

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

### FEATURES FEATURES

- Low profile package
- Ideal for automated placement
- Glass passivated junction
- Built-in strain relief
- Excellent clamping capability
- Fast response time: Typically less than 1.0ps from 0 volt to BV min
- Compliant to RoHS Directive 2011/65/EU and in accordance to WEEE 2002/96/EC
- Halogen-free according to IEC 61249-2-21

### APPLICATIONS

- Switching mode power supply (SMPS)
- Adapters
- TV
- Monitor

### MECHANICAL DATA

- Case: DO-214AA (SMB)
- Molding compound meets UL 94V-0 flammability rating
- Moisture sensitivity level: level 1, per J-STD-020
- Part no. with suffix "H" means AEC-Q101 qualified
- Packing code with suffix "G" means green compound (halogen-free)
- Terminal: Matte tin plated leads, solderable per J-STD-002
- Meet JESD 201 class 2 whisker test
- Polarity: As marked
- Weight: 0.11 g (approximately)

| 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    |
| $T_{JMAX}$                 | 175            | °C   |
| Package                    | DO-214AA (SMB) |      |
| Configuration              | Single die     |      |



DO-214AA (SMB)

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

| <b>THERMAL PERFORMANCE</b>             |                 |              |                      |
|--|-----------------|--------------|----------------------|
| <b>PARAMETER</b>                       | <b>SYMBOL</b>   | <b>LIMIT</b> | <b>UNIT</b>          |
| Junction-to-lead thermal resistance    | $R_{\theta JL}$ | 20           | $^{\circ}\text{C/W}$ |
| Junction-to-ambient thermal resistance | $R_{\theta JA}$ | 100          | $^{\circ}\text{C/W}$ |

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

| Device    | Device Marking Code | Breakdown Voltage $V_{BR@I_T}$ (V) |      | Test Current $I_T$ (mA) | Stand-Off Voltage @ $V_{WM}$ (V) | Maximum Reverse Leakage @ $V_{WM}$ ( $\mu\text{A}$ ) | Maximum Peak impure Current $I_{PP}$ (A) (Note 2) | Maximum Clamping Voltage $V_C@I_{PP}$ (V) |
|-----------|---------------------|------------------------------------|------|-------------------------|----------------------------------|--|---|---|
|           |                     | Min.                               | Max. |                         |                                  |  |   |   |
| 1KSMB10A  | A10E                | 9.5                                | 10.5 | 1.0                     | 8.55                             | 10.0   | 69.0  | 14.5                                      |
| 1KSMB10CA | N10E                |                                    |      |                         |                                  |  |   |   |
| 1KSMB11A  | A10F                | 10.5                               | 11.6 | 1.0                     | 9.40                             | 5.0  | 64.1  | 15.6                                      |
| 1KSMB11CA | N10F                |                                    |      |                         |                                  |  |   |   |
| 1KSMB12A  | A10G                | 11.4                               | 12.6 | 1.0                     | 10.2                             | 5.0  | 59.9  | 16.7                                      |
| 1KSMB12CA | N10G                |                                    |      |                         |                                  |  |   |   |
| 1KSMB13A  | A10H                | 12.4                               | 13.7 | 1.0                     | 11.1                             | 5.0  | 54.9  | 18.2                                      |
| 1KSMB13CA | N10H                |                                    |      |                         |                                  |  |   |   |
| 1KSMB15A  | A10I                | 14.3                               | 15.8 | 1.0                     | 12.8                             | 5.0  | 47.2  | 21.2                                      |
| 1KSMB15CA | N10I                |                                    |      |                         |                                  |  |   |   |
| 1KSMB16A  | A10J                | 15.2                               | 16.8 | 1.0                     | 13.6                             | 1.0  | 44.4  | 22.5                                      |
| 1KSMB16CA | N10J                |                                    |      |                         |                                  |  |   |   |
| 1KSMB18A  | A10K                | 17.1                               | 18.9 | 1.0                     | 15.3                             | 1.0  | 39.2  | 25.5                                      |
| 1KSMB18CA | N10K                |                                    |      |                         |                                  |  |   |   |
| 1KSMB20A  | A10L                | 19.0                               | 21.0 | 1.0                     | 17.1                             | 1.0  | 36.1  | 27.7                                      |
| 1KSMB20CA | N10L                |                                    |      |                         |                                  |  |   |   |
| 1KSMB22A  | A10M                | 20.9                               | 23.1 | 1.0                     | 18.8                             | 1.0  | 32.7  | 30.6                                      |
| 1KSMB22CA | N10M                |                                    |      |                         |                                  |  |   |   |
| 1KSMB24A  | A10N                | 22.8                               | 25.2 | 1.0                     | 20.5                             | 1.0  | 30.1  | 33.2                                      |
| 1KSMB24CA | N10N                |                                    |      |                         |                                  |  |   |   |
| 1KSMB27A  | A10O                | 25.7                               | 28.4 | 1.0                     | 23.1                             | 1.0  | 26.7  | 37.5                                      |
| 1KSMB27CA | N10O                |                                    |      |                         |                                  |  |   |   |
| 1KSMB30A  | A10P                | 28.5                               | 31.5 | 1.0                     | 25.6                             | 1.0  | 24.2  | 41.4                                      |
| 1KSMB30CA | N10P                |                                    |      |                         |                                  |  |   |   |
| 1KSMB33A  | A10Q                | 31.4                               | 34.7 | 1.0                     | 28.2                             | 1.0  | 21.9  | 45.7                                      |
| 1KSMB33CA | N10Q                |                                    |      |                         |                                  |  |   |   |
| 1KSMB36A  | A10R                | 34.2                               | 37.8 | 1.0                     | 30.8                             | 1.0  | 20.0  | 49.9                                      |
| 1KSMB36CA | N10R                |                                    |      |                         |                                  |  |   |   |
| 1KSMB39A  | A10S                | 37.1                               | 41.0 | 1.0                     | 33.3                             | 1.0  | 18.6  | 53.9                                      |
| 1KSMB39CA | N10S                |                                    |      |                         |                                  |  |   |   |
| 1KSMB43A  | A10T                | 40.9                               | 45.2 | 1.0                     | 36.8                             | 1.0  | 16.9  | 59.3                                      |
| 1KSMB43CA | N10T                |                                    |      |                         |                                  |  |   |   |
| 1KSMB47A  | A10U                | 44.7                               | 49.4 | 1.0                     | 40.2                             | 1.0  | 15.4  | 64.8                                      |
| 1KSMB47CA | N10U                |                                    |      |                         |                                  |  |   |   |
| 1KSMB51A  | A10V                | 48.5                               | 53.6 | 1.0                     | 43.6                             | 1.0  | 14.3  | 70.1                                      |
| 1KSMB51CA | N10V                |                                    |      |                         |                                  |  |   |   |
| 1KSMB56A  | A10W                | 53.2                               | 58.8 | 1.0                     | 47.8                             | 1.0  | 13.0  | 77.0                                      |
| 1KSMB56CA | N10W                |                                    |      |                         |                                  |  |   |   |
| 1KSMB62A  | A10X                | 58.9                               | 65.1 | 1.0                     | 53.0                             | 1.0  | 11.8  | 85.0                                      |
| 1KSMB62CA | N10X                |                                    |      |                         |                                  |  |   |   |
| 1KSMB68A  | A10Y                | 64.6                               | 71.4 | 1.0                     | 58.1                             | 1.0  | 10.9  | 92.0                                      |
| 1KSMB68CA | 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 @ $V_{WM}$ ( $\mu\text{A}$ ) | Maximum peak impulse current $I_{PP}$ (A) (Note 2) | Maximum clamping voltage $V_C@I_{PP}$ (V) |
|------------|---------------------|---|------|-------------------------|----------------------------------|--|--|---|
|            |                     | Min.  | Max. |                         |                                  |  |  |   |
| 1KSMB75A   | A10Z                | 71.3  | 78.8 | 1.0                     | 64.1                             | 1.0  | 9.7  | 103                                       |
| 1KSMB75CA  | N10Z                |   |      |                         |                                  |  |  |   |
| 1KSMB82A   | B10A                | 77.9  | 86.1 | 1.0                     | 70.1                             | 1.0  | 8.8  | 113                                       |
| 1KSMB82CA  | O10A                |   |      |                         |                                  |  |  |   |
| 1KSMB91A   | B10B                | 86.5  | 95.5 | 1.0                     | 77.8                             | 1.0  | 8.0  | 125                                       |
| 1KSMB91CA  | O10B                |   |      |                         |                                  |  |  |   |
| 1KSMB100A  | B10C                | 95  | 105  | 1.0                     | 85.5                             | 1.0  | 7.3  | 137                                       |
| 1KSMB100CA | O10C                |   |      |                         |                                  |  |  |   |

**Notes:**

- $V_{BR}$  measure after  $I_T$  applied for  $300\mu\text{s}$ ,  $I_T$ =square wave pulse or equivalent.
- All terms and symbols are consistent with ANSI/IEEE C62.35.
- For Bidirectional use CA suffix

**ORDERING INFORMATION**

| PART NO.              | PART NO. SUFFIX | PACKING CODE | PACKING CODE SUFFIX(*) | PACKAGE | PACKING                  |
|-----------------------|-----------------|--------------|------------------------|---------|--------------------------|
| 1KSMBxxxx<br>(Note 1) | H               | R5           | G                      | SMB     | 850 / 7" Plastic reel    |
|                       |                 | R4           |                        | SMB     | 3,000 / 13" Paper reel   |
|                       |                 | M4           |                        | SMB     | 3,000 / 13" Plastic reel |

**Note :**

- "xxxx" defines voltage from 10V (1KSMB10A) to 100V (1KSMB100CA)

\*: Optional available

**EXAMPLE P/N**

| EXAMPLE P/N  | PART NO. | PART NO. SUFFIX | PACKING CODE | PACKING CODE SUFFIX | DESCRIPTION                          |
|--------------|----------|-----------------|--------------|---------------------|--------------------------------------|
| 1KSMB39AHR5G | 1KSMB39A | H               | R5           | G                   | AEC-Q101 qualified<br>Green compound |

**CHARACTERISTICS CURVES**

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

**Fig1. Peak Pulse Power Rating Curve**



**Fig2. Pulse Derating Curve**



**Fig3. Clamping Power Pulse Waveform**



**Fig4. Maximum Non-Repetitive Forward Surge Current Unidirectional Only**



**Fig5. Typical Junction Capacitance**



**PACKAGE OUTLINE DIMENSIONS**

DO-214AA (SMB)



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

**SUGGESTED PAD LAYOUT**



| Symbol | Unit (mm) | Unit (inch) |
|--------|-----------|-------------|
| A      | 2.3       | 0.091       |
| B      | 2.5       | 0.098       |
| C      | 4.3       | 0.169       |
| D      | 1.8       | 0.071       |
| E      | 6.8       | 0.268       |

**MARKING DIAGRAM**



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

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