



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

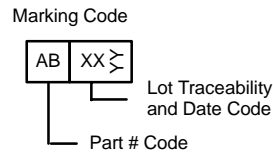
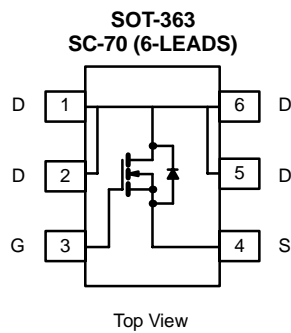
| PRODUCT SUMMARY |                           |           |
|-----------------|---------------------------|-----------|
| $V_{DS}$ (V)    | $r_{DS(on)}$ ( $\Omega$ ) | $I_D$ (A) |
| 20              | 0.065 @ $V_{GS} = 4.5$ V  | 3.9       |
|                 | 0.075 @ $V_{GS} = 2.5$ V  | 3.6       |
|                 | 0.096 @ $V_{GS} = 1.8$ V  | 3.2       |

### FEATURES

- TrenchFET® Power MOSFETS: 1.8-V Rated
- Thermally Enhanced SC-70 Package

### APPLICATIONS

- Load Switching
- PA Switch
- Level Switch



| ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED) |                |                          |              |                  |   |
|---|----------------|--------------------------|--------------|------------------|---|
| Parameter   | Symbol         | 5 secs                   | Steady State | Unit             |   |
| Drain-Source Voltage  | $V_{DS}$       | 20                       |              | V                |   |
| Gate-Source Voltage   | $V_{GS}$       | $\pm 8$                  |              |                  |   |
| Continuous Drain Current ( $T_J = 150^\circ\text{C}$ ) <sup>a</sup>         | $I_D$          | $T_A = 25^\circ\text{C}$ | 3.9          | 3.1              | A |
|   |                | $T_A = 85^\circ\text{C}$ | 2.8          | 2.2              |   |
| Pulsed Drain Current  | $I_{DM}$       | 10                       |              |                  |   |
| Continuous Diode Current (Diode Conduction) <sup>a</sup>                    | $I_S$          | 1.4                      | 0.9          |                  |   |
| Maximum Power Dissipation <sup>a</sup>                                      | $P_D$          | $T_A = 25^\circ\text{C}$ | 1.56         | 1.0              | W |
|   |                | $T_A = 85^\circ\text{C}$ | 0.81         | 0.52             |   |
| 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 <sup>a</sup> | $R_{thJA}$ | $t \leq 5$ sec | 60      | 80   | $^\circ\text{C/W}$ |
|  |            | Steady State   | 100     | 125  |                    |
| Maximum Junction-to-Foot (Drain)         | $R_{thJF}$ | 34             | 45      |      |                    |

Notes

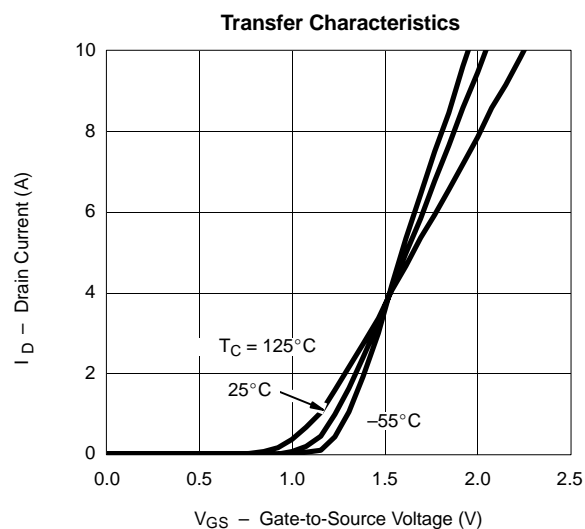
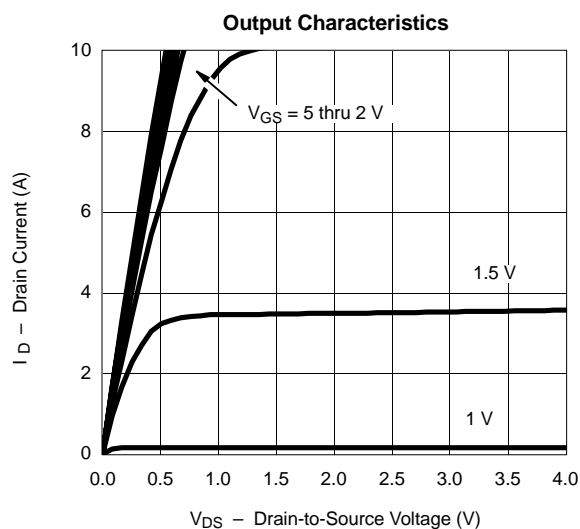
a. Surface Mounted on 1" x 1" FR4 Board.

**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> = 250 μA   | 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> = 85 °C   |  |       | 5     |      |
| On-State Drain Current <sup>a</sup>           | I <sub>D(on)</sub>  | V <sub>DS</sub> = 5 V, V <sub>GS</sub> = 4.5 V  | 8                                      |       |       | 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> = 3.9 A   |  | 0.053 | 0.065 | Ω    |
|   |                     | V <sub>GS</sub> = 2.5 V, I <sub>D</sub> = 3.6 A   |  | 0.062 | 0.075 |      |
|   |                     | V <sub>GS</sub> = 1.8 V, I <sub>D</sub> = 2 A   |  | 0.079 | 0.096 |      |
| Forward Transconductance <sup>a</sup>         | g <sub>fs</sub>     | V <sub>DS</sub> = 10 V, I <sub>D</sub> = 3.9 A  |  | 11    |       | S    |
| Diode Forward Voltage <sup>a</sup>            | V <sub>SD</sub>     | I <sub>S</sub> = 1.4 A, V <sub>GS</sub> = 0 V   |  | 0.75  | 1.1   | 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> = 3.9 A   |  | 4.9   | 7.5   | nC   |
| Gate-Source Charge                            | Q <sub>gs</sub>     |   | 1.0                                    |       |       |      |
| Gate-Drain Charge                             | Q <sub>gd</sub>     |   | 0.95                                   |       |       |      |
| Turn-On Delay Time                            | t <sub>d(on)</sub>  | V <sub>DD</sub> = 10 V, R <sub>L</sub> = 20 Ω<br>I <sub>D</sub> ≅ 0.5 A, V <sub>GEN</sub> = 4.5 V, R <sub>G</sub> = 6 Ω |  | 27    | 41    | ns   |
| Rise Time                                     | t <sub>r</sub>      |   | 47                                     | 71    |       |      |
| Turn-Off Delay Time                           | t <sub>d(off)</sub> |   | 54                                     | 81    |       |      |
| Fall Time                                     | t <sub>f</sub>      |   | 29                                     | 44    |       |      |
| Source-Drain Reverse Recovery                 | t <sub>rr</sub>     |   | I <sub>F</sub> = 1.4 A, di/dt = 100/μs |       | 35    |      |

## Notes

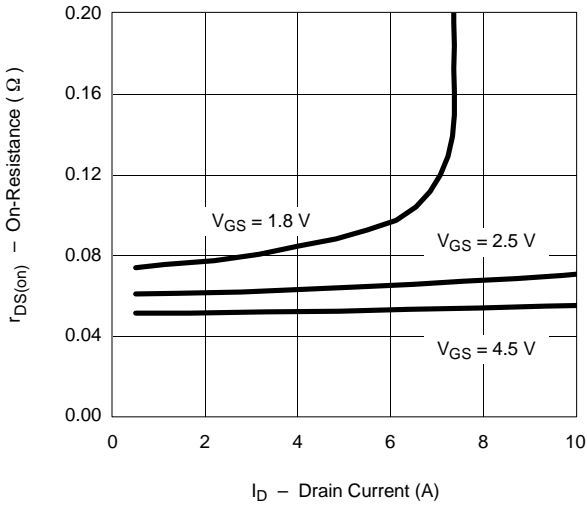
- a. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.  
b. Guaranteed by design, not subject to production testing.

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

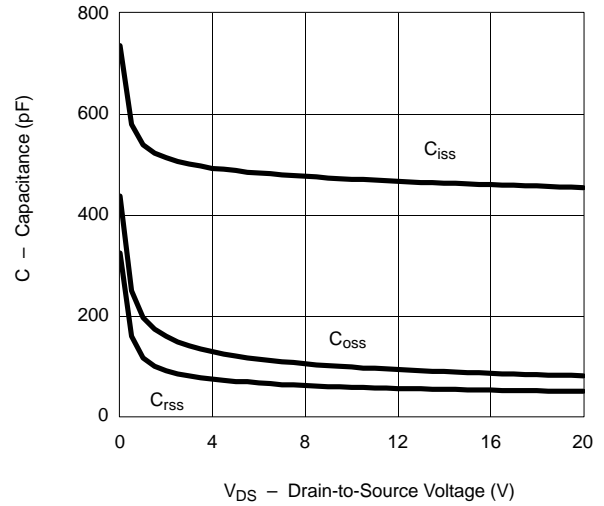


**TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)**

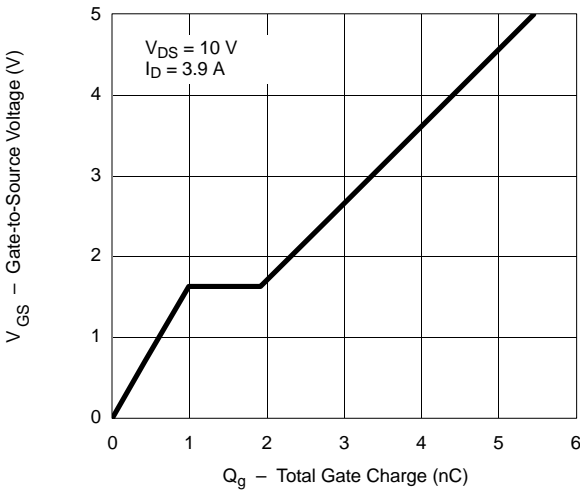
**On-Resistance vs. Drain Current**



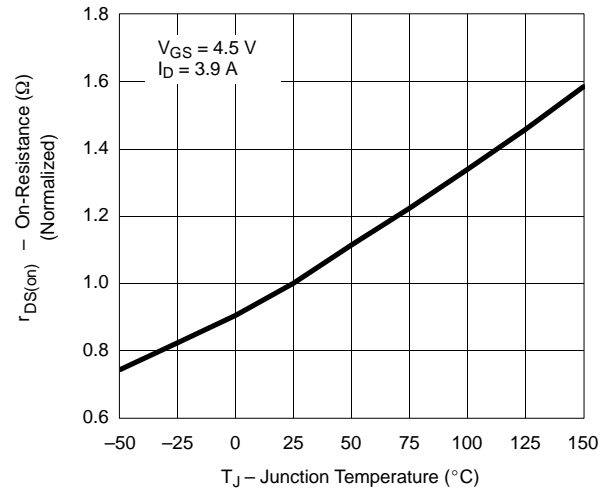
**Capacitance**



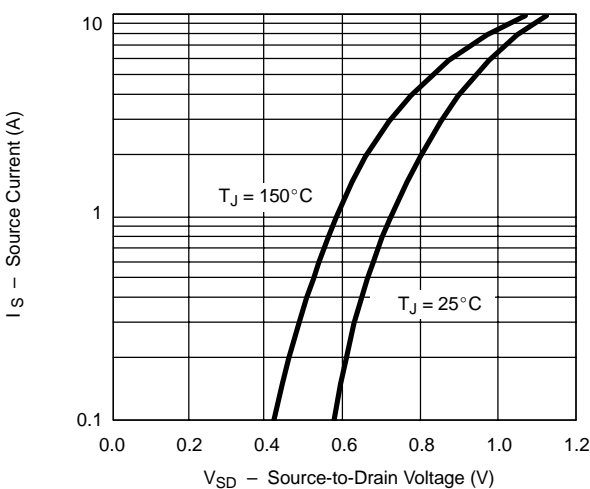
**Gate Charge**



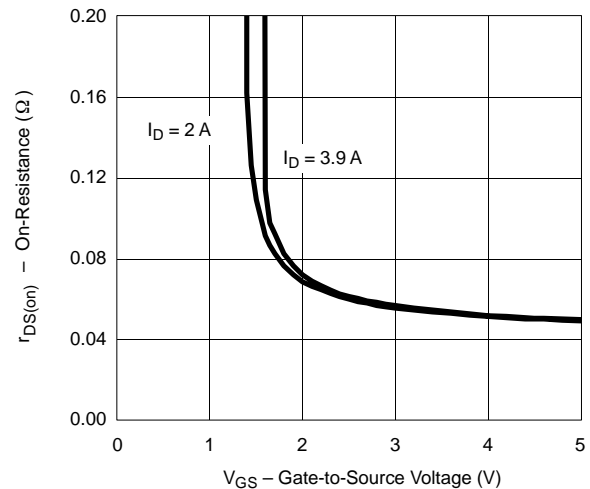
**On-Resistance vs. Junction Temperature**



**Source-Drain Diode Forward Voltage**



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



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

