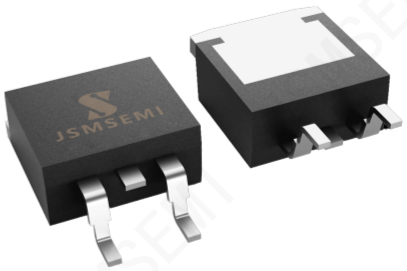
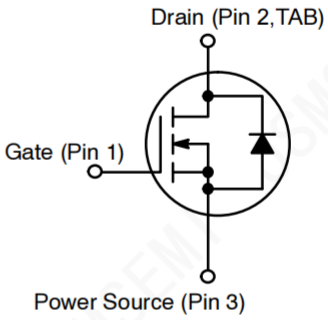
## Product Summary

- $V_{DS}$ 200V
- $I_D$ 45A
- $R_{DS(ON)}$( at $V_{GS}$=10V) ＜60mΩ
- 100% EAS Tested
- 100% ▽$V_{DS}$ Tested



## General Description

- Vertical Double-diffused MOSFET technology
- 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 $T_C$= 25ºC, unless otherwise noted

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| | | TO-263 | |
| Drain-Source Voltage | $V_{DSS}$ | 200 | V |
| Continuous Drain Current | $I_D$ | 45 | A |
| Pulsed Drain Current (note2) | $I_{DM}$ | 180 | A |
| Gate-Source Voltage | $V_{GSS}$ | ±20 | V |
| Single Pulse Avalanche Energy (note2) | $E_{AS}$ | 1700 | mJ |
| Avalanche Current (note1) | $I_{AR}$ | 6.5 | V/ns |
| Repetitive Avalanche Energy (note1) | $E_{AR}$ | 368 | mJ |
| Power Dissipation ($T_C$ = 25ºC) | $P_D$ | 300 | W |
| Operating Junction and Storage Temperature Range | $T_J$, $T_{stg}$ | -55 to150 | ºC |

## Ordering Information

| Order number | Package | Marking | Operation Temperature Range | MSL Grade | Ship, Quantity | Green |
|---|---|---|---|---|---|---|
| FDB44N25TM-JSM | TO-263 | FDB44N25 | -55 to 150°C | 1 | T&R,800 | Rohs |

## Thermal Resistance

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| | | TO-263 | |
| Thermal Resistance, Junction-to-Case | $R_{thJC}$ | 0.4 | ℃/W |
| Thermal Resistance, Junction-to-Ambient | $R_{thJA}$ | 55 | |

## Specifications $T_J$ = 25ºC, unless otherwise noted

| Parameter | Symbol | Test Conditions | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| **Static** | | | | | | |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS}$ = 0V, $I_D$ = 250μA | 200 | -- | -- | V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$ = 200V, $V_{GS}$ = 0V, $T_J$ = 25ºC | -- | -- | 1 | μA |
| Gate-Source Leakage | $I_{GSS}$ | $V_{GS}$ = +20V,$V_{DS}$=0V | -- | -- | 100 | nA |
| | | $V_{GS}$=-20V, $V_{DS}$=0V | -- | -- | -100 | |
| Gate-Source Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$ = $V_{GS}$, $I_D$ = 250μA | 2.0 | -- | 4.0 | V |
| Drain-Source On-Resistance (Note3) | $R_{DS(on)}$ | $V_{GS}$ = 10V, $I_D$ = 20A | -- | 50 | 60 | mΩ |
| **Dynamic** | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{GS}$ = 0V, $V_{DS}$ = 25V, f = 1.0MHz | -- | 3005 | -- | pF |
| Output Capacitance | $C_{oss}$ | | -- | 357 | -- | |
| Reverse Transfer Capacitance | $C_{rss}$ | | -- | 35 | -- | |
| Total Gate Charge | $Q_g$ | $V_{DD}$ =160V, $I_D$ = 20A, $V_{GS}$ = 0 to 10V | -- | 50 | -- | nC |
| Gate-Source Charge | $Q_{gs}$ | | -- | 13 | -- | |
| Gate-Drain Charge | $Q_{gd}$ | | -- | 18 | -- | |
| Turn-on Delay Time | $t_{d(on)}$ | VDD = 100V, ID =20A, VGS= 10V $R_G$ = 10Ω | -- | 36 | -- | ns |
| Turn-on Rise Time | $t_r$ | | -- | 39 | -- | |
| Turn-off Delay Time | $t_{d(off)}$ | | -- | 75 | -- | |
| Turn-off Fall Time | $t_f$ | | -- | 22 | -- | |
| **Drain-Source Body Diode Characteristics** | | | | | | |
| Continuous Body Diode Current | $I_S$ | $T_C$ = 25 ºC | -- | -- | 45 | A |
| Pulsed Diode Forward Current | $I_{SM}$ | | -- | -- | 200 | |
| Body Diode Voltage | $V_{SD}$ | $T_J$ = 25ºC, $I_{SD}$ = 25A, $V_{GS}$ = 0V | -- | -- | 1.5 | V |
| Reverse Recovery Time | $t_{rr}$ | $V_{GS}$ = 0V,$I_S$ = 25A, $di_F/dt$ =100A /μs | -- | 208 | -- | ns |
| Reverse Recovery Charge | $Q_{rr}$ | | -- | 2.04 | -- | μC |

**Notes**
1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. $I_{AS}$ = 30A, $V_{DD}$ = 30V, $R_G$ = 25 Ω, Starting $T_J$ = 25 ºC
3. Pulse Test: Pulse width ≤ 300μs, Duty Cycle ≤ 1%

## Typical Characteristics $T_J$ = 25ºC, unless otherwise noted

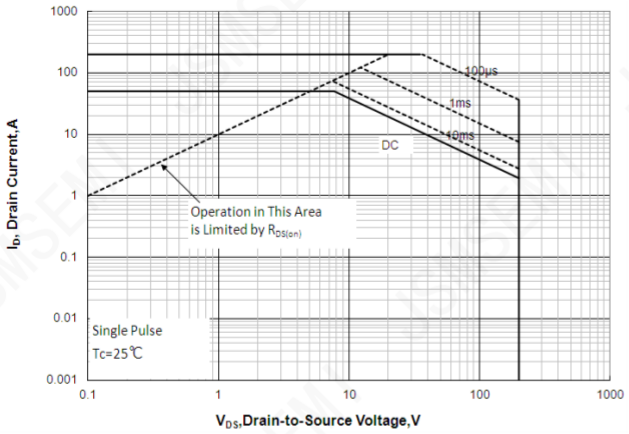



Figure 1 Maximum Forward Bias Safe Operating Area

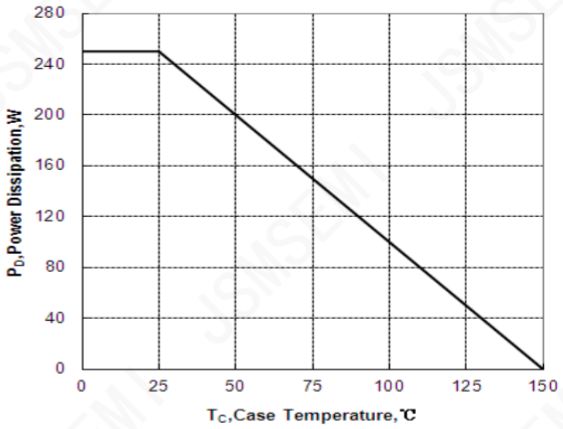



Figure 2 Maximum Power dissipation vs Case Temperature

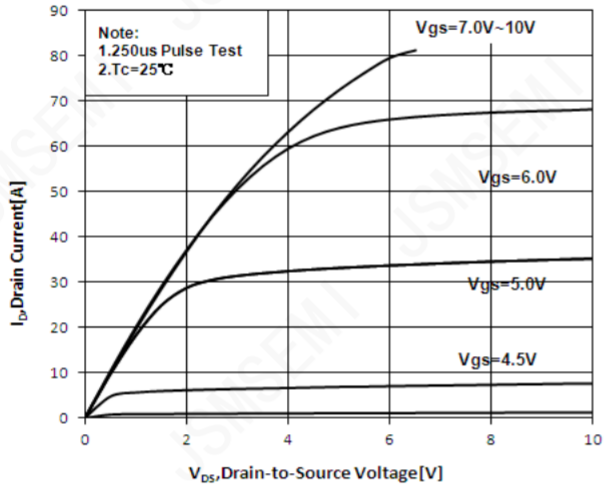



Figure 3 Maximum Continuous Drain Current vs Case Temperature

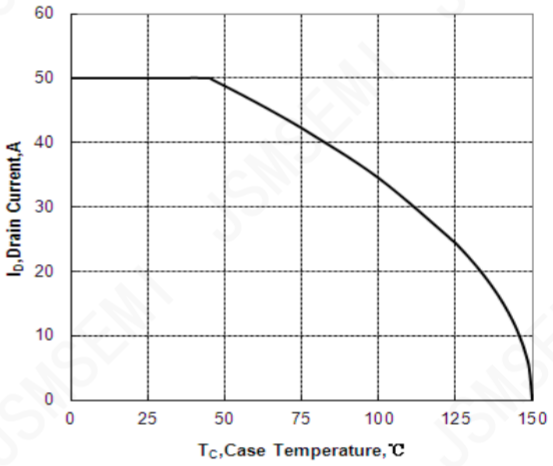



Figure 4 Typical Output Characteristics

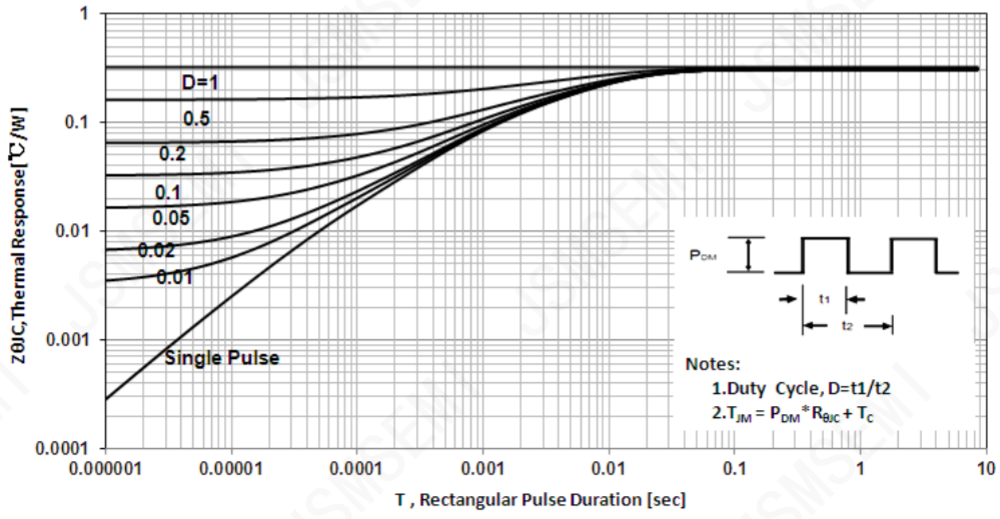



Figure 5 Maximum Effective Thermal Impedance , Junction to Case

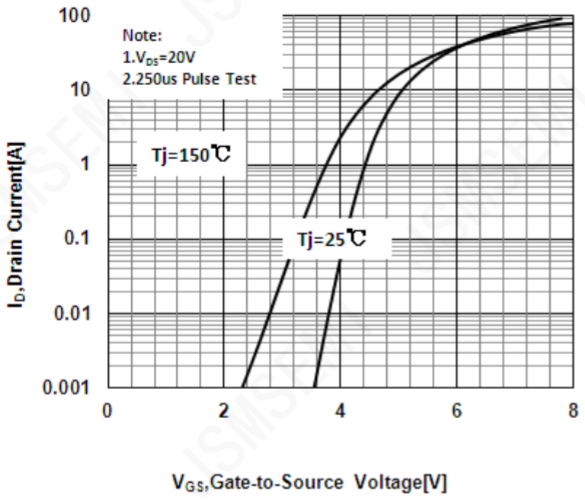



Figure 6 Typical Transfer Characteristics

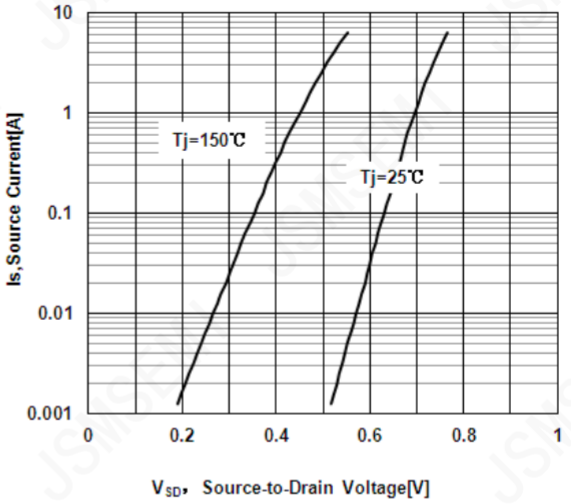



Figure 7 Typical Body Diode Transfer Characteristics

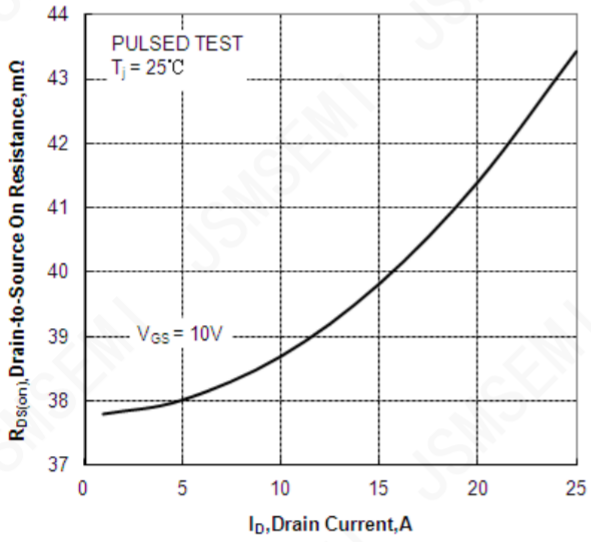



Figure 8 Typical Drain to Source ON Resistance vs Drain Current

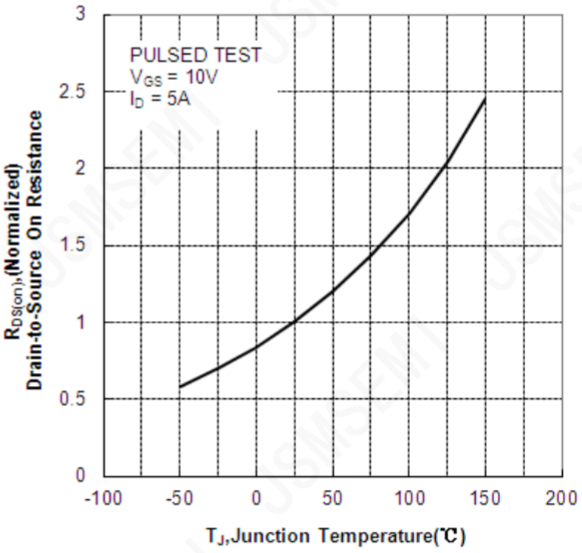



Figure 9 Typical Drian to Source on Resistance vs Junction Temperature

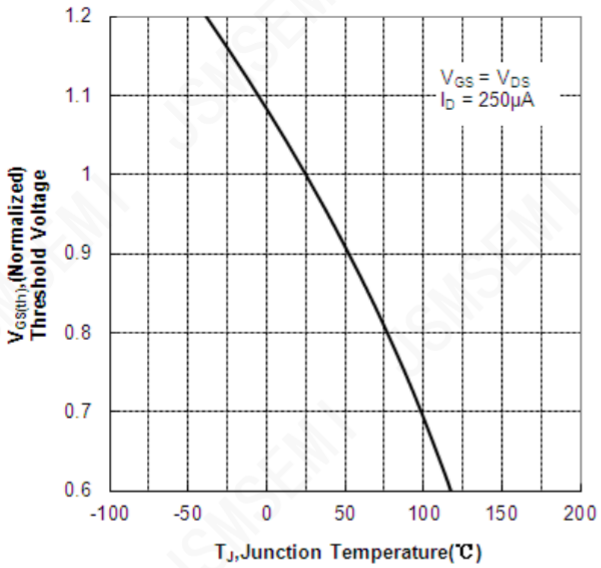



Figure 10 Typical Theshold Voltage vs Junction Temperature

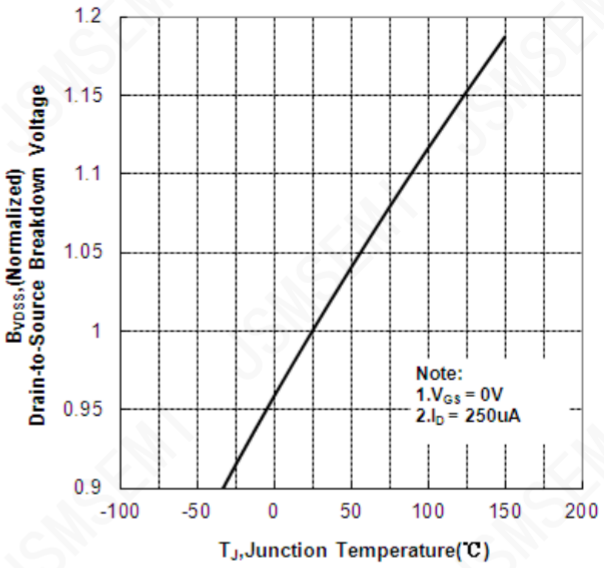



Figure 11 Typical Breakdown Voltage vs Junction Temperature

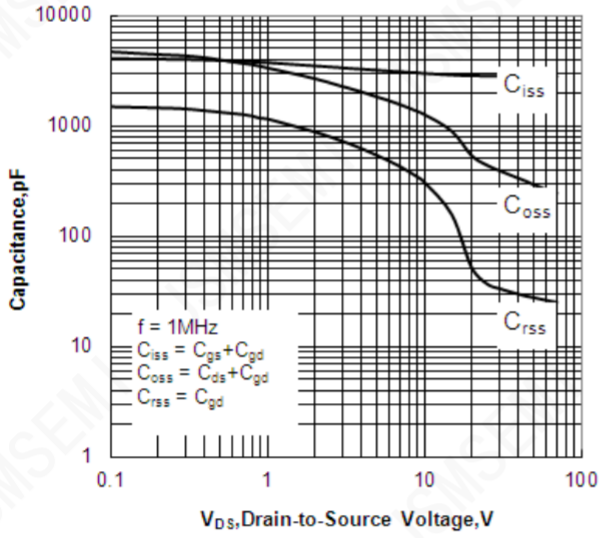



Figure 12 Typical Capacitance vs Drain to Source Voltage

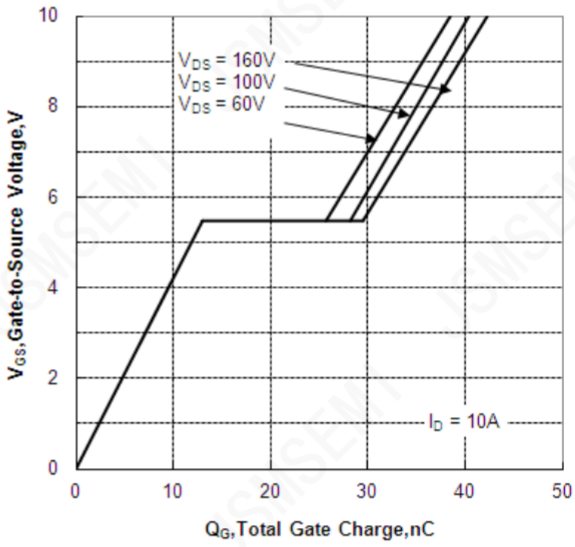



Figure 13 Typical Gate Charge vs Gate to Source Voltage

**Figure A：Gate Charge Test Circuit and Waveform**

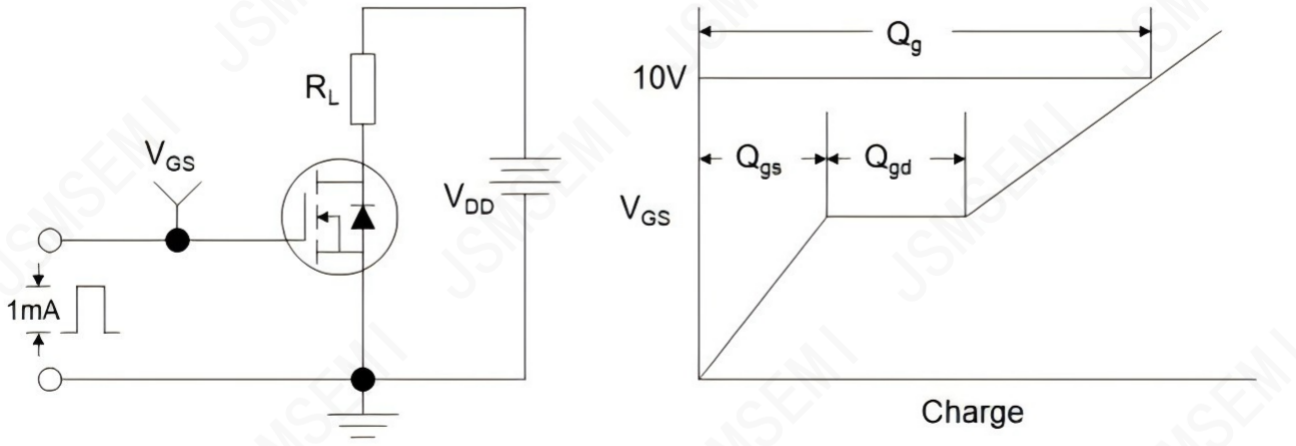



**Figure B：Resistive Switching Test Circuit and Waveform**

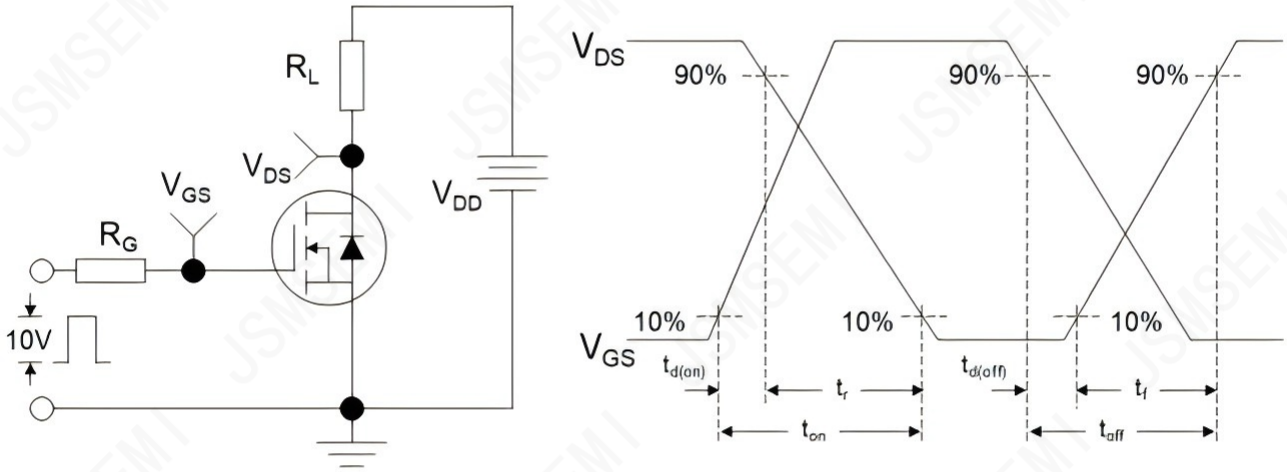
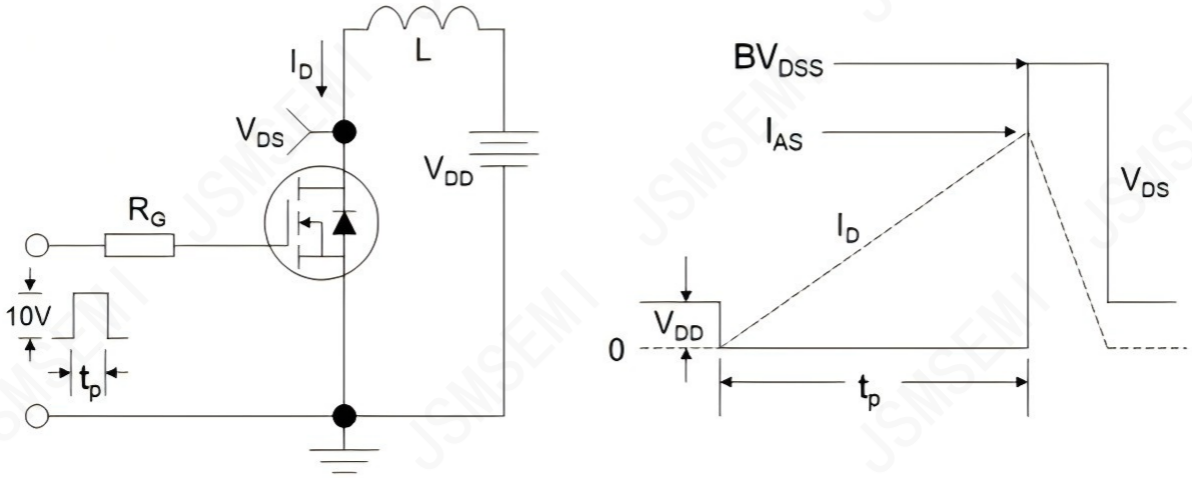
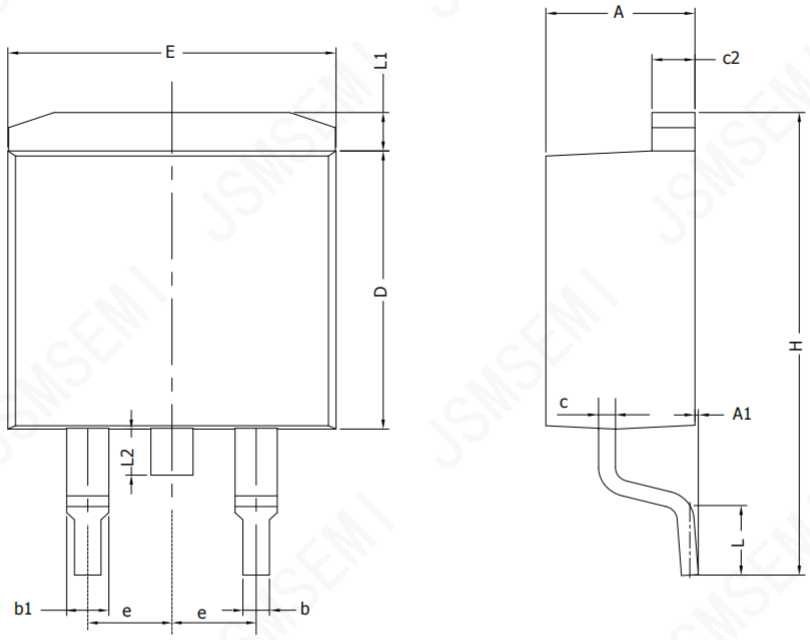



**Figure C：Unclamped Inductive Switching Test Circuit and Waveform**



## 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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