

## N-Channel 60-V (D-S) MOSFET

### Key Features:

- Low  $r_{DS(on)}$  trench technology
- Low thermal impedance
- Fast switching speed

### Typical Applications:

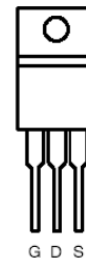
- PoE Power Sourcing Equipment
- PoE Powered Devices
- Telecom DC/DC converters
- White LED boost converters

| PRODUCT SUMMARY |                            |                 |
|-----------------|----------------------------|-----------------|
| $V_{DS}$ (V)    | $r_{DS(on)}$ (m $\Omega$ ) | $I_D$ (A)       |
| 60              | 9.9 @ $V_{GS} = 10V$       | 90 <sup>a</sup> |
|                 | 13 @ $V_{GS} = 4.5V$       |                 |

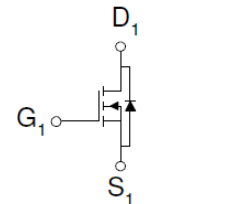


RoHS  
COMPLIANT  
HALOGEN  
FREE

TO-220AB



Top View



N-Channel MOSFET

### ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)

| Parameter   | Symbol   | Limit          | Units |
|---|----------|----------------|-------|
| Drain-Source Voltage                                      | $V_{DS}$ | 60             | V     |
| Gate-Source Voltage                                       | $V_{GS}$ | $\pm 20$       |       |
| Continuous Drain Current <sup>a</sup>                     | $I_D$    | 90             | A     |
| Pulsed Drain Current <sup>b</sup>                         |          | $I_{DM}$       |       |
| Continuous Source Current (Diode Conduction) <sup>a</sup> | $I_S$    | 90             | A     |
| Power Dissipation <sup>a</sup>                            | $P_D$    | 120            | W     |
| Operating Junction and Storage Temperature Range          |          | $T_J, T_{stg}$ |       |

### THERMAL RESISTANCE RATINGS

| Parameter                                | Symbol          | Maximum | Units              |
|--|-----------------|---------|--------------------|
| Maximum Junction-to-Ambient <sup>a</sup> | $R_{\theta JA}$ | 62.5    | $^\circ\text{C/W}$ |
| Maximum Junction-to-Case                 | $R_{\theta JC}$ | 1.25    |                    |

### Notes

- Package limited
- Pulse width limited by maximum junction temperature

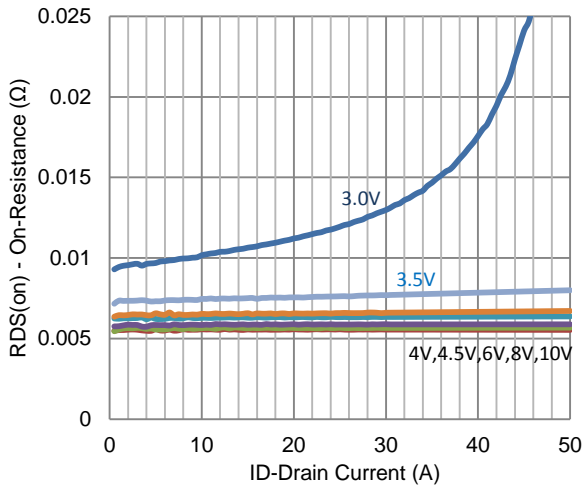
| Parameter                       | Symbol       | Test Conditions   | Min | Typ  | Max       | Unit       |
|---------------------------------|--------------|---|-----|------|-----------|------------|
| <b>Static</b>                   |              |   |     |      |           |            |
| Gate-Source Threshold Voltage   | $V_{GS(th)}$ | $V_{DS} = V_{GS}, I_D = 250 \mu A$  | 1   |      | 3.5       | V          |
| Gate-Body Leakage               | $I_{GSS}$    | $V_{DS} = 0 V, V_{GS} = 20 V$   |     |      | $\pm 100$ | nA         |
| Zero Gate Voltage Drain Current | $I_{DSS}$    | $V_{DS} = 48 V, V_{GS} = 0 V$   |     |      | 1         | uA         |
|                                 |              | $V_{DS} = 48 V, V_{GS} = 0 V, T_J = 55^\circ C$                                   |     |      | 25        |            |
| On-State Drain Current          | $I_{D(on)}$  | $V_{DS} = 5 V, V_{GS} = 10 V$   | 120 |      |           | A          |
| Drain-Source On-Resistance      | $r_{DS(on)}$ | $V_{GS} = 10 V, I_D = 30 A$   |     |      | 9.9       | m $\Omega$ |
|                                 |              | $V_{GS} = 4.5 V, I_D = 20 A$  |     |      | 13        |            |
| Forward Transconductance        | $g_{fs}$     | $V_{DS} = 15 V, I_D = 20 A$   |     | 30   |           | S          |
| Diode Forward Voltage           | $V_{SD}$     | $I_S = 20 A, V_{GS} = 0 V$  |     | 0.8  |           | V          |
| <b>Dynamic</b>                  |              |   |     |      |           |            |
| Total Gate Charge               | $Q_g$        | $V_{DS} = 30 V, V_{GS} = 4.5 V, I_D = 20 A$                                       |     | 77   |           | nC         |
| Gate-Source Charge              | $Q_{gs}$     |   |     | 21   |           |            |
| Gate-Drain Charge               | $Q_{gd}$     |   |     | 40   |           |            |
| Turn-On Delay Time              | $t_{d(on)}$  | $V_{DD} = 30 V, R_L = 1.5 \Omega, I_D = 20 A, V_{GEN} = 10 V, R_{GEN} = 6 \Omega$ |     | 23   |           | ns         |
| Rise Time                       | $t_r$        |   |     | 80   |           |            |
| Turn-Off Delay Time             | $t_{d(off)}$ |   |     | 226  |           |            |
| Fall-Time                       | $t_f$        |   |     | 99   |           |            |
| Input Capacitance               | $C_{iss}$    | $V_{DS} = 15 V, V_{GS} = 0 V, f = 1 MHz$  |     | 5887 |           | pF         |
| Output Capacitance              | $C_{oss}$    |   |     | 567  |           |            |
| Reverse Transfer Capacitance    | $C_{rss}$    |   |     | 352  |           |            |

## Notes

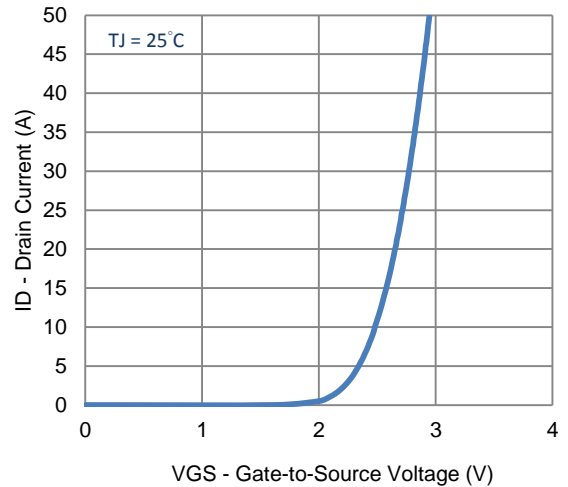
- Pulse test:  $PW \leq 300 \mu s$  duty cycle  $\leq 2\%$ .
- Guaranteed by design, not subject to production testing.

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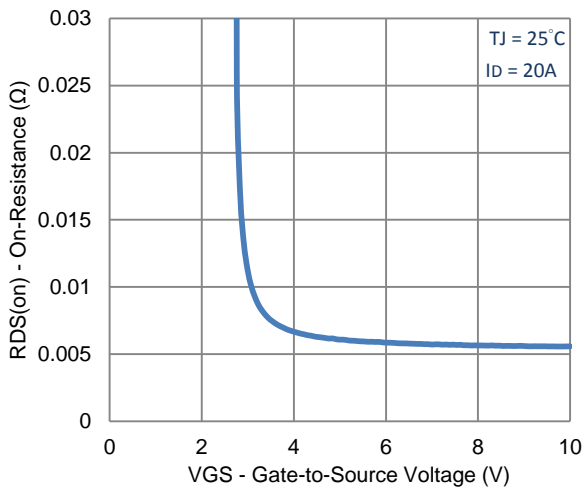
Typical Electrical Characteristics



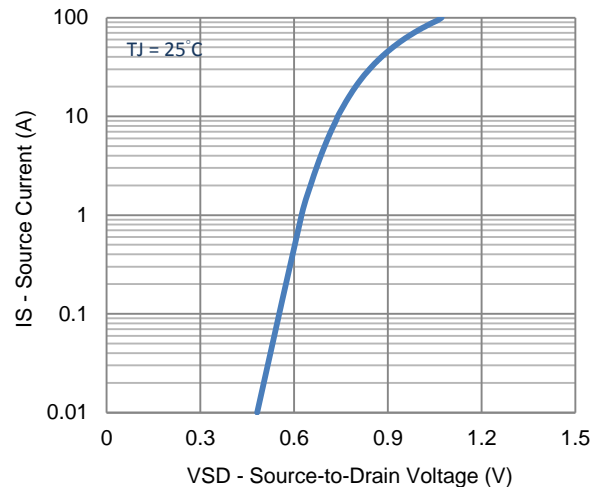
1. On-Resistance vs. Drain Current



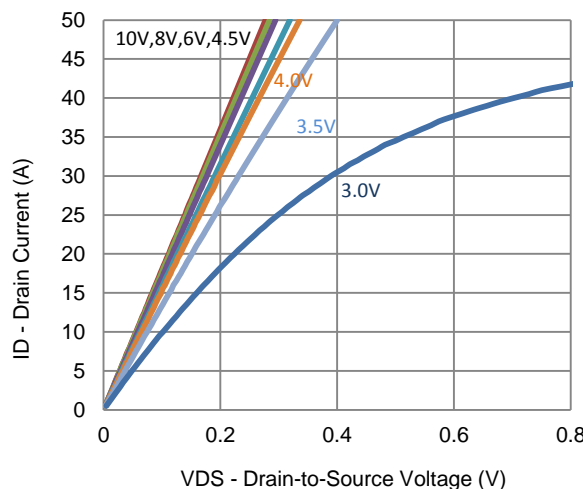
2. Transfer Characteristics



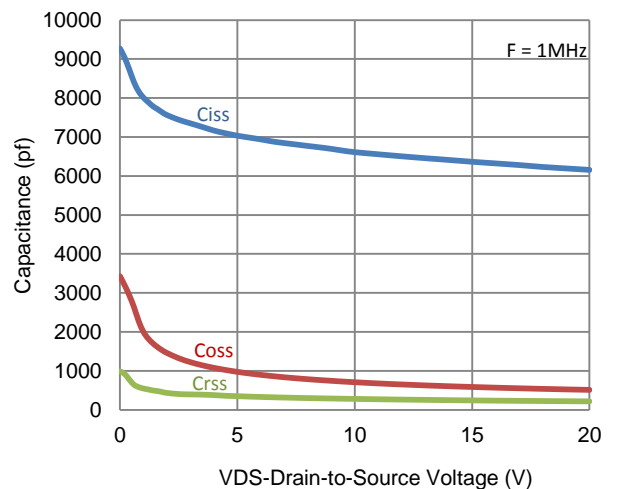
3. On-Resistance vs. Gate-to-Source Voltage



4. Drain-to-Source Forward Voltage

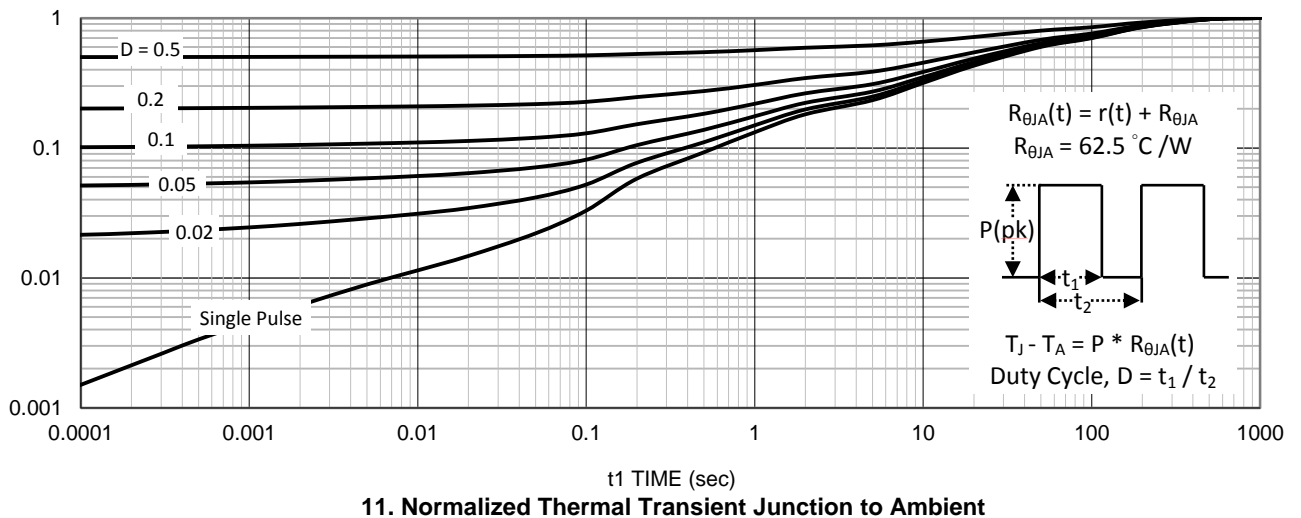
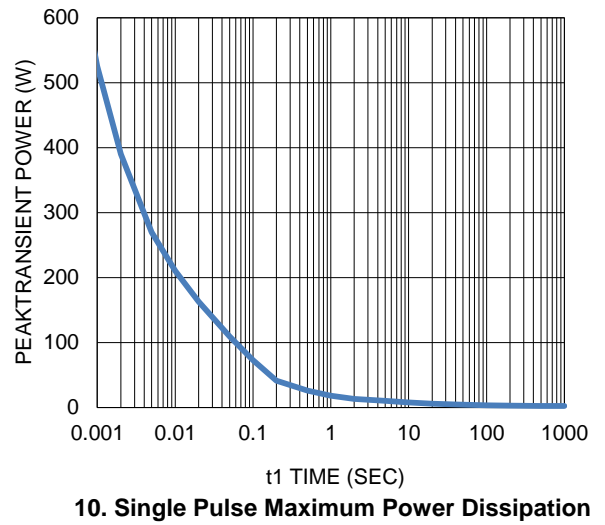
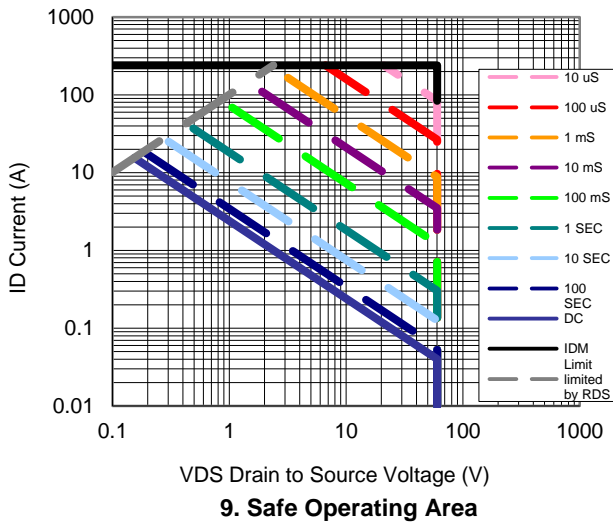
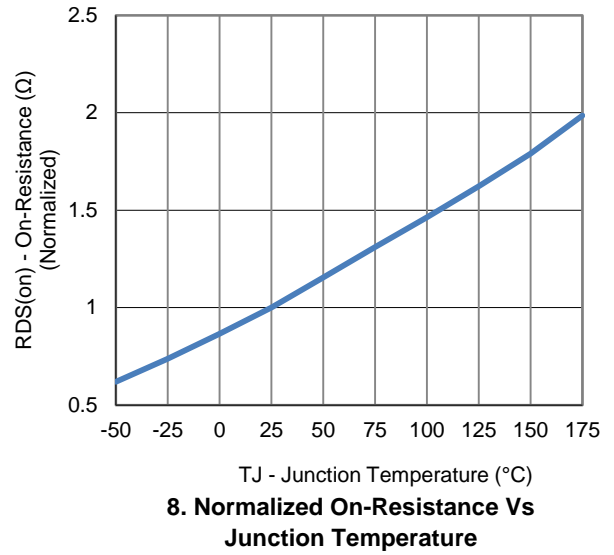
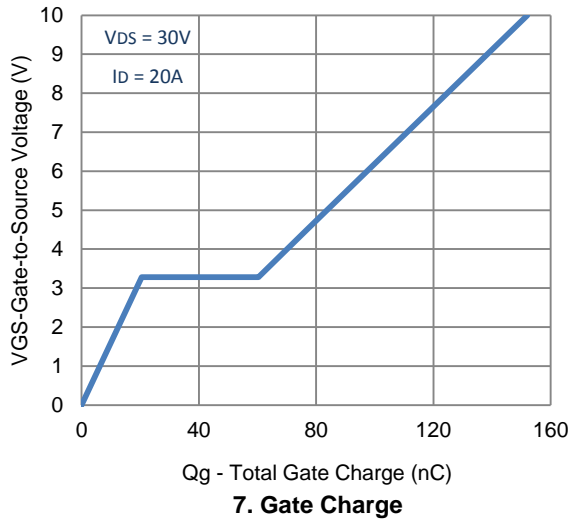


5. Output Characteristics



6. Capacitance

Typical Electrical Characteristics



Package Information

