM = 24V |
| Clamping Voltage | VC | | | 40 | V | I _{PP} = 1A (8 x 20μs pulse) |
| Clamping Voltage | VC | | | 71 | V | I _{PP} = 3.5A (8 x 20μs pulse) |
| Peak Pulse Current | I _{PP} | | | 3.5 | A | tp=8/20μs |
| Junction Capacitance | CJ | | 1 | | pF | VR = 0V, f = 1MHz |

Electrical Parameter

| 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} |
| I_T | Test Current |
| V_{BR} | Breakdown Voltage @ I_T |

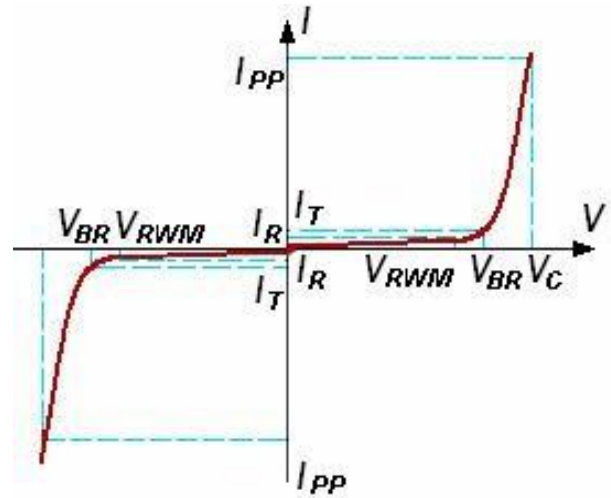


FIG1: Pulse Waveform

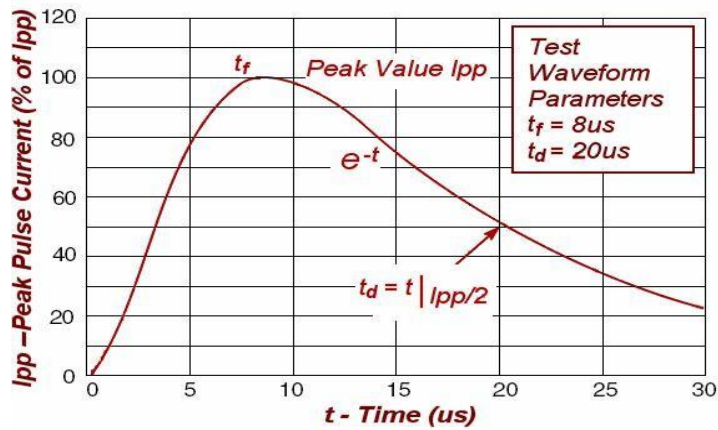
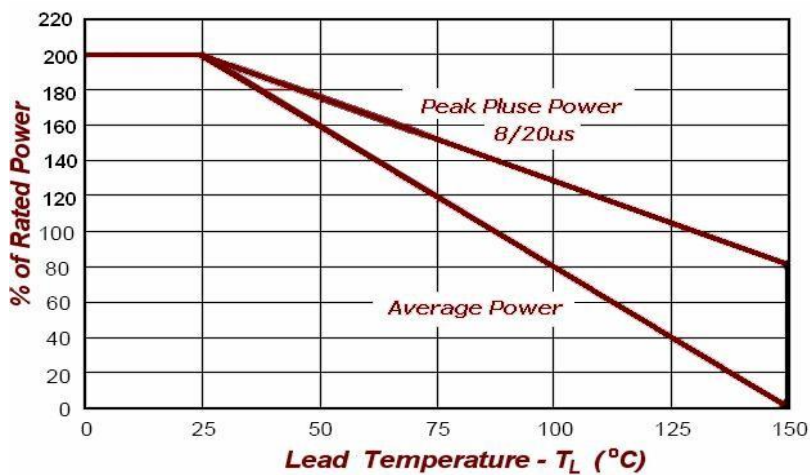
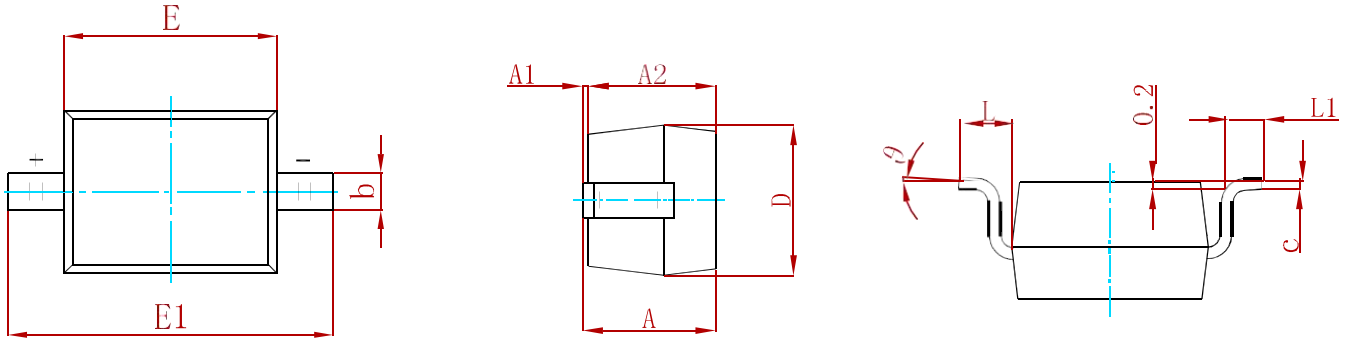


FIG2: Power Derating

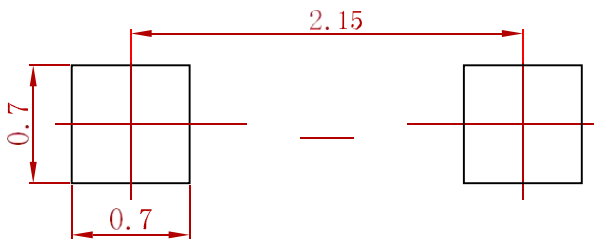


PACKAGE MECHANICAL DATA



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|-------|----------------------|-------|
| | Min. | Max. | Min. | Max. |
| A | | 1.000 | | 0.039 |
| A1 | 0.000 | 0.100 | 0.000 | 0.004 |
| A2 | 0.800 | 0.900 | 0.031 | 0.035 |
| b | 0.250 | 0.350 | 0.010 | 0.014 |
| c | 0.080 | 0.150 | 0.003 | 0.006 |
| D | 1.200 | 1.400 | 0.047 | 0.055 |
| E | 1.600 | 1.800 | 0.063 | 0.071 |
| E1 | 2.550 | 2.750 | 0.100 | 0.108 |
| L | 0.475 REF. | | 0.019 REF. | |
| L1 | 0.250 | 0.400 | 0.010 | 0.016 |
| θ | 0° | 8° | 0° | 8° |

Suggested Pad Layout



- Note:**
1. Controlling dimension: in millimeters.
 2. General tolerance: ± 0.05mm.
 3. The pad layout is for reference purposes only.

REEL SPECIFICATION

| P/N | PKG | QTY |
|----------|---------|------|
| MESDxxCI | SOD-323 | 3000 |

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