



**THE DATASHEET OF  
SM6T22AHE3/5B**



# Surface-Mount TRANSZORB® Transient Voltage Suppressors


**SMB (DO-214AA)**

**FEATURES**

- Low profile package
- Ideal for automated placement
- Glass passivated chip junction
- Available in unidirectional and bidirectional
- 600 W peak pulse power capability with a 10/1000  $\mu$ s waveform
- Excellent clamping capability
- Low inductance
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- AEC-Q101 qualified available
  - Automotive ordering code: base P/NHE3 or base P/NHM3
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)

**LINKS TO ADDITIONAL RESOURCES**


| PRIMARY CHARACTERISTICS         |                               |
|---------------------------------|-------------------------------|
| $V_{WM}$                        | 5.80 V to 188 V               |
| $V_{BR}$ unidirectional         | 6.8 V to 220 V                |
| $V_{BR}$ bidirectional          | 6.8 V to 220 V                |
| $P_{PPM}$                       | 600 W                         |
| $P_D$                           | 5.0 W                         |
| $I_{FSM}$ (unidirectional only) | 100 A                         |
| $T_J$ max.                      | 150 °C                        |
| Polarity                        | Unidirectional, bidirectional |
| Package                         | SMB (DO-214AA)                |

**DEVICES FOR BIDIRECTION APPLICATIONS**

For bidirectional devices use CA suffix (e.g. SM6T12CA).  
Electrical characteristics apply in both directions.

**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:** SMB (DO-214AA)

Molding compound meets UL 94 V-0 flammability rating  
 Base P/N-E3 - RoHS-compliant, commercial grade  
 Base P/N-M3 - halogen-free, RoHS-compliant, commercial grade  
 Base P/NHE3\_X - RoHS-compliant and AEC-Q101 qualified  
 Base P/NHM3\_X - halogen-free, 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

E3, M3, HE3, and HM3 suffix meets JESD 201 class 2 whisker test

**Polarity:** for unidirectional types the band denotes cathode end, no marking on bidirectional types

| MAXIMUM RATINGS ( $T_A = 25$ °C unless otherwise noted)                                   |                |                |      |
|---|----------------|----------------|------|
| PARAMETER   | SYMBOL         | VALUE          | UNIT |
| Peak power dissipation with a 10/1000 $\mu$ s waveform <sup>(1)(2)</sup> (fig. 1)         | $P_{PPM}$      | 600            | W    |
| Peak pulse current with a 10/1000 $\mu$ s waveform <sup>(1)</sup> (fig. 3)                | $I_{PPM}$      | See next table | A    |
| Power dissipation on infinite heatsink at $T_A = 50$ °C                                   | $P_D$          | 5.0            | W    |
| Peak forward surge current 10 ms single half sine-wave unidirectional only <sup>(2)</sup> | $I_{FSM}$      | 100            | A    |
| Operating junction and storage temperature range  | $T_J, T_{STG}$ | -65 to +150    | °C   |

**Notes**

<sup>(1)</sup> Non-repetitive current pulse, per fig. 3 and derated above  $T_A = 25$  °C per fig. 2

<sup>(2)</sup> Mounted on 0.2" x 0.2" (5.0 mm x 5.0 mm) copper pads to each terminal



| ELECTRICAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise noted) |                     |     |   |      |                                  |                                       |  |  |      |   |      |  |
|--|---------------------|-----|---|------|----------------------------------|---------------------------------------|--|--|------|---|------|--|
| TYPE (1)   | DEVICE MARKING CODE |     | BREAKDOWN VOLTAGE V <sub>BR</sub> AT I <sub>T</sub> (2) |      | TEST CURRENT I <sub>T</sub> (mA) | STAND-OFF VOLTAGE V <sub>WM</sub> (V) | MAXIMUM REVERSE LEAKAGE AT V <sub>WM</sub> I <sub>D</sub> (3) (μA) | MAXIMUM CLAMPING VOLTAGE V <sub>C</sub> AT I <sub>PPM</sub> (10/1000 μs) |      | MAXIMUM CLAMPING VOLTAGE V <sub>C</sub> AT I <sub>PPM</sub> (8/20 μs) |      | α <sub>T</sub> MAX. 10 <sup>-4</sup> /°C |
|  | UNI                 | BI  | MIN.  | MAX. |                                  |                                       |  | (V)  | (A)  | (V)   | (A)  |  |
| SM6T6V8A   | KE7                 | KE7 | 6.45  | 7.14 | 10                               | 5.80                                  | 1000   | 10.5   | 57.0 | 13.4  | 298  | 5.7                                      |
| SM6T7V5A   | KK7                 | AK7 | 7.13  | 7.88 | 10                               | 6.40                                  | 500  | 11.3   | 53.0 | 14.5  | 276  | 6.1                                      |
| SM6T10A  | KT7                 | AT7 | 9.50  | 10.5 | 1.0                              | 8.55                                  | 10.0   | 14.5   | 41.0 | 18.6  | 215  | 7.3                                      |
| SM6T12A  | KX7                 | AX7 | 11.4  | 12.6 | 1.0                              | 10.2                                  | 5.0  | 16.7   | 36.0 | 21.7  | 184  | 7.8                                      |
| SM6T15A  | LG7                 | LG7 | 14.3  | 15.8 | 1.0                              | 12.8                                  | 1.0  | 21.2   | 28.0 | 27.2  | 147  | 8.4                                      |
| SM6T18A  | LM7                 | BM7 | 17.1  | 18.9 | 1.0                              | 15.3                                  | 1.0  | 25.2   | 24.0 | 32.5  | 123  | 8.8                                      |
| SM6T22A  | LT7                 | BT7 | 20.9  | 23.1 | 1.0                              | 18.8                                  | 1.0  | 30.6   | 20.0 | 39.3  | 102  | 9.2                                      |
| SM6T24A  | LV7                 | LV7 | 22.8  | 25.2 | 1.0                              | 20.5                                  | 1.0  | 33.2   | 18.0 | 42.8  | 93   | 9.4                                      |
| SM6T27A  | LX7                 | BX7 | 25.7  | 28.4 | 1.0                              | 23.1                                  | 1.0  | 37.5   | 16.0 | 48.3  | 83   | 9.6                                      |
| SM6T30A  | ME7                 | CE7 | 28.5  | 31.5 | 1.0                              | 25.6                                  | 1.0  | 41.5   | 14.5 | 53.5  | 75   | 9.7                                      |
| SM6T33A  | MG7                 | MG7 | 31.4  | 34.7 | 1.0                              | 28.2                                  | 1.0  | 45.7   | 13.1 | 59  | 68   | 9.8                                      |
| SM6T36A  | MK7                 | CK7 | 34.2  | 37.8 | 1.0                              | 30.8                                  | 1.0  | 49.9   | 12.0 | 64.3  | 62   | 9.9                                      |
| SM6T39A  | MM7                 | CM7 | 37.1  | 41.0 | 1.0                              | 33.3                                  | 1.0  | 53.9   | 11.1 | 69.7  | 57   | 10.0                                     |
| SM6T68A  | NG7                 | NG7 | 64.6  | 71.4 | 1.0                              | 58.1                                  | 1.0  | 92.0   | 6.50 | 121   | 33   | 10.4                                     |
| SM6T100A   | NV7                 | NV7 | 95.0  | 105  | 1.0                              | 85.5                                  | 1.0  | 137  | 4.40 | 178   | 22.5 | 10.6                                     |
| SM6T150A   | PK7                 | PK7 | 143   | 158  | 1.0                              | 128                                   | 1.0  | 207  | 2.90 | 265   | 15   | 10.8                                     |
| SM6T200A   | PR7                 | PR7 | 190   | 210  | 1.0                              | 171                                   | 1.0  | 274  | 2.20 | 353   | 11.3 | 10.8                                     |
| SM6T220A   | PR8                 | PR8 | 209   | 231  | 1.0                              | 188                                   | 1.0  | 328  | 2.00 | 388   | 10.3 | 10.8                                     |

Notes

- (1) For bidirectional devices add suffix "CA"
- (2) V<sub>BR</sub> measured after I<sub>T</sub> applied for 300 μs square wave pulse
- (3) For bi-polar devices with V<sub>WM</sub> = 10 V or under, the I<sub>D</sub> limit is doubled

| THERMAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise noted) |                  |       |       |
|---|------------------|-------|-------|
| PARAMETER   | SYMBOL           | VALUE | UNIT  |
| Typical thermal resistance, junction to ambient air (1)                 | R <sub>θJA</sub> | 100   | °C/ W |
| Typical thermal resistance, junction to lead                            | R <sub>θJL</sub> | 20    |       |

Note

- (1) Mounted on minimum recommended pad layout

| ORDERING INFORMATION (Example) |                 |                        |               |                                    |
|--------------------------------|-----------------|------------------------|---------------|------------------------------------|
| PREFERRED P/N                  | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE                      |
| SM6T10A-E3/52                  | 0.106           | 52                     | 750           | 7" diameter plastic tape and reel  |
| SM6T10A-M3/52                  |                 |                        |               |                                    |
| SM6T10A-E3/5B                  | 0.106           | 5B                     | 3200          | 13" diameter plastic tape and reel |
| SM6T10A-M3/5B                  |                 |                        |               |                                    |
| SM6T10AHE3_B/H (1)             | 0.106           | H                      | 750           | 7" diameter plastic tape and reel  |
| SM6T10AHM3_B/H (1)             |                 |                        |               |                                    |
| SM6T10AHE3_B/I (1)             | 0.106           | I                      | 3200          | 13" diameter plastic tape and reel |
| SM6T10AHM3_B/I (1)             |                 |                        |               |                                    |

Note

- (1) 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. 4 - Typical Junction Capacitance



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



Fig. 5 - Typical Transient Thermal Impedance



Fig. 3 - Pulse Waveform



Fig. 6 - Maximum Non-Repetitive Peak Forward Surge Current



### PACKAGE OUTLINE DIMENSIONS in inches (millimeters)





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