

Surface Mount Transient Voltage Suppressors

High temperature stability and high reliability conditions



DO-218AB



FEATURES

- Junction passivation optimized design passivated anisotropic rectifier technology.
- $T_J = 175^\circ\text{C}$ capability suitable for high reliability and automotive requirement.
- Available in uni-directional polarity only.
- Low leakage current.
- Low forward voltage drop.
- High surge capability.
- Meets ISO16750-2 surge specification(varied by test condition).
- Meets MSL-1, per J-STD-020, LF maximum peak of 245°C .
- AEC-Q101 qualified.
- Compliant to RoHS directive 2011/65/EU and in accordance to WEEE 2002/96/EC.

TYPICAL APPLICATIONS

Use in sensitive electronics protection against voltage transients induced by inductive load switching and lighting, especially for automotive load dump protection application.

MECHANICAL DATA

Case: DO-218AB

Molding compound meets UL 94V-0 flammability rating

Base P/NHE3-RoHS-compliant, AEC-Q101 qualified

Terminals: Matte tin plated leads, solderable per J-STD-002

| PRIMARY CHARACTERISTICS | |
|------------------------------------|---------------------|
| V_R | 10V to 36V |
| P_{PP} (10/1000 μs) | 4600W |
| P_{PP} (10/10000 μs) | 3600W |
| P_D | 6W |
| I_{FSM} | 600A |
| T_{Jmax} | 175°C |
| Package | DO-218AB |

| MAXIMUM RATINGS($T_C=25^\circ\text{C}$, RH=45%-75%, unless otherwise noted) | | | |
|---|-----------------|----------------|--------------------|
| Parameter | Symbol | Value | Unit |
| Peak pulse power dissipation on 10/1000 μs waveform | P_{PP} | 4600 | Watts |
| Peak pulse power dissipation on 10/10000 μs waveform | | 3600 | Watts |
| Power dissipation on infinite heat sink at $T_C=25^\circ\text{C}$ | P_D | 6.0 | Watts |
| Peak pulse current with 10/1000 μs waveform | $I_{PPM}^{(1)}$ | See next table | Amps |
| Peak forward surge current, 8.3ms single half sine-wave | I_{FSM} | 600 | Amps |
| Operating junction and storage temperature range | T_J, T_{STG} | -55 to +175 | $^\circ\text{C}$ |
| Typical thermal resistance, junction to case | $R_{\theta JC}$ | 0.95 | $^\circ\text{C/W}$ |

Note

(1) Non-repetitive current pulse derated above $T_A=25^\circ\text{C}$

SM6S10A thru SM6S36A

| ELECTRICAL CHARACTERISTICS | | | | | | | | |
|----------------------------|----------------|----------------|--------------------------------|----------|---------------------------------|---------|---------------------------------|-----------------|
| Part Number | V _R | I _T | I _R @V _R | | V _{BR} @I _T | | V _C @I _{PP} | I _{PP} |
| Uni-polar | V | mA | μA@25°C | μA@175°C | min(V) | max (V) | V | A |
| SM6S10A | 10.0 | 5 | 5 | 250 | 11.1 | 12.3 | 17.0 | 271.0 |
| SM6S11A | 11.0 | 5 | 5 | 150 | 12.2 | 13.5 | 18.2 | 253.0 |
| SM6S12A | 12.0 | 5 | 5 | 150 | 13.3 | 14.7 | 19.9 | 231.0 |
| SM6S13A | 13.0 | 5 | 5 | 150 | 14.4 | 15.9 | 21.5 | 214.0 |
| SM6S14A | 14.0 | 5 | 5 | 150 | 15.6 | 17.2 | 23.2 | 198.0 |
| SM6S15A | 15.0 | 5 | 5 | 150 | 16.7 | 18.5 | 24.4 | 189.0 |
| SM6S16A | 16.0 | 5 | 5 | 150 | 17.8 | 19.7 | 26.0 | 177.0 |
| SM6S17A | 17.0 | 5 | 5 | 150 | 18.9 | 20.9 | 27.6 | 167.0 |
| SM6S18A | 18.0 | 5 | 5 | 150 | 20.0 | 22.1 | 29.2 | 158.0 |
| SM6S20A | 20.0 | 5 | 5 | 150 | 22.2 | 24.5 | 32.4 | 142.0 |
| SM6S22A | 22.0 | 5 | 5 | 150 | 24.4 | 26.9 | 35.5 | 130.0 |
| SM6S24A | 24.0 | 5 | 5 | 150 | 26.7 | 29.5 | 38.9 | 118.0 |
| SM6S26A | 26.0 | 5 | 5 | 150 | 28.9 | 31.9 | 42.1 | 109.0 |
| SM6S28A | 28.0 | 5 | 5 | 150 | 31.1 | 34.4 | 45.4 | 101.0 |
| SM6S30A | 30.0 | 5 | 5 | 150 | 33.3 | 36.8 | 48.4 | 95.0 |
| SM6S33A | 33.0 | 5 | 5 | 150 | 36.7 | 40.6 | 53.3 | 86.0 |
| SM6S36A | 36.0 | 5 | 5 | 150 | 40.0 | 44.2 | 58.1 | 79.0 |

Note:

①. For all types maximum V_F=1.9V at I_F=100A measured on 8.3ms single half sine-wave or equivalent square wave, duty cycle=4 pulses per minute maximum.

②. Surge waveform: 10/1000μs

V_R: Stand-off voltage -- Maximum voltage that can be applied

V_{BR}: Breakdown voltage

V_C: Clamping voltage -- Peak voltage measured across the suppressor at a specified I_{PP}

I_R: Reverse leakage current

I_T: Test current

ORDERING INFORMATION

| | | |
|---|---|--|
| <p>SM6S</p> <p>SM6S 4600W Series</p> | <p>XX</p> <p>V_R voltage</p> | <p>A</p> <p>5% V_{BR} Voltage tolerance</p> |
|---|---|--|

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

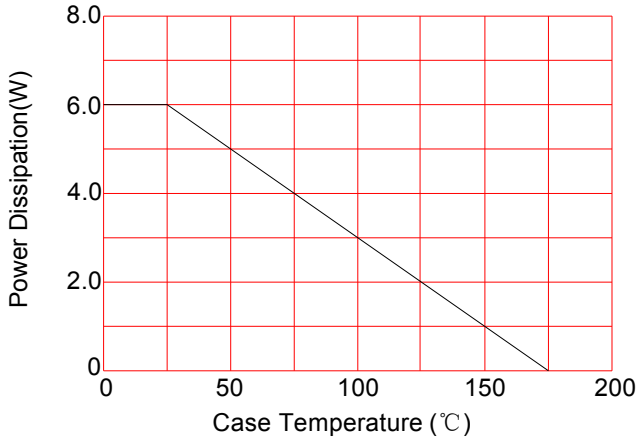


FIG.1: Power Derating Curve

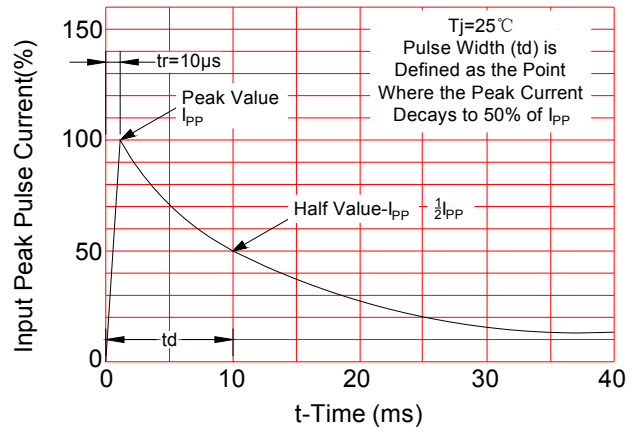


FIG.2: Pulse Waveform

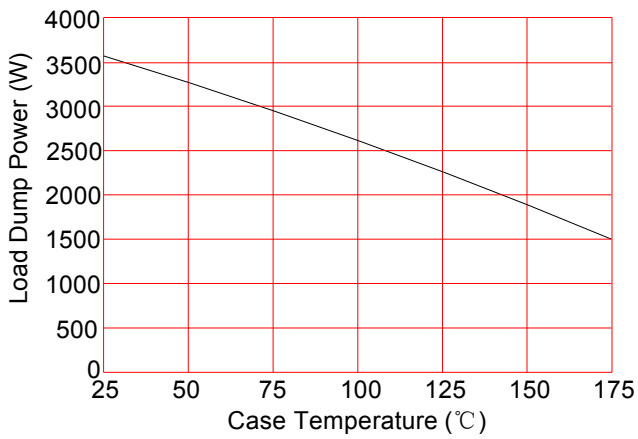


FIG.3: Load Dump Power Characteristics (10ms Exponential Waveform)

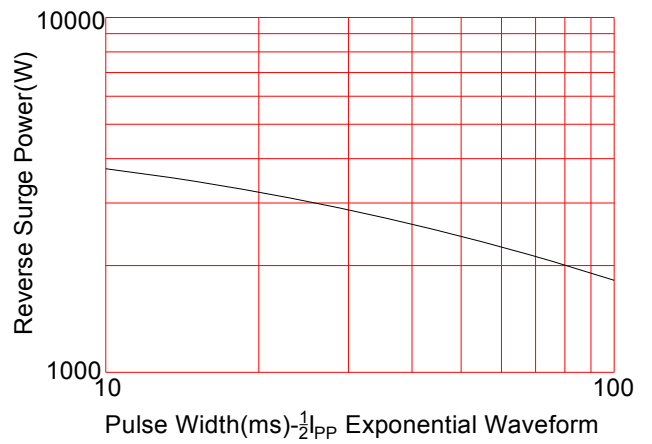


FIG.4: Reverse Power Capability

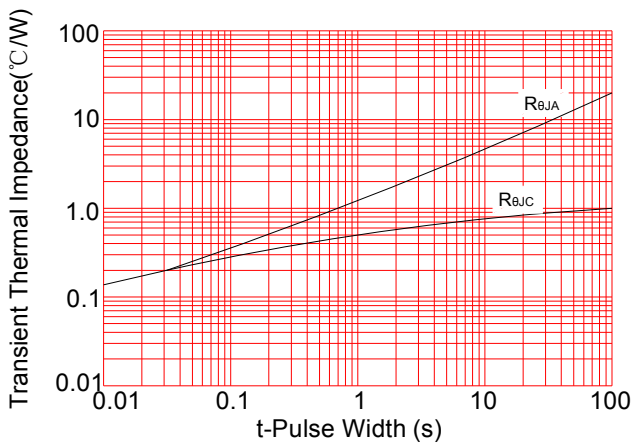
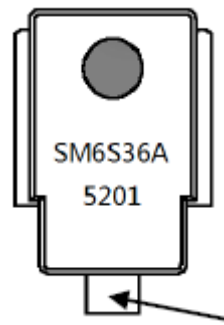


FIG.5: Typical Transient Thermal Impedance

MARKING



SM6S36A: Device marking code

5201: “5” --2015 (year)

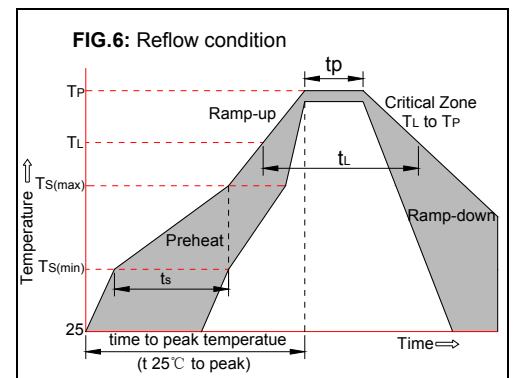
“2” --2 (month)

“01” -- (lot)

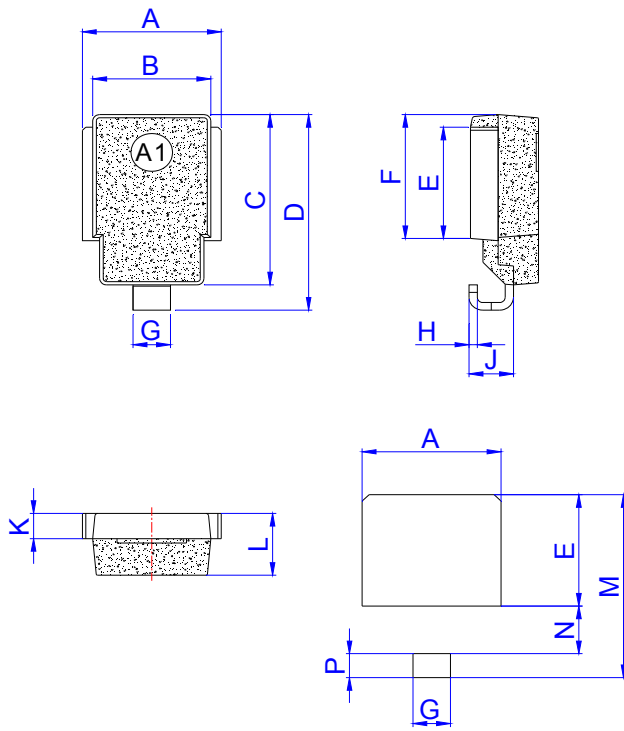
Cathode

SOLDERING PARAMETERS

| | | |
|---|-----------------------------------|---------------------------------|
| Reflow Condition | | Pb-Free assembly (see FIG.6) |
| Pre Heat | -Temperature Min ($T_{s(min)}$) | +150°C |
| | -Temperature Max($T_{s(max)}$) | +200°C |
| | -Time (Min to Max) (t_s) | 60-180 secs. |
| Average ramp up rate (Liquidus Temp (T_L)to peak) | | 3°C/sec. Max |
| $T_{s(max)}$ to T_L - Ramp-up Rate | | 3°C/sec. Max |
| Reflow | -Temperature(T_L)(Liquidus) | +217°C |
| | -Temperature(t_L) | 60-150 secs. |
| Peak Temp (T_p) | | +260(+0/-5)°C |
| Time within 5°C of actual Peak Temp (t_p) | | 20-40secs. |
| Ramp-down Rate | | 6°C/sec. Max |
| Time 25°C to Peak Temp (T_p) | | 8 min. Max |
| Do not exceed | | +260°C |



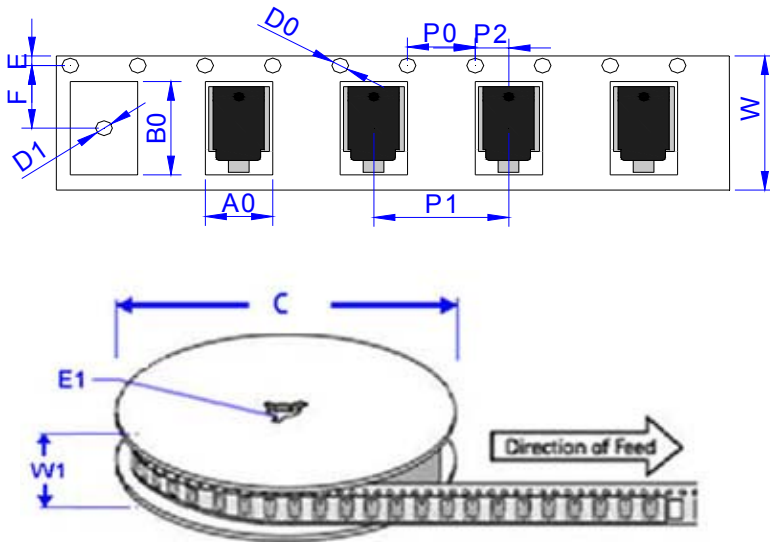
PACKAGE MECHANICAL DATA



DO-218AB

| Ref. | Dimensions | | | |
|------|-------------|------|--------|-------|
| | Millimeters | | Inches | |
| | Min. | Max. | Min. | Max. |
| A | 9.5 | 10.5 | 0.374 | 0.413 |
| B | 8.3 | 8.7 | 0.327 | 0.342 |
| C | 13.3 | 13.7 | 0.524 | 0.539 |
| D | 15.0 | 16.0 | 0.592 | 0.628 |
| E | 8.5 | 9.1 | 0.335 | 0.358 |
| F | 9.5 | 10.1 | 0.374 | 0.398 |
| G | 2.4 | 3.0 | 0.094 | 0.118 |
| H | 0.5 | 0.7 | 0.020 | 0.028 |
| J | 2.7 | 3.7 | 0.106 | 0.146 |
| K | 1.9 | 2.1 | 0.075 | 0.083 |
| L | 4.7 | 5.1 | 0.185 | 0.201 |
| M | 14.2 | 14.8 | 0.559 | 0.583 |
| N | 3.5 | 4.1 | 0.138 | 0.161 |
| P | 1.6 | 2.2 | 0.063 | 0.087 |

TAPE AND REEL SPECIFICATION-DO-218AB



| Ref. | Dimensions | |
|------|-------------|---------------|
| | Millimeters | Inches |
| A0 | 10.80 ± 0.3 | 0.425 ± 0.012 |
| B0 | 16.13 ± 0.3 | 0.635 ± 0.012 |
| C | 330.0 ± 0.3 | 13.0 ± 0.012 |
| D0 | 1.55 ± 0.2 | 0.061 ± 0.008 |
| E | 1.75 ± 0.2 | 0.069 ± 0.008 |
| E1 | 13.30 ± 0.2 | 0.524 ± 0.008 |
| F | 11.50 ± 0.2 | 0.453 ± 0.008 |
| P0 | 4.00 ± 0.2 | 0.157 ± 0.008 |
| P1 | 16.00 ± 0.2 | 0.630 ± 0.008 |
| P2 | 2.00 ± 0.2 | 0.079 ± 0.008 |
| W | 24.00 ± 0.2 | 0.945 ± 0.008 |
| W1 | 25.85 ± 0.2 | 1.018 ± 0.008 |

ORDERING INFORMATION

| PART No. | UNIT WEIGHT (g) typ | REEL (PCS) | PER CARTON (PCS) | DESCRIPTION |
|----------|------------------------|---------------|---------------------|-------------------|
| SM6SxxA | 2.985 | 750 | 3000 | 13 inch reel pack |

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