

# Surface Mount PAR<sup>®</sup> Transient Voltage Suppressors

High Temperature Stability and High Reliability Conditions



DO-214AB (SMC)

## FEATURES

- Junction passivation optimized design passivated anisotropic rectifier technology
- $T_J = 185\text{ }^{\circ}\text{C}$  capability suitable for high reliability and automotive requirement
- Available in uni-directional polarity only
- 3000 W peak pulse power capability with a 10/1000  $\mu\text{s}$  waveform
- Excellent clamping capability
- Very fast response time
- Low incremental surge resistance
- Meets MSL level 1, per J-STD-020, LF maximum peak of  $260\text{ }^{\circ}\text{C}$
- AEC-Q101 qualified
- Material categorization: For definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT

## TYPICAL APPLICATIONS

Use in sensitive electronics protection against voltage transients induced by inductive load switching and lighting on ICs, MOSFET, signal lines of sensor units for consumer, computer, industrial, automotive, and telecommunication.

## MECHANICAL DATA

**Case:** DO-214AB (SMC)

Molding compound meets UL 94 V-0 flammability rating  
Base P/NHE3 - RoHS-compliant and AEC-Q101 qualified  
Base P/NHE3\_X - RoHS-compliant and AEC-Q101 qualified ("X" denotes revision code e.g. A, B, ....)

**Terminals:** Matte tin plated leads, solderable per J-STD-002 and JESD 22-B102

HE3 suffix meets JESD 201 class 2 whisker test

**Polarity:** Color band denotes cathode end

| PRIMARY CHARACTERISTICS |                               |
|-------------------------|-------------------------------|
| $V_{WM}$                | 10 V to 43 V                  |
| $V_{BR}$                | 11.1 V to 52.8 V              |
| $P_{PPM}$               | 3000 W                        |
| $P_D$                   | 6.0 W                         |
| $I_{FSM}$               | 200 A                         |
| $T_J \text{ max.}$      | $185\text{ }^{\circ}\text{C}$ |
| Polarity                | Uni-directional               |
| Package                 | DO-214AB (SMC)                |

| MAXIMUM RATINGS ( $T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise noted)               |                |                |                    |
|--------------------------------------------------------------------------------------------|----------------|----------------|--------------------|
| PARAMETER                                                                                  | SYMBOL         | VALUE          | UNIT               |
| Peak pulse power dissipation with a 10/1000 $\mu\text{s}$ waveform <sup>(1)</sup> (fig. 3) | $P_{PPM}$      | 3000           | W                  |
| Peak power pulse current with a 10/1000 $\mu\text{s}$ waveform <sup>(1)</sup> (fig. 1)     | $I_{PPM}$      | See next table | A                  |
| Peak forward surge current 8.3 ms single half sine-wave <sup>(2)</sup>                     | $I_{FSM}$      | 200            | A                  |
| Power dissipation on infinite heatsink, $T_L = 75\text{ }^{\circ}\text{C}$ (fig. 6)        | $P_D$          | 6.0            | W                  |
| Maximum instantaneous forward voltage at 100 A <sup>(2)</sup>                              | $V_F$          | 3.5            | V                  |
| Operating junction and storage temperature range                                           | $T_J, T_{STG}$ | - 65 to + 185  | $^{\circ}\text{C}$ |

### Notes

<sup>(1)</sup> Non-repetitive current pulse, per fig. 3 and derated above  $T_A = 25\text{ }^{\circ}\text{C}$  per fig. 2.

<sup>(2)</sup> Measured on 8.3 ms single half sine-wave, or equivalent square wave, duty cycle = 4 pulses per minute maximum

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

| DEVICE TYPE | DEVICE MARKING CODE | BREAKDOWN VOLTAGE $V_{BR}$ AT $I_T^{(1)}$ (V) |      | TEST CURRENT $I_T$ (mA) | STAND-OFF VOLTAGE $V_{WM}$ (V) | MAXIMUM REVERSE LEAKAGE AT $V_{WM}$ $I_R$ ( $\mu\text{A}$ ) | MAXIMUM REVERSE LEAKAGE AT $V_{WM}$ $I_D$ ( $\mu\text{A}$ ) $T_J = 150^\circ\text{C}$ | MAXIMUM PEAK PULSE SURGE CURRENT $I_{PPM}$ (A) $^{(2)}$ | MAXIMUM CLAMPING VOLTAGE AT $I_{PPM}$ $V_C$ (V) |
|-------------|---------------------|-----------------------------------------------|------|-------------------------|--------------------------------|-------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------|-------------------------------------------------|
|             |                     | MIN.                                          | MAX. |                         |                                |                                                             |                                                                                       |                                                         |                                                 |
| 3KASMC10    | 3AW                 | 11.1                                          | 13.6 | 1.0                     | 10                             | 5.0                                                         | 50                                                                                    | 160                                                     | 18.8                                            |
| 3KASMC10A   | 3AX                 | 11.1                                          | 12.3 | 1.0                     | 10                             | 5.0                                                         | 50                                                                                    | 177                                                     | 17.0                                            |
| 3KASMC11    | 3AY                 | 12.2                                          | 14.9 | 1.0                     | 11                             | 5.0                                                         | 50                                                                                    | 149                                                     | 20.1                                            |
| 3KASMC11A   | 3AZ                 | 12.2                                          | 13.5 | 1.0                     | 11                             | 5.0                                                         | 50                                                                                    | 165                                                     | 18.2                                            |
| 3KASMC12    | 3BD                 | 13.3                                          | 16.3 | 1.0                     | 12                             | 2.0                                                         | 20                                                                                    | 136                                                     | 22.0                                            |
| 3KASMC12A   | 3BE                 | 13.3                                          | 14.7 | 1.0                     | 12                             | 2.0                                                         | 20                                                                                    | 151                                                     | 19.9                                            |
| 3KASMC13    | 3BF                 | 14.4                                          | 17.6 | 1.0                     | 13                             | 2.0                                                         | 20                                                                                    | 126                                                     | 23.8                                            |
| 3KASMC13A   | 3BG                 | 14.4                                          | 15.9 | 1.0                     | 13                             | 2.0                                                         | 20                                                                                    | 140                                                     | 21.5                                            |
| 3KASMC14    | 3BH                 | 15.6                                          | 19.1 | 1.0                     | 14                             | 1.0                                                         | 10                                                                                    | 116                                                     | 25.8                                            |
| 3KASMC14A   | 3BK                 | 15.6                                          | 17.2 | 1.0                     | 14                             | 1.0                                                         | 10                                                                                    | 129                                                     | 23.2                                            |
| 3KASMC15    | 3BL                 | 16.7                                          | 20.4 | 1.0                     | 15                             | 1.0                                                         | 10                                                                                    | 112                                                     | 26.9                                            |
| 3KASMC15A   | 3BM                 | 16.7                                          | 18.5 | 1.0                     | 15                             | 1.0                                                         | 10                                                                                    | 123                                                     | 24.4                                            |
| 3KASMC16    | 3BN                 | 17.8                                          | 21.8 | 1.0                     | 16                             | 1.0                                                         | 10                                                                                    | 104                                                     | 28.8                                            |
| 3KASMC16A   | 3BP                 | 17.8                                          | 19.7 | 1.0                     | 16                             | 1.0                                                         | 10                                                                                    | 115                                                     | 26.0                                            |
| 3KASMC17    | 3BQ                 | 18.9                                          | 23.1 | 1.0                     | 17                             | 1.0                                                         | 10                                                                                    | 98.4                                                    | 30.5                                            |
| 3KASMC17A   | 3BR                 | 18.9                                          | 20.9 | 1.0                     | 17                             | 1.0                                                         | 10                                                                                    | 109                                                     | 27.6                                            |
| 3KASMC18    | 3BS                 | 20.0                                          | 24.4 | 1.0                     | 18                             | 1.0                                                         | 10                                                                                    | 93.2                                                    | 32.2                                            |
| 3KASMC18A   | 3BT                 | 20.0                                          | 22.1 | 1.0                     | 18                             | 1.0                                                         | 10                                                                                    | 103                                                     | 29.2                                            |
| 3KASMC20    | 3BU                 | 22.2                                          | 27.1 | 1.0                     | 20                             | 1.0                                                         | 10                                                                                    | 83.8                                                    | 35.8                                            |
| 3KASMC20A   | 3BV                 | 22.2                                          | 24.5 | 1.0                     | 20                             | 1.0                                                         | 10                                                                                    | 92.6                                                    | 32.4                                            |
| 3KASMC22    | 3BW                 | 24.4                                          | 29.8 | 1.0                     | 22                             | 1.0                                                         | 10                                                                                    | 76.1                                                    | 39.4                                            |
| 3KASMC22A   | 3BX                 | 24.4                                          | 26.9 | 1.0                     | 22                             | 1.0                                                         | 10                                                                                    | 84.5                                                    | 35.5                                            |
| 3KASMC24    | 3BY                 | 26.7                                          | 32.6 | 1.0                     | 24                             | 1.0                                                         | 10                                                                                    | 69.8                                                    | 43.0                                            |
| 3KASMC24A   | 3BZ                 | 26.7                                          | 29.5 | 1.0                     | 24                             | 1.0                                                         | 10                                                                                    | 77.1                                                    | 38.9                                            |
| 3KASMC26    | 3CD                 | 28.9                                          | 35.3 | 1.0                     | 26                             | 1.0                                                         | 10                                                                                    | 64.4                                                    | 46.6                                            |
| 3KASMC26A   | 3CE                 | 28.9                                          | 31.9 | 1.0                     | 26                             | 1.0                                                         | 10                                                                                    | 71.3                                                    | 42.1                                            |
| 3KASMC28    | 3CF                 | 31.1                                          | 38.0 | 1.0                     | 28                             | 1.0                                                         | 10                                                                                    | 60.0                                                    | 50.0                                            |
| 3KASMC28A   | 3CG                 | 31.1                                          | 34.4 | 1.0                     | 28                             | 1.0                                                         | 10                                                                                    | 66.1                                                    | 45.4                                            |
| 3KASMC30    | 3CH                 | 33.3                                          | 40.7 | 1.0                     | 30                             | 1.0                                                         | 15                                                                                    | 56.1                                                    | 53.5                                            |
| 3KASMC30A   | 3CK                 | 33.3                                          | 36.8 | 1.0                     | 30                             | 1.0                                                         | 15                                                                                    | 62.0                                                    | 48.4                                            |
| 3KASMC33    | 3CL                 | 36.7                                          | 44.9 | 1.0                     | 33                             | 1.0                                                         | 15                                                                                    | 50.8                                                    | 59.0                                            |
| 3KASMC33A   | 3CM                 | 36.7                                          | 40.6 | 1.0                     | 33                             | 1.0                                                         | 15                                                                                    | 56.3                                                    | 53.3                                            |
| 3KASMC36    | 3CN                 | 40.0                                          | 48.9 | 1.0                     | 36                             | 1.0                                                         | 20                                                                                    | 46.7                                                    | 64.3                                            |
| 3KASMC36A   | 3CP                 | 40.0                                          | 44.2 | 1.0                     | 36                             | 1.0                                                         | 20                                                                                    | 51.6                                                    | 58.1                                            |
| 3KASMC40    | 3CQ                 | 44.4                                          | 54.3 | 1.0                     | 40                             | 1.0                                                         | 20                                                                                    | 42.0                                                    | 71.4                                            |
| 3KASMC40A   | 3CR                 | 44.4                                          | 49.1 | 1.0                     | 40                             | 1.0                                                         | 20                                                                                    | 46.5                                                    | 64.5                                            |
| 3KASMC43    | 3CS                 | 47.8                                          | 58.4 | 1.0                     | 43                             | 1.0                                                         | 20                                                                                    | 39.1                                                    | 76.7                                            |
| 3KASMC43A   | 3CT                 | 47.8                                          | 52.8 | 1.0                     | 43                             | 1.0                                                         | 20                                                                                    | 43.2                                                    | 69.4                                            |

**Notes**(1) Pulse test:  $t_p \leq 50$  ms

(2) Surge current waveform per fig. 3 and derate per fig. 2

(3) All terms and symbols are consistent with ANSI/IEEE C62.35

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

| PARAMETER                                                          | SYMBOL          | VALUE | UNIT                 |
|--------------------------------------------------------------------|-----------------|-------|----------------------|
| Typical thermal resistance, junction to ambient air <sup>(1)</sup> | $R_{\theta JA}$ | 77.5  | $^{\circ}\text{C/W}$ |
| Typical thermal resistance, junction to leads                      | $R_{\theta JL}$ | 18.3  |                      |

**Note**

<sup>(1)</sup> Mounted on minimum recommended pad layout

**ORDERING INFORMATION** (Example)

| PREFERRED P/N                   | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE                      |
|---------------------------------|-----------------|------------------------|---------------|------------------------------------|
| 3KASMC10AHE3/57T <sup>(1)</sup> | 0.211           | 57T                    | 850           | 7" diameter plastic tape and reel  |
| 3KASMC10AHE3/9AT <sup>(1)</sup> | 0.211           | 9AT                    | 3500          | 13" diameter plastic tape and reel |
| 3KASMC10A_A/H <sup>(1)</sup>    | 0.211           | H                      | 850           | 7" diameter plastic tape and reel  |
| 3KASMC10A_A/I <sup>(1)</sup>    | 0.211           | I                      | 3500          | 13" diameter plastic tape and reel |

**Note**

<sup>(1)</sup> AEC-Q101 qualified

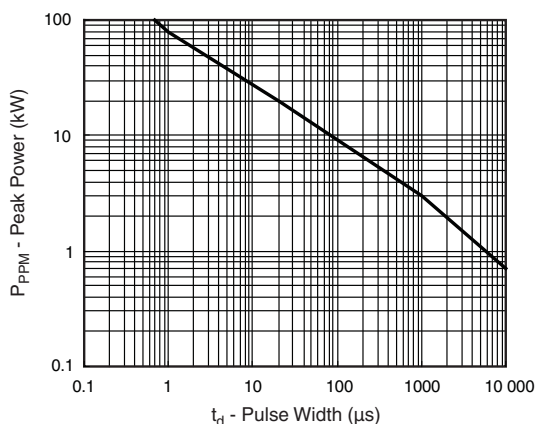
**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)

Fig. 1 - Peak Pulse Power Rating Curve

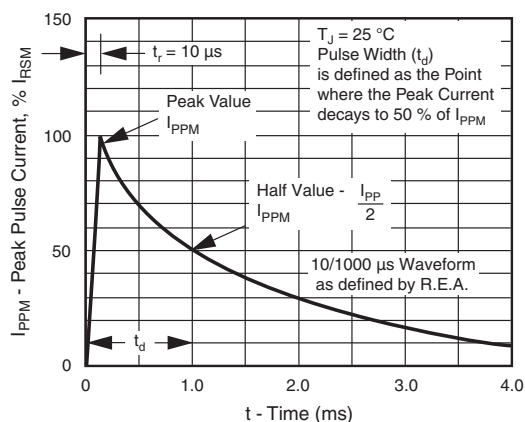


Fig. 3 - Pulse Waveform

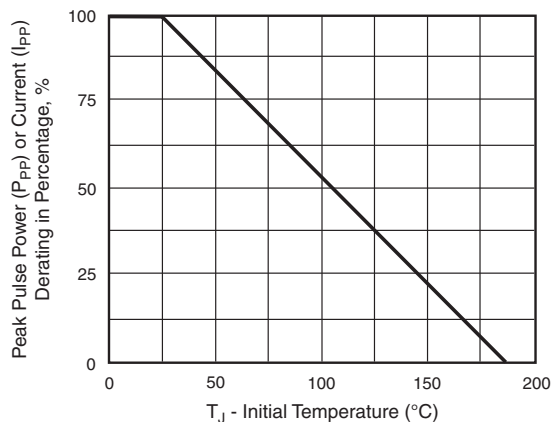


Fig. 2 - Pulse Power or Current vs. Initial Junction Temperature

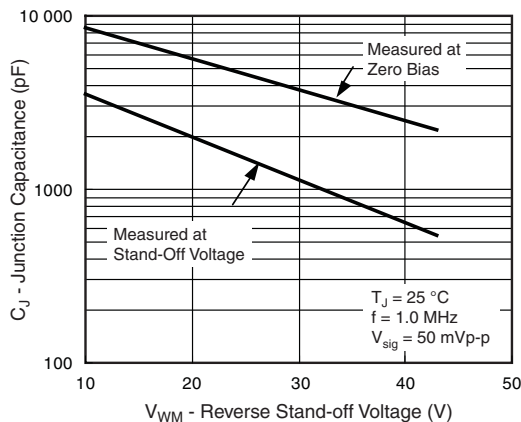


Fig. 4 - Typical Junction Capacitance

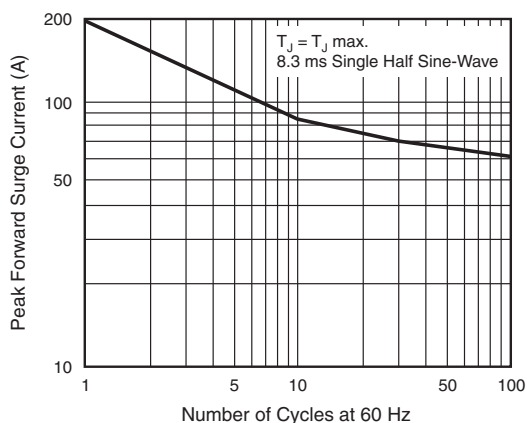


Fig. 5 - Maximum Non-Repetitive/Peak Forward Surge Current

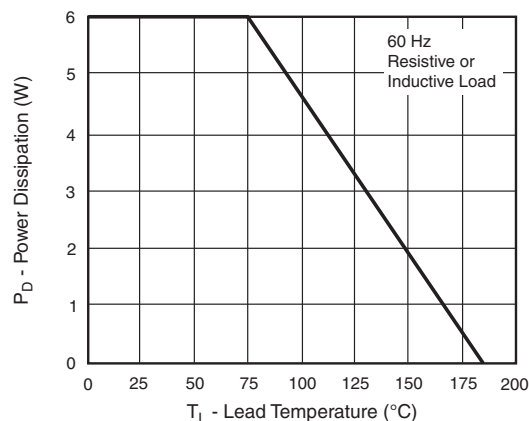
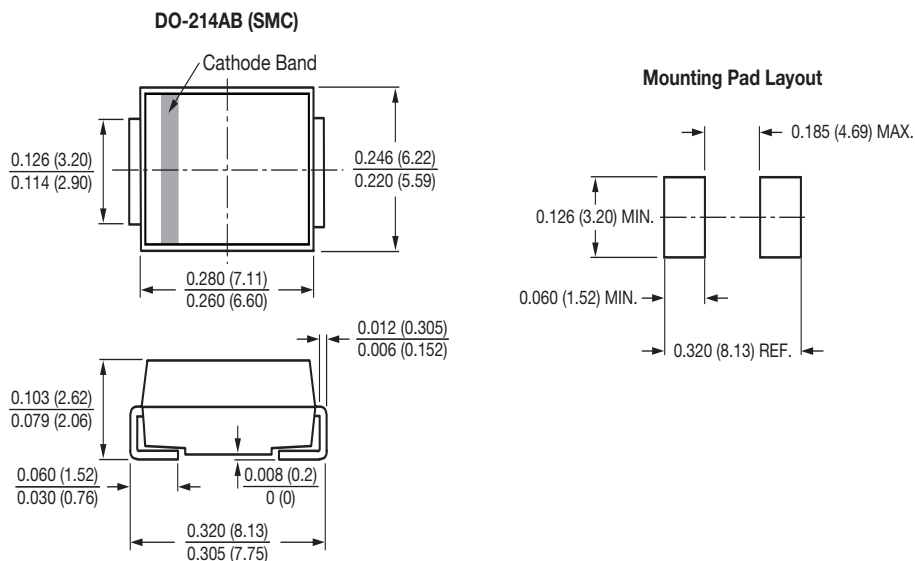


Fig. 6 - Power Derating Curve

### PACKAGE OUTLINE DIMENSIONS in inches (millimeters)





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