

# N-Channel Enhancement Mode MOSFET

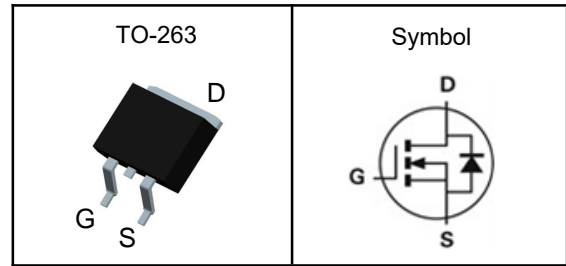
## Features

- Fast switching speed
- Reliable and Rugged
- ROHS Compliant
- 100% UIS and Rg Tested

## Applications

- Power Management in Desktop Computer
- DC/DC Converters

## Pin Description



|                  |     |            |
|------------------|-----|------------|
| $V_{DSS}$        | 100 | V          |
| $R_{DS(ON)-Typ}$ | 3.5 | m $\Omega$ |
| $I_D$            | 150 | A          |

## Absolute Maximum Ratings ( $T_J=25^\circ\text{C}$ , Unless Otherwise Noted)

| Symbol       | Parameter                                    | N-Channel              | Unit             |
|--------------|--|------------------------|------------------|
| $V_{DSS}$    | Drain-Source Voltage                         | 100                    | V                |
| $V_{GSS}$    | Gate-Source Voltage                          | $\pm 20$               | V                |
| $T_J$        | Maximum Junction Temperature                 | -55 to 150             | $^\circ\text{C}$ |
| $T_{STG}$    | Storage Temperature Range                    | -55 to 150             | $^\circ\text{C}$ |
| $E_{AS}$     | Single Pulse Avalanche Energy <sup>③</sup>   | 756                    | mJ               |
| $I_{DM}^{①}$ | 300 $\mu\text{s}$ Pulse Drain Current Tested | 550                    | A                |
| $I_D$        | Continuous Drain Current                     | $T_c=25^\circ\text{C}$ | A                |
| $P_D$        | Maximum Power Dissipation                    | $T_c=25^\circ\text{C}$ | W                |

## Thermal Characteristics

| Symbol          | Parameter  | Rating | Unit                      |
|-----------------|--|--------|---------------------------|
| $R_{\theta JA}$ | Thermal Resistance Junction-Ambient <sub>1</sub> (Max) | 55     | $^\circ\text{C}/\text{W}$ |
| $R_{\theta JC}$ | Thermal Resistance Junction-Case <sub>1</sub>          | 0.8    | $^\circ\text{C}/\text{W}$ |

Note ① : Max. current is limited by bonding wire.

Note ② : UIS tested and pulse width are limited by maximum junction temperature 150 $^\circ\text{C}$ .

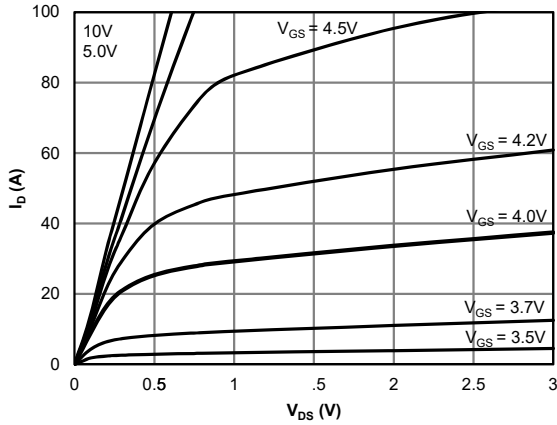
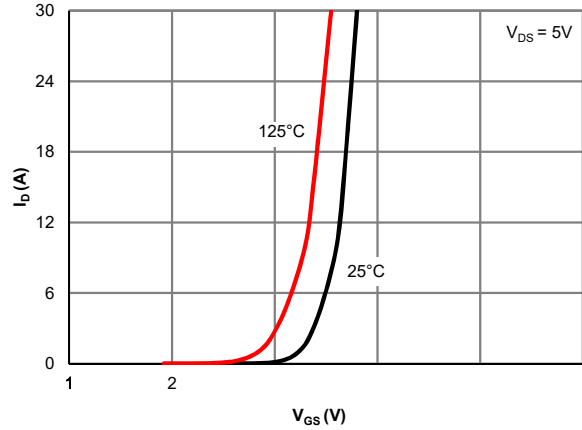
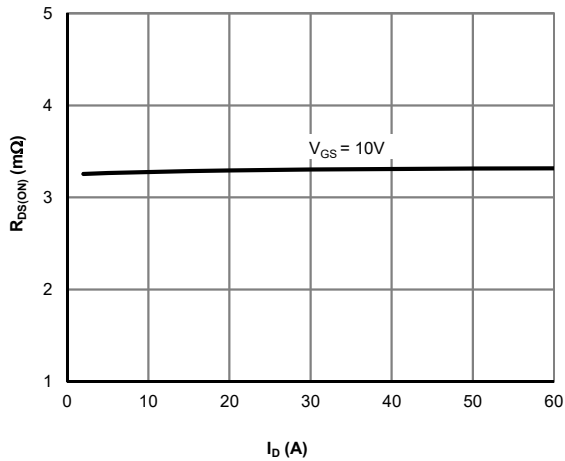
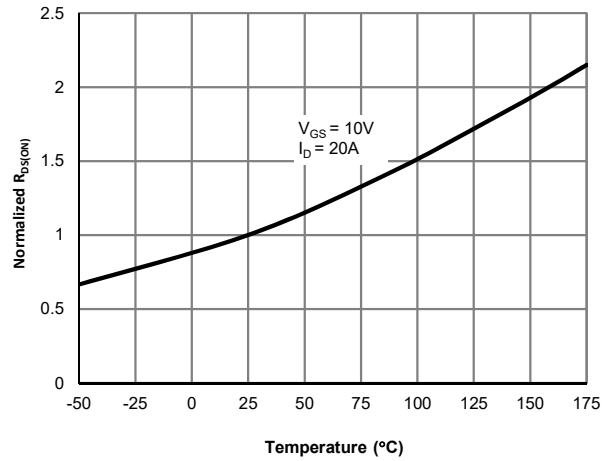
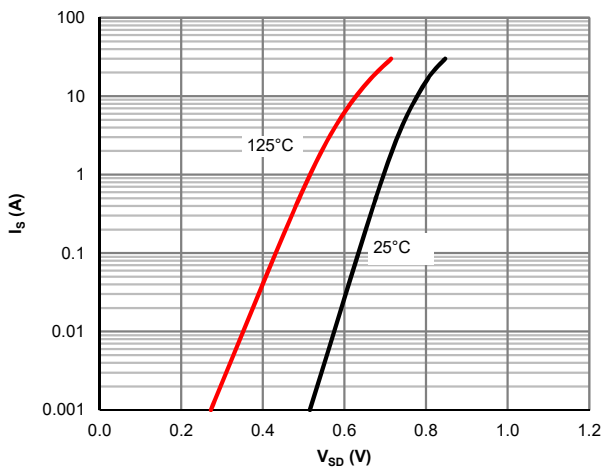
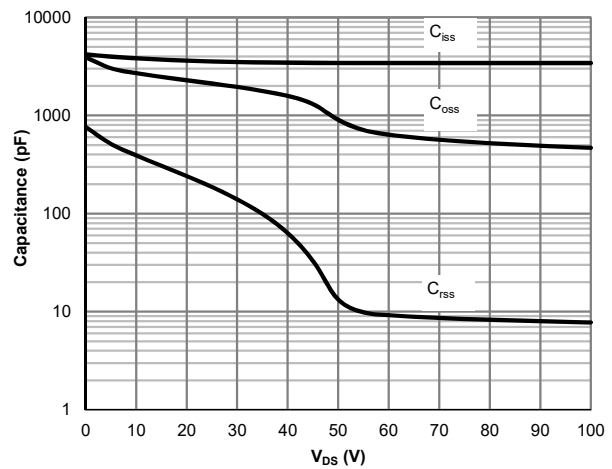
Note ③ : Surface Mounted on 1in<sup>2</sup> FR-4 board with 1oz.

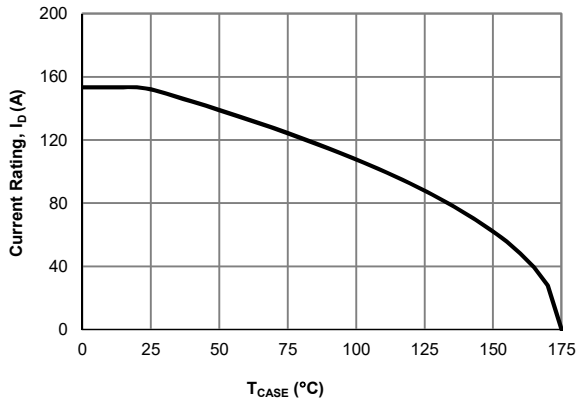
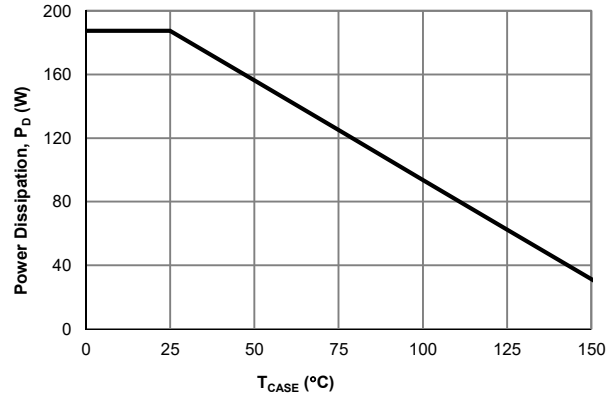
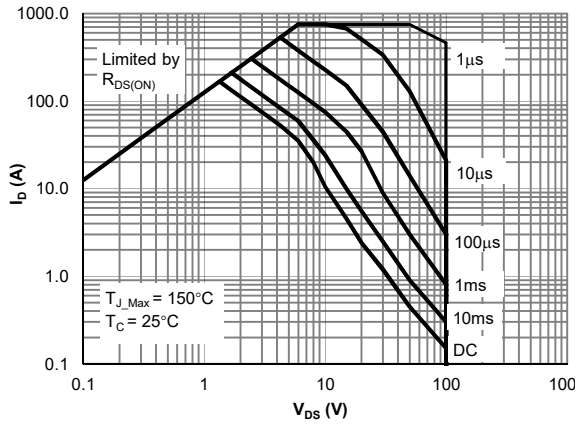
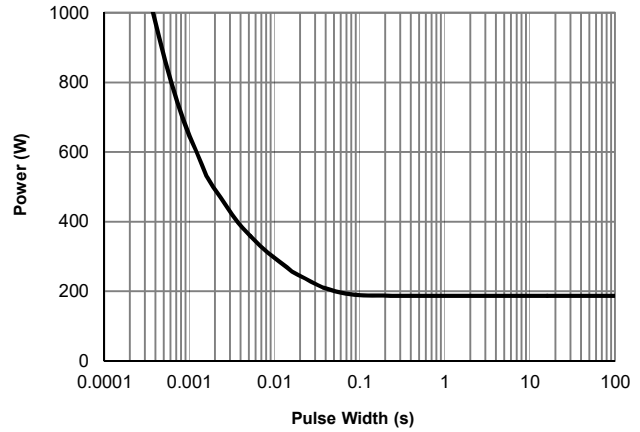
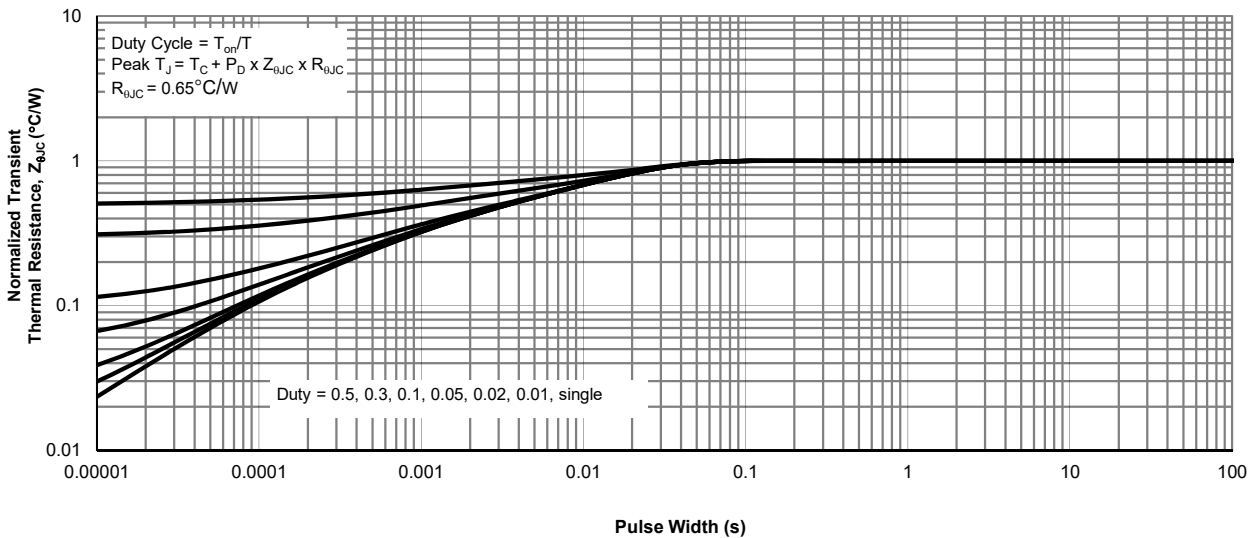
**N-Channel Enhancement Mode MOSFET****Electrical Characteristics** ( $T_J=25^\circ\text{C}$ , Unless Otherwise Noted)

| Symbol   | Parameter                          | Test Conditions                                    | Min | Typ  | Max       | Unit      |
|--|------------------------------------|--|-----|------|-----------|-----------|
| <b>Static Electrical Characteristics</b>                       |                                    |  |     |      |           |           |
| $BV_{DSS}$   | Drain-Source Breakdown Voltage     | $V_{GS}=0V, I_D=250mA$                             | 100 | ---  | ---       | V         |
| $I_{DSS}$  | Zero Gate Voltage Drain Current    | $V_{DS}=100V, V_{GS}=0V$                           | --- | ---  | 1         | $\mu A$   |
| $V_{GS(th)}$   | Gate Threshold Voltage             | $V_{DS}=V_{GS}, I_D=250\mu A$                      | 2.0 | ---  | 4.0       | V         |
| $I_{GSS}$  | Gate Leakage Current               | $V_{GS}=\pm 20V, V_{DS}=0V$                        | --- | ---  | $\pm 100$ | nA        |
| $R_{DS(on)}$   | Drain-Source On-state Resistance   | $V_{GS}=10V, I_D=20A$                              | --- | 3.5  | 4.2       | $m\Omega$ |
| <b>Dynamic Characteristics</b> <sup>⑤</sup>                    |                                    |  |     |      |           |           |
| $C_{iss}$  | Input Capacitance                  | $V_{GS}=0V,$<br>$V_{DS}=50V,$<br>Freq.=1MHz        | --- | 3430 | ---       | pF        |
| $C_{oss}$  | Output Capacitance                 |  | --- | 900  | ---       |           |
| $C_{rss}$  | Reverse Transfer Capacitance       |  | --- | 13   | ---       |           |
| $T_{d(on)}$  | Turn-on Delay Time                 | $V_{DD}=50V, V_{GS}=10V,$<br>$R_G=6\Omega, I_D=1A$ | --- | 14   | ---       | nS        |
| $T_r$  | Turn-on Rise Time                  |  | --- | 34   | ---       |           |
| $T_{d(off)}$   | Turn-off Delay Time                |  | --- | 60   | ---       |           |
| $T_f$  | Turn-off Fall Time                 |  | --- | 50   | ---       |           |
| $Q_g$  | Total Gate Charge                  | $V_{DS}=40V, V_{GS}=10V,$<br>$I_D=10A$             | --- | 57   | ---       | nC        |
| $Q_{gs}$   | Gate-Source Charge                 |  | --- | 11   | ---       |           |
| $Q_{gd}$   | Gate-Drain Charge                  |  | --- | 16   | ---       |           |
| <b>Source-Drain Characteristics</b> ( $T_J=25^\circ\text{C}$ ) |                                    |  |     |      |           |           |
| $V_{SD}$   | Diode Forward Voltage <sub>z</sub> | $V_{GS}=0V, I_S=1A, T_J=25^\circ\text{C}$          | --- | ---  | 1.2       | V         |

Note ④ : Pulse test (pulse width $\leq 300\mu s$ , duty cycle $\leq 2\%$ ).

Note ⑤ : Guaranteed by design, not subject to production testing.

**N-Channel Enhancement Mode MOSFET**
**Typical Characteristics**

**Figure 1: Saturation Characteristics**

**Figure 2: Transfer Characteristics**

**Figure 3:  $R_{DS(ON)}$  vs. Drain Current**

**Figure 4:  $R_{DS(ON)}$  vs. Junction Temperature**

**Figure 5: Body-Diode Characteristics**

**Figure 6: Capacitance Characteristics**

**N-Channel Enhancement Mode MOSFET**

**Figure 7: Current De-rating**

**Figure 8: Power De-rating**

**Figure 9: Maximum Safe Operating Area**

**Figure 10: Single Pulse Power Rating, Junction-to-Case**

**Figure 11: Normalized Maximum Transient Thermal Impedance**

**N-Channel Enhancement Mode MOSFET**
**TO-263 Package Outline Data**
