

## P-Channel 12-V (D-S) MOSFET

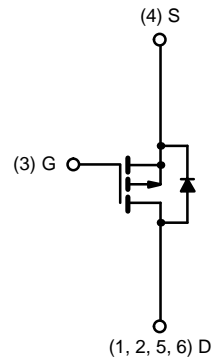
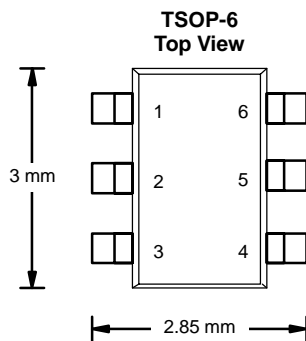
| PRODUCT SUMMARY |                           |           |
|-----------------|---------------------------|-----------|
| $V_{DS}$ (V)    | $r_{DS(on)}$ ( $\Omega$ ) | $I_D$ (A) |
| -12             | 0.031 @ $V_{GS} = -4.5$ V | -6.8      |
|                 | 0.040 @ $V_{GS} = -2.5$ V | -6.0      |
|                 | 0.053 @ $V_{GS} = -1.8$ V | -5.2      |

### FEATURES

- TrenchFET® Power MOSFET: 1.8-V Rated

### APPLICATIONS

- Load Switch
- PA Switch



P-Channel MOSFET

| ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED) |                |                          |              |                  |   |
|---|----------------|--------------------------|--------------|------------------|---|
| Parameter   | Symbol         | 5 secs                   | Steady State | Unit             |   |
| Drain-Source Voltage  | $V_{DS}$       | -12                      |              | V                |   |
| Gate-Source Voltage   | $V_{GS}$       | $\pm 8$                  |              |                  |   |
| Continuous Drain Current ( $T_J = 150^\circ\text{C}$ ) <sup>a</sup>         | $I_D$          | $T_A = 25^\circ\text{C}$ | -6.8         | -5.1             | A |
|   |                | $T_A = 85^\circ\text{C}$ | -4.9         | -3.7             |   |
| Pulsed Drain Current  | $I_{DM}$       | -20                      |              |                  |   |
| Continuous Diode Current (Diode Conduction) <sup>a</sup>                    | $I_S$          | -1.7                     | -0.9         |                  |   |
| Maximum Power Dissipation <sup>a</sup>                                      | $P_D$          | $T_A = 25^\circ\text{C}$ | 2.0          | 1.1              | W |
|   |                | $T_A = 85^\circ\text{C}$ | 1.0          | 0.6              |   |
| 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 <sup>a</sup> | $t \leq 5$ sec | $R_{thJA}$ | 55      | 62.5    | $^\circ\text{C/W}$ |
|  | Steady State   |            | 90      | 110     |                    |
| Maximum Junction-to-Foot (Drain)         | Steady State   | $R_{thJF}$ | 30      | 36      |                    |

#### Notes

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

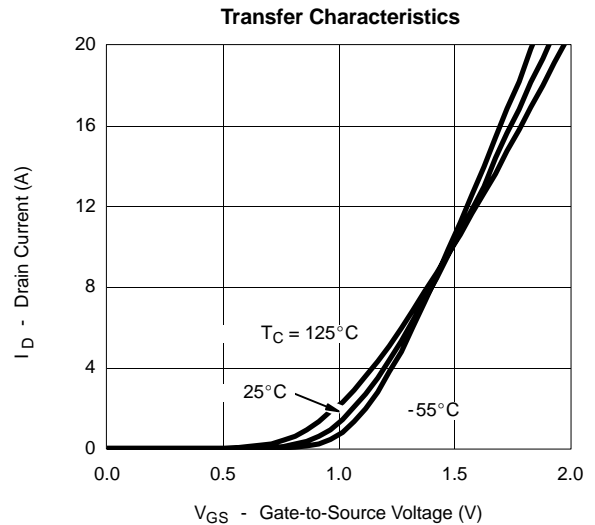
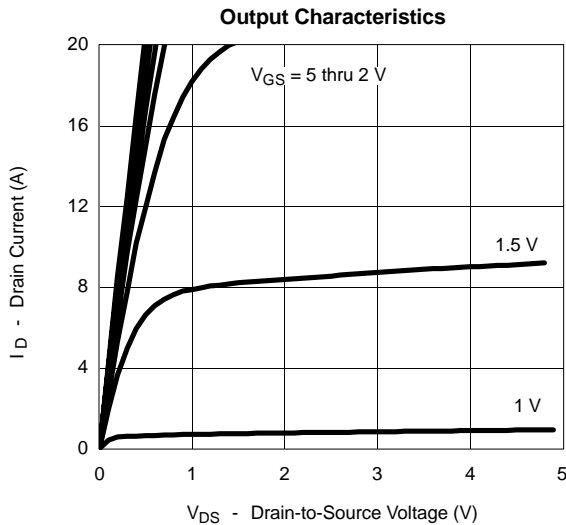


| SPECIFICATIONS (T <sub>J</sub> = 25 °C UNLESS OTHERWISE NOTED) |                     |  |       |       |       |      |
|--|---------------------|--|-------|-------|-------|------|
| Parameter  | Symbol              | Test Condition   | Min   | Typ   | Max   | Unit |
| <b>Static</b>  |                     |  |       |       |       |      |
| Gate Threshold Voltage   | V <sub>GS(th)</sub> | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250 μA   | -0.40 |       | -1    | 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> = -9.6 V, V <sub>GS</sub> = 0 V  |       |       | -1    | μA   |
|  |                     | V <sub>DS</sub> = -9.6 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   | -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> = -6.8 A  |       | 0.025 | 0.031 | Ω    |
|  |                     | V <sub>GS</sub> = -2.5 V, I <sub>D</sub> = -6 A  |       | 0.032 | 0.040 |      |
|  |                     | V <sub>GS</sub> = -1.8 V, I <sub>D</sub> = -3 A  |       | 0.041 | 0.053 |      |
| Forward Transconductance <sup>a</sup>                          | g <sub>fs</sub>     | V <sub>DS</sub> = -5 V, I <sub>D</sub> = -6.8 A  |       | 20    |       | S    |
| Diode Forward Voltage <sup>a</sup>                             | V <sub>SD</sub>     | I <sub>S</sub> = -1.7 A, V <sub>GS</sub> = 0 V   |       | -0.7  | -1.2  | V    |
| <b>Dynamic<sup>b</sup></b>                                     |                     |  |       |       |       |      |
| Total Gate Charge  | Q <sub>g</sub>      | V <sub>DS</sub> = -6 V, V <sub>GS</sub> = -4.5 V, I <sub>D</sub> = -6.8 A  |       | 18    | 33    | nC   |
| Gate-Source Charge   | Q <sub>gs</sub>     |  |       | 2.3   |       |      |
| Gate-Drain Charge  | Q <sub>gd</sub>     |  |       | 4.6   |       |      |
| Turn-On Delay Time   | t <sub>d(on)</sub>  | V <sub>DD</sub> = -6 V, R <sub>L</sub> = 6 Ω<br>I <sub>D</sub> ≅ -1 A, V <sub>GEN</sub> = -4.5 V, R <sub>G</sub> = 6 Ω |       | 21    | 33    | ns   |
| Rise Time  | t <sub>r</sub>      |  |       | 50    | 75    |      |
| Turn-Off Delay Time  | t <sub>d(off)</sub> |  |       | 125   | 190   |      |
| Fall Time  | t <sub>f</sub>      |  |       | 110   | 165   |      |
| Source-Drain Reverse Recovery Time                             | t <sub>rr</sub>     | I <sub>F</sub> = -1.7 A, di/dt = 100 A/μs  |       | 50    | 80    |      |

Notes

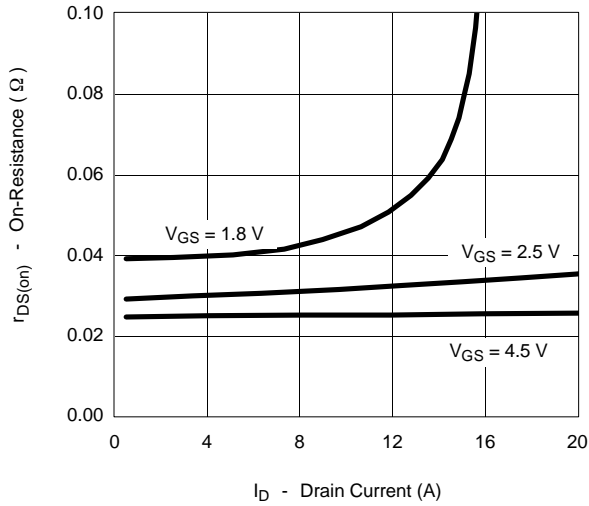
- a. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.
- b. Guaranteed by design, not subject to production testing.

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

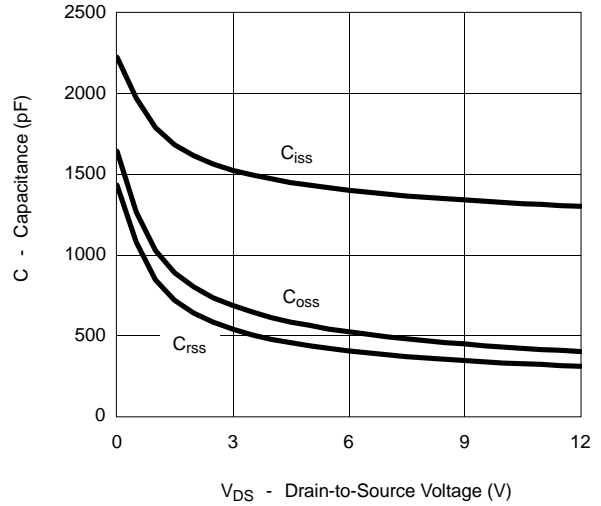


**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)**

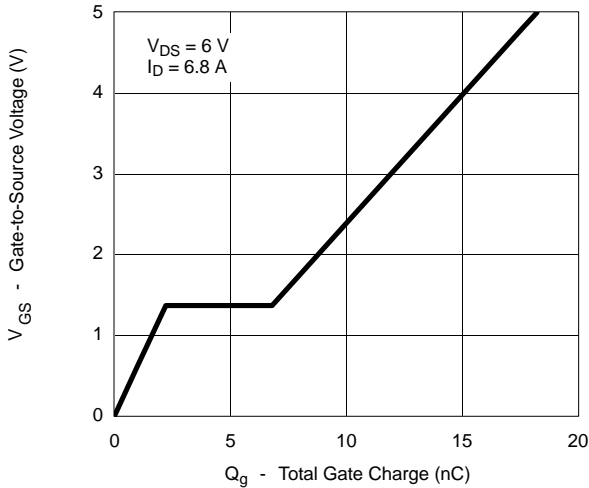
**On-Resistance vs. Drain Current**



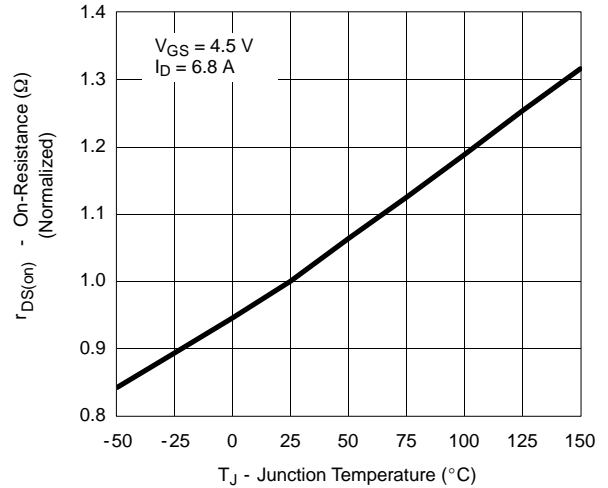
**Capacitance**



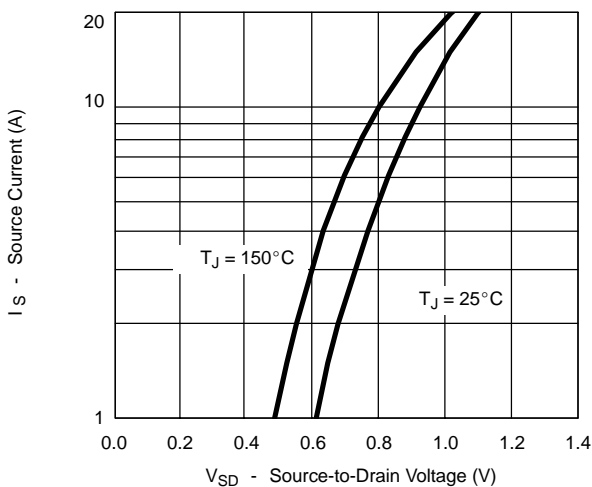
**Gate Charge**



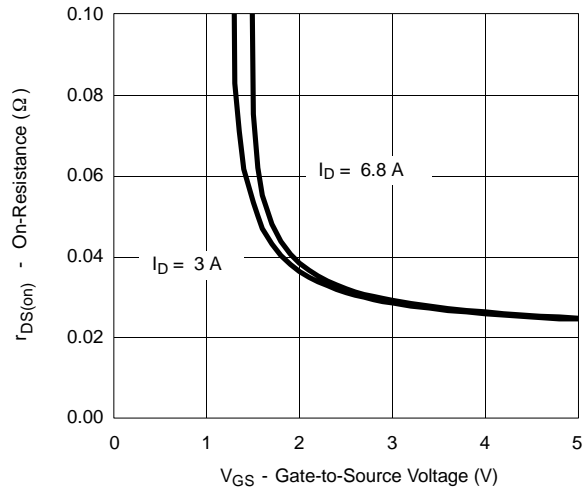
**On-Resistance vs. Junction Temperature**



**Source-Drain Diode Forward Voltage**

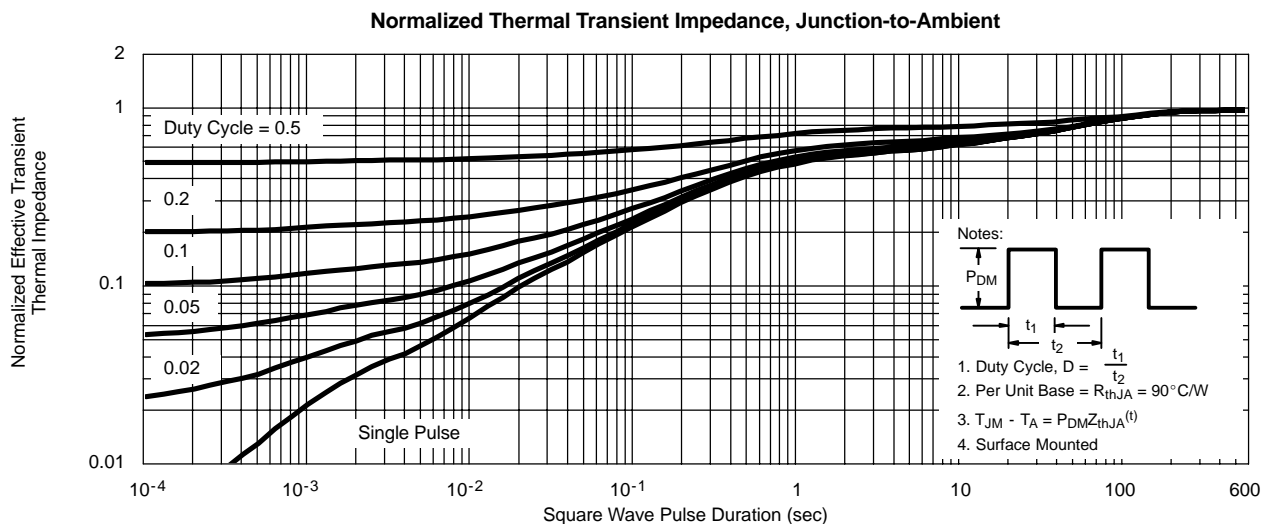
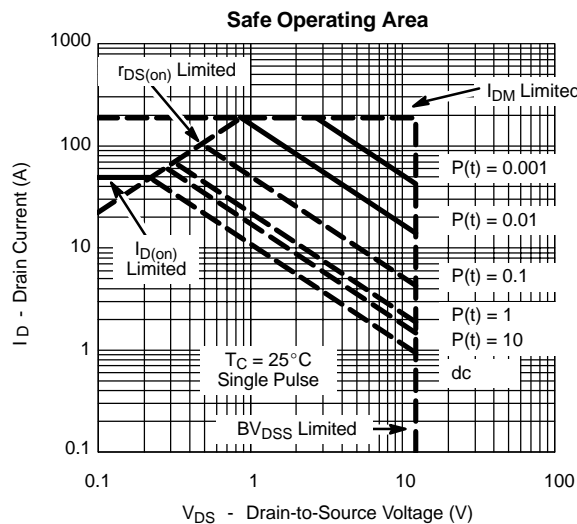
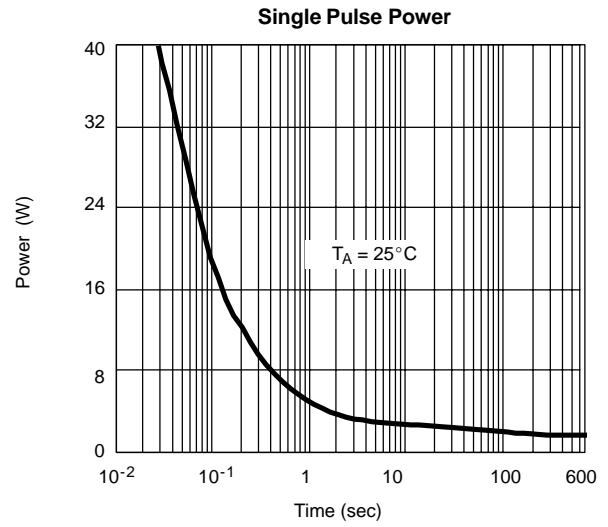
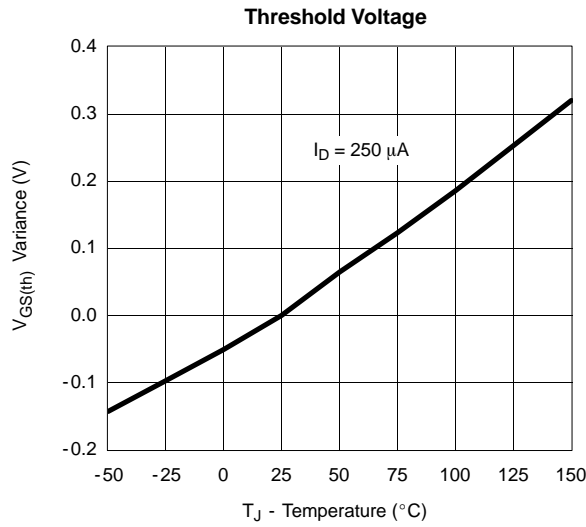


**On-Resistance vs. Gate-to-Source Voltage**





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





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

