

DATA SHEET

**ELECTROSTATIC DISCHARGE
PROTECTION DEVICES**

INDUSTRIAL / CONSUMER

STD12A(C)XXXL01E Series

RoHS compliant & Halogen free

Product specification— July 14, 2023 V.0



Electrostatic Discharged Protection Devices (ESD) Data Sheet

Features

- Glass passivated chip junction in SOD-123S Package
- IEC61000-4-2 ESD 30KV Air,30KV contact compliance
- Excellent clamping capability
- 400W peak pulse power capability on 10/1000µs waveform
- Fast response time: typically less than 1.0ps from 0 Volts to BV min

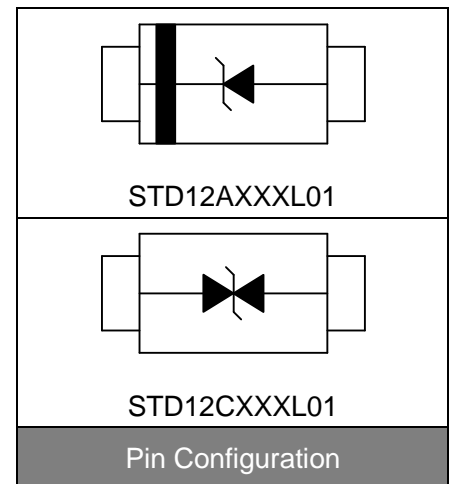


Contact : ±30kV
Air : ±30kV



Mechanical Data

- Terminals: axial leads, solderable per MIL-STD-750, Method 2026
- Polarity: Color band denoted cathode except bidirectional
- Mounting Position: any



Maximum Ratings and Characteristics

Ratings at 25°C ambient temperature unless otherwise specified.

| Rating | Symbol | Value | Units |
|--|-----------------|----------------|-------|
| Peak pulse power dissipation with 10/1000µs waveform | P_{PPM} | 400 | W |
| Peak pulse current with 10/1000µs waveform | $I_{PPM}^{(1)}$ | See next table | A |
| ESD voltage (Contact discharge) | V_{ESD} | ±30 | KV |
| ESD voltage (Air discharge) | | ±30 | KV |
| Operating junction and storage temperature range | T_J, T_{STG} | -55 to +150 | °C |

Notes:

(1). Non-repetitive current pulse derated above $T_A=25^\circ\text{C}$

Electrostatic Discharge Protection Devices | STD12A(C)XXXL01E Series

Electrical Characteristics (T_A=25°C)

| Part Number | | Marking | | Breakdown Voltage VBR (V) @ IT | | Test Current IT (mA) | Reverse Stand off Voltage VR(V) | Maximum Reverse Leakage IR(μA)@VR | Maximum Peak Pulse Current I _{pp} (A) | Maximum Clamping Voltage VC(V)@I _{pp} |
|---------------|--------------|---------|----|--------------------------------|------|----------------------|---------------------------------|-----------------------------------|--|--|
| Uni | Bi | Uni | Bi | Min. | Max. | | | | | |
| STD12A05L01E | - | KE | - | 6.4 | 7 | 10 | 5 | 800 | 43.5 | 9.2 |
| STD12A06L01E | - | KG | - | 6.67 | 7.37 | 10 | 6 | 800 | 38.8 | 10.3 |
| STD12A6.5L01E | - | KK | - | 7.22 | 7.98 | 10 | 6.5 | 500 | 35.7 | 11.2 |
| STD12A07L01E | - | KM | - | 7.78 | 8.6 | 10 | 7 | 200 | 33.3 | 12 |
| STD12A7.5L01E | - | KP | - | 8.33 | 9.21 | 1 | 7.5 | 100 | 31.0 | 12.9 |
| STD12A08L01E | - | KR | - | 8.89 | 9.83 | 1 | 8 | 50 | 29.4 | 13.6 |
| STD12A8.5L01E | - | KT | - | 9.44 | 10.4 | 1 | 8.5 | 20 | 27.8 | 14.4 |
| STD12A09L01E | STD12C09L01E | KV | AV | 10 | 11.1 | 1 | 9 | 5 | 26.0 | 15.4 |
| STD12A10L01E | STD12C10L01E | KX | AX | 11.1 | 12.3 | 1 | 10 | 5 | 23.5 | 17 |
| STD12A11L01E | STD12C11L01E | KZ | AZ | 12.2 | 13.5 | 1 | 11 | 1 | 22.0 | 18.2 |
| STD12A12L01E | STD12C12L01E | LE | BE | 13.3 | 14.7 | 1 | 12 | 1 | 20.1 | 19.9 |
| STD12A13L01E | STD12C13L01E | LG | BG | 14.4 | 15.9 | 1 | 13 | 1 | 18.6 | 21.5 |
| STD12A14L01E | STD12C14L01E | LK | BK | 15.6 | 17.2 | 1 | 14 | 1 | 17.2 | 23.2 |
| STD12A15L01E | STD12C15L01E | LM | BM | 16.7 | 18.5 | 1 | 15 | 1 | 16.4 | 24.4 |
| STD12A16L01E | STD12C16L01E | LP | BP | 17.8 | 19.7 | 1 | 16 | 1 | 15.4 | 26 |
| STD12A17L01E | STD12C17L01E | LR | BR | 18.9 | 20.9 | 1 | 17 | 1 | 14.5 | 27.6 |
| STD12A18L01E | STD12C18L01E | LT | BT | 20 | 22.1 | 1 | 18 | 1 | 13.7 | 29.2 |
| STD12A20L01E | STD12C20L01E | LV | BV | 22.2 | 24.5 | 1 | 20 | 1 | 12.3 | 32.4 |
| STD12A22L01E | STD12C22L01E | LX | BX | 24.4 | 26.9 | 1 | 22 | 1 | 11.3 | 35.5 |
| STD12A24L01E | STD12C24L01E | LZ | BZ | 26.7 | 29.5 | 1 | 24 | 1 | 10.3 | 38.9 |
| STD12A26L01E | STD12C26L01E | ME | CE | 28.9 | 31.9 | 1 | 26 | 1 | 9.5 | 42.1 |
| STD12A28L01E | STD12C28L01E | MG | CG | 31.1 | 34.4 | 1 | 28 | 1 | 8.8 | 45.4 |
| STD12A30L01E | STD12C30L01E | MK | CK | 33.3 | 36.8 | 1 | 30 | 1 | 8.3 | 48.4 |
| STD12A33L01E | STD12C33L01E | MM | CM | 36.7 | 40.6 | 1 | 33 | 1 | 7.5 | 53.3 |
| STD12A36L01E | STD12C36L01E | MP | CP | 40 | 44.2 | 1 | 36 | 1 | 6.9 | 58.1 |
| STD12A40L01E | STD12C40L01E | MR | CR | 44.4 | 49.1 | 1 | 40 | 1 | 6.2 | 64.5 |
| STD12A43L01E | STD12C43L01E | MT | CT | 47.8 | 52.8 | 1 | 43 | 1 | 5.8 | 69.4 |
| STD12A45L01E | STD12C45L01E | MV | CV | 50 | 55.3 | 1 | 45 | 1 | 5.5 | 72.7 |
| STD12A48L01E | STD12C48L01E | MX | CX | 53.3 | 58.9 | 1 | 48 | 1 | 5.2 | 77.4 |
| STD12A51L01E | STD12C51L01E | MZ | CZ | 56.7 | 62.7 | 1 | 51 | 1 | 4.9 | 82.4 |
| STD12A54L01E | STD12C54L01E | NE | DE | 60 | 66.3 | 1 | 54 | 1 | 4.6 | 87.1 |
| STD12A58L01E | - | NG | - | 64.4 | 71.2 | 1 | 58 | 1 | 4.3 | 93.6 |
| STD12A60L01E | - | NK | - | 66.7 | 73.7 | 1 | 60 | 1 | 4.1 | 96.8 |
| STD12A64L01E | - | NM | - | 71.1 | 78.6 | 1 | 64 | 1 | 3.9 | 103 |
| STD12A70L01E | - | NP | - | 77.8 | 86 | 1 | 70 | 1 | 3.5 | 113 |
| STD12A75L01E | - | NR | - | 83.3 | 92.1 | 1 | 75 | 1 | 3.3 | 121 |
| STD12A78L01E | - | NT | - | 86.7 | 95.8 | 1 | 78 | 1 | 3.2 | 126 |
| STD12A85L01E | - | NV | - | 94.4 | 104 | 1 | 85 | 1 | 2.9 | 137 |

Electrostatic Discharge Protection Devices STD12A(C)XXXL01E Series

| Part Number | | Marking | | Breakdown Voltage VBR (V) @ IT | | Test Current IT (mA) | Reverse Stand off Voltage VR(V) | Maximum Reverse Leakage IR(μA)@VR | Maximum Peak Pulse Current Ipp (A) | Maximum Clamping Voltage VC(V)@Ipp |
|---------------|----|---------|----|--------------------------------|------|----------------------|---------------------------------|-----------------------------------|------------------------------------|------------------------------------|
| Uni | Bi | Uni | Bi | Min. | Max. | | | | | |
| STD12A90L01E | - | NX | - | 100 | 111 | 1 | 90 | 1 | 2.7 | 146 |
| STD12A100L01E | - | NZ | - | 111 | 123 | 1 | 100 | 1 | 2.5 | 162 |
| STD12A110L01E | - | OE | - | 122 | 135 | 1 | 110 | 1 | 2.3 | 177 |
| STD12A120L01E | - | OG | - | 133 | 147 | 1 | 120 | 1 | 2.1 | 193 |
| STD12A130L01E | - | OK | - | 144 | 159 | 1 | 130 | 1 | 1.9 | 209 |
| STD12A150L01E | - | OM | - | 167 | 185 | 1 | 150 | 1 | 1.6 | 243 |
| STD12A160L01E | - | OP | - | 178 | 197 | 1 | 160 | 1 | 1.5 | 259 |
| STD12A170L01E | - | OR | - | 189 | 209 | 1 | 170 | 1 | 1.5 | 275 |
| STD12A180L01E | - | OT | - | 201 | 222 | 1 | 180 | 1 | 1.4 | 292 |
| STD12A188L01E | - | OV | - | 209 | 231 | 1 | 188 | 1 | 1.3 | 304 |
| STD12A200L01E | - | OX | - | 224 | 247 | 1 | 200 | 1 | 1.2 | 324 |
| STD12A220L01E | - | OZ | - | 246 | 272 | 1 | 220 | 1 | 1.1 | 356 |
| STD12A250L01E | - | PE | - | 279 | 309 | 1 | 250 | 1 | 1.0 | 405 |

Ratings and Characteristic Curves (TA=25°C unless otherwise noted)

Figure 1. Peak Pulse Power Rating Curve

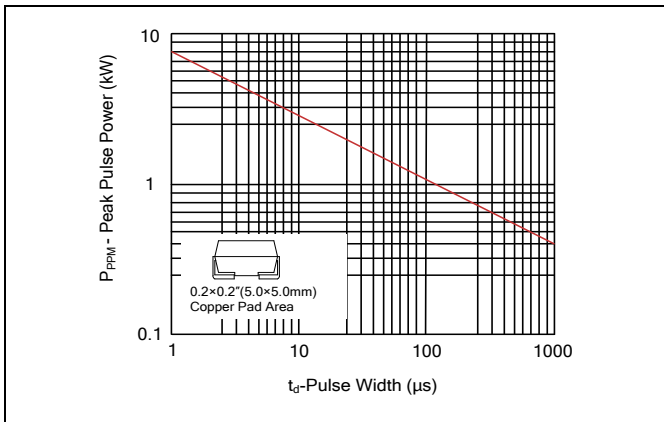


Figure 2. Power Derating Curve

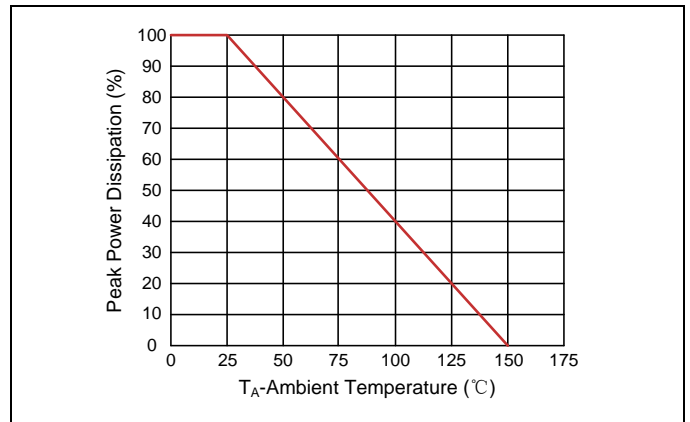


Figure 3. 10/1000μs Pulse Waveforms

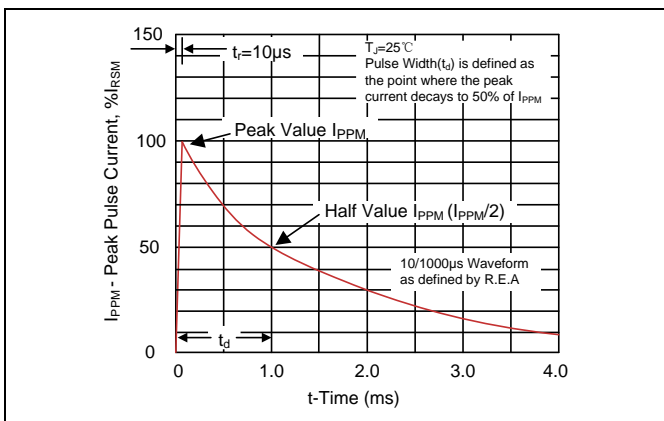


Figure 4. Capacitance vs. Reverse Voltage

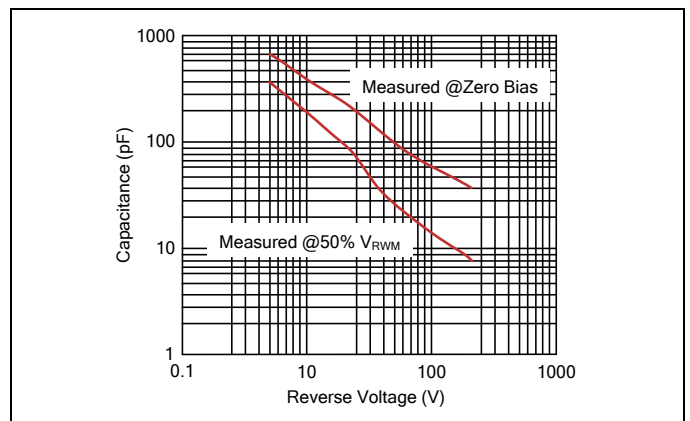
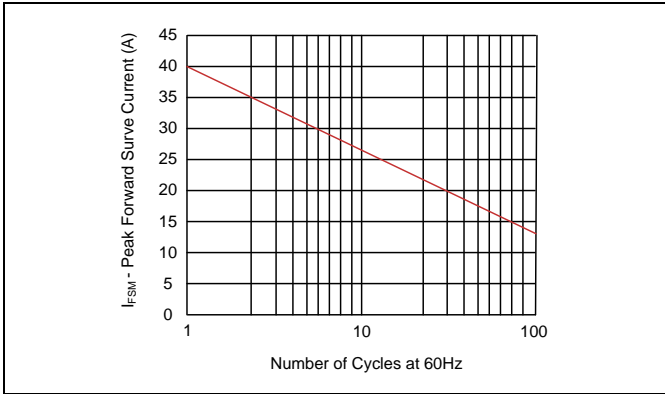
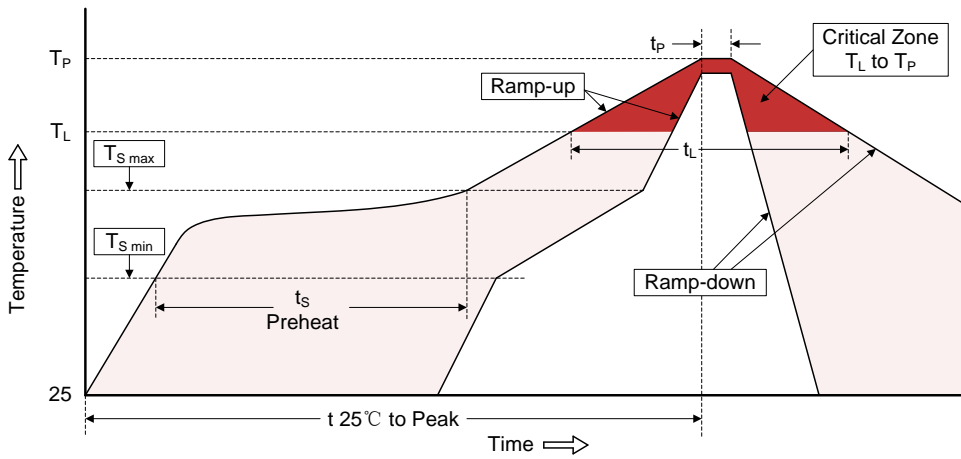


Figure 5. Maximum Non-Repetitive Forward Surge Current Uni-Directional Only



Recommended Soldering Conditions

Reflow Soldering



Recommended Conditions

| Profile Feature | Pb-Free Assembly |
|--|------------------|
| Average ramp-up rate (T_L to T_P) | 3°C/second max. |
| Preheat | |
| -Temperature Min ($T_{S\ min}$) | 150°C |
| -Temperature Max ($T_{S\ max}$) | 200°C |
| -Time (min to max) (t_s) | 60-180 seconds |
| $T_{S\ max}$ to T_L | |
| -Ramp-up Rate | 3°C/second max. |
| Time maintained above: | |
| -Temperature (T_L) | 217°C |
| -Time (t_L) | 60-150 seconds |
| Peak Temperature (T_P) | 260°C |
| Time within 5°C of actual Peak Temperature (t_p) | 20-40 seconds |
| Ramp-down Rate | 6°C/second max. |
| Time 25°C to Peak Temperature | 8 minutes max. |

Dimensions (SOD-123S)

| | Symbol | Millimeters | | Inches | |
|---|--------|-------------|-------|--------|-------|
| | | Min. | Max. | Min. | Max. |
| | A | 3.35 | 4.05 | 0.132 | 0.159 |
| | B | 2.55 | 3.05 | 0.100 | 0.120 |
| | C | 0.70 | 1.10 | 0.028 | 0.043 |
| | D | 1.60 | 2.00 | 0.063 | 0.079 |
| | E | 0.35 | 1.00 | 0.014 | 0.039 |
| | F | 0.90 | 1.40 | 0.035 | 0.055 |
| G | 0.13 | 0.25 | 0.005 | 0.010 | |

Packaging

| <p>Tape</p> | Symbol | Dimension (mm) | |
|-------------------|-------------|----------------|-----------|
| | W | 8.0±0.2 | |
| | A | 2.05±0.1 | |
| | B | 3.95±0.1 | |
| | C | 1.45±0.1 | |
| | d1 | Max.:1.00 | |
| | d | 1.55±0.1 | |
| | E | 1.75±0.1 | |
| | F | 3.50±0.1 | |
| | P | 4.00±0.1 | |
| | P0 | 4.00±0.1 | |
| | T | 0.21±0.1 | |
| | <p>Reel</p> | D | 178.0±0.5 |
| | | D1 | Min.:65 |
| D2 | | 8.00±0.2 | |
| G | | Min.:10.0 | |
| W1 | | Min.:12.0 | |
| Quantity: 3000PCS | | | |

LEGAL DISCLAIMER

YAGEO, its distributors and agents (collectively, "YAGEO"), hereby disclaims any and all liabilities for any errors, inaccuracies or incompleteness contained in any product related information, including but not limited to product specifications, datasheets, pictures and/or graphics. YAGEO may make changes, modifications and/or improvements to product related information at any time and without notice.

YAGEO makes no representation, warranty, and/or guarantee about the fitness of its products for any particular purpose or the continuing production of any of its products. To the maximum extent permitted by law, YAGEO disclaims (i) any and all liability arising out of the application or use of any YAGEO product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for a particular purpose, non-infringement and merchantability.

YAGEO products are designed for general purpose applications under normal operation and usage conditions. Please contact YAGEO for the applications listed below which require especially high reliability for the prevention of defects which might directly cause damage to the third party's life, body or property: Aerospace equipment (artificial satellite, rocket, etc.), Atomic energy-related equipment, Aviation equipment, Disaster prevention equipment, crime prevention equipment, Electric heating apparatus, burning equipment, Highly public information network equipment, data-processing equipment, Medical devices, Military equipment, Power generation control equipment, Safety equipment, Traffic signal equipment, Transportation equipment and Undersea equipment, or for any other application or use in which the failure of YAGEO products could result in personal injury or death, or serious property damage. Particularly **YAGEO Corporation and its affiliates do not recommend the use of commercial, automotive, and/or COTS grade products for high reliability applications or manned space flight.**

Information provided here is intended to indicate product specifications only. YAGEO reserves all the rights for revising this content without further notification, as long as products are unchanged. Any product change will be announced by PCN.