

## Product Summary

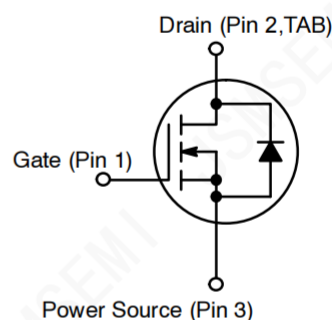
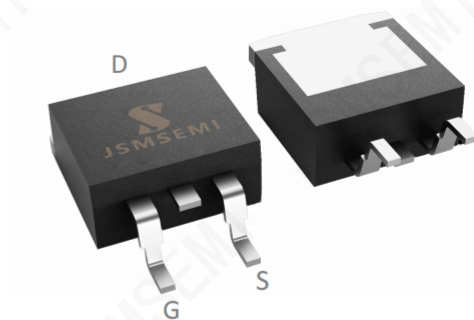
- $V_{DS}$  100V
- $I_D$  150A
- $R_{DS(ON)}$  (at  $V_{GS}=10V$ )  $<2.8m\Omega$
- 100% EAS Tested
- 100%  $\nabla V_{DS}$  Tested

## General Description

- Trench Power MOSFET technologygate
- Excellent package for heat dissipation
- High density cell design for low  $R_{DS(ON)}$
- Moisture Sensitivity Level 1
- Epoxy Meets UL 94 V-0 Flammability Rating
- Halogen Free

## Applications

- Power switching application
- Uninterruptible power supply
- DC-DC convertor
- Motor drivers



### ■ Absolute Maximum Ratings ( $T_A=25^\circ\text{C}$ unless otherwise noted)

| Parameter                              |                         | Symbol         | Limit    | Unit             |
|----------------------------------------|-------------------------|----------------|----------|------------------|
| Drain-source Voltage                   |                         | $V_{DS}$       | 100      | V                |
| Gate-source Voltage                    |                         | $V_{GS}$       | $\pm 20$ | V                |
| Drain Current                          | $T_C=25^\circ\text{C}$  | $I_D$          | 150      | A                |
|                                        | $T_C=100^\circ\text{C}$ |                | 150      |                  |
| Pulsed Drain Current <sup>A</sup>      |                         | $I_{DM}$       | 600      | A                |
| Avalanche energy <sup>B</sup>          |                         | EAS            | 980      | mJ               |
| Total Power Dissipation                | $T_C=25^\circ\text{C}$  | $P_D$          | 280      | W                |
|                                        | $T_C=100^\circ\text{C}$ |                | 120      |                  |
| Junction and Storage Temperature Range |                         | $T_J, T_{STG}$ | -55~+150 | $^\circ\text{C}$ |

### ■ Thermal resistance

| Parameter                                           |              | Symbol          | Typ | Max  | Units              |
|-----------------------------------------------------|--------------|-----------------|-----|------|--------------------|
| Thermal Resistance Junction-to-Ambient <sup>D</sup> | Steady-State | $R_{\theta JA}$ |     | 40   | $^\circ\text{C/W}$ |
| Thermal Resistance Junction-to-Case                 | Steady-State | $R_{\theta JC}$ |     | 0.45 |                    |

## Ordering Information

| Order number      | Package | Marking   | Operation Temperature Range | MSL Grade | Ship, Quantity | Green |
|-------------------|---------|-----------|-----------------------------|-----------|----------------|-------|
| SUM70030E-GE3-JSM | TO-263  | SUM70030E | -55 to 150 $^\circ\text{C}$ | 1         | T&R,800        | RoHS  |

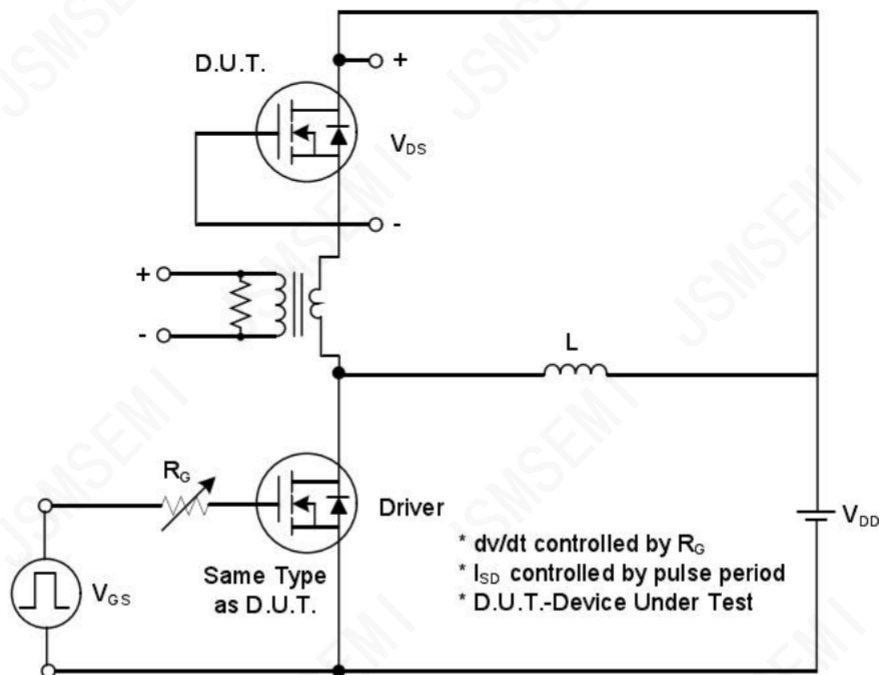
**■ Electrical Characteristics** ( $T_J=25^{\circ}\text{C}$  unless otherwise noted)

| Parameter                             | Symbol              | Conditions                                                                              | Min | Typ  | Max  | Units |
|---------------------------------------|---------------------|-----------------------------------------------------------------------------------------|-----|------|------|-------|
| Static Parameter                      |                     |                                                                                         |     |      |      |       |
| Drain-Source Breakdown Voltage        | BV <sub>DSS</sub>   | V <sub>GS</sub> = 0V, I <sub>D</sub> =250μA                                             | 100 | -    | -    | V     |
|                                       |                     | V <sub>GS</sub> = 0V, I <sub>D</sub> =1mA                                               | 100 | -    | -    | V     |
| Zero Gate Voltage Drain Current       | I <sub>DSS</sub>    | V <sub>DS</sub> =100V, V <sub>GS</sub> =0V                                              | -   | -    | 1    | μA    |
|                                       |                     | V <sub>DS</sub> =100V, V <sub>GS</sub> =0V, T <sub>j</sub> =150°C                       | -   | -    | 100  |       |
| Gate-Body Leakage Current             | I <sub>GSS</sub>    | V <sub>GS</sub> = ±20V, V <sub>DS</sub> =0V                                             | -   | -    | ±100 | nA    |
| Gate Threshold Voltage                | V <sub>GS(th)</sub> | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> =250μA                               | 2.0 | 3.0  | 4.0  | V     |
| Static Drain-Source On-Resistance     | R <sub>DS(ON)</sub> | V <sub>GS</sub> =10V, I <sub>D</sub> =20A                                               | -   | 2.4  | 2.8  | mΩ    |
| Diode Forward Voltage                 | V <sub>SD</sub>     | I <sub>S</sub> =50A, V <sub>GS</sub> =0V                                                | -   | -    | 1.2  | V     |
| Gate resistance                       | R <sub>G</sub>      | f=1MHz                                                                                  | -   | 1.7  | -    | Ω     |
| Maximum Body-Diode Continuous Current | I <sub>S</sub>      |                                                                                         | -   | -    | 150  | A     |
| Dynamic Parameters                    |                     |                                                                                         |     |      |      |       |
| Input Capacitance                     | C <sub>iss</sub>    | V <sub>DS</sub> =50V, V <sub>GS</sub> =0V, f=1MHz                                       | -   | 7315 | -    | pF    |
| Output Capacitance                    | C <sub>oss</sub>    |                                                                                         | -   | 2656 | -    |       |
| Reverse Transfer Capacitance          | C <sub>rss</sub>    |                                                                                         | -   | 59   | -    |       |
| Switching Parameters                  |                     |                                                                                         |     |      |      |       |
| Total Gate Charge                     | Q <sub>g</sub>      | V <sub>GS</sub> =10V, V <sub>DS</sub> =50V, I <sub>D</sub> =20A                         | -   | 110  | -    | nC    |
| Gate-Source Charge                    | Q <sub>gs</sub>     |                                                                                         | -   | 24   | -    |       |
| Gate-Drain Charge                     | Q <sub>gd</sub>     |                                                                                         | -   | 35   | -    |       |
| Reverse Recovery Charge               | Q <sub>rr</sub>     | I <sub>F</sub> =20A, di/dt=100A/us                                                      | -   | 209  | -    | nC    |
| Reverse Recovery Time                 | t <sub>rr</sub>     |                                                                                         | -   | 90   | -    | ns    |
| Turn-on Delay Time                    | t <sub>D(on)</sub>  | V <sub>GS</sub> =10V, V <sub>DD</sub> =50V, I <sub>D</sub> =20A<br>R <sub>GEN</sub> =3Ω | -   | 25   | -    | ns    |
| Turn-on Rise Time                     | t <sub>r</sub>      |                                                                                         | -   | 45   | -    |       |
| Turn-off Delay Time                   | t <sub>D(off)</sub> |                                                                                         | -   | 88   | -    |       |
| Turn-off fall Time                    | t <sub>f</sub>      |                                                                                         | -   | 53   | -    |       |

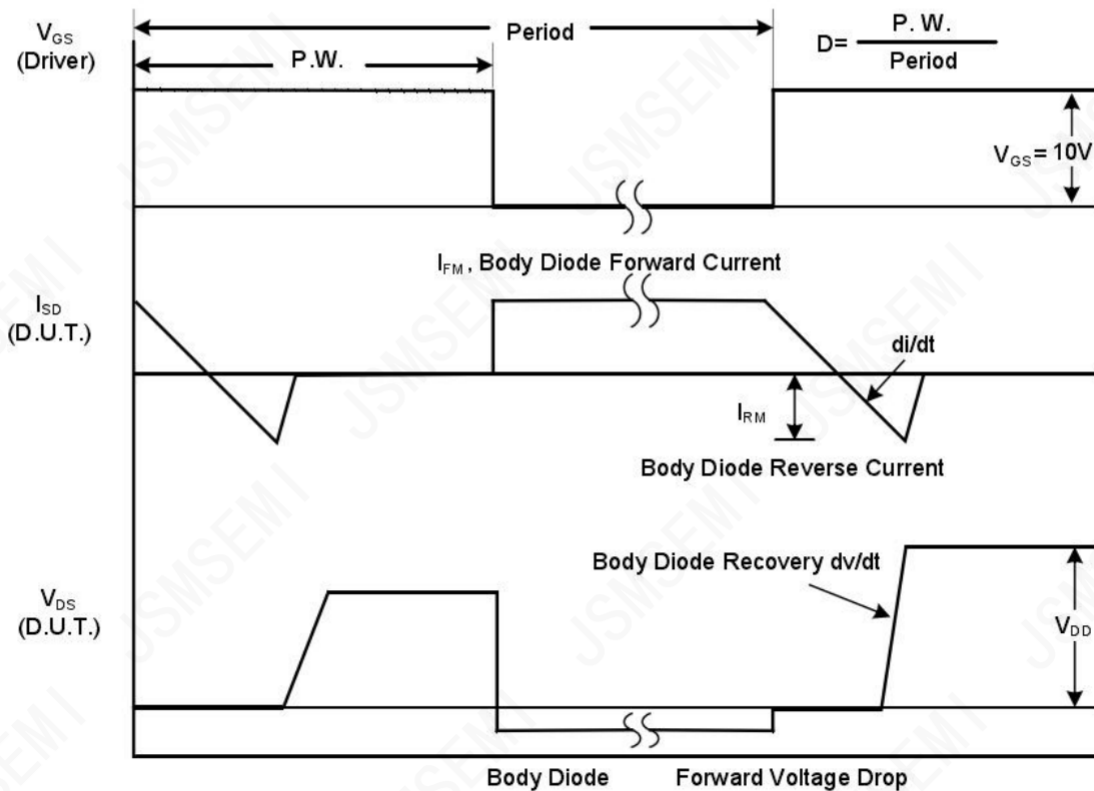
A. Repetitive rating; pulse width limited by max. junction temperature.

 B.  $T_J=25^{\circ}\text{C}$ ,  $V_G=10\text{V}$ ,  $R_G=25\Omega$ ,  $L=0.5\text{mH}$

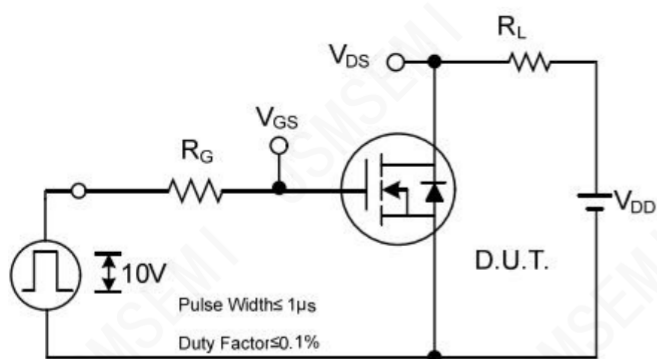
■ RATING AND CHARACTERISTIC CURVES



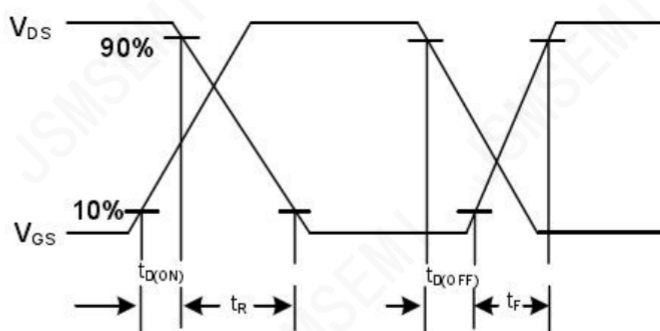
Peak Diode Recovery dv/dt Test Circuit



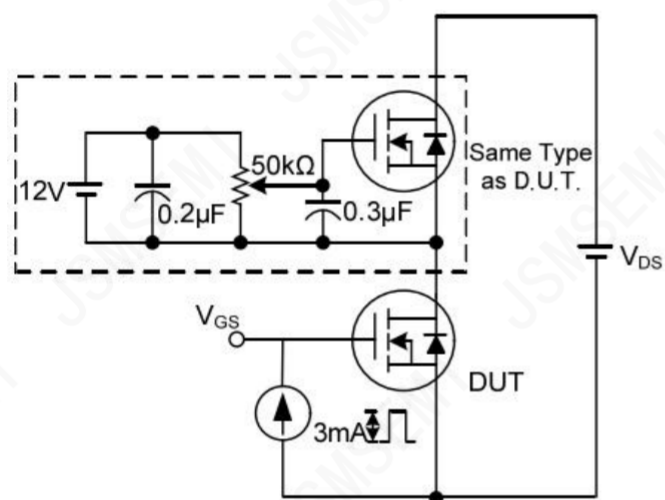
Peak Diode Recovery dv/dt Waveforms



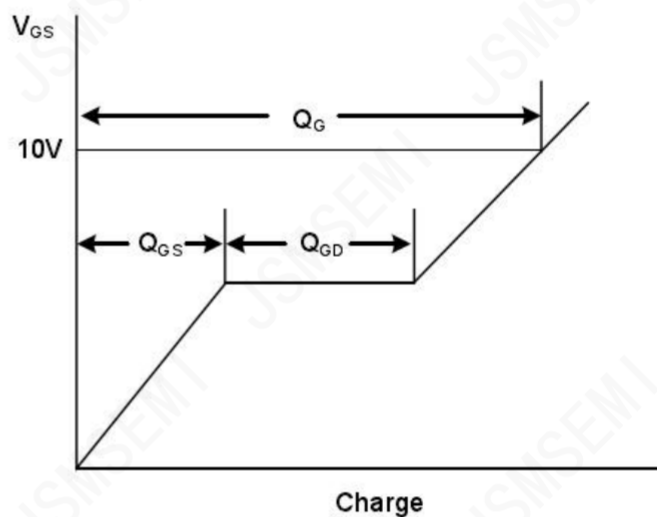
Switching Test Circuit



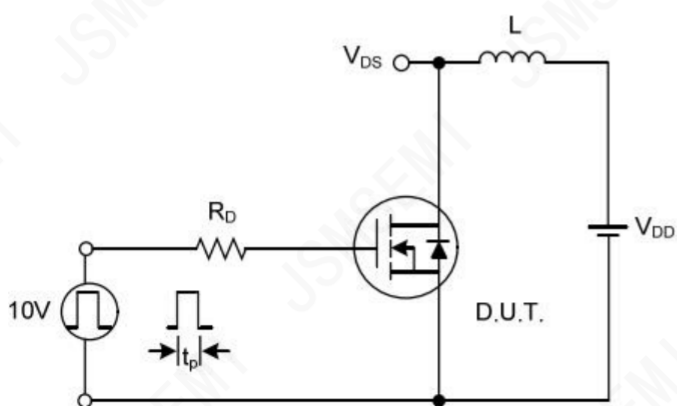
Switching Waveforms



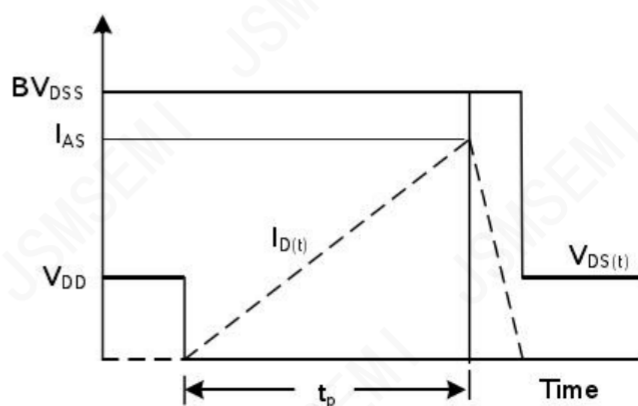
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

### Typical Electrical and Thermal Characteristics Diagrams

Figure 1: Power De-rating

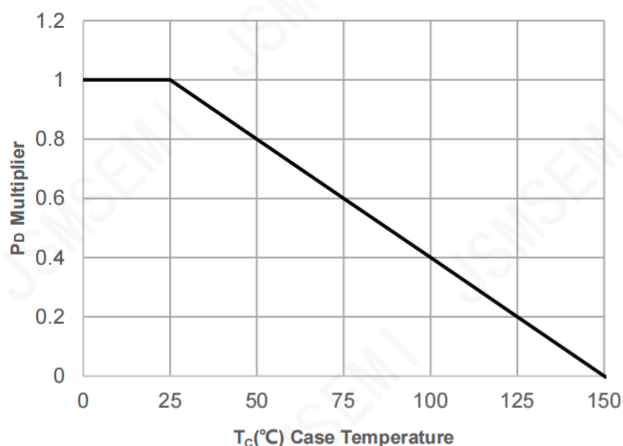


Figure 2: Current De-rating

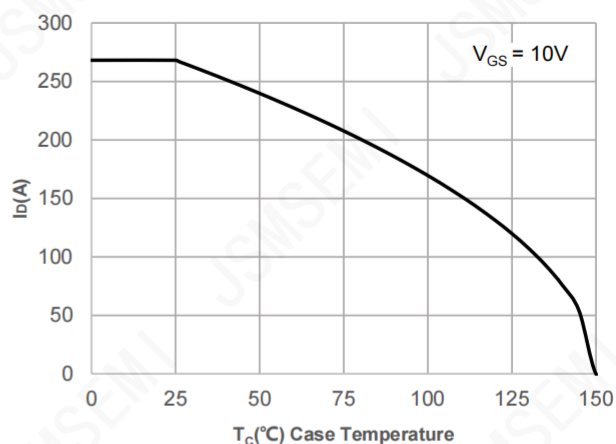


Figure 3: Normalized Maximum Transient Thermal Impedance

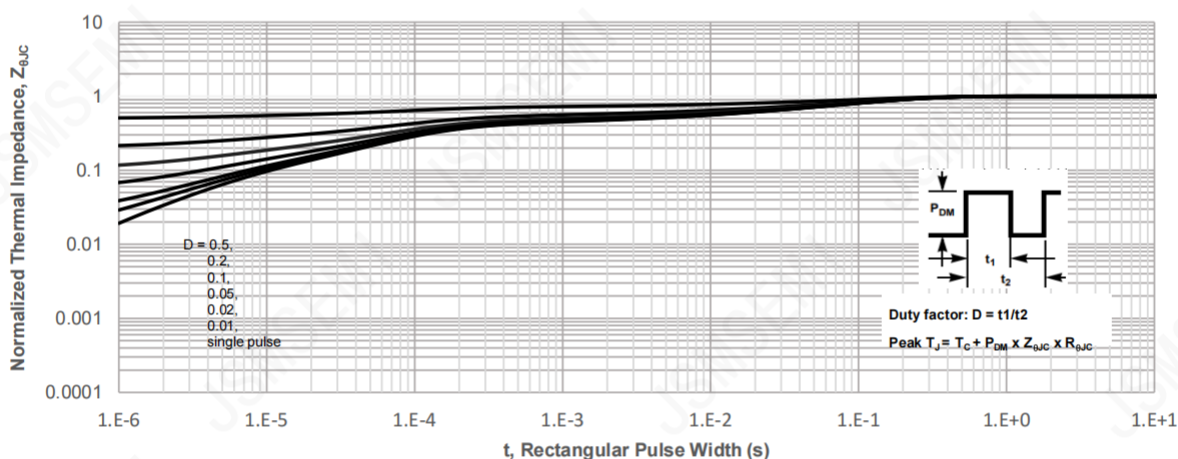


Figure 4: Peak Current Capacity

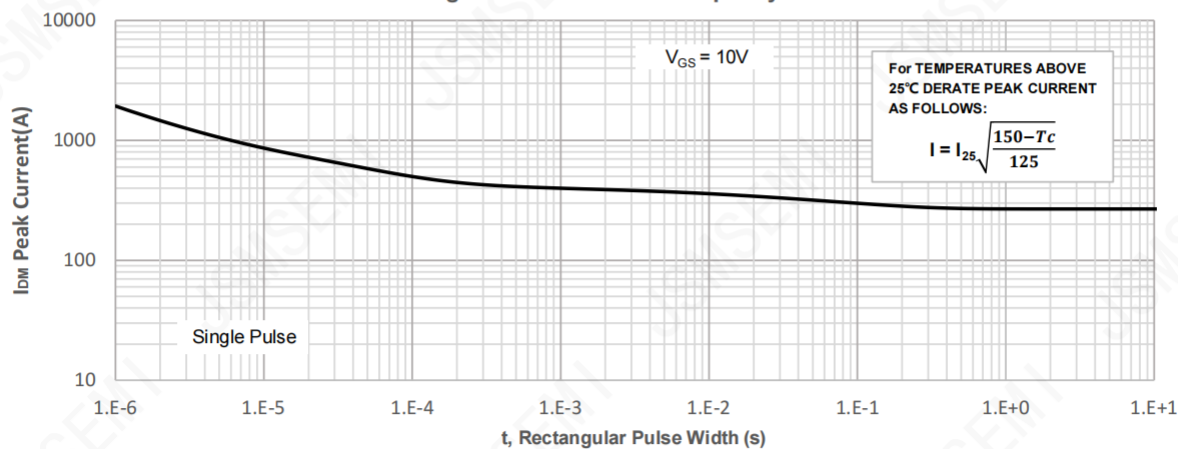


Figure 5: Output Characteristics

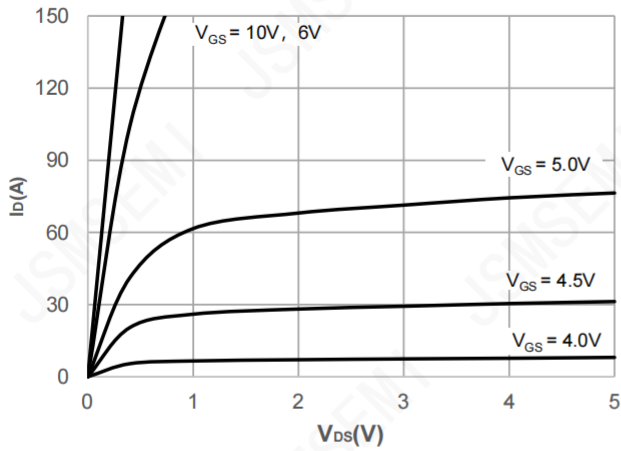


Figure 6: Typical Transfer Characteristics

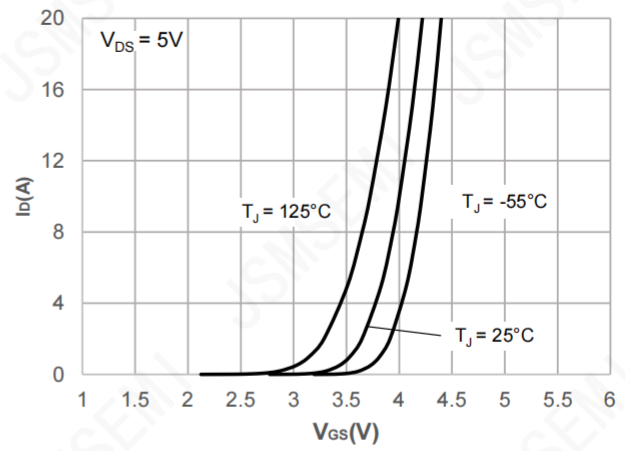


Figure 7: On-resistance vs. Drain Current

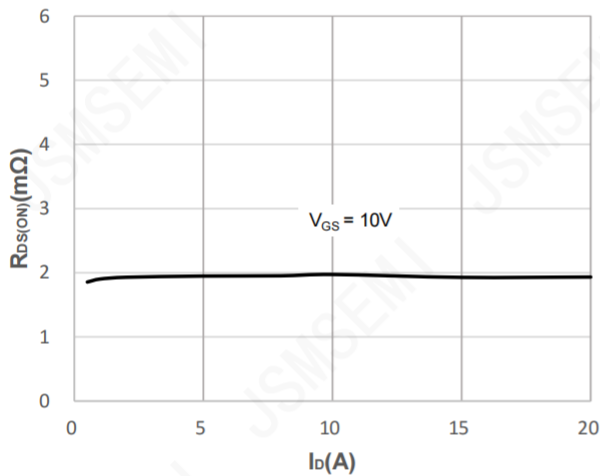


Figure 8: Body Diode Characteristics

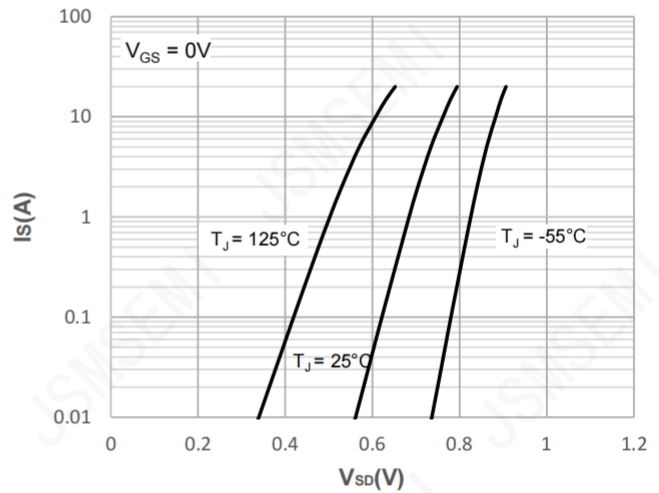


Figure 9: Gate Charge Characteristics

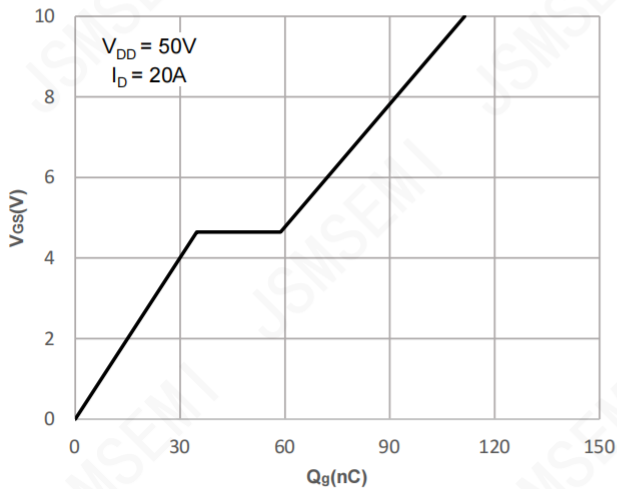


Figure 10: Capacitance Characteristics

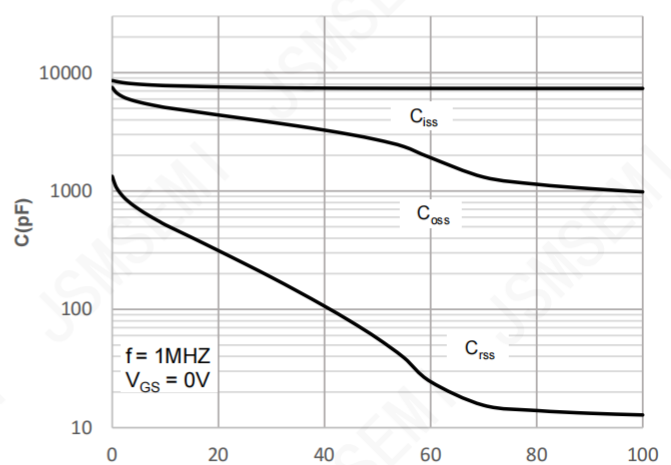


Figure 11: Normalized Breakdown voltage vs. Junction Temperature

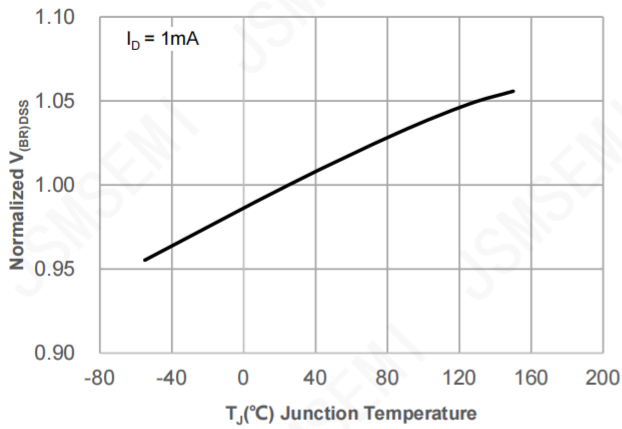


Figure 12: Normalized on Resistance vs. Junction Temperature

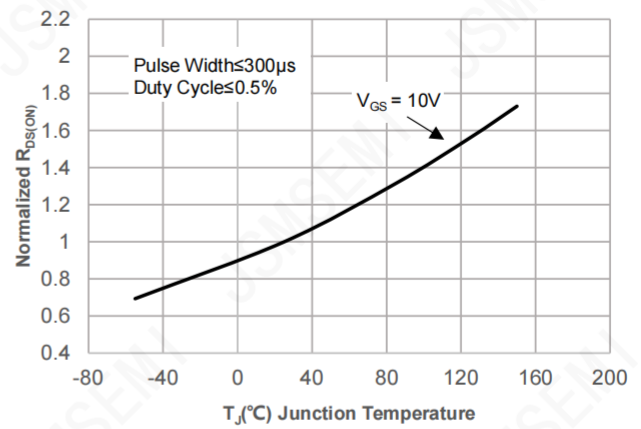


Figure 13: Normalized Threshold Voltage vs. Junction Temperature

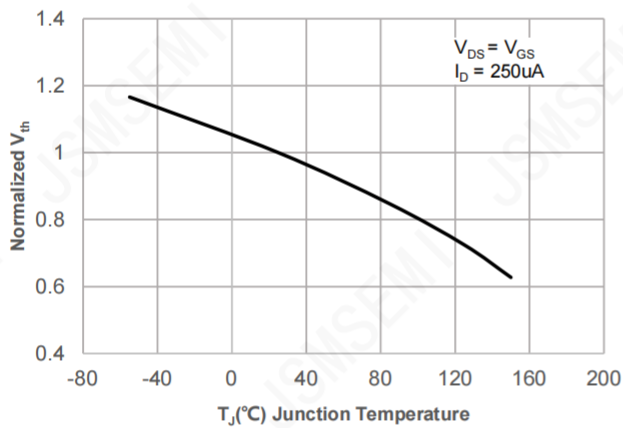


Figure 14:  $R_{DS(ON)}$  vs.  $V_{GS}$

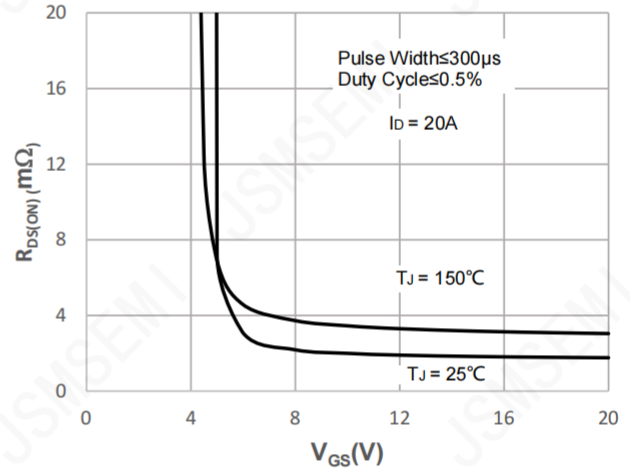
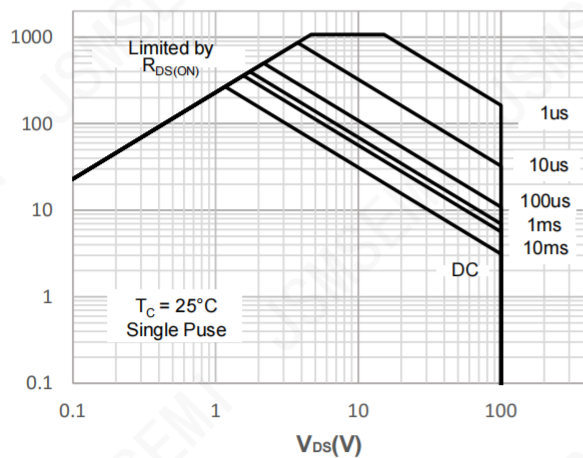
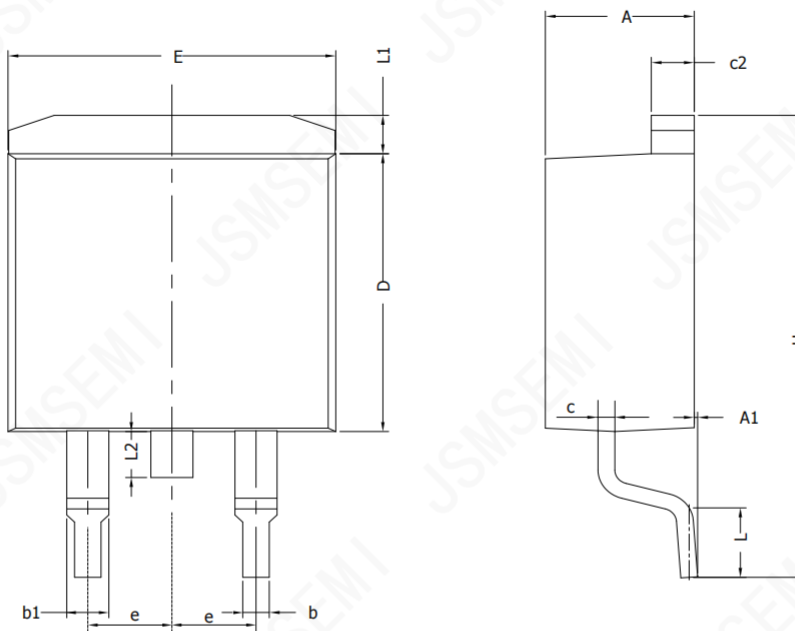


Figure 15: Maximum Safe Operating Area



## Package Information

TO-263



| SYMBOL | MIN     | NOM  | MAX   |
|--------|---------|------|-------|
| A      | 4.30    | 4.57 | 4.72  |
| A1     | 0       | 0.10 | 0.25  |
| b      | 0.71    | 0.81 | 0.91  |
| c      | 0.30    | ---  | 0.60  |
| c2     | 1.17    | 1.27 | 1.37  |
| D      | 8.50    | ---  | 9.35  |
| E      | 9.80    | ---  | 10.45 |
| e      | 2.54BSC |      |       |
| H      | 14.70   | ---  | 15.75 |
| L      | 2.00    | 2.30 | 2.74  |
| L1     | 1.12    | 1.27 | 1.42  |
| L2     | ---     | ---  | 1.75  |

## Revision History

| Rev. | Change          | Date      |
|------|-----------------|-----------|
| V1.0 | Initial version | 6/27/2021 |
|      |                 |           |

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