



## P-Channel 40-V (D-S) MOSFET

## PRODUCT SUMMARY

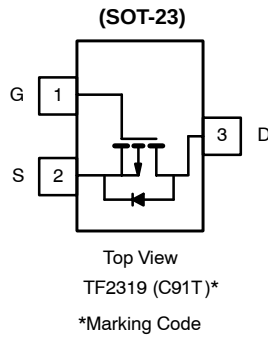
| $V_{DS}$ (V) | $r_{DS(on)}$ ( $\Omega$ ) | $I_D$ (A) <sup>b</sup> |
|--------------|---------------------------|------------------------|
| -40          | 0.082 @ $V_{GS} = -10$ V  | -3.0                   |
|              | 0.130 @ $V_{GS} = -4.5$ V | -2.4                   |

## FEATURES

- TrenchFET® Power MOSFET

## APPLICATIONS

- Load Switch

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

| Parameter                                                      |                       | Symbol                            | 5 sec      | Steady State | Unit |
|----------------------------------------------------------------|-----------------------|-----------------------------------|------------|--------------|------|
| Drain-Source Voltage                                           |                       | V <sub>DS</sub>                   | −40        |              | V    |
| Gate-Source Voltage                                            |                       | V <sub>GS</sub>                   | ± 20       |              |      |
| Continuous Drain Current (T <sub>J</sub> = 150°C) <sup>b</sup> | T <sub>A</sub> = 25°C | I <sub>D</sub>                    | −3.0       | −2.3         | A    |
| Pulsed Drain Current <sup>a</sup>                              |                       | I <sub>DM</sub>                   | −12        |              |      |
| Continuous Source Current (Diode Conduction) <sup>b</sup>      |                       | I <sub>S</sub>                    | −1.0       | −0.62        |      |
| Power Dissipation <sup>b</sup>                                 | T <sub>A</sub> = 25°C | P <sub>D</sub>                    | 1.25       | 0.75         | W    |
| 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>b</sup> | $R_{thJA}$ | 75      | 100     | $^\circ\text{C/W}$ |
| Maximum Junction-to-Ambient <sup>c</sup> |            | 120     | 166     |                    |
| Maximum Junction-to-Foot (Drain)         | $R_{thJF}$ | 40      | 50      |                    |

## Notes

- Pulse width limited by maximum junction temperature.
- Surface Mounted on FR4 Board,  $t \leq 5$  sec.
- Surface Mounted on FR4 Board.

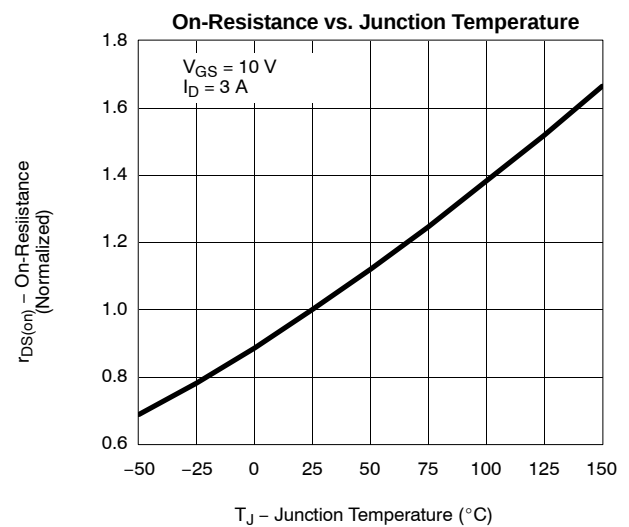
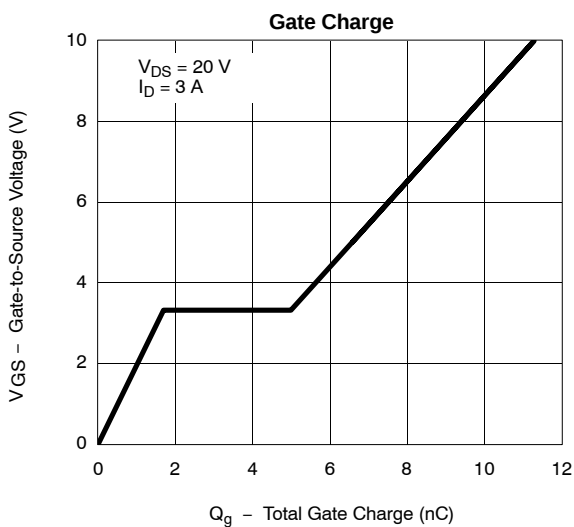
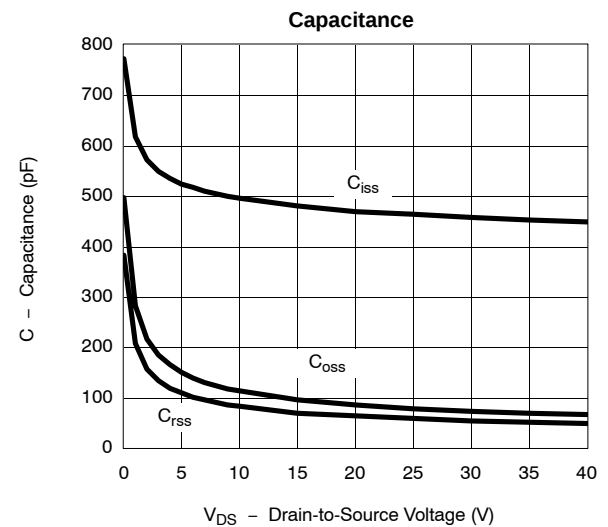
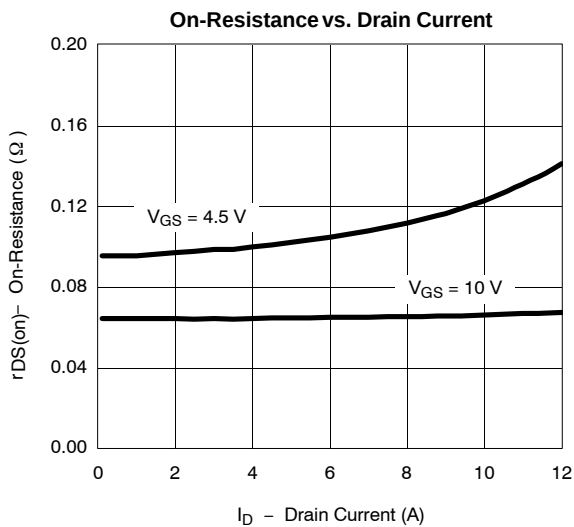
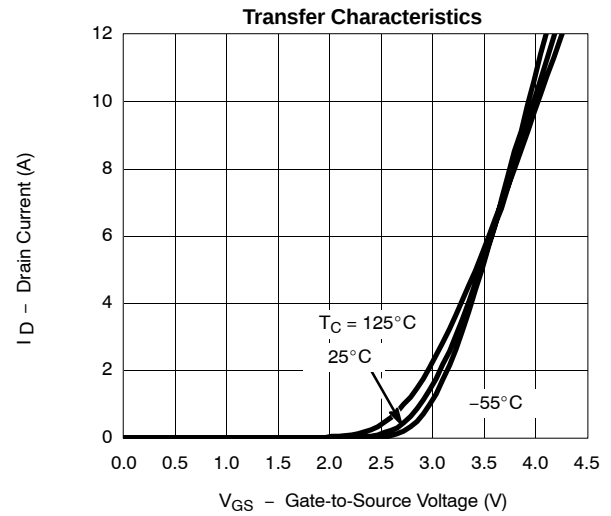
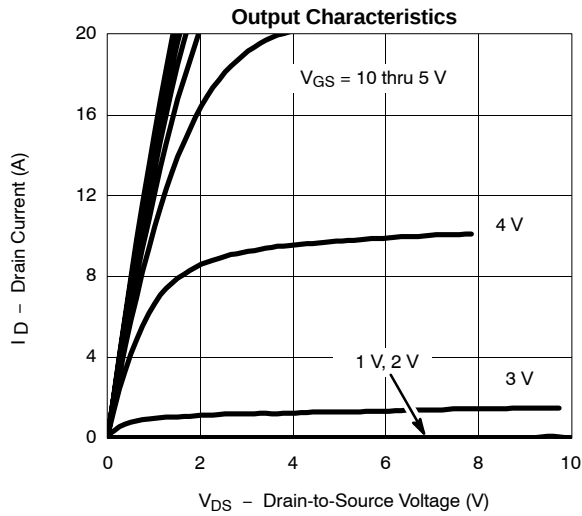


| SPECIFICATIONS (T <sub>J</sub> = 25 °C UNLESS OTHERWISE NOTED) |                      |                                                                                                                             |        |       |       |      |
|----------------------------------------------------------------|----------------------|-----------------------------------------------------------------------------------------------------------------------------|--------|-------|-------|------|
| Parameter                                                      | Symbol               | Test Conditions                                                                                                             | Limits |       |       | Unit |
|                                                                |                      |                                                                                                                             | Min    | Typ   | Max   |      |
| Static                                                         |                      |                                                                                                                             |        |       |       |      |
| Drain-Source Breakdown Voltage                                 | V <sub>(BR)DSS</sub> | V <sub>GS</sub> = 0 V, I <sub>D</sub> = -250 μA                                                                             | -40    |       |       | V    |
| Gate-Threshold Voltage                                         | V <sub>GS(th)</sub>  | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250 μA                                                                | -1.0   |       | -3.0  |      |
| 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> = -36 V, V <sub>GS</sub> = 0 V                                                                              |        |       | -50   | nA   |
| On-State Drain Current <sup>a</sup>                            | I <sub>D(on)</sub>   | V <sub>DS</sub> ≤ -5 V, V <sub>GS</sub> = -10 V                                                                             | -6     |       |       | A    |
| Drain-Source On-Resistance <sup>a</sup>                        | r <sub>DS(on)</sub>  | V <sub>GS</sub> = -10 V, I <sub>D</sub> = -3.0 A                                                                            |        | 0.065 | 0.082 | Ω    |
|                                                                |                      | V <sub>GS</sub> = -4.5 V, I <sub>D</sub> = -2.4 A                                                                           |        | 0.100 | 0.130 |      |
| Forward Transconductance <sup>a</sup>                          | g <sub>fs</sub>      | V <sub>DS</sub> = -5 V, I <sub>D</sub> = -3.0 A                                                                             |        | 7.0   |       | S    |
| Diode Forward Voltage                                          | V <sub>SD</sub>      | I <sub>S</sub> = -1.25 A, V <sub>GS</sub> = 0 V                                                                             |        | -0.8  | -1.28 | V    |
| Dynamic <sup>b</sup>                                           |                      |                                                                                                                             |        |       |       |      |
| Total Gate Charge                                              | Q <sub>g</sub>       | V <sub>DS</sub> = -20 V, V <sub>GS</sub> = -10 V<br>I <sub>D</sub> ≅ -3 A                                                   |        | 11.3  | 17    | nC   |
| Gate-Source Charge                                             | Q <sub>gs</sub>      |                                                                                                                             |        | 1.7   |       |      |
| Gate-Drain Charge                                              | Q <sub>gd</sub>      |                                                                                                                             |        | 3.3   |       |      |
| Input Capacitance                                              | C <sub>iss</sub>     | V <sub>DS</sub> = -20 V, V <sub>GS</sub> = 0, f = 1 MHz                                                                     |        | 470   |       | pF   |
| Output Capacitance                                             | C <sub>oss</sub>     |                                                                                                                             |        | 85    |       |      |
| Reverse Transfer Capacitance                                   | C <sub>rss</sub>     |                                                                                                                             |        | 65    |       |      |
| Switching <sup>c</sup>                                         |                      |                                                                                                                             |        |       |       |      |
| Turn-On Time                                                   | t <sub>d(on)</sub>   | V <sub>DD</sub> = -20 V, R <sub>L</sub> =20 Ω<br>I <sub>D</sub> ≅ -1.0 A, V <sub>GEN</sub> = -4.5 V<br>R <sub>g</sub> = 6 Ω |        | 7     | 15    | ns   |
|                                                                | t <sub>r</sub>       |                                                                                                                             |        | 15    | 25    |      |
| Turn-Off Time                                                  | t <sub>d(off)</sub>  |                                                                                                                             |        | 25    | 40    |      |
|                                                                | t <sub>f</sub>       |                                                                                                                             |        | 25    | 40    |      |

# Notes

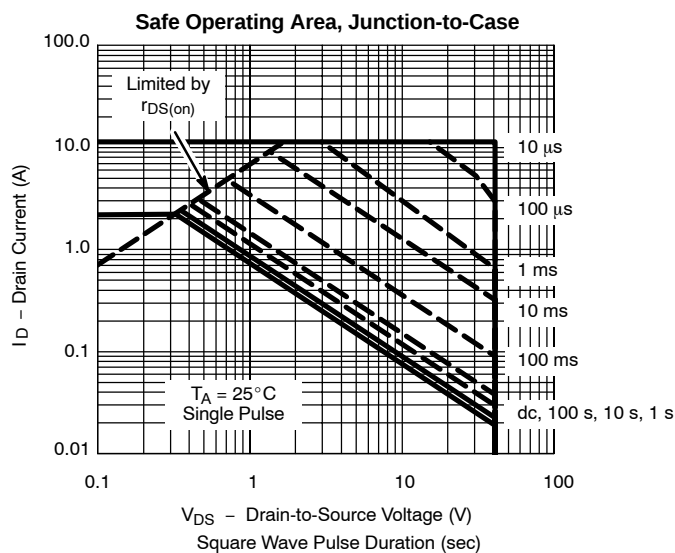
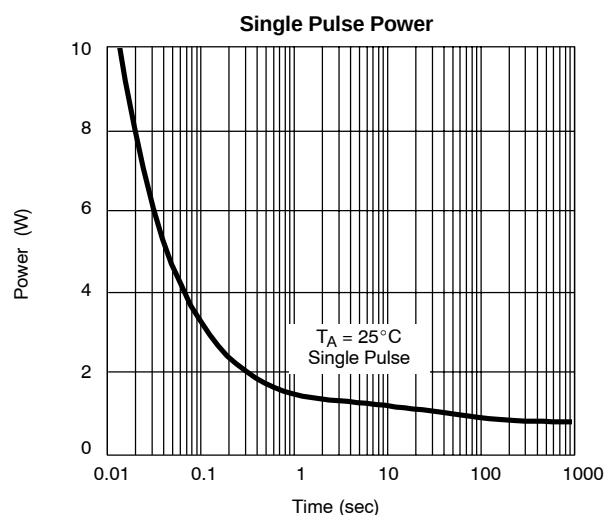
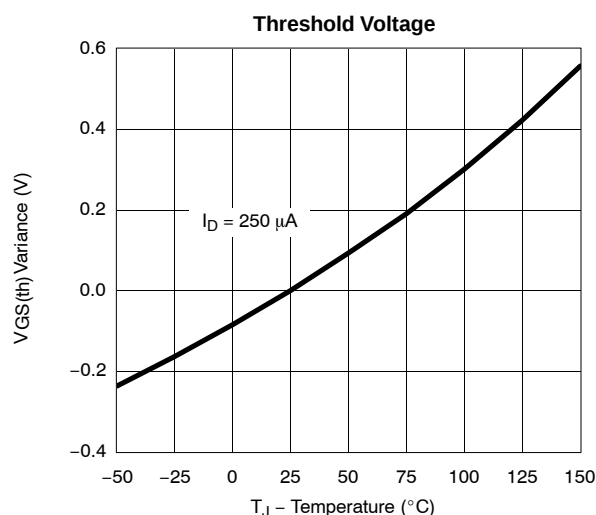
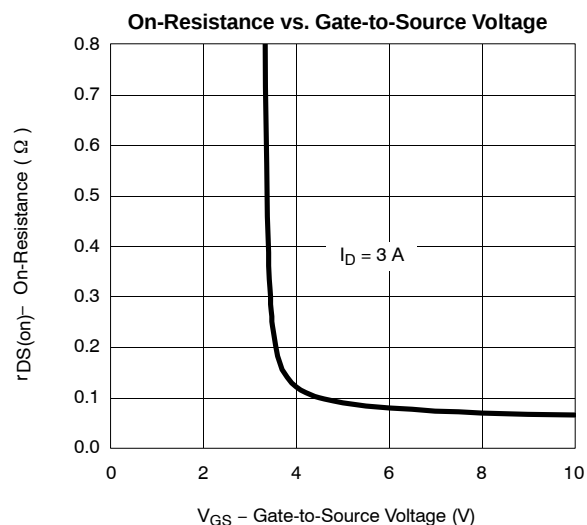
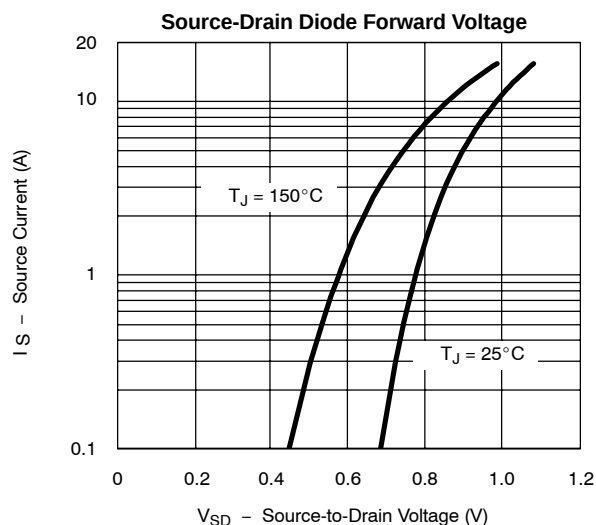
- Pulse test: PW ≤ 300 μs duty cycle ≤ 2%.
- For DESIGN AID ONLY, not subject to production testing.
- Switching time is essentially independent of operating temperature.

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





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