Rev.1.2

# Surface Mount Transient Voltage Suppressors

High temperature stability and high reliability conditions



DO-218AB



Bi-directional

## FEATURES

- Junction passivation optimized design passivated anisotropic rectifier technology.
- $T_J$ = 175℃ capability suitable for high reliability and automotive requirement.
- Available in bi-directional polarity.
- 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℃.
- AEC-Q101 qualified.
- Compliant to RoHS directive 2011/65/EU and in accordance to WEEE 2002/96/EC.

| PRIMARY CHARACTERISTICS | |
|---|---|
| $V_R$ | 12V to 36V |
| $P_{PP}$ (10/1000μs) | 6600W |
| $P_{PP}$ (10/10000μs) | 5200W |
| $P_D$ | 8W |
| $T_{Jmax}$ | 175℃ |
| Polarity | Bi-directional |
| Package | DO-218AB |

## 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

| **MAXIMUM RATINGS**($T_C$=25℃, RH=45%-75%, unless otherwise noted) | | | |
|---|---|---|---|
| **Parameter** | **Symbol** | **Value** | **Unit** |
| Peak pulse power dissipation on 10/1000μs waveform | $P_{PP}$ | 6600 | Watts |
| Peak pulse power dissipation on 10/10000μs waveform | | 5200 | Watts |
| Power dissipation on infinite heat sink at $T_C$=25℃ | $P_D$ | 8.0 | Watts |
| Peak pulse current with 10/1000μs waveform | $I_{PPM}$(1) | See next table | Amps |
| Operating junction and storage temperature range | $T_J$ ,$T_{STG}$ | -55 to +175 | ℃ |
| Typical thermal resistance, junction to case | $R_{\theta JC}$ | 0.9 | ℃/W |

**Note**

(1) Non-repetitive current pulse derated above $T_A$=25℃

| ELECTRICAL CHARACTERISTICS | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Part Number | $V_R$ | $I_T$ | $I_R$@$V_R$ | | $V_{BR}$@$I_T$ | | $V_C$@$I_{PP}$ | $I_{PP}$ |
| Bi-polar | V | mA | μA@25°C | μA@175°C | min(V) | max (V) | V | A |
| SM8S12CA | 12.0 | 5 | 5 | 150 | 13.3 | 14.7 | 19.9 | 332 |
| SM8S13CA | 13.0 | 5 | 5 | 150 | 14.4 | 15.9 | 21.5 | 307 |
| SM8S14CA | 14.0 | 5 | 5 | 150 | 15.6 | 17.2 | 23.2 | 284 |
| SM8S15CA | 15.0 | 5 | 5 | 150 | 16.7 | 18.5 | 24.4 | 270 |
| SM8S16CA | 16.0 | 5 | 5 | 150 | 17.8 | 19.7 | 26.0 | 253 |
| SM8S17CA | 17.0 | 5 | 5 | 150 | 18.9 | 20.9 | 27.6 | 239 |
| SM8S18CA | 18.0 | 5 | 5 | 150 | 20.0 | 22.1 | 29.2 | 226 |
| SM8S20CA | 20.0 | 5 | 5 | 150 | 22.2 | 24.5 | 32.4 | 204 |
| SM8S22CA | 22.0 | 5 | 5 | 150 | 24.4 | 26.9 | 35.5 | 186 |
| SM8S24CA | 24.0 | 5 | 5 | 150 | 26.7 | 29.5 | 38.9 | 170 |
| SM8S26CA | 26.0 | 5 | 5 | 150 | 28.9 | 31.9 | 42.1 | 157 |
| SM8S28CA | 28.0 | 5 | 5 | 150 | 31.1 | 34.4 | 45.4 | 145 |
| SM8S30CA | 30.0 | 5 | 5 | 150 | 33.3 | 36.8 | 48.4 | 136 |
| SM8S33CA | 33.0 | 5 | 5 | 150 | 36.7 | 40.6 | 53.3 | 124 |
| SM8S36CA | 36.0 | 5 | 5 | 150 | 40.0 | 44.2 | 58.1 | 114 |

**Note:**

①.Surge waveform:10/1000μs

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

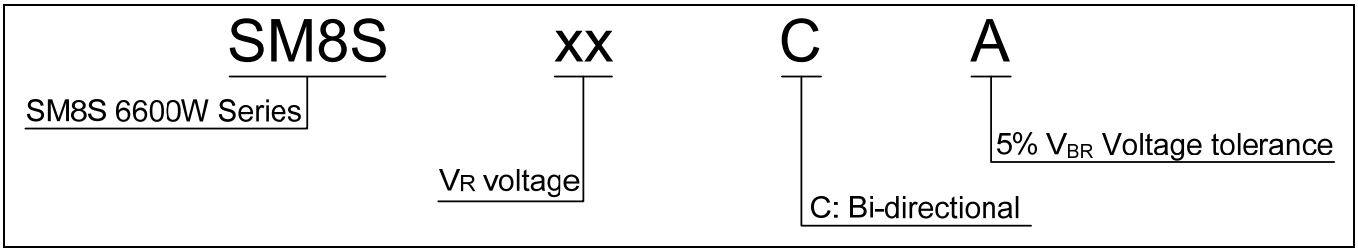
$V_{BR}$: Breakdown voltage

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

$I_R$: Reverse leakage current

$I_T$: Test current

## ORDERING INFORMATION



**RATINGS AND CHARACTERISTICS CURVES** ($T_A$=25℃, unless otherwise noted)

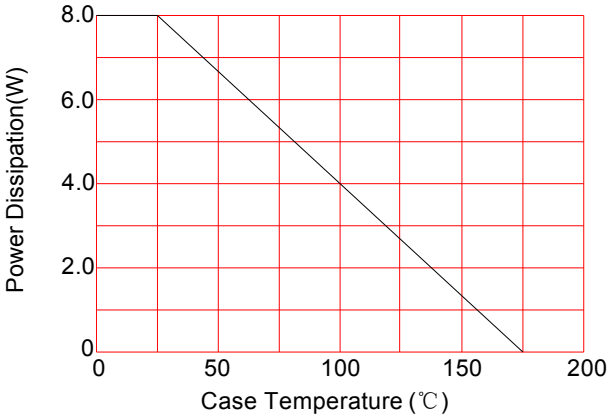



**FIG.1:** Power Derating Curve

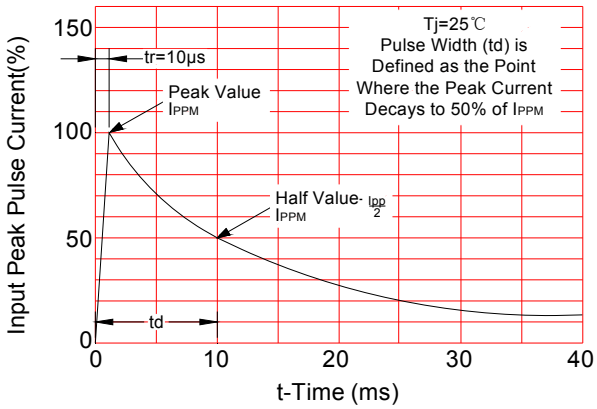



**FIG.2:** Pulse Waveform

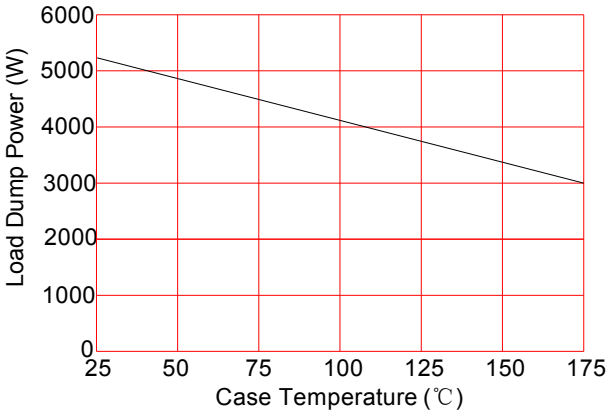



**FIG.3:** Load Dump Power Characteristics
(10ms Exponential Waveform)

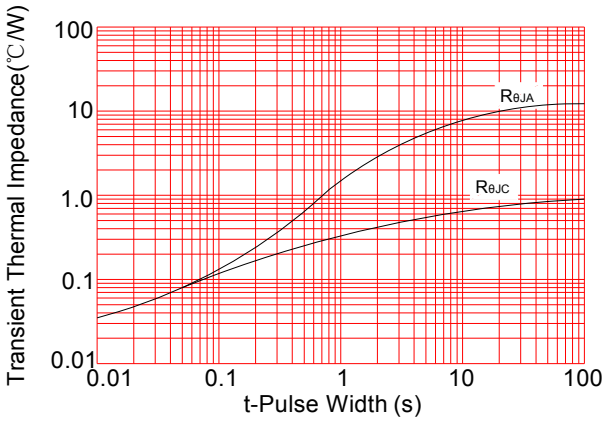
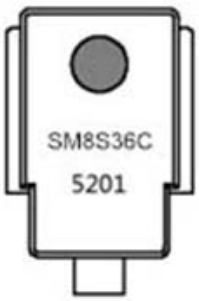



**FIG.4:** Typical Transient Thermal Impedance

**MARKING**




**SM8S36C:** Device marking code

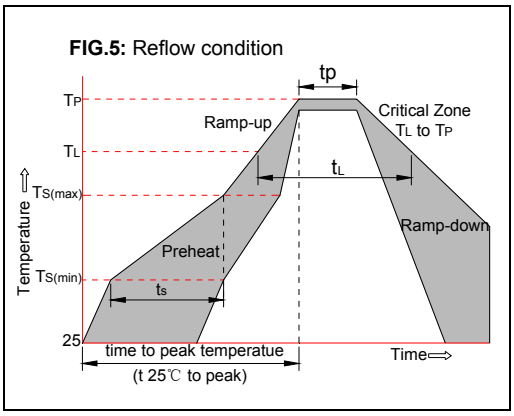
**5201:** "5" --2015 (year)

"2" --2 (month)

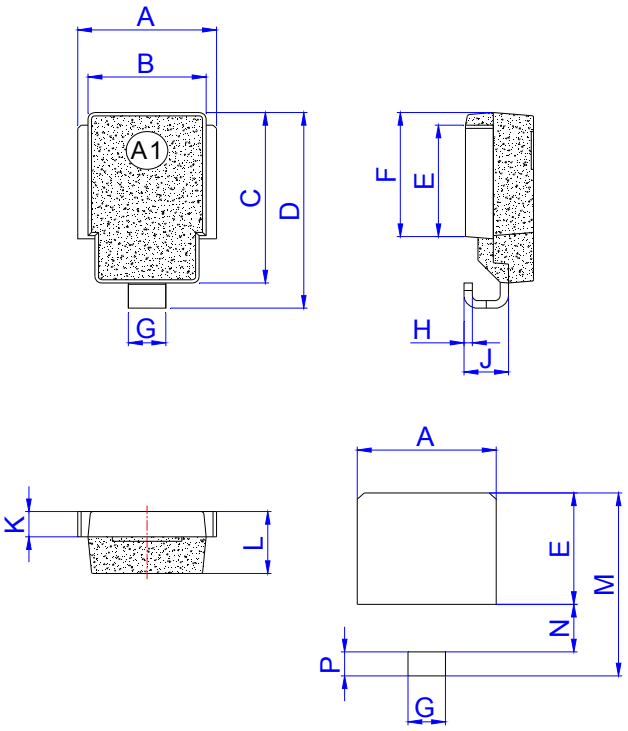
"01" -- (lot)

## SOLDERING PARAMETERS

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



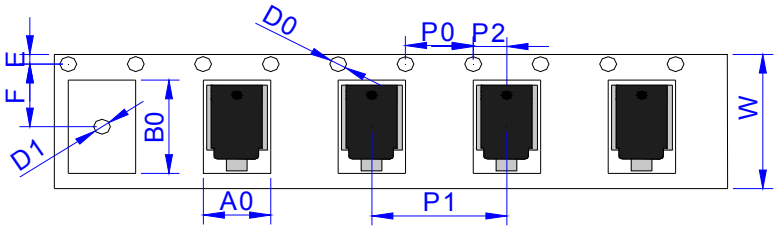

## PACKAGE MECHANICAL DATA

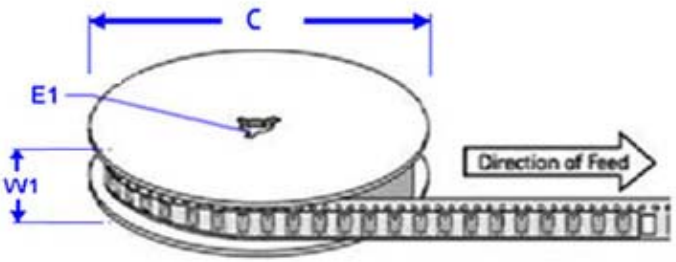



DO-218AB

| 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 |
| D1 | 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 |
|---|---|---|---|---|
| SM8SxxCA | 2.985 | 750 | 3000 | 13 inch reel pack |

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