



## N-Channel 30-V (D-S) MOSFET

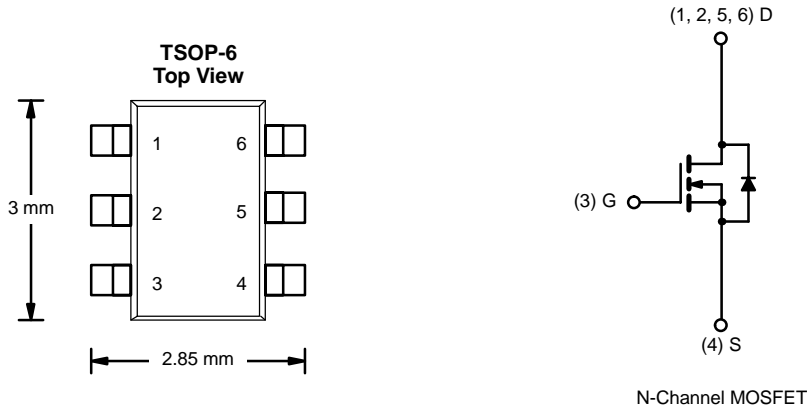
| PRODUCT SUMMARY     |                                 |                    |
|---------------------|---------------------------------|--------------------|
| V <sub>DS</sub> (V) | r <sub>DS(on)</sub> (Ω)         | I <sub>D</sub> (A) |
| 30                  | 0.034 @ V <sub>GS</sub> = 4.5 V | 6.1                |
|                     | 0.050 @ V <sub>GS</sub> = 2.5 V | 5.0                |

### FEATURES

- TrenchFET® Power MOSFET
- 2.5-V Rating for 30-V N-Channel
- Low r<sub>DS(on)</sub> for Footprint Area

### APPLICATIONS

- Li-Ion Battery Protection



| ABSOLUTE MAXIMUM RATINGS (T <sub>A</sub> = 25 °C UNLESS OTHERWISE NOTED) |                        |                                   |            |              |      |
|--|------------------------|-----------------------------------|------------|--------------|------|
| Parameter  |                        | Symbol                            | 5 secs     | Steady State | Unit |
| Drain-Source Voltage   |                        | V <sub>DS</sub>                   | 30         |              | V    |
| Gate-Source Voltage  |                        | V <sub>GS</sub>                   | ± 12       |              |      |
| Continuous Drain Current (T <sub>J</sub> = 150 °C) <sup>a</sup>          | T <sub>A</sub> = 25 °C | I <sub>D</sub>                    | 6.1        | 4.6          | A    |
|  | T <sub>A</sub> = 70 °C |                                   | 4.9        | 3.6          |      |
| Pulsed Drain Current   |                        | I <sub>DM</sub>                   | 30         |              |      |
| Continuous Source Current (Diode Conduction) <sup>a</sup>                |                        | I <sub>S</sub>                    | 1.7        | 1.0          | W    |
| Maximum Power Dissipation <sup>a</sup>                                   | T <sub>A</sub> = 25 °C | P <sub>D</sub>                    | 2.0        | 1.14         |      |
|  | T <sub>A</sub> = 70 °C |                                   | 1.3        | 0.73         |      |
| 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 ≤ 5 sec    | R <sub>thJA</sub> | 40      | 62.5    | °C/W |
|  | Steady State |                   | 90      | 110     |      |
| Maximum Junction-to-Foot (Drain)         | Steady State | R <sub>thJF</sub> | 25      | 30      |      |

Notes

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

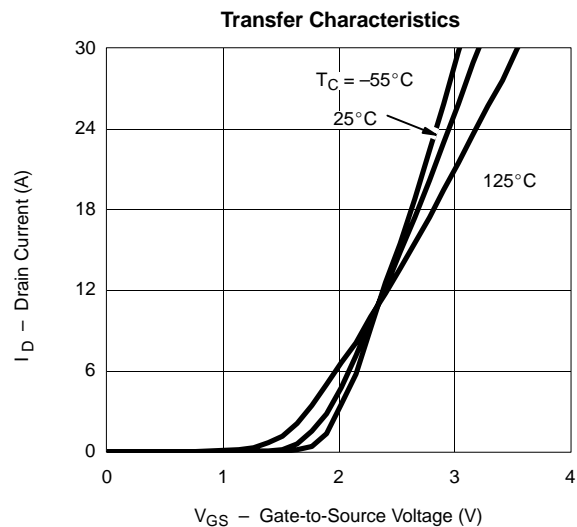
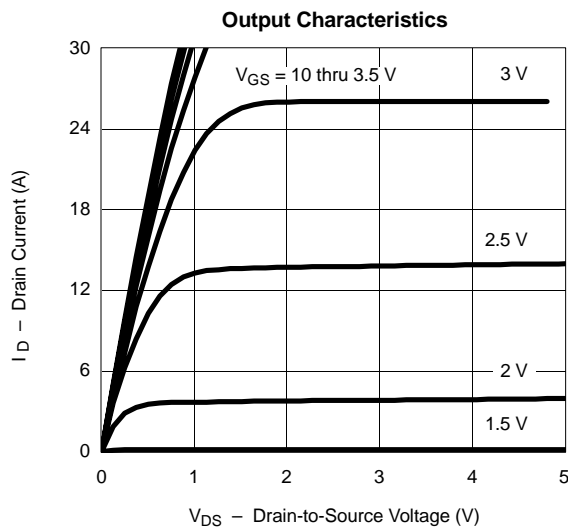
### SPECIFICATIONS (T<sub>J</sub> = 25 °C UNLESS OTHERWISE NOTED)

| 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   | 0.6 |       |       | V    |
| Gate-Body Leakage                             | I <sub>GSS</sub>    | V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ± 12 V   |     |       | ± 100 | nA   |
| Zero Gate Voltage Drain Current               | I <sub>DSS</sub>    | V <sub>DS</sub> = 24 V, V <sub>GS</sub> = 0 V   |     |       | 1     | μA   |
|   |                     | V <sub>DS</sub> = 24 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> = 4.5 V  | 30  |       |       | 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> = 6.1 A   |     | 0.028 | 0.034 | Ω    |
|   |                     | V <sub>GS</sub> = 2.5 V, I <sub>D</sub> = 2 A   |     | 0.042 | 0.050 |      |
| Forward Transconductance <sup>a</sup>         | g <sub>fs</sub>     | V <sub>DS</sub> = 10 V, I <sub>D</sub> = 6.1 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   |     | 0.8   | 1.2   | V    |
| <b>Dynamic<sup>b</sup></b>                    |                     |   |     |       |       |      |
| Total Gate Charge                             | Q <sub>g</sub>      | V <sub>DS</sub> = 15 V, V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 6.1 A   |     | 8     | 12    | nC   |
| Gate-Source Charge                            | Q <sub>gs</sub>     |   |     | 1.9   |       |      |
| Gate-Drain Charge                             | Q <sub>gd</sub>     |   |     | 2.6   |       |      |
| Turn-On Delay Time                            | t <sub>d(on)</sub>  | V <sub>DD</sub> = 15 V, R <sub>L</sub> = 15 Ω<br>I <sub>D</sub> ≅ 1 A, V <sub>GEN</sub> = 4.5 V, R <sub>G</sub> = 6 Ω |     | 21    | 40    | ns   |
| Rise Time                                     | t <sub>r</sub>      |   |     | 45    | 90    |      |
| Turn-Off Delay Time                           | t <sub>d(off)</sub> |   |     | 40    | 80    |      |
| 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.

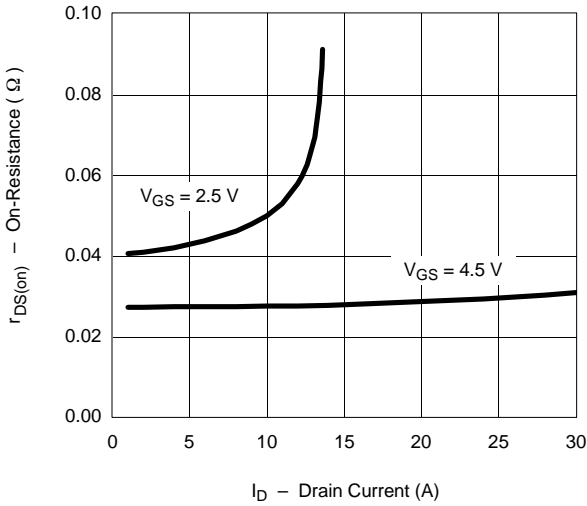
### TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)



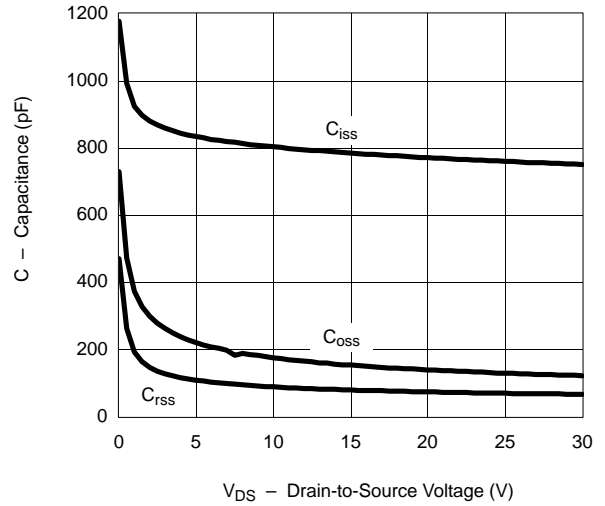


**TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)**

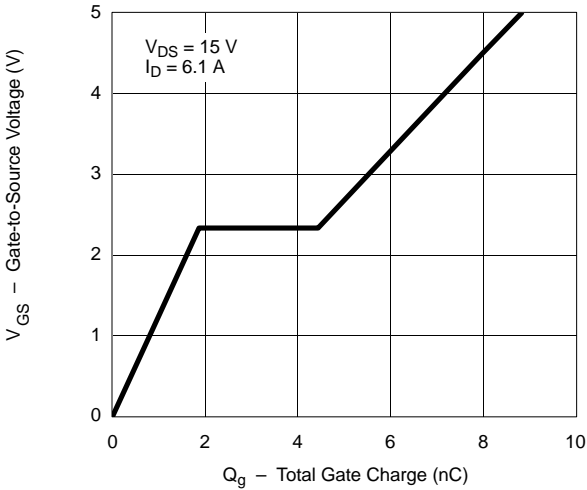
On-Resistance vs. Drain Current



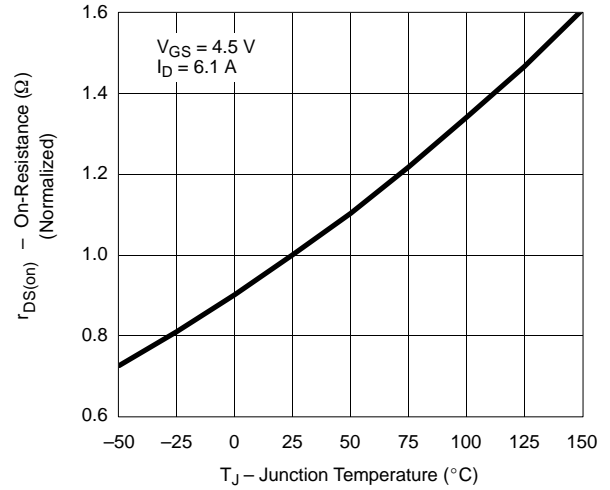
Capacitance



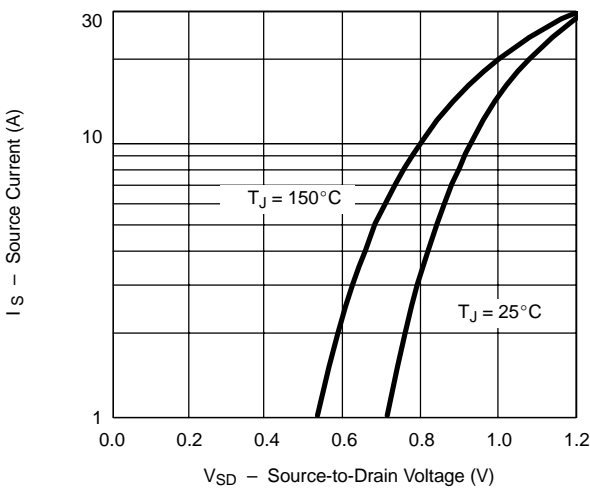
Gate Charge



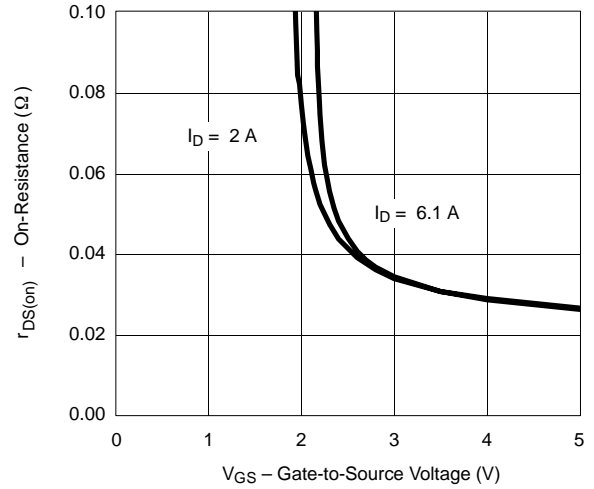
On-Resistance vs. Junction Temperature



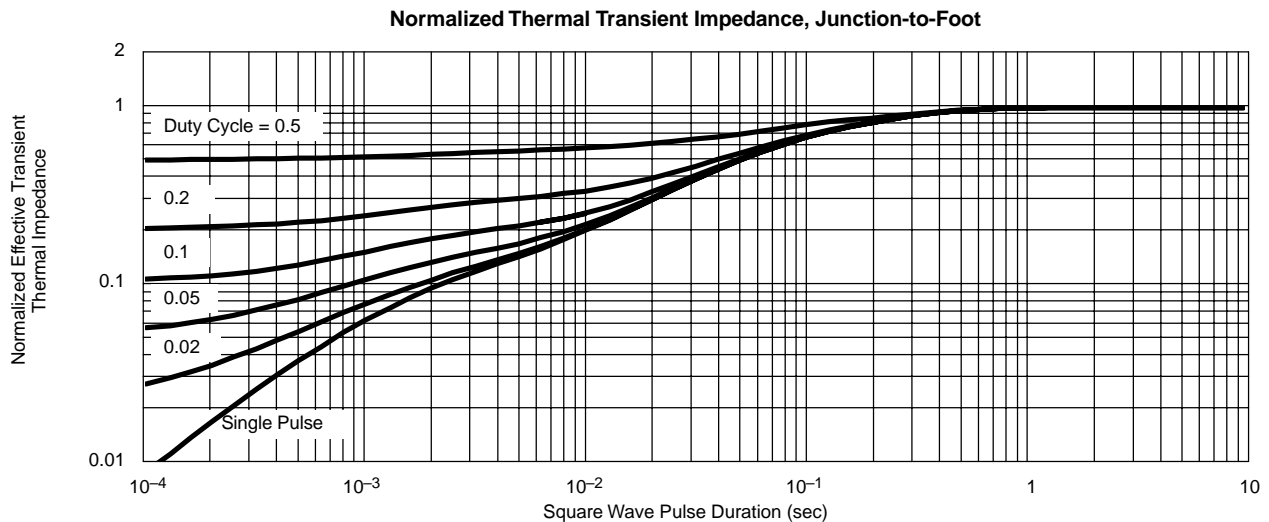
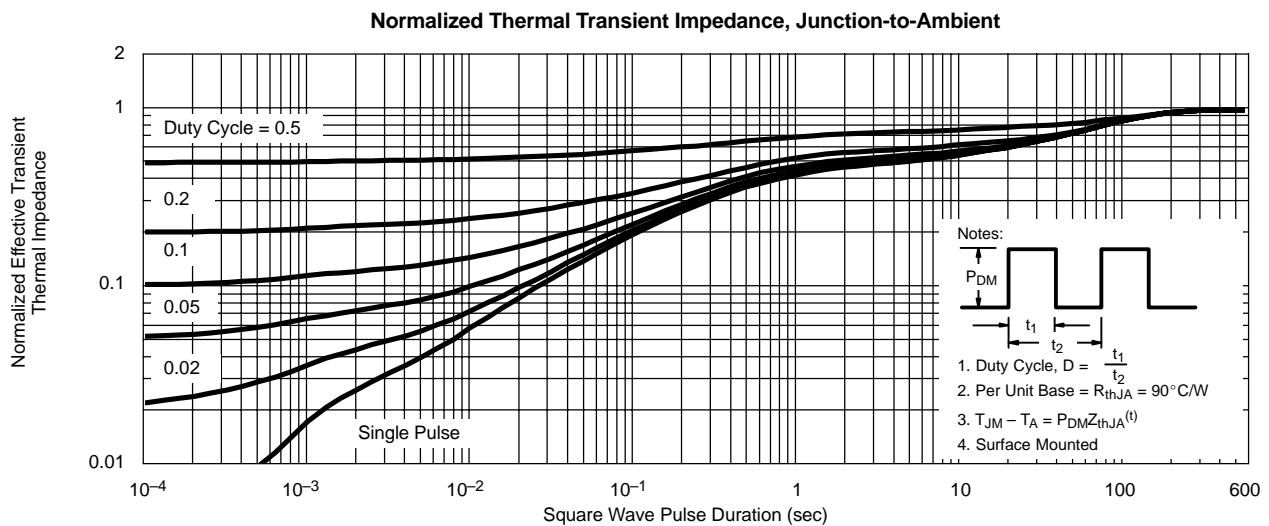
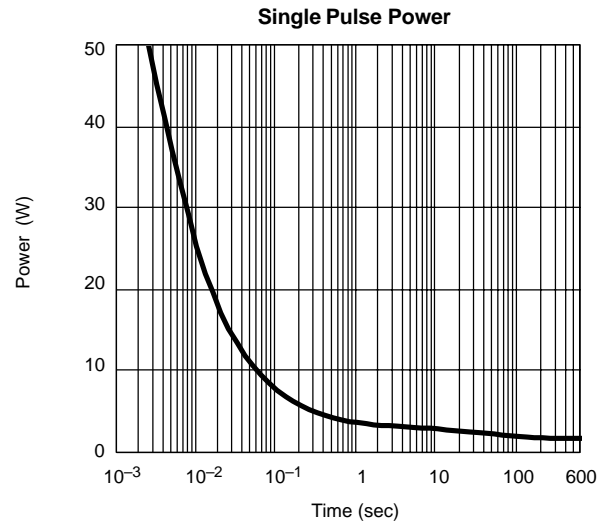
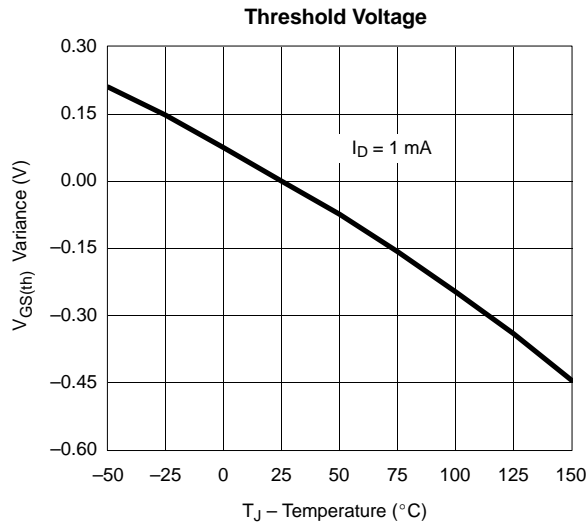
Source-Drain Diode Forward Voltage



On-Resistance vs. Gate-to-Source Voltage



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





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