

1000W, 10V - 100V Surface Mount Transient Voltage Suppressor

FEATURES

- AEC-Q101 qualified
- Ideal for automated placement
- Glass passivated chip junction
- Excellent clamping capability
- Fast response time: Typically less than 1.0ps from 0 V to BV min
- Meets ISO 7637-2 (Pulse 1/2a/2b/3a/3b)
- Moisture sensitivity level: level 1, per J-STD-020
- RoHS Compliant
- Halogen-free according to IEC 61249-2-21

| KEY PARAMETERS | | |
|----------------------------|----------------|------|
| PARAMETER | VALUE | UNIT |
| V_{WM} | 8.55 - 85.5 | V |
| V_{BR} (uni-directional) | 9.5 - 105 | V |
| V_{BR} (bi-directional) | 9.5 - 105 | V |
| P_{PPSM} | 1000 | W |
| $T_{J\ MAX}$ | 175 | |
| Package | DO-214AA (SMB) | |
| Configuration | Single die | |

APPLICATIONS

- Protect sensitive circuit from damage by high voltage transients
- Lighting, ESD transient voltage protection of IC, system
- Inductive switching load protection of IC, system
- Electrical Fast Transient Immunity protection of IC, system



DO-214AA (SMB)

MECHANICAL DATA

- Case: DO-214AA (SMB)
- Molding compound meets UL 94V-0 flammability rating
- Terminal: Matte tin plated leads, solderable per J-STD-002
- Meet JESD 201 class 2 whisker test
- Polarity: As marked
- Weight: 0.110g (approximately)

| ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ unless otherwise noted) | | | |
|---|-----------|-------------|------------------|
| PARAMETER | SYMBOL | VALUE | UNIT |
| Non-repetitive peak impulse power dissipation with 10/1000 μs waveform ⁽¹⁾ | P_{PK} | 1000 | W |
| Steady state power dissipation at $T_A = 25^\circ\text{C}$ | P_D | 5 | W |
| Peak forward surge current, 8.3ms single half sine-wave superimposed on rated load for Uni-directional only | I_{FSM} | 100 | A |
| Forward Voltage @ $I_F = 50\text{A}$ for Uni-directional only ⁽²⁾ | V_F | 3.5 / 5.0 | V |
| Junction temperature | T_J | -55 to +175 | $^\circ\text{C}$ |
| Storage temperature | T_{STG} | -55 to +175 | $^\circ\text{C}$ |

Notes:

1. Non-repetitive current pulse per Fig. 3 and derated above $T_A = 25^\circ\text{C}$ per Fig. 2
2. $V_F = 3.5\text{V}$ for devices of $V_{BR} \leq 50\text{V}$ and $V_F = 5.0\text{V}$ max. for devices $V_{BR} > 50\text{V}$

Devices for Bipolar Applications

1. For Bidirectional use CAH suffix

| THERMAL PERFORMANCE | | | |
|--|-----------------|------------|-------------|
| PARAMETER | SYMBOL | TYP | UNIT |
| Junction-to-lead thermal resistance | $R_{\theta JL}$ | 20 | °C/W |
| Junction-to-ambient thermal resistance | $R_{\theta JA}$ | 100 | °C/W |

| ELECTRICAL SPECIFICATIONS ($T_A = 25^\circ\text{C}$ unless otherwise noted) | | | | | | | | |
|---|---------------------|---|------|-------------------------|--------------------------------|--|---|---|
| Device | Device Marking Code | Breakdown Voltage $V_{BR}@I_T$ (V) (Note 1) | | Test Current I_T (mA) | Stand-Off Voltage V_{WM} (V) | Maximum Reverse Leakage @ V_{WM} (μA) | Maximum Peak impulse Current I_{PP} (A) | Maximum Clamping Voltage $V_C@I_{PP}$ (V) |
| | | Min | Max | | | | | |
| 1KSMB10AH | A10E | 9.5 | 10.5 | 1.0 | 8.55 | 10.0 | 69.0 | 14.5 |
| 1KSMB10CAH | N10E | | | | | | | |
| 1KSMB11AH | A10F | 10.5 | 11.6 | 1.0 | 9.40 | 5.0 | 64.1 | 15.6 |
| 1KSMB11CAH | N10F | | | | | | | |
| 1KSMB12AH | A10G | 11.4 | 12.6 | 1.0 | 10.2 | 5.0 | 59.9 | 16.7 |
| 1KSMB12CAH | N10G | | | | | | | |
| 1KSMB13AH | A10H | 12.4 | 13.7 | 1.0 | 11.1 | 5.0 | 54.9 | 18.2 |
| 1KSMB13CAH | N10H | | | | | | | |
| 1KSMB15AH | A10I | 14.3 | 15.8 | 1.0 | 12.8 | 5.0 | 47.2 | 21.2 |
| 1KSMB15CAH | N10I | | | | | | | |
| 1KSMB16AH | A10J | 15.2 | 16.8 | 1.0 | 13.6 | 1.0 | 44.4 | 22.5 |
| 1KSMB16CAH | N10J | | | | | | | |
| 1KSMB18AH | A10K | 17.1 | 18.9 | 1.0 | 15.3 | 1.0 | 39.2 | 25.5 |
| 1KSMB18CAH | N10K | | | | | | | |
| 1KSMB20AH | A10L | 19.0 | 21.0 | 1.0 | 17.1 | 1.0 | 36.1 | 27.7 |
| 1KSMB20CAH | N10L | | | | | | | |
| 1KSMB22AH | A10M | 20.9 | 23.1 | 1.0 | 18.8 | 1.0 | 32.7 | 30.6 |
| 1KSMB22CAH | N10M | | | | | | | |
| 1KSMB24AH | A10N | 22.8 | 25.2 | 1.0 | 20.5 | 1.0 | 30.1 | 33.2 |
| 1KSMB24CAH | N10N | | | | | | | |
| 1KSMB27AH | A10O | 25.7 | 28.4 | 1.0 | 23.1 | 1.0 | 26.7 | 37.5 |
| 1KSMB27CAH | N10O | | | | | | | |
| 1KSMB30AH | A10P | 28.5 | 31.5 | 1.0 | 25.6 | 1.0 | 24.2 | 41.4 |
| 1KSMB30CAH | N10P | | | | | | | |
| 1KSMB33AH | A10Q | 31.4 | 34.7 | 1.0 | 28.2 | 1.0 | 21.9 | 45.7 |
| 1KSMB33CAH | N10Q | | | | | | | |
| 1KSMB36AH | A10R | 34.2 | 37.8 | 1.0 | 30.8 | 1.0 | 20.0 | 49.9 |
| 1KSMB36CAH | N10R | | | | | | | |
| 1KSMB39AH | A10S | 37.1 | 41.0 | 1.0 | 33.3 | 1.0 | 18.6 | 53.9 |
| 1KSMB39CAH | N10S | | | | | | | |
| 1KSMB43AH | A10T | 40.9 | 45.2 | 1.0 | 36.8 | 1.0 | 16.9 | 59.3 |
| 1KSMB43CAH | N10T | | | | | | | |
| 1KSMB47AH | A10U | 44.7 | 49.4 | 1.0 | 40.2 | 1.0 | 15.4 | 64.8 |
| 1KSMB47CAH | N10U | | | | | | | |
| 1KSMB51AH | A10V | 48.5 | 53.6 | 1.0 | 43.6 | 1.0 | 14.3 | 70.1 |
| 1KSMB51CAH | N10V | | | | | | | |
| 1KSMB56AH | A10W | 53.2 | 58.8 | 1.0 | 47.8 | 1.0 | 13.0 | 77.0 |
| 1KSMB56CAH | N10W | | | | | | | |
| 1KSMB62AH | A10X | 58.9 | 65.1 | 1.0 | 53.0 | 1.0 | 11.8 | 85.0 |
| 1KSMB62CAH | N10X | | | | | | | |
| 1KSMB68AH | A10Y | 64.6 | 71.4 | 1.0 | 58.1 | 1.0 | 10.9 | 92.0 |
| 1KSMB68CAH | N10Y | | | | | | | |

ELECTRICAL SPECIFICATIONS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

| Device | Device Marking Code | Breakdown voltage $V_{BR}@I_T$ (V) (Note 1) | | Test current I_T (mA) | Stand-Off Voltage V_{WM} (V) | Maximum Reverse leakage @ V_{WM} (μA) | Maximum peak impulse current I_{PP} (A) | Maximum clamping voltage $V_C@I_{PP}$ (V) |
|-------------|---------------------|--|------|-------------------------------|--------------------------------------|--|---|---|
| | | Min | Max | | | | | |
| 1KSMB75AH | A10Z | 71.3 | 78.8 | 1.0 | 64.1 | 1.0 | 9.7 | 103 |
| 1KSMB75CAH | N10Z | | | | | | | |
| 1KSMB82AH | B10A | 77.9 | 86.1 | 1.0 | 70.1 | 1.0 | 8.8 | 113 |
| 1KSMB82CAH | O10A | | | | | | | |
| 1KSMB91AH | B10B | 86.5 | 95.5 | 1.0 | 77.8 | 1.0 | 8.0 | 125 |
| 1KSMB91CAH | O10B | | | | | | | |
| 1KSMB100AH | B10C | 95 | 105 | 1.0 | 85.5 | 1.0 | 7.3 | 137 |
| 1KSMB100CAH | O10C | | | | | | | |

Notes:

- V_{BR} measure after I_T applied for 30ms, I_T =square wave pulse or equivalent.
- All terms and symbols are consistent with ANSI/IEEE C62.35.
- For Bidirectional use CAH suffix

ORDERING INFORMATION

| ORDERING CODE ⁽¹⁾ | PACKAGE | PACKING |
|------------------------------|----------------|---------------------|
| 1KSMBxH | DO-214AA (SMB) | 3,000 / Tape & Reel |

Notes:

- "x" defines voltage from 10V(1KSMB10AH) to 100V(1KSMB100CAH)

CHARACTERISTICS CURVES

($T_A = 25^\circ\text{C}$ unless otherwise noted)

Fig.1 Peak Pulse Power Rating Curve

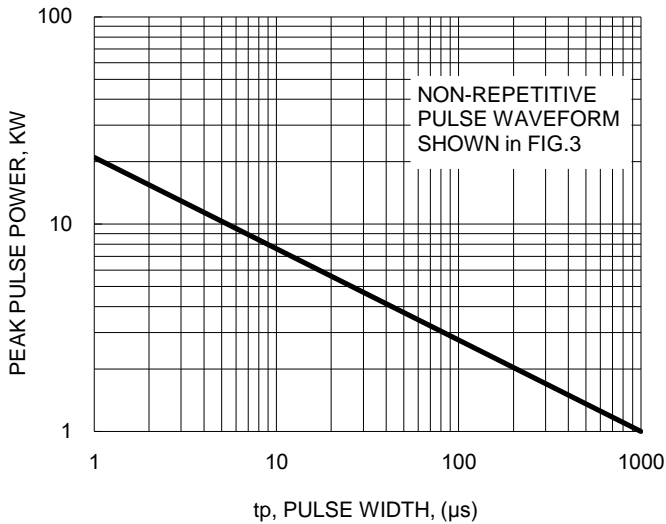


Fig.2 Pulse Derating Curve

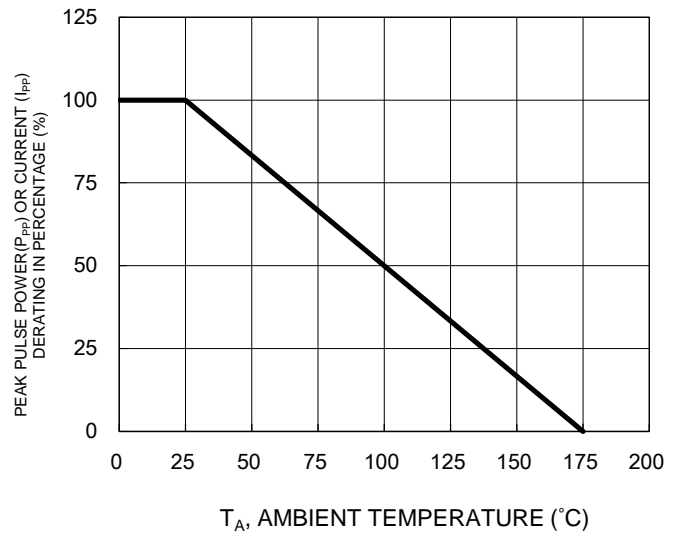


Fig.3 Clamping Power Pulse Waveform

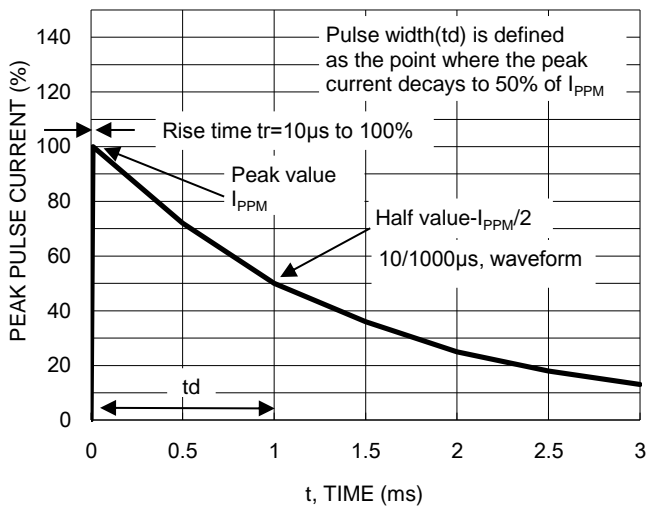
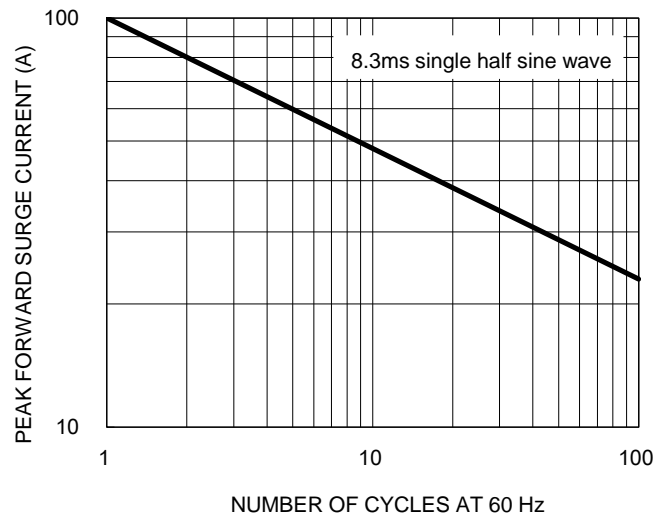


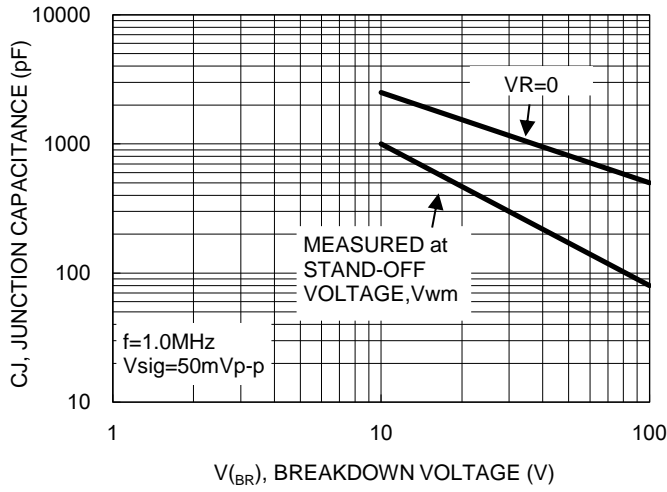
Fig.4 Maximum Non-Repetitive Forward Surge Current Unidirectional Only



CHARACTERISTICS CURVES

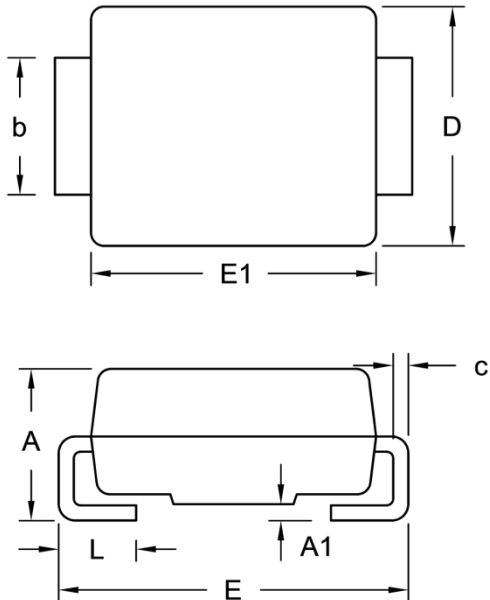
($T_A = 25^\circ\text{C}$ unless otherwise noted)

Fig.5 Typical Junction Capacitance



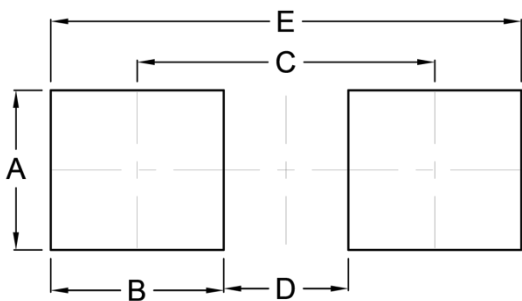
PACKAGE OUTLINE DIMENSIONS

DO-214AA (SMB)



| DIM. | Unit (mm) | | Unit (inch) | |
|------|-----------|------|-------------|-------|
| | Min. | Max. | Min. | Max. |
| A | 1.95 | 2.65 | 0.077 | 0.104 |
| A1 | 0.05 | 0.20 | 0.002 | 0.008 |
| b | 1.95 | 2.20 | 0.077 | 0.087 |
| c | 0.15 | 0.31 | 0.006 | 0.012 |
| D | 3.30 | 3.95 | 0.130 | 0.156 |
| E | 5.10 | 5.60 | 0.201 | 0.220 |
| E1 | 4.05 | 4.60 | 0.159 | 0.181 |
| L | 0.75 | 1.60 | 0.030 | 0.063 |

SUGGESTED PAD LAYOUT



| Symbol | Unit (mm) | Unit (inch) |
|--------|-----------|-------------|
| A | 2.30 | 0.091 |
| B | 2.50 | 0.098 |
| C | 4.30 | 0.169 |
| D | 1.80 | 0.071 |
| E | 6.80 | 0.268 |

MARKING DIAGRAM



- P/N = Marking Code
- G = Green Compound
- YW = Date Code
- F = Factory Code

Cathode band for uni-directional products only