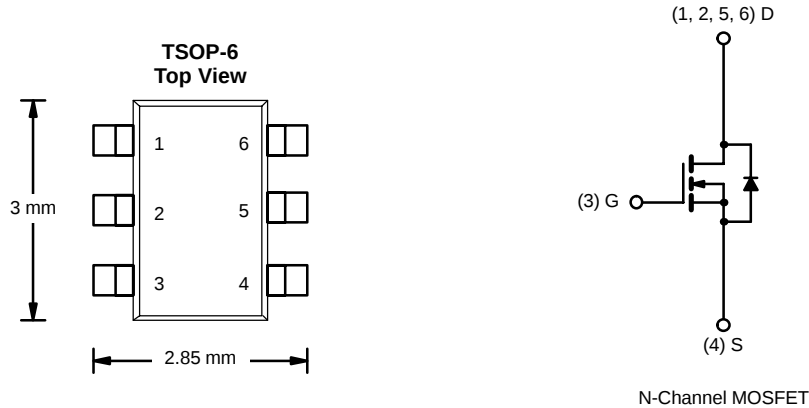




## N-Channel 20-V (D-S) MOSFET

**TrenchFET®**  
Power MOSFETs  
1.8-V Rated

| PRODUCT SUMMARY |                           |           |
|-----------------|---------------------------|-----------|
| $V_{DS}$ (V)    | $r_{DS(on)}$ ( $\Omega$ ) | $I_D$ (A) |
| 20              | 0.027 @ $V_{GS} = 4.5$ V  | 6.8       |
|                 | 0.032 @ $V_{GS} = 2.5$ V  | 6.3       |
|                 | 0.038 @ $V_{GS} = 1.8$ V  | 5.7       |



| ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED) |                          |                |                |              |
|-----------------------------------------------------------------------------|--------------------------|----------------|----------------|--------------|
| Parameter                                                                   |                          | Symbol         | 5 secs         | Steady State |
| Drain-Source Voltage                                                        |                          | $V_{DS}$       | 20             |              |
| Gate-Source Voltage                                                         |                          | $V_{GS}$       | $\pm 8$        |              |
| Continuous Drain Current ( $T_J = 150^\circ\text{C}$ ) <sup>a</sup>         | $T_A = 25^\circ\text{C}$ | $I_D$          | 6.8            | 5.1          |
|                                                                             | $T_A = 70^\circ\text{C}$ |                | 5.4            | 4.1          |
| Pulsed Drain Current                                                        |                          | $I_{DM}$       | 20             |              |
| Continuous Source Current (Diode Conduction) <sup>a</sup>                   |                          | $I_S$          | 1.7            | 0.9          |
| Maximum Power Dissipation <sup>a</sup>                                      | $T_A = 25^\circ\text{C}$ | $P_D$          | 2.0            | 1.1          |
|                                                                             | $T_A = 70^\circ\text{C}$ |                | 1.3            | 0.73         |
| Operating Junction and Storage Temperature Range                            |                          | $T_J, T_{stg}$ | $-55$ to $150$ |              |

| THERMAL RESISTANCE RATINGS               |                |            |         |         |
|------------------------------------------|----------------|------------|---------|---------|
| Parameter                                |                | Symbol     | Typical | Maximum |
| Maximum Junction-to-Ambient <sup>a</sup> | $t \leq 5$ sec | $R_{thJA}$ | 45      | 62.5    |
|                                          | Steady State   |            | 90      | 110     |
| Maximum Junction-to-Foot (Drain)         | Steady State   | $R_{thJF}$ | 25      | 30      |

Notes

a. Surface Mounted on 1" x 1" FR4 Board.

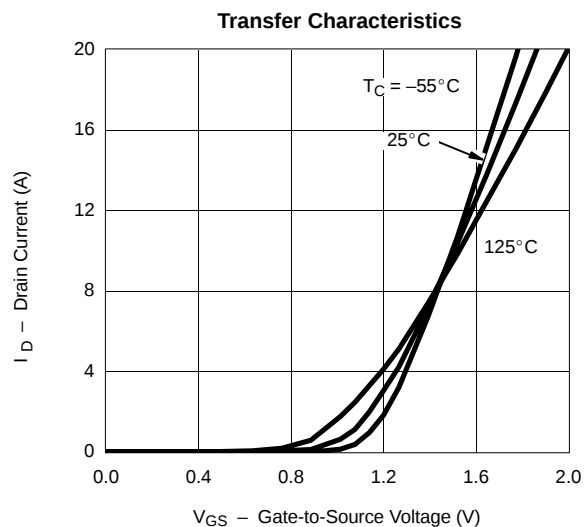
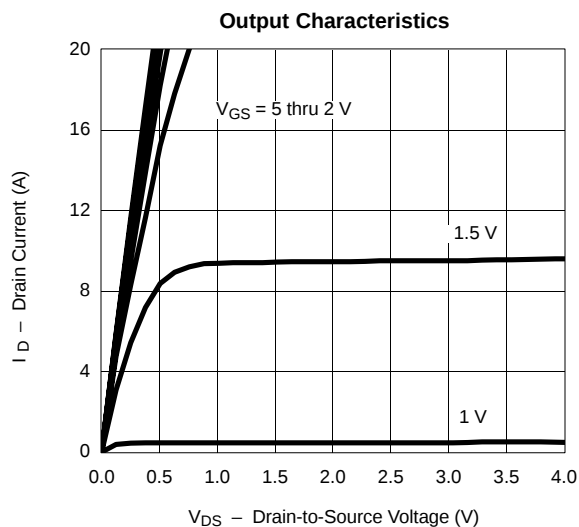
**SPECIFICATIONS (T<sub>J</sub> = 25 °C UNLESS OTHERWISE NOTED)**

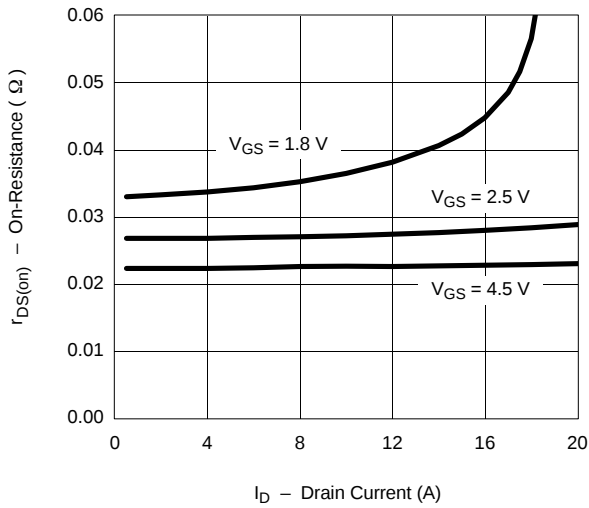
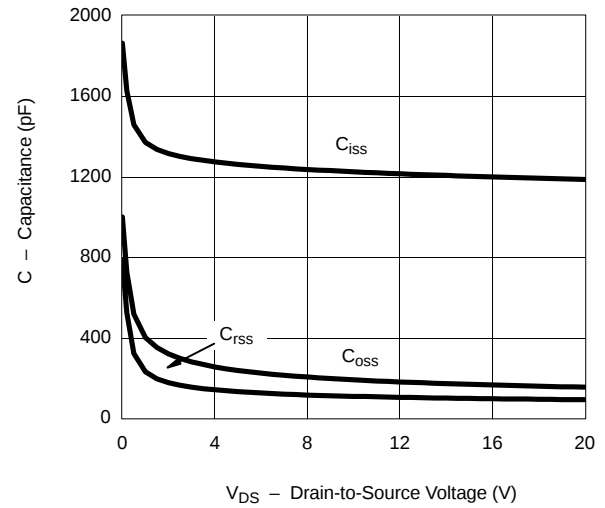
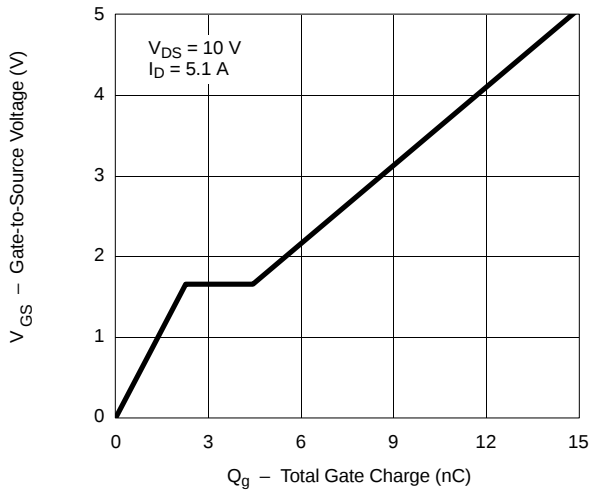
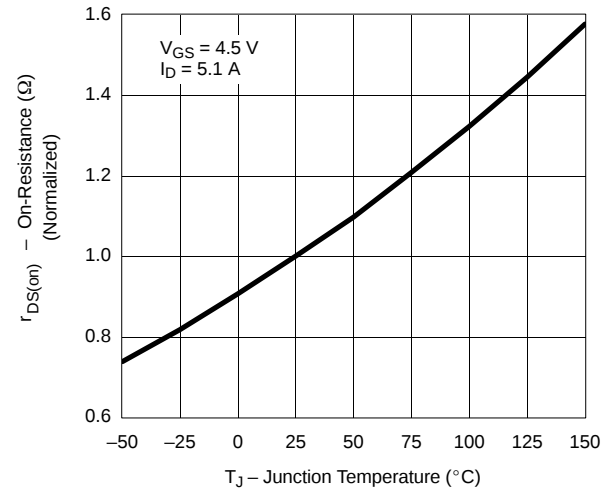
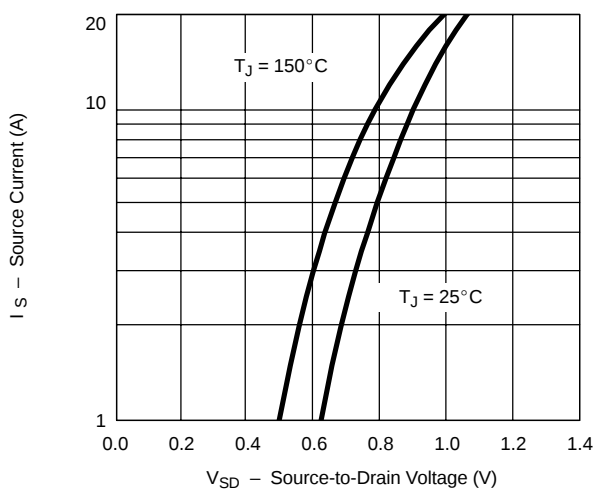
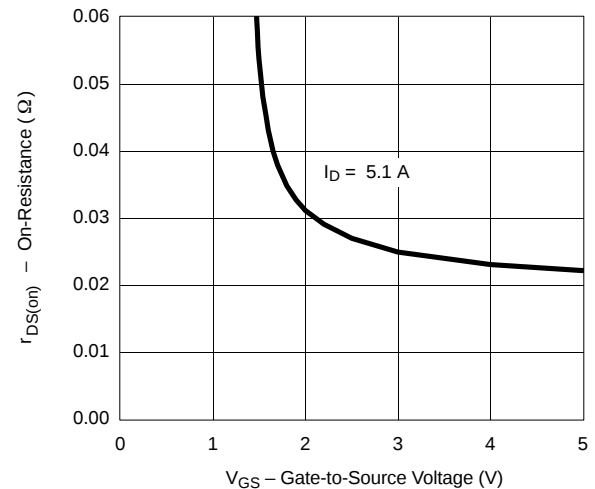
| Parameter                                     | Symbol              | Test Condition                                                                                                        | Min  | Typ   | Max   | Unit |
|-----------------------------------------------|---------------------|-----------------------------------------------------------------------------------------------------------------------|------|-------|-------|------|
| <b>Static</b>                                 |                     |                                                                                                                       |      |       |       |      |
| Gate Threshold Voltage                        | V <sub>GS(th)</sub> | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 1 mA                                                             | 0.45 |       |       | V    |
| Gate-Body Leakage                             | I <sub>GSS</sub>    | V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ±8 V                                                                         |      |       | ±100  | nA   |
| Zero Gate Voltage Drain Current               | I <sub>DSS</sub>    | V <sub>DS</sub> = 16 V, V <sub>GS</sub> = 0 V                                                                         |      |       | 1     | μA   |
|                                               |                     | V <sub>DS</sub> = 16 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 70 °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                                                                         | 20   |       |       | A    |
| Drain-Source On-State Resistance <sup>a</sup> | r <sub>DS(on)</sub> | V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 5.1 A                                                                       |      | 0.023 | 0.027 | Ω    |
|                                               |                     | V <sub>GS</sub> = 2.5 V, I <sub>D</sub> = 4.7 A                                                                       |      | 0.027 | 0.032 |      |
|                                               |                     | V <sub>GS</sub> = 1.8 V, I <sub>D</sub> = 2 A                                                                         |      | 0.032 | 0.038 |      |
| Forward Transconductance <sup>a</sup>         | g <sub>fs</sub>     | V <sub>DS</sub> = 10 V, I <sub>D</sub> = 5.1 A                                                                        |      | 25    |       | S    |
| Diode Forward Voltage <sup>a</sup>            | V <sub>SD</sub>     | I <sub>S</sub> = 1.7 A, V <sub>GS</sub> = 0 V                                                                         |      | 0.8   | 1.2   | V    |
| <b>Dynamic<sup>b</sup></b>                    |                     |                                                                                                                       |      |       |       |      |
| Total Gate Charge                             | Q <sub>g</sub>      | V <sub>DS</sub> = 10 V, V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 5.1 A                                               |      | 13.5  | 20    | nC   |
| Gate-Source Charge                            | Q <sub>gs</sub>     |                                                                                                                       |      | 2.3   |       |      |
| Gate-Drain Charge                             | Q <sub>gd</sub>     |                                                                                                                       |      | 2.2   |       |      |
| Turn-On Delay Time                            | t <sub>d(on)</sub>  | V <sub>DD</sub> = 10 V, R <sub>L</sub> = 10 Ω<br>I <sub>D</sub> = 1 A, V <sub>GEN</sub> = 4.5 V, R <sub>G</sub> = 6 Ω |      | 15    | 30    | ns   |
| Rise Time                                     | t <sub>r</sub>      |                                                                                                                       |      | 30    | 60    |      |
| Turn-Off Delay Time                           | t <sub>d(off)</sub> |                                                                                                                       |      | 70    | 140   |      |
| Fall Time                                     | t <sub>f</sub>      |                                                                                                                       |      | 30    | 60    |      |
| Source-Drain Reverse Recovery Time            | t <sub>rr</sub>     | I <sub>F</sub> = 1.7 A, di/dt = 100 A/μs                                                                              |      | 40    | 80    |      |

## 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)**

**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)****On-Resistance vs. Drain Current****Capacitance****Gate Charge****On-Resistance vs. Junction Temperature****Source-Drain Diode Forward Voltage****On-Resistance vs. Gate-to-Source Voltage**

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