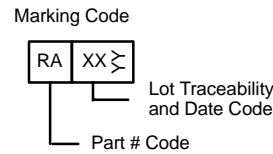
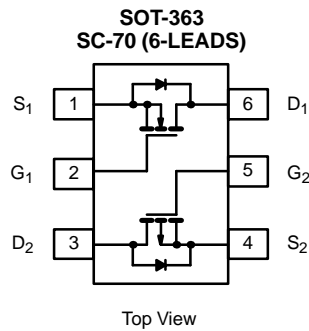


## Complementary 2.5-V (G-S) MOSFET

**TrenchFET®**  
Power MOSFETS  
2.5-V Rated

| PRODUCT SUMMARY |              |                           |            |
|-----------------|--------------|---------------------------|------------|
|                 | $V_{DS}$ (V) | $r_{DS(on)}$ ( $\Omega$ ) | $I_D$ (A)  |
| N-Channel       | 20           | 0.385 @ $V_{GS} = 4.5$ V  | $\pm 0.70$ |
|                 |              | 0.630 @ $V_{GS} = 2.5$ V  | $\pm 0.54$ |
| P-Channel       | -20          | 0.995 @ $V_{GS} = -4.5$ V | $\pm 0.44$ |
|                 |              | 1.800 @ $V_{GS} = -2.5$ V | $\pm 0.32$ |



| ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED) |                          |            |              |            |              |                  |  |
|---|--------------------------|------------|--------------|------------|--------------|------------------|--|
| Parameter   | Symbol                   | N-Channel  |              | P-Channel  |              | Unit             |  |
|   |                          | 5 secs     | Steady State | 5 secs     | Steady State |                  |  |
| Drain-Source Voltage  | $V_{DS}$                 | 20         |              | -20        |              | V                |  |
| Gate-Source Voltage   | $V_{GS}$                 | $\pm 12$   |              |            |              |                  |  |
| Continuous Drain Current ( $T_J = 150^\circ\text{C}$ ) <sup>a</sup>         | $T_A = 25^\circ\text{C}$ | $\pm 0.70$ | $\pm 0.66$   | $\pm 0.44$ | $\pm 0.41$   | A                |  |
|   | $T_A = 85^\circ\text{C}$ | $\pm 0.50$ | $\pm 0.48$   | $\pm 0.31$ | $\pm 0.30$   |                  |  |
| Pulsed Drain Current  | $I_{DM}$                 | $\pm 1.0$  |              |            |              |                  |  |
| Continuous Source Current (Diode Conduction) <sup>a</sup>                   | $I_S$                    | 0.25       | 0.23         | -0.25      | -0.23        |                  |  |
| Maximum Power Dissipation <sup>a</sup>                                      | $T_A = 25^\circ\text{C}$ | 0.30       | 0.27         | 0.30       | 0.27         | W                |  |
|   | $T_A = 85^\circ\text{C}$ | 0.16       | 0.14         | 0.16       | 0.14         |                  |  |
| 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 | $R_{thJA}$ | 360     | 415     | $^\circ\text{C/W}$ |
|  | Steady State   |            | 400     | 460     |                    |
| Maximum Junction-to-Foot (Drain)         | Steady State   | $R_{thJF}$ | 300     | 350     |                    |

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   | N-Ch | 0.6  |       |       | V    |
|  |                     | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250 μA  | P-Ch | -0.6 |       |       |      |
| Gate-Body Leakage  | I <sub>GSS</sub>    | V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ±12 V  | N-Ch |      |       | ±100  | nA   |
|  |                     |   | P-Ch |      |       | ±100  |      |
| Zero Gate Voltage Drain Current                                | I <sub>DSS</sub>    | V <sub>DS</sub> = 16 V, V <sub>GS</sub> = 0 V   | N-Ch |      |       | 1     | μA   |
|  |                     | V <sub>DS</sub> = -16 V, V <sub>GS</sub> = 0 V  | P-Ch |      |       | -1    |      |
|  |                     | V <sub>DS</sub> = 16 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 85 °C   | N-Ch |      |       | 5     |      |
|  |                     | V <sub>DS</sub> = -16 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 85 °C  | P-Ch |      |       | -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  | N-Ch | 1.0  |       |       | A    |
|  |                     | V <sub>DS</sub> ≤ -5 V, V <sub>GS</sub> = -4.5 V  | P-Ch | -1.0 |       |       |      |
| Drain-Source On-State Resistance <sup>a</sup>                  | r <sub>DS(on)</sub> | V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 0.66 A  | N-Ch |      | 0.320 | 0.385 | Ω    |
|  |                     | V <sub>GS</sub> = -4.5 V, I <sub>D</sub> = -0.41 A  | P-Ch |      | 0.850 | 0.995 |      |
|  |                     | V <sub>GS</sub> = 2.5 V, I <sub>D</sub> = 0.40 A  | N-Ch |      | 0.560 | 0.630 |      |
|  |                     | V <sub>GS</sub> = -2.5 V, I <sub>D</sub> = -0.25 A  | P-Ch |      | 1.4   | 1.800 |      |
| Forward Transconductance <sup>a</sup>                          | g <sub>fs</sub>     | V <sub>DS</sub> = 10 V, I <sub>D</sub> = 0.66 A   | N-Ch |      | 1.5   |       | S    |
|  |                     | V <sub>DS</sub> = -10 V, I <sub>D</sub> = -0.41 A   | P-Ch |      | 0.8   |       |      |
| Diode Forward Voltage <sup>a</sup>                             | V <sub>SD</sub>     | I <sub>S</sub> = 0.23 A, V <sub>GS</sub> = 0 V  | N-Ch |      | 0.8   | 1.2   | V    |
|  |                     | I <sub>S</sub> = -0.23 A, V <sub>GS</sub> = 0 V   | P-Ch |      | -0.8  | -1.2  |      |
| <b>Dynamic<sup>b</sup></b>                                     |                     |   |      |      |       |       |      |
| Total Gate Charge  | Q <sub>g</sub>      | <b>N-Channel</b><br>V <sub>DS</sub> = 10 V, V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 0.66 A<br><br><b>P-Channel</b><br>V <sub>DS</sub> = -10 V, V <sub>GS</sub> = -4.5 V, I <sub>D</sub> = -0.41 A   | N-Ch |      | 0.8   | 1.2   | nC   |
|  |                     |   | P-Ch |      | 1.2   | 1.8   |      |
| Gate-Source Charge   | Q <sub>gs</sub>     |   | N-Ch |      | 0.06  |       |      |
|  |                     |   | P-Ch |      | 0.45  |       |      |
| Gate-Drain Charge  | Q <sub>gd</sub>     |   | N-Ch |      | 0.30  |       |      |
|  |                     |   | P-Ch |      | 0.25  |       |      |
| Turn-On Delay Time   | t <sub>d(on)</sub>  | <b>N-Channel</b><br>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<br><br><b>P-Channel</b><br>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 | N-Ch |      | 10    | 20    | ns   |
|  |                     |   | P-Ch |      | 7.5   | 15    |      |
| Rise Time  | t <sub>r</sub>      |   | N-Ch |      | 16    | 30    |      |
|  |                     |   | P-Ch |      | 20    | 40    |      |
| Turn-Off Delay Time  | t <sub>d(off)</sub> |   | N-Ch |      | 10    | 20    |      |
|  |                     |   | P-Ch |      | 8.5   | 17    |      |
| Fall Time  | t <sub>f</sub>      |   | N-Ch |      | 10    | 20    |      |
|  |                     |   | P-Ch |      | 12    | 24    |      |
| Source-Drain Reverse Recovery Time                             | t <sub>rr</sub>     | I <sub>F</sub> = 0.23 A, di/dt = 100 A/μs   | N-Ch |      | 20    | 40    |      |
|  |                     | I <sub>F</sub> = -0.23 A, di/dt = 100 A/μs  | P-Ch |      | 25    | 40    |      |

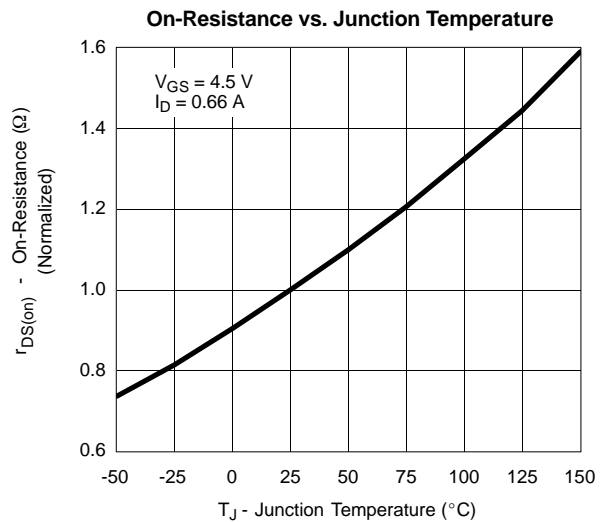
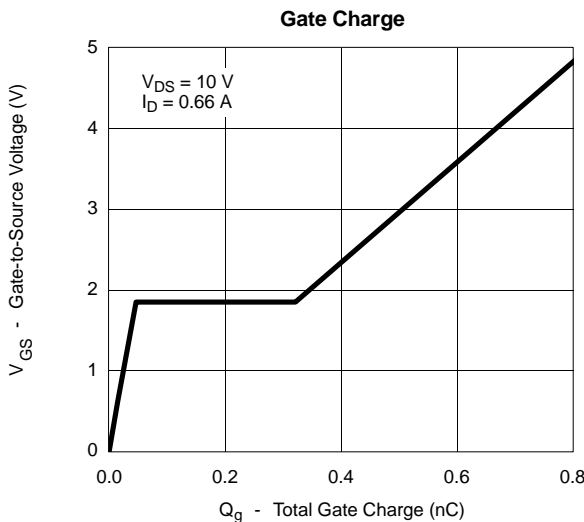
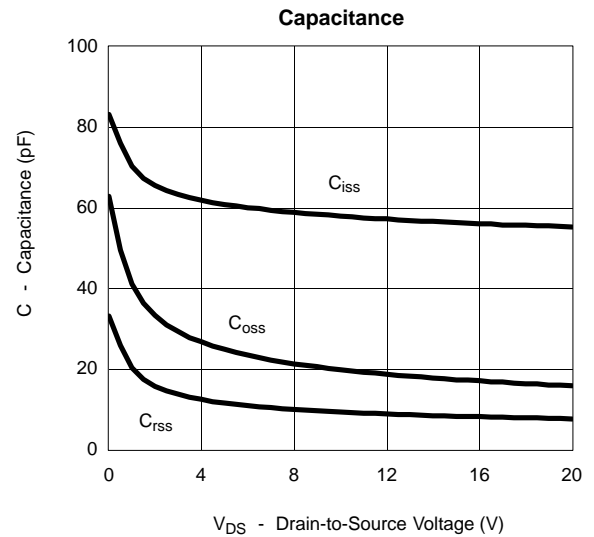
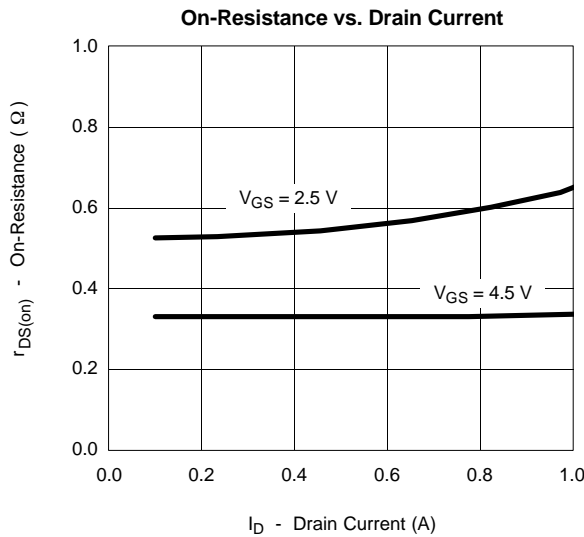
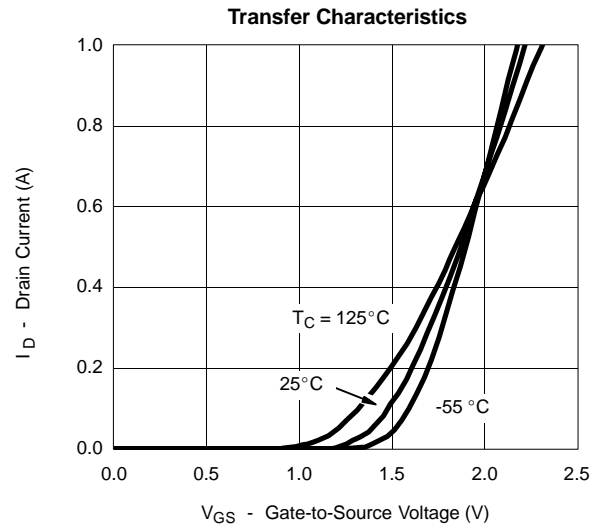
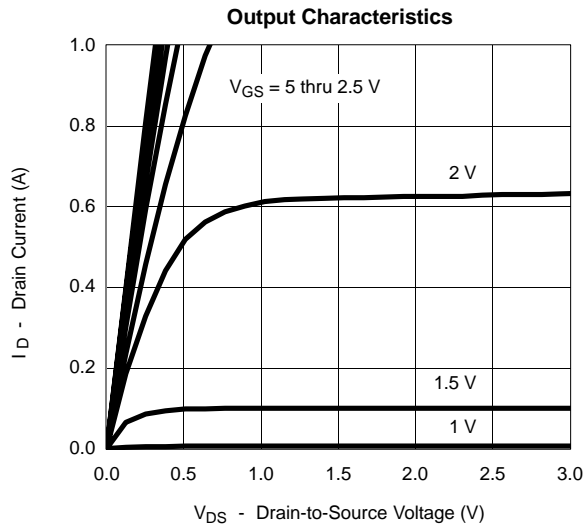
## Notes

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



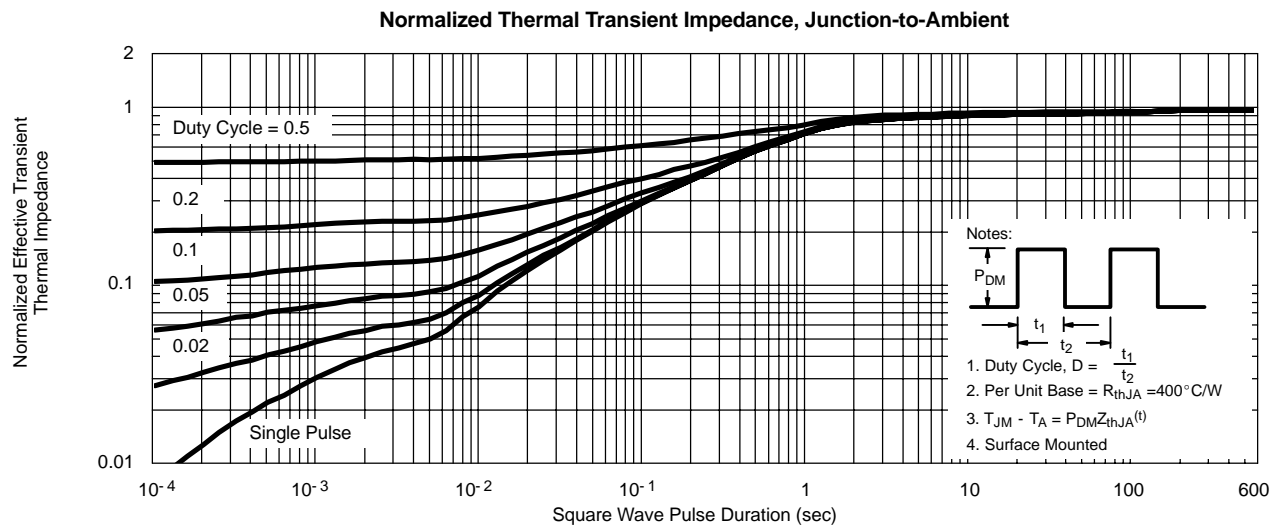
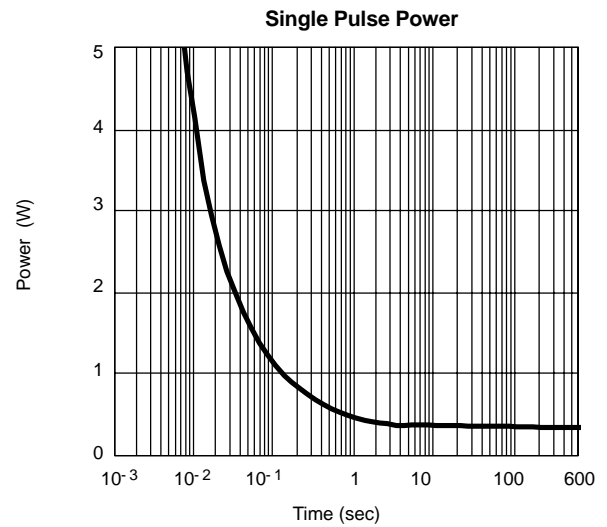
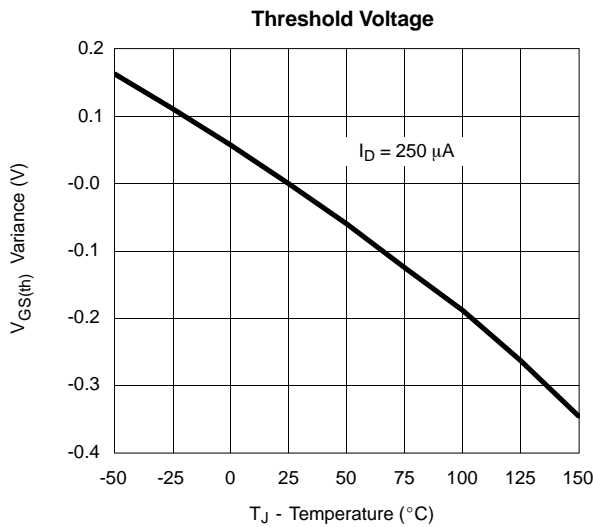
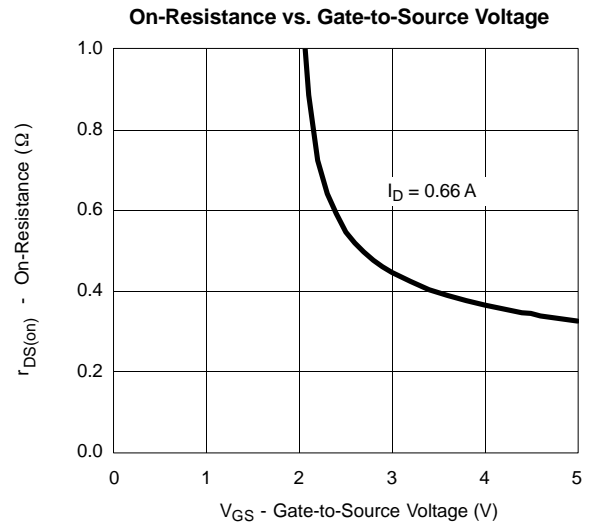
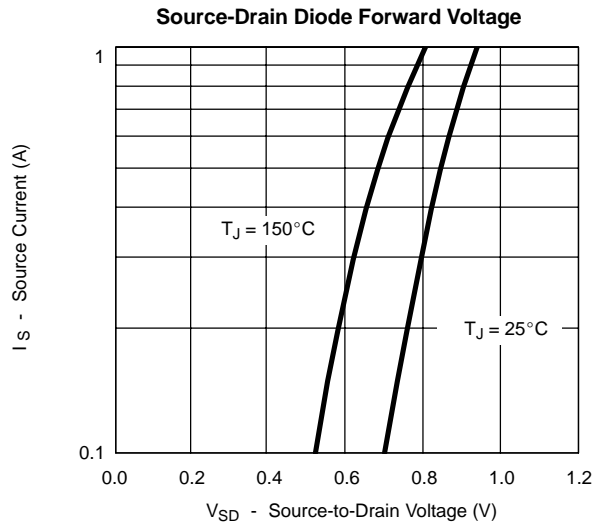
**TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)**

**N-CHANNEL**



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

**N-CHANNEL**

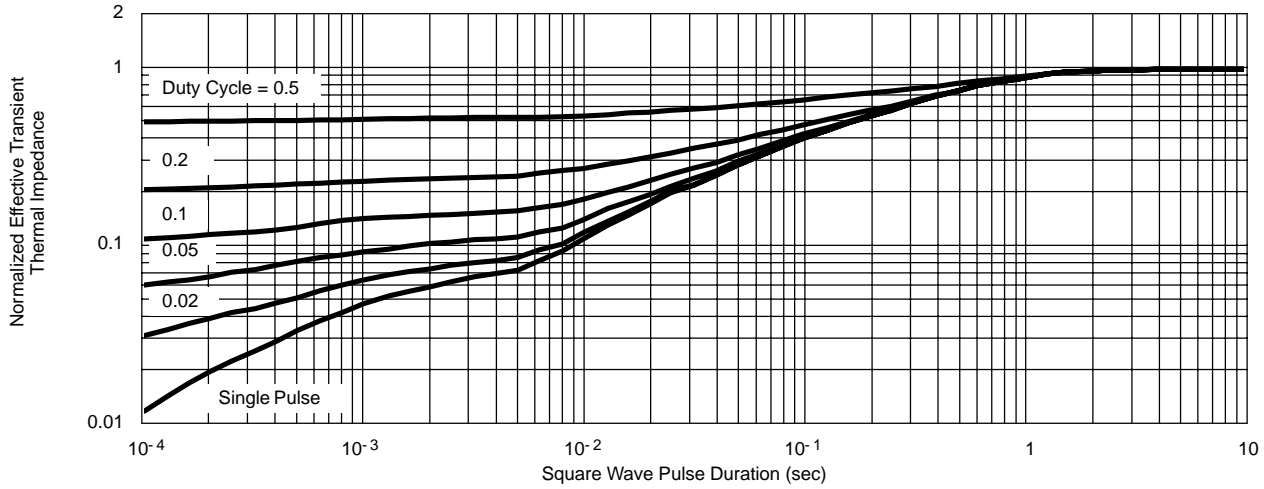




**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)**

**N-CHANNEL**

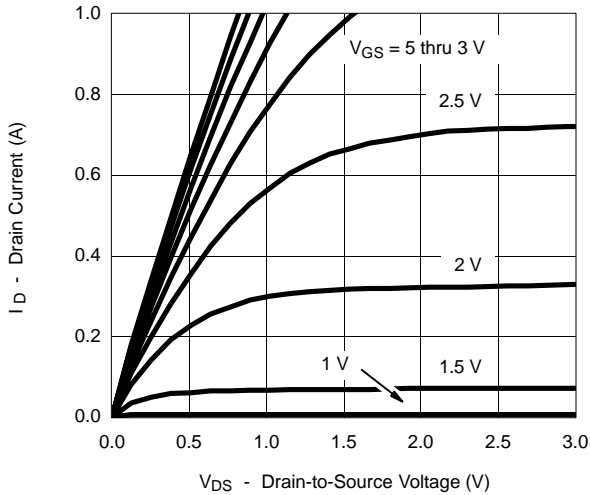
Normalized Thermal Transient Impedance, Junction-to-Foot



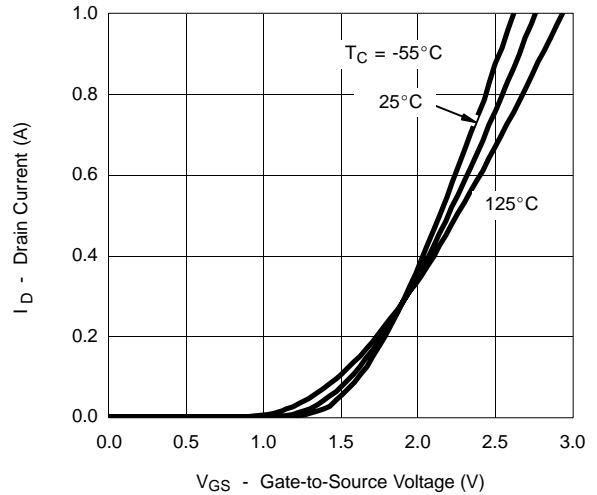
**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)**

**P-CHANNEL**

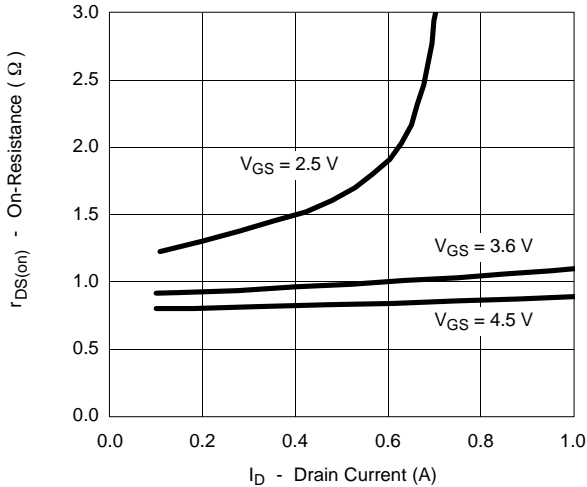
Output Characteristics



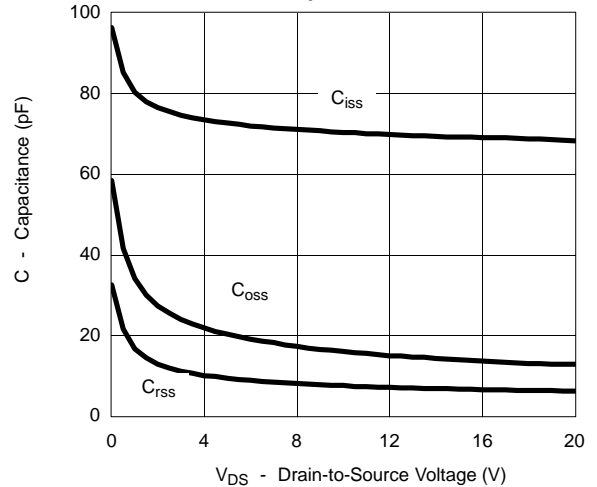
Transfer Characteristics



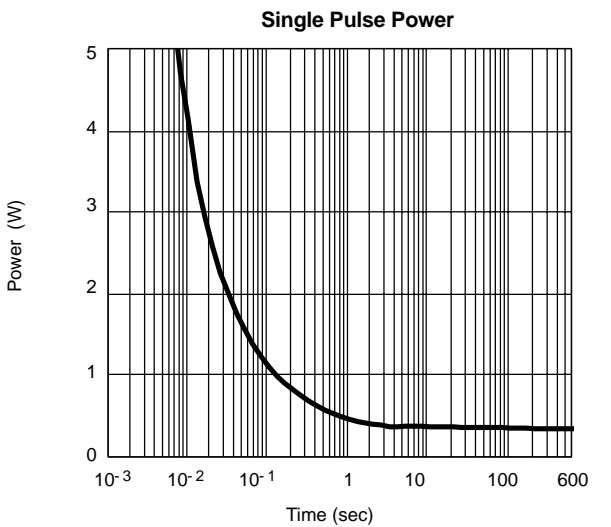
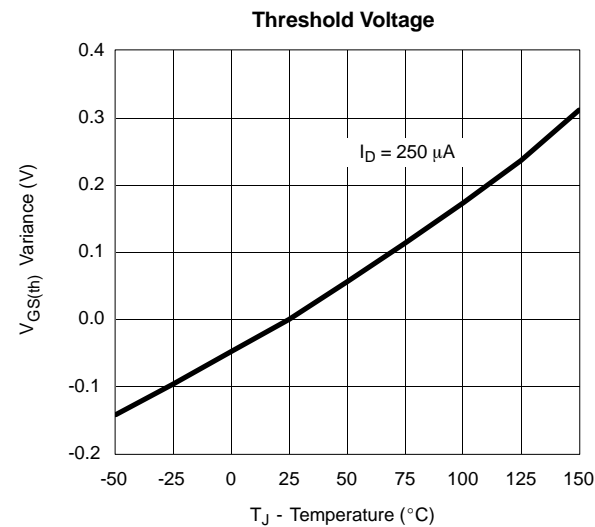
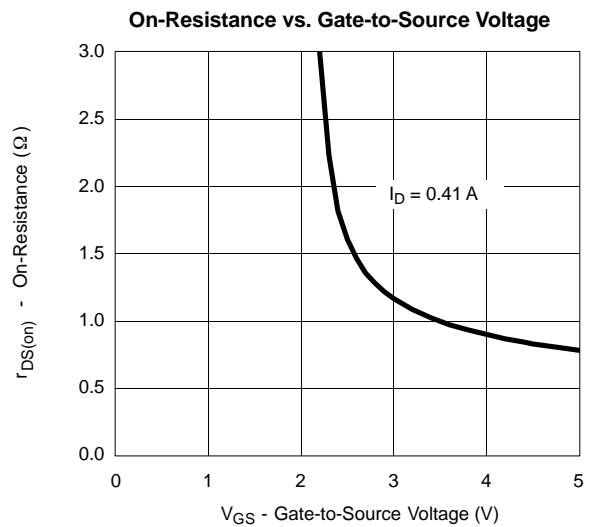
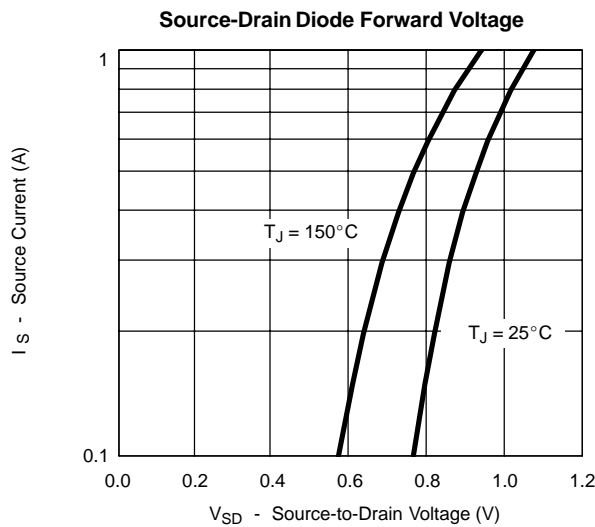
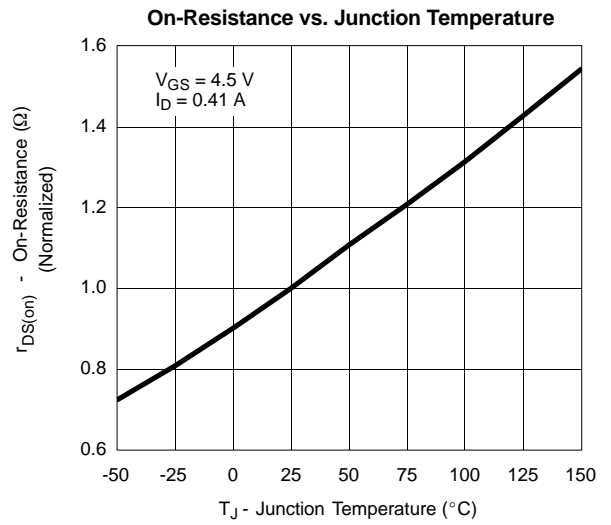
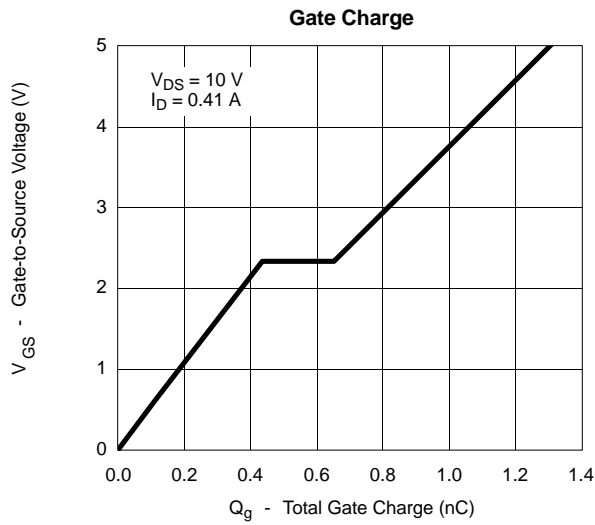
On-Resistance vs. Drain Current



Capacitance

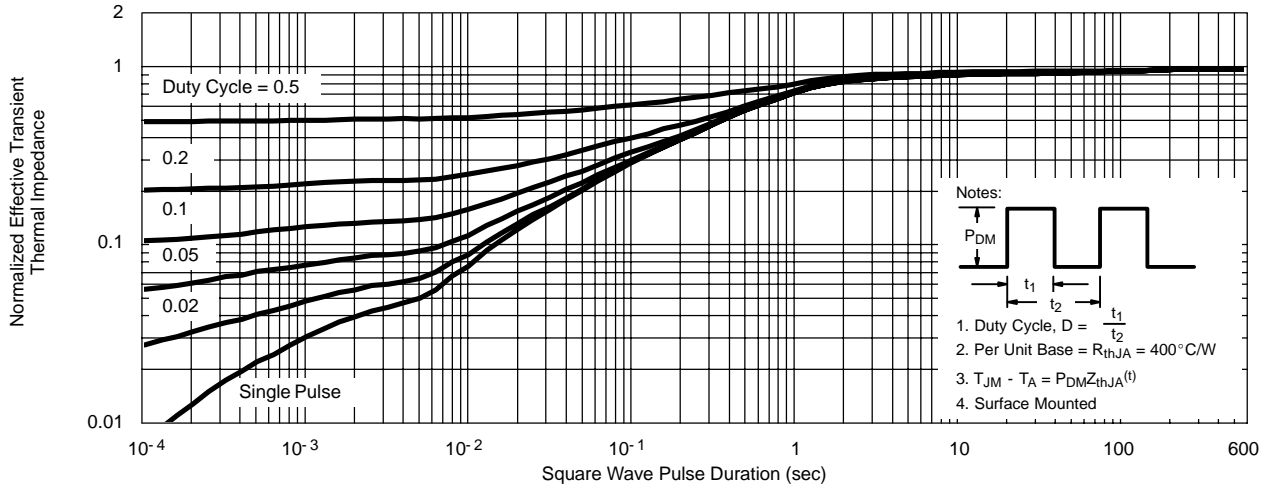


**TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED) P-CHANNEL**

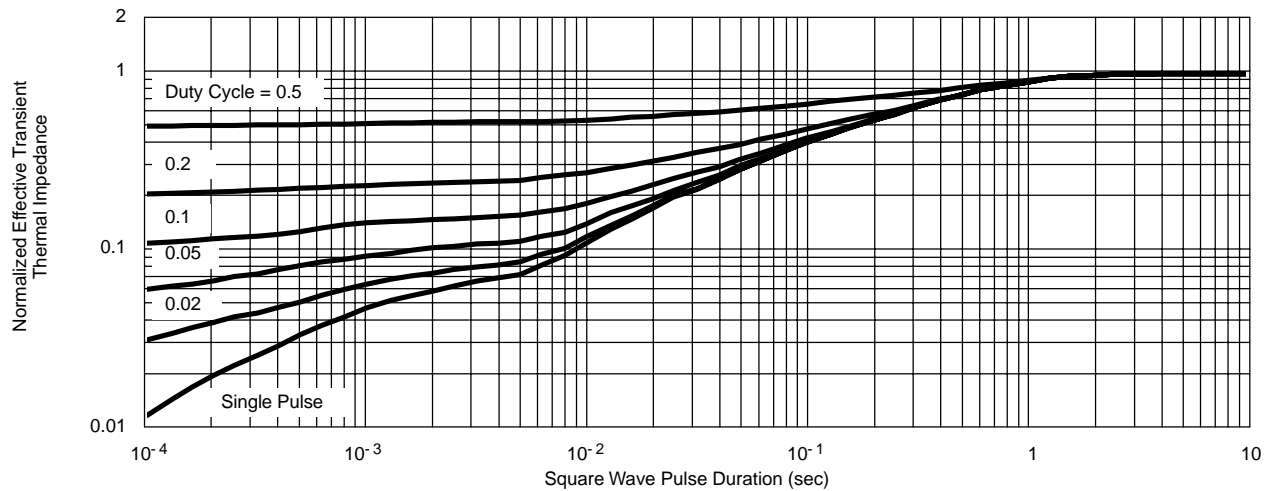


**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED) P-CHANNEL**

**Normalized Thermal Transient Impedance, Junction-to-Ambient**



**Normalized Thermal Transient Impedance, Junction-to-Foot**





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