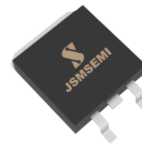


## FEATURES

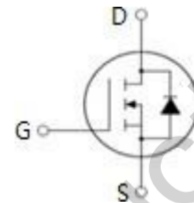
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability

## APPLICATIONS

- Switch Mode Power Supply (SMPS)
- Uninterruptible Power Supply (UPS)
- Power Factor Correction (PFC)



TO-263



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

| Parameter                                        | Symbol         | Value    | Unit             |
|--------------------------------------------------|----------------|----------|------------------|
|                                                  |                | TO-263   |                  |
| Drain-Source Voltage ( $V_{GS} = 0V$ )           | $V_{DSS}$      | 100      | V                |
| Continuous Drain Current                         | $I_D$          | 30       | A                |
| Pulsed Drain Current (note1)                     | $I_{DM}$       | 120      | A                |
| Gate-Source Voltage                              | $V_{GSS}$      | $\pm 20$ | V                |
| Single Pulse Avalanche Energy (note2)            | $E_{AS}$       | 335      | mJ               |
| Single Pulse Avalanche Current (note1)           | $I_{AS}$       | 22       | A                |
| Repetitive Avalanche Energy (note1)              | $E_{AR}$       | 201      | mJ               |
| Power Dissipation ( $T_C = 25^\circ\text{C}$ )   | $P_D$          | 110      | W                |
| Operating Junction and Storage Temperature Range | $T_J, T_{stg}$ | -55~+150 | $^\circ\text{C}$ |

### Thermal Resistance

| Parameter                               | Symbol     | Value  | Unit |
|-----------------------------------------|------------|--------|------|
|                                         |            | TO-263 |      |
| Thermal Resistance, Junction-to-Case    | $R_{thJC}$ | 1.14   | K/W  |
| Thermal Resistance, Junction-to-Ambient | $R_{thJA}$ | 60     |      |

**Specifications**  $T_J = 25^\circ\text{C}$ , unless otherwise noted

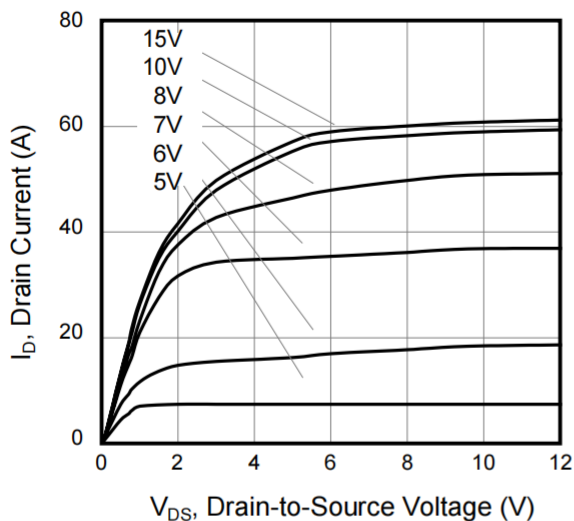
| Parameter                               | Symbol        | Test Conditions                                     | Value |      |           | Unit       |
|-----------------------------------------|---------------|-----------------------------------------------------|-------|------|-----------|------------|
|                                         |               |                                                     | Min.  | Typ. | Max.      |            |
| Static                                  |               |                                                     |       |      |           |            |
| Drain-Source Breakdown Voltage          | $V_{(BR)DSS}$ | $V_{GS} = 0V, I_D = 250\mu A$                       | 100   | --   | --        | V          |
| Zero Gate Voltage Drain Current         | $I_{DSS}$     | $V_{DS} = 100V, V_{GS} = 0V, T_J = 25^{\circ}C$     | --    | --   | 1         | $\mu A$    |
|                                         |               | $V_{DS} = 80V, V_{GS} = 0V, T_J = 125^{\circ}C$     | --    | --   | 100       |            |
| Gate-Source Leakage                     | $I_{GSS}$     | $V_{GS} = \pm 20V$                                  | --    | --   | $\pm 100$ | nA         |
| Gate-Source Threshold Voltage           | $V_{GS(th)}$  | $V_{DS} = V_{GS}, I_D = 250\mu A$                   | 2.0   | --   | 4.0       | V          |
| Drain-Source On-Resistance (Note3)      | $R_{DS(on)}$  | $V_{GS} = 10V, I_D = 15A$                           | --    | 30   | 38        | m $\Omega$ |
| Dynamic                                 |               |                                                     |       |      |           |            |
| Input Capacitance                       | $C_{iss}$     | $V_{GS} = 0V,$<br>$V_{DS} = 25V,$<br>$f = 1.0MHz$   | --    | 1331 | --        | pF         |
| Output Capacitance                      | $C_{oss}$     |                                                     | --    | 276  | --        |            |
| Reverse Transfer Capacitance            | $C_{rss}$     |                                                     | --    | 88   | --        |            |
| Total Gate Charge                       | $Q_g$         | $V_{DD} 80V, I_D = 30A,$<br>$V_{GS} = 10V$          | --    | 53   | --        | nC         |
| Gate-Source Charge                      | $Q_{gs}$      |                                                     | --    | 6    | --        |            |
| Gate-Drain Charge                       | $Q_{gd}$      |                                                     | --    | 29   | --        |            |
| Turn-on Delay Time                      | $t_{d(on)}$   | $V_{DD} = 50V, I_D = 10A,$<br>$R_G = 25 \Omega$     | --    | 39   | --        | ns         |
| Turn-on Rise Time                       | $t_r$         |                                                     | --    | 45   | --        |            |
| Turn-off Delay Time                     | $t_{d(off)}$  |                                                     | --    | 207  | --        |            |
| Turn-off Fall Time                      | $t_f$         |                                                     | --    | 64   | --        |            |
| Drain-Source Body Diode Characteristics |               |                                                     |       |      |           |            |
| Continuous Body Diode Current           | $I_S$         | $T_C = 25^{\circ}C$                                 | --    | --   | 30        | A          |
| Pulsed Diode Forward Current            | $I_{SM}$      |                                                     | --    | --   | 120       |            |
| Body Diode Voltage                      | $V_{SD}$      | $T_J = 25^{\circ}C, I_{SD} = 15A, V_{GS} = 0V$      | --    | --   | 2         | V          |
| Reverse Recovery Time                   | $t_{rr}$      | $V_{GS} = 0V, I_S = 10A,$<br>$di_F/dt = 100A/\mu s$ | --    | 102  | --        | ns         |
| Reverse Recovery Charge                 | $Q_{rr}$      |                                                     | --    | 0.46 | --        | $\mu C$    |

**Notes**

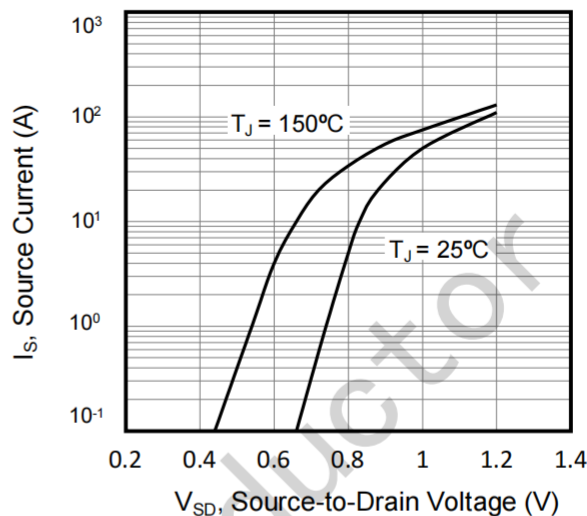
1. Repetitive Rating: Pulse width limited by maximum junction temperature
2.  $L=1mH, V_{DD} = 50V, R_G = 25\Omega$ , Starting  $T_J = 25^\circ\text{C}$
3. Pulse Test: Pulse width  $\leq 300\mu s$ , Duty Cycle  $\leq 1\%$

**Typical Characteristics**  $T_J = 25^\circ\text{C}$ , unless otherwise noted

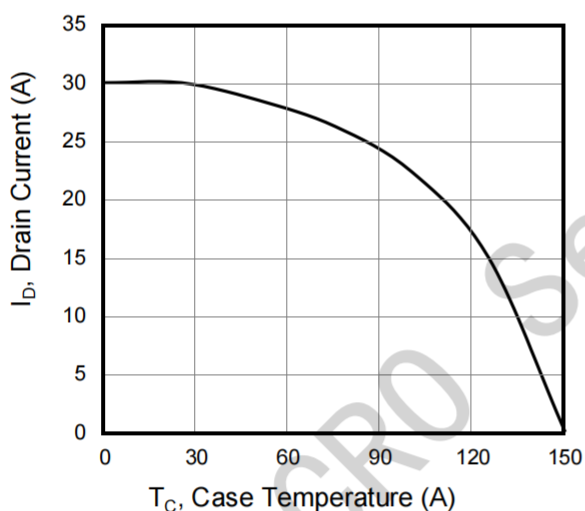
**Figure 1. Output Characteristics ( $T_J = 25^\circ\text{C}$ )**



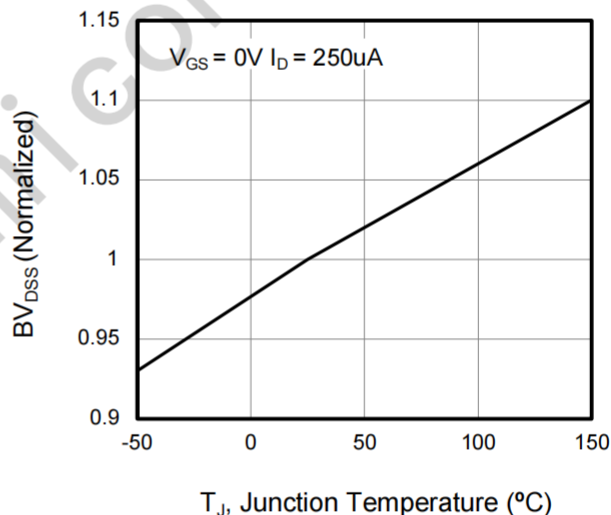
**Figure 2. Body Diode Forward Voltage**



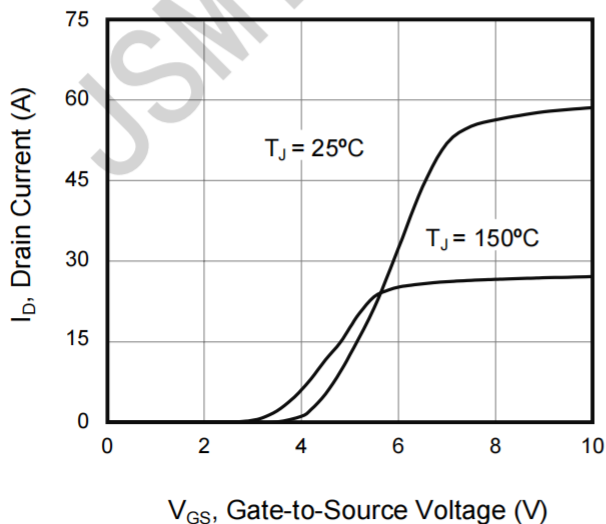
**Figure 3. Drain Current vs. Temperature**



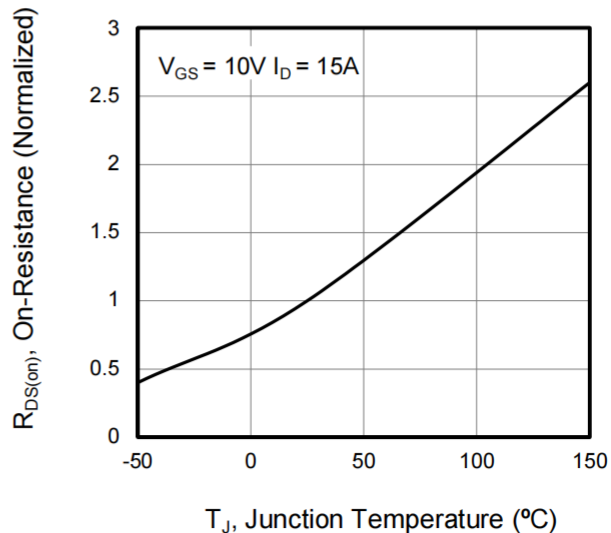
**Figure 4.  $BV_{DSS}$  Variation vs. Temperature**



**Figure 5. Transfer Characteristics**

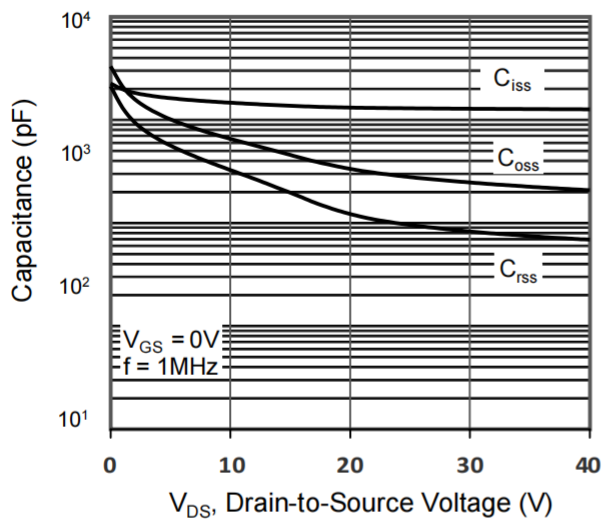


**Figure 6. On-Resistance vs. Temperature**

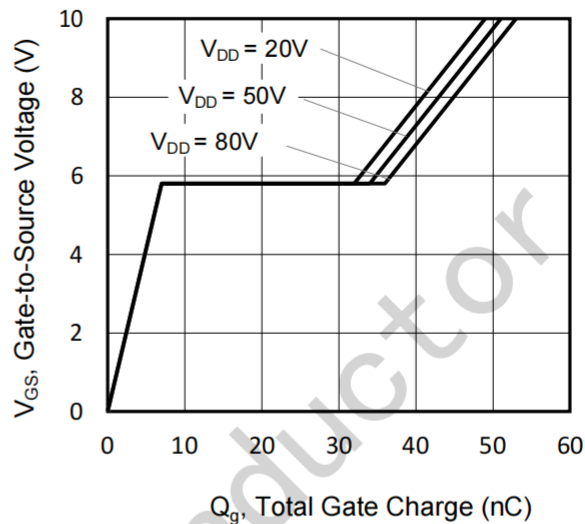


**Typical Characteristics**  $T_J = 25^\circ\text{C}$ , unless otherwise noted

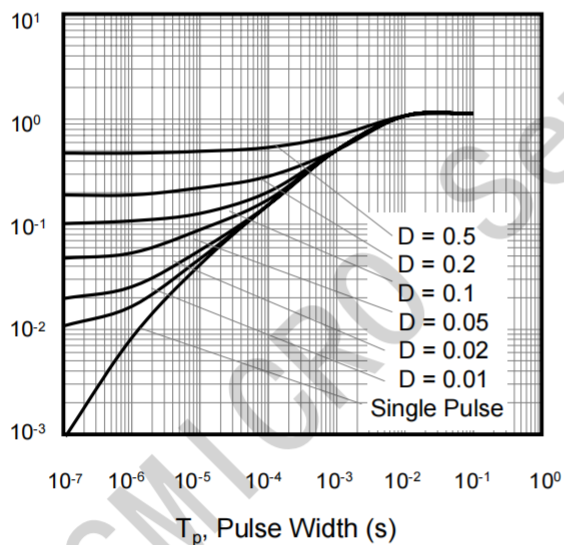
**Figure 7. Capacitance**

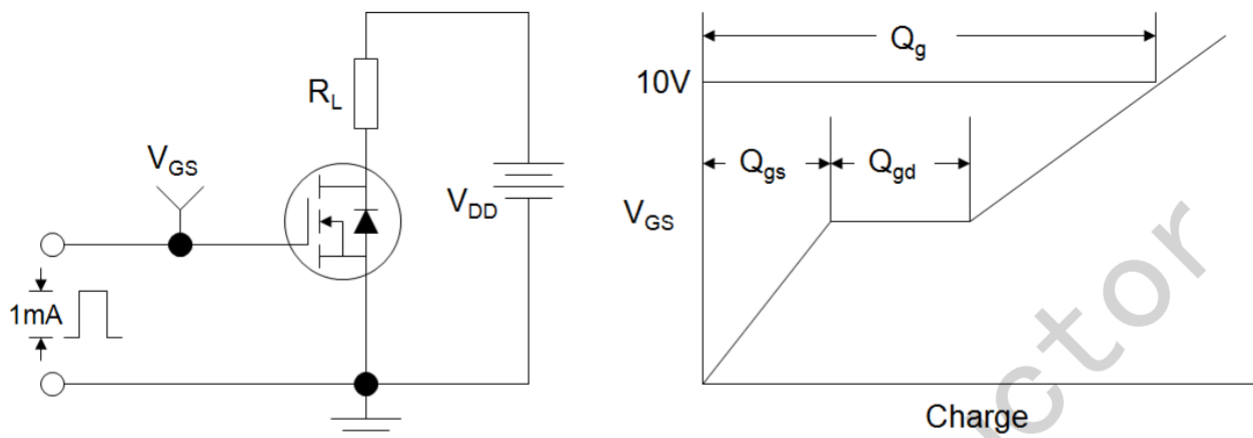
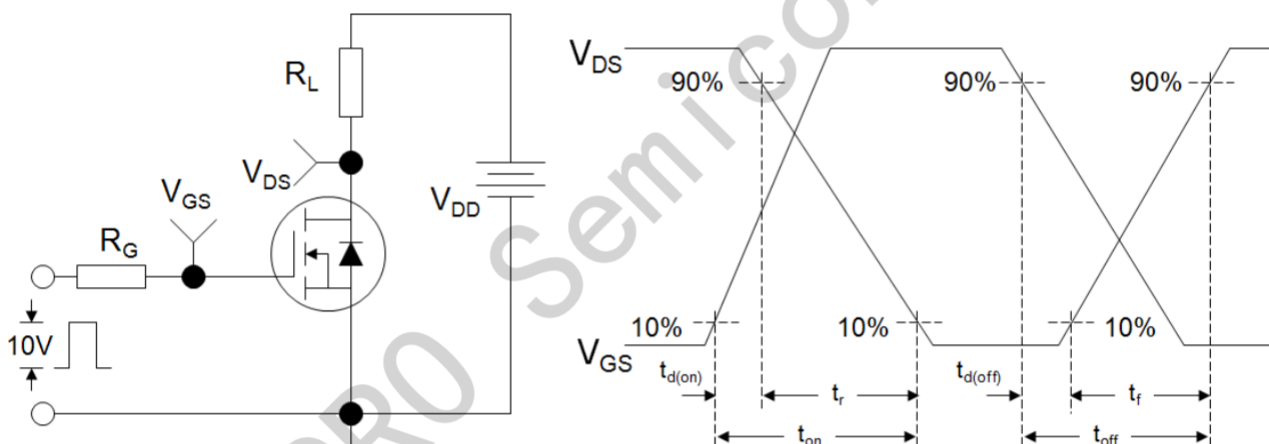
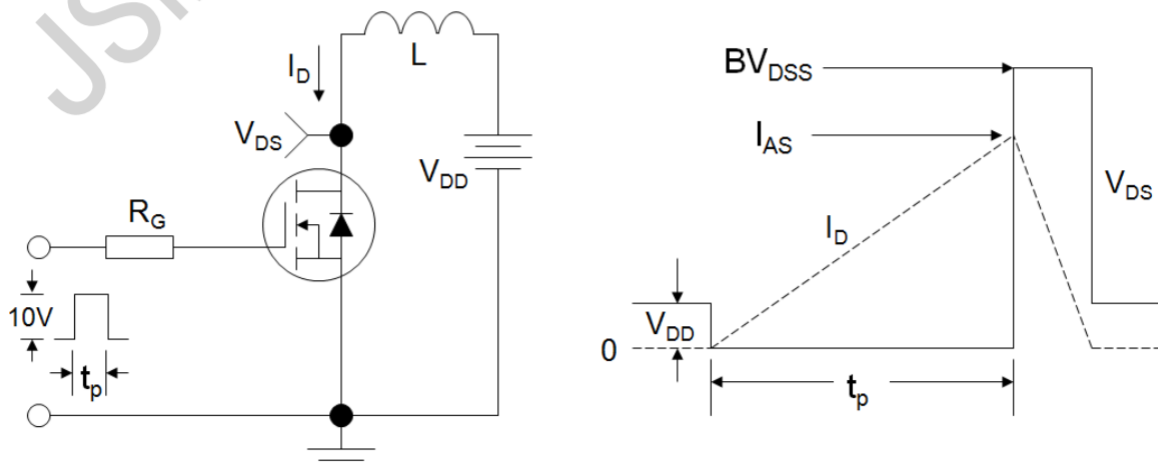


**Figure 8. Gate Charge**



**Figure 10. Transient Thermal Impedance**  
**TO-220, TO-263, TO-252**



**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

Unit: mm

