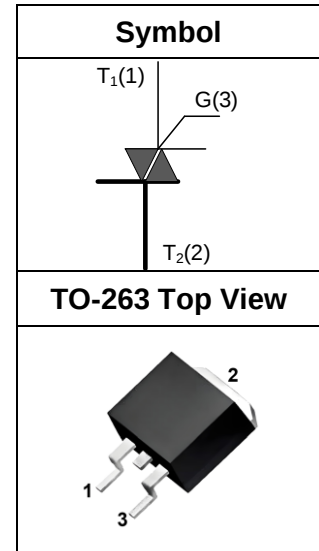


### Features

- ◆ Five-layer NPNPN-Structured Silicon Bidirectional Device
- ◆ Single-Side Trenching Technology and Mesa Glass Passivation Process
- ◆ Backside Multilayer Metallized Electrode
- ◆ High Blocking Voltage and Superior Temperature Stability

### Application

- ◆ Solid State Relay
- ◆ Heating Controller (Temperature Adjustment)
- ◆ Motor Speed Controllers for Vacuum Cleaners, Power Tools, and Similar Applications



### Product Summary

| Symbol              | Value | Unit |
|---------------------|-------|------|
| I <sub>T(RMS)</sub> | 24    | A    |
| V <sub>DRM</sub>    | 800   | V    |
| V <sub>RRM</sub>    | 800   |      |

### ■ Absolute Maximum Ratings

| Symbol              | Parameter                                  | Test Condition                                | Value      | Unit             |
|---------------------|--------------------------------------------|-----------------------------------------------|------------|------------------|
| I <sub>T(RMS)</sub> | RMS On-State Current                       | T <sub>C</sub> = 90°C                         | 24         | A                |
| I <sub>TSM</sub>    | Non-Repetitive Surge Peak On-State Current | F = 50Hz, t = 20ms                            | 240        |                  |
| I <sup>2</sup> t    | I <sup>2</sup> t Value for Fusing          | t <sub>p</sub> = 10ms                         | 288        | A <sup>2</sup> s |
| di/dt               | Critical Rate of Rise of On-State Current  | T <sub>J</sub> = 125°C                        | 50         | A/μs             |
| V <sub>DRM</sub>    | Repetitive Peak Off-State Voltage          | T <sub>J</sub> = 25°C                         | 800        | V                |
| V <sub>RRM</sub>    | Repetitive Peak Reverse Voltage            | T <sub>J</sub> = 25°C                         | 800        |                  |
| I <sub>GM</sub>     | Peak Gate Current                          | t <sub>p</sub> = 20μs, T <sub>J</sub> = 125°C | 4.0        | A                |
| P <sub>G(AV)</sub>  | Average Gate Power Dissipation             | T <sub>J</sub> = 125°C                        | 1.0        | W                |
| T <sub>stg</sub>    | Storage Junction Temperature Range         | -                                             | -40 to 150 | °C               |
| T <sub>J</sub>      | Operating Junction Temperature Range       | -                                             | -40 to 125 |                  |

### ■ Thermal Characteristics

| Symbol        | Parameter             | Test Condition | Value(Max) | Unit |
|---------------|-----------------------|----------------|------------|------|
| $R_{th(j-c)}$ | Junction to Case (AC) | -              | 1.25       | °C/W |

### ■ Electrical Characteristics (3 Quadrants)

| Symbol                                         | Parameter                                    | Test Condition                                                | Quadrant | Value |     | Unit |
|------------------------------------------------|----------------------------------------------|---------------------------------------------------------------|----------|-------|-----|------|
| I <sub>GT</sub>                                | Gate Trigger Current                         | V <sub>D</sub> = 12V,<br>R <sub>L</sub> = 100Ω                | I-II-III | Max   | 50  | mA   |
| V <sub>GT</sub>                                | Gate Trigger Voltage                         |                                                               |          |       | 1.5 |      |
| V <sub>GD</sub>                                | Gate Non-Trigger Voltage                     | T <sub>J</sub> = 125°C                                        |          | Min   | 0.2 |      |
| I <sub>H</sub>                                 | Holding Current                              | I <sub>T</sub> = 0.5A                                         |          | Max   | 80  | mA   |
| I <sub>L</sub>                                 | Latching Current                             | I <sub>G</sub> = 1.2I <sub>GT</sub>                           | I-III    |       | 80  |      |
|                                                |                                              |                                                               | II       |       | 100 |      |
| d <sub>V</sub> /d <sub>t</sub>                 | Critical Rate-of-Rise of Off-Stage Voltage   | V <sub>D</sub> = 2/3V <sub>DRM</sub> , T <sub>J</sub> = 125°C |          | Min   | 500 | V/μs |
| (d <sub>V</sub> /d <sub>t</sub> ) <sub>c</sub> | Critical Rate-of-Rise of Commutation Voltage | T <sub>J</sub> = 125°C                                        |          |       | 10  |      |

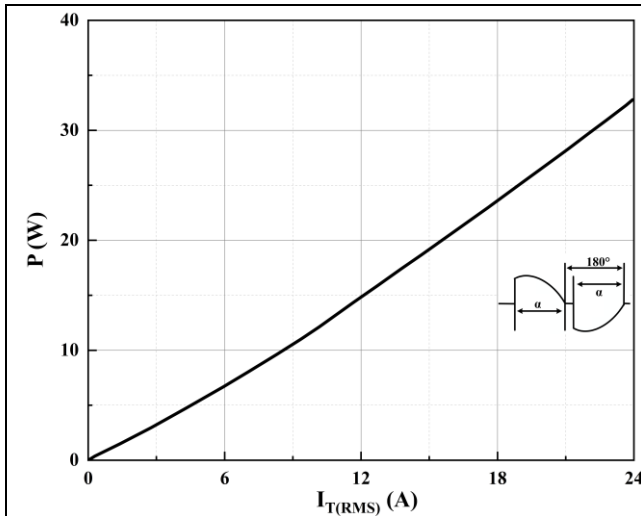
### ■ Electrical Characteristics (4 Quadrants)

| Symbol               | Parameter                                    | Test Condition                                                | Quadrant    | Value |     | Unit |
|----------------------|----------------------------------------------|---------------------------------------------------------------|-------------|-------|-----|------|
| I <sub>GT</sub>      | Gate Trigger Current                         | V <sub>D</sub> = 12V,<br>R <sub>L</sub> = 100Ω                | I-II-III    | Max   | 50  | mA   |
|                      |                                              |                                                               | IV          |       | 120 |      |
| V <sub>GT</sub>      | Gate Trigger Voltage                         | T <sub>J</sub> = 125°C                                        | I-II-III-IV | Min   | 1.5 | V    |
| V <sub>GD</sub>      | Gate Non-Trigger Voltage                     |                                                               |             |       | 0.2 |      |
| I <sub>H</sub>       | Holding Current                              | I <sub>T</sub> = 0.5A                                         |             | Max   | 80  | mA   |
| I <sub>L</sub>       | Latching Current                             | I <sub>G</sub> = 1.2I <sub>GT</sub>                           | I-III-IV    |       | 80  |      |
|                      |                                              |                                                               | II          |       | 100 |      |
| dv/dt                | Critical Rate-of-Rise of Off-Stage Voltage   | V <sub>D</sub> = 2/3V <sub>DRM</sub> , T <sub>J</sub> = 125°C |             | Min   | 500 | V/μs |
| (dv/dt) <sub>c</sub> | Critical Rate-of-Rise of Commutation Voltage | T <sub>J</sub> = 125°C                                        |             |       | 10  |      |

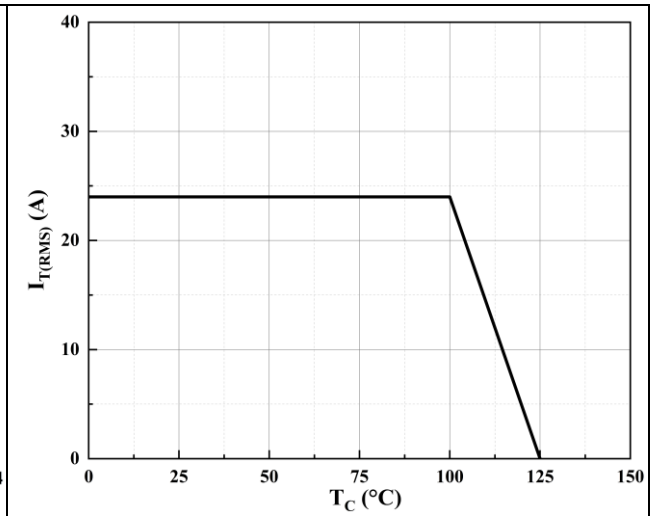
### ■ Static Characteristics

| Symbol    | Parameter                         | Test Condition                                    | Value(Max) | Unit       |
|-----------|-----------------------------------|---------------------------------------------------|------------|------------|
| $V_{TM}$  | Peak ON-State Voltage             | $I_{TM} = 40A, T_J = 25^\circ C$                  | 1.5        | V          |
| $V_{TO}$  | Threshold Voltage                 | $T_J = 125^\circ C$                               | 0.87       |            |
| $R_D$     | Dynamic Resistance                | $T_J = 125^\circ C$                               | 14.6       | m $\Omega$ |
| $I_{DRM}$ | Repetitive Peak Off-State Current | $V_D = V_{DRM}, V_R = V_{RRM}, T_J = 25^\circ C$  | 5.0        | $\mu A$    |
| $I_{RRM}$ | Repetitive Peak Reverse Current   | $V_D = V_{DRM}, V_R = V_{RRM}, T_J = 125^\circ C$ | 1.0        | mA         |

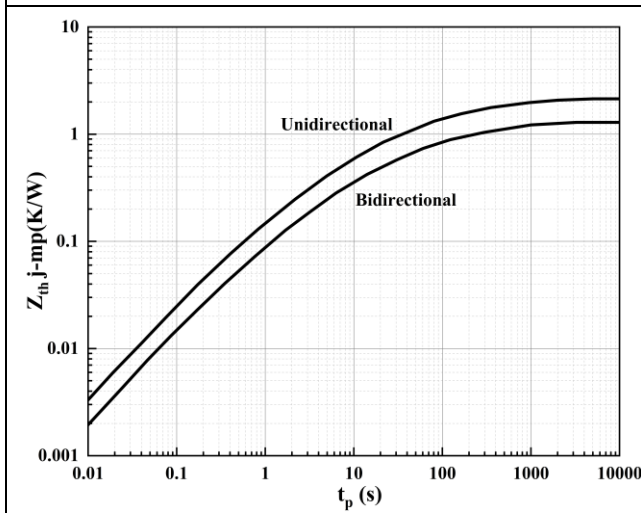
### ■ Characteristic Curve



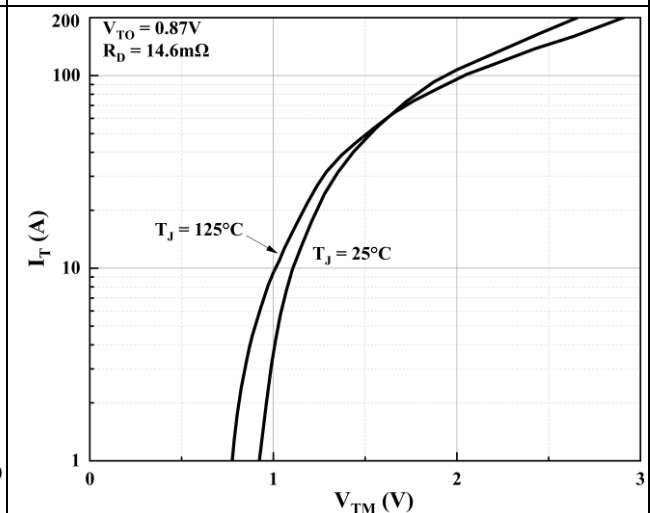
**Figure 1. Power Dissipation vs. RMS On-State Current**



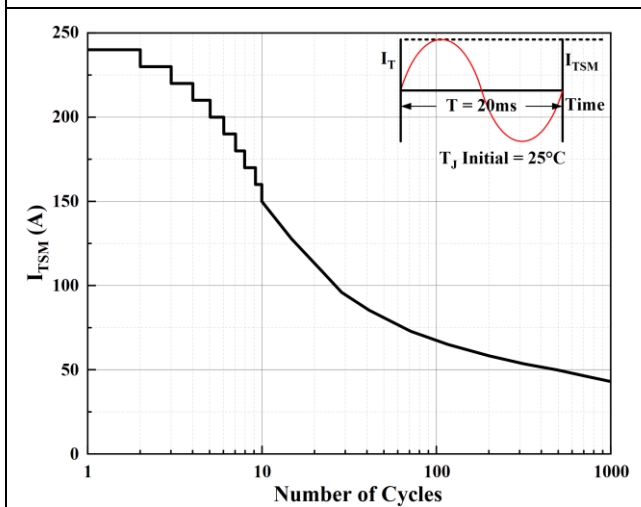
**Figure 2. RMS On-State Current vs. Case Temperature**



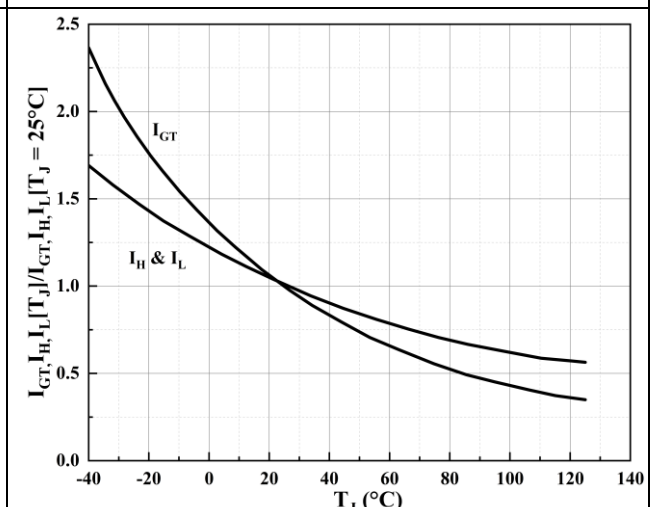
**Figure 3. Relative Variation of Thermal Impedance Junction to Case vs. Pulse Duration**



**Figure 4. On-State Current vs. Peak ON-State Voltage**

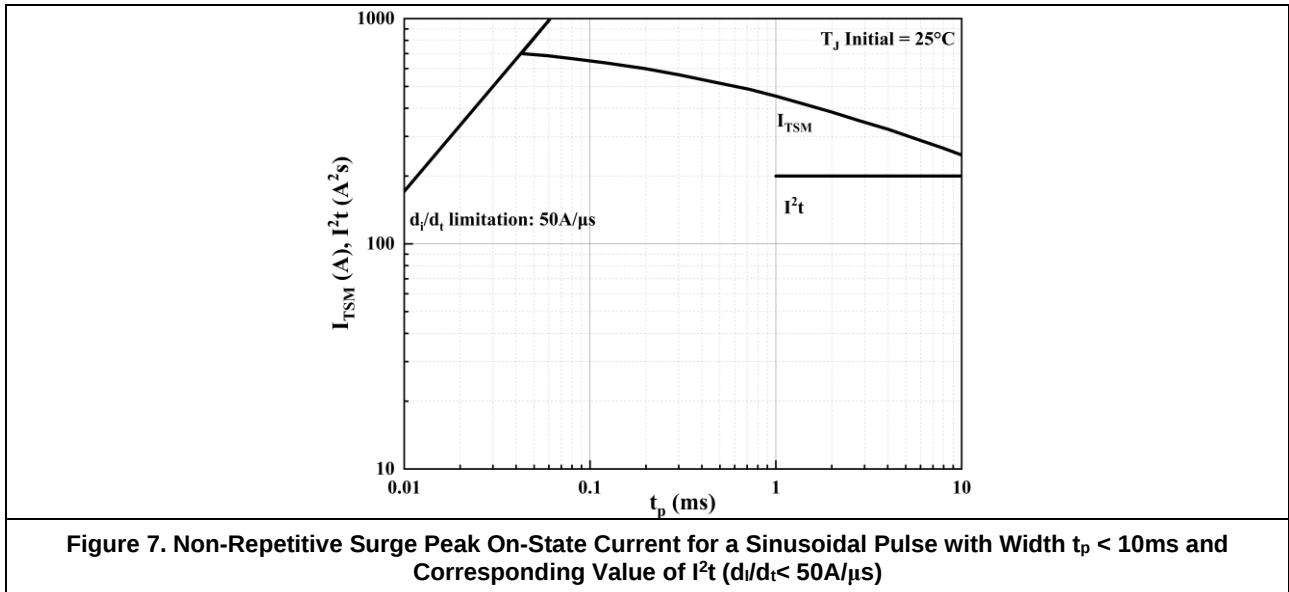


**Figure 5. Surge Peak On-State Current vs. Number of Cycles**



**Figure 6. Gate Trigger Current, Holding Current and Latching Current vs. Junction Temperature**

### ■ Characteristic Curve



### ■ Package Information

#### TO-263

Unit: mm

