

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

## PRODUCT SUMMARY

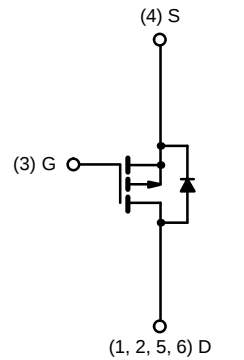
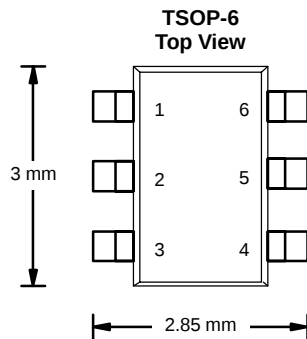
| $V_{DS}$ (V) | $r_{DS(on)}$ ( $\Omega$ ) | $I_D$ (A) |
|--------------|---------------------------|-----------|
| -12          | 0.023 @ $V_{GS} = -4.5$ V | -7.9      |
|              | 0.029 @ $V_{GS} = -2.5$ V | -7.0      |
|              | 0.041 @ $V_{GS} = -1.8$ V | -5.9      |

## FEATURES

- TrenchFET® Power MOSFET: 1.8-V Rated
- Ultra Low On-Resistance

## 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 <sub>DS</sub>                   | -12        |              | V    |
| Gate-Source Voltage                                            |                       | V <sub>GS</sub>                   | ±8         |              |      |
| Continuous Drain Current (T <sub>J</sub> = 150°C) <sup>a</sup> | T <sub>A</sub> = 25°C | I <sub>D</sub>                    | - 7.9      | -5.9         | A    |
|                                                                | T <sub>A</sub> = 85°C |                                   | - 5.7      | -4.3         |      |
| Pulsed Drain Current                                           |                       | I <sub>DM</sub>                   | -20        |              |      |
| Continuous Diode Current (Diode Conduction) <sup>a</sup>       |                       | I <sub>S</sub>                    | -1.7       | -0.9         |      |
| Maximum Power Dissipation <sup>a</sup>                         | T <sub>A</sub> = 25°C | P <sub>D</sub>                    | 2.0        | 1.1          | W    |
|                                                                | T <sub>A</sub> = 85°C |                                   | 1.0        | 0.6          |      |
| Operating Junction and Storage Temperature Range               |                       | T <sub>J</sub> , T <sub>stg</sub> | -55 to 150 |              | °C   |

## THERMAL RESISTANCE RATINGS

| Parameter                                |                | Symbol     | Typical | Maximum | Unit               |
|------------------------------------------|----------------|------------|---------|---------|--------------------|
| Maximum Junction-to-Ambient <sup>a</sup> | $t \leq 5$ sec | $R_{thJA}$ | 45      | 62.5    | $^\circ\text{C/W}$ |
|                                          | 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.

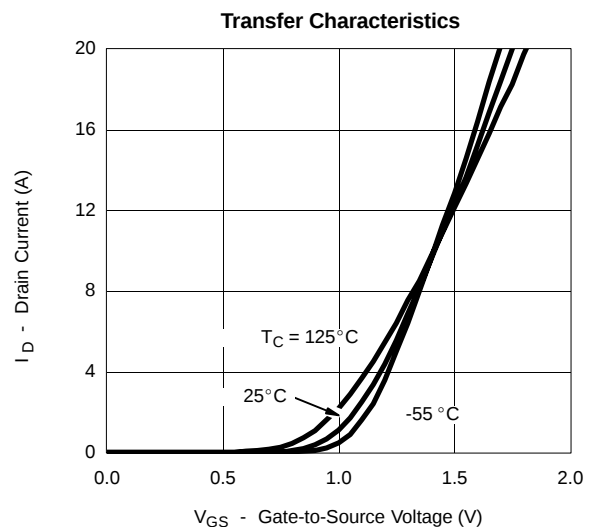
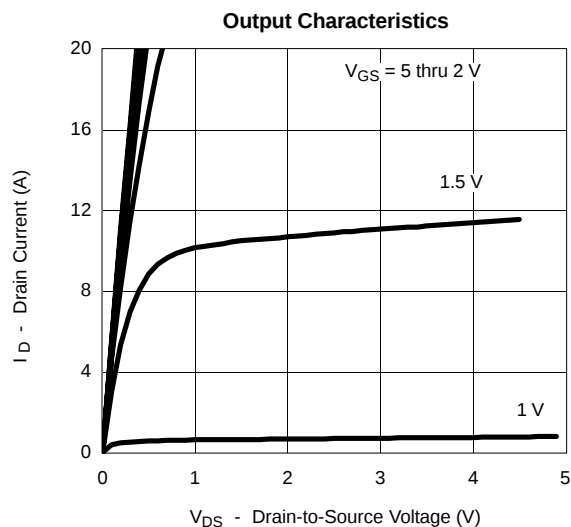
**SPECIFICATIONS ( $T_J = 25^\circ\text{C}$  UNLESS OTHERWISE NOTED)**

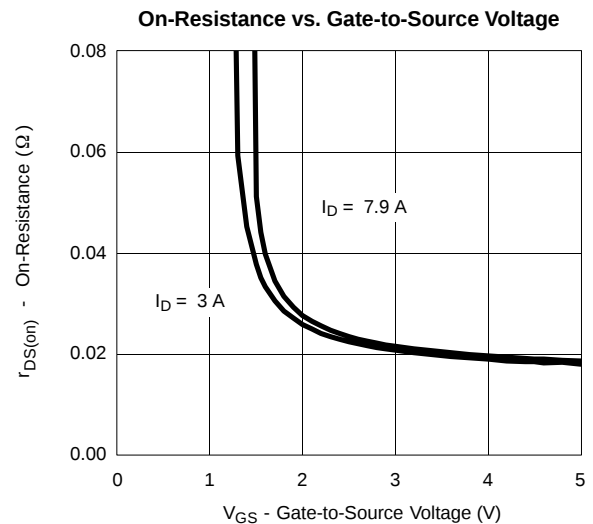
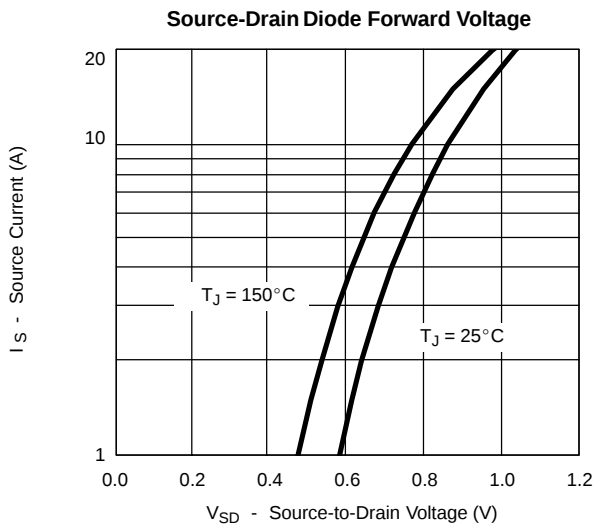
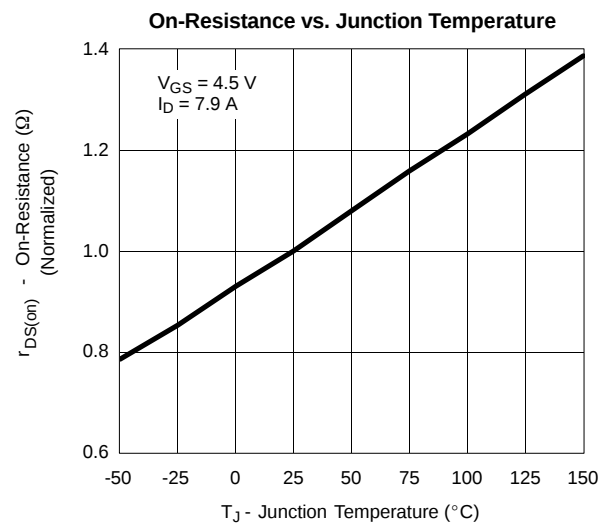
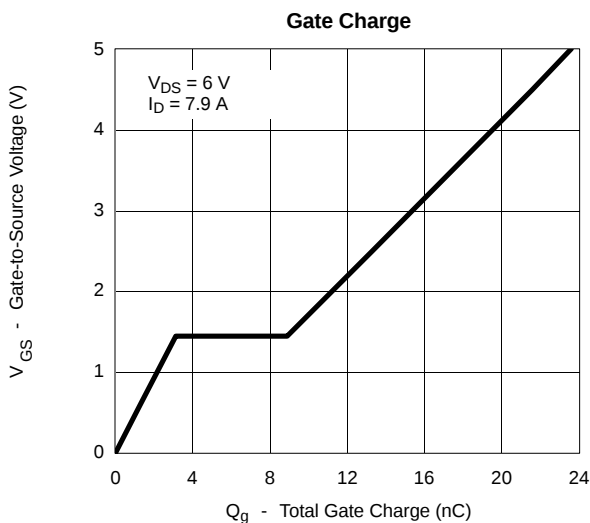
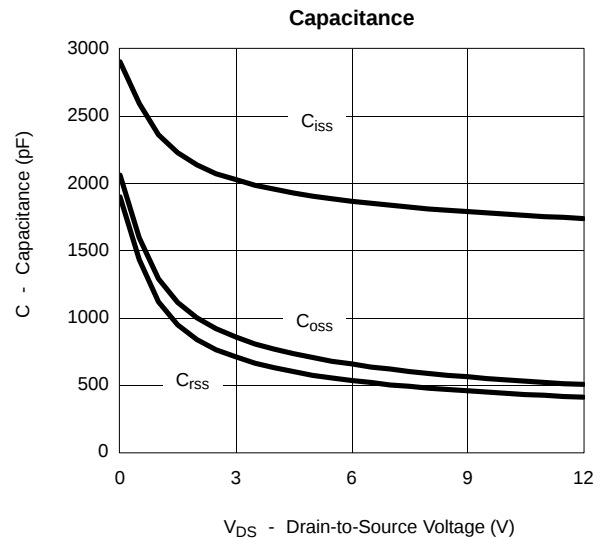
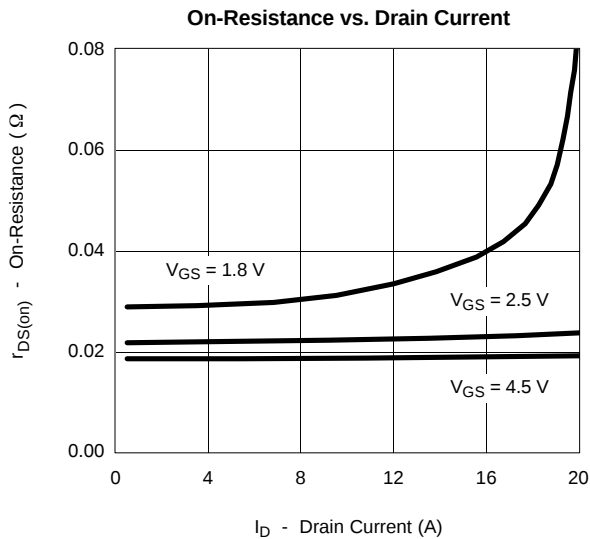
| Parameter                                     | Symbol       | Test Condition                                                                                                           | Min   | Typ   | Max       | Unit          |
|-----------------------------------------------|--------------|--------------------------------------------------------------------------------------------------------------------------|-------|-------|-----------|---------------|
| <b>Static</b>                                 |              |                                                                                                                          |       |       |           |               |
| Gate Threshold Voltage                        | $V_{GS(th)}$ | $V_{DS} = V_{GS}$ , $I_D = -250\ \mu\text{A}$                                                                            | -0.40 |       | -1        | V             |
| Gate-Body Leakage                             | $I_{GSS}$    | $V_{DS} = 0\ \text{V}$ , $V_{GS} = \pm 8\ \text{V}$                                                                      |       |       | $\pm 100$ | nA            |
| Zero Gate Voltage Drain Current               | $I_{DSS}$    | $V_{DS} = -9.6\ \text{V}$ , $V_{GS} = 0\ \text{V}$                                                                       |       |       | -1        | $\mu\text{A}$ |
|                                               |              | $V_{DS} = -9.6\ \text{V}$ , $V_{GS} = 0\ \text{V}$ , $T_J = 85^\circ\text{C}$                                            |       |       | -5        |               |
| On-State Drain Current <sup>a</sup>           | $I_{D(on)}$  | $V_{DS} = -5\ \text{V}$ , $V_{GS} = -4.5\ \text{V}$                                                                      | -20   |       |           | A             |
| Drain-Source On-State Resistance <sup>a</sup> | $r_{DS(on)}$ | $V_{GS} = -4.5\ \text{V}$ , $I_D = -7.9\ \text{A}$                                                                       |       | 0.019 | 0.023     | $\Omega$      |
|                                               |              | $V_{GS} = -2.5\ \text{V}$ , $I_D = -7.0\ \text{A}$                                                                       |       | 0.024 | 0.029     |               |
|                                               |              | $V_{GS} = -1.8\ \text{V}$ , $I_D = -3\ \text{A}$                                                                         |       | 0.033 | 0.041     |               |
| Forward Transconductance <sup>a</sup>         | $g_{fs}$     | $V_{DS} = -5\ \text{V}$ , $I_D = -7.9\ \text{A}$                                                                         |       | 28    |           | S             |
| Diode Forward Voltage <sup>a</sup>            | $V_{SD}$     | $I_S = -1.7\ \text{A}$ , $V_{GS} = 0\ \text{V}$                                                                          |       | -0.7  | -1.2      | V             |
| <b>Dynamic<sup>b</sup></b>                    |              |                                                                                                                          |       |       |           |               |
| Total Gate Charge                             | $Q_g$        | $V_{DS} = -6\ \text{V}$ , $V_{GS} = -4.5\ \text{V}$ , $I_D = -7.9\ \text{A}$                                             |       | 22    | 33        | nC            |
| Gate-Source Charge                            | $Q_{gs}$     |                                                                                                                          |       | 3.2   |           |               |
| Gate-Drain Charge                             | $Q_{gd}$     |                                                                                                                          |       | 5.8   |           |               |
| Turn-On Delay Time                            | $t_{d(on)}$  | $V_{DD} = -6\ \text{V}$ , $R_L = 6\ \Omega$<br>$I_D \cong -1\ \text{A}$ , $V_{GEN} = -4.5\ \text{V}$ , $R_G = 6\ \Omega$ |       | 25    | 40        | ns            |
| Rise Time                                     | $t_r$        |                                                                                                                          |       | 50    | 75        |               |
| Turn-Off Delay Time                           | $t_{d(off)}$ |                                                                                                                          |       | 130   | 200       |               |
| Fall Time                                     | $t_f$        |                                                                                                                          |       | 110   | 165       |               |
| Source-Drain Reverse Recovery Time            | $t_{rr}$     | $I_F = -1.7\ \text{A}$ , $di/dt = 100\ \text{A}/\mu\text{s}$                                                             |       | 65    | 90        |               |

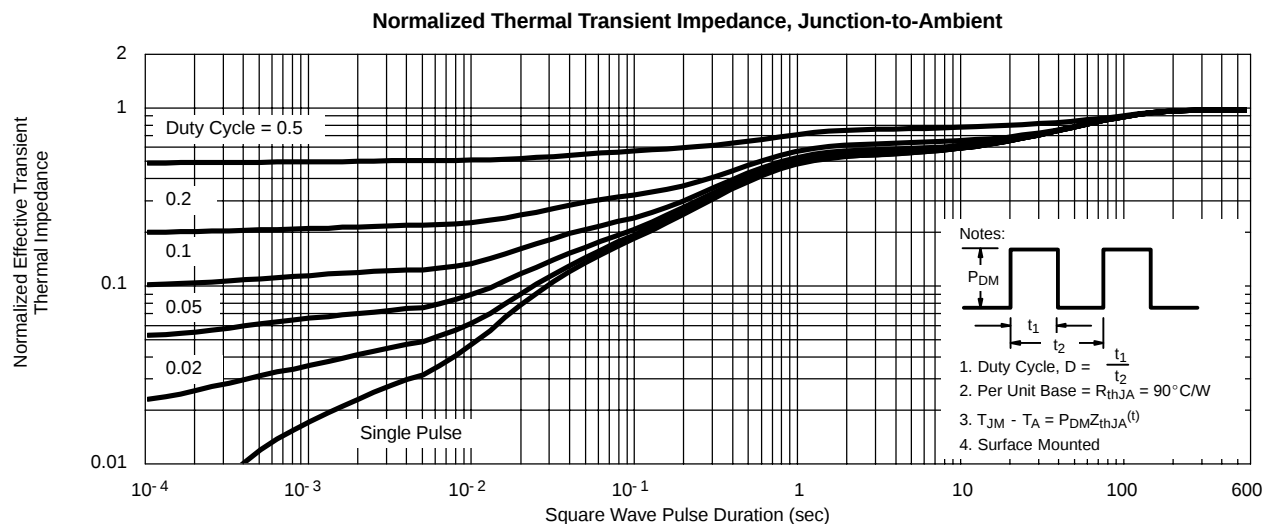
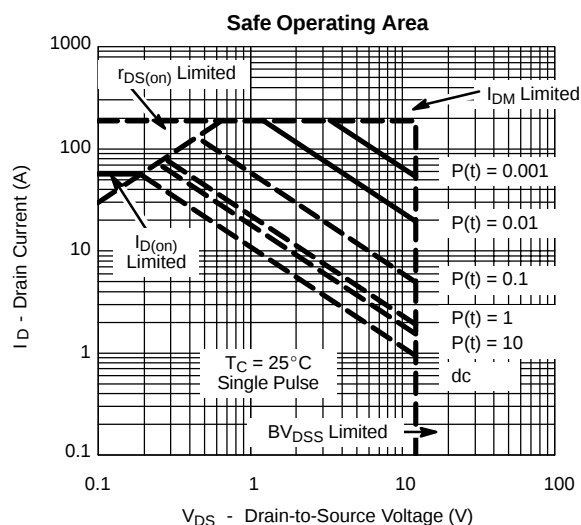
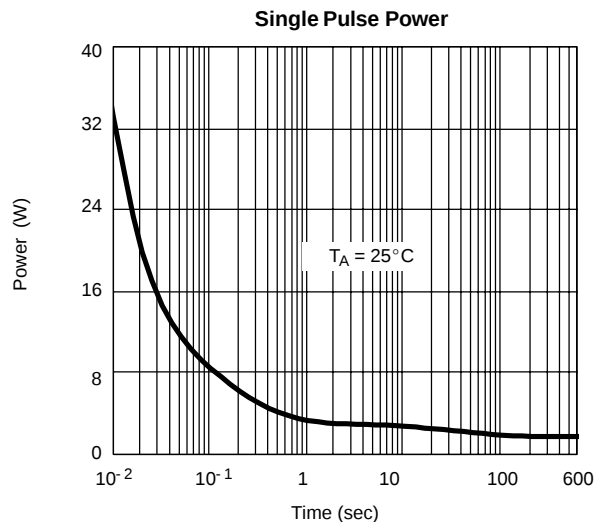
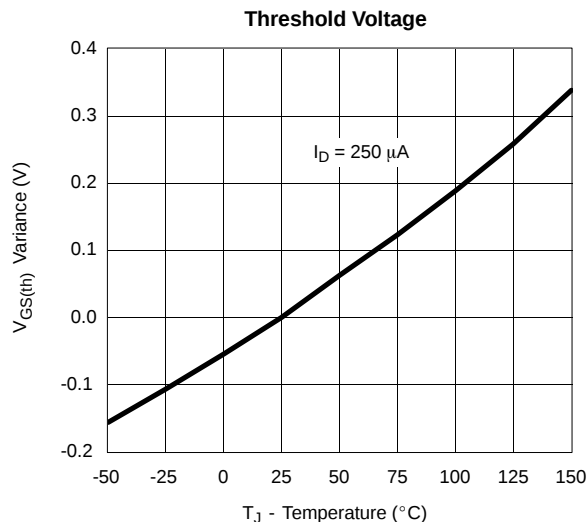
## Notes

a. Pulse test; pulse width  $\leq 300\ \mu\text{s}$ , duty cycle  $\leq 2\%$ .

b. Guaranteed by design, not subject to production testing.

**TYPICAL CHARACTERISTICS ( $25^\circ\text{C}$  UNLESS NOTED)**

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