BORN SEMICONDUCTOR

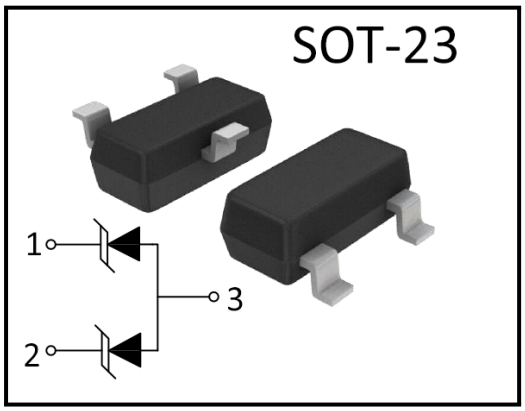
# SM12.N

**ESD Protection Diode**

## Features

- 300W Peak pulse power per line (tp = 8/20μs)
- Unidirectional configurations
- Solid-state silicon-avalanche technology
- Low clamping voltage
- Low leakage current
- IEC 61000-4-2 ±30kV contact ; ±30kV air
- IEC 61000-4-4 (EFT) 40A (5/50ns)
- IEC 61000-4-5 (Lightning) 12A(8/20μs)

## Package



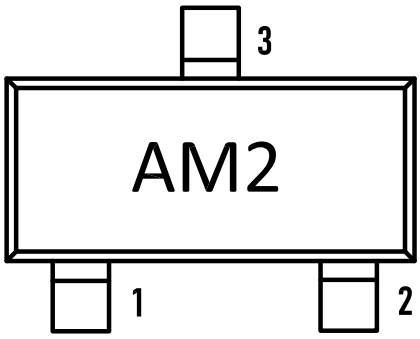

## Applications

- Dataline
- Automatic Teller Machines
- Net works
- Power line

## Mechanical Characteristics

- SOT-23 package
- Molding compound flammability rating: UL 94V-0
- Packaging: Tape and Reel
- RoHS/WEEE Compliant

## Marking




## Ordering information

| Order code | Package | Base qty | Delivery mode |
|---|---|---|---|
| SM12.N | SOT-23 | 3K | Tape and reel |

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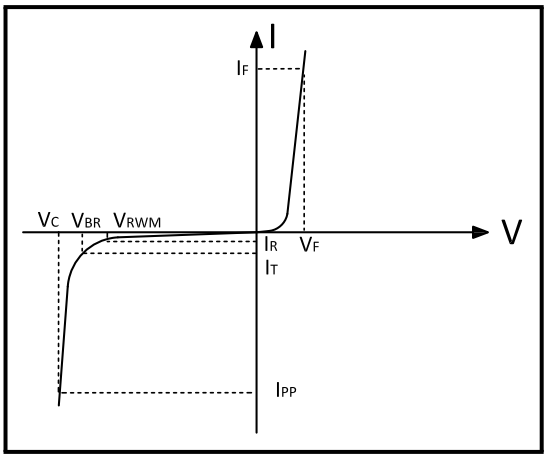
**Revision: 2022-Jan-1-A**

# SM12.N

**ESD Protection Diode**

## Electrical Parameters ($T_A$ = 25°C unless otherwise noted)

| Symbol | Parameter |
|---|---|
| $V_{RWM}$ | Peak Reverse Working Voltage |
| $I_R$ | Reverse Leakage Current @ $V_{RWM}$ |
| $V_{BR}$ | Breakdown Voltage @ $I_T$ |
| $I_T$ | Test Current |
| $I_{PP}$ | Maximum Reverse Peak Pulse Current |
| $V_C$ | Clamping Voltage @ $I_{PP}$ |
| | |
| | |
| | |




## Absolute Maximum Rating

| Rating | Symber | Value | Units |
|---|---|---|---|
| Peak Pulse Power ( tp =8/20μs ) | $P_{PP}$ | 300 | Watts |
| Peak Pulse Current (tp =8/20μs ) | $I_{PP}$ | 12 | A |
| ESD per IEC 61000-4-2 (Air)<br>ESD per IEC 61000-4-2 (Contact) | $V_{ESD}$ | 30<br>30 | KV |
| Lead Soldering Temperature | $T_L$ | 260(10seconds) | °C |
| Junction Temperature | $T_J$ | -55 to + 150 | °C |
| Storage Temperature | $T_{stg}$ | -55 to + 150 | °C |

## Electrical Characteristics

| Parameter | Symber | Conditions | Min | Typical | Max | Units |
|---|---|---|---|---|---|---|
| Reverse Stand-Off Voltage | $V_{RWM}$ | – | – | – | 12 | V |
| Reverse Breakdown Voltage | $V_{BR}$ | $I_T$=1mA | 13.3 | 14.5 | 17 | V |
| Reverse Leakage Current | $I_R$ | $V_{RWM}$=12V,T=25°C | – | – | 0.2 | uA |
| Peak Pulse Current | $I_{PP}$ | tp =8/20us | – | – | 12 | A |
| Clamping Voltage | $V_C$ | $I_{PP}$=12A, tp =8/20us | – | 22 | 25 | V |
| Junction Capacitance | $C_j$ | $V_R$=0V,T=25°C,f=1MHZ<br>(pin1,pin2 to pin3 ) | – | 80 | 85 | pF |

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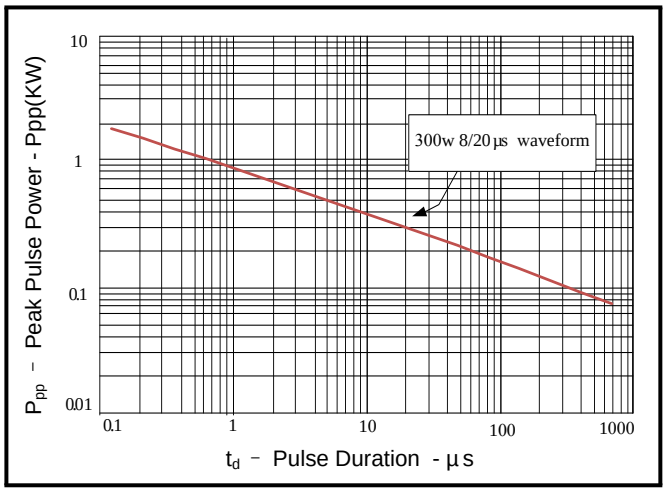
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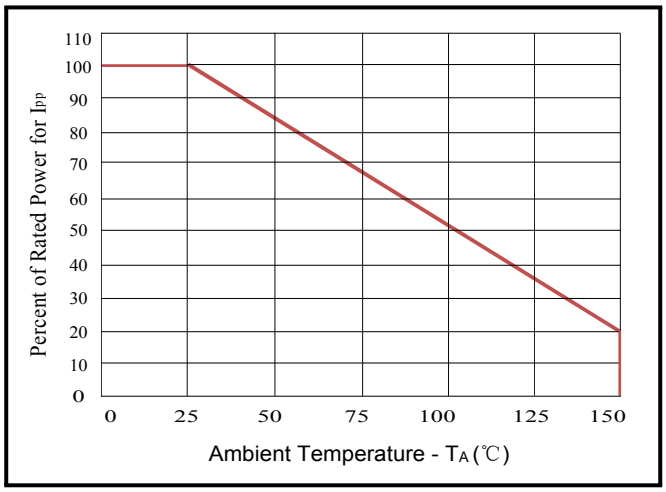
ESD Protection Diode

## Typical Characteristics

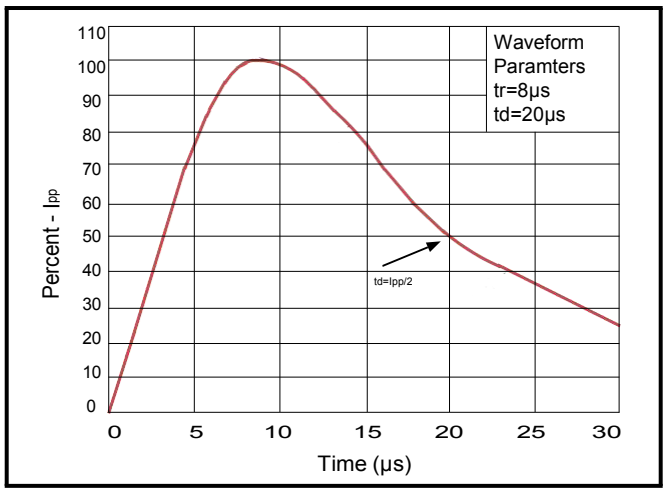
### Figure 1: Peak Pulse Power vs. Pulse Time



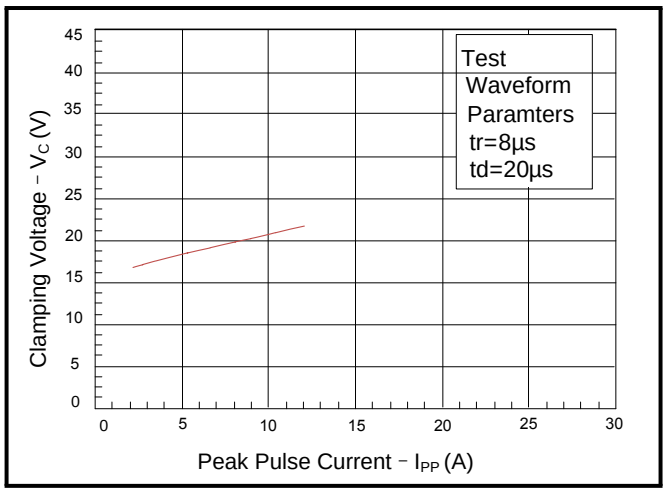

### Figure 2: Power Derating Curve




### Figure 3: Pulse Waveform




### Figure 4: Clamping Voltage vs. $I_{PP}$



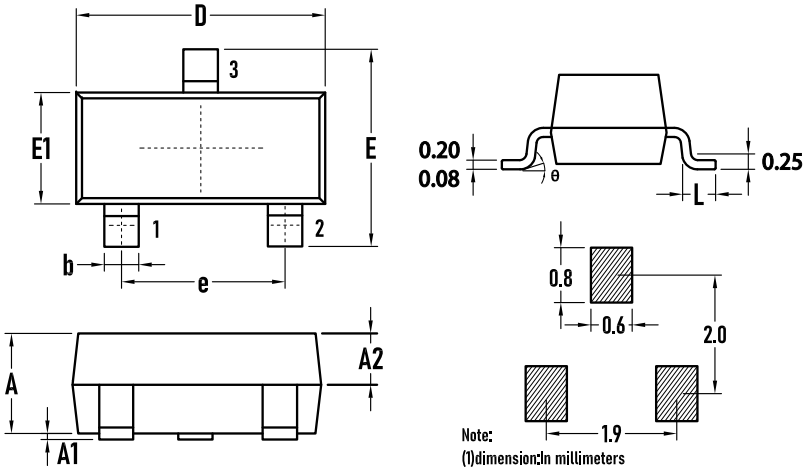

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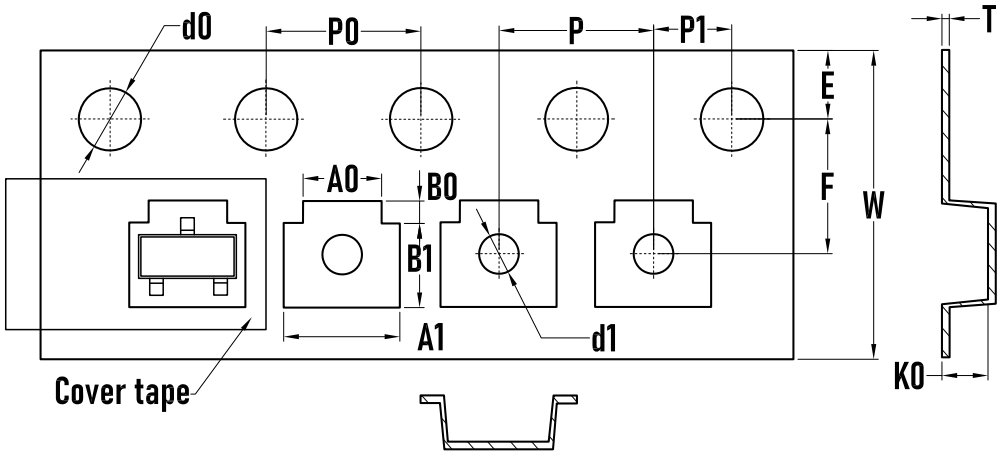
**ESD Protection Diode**

## Outline Drawing – SOT-23



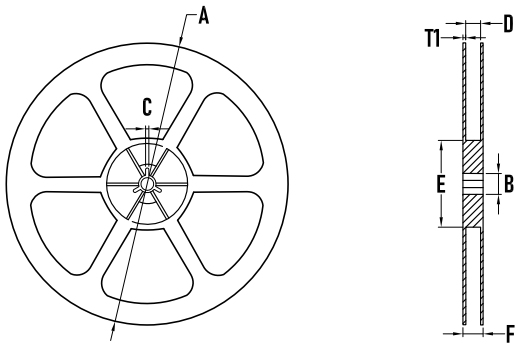

| SYMBOL | MILLIMETER | | |
|---|---|---|---|
| | MIN. | Typ. | MAX. |
| A | 0.90 | 1.00 | 1.10 |
| A1 | 0.01 | – | 0.10 |
| A2 | 0.50 | 0.60 | 0.70 |
| D | 2.80 | 2.90 | 3.00 |
| b | 0.25 | 0.35 | 0.45 |
| E | 2.10 | 2.30 | 2.50 |
| E1 | 1.20 | 1.30 | 1.40 |
| e | 1.80 | 1.90 | 2.00 |
| L | 0.25 | 0.35 | 0.45 |
| θ | 0 | – | 8° |

## Packaging Tape - SOT-23




| SYMBOL | MILLIMETER |
|---|---|
| A0 | 2.10±0.10 |
| A1 | 3.10±0.10 |
| B0 | 0.65±0.10 |
| B1 | 2.75±0.10 |
| d0 | 1.55±0.10 |
| d1 | 1.00±0.05 |
| E | 1.75±0.10 |
| F | 3.50±0.10 |
| K0 | 1.10±0.10 |
| P | 4.00±0.10 |
| P0 | 4.00±0.10 |
| P1 | 2.00±0.10 |
| W | 8.00±0.30 |
| T | 0.20 ±0.05 |

## Packaging Reel




| SYMBOL | MILLIMETER |
|---|---|
| A | 177.8±0.2 |
| B | 3.1 |
| C | 13.50 |
| D | 9.6±0.3 |
| E | 75±0.2 |
| F | 12.3±0.3 |
| T1 | 1.0±0.2 |
| Quantity | 3000PCS |

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**Revision: 2022-Jan-1-A**