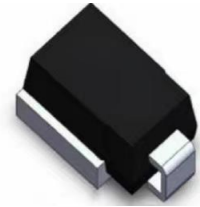
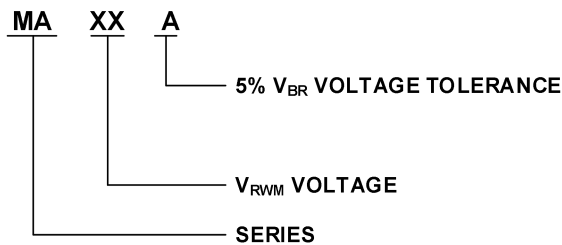


## Features

- ◆ 6.6KW peak pulse power capability at 10/1000 $\mu$ s Waveform, repetition rate (duty cycle): 0.01%
- ◆ Low incremental surge impedance
- ◆ Excellent clamping capability
- ◆ Fast response time: typically less than 1.0ps from 0V to BV min.
- ◆ High Temperature soldering guaranteed: 265 $^{\circ}$ C/10 seconds at terminals
- ◆ Plastic package has underwriters laboratory flammability 94V-0
- ◆ Meets MSL level 1, per J-STD-020
- ◆ Meet Halogen free and RoHS compliant



## Part Number Coding System



## Mechanical Data

- ◆ Case: DO-218AB package
- ◆ Polarity: Color band denotes positive end (cathode) except bi-directional models
- ◆ Weight: About 2.605g

## Applications

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

## Maximum Rating and Characteristics

Parameters at 25°C ambient temperature unless otherwise Noted.

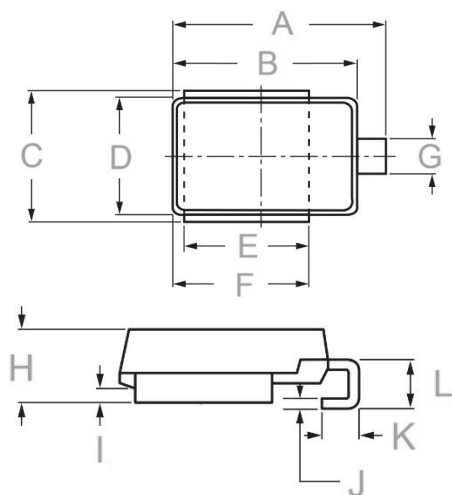
| Rating                                                                      |                                 | Symbol         | Value       | Unit             |
|-----------------------------------------------------------------------------|---------------------------------|----------------|-------------|------------------|
| Peak pulse power dissipation                                                | with 10/1000 $\mu$ s waveform   | $P_{PPM}$      | 6600        | Watts            |
|                                                                             | with 10/10 000 $\mu$ s waveform |                | 5200        |                  |
| Power dissipation on infinite heatsink at $T_C = 25^\circ\text{C}$ (fig. 1) |                                 | $P_D$          | 8.0         | Watts            |
| Peak pulse current with 10/1000 $\mu$ s waveform                            |                                 | $I_{PPM}$      | See Table   | Amps             |
| Peak forward surge current 8.3 ms single half sine-wave                     |                                 | $I_{FSM}$      | 700         | Amps             |
| Operating junction and Storage Temperature Range                            |                                 | $T_J, T_{STG}$ | -55 to +175 | $^\circ\text{C}$ |

### Notes:

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

## Dimensions (DO-218AB)

| Ref. | Millimeters |      | Inches |       |
|------|-------------|------|--------|-------|
|      | Min         | Max  | Min.   | Max.  |
| A    | 15.0        | 16.0 | 0.592  | 0.628 |
| B    | 13.3        | 13.7 | 0.524  | 0.539 |
| C    | 9.5         | 10.5 | 0.374  | 0.413 |
| D    | 8.3         | 8.7  | 0.327  | 0.342 |
| E    | 8.7         | 9.3  | 0.343  | 0.366 |
| F    | 9.7         | 10.3 | 0.382  | 0.406 |
| G    | 2.4         | 3.0  | 0.093  | 0.116 |
| H    | 4.7         | 5.0  | 0.185  | 0.197 |
| I    | 0.4         | -    | 0.016  | -     |
| J    | 0.5         | 0.7  | 0.020  | 0.028 |
| K    | 1.5         | 2.5  | 0.059  | 0.098 |
| L    | 2.5         | 3.5  | 0.098  | 0.138 |



## Electrical Characteristics (T<sub>A</sub>=25°C unless otherwise noted)

| Part Number | Reverse Stand-Off Voltage | Breakdown Voltage MIN@I <sub>T</sub> | Breakdown Voltage MAX@I <sub>T</sub> | Test Current        | Maximum Clamping Voltage @I <sub>PP</sub> | Peak Pulse Current  | Reverse Leakage @V <sub>RWM</sub> |
|-------------|---------------------------|--------------------------------------|--------------------------------------|---------------------|-------------------------------------------|---------------------|-----------------------------------|
|             | V <sub>RWM</sub> (V)      | V <sub>BRMIN</sub> (V)               | V <sub>BRMAX</sub> (V)               | I <sub>T</sub> (mA) | V <sub>C</sub> (V)                        | I <sub>PP</sub> (A) | I <sub>R</sub> (μA)               |
| MA10A       | 10.0                      | 11.1                                 | 12.3                                 | 5.0                 | 17.0                                      | 388                 | 15                                |
| MA11A       | 11.0                      | 12.2                                 | 13.5                                 | 5.0                 | 18.2                                      | 363                 | 10                                |
| MA12A       | 12.0                      | 13.3                                 | 14.7                                 | 5.0                 | 19.9                                      | 332                 | 10                                |
| MA13A       | 13.0                      | 14.4                                 | 15.9                                 | 5.0                 | 21.5                                      | 307                 | 10                                |
| MA14A       | 14.0                      | 15.6                                 | 17.2                                 | 5.0                 | 23.2                                      | 284                 | 10                                |
| MA15A       | 15.0                      | 16.7                                 | 18.5                                 | 5.0                 | 24.4                                      | 270                 | 10                                |
| MA16A       | 16.0                      | 17.8                                 | 19.7                                 | 5.0                 | 26.0                                      | 254                 | 10                                |
| MA17A       | 17.0                      | 18.9                                 | 20.9                                 | 5.0                 | 27.6                                      | 239                 | 10                                |
| MA18A       | 18.0                      | 20.0                                 | 22.1                                 | 5.0                 | 29.2                                      | 226                 | 10                                |
| MA20A       | 20.0                      | 22.2                                 | 24.5                                 | 5.0                 | 32.4                                      | 204                 | 10                                |
| MA22A       | 22.0                      | 24.4                                 | 26.9                                 | 5.0                 | 35.5                                      | 186                 | 10                                |
| MA24A       | 24.0                      | 26.7                                 | 29.5                                 | 5.0                 | 38.9                                      | 170                 | 10                                |
| MA26A       | 26.0                      | 28.9                                 | 31.9                                 | 5.0                 | 42.1                                      | 157                 | 10                                |
| MA28A       | 28.0                      | 31.1                                 | 34.4                                 | 5.0                 | 45.4                                      | 145                 | 10                                |
| MA30A       | 30.0                      | 33.3                                 | 36.8                                 | 5.0                 | 48.4                                      | 136                 | 10                                |
| MA33A       | 33.0                      | 36.7                                 | 40.6                                 | 5.0                 | 53.3                                      | 124                 | 10                                |
| MA36A       | 36.0                      | 40.0                                 | 44.2                                 | 5.0                 | 58.1                                      | 114                 | 10                                |
| MA40A       | 40.0                      | 44.4                                 | 49.1                                 | 5.0                 | 64.5                                      | 102                 | 10                                |
| MA43A       | 43.0                      | 47.8                                 | 52.8                                 | 5.0                 | 69.4                                      | 95.1                | 10                                |

## Ratings and Characteristic Curves ( $T_A=25^\circ\text{C}$ unless otherwise noted)

Figure 1. Power Derating Curve

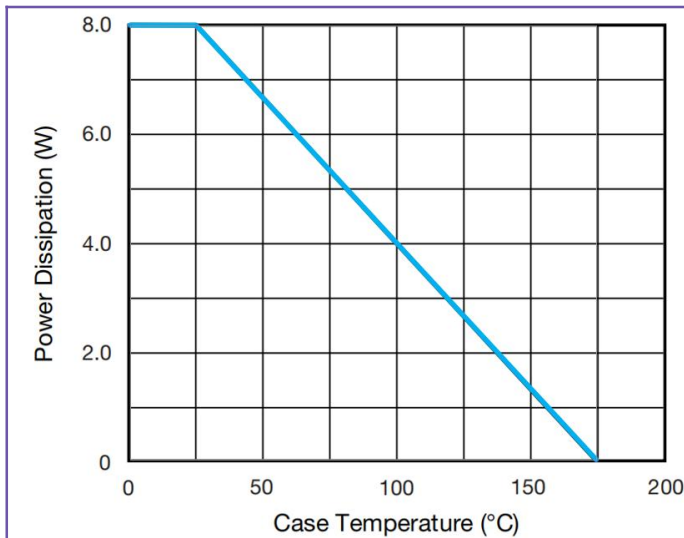


Figure 2. Load Dump Power Characteristics (10 ms Exponential Waveform)

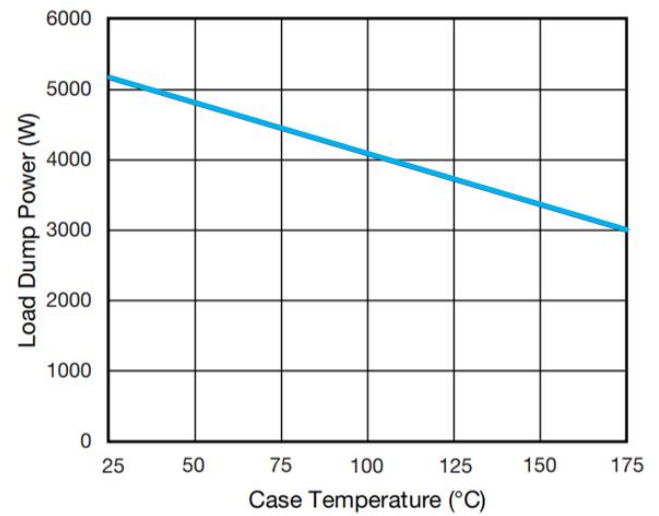


Figure 3. Pulse Waveform

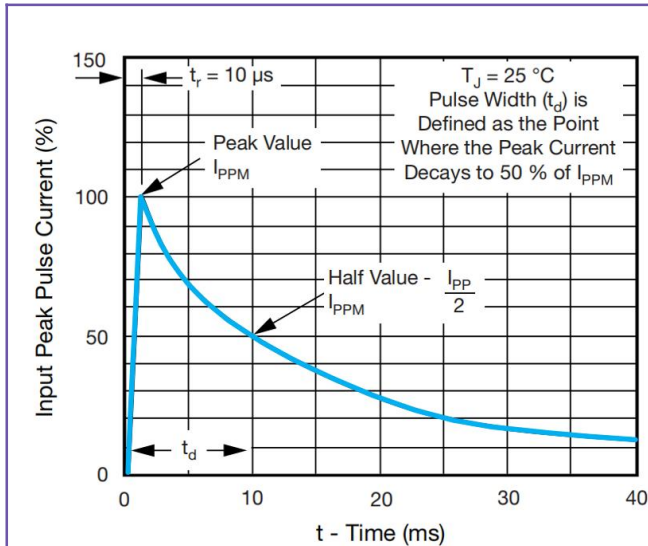


Figure 4. Reverse Power Capability

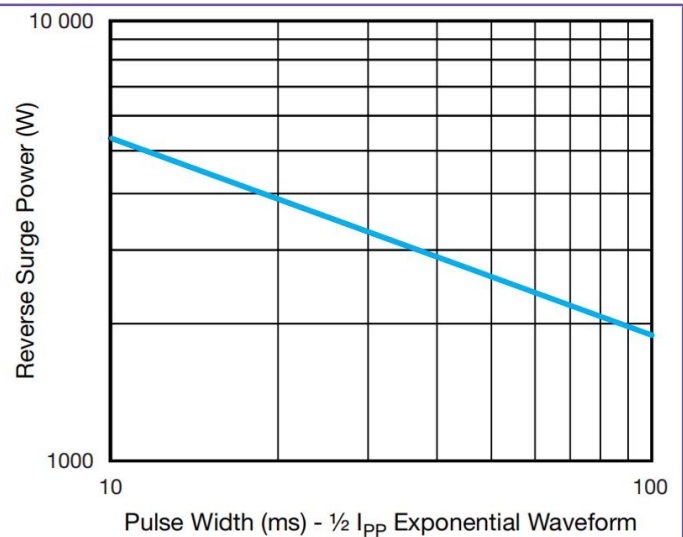


Figure 5. Typical Transient Thermal Impedance

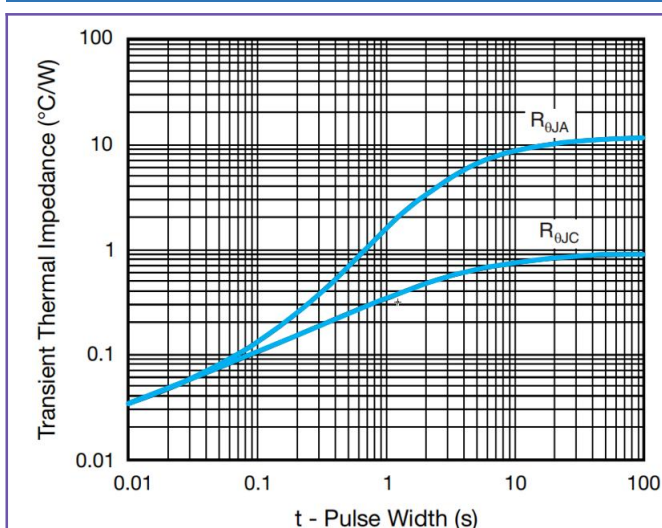
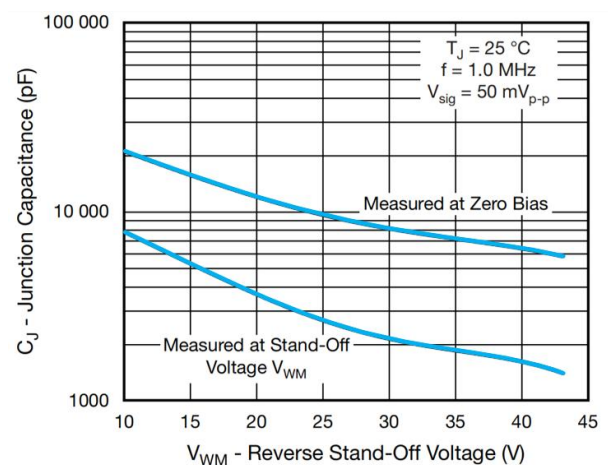
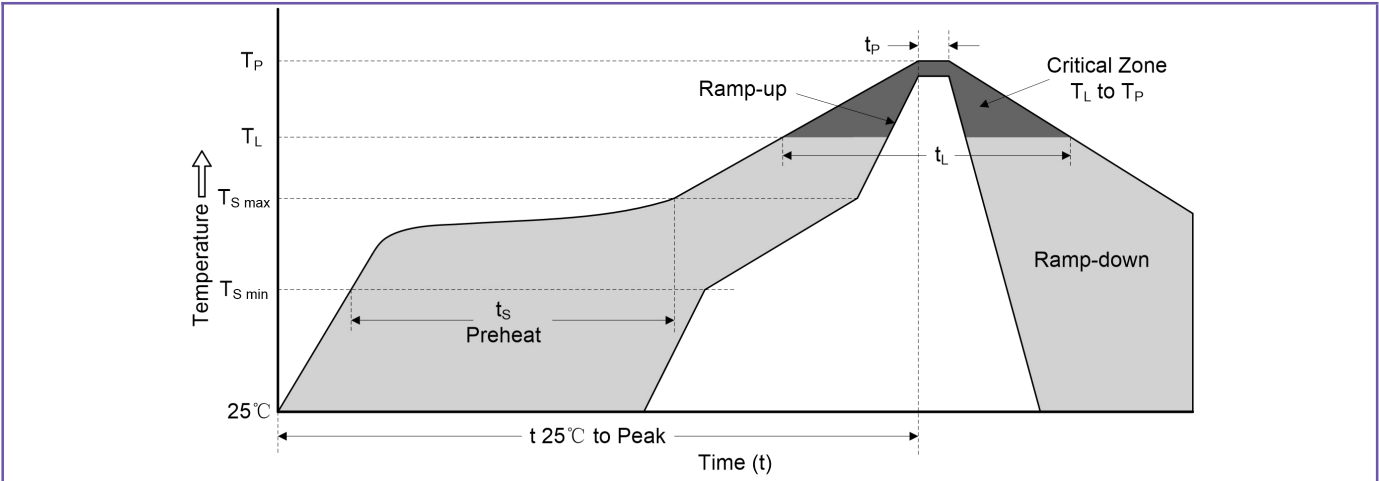


Figure 6. Typical Junction Capacitance



## Reflow Soldering Parameters



| Reflow Condition                                     |                                   | Lead-free Assembly |
|------------------------------------------------------|-----------------------------------|--------------------|
| Pre heat                                             | -Temperature Min ( $T_{S\ min}$ ) | 150°C              |
|                                                      | -Temperature Max ( $T_{S\ max}$ ) | 200°C              |
|                                                      | -Time (min to max) ( $t_s$ )      | 60-180 seconds     |
| Average ramp-up rate ( $T_L$ to $T_P$ )              |                                   | 3°C/second max.    |
| $T_{S\ max}$ to $T_L$ -Ramp-up Rate                  |                                   | 3°C/second max.    |
| Reflow                                               | -Temperature ( $T_L$ ) (Liquidus) | 217°C              |
|                                                      | -Time (min to max) ( $t_s$ )      | 60-150 seconds     |
| Peak Temperature ( $T_P$ )                           |                                   | 260(+0/-5)°C       |
| Time within 5°C of actual Peak Temperature ( $t_p$ ) |                                   | 20-40 seconds      |
| Ramp-down Rate                                       |                                   | 6°C/second max.    |
| Time 25°C to Peak Temperature( $T_P$ )               |                                   | 8 minutes max.     |
| Do not exceed                                        |                                   | 280°C              |

## Reliability

| Items                                | Standards               |
|--------------------------------------|-------------------------|
| Terminal strength                    | MIL-STD-750 Method 2036 |
| Mechanical shock                     | JESD22-B104             |
| Vibration                            | JESD22-B103             |
| High Temp. Storage                   | JESD22-A103             |
| High Temp Reverse Bias               | JESD22-A108             |
| Temperature Cycling                  | JESD22-A104             |
| High Temp High Humidity Reverse Bias | JESD22-A101             |
| Resistance to solder heat            | JESD22-A111(SMD)        |