




SPECIFICATION SHEET

| | |
|--------------------------------|---|
| SPECIFICATION SHEET NO. | N1004- SOT23SM712S712 |
| DATE | Oct. 04, 2021 |
| REVISION | A0 |
| DESCRIPTION | <p>SMD Plastic-Encapsulate ESD Protection Diodes, SOT-23 series, 3 pads SM712 Type, Asymmetrical TVS Diodes for extended Common-Mode RS-485 Reverse Working Voltage : 12V/7V, Clamping Voltage 20V/12 Max.@5.0A Operating Temp. Range -55°C ~+150°C, Package in Tape/Reel, 3000pcs/Reel RoHS/RoHS III compliant</p> |
| CUSTOMER | |
| CUSTOMER PART NUMBER | |
| CROSS REF. PART NUMBER | |
| ORIGINAL PART NUMBER | MDD SM712 |
| PART CODE | SOT23SM712S712 |

| | | | |
|-------------------------|---|--|---|
| VENDOR APPROVE | | | |
| Issued/Checked/Approved |  |  |  |
| DATE: Oct. 04, 2021 | | | |

| | |
|-------------------------|--|
| CUSTOMER APPROVE | |
| | |
| DATE: | |

SMD ESD PROTECTION DIODES SOT-23 SERIES

MAIN FEATURE

- Peak power dissipation 400W (8/20µs)
- Transient protection for asymmetrical data lines
- IEC61000-4-2 (ESD) ±15kV (air), ±8kV (contact)
- IEC61000-4-4 (EFT) 40A (5/50ns)
- IEC61000-4-5 (Lightning) 12A (8/20µs)
- Protects Two +12V to -7V lines
- Low clamping voltage
- Low leakage current
- Low capacitance
- Solid-state silicon avalanche technology
- Meet MSL 1 requirement



APPLICATION

- Protection of RS-485 transceivers with extended
- Common-mode range
- Security system
- Automatic Teller Machines
- HFC systems
- Networks

RFQ

[Request For Quotation](#)

PART CODE GUIDE

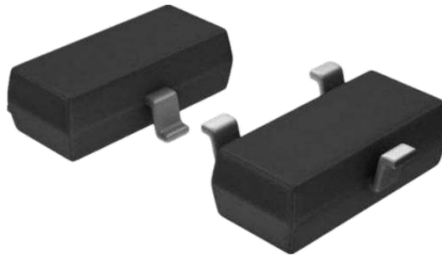
| SOT23 | SM712 | S | 712 |
|-------|-------|---|-----|
| 1 | 2 | 3 | 4 |

- 1) **SOT23**: SMD Plastic-Encapsulate ESD Protection Diodes, SOT-23 series, 3 pads
- 2) **SM712**: Type code for original part number SM712
- 3) **S**: Package code, Package in Tape/Reel, 3000pcs/Reel
- 4) **712**: Marking code for “712 ” or “C72” on the case surface, Different Marking for different specification.

SMD ESD PROTECTION DIODES SOT-23 SERIES

DIMENSION (Unit: Inch/mm)

Image for reference

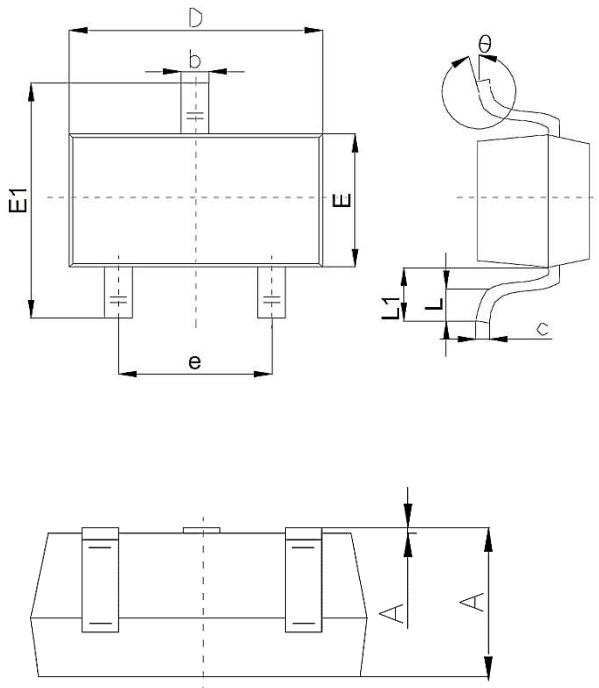


Marking: 712

or

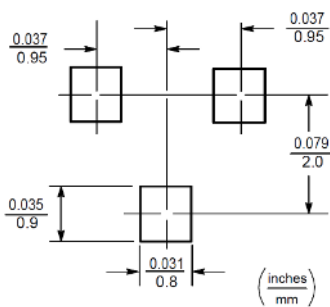
Marking: C72

SOT-23

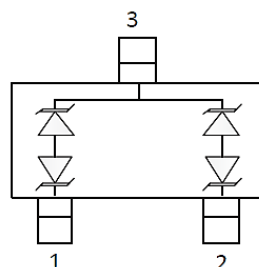


| Symbol | Value (mm) | | |
|--------|--------------|------|------|
| | Min. | Typ. | Max. |
| A | 0.89 | 1.00 | 1.4 |
| A1 | 0.01 | 0.06 | 0.10 |
| b | 0.37 | 0.44 | 0.50 |
| c | 0.09 | 0.13 | 0.20 |
| D | 2.80 | 2.90 | 3.10 |
| E | 1.20 | 1.30 | 1.60 |
| E1 | 2.10 | 2.40 | 2.80 |
| e | 1.78 | 1.9 | 2.04 |
| L | 0.10 | | 0.30 |
| L1 | 0.35 | 0.54 | 0.69 |
| θ | 0° | | 10° |

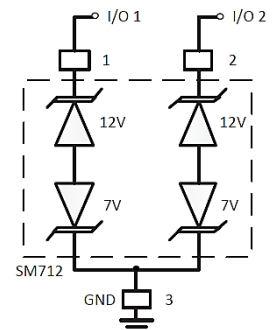
Recommend Pad Layout



Schematic & Pin Configuration



Circuit Diagram



SMD ESD PROTECTION DIODES SOT-23 SERIES
MECHANICAL DATA

| Case | Flammability Rating | Terminals | Mounting Position | Weight per piece |
|--------------------------------------|---------------------|------------------|-------------------|------------------|
| JEDEC SOT-323 molded plastic body | UL 94V-0 | Matte tin plated | - | - |

ABSOLUTE MAX. RATINGS AT Ta=25 °C (unless otherwise specified)

| Parameter | SYMBOLS | VALUE | UNITS |
|---|---------|------------|-------|
| | | LIMIT | |
| ESD per IEC 61000-4-2 (Air) | V ESD | +/-15 | KV |
| ESD per IEC 61000-4-2 (Contact) | V ESD | +/-8 | KV |
| Peak Pulse Power @8/20µs | P PP | 400 | W |
| Peak Pulse Current @8/20µs | I PP | 17 | A |
| Operating Temperature Range | T J | -55 ~+ 150 | °C |
| Storage Temperature Range | T STG | -55 ~ +150 | °C |
| Lead Solder Temperature- Max. (10 sec. Duration) | T L | 260 /10s | °C |

SMD ESD PROTECTION DIODES SOT-23 SERIES
ELECTRICAL CHARACTERISTICS (Ta=25 °C unless otherwise specified)

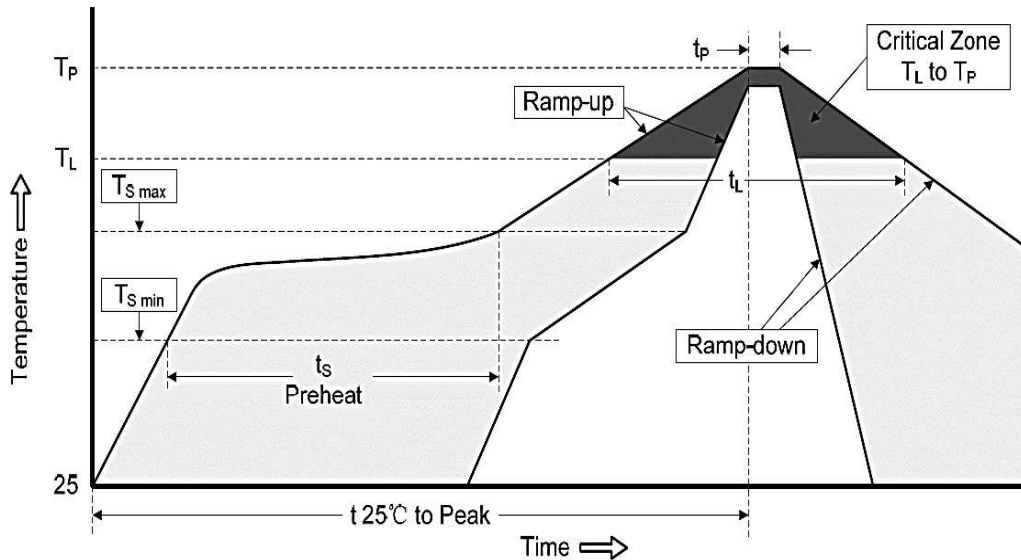
| Parameter | SYMBOLS | Pin 1 to Pin 3 and Pin 2 to pin 3 (12V) TVs | | | Pin 3 to Pin 1 and Pin 3 to pin 2 (7V) TVs | | | UNITS |
|--|-----------|---|------|------|--|------|------|---------|
| | | Min. | Typ. | Max. | Min. | Typ. | Max. | |
| Reverse Working Voltage Pin 3 to Pin 1 or Pin 2 to Pin 1 | V_{RWM} | | | 12 | | | 7 | V |
| Reverse Breakdown Voltage @ $I_T = 1.0mA$ | V_{BR} | 13.3 | | | 7.5 | | | V |
| Reverse Leakage Current @ $V_{RWM} = V_R$ | I_R | | | 1 | | | 20 | μA |
| Clamping Voltage 1 @ $I_{PP} = 5A, t_p = 8/20\mu s$ | V_C | | | 20 | | | 12 | V |
| Clamping Voltage 2 @ $I_{PP} = 17A, t_p = 8/20\mu s$ | V_C | | | 26 | | | 16 | V |
| Junction Capacitance 1 @ $V_R = 0V, f = 1MHz$ | C_T | | | 75 | | | 75 | pF |
| Junction Capacitance 2 @ $V_R = V_{RWM}, f = 1MHz$ | C_T | | 45 | | 45 | | | pF |

SMD ESD PROTECTION DIODES SOT-23 SERIES
RELIABILITY

| Number | Experiment Items | Experiment Method And Conditions | Reference Documents |
|--------|------------------------------------|--|---------------------------------|
| 1 | Solder Resistance Test | Test 260°C± 5°C for 10 ± 2 sec. Immerse body into solder 1/16" ± 1/32" | MIL-STD-750D METHOD-2031.2 |
| 2 | Solderability Test | 230°C ±5°C for 5 sec. | MIL-STD-750D METHOD-2026.1 0 |
| 3 | Pull Test | 1 kg in axial lead direction for 10 sec. | MIL-STD-750D METHOD-2036.4 |
| 4 | Bend Test | 0.5Kg Weight Applied To Each Lead, Bending Arcs 90 °C ± 5 °C For 3 Times | MIL-STD-750D METHOD-2036.4 |
| 5 | High Temperature Reverse Bias Test | TA=100°C for 1000 Hours at VR=80% Rated VR | MIL-STD-750D METHOD-1038.4 |
| 6 | Forward Operation Life Test | TA=25°C Rated Average Rectified Current | MIL-STD-750D METHOD-1027.3 |
| 7 | Intermittent Operation Life Test | On state: 5 min with rated IRMS Power Off state: 5 min with Cool Forced Air. On and off for 1000 cycles. | MIL-STD-750D METHOD-1036.3 |
| 8 | Pressure Cooker Test | 15 PSIG, TA=121°C, 4 hours | MIL-S-19500 APPENOIXC |
| 9 | Temperature Cycling Test | -55°C~+125°C; 30 Minutes For Dwelled Time 5 minutes for transferred time. Total: 10 cycles. | MIL-STD-750D METHOD-1051.7 |
| 10 | Thermal Shock Test | 0°C for 5 minutes., 100°C for 5minutes, Total: 10 cycles | MIL-STD-750D METHOD-1056.7 |
| 11 | Forward Surge Test | 8.3ms Single Sale Sine-wave One Surge. | MIL-STD-750D METHOD-4066.4 |
| 12 | Humidity Test | TA=65°C, RH=98% for 1000 hours. | MIL-STD-750D METHOD-1021.3 |
| 13 | High Temperature Storage life Test | 150°C for 1000 Hours | MIL-STD-750D METHOD-1031.5 |

SMD ESD PROTECTION DIODES SOT-23 SERIES

SUGGESTED REFLOW PROFILE (For Reference Only)

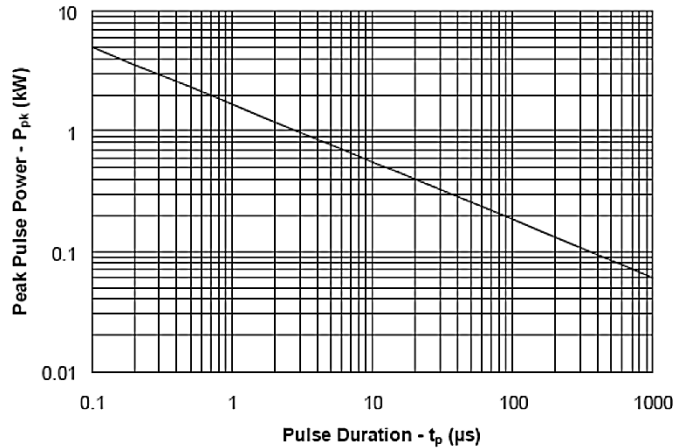


| | | |
|--|----------------------------------|-------------------|
| Profile Feature | | Pb-Free Assembly |
| Average Ramp-up Rate (Ts Max to Tp) | | 3°C/second Max |
| Preheat | Temperature Min (Ts Min.) | 150°C |
| | Temperature Max (Ts Max.) | 200°C |
| | Time (ts Min. to ts Max.) | 60 ~ 180 seconds |
| Time maintained above | Temperature (Tl) | 217°C |
| | Time (tl) | 60 ~ 150 seconds |
| Peak/Classification Temperature (Tp) | | 260 °C |
| Time within 5°C of actual Peak Temperature (tp) | | 20 ~ 40 seconds |
| Ramp-down rate | | 6 °C /Second Max. |
| Time 25 °C to Peak Temperature | | 8 minutes Max. |
| Suggest reflow times | | 3 Times Max. |

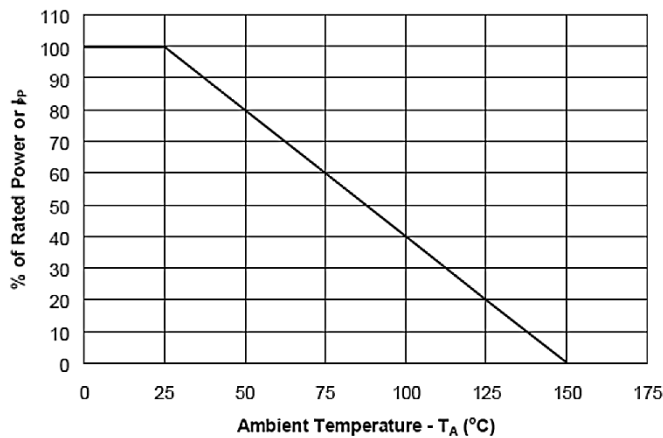
SMD ESD PROTECTION DIODES SOT-23 SERIES

RATINGS AND CHARACTERISTIC CURVES (For Reference Only)

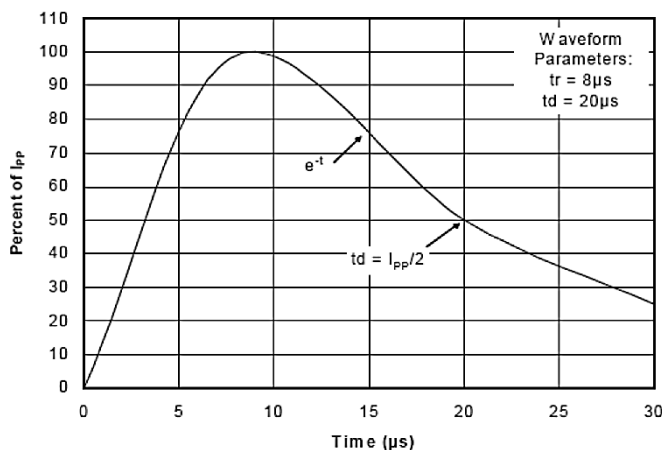
Non-Repetitive Peak Pulse Power vs. Pulse Time



Power Derating Curve



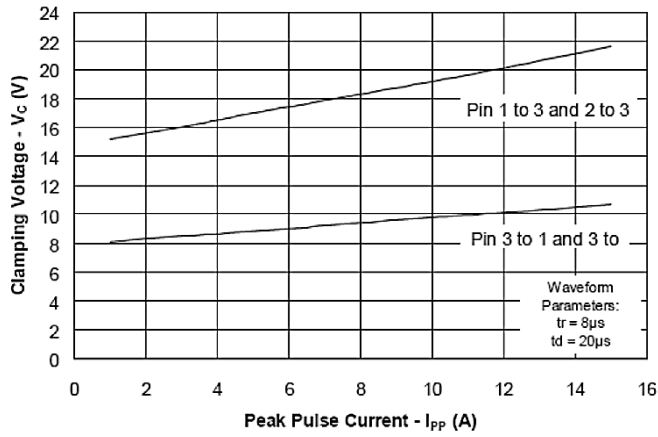
Pulse Waveform



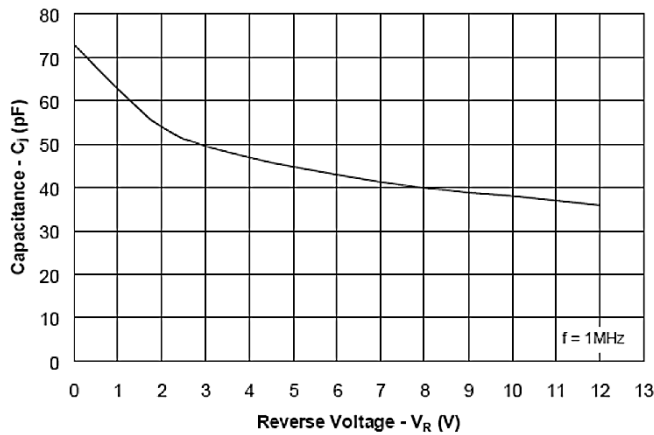
SMD ESD PROTECTION DIODES SOT-23 SERIES

RATINGS AND CHARACTERISTIC CURVES (For Reference Only)

Clamping Voltage vs. Peak Pulse Current



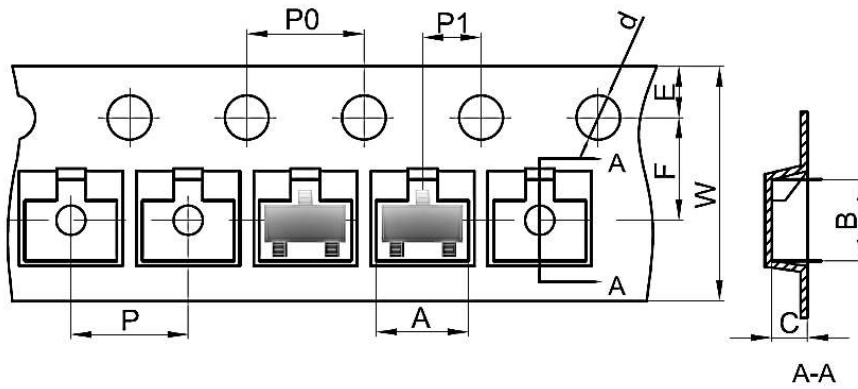
Capacitance vs. Reverse Voltage



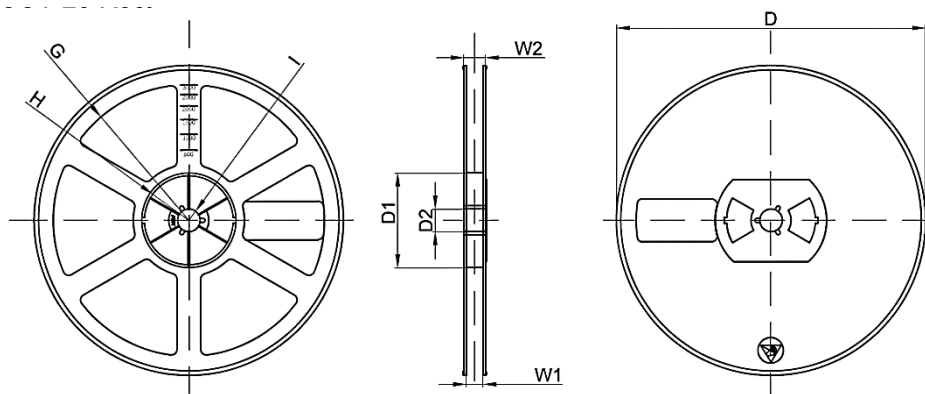
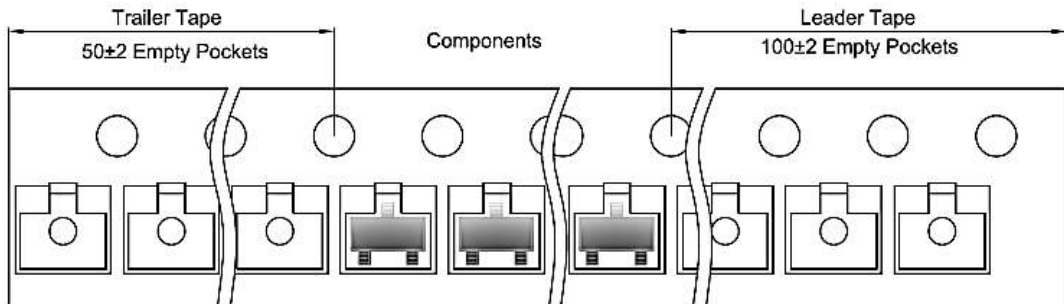
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TAPE/REEL (Unit: mm)

All Devices are packed in accordance with EIA standard RS-481-A and specifications.



| Case | A | B | C | d | E | F | P0 | P | P1 | W |
|--------|------|------|------|------|------|-----|-----|-----|-----|-----|
| SOT-23 | 3.15 | 2.77 | 1.22 | ∅1.5 | 1.75 | 3.5 | 4.0 | 4.0 | 2.0 | 8.0 |



| Reel Size | D | D1 | D2 | G | H | I | W1 | W2 |
|-----------|------|------|------|-------|-------|------|-----|------|
| 7" | ∅178 | 54.4 | 13.0 | R78.0 | R25.6 | R6.5 | 9.5 | 12.3 |

SMD ESD PROTECTION DIODES SOT-23 SERIES

SPQ PACKAGE for Reference

| Item | Unit | Value |
|--------------|------|----------------|
| Case Code | | SOT-23 |
| Reel Size | Inch | 7 |
| Reel Size | mm | 178 |
| Tape Space | mm | / |
| SPQ /Reel | pcs | 3000 |
| Weigh /SPQ | LBS | - |
| Weigh /SPQ | KGs | - |
| Qty. Per Box | pcs | 6000 |
| Inner Box | Inch | L8.0*W8.0*H1.5 |

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