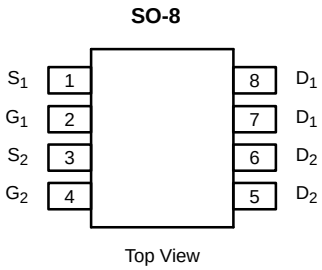
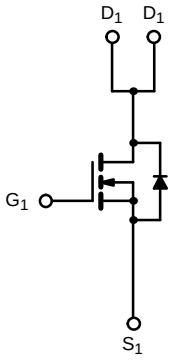
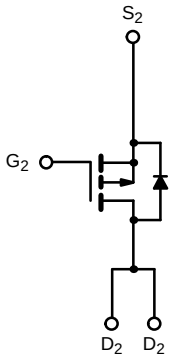
# Complimentary 20-V (D-S) MOSFET

| PRODUCT SUMMARY | | | |
|---|---|---|---|
| | $V_{DS}$ (V) | $r_{DS(on)}$ (Ω) | $I_D$ (A) |
| N-Channel | 20 | 0.125 @ $V_{GS}$ = 10 V | ±3.0 |
| | | 0.250 @ $V_{GS}$ = 4.5 V | ±2.0 |
| P-Channel | –20 | 0.200 @ $V_{GS}$ = –10 V | ±2.5 |
| | | 0.350 @ $V_{GS}$ = –4.5 V | ±2.0 |




N-Channel MOSFET




P-Channel MOSFET

| ABSOLUTE MAXIMUM RATINGS ($T_A$ = 25°C UNLESS OTHERWISE NOTED) | | | | | |
|---|---|---|---|---|---|
| Parameter | | Symbol | N-Channel | P-Channel | Unit |
| Drain-Source Voltage | | $V_{DS}$ | 20 | –20 | V |
| Gate-Source Voltage | | $V_{GS}$ | ±20 | ±20 | |
| Continuous Drain Current ($T_J$ = 150°C)[a] | $T_A$ = 25°C | $I_D$ | ±3.0 | ±2.5 | A |
| | $T_A$ = 70°C | | ±2.5 | ±2.0 | |
| Pulsed Drain Current | | $I_{DM}$ | ±10 | ±10 | |
| Continuous Source Current (Diode Conduction)[a] | | $I_S$ | 1.6 | –1.6 | |
| Maximum Power Dissipation[a] | $T_A$ = 25°C | $P_D$ | 2.0 | | W |
| | $T_A$ = 70°C | | 1.3 | | |
| Operating Junction and Storage Temperature Range | | $T_J$, $T_{stg}$ | –55 to 150 | | °C |

| THERMAL RESISTANCE RATINGS | | | |
|---|---|---|---|
| Parameter | Symbol | N- or P-Channel | Unit |
| Maximum Junction-to-Ambient[a] | $R_{thJA}$ | 62.5 | °C/W |

Notes
a. Surface Mounted on FR4 Board, t ≤ 10 sec.

For SPICE model information via the Worldwide Web: http://www.vishay.com/www/product/spice.htm

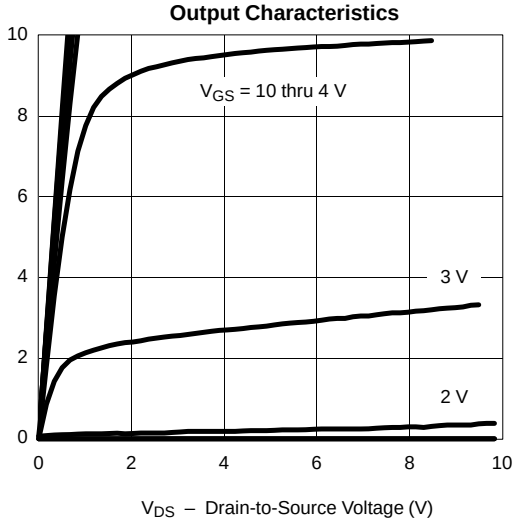
## SPECIFICATIONS ($T_J$ = 25°C UNLESS OTHERWISE NOTED)

| Parameter | Symbol | Test Condition | | Min | Typ[a] | Max | Unit |
|---|---|---|---|---|---|---|---|
| **Static** | | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$ = $V_{GS}$, $I_D$ = 250 µA | N-Ch | 1.0 | | | V |
| | | $V_{DS}$ = $V_{GS}$, $I_D$ = –250 µA | P-Ch | –1.0 | | | |
| Gate-Body Leakage | $I_{GSS}$ | $V_{DS}$ = 0 V, $V_{GS}$ = ±20 V | | | | ±100 | nA |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$ = 16 V, $V_{GS}$ = 0 V | N-Ch | | | 2 | µA |
| | | $V_{DS}$ = –16 V, $V_{GS}$ = 0 V | P-Ch | | | –2 | |
| | | $V_{DS}$ = 16 V, $V_{GS}$ = 0 V, $T_J$ = 55°C | N-Ch | | | 25 | |
| | | $V_{DS}$ = –16 V, $V_{GS}$ = 0 V, $T_J$ = 55°C | P-Ch | | | –25 | |
| On-State Drain Current[b] | $I_{D(on)}$ | $V_{DS}$ ≥ 5 V, $V_{GS}$ = 10 V | N-Ch | 10 | | | A |
| | | $V_{DS}$ ≤ –5 V, $V_{GS}$ = –10 V | P-Ch | –10 | | | |
| | | $V_{DS}$ ≥ 5 V, $V_{GS}$ = 4.5 V | N-Ch | 2 | | | |
| | | $V_{DS}$ ≤ –5 V, $V_{GS}$ = –4.5 V | P-Ch | –2 | | | |
| Drain-Source On-State Resistance[b] | $r_{DS(on)}$ | $V_{GS}$ = 10 V, $I_D$ = 1.0 A | N-Ch | | 0.07 | 0.125 | Ω |
| | | $V_{GS}$ = –10 V, $I_D$ = 1.0 A | P-Ch | | 0.12 | 0.200 | |
| | | $V_{GS}$ = 4.5 V, $I_D$ = 0.5 A | N-Ch | | 0.105 | 0.250 | |
| | | $V_{GS}$ = –4.5 V, $I_D$ = 0.5 A | P-Ch | | 0.22 | 0.350 | |
| Forward Transconductance[b] | $g_{fs}$ | $V_{DS}$ = 15 V, $I_D$ = 3.0 A | N-Ch | | 4.8 | | S |
| | | $V_{DS}$ = –15 V, $I_D$ = –3.0 A | P-Ch | | 3.0 | | |
| Diode Forward Voltage[b] | $V_{SD}$ | $I_S$ = 1.25 A, $V_{GS}$ = 0 V | N-Ch | | 0.75 | 1.2 | V |
| | | $I_S$ = –1.25 A, $V_{GS}$ = 0 V | P-Ch | | –0.8 | –1.2 | |
| **Dynamic[a]** | | | | | | | |
| Total Gate Charge | $Q_g$ | N-Channel<br>$V_{DS}$ = 10 V, $V_{GS}$ = 10 V, $I_D$ = 2.3 A<br>P-Channel<br>$V_{DS}$ = –10 V, $V_{GS}$ = –10 V, $I_D$ = –2.3 A | N-Ch | | 7 | 25 | nC |
| | | | P-Ch | | 6.7 | 25 | |
| Gate-Source Charge | $Q_{gs}$ | | N-Ch | | 0.75 | | |
| | | | P-Ch | | 1.3 | | |
| Gate-Drain Charge | $Q_{gd}$ | | N-Ch | | 1.7 | | |
| | | | P-Ch | | 1.6 | | |
| Turn-On Delay Time | $t_{d(on)}$ | N-Channel<br>$V_{DD}$ = 20 V, $R_L$ = 20 Ω<br>$I_D$ ≅ 1 A, $V_{GEN}$ = 10 V, $R_G$ = 6 Ω<br>P-Channel<br>$V_{DD}$ = –20 V, $R_L$ = 20 Ω<br>$I_D$ ≅ –1 A, $V_{GEN}$ = –10 V, $R_G$ = 6 Ω | N-Ch | | 6 | 15 | ns |
| | | | P-Ch | | 10 | 40 | |
| Rise Time | $t_r$ | | N-Ch | | 10 | 20 | |
| | | | P-Ch | | 12 | 40 | |
| Turn-Off Delay Time | $t_{d(off)}$ | | N-Ch | | 17 | 50 | |
| | | | P-Ch | | 20 | 90 | |
| Fall Time | $t_f$ | | N-Ch | | 10 | 50 | |
| | | | P-Ch | | 10 | 50 | |
| Source-Drain Reverse Recovery Time | $t_{rr}$ | $I_F$ = 1.25 A, di/dt = 100 A/µs | N-Ch | | 45 | 100 | |
| | | | P-Ch | | 70 | 100 | |

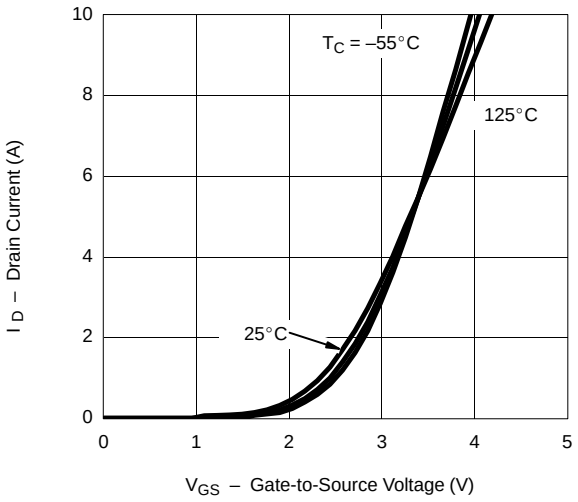
Notes
a. Guaranteed by design, not subject to production testing.
b. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2%.

## TYPICAL CHARACTERISTICS (25°C UNLESS NOTED) N-CHANNEL

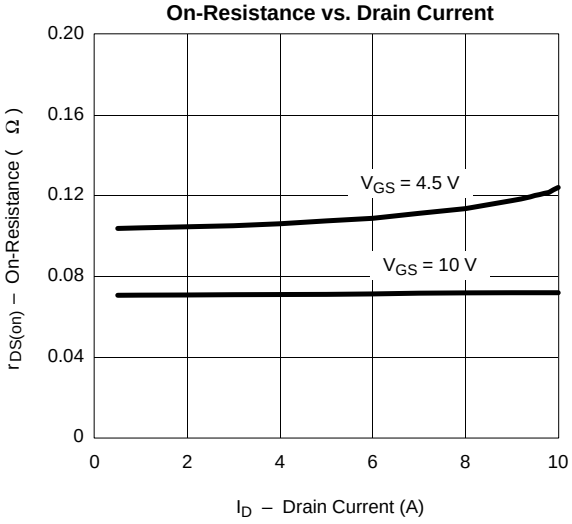
### Output Characteristics



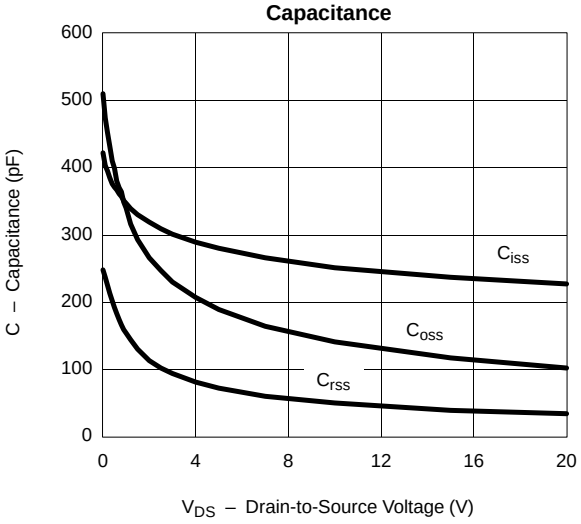

### Transfer Characteristics



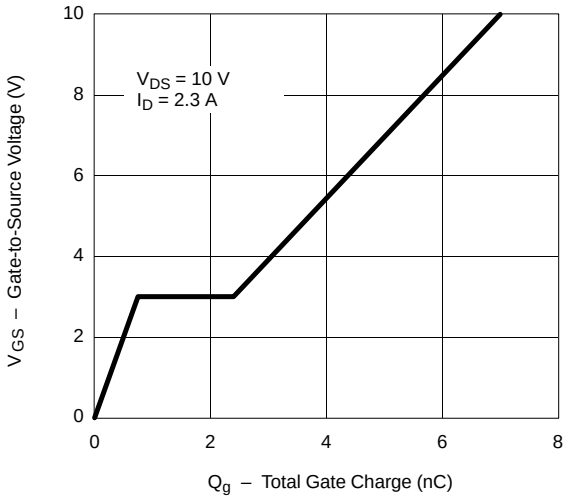

### On-Resistance vs. Drain Current



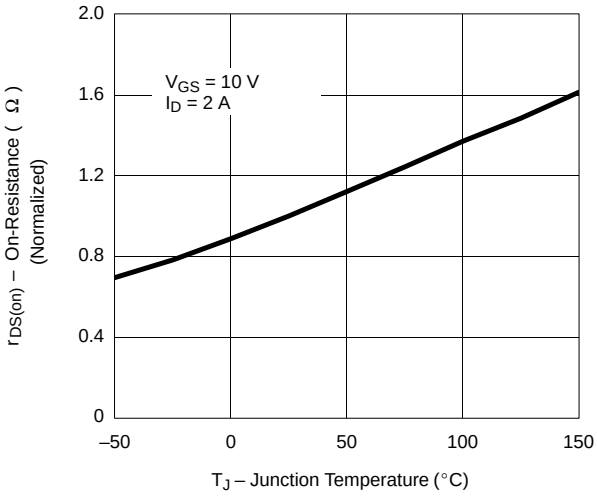

### Capacitance




### Gate Charge

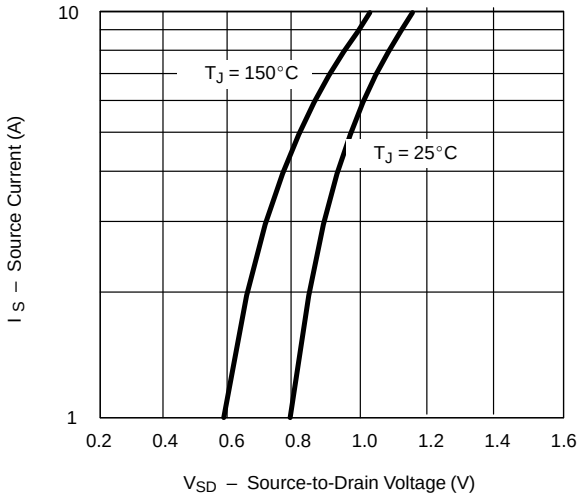



### On-Resistance vs. Junction Temperature

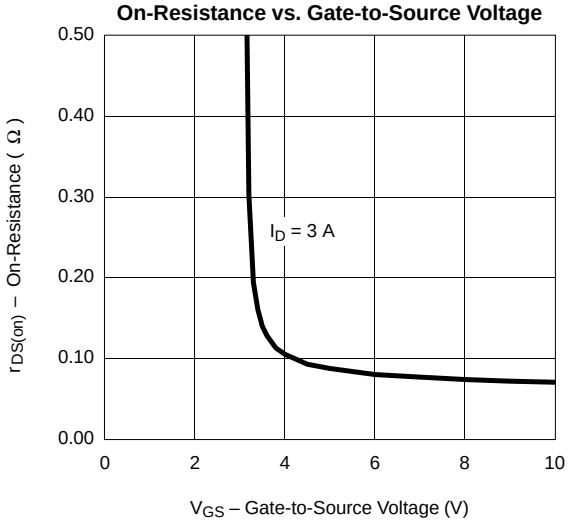


## TYPICAL CHARACTERISTICS (25°C UNLESS NOTED) N-CHANNEL

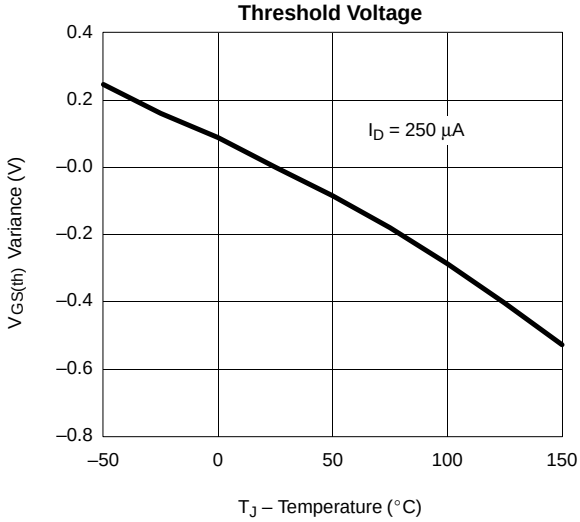
### Source-Drain Diode Forward Voltage



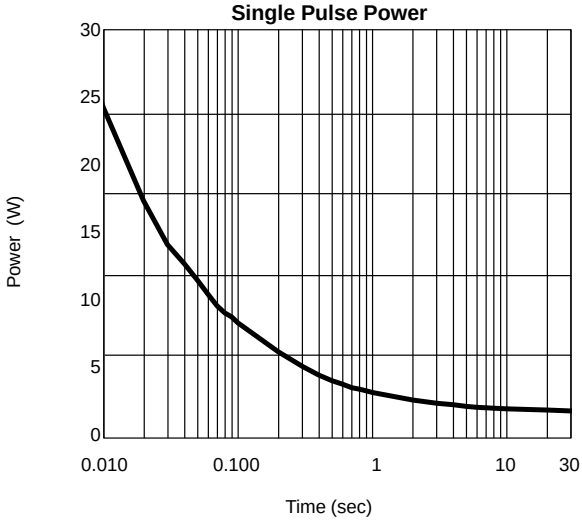

### On-Resistance vs. Gate-to-Source Voltage



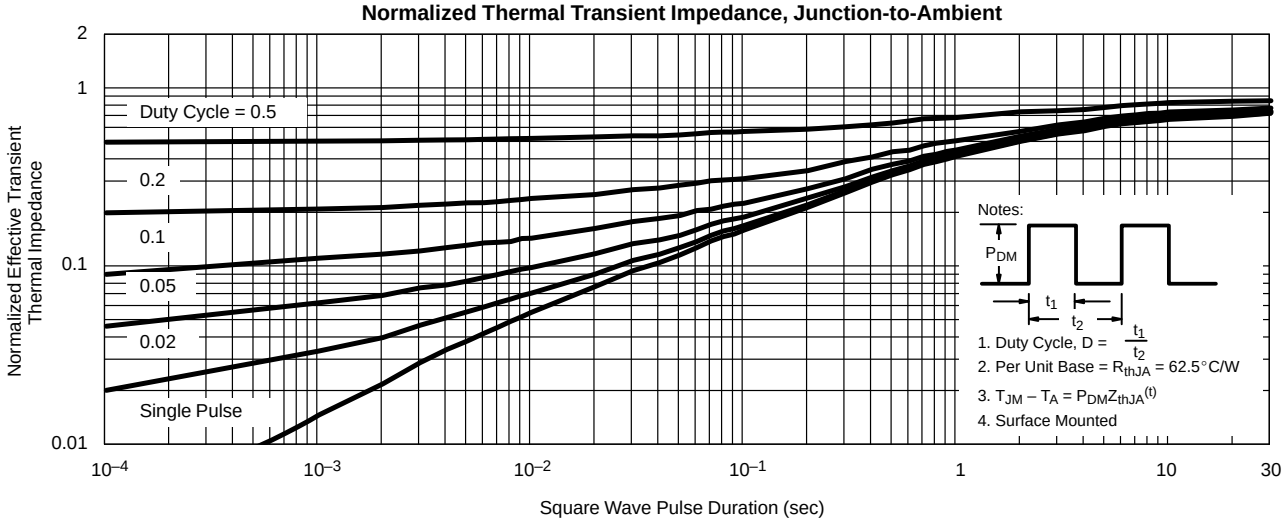

### Threshold Voltage




### Single Pulse Power

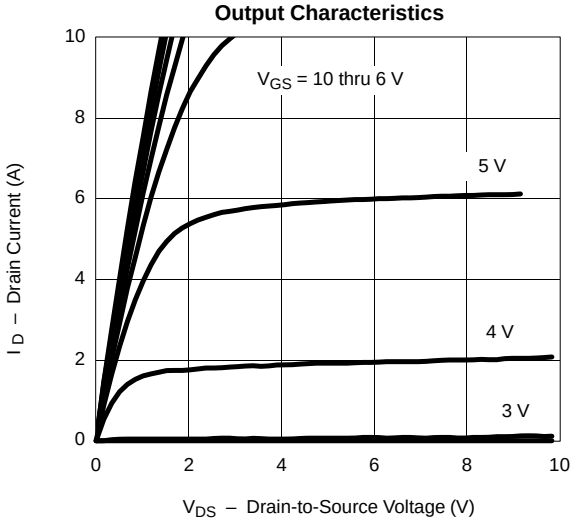



### Normalized Thermal Transient Impedance, Junction-to-Ambient

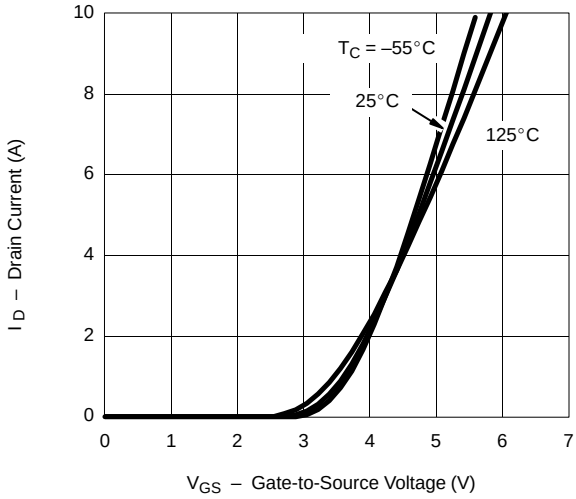


## TYPICAL CHARACTERISTICS (25°C UNLESS NOTED) P-CHANNEL

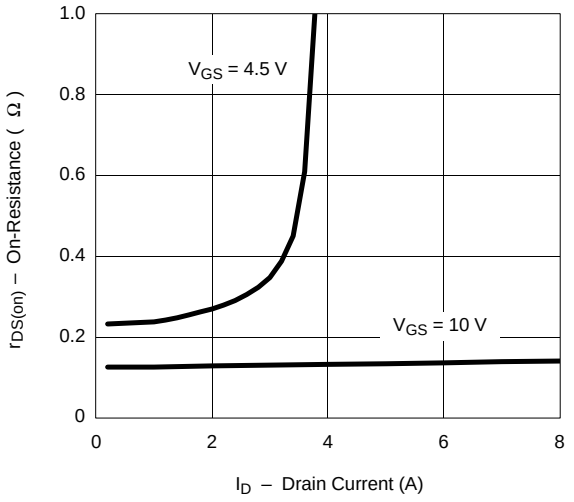
### Output Characteristics




### Transfer Characteristics




### On-Resistance vs. Drain Current

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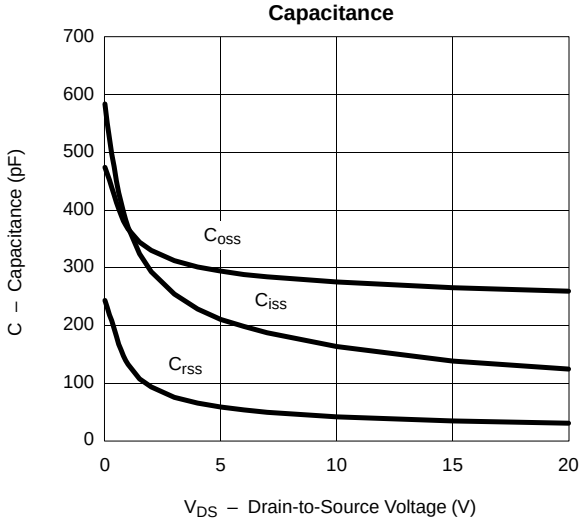
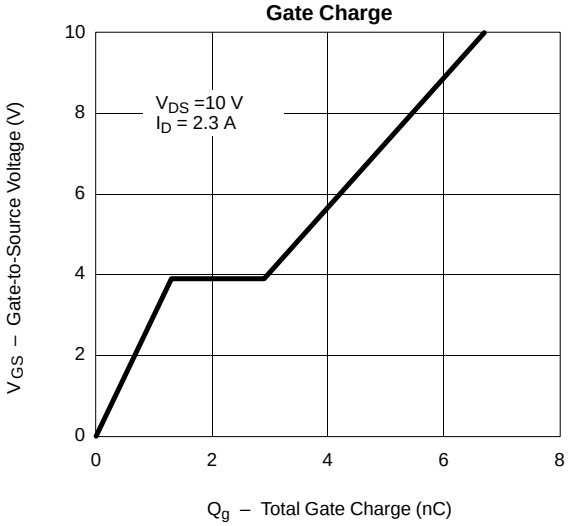



### Gate Charge

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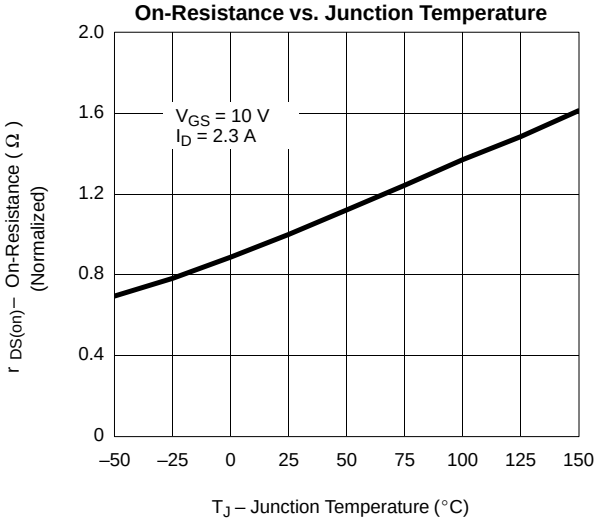

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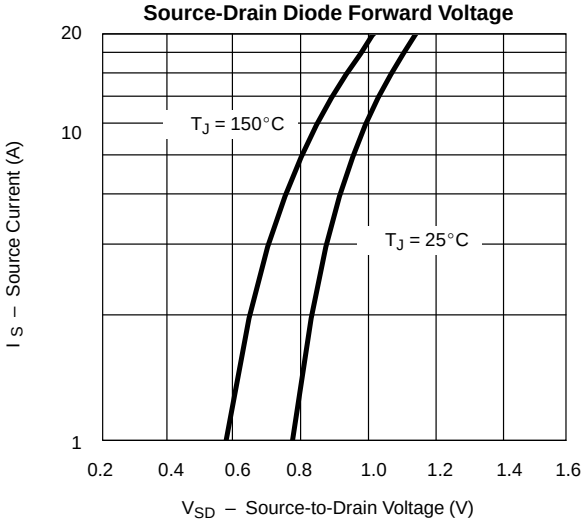
### Source-Drain Diode Forward Voltage

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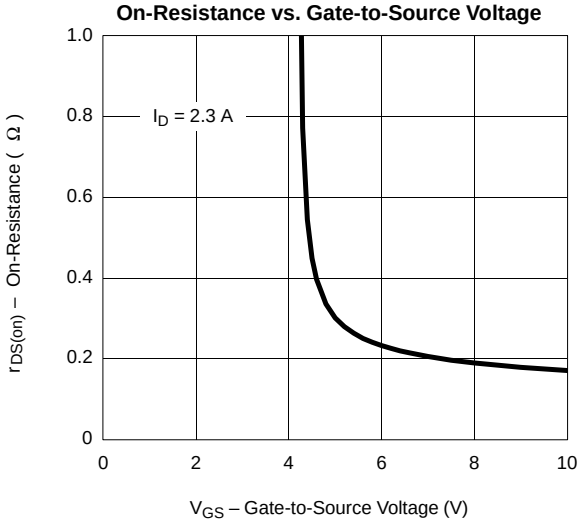


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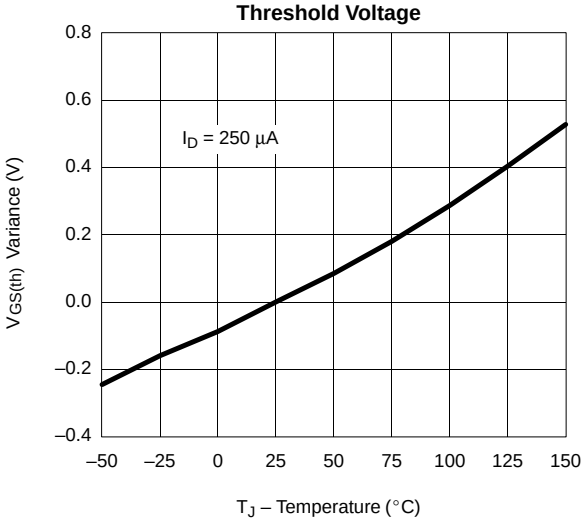


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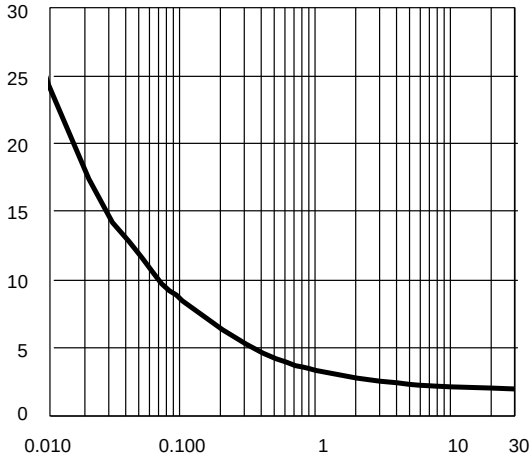


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