

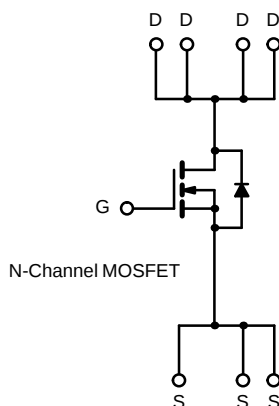
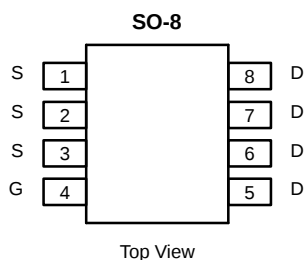


## N-Channel Reduced $Q_g$ , Fast Switching MOSFET

### PRODUCT SUMMARY

| $V_{DS}$ (V) | $r_{DS(on)}$ ( $\Omega$ ) | $I_D$ (A) |
|--------------|---------------------------|-----------|
| 30           | 0.012 @ $V_{GS} = 10$ V   | $\pm 11$  |
|              | 0.020 @ $V_{GS} = 4.5$ V  | $\pm 9$   |

**TrenchFET<sup>®</sup>**  
Power MOSFETs  
**High-Efficiency**  
PWM Optimized



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

| Parameter                                                              |                          | Symbol         | Limit      | Unit             |
|------------------------------------------------------------------------|--------------------------|----------------|------------|------------------|
| Drain-Source Voltage                                                   |                          | $V_{DS}$       | 30         | V                |
| Gate-Source Voltage                                                    |                          | $V_{GS}$       | $\pm 25$   |                  |
| Continuous Drain Current ( $T_J = 150^\circ\text{C}$ ) <sup>a, b</sup> | $T_A = 25^\circ\text{C}$ | $I_D$          | $\pm 11$   | A                |
|                                                                        | $T_A = 70^\circ\text{C}$ |                | $\pm 9$    |                  |
| Pulsed Drain Current (10 $\mu\text{s}$ Pulse Width)                    |                          | $I_{DM}$       | $\pm 50$   |                  |
| Continuous Source Current (Diode Conduction) <sup>a, b</sup>           |                          | $I_S$          | 2.3        |                  |
| Maximum Power Dissipation <sup>a, b</sup>                              | $T_A = 25^\circ\text{C}$ | $P_D$          | 2.5        | W                |
|                                                                        | $T_A = 70^\circ\text{C}$ |                | 1.6        |                  |
| Operating Junction and Storage Temperature Range                       |                          | $T_J, T_{stg}$ | -55 to 150 | $^\circ\text{C}$ |

### THERMAL RESISTANCE RATINGS

| Parameter                                         |                 | Symbol     | Typical | Maximum | Unit               |
|---------------------------------------------------|-----------------|------------|---------|---------|--------------------|
| Maximum Junction-to-Ambient (MOSFET) <sup>a</sup> | $t \leq 10$ sec | $R_{thJA}$ |         | 50      | $^\circ\text{C/W}$ |
|                                                   | Steady State    |            | 70      |         |                    |

#### Notes

- a. Surface Mounted on FR4 Board.  
b.  $t \leq 10$  sec.

| <b>MOSFET SPECIFICATIONS (T<sub>J</sub> = 25°C UNLESS OTHERWISE NOTED)</b> |                     |                                                                                                                      |     |        |       |      |
|----------------------------------------------------------------------------|---------------------|----------------------------------------------------------------------------------------------------------------------|-----|--------|-------|------|
| Parameter                                                                  | Symbol              | Test Condition                                                                                                       | Min | Typ    | Max   | Unit |
| <b>Static</b>                                                              |                     |                                                                                                                      |     |        |       |      |
| Gate Threshold Voltage                                                     | V <sub>GS(th)</sub> | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250 μA                                                          | 0.8 |        |       | V    |
| Gate-Body Leakage                                                          | I <sub>GSS</sub>    | V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ±20 V                                                                       |     |        | ±100  | nA   |
| Zero Gate Voltage Drain Current                                            | I <sub>DSS</sub>    | V <sub>DS</sub> = 24 V, V <sub>GS</sub> = 0 V                                                                        |     |        | 1     | μA   |
|                                                                            |                     | V <sub>DS</sub> = 24 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 55°C                                                 |     |        | 5     |      |
| On-State Drain Current <sup>a</sup>                                        | I <sub>D(on)</sub>  | V <sub>DS</sub> ≥ 5 V, V <sub>GS</sub> = 10 V                                                                        | 40  |        |       | A    |
| Drain-Source On-State Resistance <sup>a</sup>                              | r <sub>DS(on)</sub> | V <sub>GS</sub> = 10 V, I <sub>D</sub> = 11 A                                                                        |     | 0.0098 | 0.012 | Ω    |
|                                                                            |                     | V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 9 A                                                                        |     | 0.0164 | 0.020 |      |
| Forward Transconductance <sup>a</sup>                                      | g <sub>fs</sub>     | V <sub>DS</sub> = 15 V, I <sub>D</sub> = 11 A                                                                        |     | 21     |       | S    |
| Diode Forward Voltage <sup>a</sup>                                         | V <sub>SD</sub>     | I <sub>S</sub> = 2.3 A, V <sub>GS</sub> = 0 V                                                                        |     | 0.71   | 1.1   | V    |
| <b>Dynamic<sup>b</sup></b>                                                 |                     |                                                                                                                      |     |        |       |      |
| Total Gate Charge                                                          | Q <sub>g</sub>      | V <sub>DS</sub> = 15 V, V <sub>GS</sub> = 5.0 V, I <sub>D</sub> = 11 A                                               |     | 14.2   | 20    | nC   |
| Gate-Source Charge                                                         | Q <sub>gs</sub>     |                                                                                                                      |     | 3.3    |       |      |
| Gate-Drain Charge                                                          | Q <sub>gd</sub>     |                                                                                                                      |     | 6.6    |       |      |
| Turn-On Delay Time                                                         | t <sub>d(on)</sub>  | V <sub>DD</sub> = 15 V, R <sub>L</sub> = 15 Ω<br>I <sub>D</sub> ≈ 1 A, V <sub>GEN</sub> = 10 V, R <sub>G</sub> = 6 Ω |     | 13     | 20    | ns   |
| Rise Time                                                                  | t <sub>r</sub>      |                                                                                                                      |     | 8.5    | 15    |      |
| Turn-Off Delay Time                                                        | t <sub>d(off)</sub> |                                                                                                                      |     | 35     | 53    |      |
| Fall Time                                                                  | t <sub>f</sub>      |                                                                                                                      |     | 17     | 26    |      |
| Source-Drain Reverse Recovery Time                                         | t <sub>rr</sub>     | I <sub>F</sub> = 2.3 A, di/dt = 100 A/μs                                                                             |     | 35     | 70    |      |

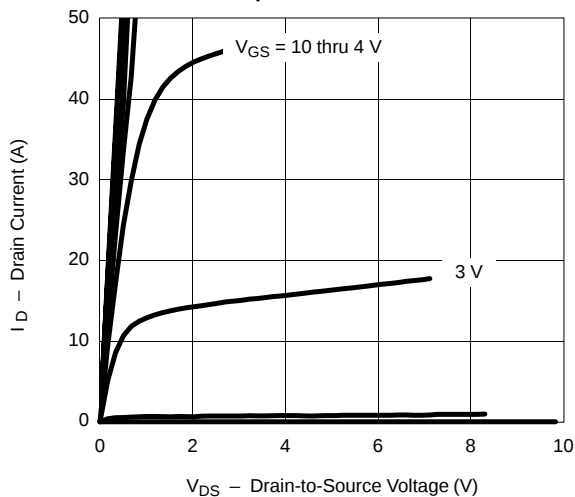
Notes

- a. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.  
b. Guaranteed by design, not subject to production testing.

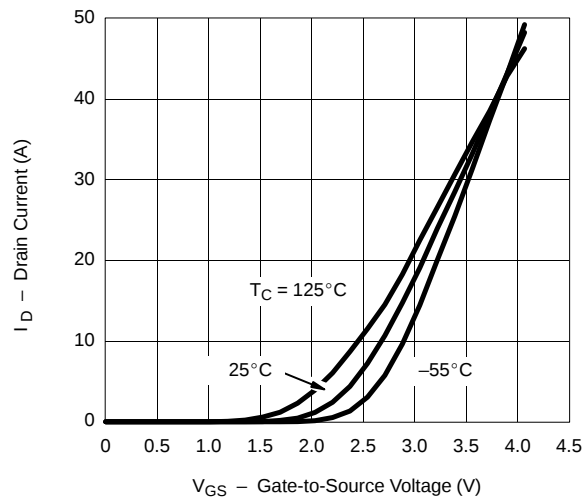


**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)**

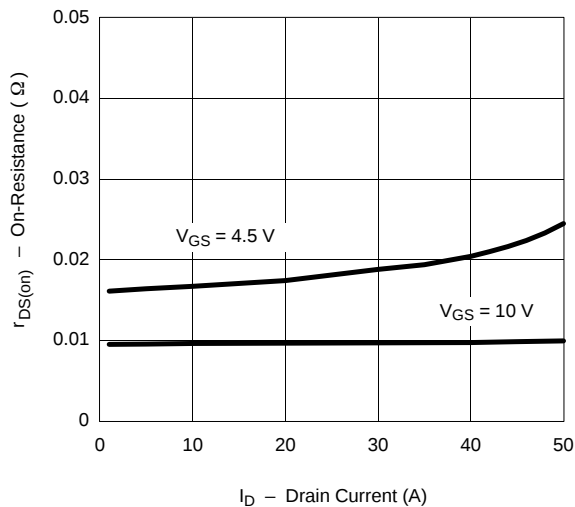
**Output Characteristics**



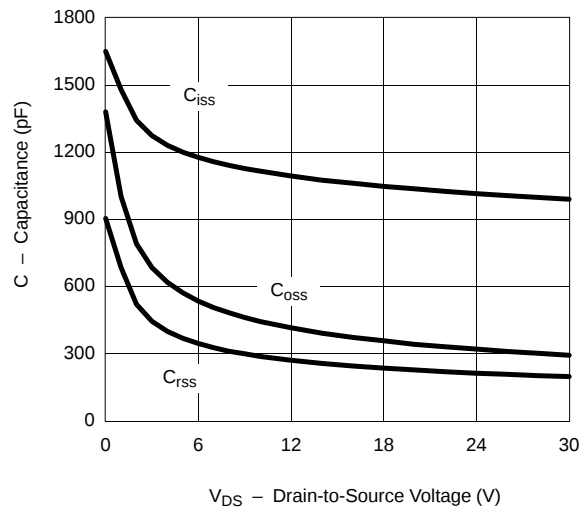
**Transfer Characteristics**



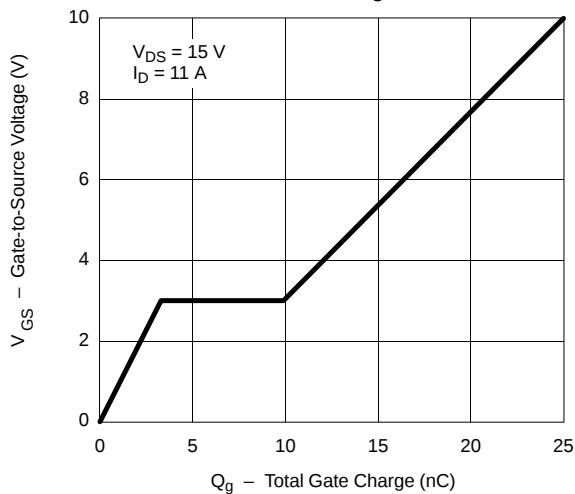
**On-Resistance vs. Drain Current**



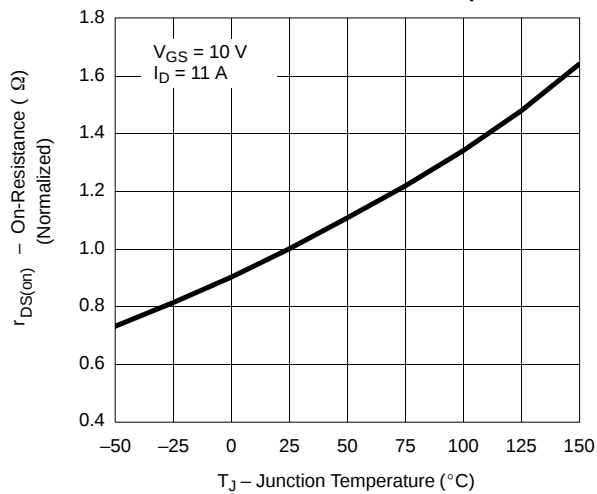
**Capacitance**



**Gate Charge**



**On-Resistance vs. Junction Temperature**



**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)**

