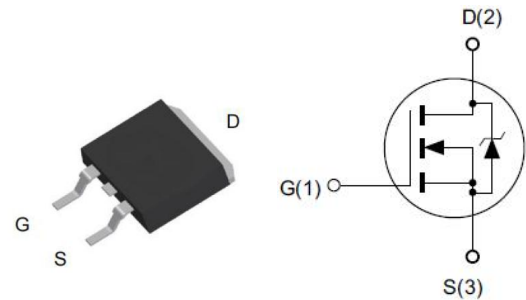


### Features

- ◆ 110V, 181A,  $R_{DS(on)}$ (Typ.) = 3.1m $\Omega$ @ $V_{GS}$  = 10V
- ◆ Excellent  $R_{DS(on)}$  and Low Gate Charge
- ◆ 100%  $E_{AS}$  Guaranteed
- ◆ Halogen-free; RoHS-compliant

### Application

- ◆ Load Switch
- ◆ PWM Application
- ◆ Power Management



### Absolute Maximum Ratings $T_c = 25^\circ\text{C}$ unless otherwise noted

| Symbol         | Parameter                                           | Rating                    | Unit             |
|----------------|-----------------------------------------------------|---------------------------|------------------|
| $V_{DS}$       | Drain-Source Voltage <sup>a</sup>                   | 110                       | V                |
| $V_{GS}$       | Gate-Source Voltage                                 | $\pm 20$                  |                  |
| $I_D$          | Drain Current-Continuous                            | $T_C = 25^\circ\text{C}$  | A                |
|                |                                                     | $T_C = 100^\circ\text{C}$ |                  |
| $I_{DM}$       | Drain Current-Pulsed <sup>b</sup>                   | 724                       |                  |
| $P_D$          | Maximum Power Dissipation, $T_C = 25^\circ\text{C}$ | 284                       | W                |
| $E_{AS}$       | Single Pulsed Avalanche Energy <sup>c</sup>         | 992                       | mJ               |
| $T_J, T_{STG}$ | Operating and Store Temperature Range               | 150, -55 to 150           | $^\circ\text{C}$ |

### Thermal Characteristics

| Symbol          | Parameter                               | Value | Unit               |
|-----------------|-----------------------------------------|-------|--------------------|
| $R_{\theta JC}$ | Thermal Resistance, Junction to Case    | 0.44  | $^\circ\text{C/W}$ |
| $R_{\theta JA}$ | Thermal Resistance, Junction to Ambient | 35    |                    |

### Electrical Characteristics $T_J = 25^\circ\text{C}$ unless otherwise noted

#### ■ Off Characteristics

| Symbol     | Parameter                         | Test Condition                  | Min. | Typ. | Max.      | Unit    |
|------------|-----------------------------------|---------------------------------|------|------|-----------|---------|
| $BV_{DSS}$ | Drain-Source Breakdown Voltage    | $V_{GS} = 0V, I_D = 250\mu A$   | 110  | -    | -         | V       |
| $I_{DSS}$  | Zero Gate Voltage Drain Current   | $V_{DS} = 110V, V_{GS} = 0V$    | -    | -    | 1.0       | $\mu A$ |
| $I_{GSS}$  | Forward Gate Body Leakage Current | $V_{DS} = 0V, V_{GS} = \pm 20V$ | -    | -    | $\pm 100$ | nA      |

### ■ On Characteristics

| Symbol       | Parameter                                      | Test Condition                    | Min. | Typ. | Max. | Unit |
|--------------|------------------------------------------------|-----------------------------------|------|------|------|------|
| $V_{GS(th)}$ | Gate Threshold Voltage                         | $V_{DS} = V_{GS}, I_D = 250\mu A$ | 2.0  | 3.0  | 4.0  | V    |
| $R_{DS(on)}$ | Static Drain-Source On-Resistance <sup>d</sup> | $V_{GS} = 10V, I_D = 20A$         | -    | 3.1  | 3.9  | mΩ   |

### ■ Dynamic Characteristics

| Symbol    | Parameter                    | Test Condition                          | Min. | Typ. | Max. | Unit |
|-----------|------------------------------|-----------------------------------------|------|------|------|------|
| $R_G$     | Gate Resistance              | $V_{DS} = V_{GS} = 0V, f = 1.0MHz$      | -    | 2.1  | -    | Ω    |
| $C_{iss}$ | Input Capacitance            | $V_{DS} = 55V, V_{GS} = 0V, f = 1.0MHz$ | -    | 6720 | -    | pF   |
| $C_{oss}$ | Output Capacitance           |                                         | -    | 946  | -    |      |
| $C_{rss}$ | Reverse Transfer Capacitance |                                         | -    | 28   | -    |      |

### ■ On Characteristics

| Symbol       | Parameter           | Test Condition                                               | Min. | Typ. | Max. | Unit |
|--------------|---------------------|--------------------------------------------------------------|------|------|------|------|
| $t_{d(on)}$  | Turn-On Delay Time  | $V_{DD} = 55V, V_{GS} = 10V, I_D = 20A, R_{GEN} = 6.2\Omega$ | -    | 32   | -    | ns   |
| $t_r$        | Turn-On Rise Time   |                                                              | -    | 45   | -    |      |
| $t_{d(off)}$ | Turn-Off Delay Time |                                                              | -    | 78   | -    |      |
| $t_f$        | Turn-Off Fall Time  |                                                              | -    | 48   | -    |      |
| $Q_g$        | Total Gate Charge   | $V_{DS} = 55V, V_{GS} = 0 \text{ to } 10V, I_D = 20A$        | -    | 101  | -    | nC   |
| $Q_{gs}$     | Gate-Source Charge  |                                                              | -    | 34   | -    |      |
| $Q_{gd}$     | Gate-Drain Charge   |                                                              | -    | 24   | -    |      |

### ■ Drain-Source Diode Characteristics

| Symbol   | Parameter                                     | Test Condition                         | Min. | Typ. | Max. | Unit |
|----------|-----------------------------------------------|----------------------------------------|------|------|------|------|
| $I_S$    | Drain-Source Diode Forward Continuous Current | $V_G = V_D = 0V, \text{Force Current}$ | -    | -    | 181  | A    |
| $I_{SM}$ | Maximum Pulsed Current                        |                                        | -    | -    | 724  |      |
| $V_{SD}$ | Drain-Source Diode Forward Voltage            | $V_{GS} = 0V, I_S = 20A$               | -    | -    | 1.2  | V    |
| $T_{rr}$ | Body Diode Reverse Recovery Time              | $I_F = 20A, di_F/dt = 100A/\mu s$      | -    | 85   | -    | ns   |
| $Q_{rr}$ | Body Diode Reverse Recovery Charge            | $I_F = 20A, di_F/dt = 100A/\mu s$      | -    | 240  | -    | nC   |

Notes:

- $T_J = +25^\circ C$  to  $+150^\circ C$ .
- Repetitive rating: pulse width limited by maximum junction temperature.
- $L = 0.5mH, V_{DD} = 25V, I_{AS} = 63A, R_G = 25\Omega$  Starting  $T_J = 25^\circ C$ .
- Pulse width  $\leq 300\mu s$ ; duty cycle  $\leq 0.5\%$ .

### Characteristic Curve

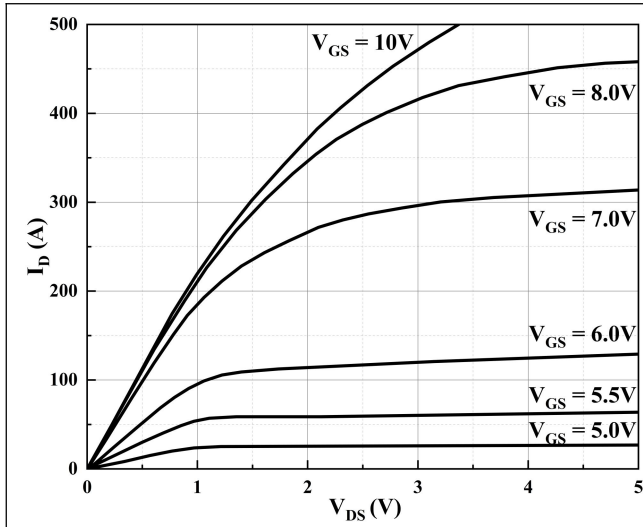


Figure 1. Typical Output Characteristics

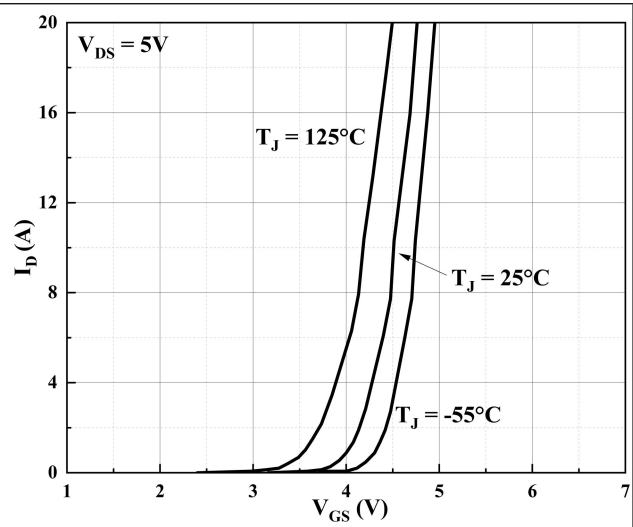


Figure 2. Typical Transfer Characteristics

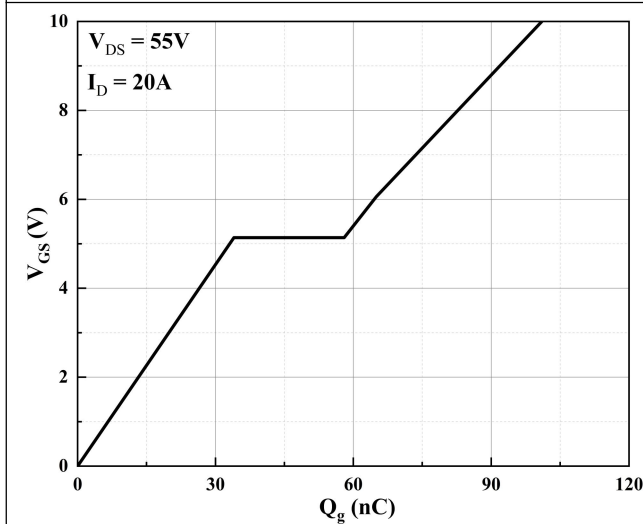


Figure 3. Typical Gate Charge

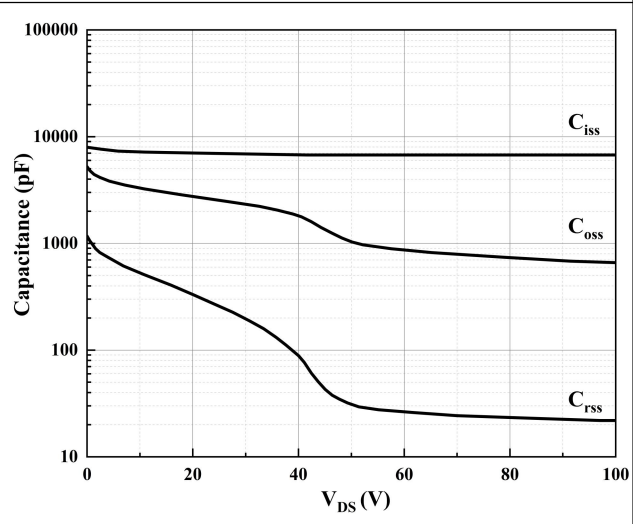


Figure 4. Typical Capacitance

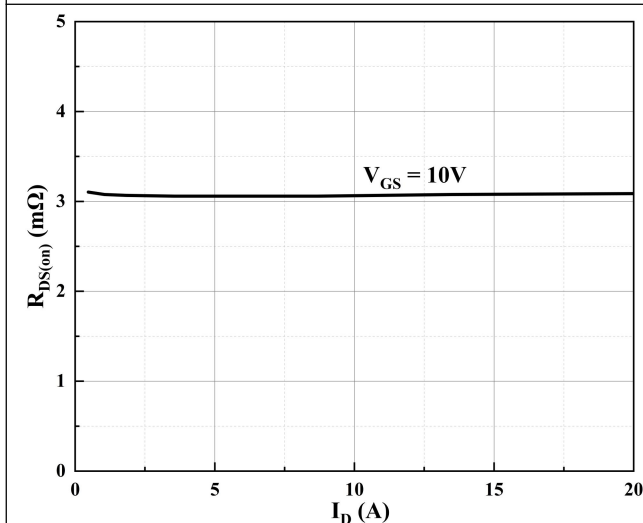


Figure 5. Static Drain-Source On-Resistance vs. Drain Current

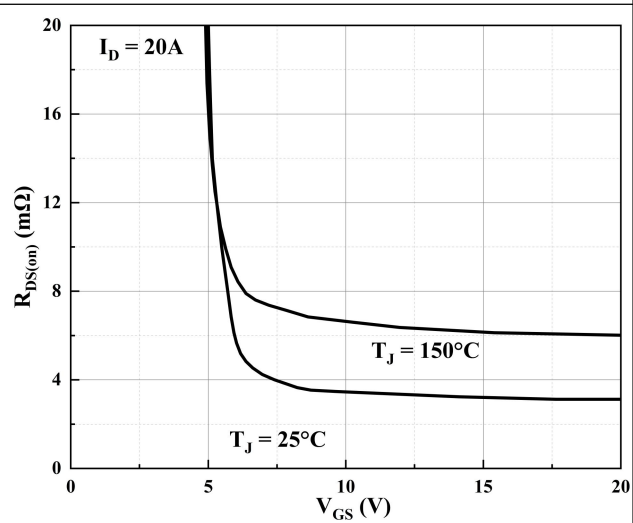
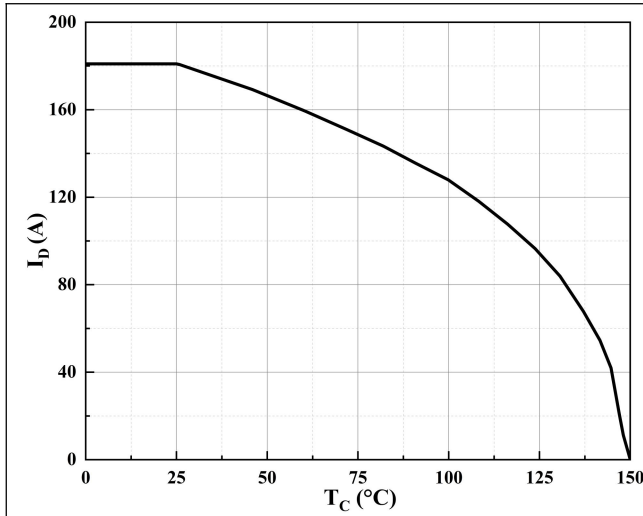
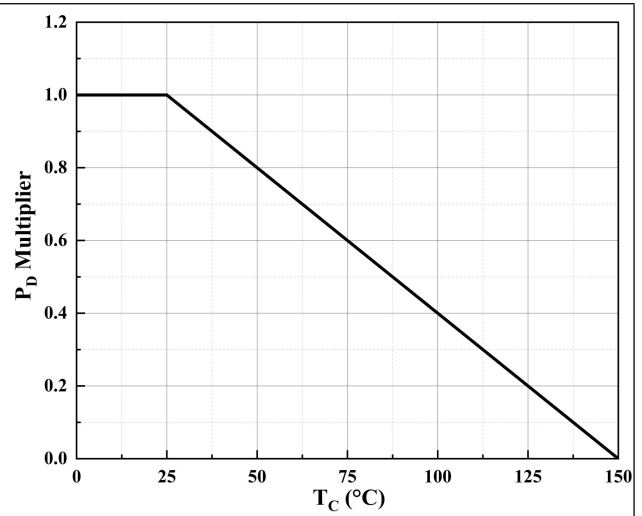


Figure 6. Static Drain-Source On-Resistance vs. Gate-Source Voltage

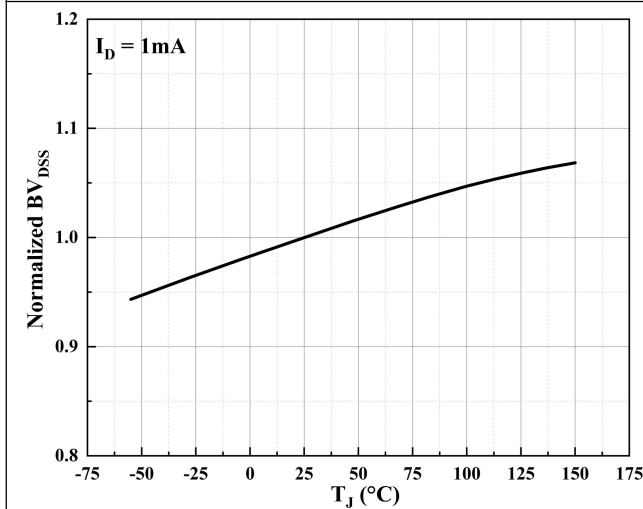
### ■ Characteristic Curve



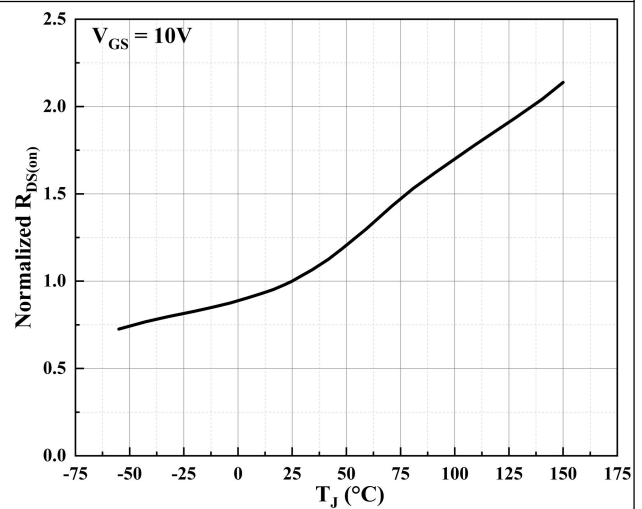
**Figure 7. Maximum Continuous Drain Current vs. Case Temperature**



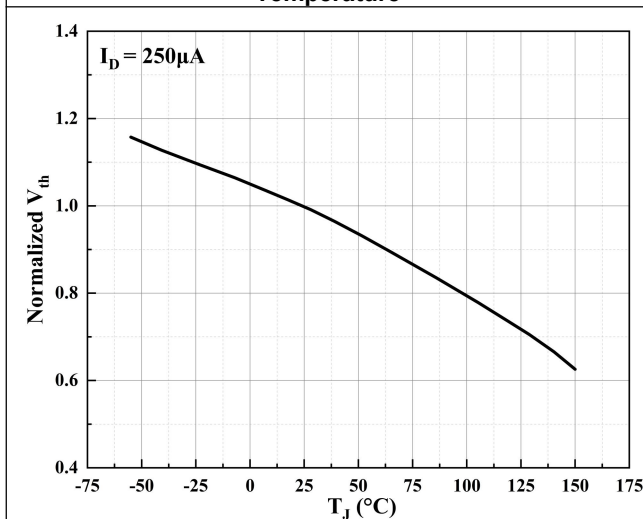
**Figure 8. Maximum Power Dissipation Multiplier vs. Case Temperature**



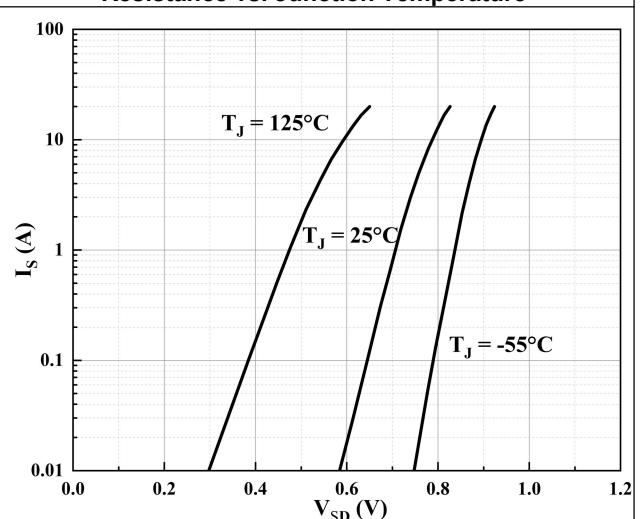
**Figure 9. Normalized Breakdown Voltage vs. Junction Temperature**



**Figure 10. Normalized Static Drain-Source On-Resistance vs. Junction Temperature**



**Figure 11. Normalized Threshold Voltage vs. Junction Temperature**



**Figure 12. Body Diode Characteristics**

### ■ Characteristic Curve

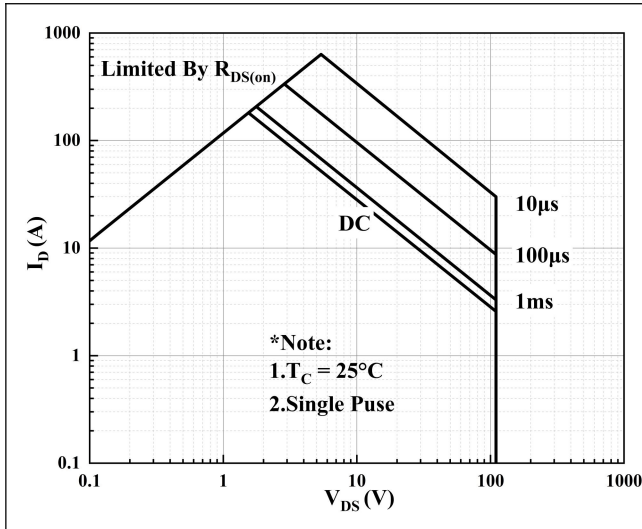


Figure 13. Maximum Safe Operating Area

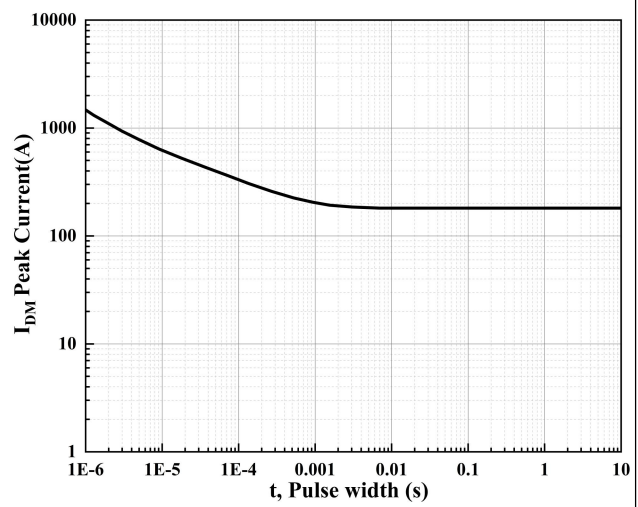


Figure 14. Peak Current Capacity

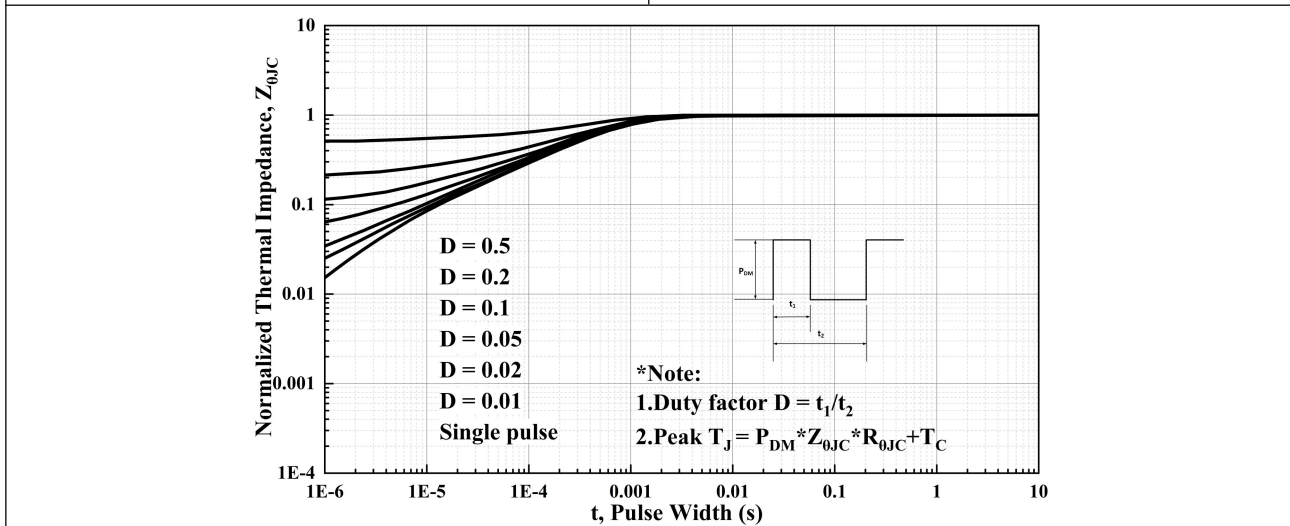
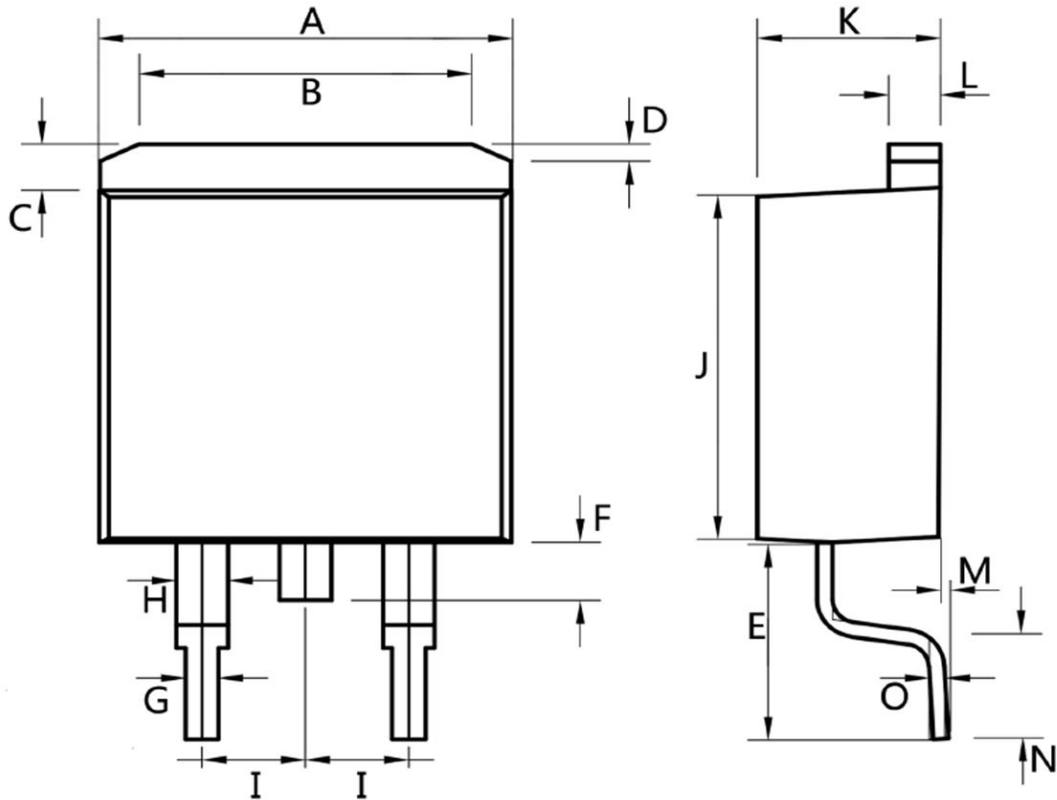


Figure 15. Normalized Maximum Transient Thermal Impedance

### ■ Package Information

TO-263



| Dim.                         | Min.    | Max.  |
|------------------------------|---------|-------|
| A                            | 10.15   | 10.35 |
| B                            | 6       | 8     |
| C                            | 1.2     | 1.5   |
| D                            | 0.55    | 1.0   |
| E                            | 4.3     | 5.3   |
| F                            | 1.4     | 1.6   |
| G                            | 0.75    | 0.85  |
| H                            | 1.2     | 1.5   |
| I                            | Typ2.54 |       |
| J                            | 8.5     | 9.5   |
| K                            | 4.3     | 4.55  |
| L                            | 1.25    | 1.35  |
| M                            | 0.02    | 0.23  |
| N                            | 2.2     | 2.8   |
| O                            | 0.35    | 0.45  |
| All Dimensions in millimeter |         |       |