# 5000W, 10V- 40V Surface Mount Transient Voltage Suppressor

## FEATURES

- AEC-Q101 qualified
- Moisture sensitivity level: level 1, per J-STD-020
- Meets IEC 61000-4-2 (Level: 4) / ISO 10605 (Level: L4)
- Meets ISO 7637-2 (Pulse 1/2a/2b/3a/3b)
- RoHS Compliant
- Halogen-free according to IEC 61249-2-21

## APPLICATIONS

- Switching mode power supply (SMPS)
- Motor for BLDC
- Lighting application
- Battery Management System
- Automotive

## MECHANICAL DATA

- Case: DO-214AB (SMC)
- 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: Indicated by cathode band
- Weight: 0.244g (approximately)

| KEY PARAMETERS | | |
|---|---|---|
| **PARAMETER** | **VALUE** | **UNIT** |
| $V_{WM}$ | 10 - 40 | V |
| $V_{BR}$ | 12 - 47 | V |
| $P_{PPM}$ | 5000 | W |
| $T_{J\,MAX}$ | 175 | °C |
| Polarity | Uni-directional | |
| Package | DO-214AB (SMC) | |

Pb-Free RoHS COMPLIANT HALOGEN FREE

**DO-214AB (SMC)**


| ABSOLUTE MAXIMUM RATINGS ($T_A$ = 25°C unless otherwise noted) | | | |
|---|---|---|---|
| **PARAMETER** | **SYMBOL** | **VALUE** | **UNIT** |
| Non-repetitive peak impulse power dissipation with 10/1000μs waveform(1) | $P_{PPM}$ | 5000 | W |
| Steady state power dissipation at $T_L$ = 25°C(2) | $P_D$ | 12.5 | W |
| Peak forward surge current 8.3ms single half sine-wave | $I_{FSM}$ | 350 | A |
| 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°C per Fig.1
2. Units mounted on PCB (16mm x 16mm Cu pad test board)

## THERMAL PERFORMANCE

| PARAMETER | SYMBOL | TYP | UNIT |
|---|---|---|---|
| Junction-to-lead thermal resistance | $R_{\Theta JL}$ | 12 | °C/W |
| Junction-to-ambient thermal resistance | $R_{\Theta JA}$ | 48 | °C/W |
| Junction-to-case thermal resistance | $R_{\Theta JC}$ | 9 | °C/W |

**Thermal Performance Note:** Units mounted on PCB (16mm x 16mm Cu pad test board)

## ELECTRICAL SPECIFICATIONS ($T_A$ = 25°C unless otherwise noted)

| Part number | Marking code | $I_R$ max at $V_{WM}$ | | $V_{BR}$ at $I_T$ (1) | | | | $V_C$ at $I_{PPM}$ 10 / 1000 µs | | $R_D$ 10 / 1000 µs | αT (2) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Min | Typ | Max | $I_T$ | Max | | | Max |
| | | µA | V | V | | mA | | V (3) | A (4) | Ω | $10^{-4}$/°C |
| 5KSMC10AH | 5K10A | 5 | 10 | 11.4 | 12.0 | 12.6 | 1 | 17.0 | 294.1 | 0.017 | 7.8 |
| 5KSMC13AH | 5K13A | 3 | 13 | 14.3 | 15.0 | 15.8 | 1 | 21.5 | 232.6 | 0.028 | 8.4 |
| 5KSMC15AH | 5K15A | 3 | 15 | 16.7 | 17.6 | 18.5 | 1 | 24.4 | 204.9 | 0.033 | 8.8 |
| 5KSMC16AH | 5K16A | 3 | 16 | 17.8 | 18.7 | 19.6 | 1 | 26.0 | 192.3 | 0.038 | 8.8 |
| 5KSMC18AH | 5K18A | 3 | 18 | 20 | 21.1 | 22.2 | 1 | 29.2 | 171.2 | 0.047 | 9.2 |
| 5KSMC20AH | 5K20A | 3 | 20 | 22.2 | 23.4 | 24.6 | 1 | 32.4 | 154.3 | 0.058 | 9.4 |
| 5KSMC22AH | 5K22A | 3 | 22 | 24.4 | 25.7 | 27.0 | 1 | 35.5 | 140.8 | 0.070 | 9.6 |
| 5KSMC24AH | 5K24A | 3 | 24 | 26.7 | 28.1 | 29.5 | 1 | 38.9 | 128.5 | 0.084 | 9.6 |
| 5KSMC26AH | 5K26A | 3 | 26 | 28.9 | 30.4 | 31.9 | 1 | 42.1 | 118.8 | 0.098 | 9.7 |
| 5KSMC28AH | 5K28A | 3 | 28 | 31.1 | 32.7 | 34.3 | 1 | 45.4 | 110.1 | 0.115 | 9.8 |
| 5KSMC30AH | 5K30A | 3 | 30 | 33.3 | 35.1 | 36.9 | 1 | 48.4 | 103.3 | 0.129 | 9.9 |
| 5KSMC33AH | 5K33A | 3 | 33 | 36.7 | 38.6 | 40.5 | 1 | 53.3 | 93.8 | 0.157 | 10.0 |
| 5KSMC36AH | 5K36A | 3 | 36 | 40.0 | 42.1 | 44.2 | 1 | 58.1 | 86.0 | 0.186 | 10.0 |
| 5KSMC40AH | 5K40A | 3 | 40 | 44.4 | 46.7 | 49.0 | 1 | 64.5 | 77.5 | 0.229 | 10.1 |

**Notes:**

1. Pulse test: tp < 30ms
2. To calculate $V_{BR}$ or $V_C$ versus junction temperature, use following formulas:
   $V_{BR}$ at $T_J$ = $V_{BR}$ at 25°C x (1 + αT x ($T_J$-25))
   $V_C$ at $T_J$ = $V_C$ at 25°C x (1 + αT x ($T_J$-25))
3. To calculate maximum clamping voltage at other surge level, use the following formula:
   $V_{Cmax}$ = $V_C$ - $R_D$ x ($I_{PP}$ – $I_{PPappli}$) where $I_{PPappli}$ is the surge current in the application.

## ORDERING INFORMATION

| ORDERING CODE | PACKAGE | PACKING |
|---|---|---|
| 5KSMCxAH | DO-214AB (SMC) | 3,000 / Tape & Reel |

**Notes:**

1. "x" defines voltage from 10V (5KSMC10AH) to 40V (5KSMC40AH)

## CHARACTERISTICS CURVES

($T_A$ = 25°C unless otherwise noted)

**Fig.1 Pulse Power or Current vs. Initial Junction Temperature**

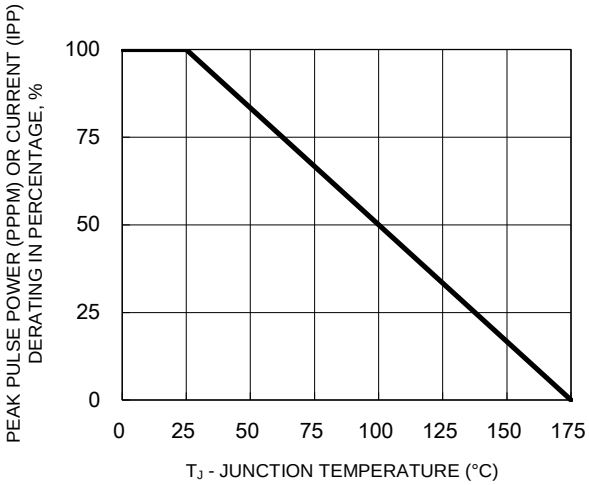



**Fig.2 Steady State Power Derating**

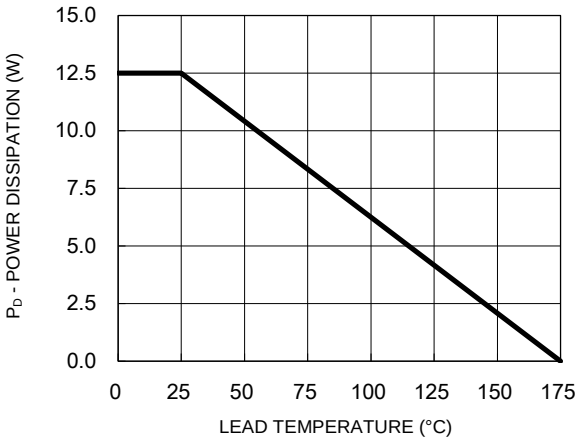



**Fig.3 Clamping Power Pulse Waveform**

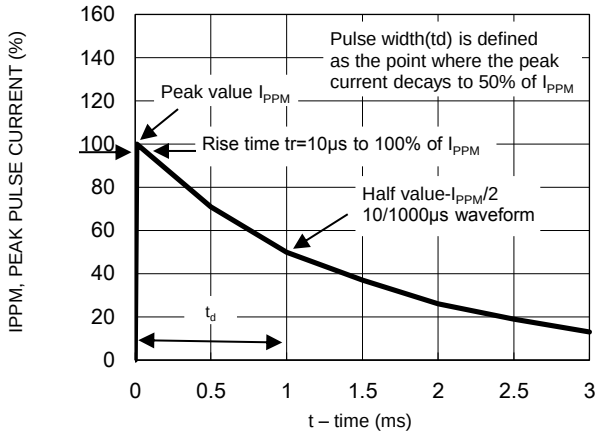



**Fig.4 Typical Junction Capacitance**

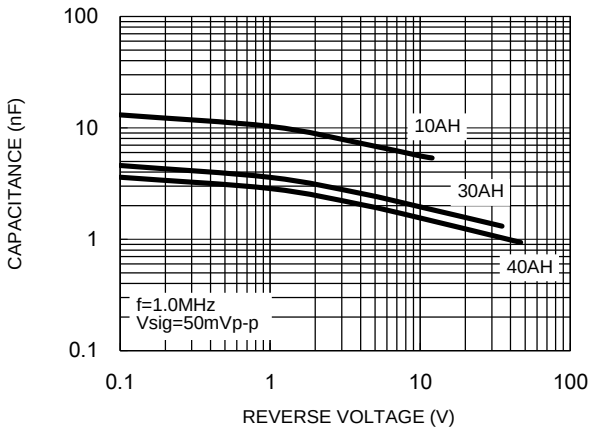



**Fig.5 Typical Transient Thermal Impedance**

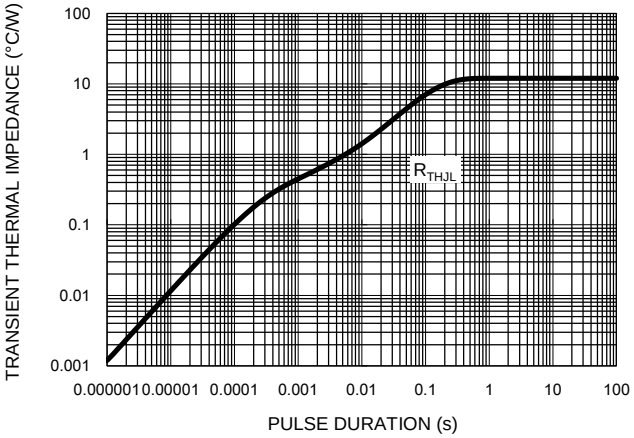
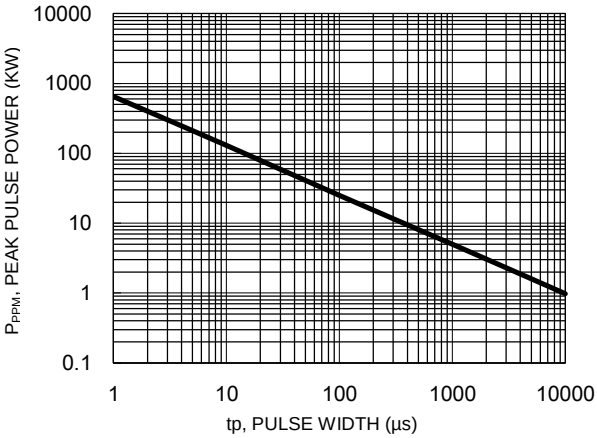
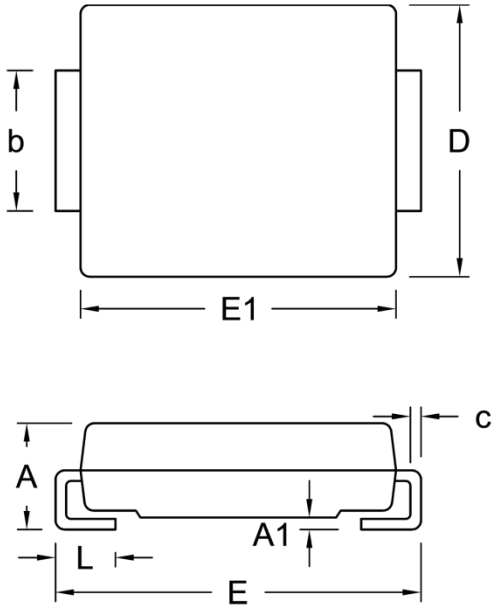



**Fig.6 Peak Pulse Power Rating Cure**



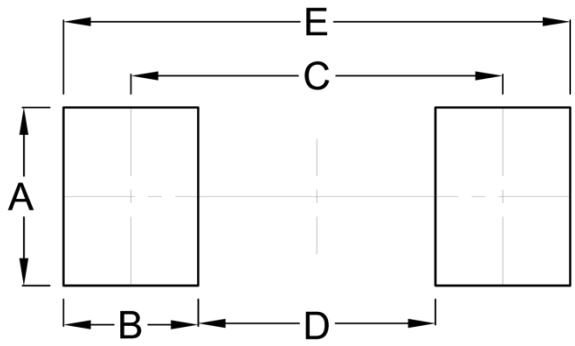
## PACKAGE OUTLINE DIMENSIONS

DO-214AB (SMC)




| DIM. | Unit (mm) | | Unit (inch) | |
|---|---|---|---|---|
| | Min. | Max. | Min. | Max. |
| A | 2.00 | 2.62 | 0.079 | 0.103 |
| A1 | - | 0.20 | - | 0.008 |
| b | 2.90 | 3.20 | 0.114 | 0.126 |
| c | 0.15 | 0.31 | 0.006 | 0.012 |
| D | 5.59 | 6.22 | 0.220 | 0.245 |
| E | 7.75 | 8.13 | 0.305 | 0.320 |
| E1 | 6.60 | 7.11 | 0.260 | 0.280 |
| L | 1.00 | 1.60 | 0.039 | 0.063 |

## SUGGESTED PAD LAYOUT




| Symbol | Unit (mm) | Unit (inch) |
|---|---|---|
| A | 3.30 | 0.130 |
| B | 2.50 | 0.098 |
| C | 6.90 | 0.272 |
| D | 4.40 | 0.173 |
| E | 9.40 | 0.370 |

## MARKING DIAGRAM


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

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