# 6600W, 10V – 43V Surface Mount Transient Voltage Suppressor

## FEATURES

- AEC-Q101 qualified
- Unidirectional and bidirectional types
- Junction passivation optimized design technology
- $T_J$ =175 °C capability suitable for high reliability and automotive requirement
- Moisture sensitivity level: level 1, per J-STD-020
- Meets ISO7637-2 and ISO16750-2 surge specifications (varied by test conditions)
- Meets IEC 61000-4-2 (Level: 4) / ISO 10605 (Level: L4)
- RoHS Compliant
- Halogen-free

## APPLICATIONS

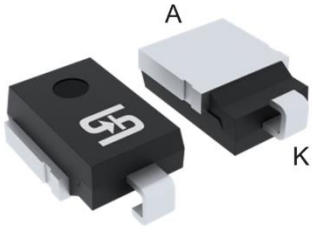
- Transient Surge Protection
- Automotive Load Dump Surge Protection

## MECHANICAL DATA

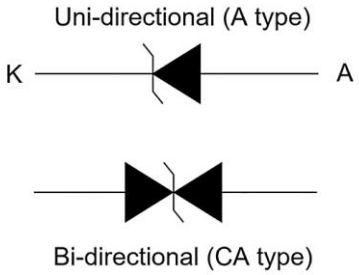
- Case: DO-218AB
- Molding compound meets UL 94V-0 flammability rating
- Terminal: Matte tin plated leads, solderable per J-STD-002
- Meet JESD 201 class 2 whisker test
- Polarity: As marked
- Weight: 2.691g (approximately)

| KEY PARAMETERS | | |
|---|---|---|
| **PARAMETER** | **VALUE** | **UNIT** |
| $V_{WM}$ | 10 - 43 | V |
| $V_{BR}$ | 11.1 - 52.8 | V |
| $P_{PPM}$ (10x1,000μs) | 6600 | W |
| $P_{PPM}$ (10x10,000μs) | 5200 | W |
| $T_{J\ MAX}$ | 175 | °C |
| Package | DO-218AB | |

Pb-Free RoHS COMPLIANT HALOGEN FREE




**DO-218AB**




| 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) | $P_{PPM}$ | 6600 | W |
| Non-repetitive peak impulse power dissipation with 10/10000μs waveform | $P_{PPM}$ | 5200 | W |
| Steady state power dissipation(Fig.1) | $P_D$ | 8 | W |
| Forward Voltage at $I_F$ = 100A(2) for uni-directional only | $V_{F\ MAX}$ | 1.8 | V |
| Peak forward surge current, 8.3ms single half sinewave for uni-directional only | $I_{FSM}$ | 700 | 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
2. Pulse test with PW = 0.3ms

## THERMAL PERFORMANCE

| PARAMETER | SYMBOL | TYP | UNIT |
|---|---|---|---|
| Junction-to-case thermal resistance | $R_{\Theta JC}$ | 0.8 | °C/W |

**Thermal Performance Note:** With ideal heatsink

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

| Part Number (Uni-directional) | Marking code | Breakdown voltage $V_{BR}$ at $I_T$ (V) (Note 1) | | Test current $I_T$ (mA) | Working stand-off voltage $V_{WM}$ (V) | Maximum blocking leakage current $I_R$ at $V_{WM}$ (μA) (Note 1) | Maximum blocking leakage current $I_R$ at $V_{WM}$ $T_J$ =175°C (μA) (Note 1) | Maximum peak impulse current $I_{PPM}$ (A) tp =10/1000 (μs) | Maximum clamping voltage $V_C$ at $I_{PPM}$ (V) | Typical temp. coefficient of $V_{BR}$ αT (%/°C) (Note 2) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Min | Max | | | | | | | |
| TLD8S10AH | TLD8S10A | 11.1 | 12.3 | 5.0 | 10.0 | 15 | 250 | 388 | 17.0 | 0.069 |
| TLD8S11AH | TLD8S11A | 12.2 | 13.5 | 5.0 | 11.0 | 10 | 150 | 363 | 18.2 | 0.072 |
| TLD8S12AH | TLD8S12A | 13.3 | 14.7 | 5.0 | 12.0 | 10 | 150 | 332 | 19.9 | 0.074 |
| TLD8S13AH | TLD8S13A | 14.4 | 15.9 | 5.0 | 13.0 | 10 | 150 | 307 | 21.5 | 0.076 |
| TLD8S14AH | TLD8S14A | 15.6 | 17.2 | 5.0 | 14.0 | 10 | 150 | 284 | 23.2 | 0.078 |
| TLD8S15AH | TLD8S15A | 16.7 | 18.5 | 5.0 | 15.0 | 10 | 150 | 270 | 24.4 | 0.080 |
| TLD8S16AH | TLD8S16A | 17.8 | 19.7 | 5.0 | 16.0 | 10 | 150 | 254 | 26.0 | 0.081 |
| TLD8S17AH | TLD8S17A | 18.9 | 20.9 | 5.0 | 17.0 | 10 | 150 | 239 | 27.6 | 0.082 |
| TLD8S18AH | TLD8S18A | 20.0 | 22.1 | 5.0 | 18.0 | 10 | 150 | 226 | 29.2 | 0.083 |
| TLD8S20AH | TLD8S20A | 22.2 | 24.5 | 5.0 | 20.0 | 10 | 150 | 204 | 32.4 | 0.085 |
| TLD8S22AH | TLD8S22A | 24.4 | 26.9 | 5.0 | 22.0 | 10 | 150 | 186 | 35.5 | 0.086 |
| TLD8S24AH | TLD8S24A | 26.7 | 29.5 | 5.0 | 24.0 | 10 | 150 | 170 | 38.9 | 0.087 |
| TLD8S26AH | TLD8S26A | 28.9 | 31.9 | 5.0 | 26.0 | 10 | 150 | 157 | 42.1 | 0.088 |
| TLD8S28AH | TLD8S28A | 31.1 | 34.4 | 5.0 | 28.0 | 10 | 150 | 145 | 45.4 | 0.089 |
| TLD8S30AH | TLD8S30A | 33.3 | 36.8 | 5.0 | 30.0 | 10 | 150 | 136 | 48.4 | 0.090 |
| TLD8S33AH | TLD8S33A | 36.7 | 40.6 | 5.0 | 33.0 | 10 | 150 | 124 | 53.3 | 0.091 |
| TLD8S36AH | TLD8S36A | 40.0 | 44.2 | 5.0 | 36.0 | 10 | 150 | 114 | 58.1 | 0.091 |
| TLD8S40AH | TLD8S40A | 44.4 | 49.1 | 5.0 | 40.0 | 10 | 150 | 102 | 64.5 | 0.092 |
| TLD8S43AH | TLD8S43A | 47.8 | 52.8 | 5.0 | 43.0 | 10 | 150 | 95.1 | 69.4 | 0.093 |

**Notes:**

1. Pulse test with PW = 30ms
2. To calculate $V_{BR}$ vs. junction temperature, use the following formula:
   $V_{BR}$ at $T_J$ = $V_{BR}$ at 25 °C x (1 + αT x ($T_J$ - 25))

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

| Part Number (Bi-directional) | Marking code | Breakdown voltage $V_{BR}$ at $I_T$ (V) (Note 1) | | Test current $I_T$ (mA) | Working stand-off voltage $V_{WM}$ (V) | Maximum blocking leakage current $I_R$ at $V_{WM}$ (μA) (Note 1) | Maximum blocking leakage current $I_R$ at $V_{WM}$ $T_J$ =175°C (μA) (Note 1) | Maximum peak impulse current $I_{PPM}$ (A) tp =10/1000 (μs) | Maximum clamping voltage $V_C$ at $I_{PPM}$ (V) | Typical temp. coefficient of $V_{BR}$ αT (%/°C) (Note 2) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Min | Max | | | | | | | |
| TLD8S10CAH | TLD8S10A | 11.1 | 12.3 | 5.0 | 10.0 | 15 | 250 | 388 | 17.0 | 0.069 |
| TLD8S11CAH | TLD8S11A | 12.2 | 13.5 | 5.0 | 11.0 | 10 | 150 | 363 | 18.2 | 0.072 |
| TLD8S12CAH | TLD8S12A | 13.3 | 14.7 | 5.0 | 12.0 | 10 | 150 | 332 | 19.9 | 0.074 |
| TLD8S13CAH | TLD8S13A | 14.4 | 15.9 | 5.0 | 13.0 | 10 | 150 | 307 | 21.5 | 0.076 |
| TLD8S14CAH | TLD8S14A | 15.6 | 17.2 | 5.0 | 14.0 | 10 | 150 | 284 | 23.2 | 0.078 |
| TLD8S15CAH | TLD8S15A | 16.7 | 18.5 | 5.0 | 15.0 | 10 | 150 | 270 | 24.4 | 0.080 |
| TLD8S16CAH | TLD8S16A | 17.8 | 19.7 | 5.0 | 16.0 | 10 | 150 | 254 | 26.0 | 0.081 |
| TLD8S17CAH | TLD8S17A | 18.9 | 20.9 | 5.0 | 17.0 | 10 | 150 | 239 | 27.6 | 0.082 |
| TLD8S18CAH | TLD8S18A | 20.0 | 22.1 | 5.0 | 18.0 | 10 | 150 | 226 | 29.2 | 0.083 |
| TLD8S20CAH | TLD8S20A | 22.2 | 24.5 | 5.0 | 20.0 | 10 | 150 | 204 | 32.4 | 0.085 |
| TLD8S22CAH | TLD8S22A | 24.4 | 26.9 | 5.0 | 22.0 | 10 | 150 | 186 | 35.5 | 0.086 |
| TLD8S24CAH | TLD8S24A | 26.7 | 29.5 | 5.0 | 24.0 | 10 | 150 | 170 | 38.9 | 0.087 |
| TLD8S26CAH | TLD8S26A | 28.9 | 31.9 | 5.0 | 26.0 | 10 | 150 | 157 | 42.1 | 0.088 |
| TLD8S28CAH | TLD8S28A | 31.1 | 34.4 | 5.0 | 28.0 | 10 | 150 | 145 | 45.4 | 0.089 |
| TLD8S30CAH | TLD8S30A | 33.3 | 36.8 | 5.0 | 30.0 | 10 | 150 | 136 | 48.4 | 0.090 |
| TLD8S33CAH | TLD8S33A | 36.7 | 40.6 | 5.0 | 33.0 | 10 | 150 | 124 | 53.3 | 0.091 |
| TLD8S36CAH | TLD8S36A | 40.0 | 44.2 | 5.0 | 36.0 | 10 | 150 | 114 | 58.1 | 0.091 |
| TLD8S40CAH | TLD8S40A | 44.4 | 49.1 | 5.0 | 40.0 | 10 | 150 | 102 | 64.5 | 0.092 |
| TLD8S43CAH | TLD8S43A | 47.8 | 52.8 | 5.0 | 43.0 | 10 | 150 | 95.1 | 69.4 | 0.093 |

**Notes:**

1. Pulse test with PW = 30ms
2. To calculate $V_{BR}$ vs. junction temperature, use the following formula:
   $V_{BR}$ at $T_J$ = $V_{BR}$ at 25 °C x (1 + αT x ($T_J$ - 25))

## ORDERING INFORMATION

| ORDERING CODE[1][2] | PACKAGE | PACKING |
|---|---|---|
| TLD8SxAH | DO-218AB | 750 / Tape & Reel |

**Notes:**

1. "x" defines voltage from 10V (TLD8S10AH) to 43V (TLD8S43AH)
2. Bidirectional use of type CA suffix

## CHARACTERISTICS CURVES

($T_A$ = 25°C unless otherwise noted)

**Fig.1 Power Derating Curve**

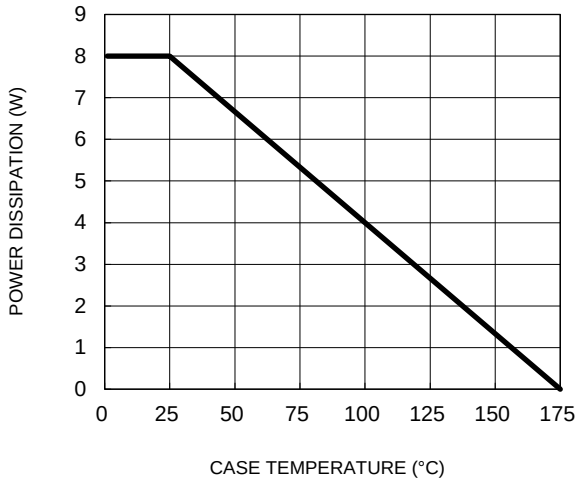



**Fig.2 Load Dump Power Characteristics (10ms Exponential Waveform)**

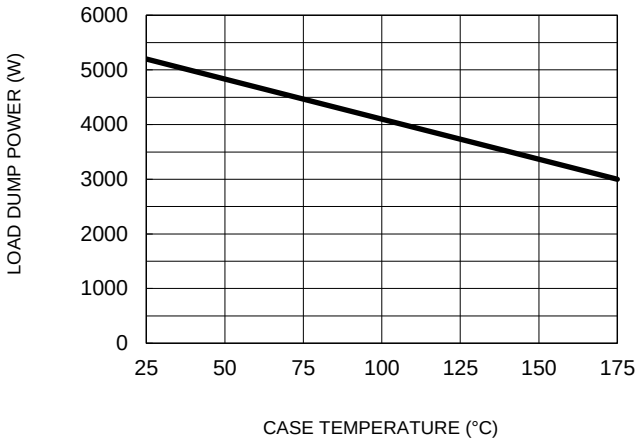



**Fig.3 10/1000μs Pulse Waveform**

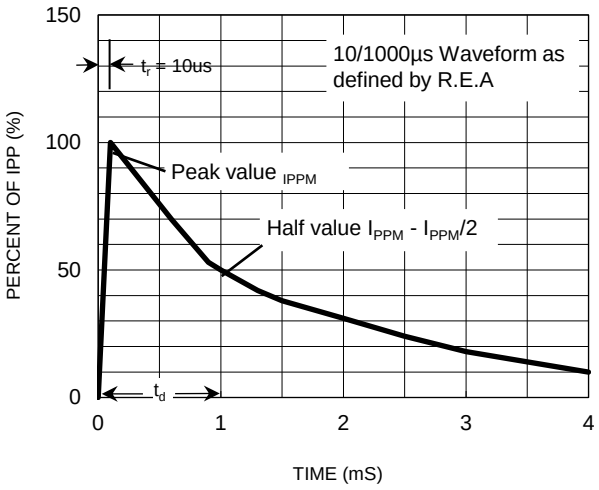



**Fig.4 Reverse Power Capability**

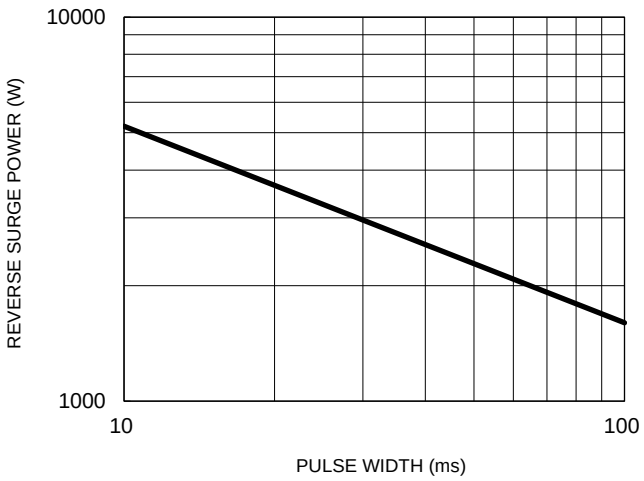



**Fig.5 Typical Transient Thermal Impedance**

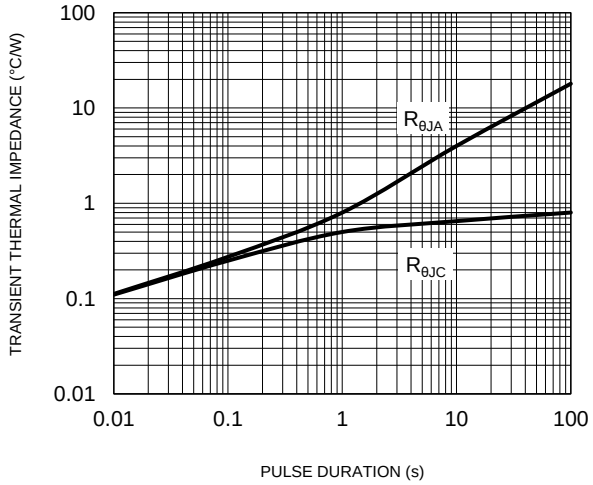
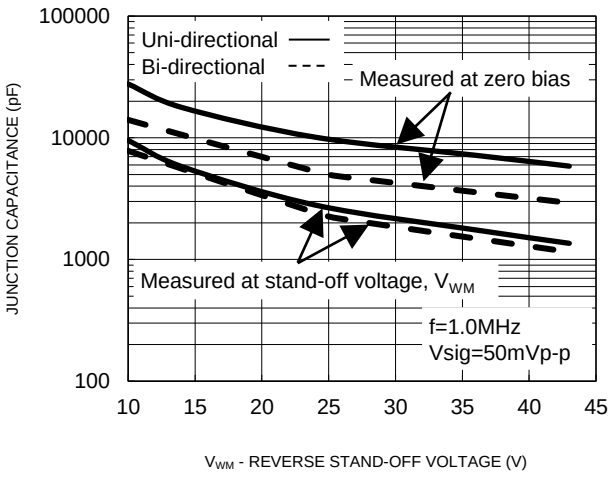
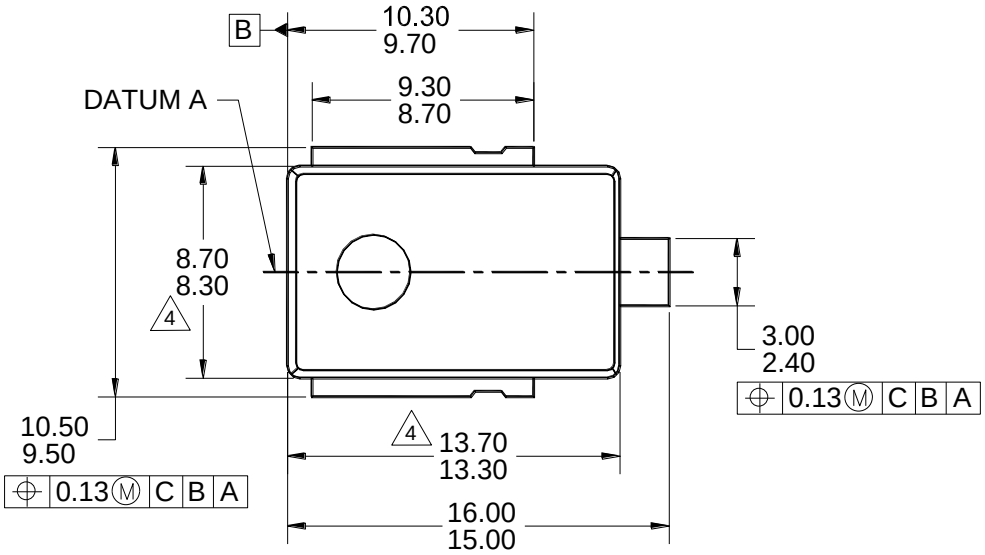


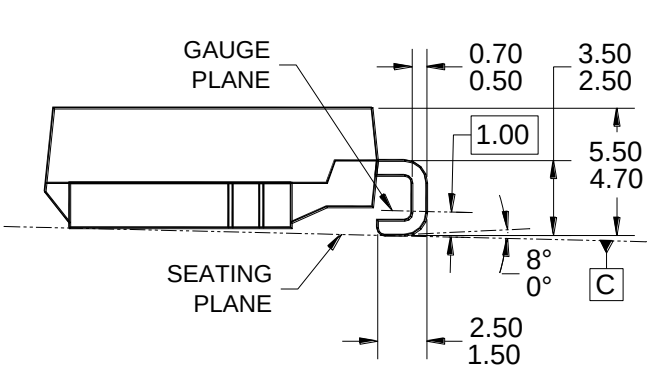

**Fig.6 Typical Junction Capacitance**

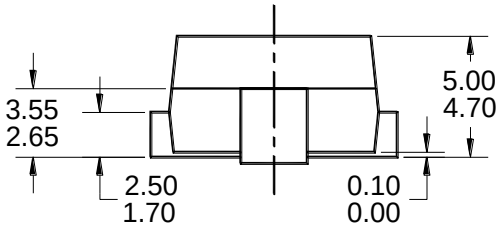


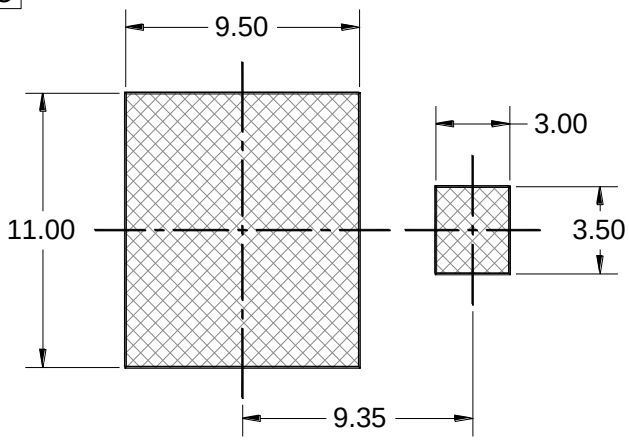
## PACKAGE OUTLINE DIMENSIONS

### DO-218

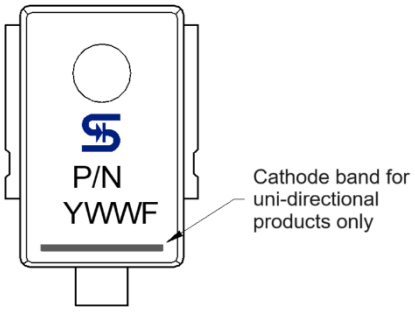



SUGGESTED PAD LAYOUT




MARKING DIAGRAM

P/N = MARKING CODE
YWW = DATE CODE
F = FACTORY CODE

NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994.
3. PACKAGE OUTLINE REFERENCE: JEDEC DO-218, VARIATION AB, ISSUE C.
4. MOLDED PLASTIC BODY DIMENSIONS DO NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS .
5. DWG NO. REF: HQ2SD07-DO-218AB-080 REV A.

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