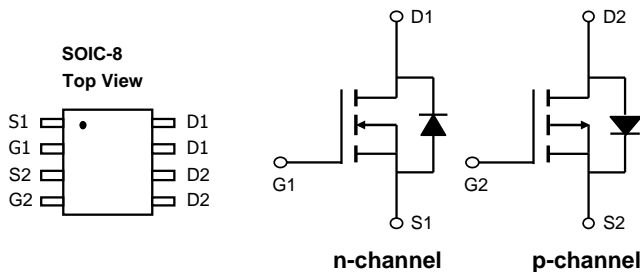




Product Summary

| N-Channel | P-Channel |
|----------------------------|-----------------------------|
| $V_{DS} (V) = 20V$ | -20V |
| $I_D = 6.4A (V_{GS}=4.5V)$ | -6.4A ($V_{GS} = -4.5V$) |
| $R_{DS(ON)}$ | $R_{DS(ON)}$ |
| < 23mΩ ($V_{GS}=4.5V$) | < 40mΩ ($V_{GS} = -4.5V$) |
| < 30mΩ ($V_{GS}=2.5V$) | < 50mΩ ($V_{GS} = -2.5V$) |
| 100% UIS Tested | 100% UIS Tested |
| 100% Rg Tested | 100% Rg Tested |



Absolute Maximum Ratings $T_A=25^\circ C$ unless otherwise noted

| Parameter | Symbol | Max n-channel | Max p-channel | Units |
|--|----------------|---------------|---------------|-------|
| Drain-Source Voltage | V_{DS} | 20 | -20 | V |
| Gate-Source Voltage | V_{GS} | ±16 | ±12 | V |
| Continuous Drain Current ^{AF} | I_D | 6.4 | -6.4 | A |
| Pulsed Drain Current ^B | | | | |
| Power Dissipation | P_D | 2 | 2 | W |
| Avalanche Current ^B | | | | |
| Repetitive avalanche energy 0.3mH ^B | E_{AR} | 25 | 25 | mJ |
| Junction and Storage Temperature Range | T_J, T_{STG} | -55 to 150 | -55 to 150 | °C |

Thermal Characteristics: n-channel and p-channel

| Parameter | Symbol | Device | Typ | Max | Units |
|--|-----------------|--------|-----|------|-------|
| Maximum Junction-to-Ambient ^A | $R_{\theta JA}$ | n-ch | 48 | 62.5 | °C/W |
| Maximum Junction-to-Ambient ^A | | n-ch | 74 | 110 | °C/W |
| Maximum Junction-to-Lead ^C | $R_{\theta JL}$ | n-ch | 35 | 40 | °C/W |
| Maximum Junction-to-Ambient ^A | $R_{\theta JA}$ | p-ch | 48 | 62.5 | °C/W |
| Maximum Junction-to-Ambient ^A | | p-ch | 74 | 110 | °C/W |
| Maximum Junction-to-Lead ^C | $R_{\theta JL}$ | p-ch | 35 | 40 | °C/W |



N-Channel Electrical Characteristics (T_J=25°C unless otherwise noted)

| Symbol | Parameter | Conditions | Min | Typ | Max | Units |
|-----------------------------|---------------------------------------|---|-----|------|------|-------|
| STATIC PARAMETERS | | | | | | |
| B _V DSS | Drain-Source Breakdown Voltage | I _D =250μA, V _{GS} =0V | 20 | | | V |
| I _{DSS} | Zero Gate Voltage Drain Current | V _{DS} =16V, V _{GS} =0V | | | 1 | uA |
| I _{GSS} | Gate-Body leakage current | V _{DS} =0V, V _{GS} =±16V | | | 100 | nA |
| V _{GS(th)} | Gate Threshold Voltage | V _{DS} =V _{GS} I _D =250μA | 0.6 | 1.25 | 2 | V |
| I _{D(ON)} | On state drain current | V _{GS} =4.5V, V _{DS} =5V | 35 | | | A |
| R _{DS(ON)} | Static Drain-Source On-Resistance | V _{GS} =4.5V, I _D =6.4A | | 15 | 23 | mΩ |
| | | V _{GS} =2.5V, I _D =4.5A | | 20 | 30 | Ω |
| g _{FS} | Forward Transconductance | V _{DS} =5V, I _D =6.4A | | 17 | | S |
| V _{SD} | Diode Forward Voltage | I _S =1A | | 0.7 | 1 | V |
| I _S | Maximum Body-Diode Continuous Current | | | | 3 | A |
| DYNAMIC PARAMETERS | | | | | | |
| C _{iss} | Input Capacitance | V _{GS} =0V, V _{DS} =10V, f=1MHz | | 900 | 1100 | pF |
| C _{oss} | Output Capacitance | | | 162 | | pF |
| C _{rss} | Reverse Transfer Capacitance | | | 105 | | pF |
| R _g | Gate resistance | V _{GS} =0V, V _{DS} =0V, f=1MHz | | 0.9 | 1.35 | Ω |
| SWITCHING PARAMETERS | | | | | | |
| Q _{g(10V)} | Total Gate Charge | V _{GS} =10V, V _{DS} =10V, I _D =6.5A | | 15 | 18 | nC |
| Q _{g(4.5V)} | Total Gate Charge | | | 7.2 | 9 | nC |
| Q _{gs} | Gate Source Charge | | | 1.8 | | nC |
| Q _{gd} | Gate Drain Charge | | | 2.8 | | nC |
| t _{D(on)} | Turn-On DelayTime | V _{GS} =10V, V _{DS} =10V, R _L =1.4Ω, R _{GEN} =3Ω | | 4.5 | | ns |
| t _r | Turn-On Rise Time | | | 9.2 | | ns |
| t _{D(off)} | Turn-Off DelayTime | | | 18.7 | | ns |
| t _f | Turn-Off Fall Time | | | 3.3 | | ns |
| t _{rr} | Body Diode Reverse Recovery Time | I _F =6.4A, di/dt=100A/μs | | 18 | | ns |
| Q _{rr} | Body Diode Reverse Recovery Charge | I _F =6.4A, di/dt=100A/μs | | 9.5 | | nC |

A: The value of R_{θJA} is measured with the device mounted on 1 in² FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C. The value in any given application depends on the user's specific board design.

B: Repetitive rating, pulse width limited by junction temperature.

C: The R_{θJA} is the sum of the thermal impedance from junction to lead R_{θJL} and lead to ambient. R_{θJL} and R_{θJC} are equivalent terms referring to thermal resistance from junction to drain lead.

D: The static characteristics in Figures 1 to 6 are obtained using <300 μs pulses, duty cycle 0.5% max.

E: These tests are performed with the device mounted on 1 in² FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C. The SOA curve provides a single pulse rating.

F: The current rating is based on the t ≤ 10s thermal resistance rating.

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N-CHANNEL TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

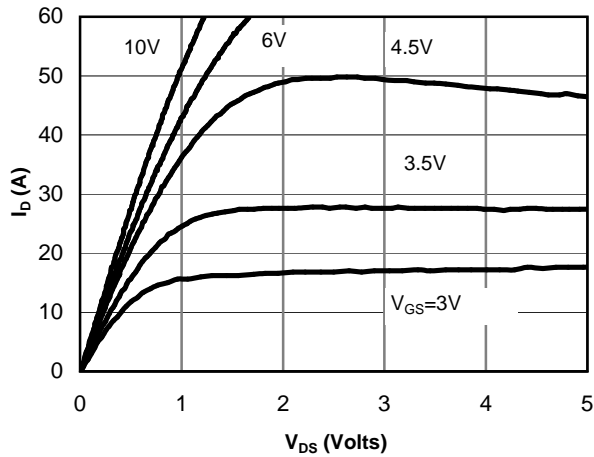


Figure 1: On-Region Characteristics

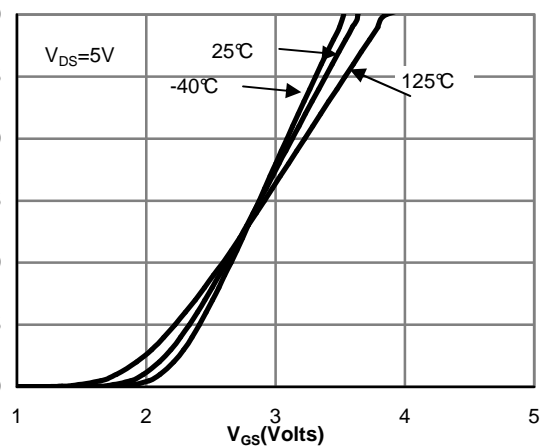


Figure 2: Transfer Characteristics

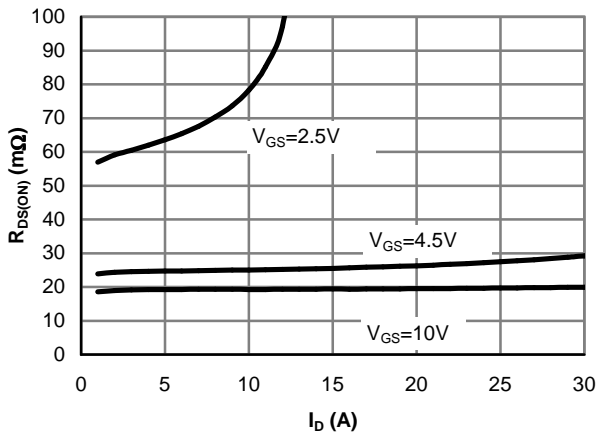


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

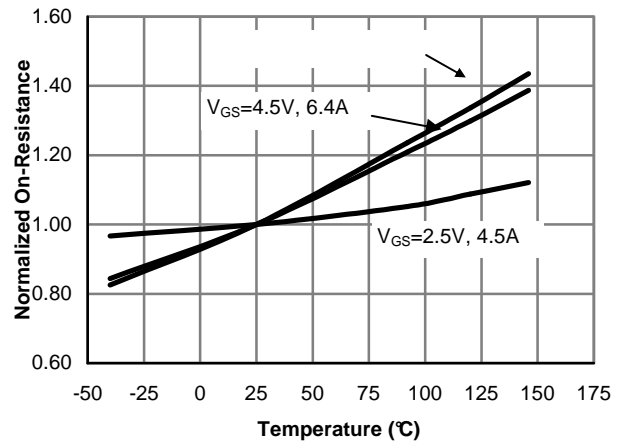


Figure 4: On-Resistance vs. Junction Temperature

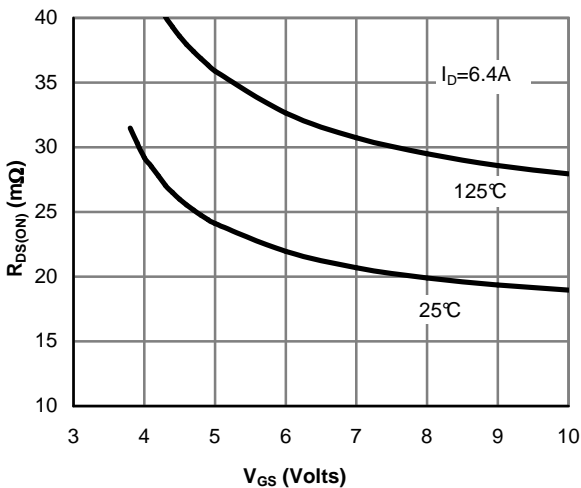


Figure 5: On-Resistance vs. Gate-Source Voltage

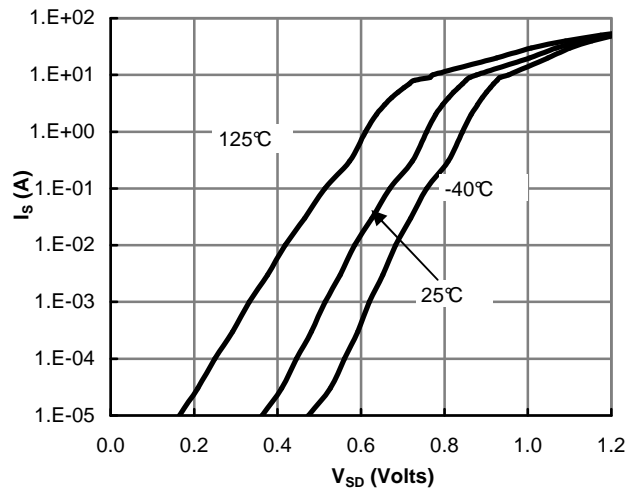


Figure 6: Body-Diode Characteristics

N-Channel TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

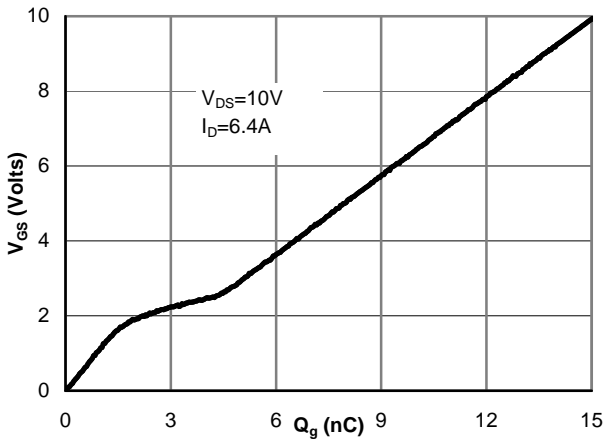


Figure 7: Gate-Charge Characteristics

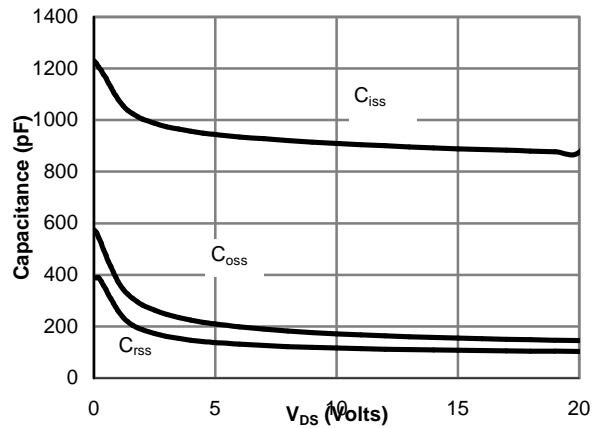


Figure 8: Capacitance Characteristics

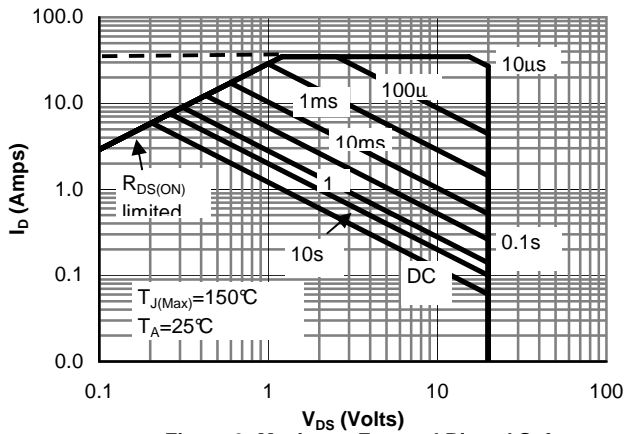


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

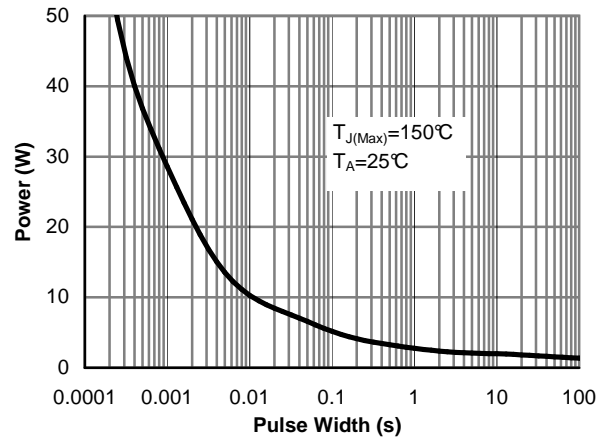


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

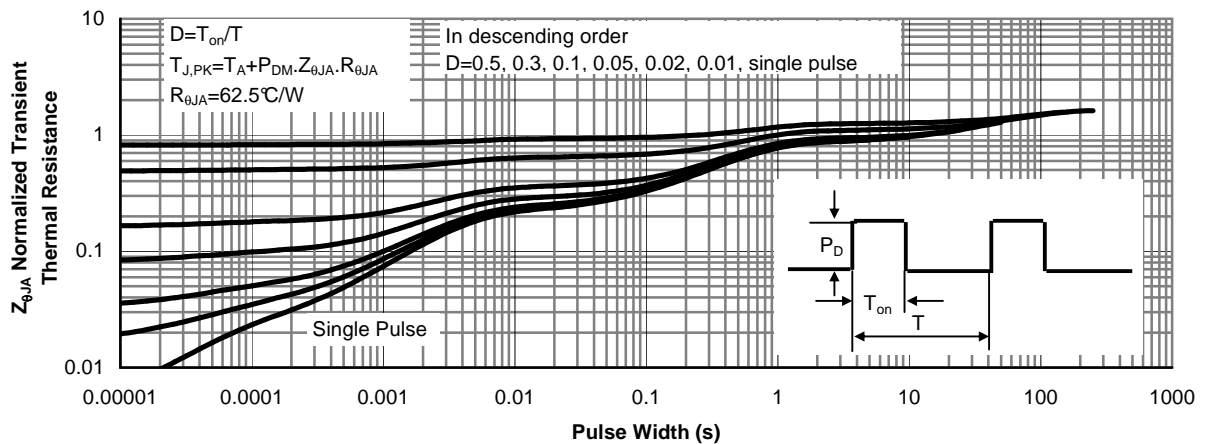


Figure 11: Normalized Maximum Transient Thermal Impedance



P-Channel Electrical Characteristics (T_J=25°C unless otherwise noted)

| Symbol | Parameter | Conditions | Min | Typ | Max | Units |
|-----------------------------|---------------------------------------|--|------|-------|------|-------|
| STATIC PARAMETERS | | | | | | |
| BV _{DSS} | Drain-Source Breakdown Voltage | I _D =-250μA, V _{GS} =0V | -20 | | | V |
| I _{DSS} | Zero Gate Voltage Drain Current | V _{DS} =-16V, V _{GS} =0V | | | -1 | μA |
| I _{GSS} | Gate-Body leakage current | V _{DS} =0V, V _{GS} =±12V | | | ±100 | nA |
| V _{GS(th)} | Gate Threshold Voltage | V _{DS} =V _{GS} I _D =-250μA | -1.3 | -0.9 | -0.5 | V |
| I _{D(ON)} | On state drain current | V _{GS} =-4.5V, V _{DS} =-5V | -25 | | | A |
| R _{DS(ON)} | Static Drain-Source On-Resistance | V _{GS} =-4.5V, I _D =-6.4A | | 30 | 40 | mΩ |
| | | V _{GS} =-2.5V, I _D =-4.5A | | 40 | 50 | mΩ |
| g _{FS} | Forward Transconductance | V _{DS} =-5V, I _D =-5A | | 13 | | S |
| V _{SD} | Diode Forward Voltage | I _S =-1A, V _{GS} =0V | | -0.76 | -1 | V |
| I _S | Maximum Body-Diode Continuous Current | | | | -2.5 | A |
| DYNAMIC PARAMETERS | | | | | | |
| C _{iss} | Input Capacitance | V _{GS} =0V, V _{DS} =-10V, f=1MHz | | 800 | 960 | pF |
| C _{oss} | Output Capacitance | | | 131 | | pF |
| C _{rss} | Reverse Transfer Capacitance | | | 103 | | pF |
| R _g | Gate resistance | V _{GS} =0V, V _{DS} =0V, f=1MHz | | 6.7 | 10 | Ω |
| SWITCHING PARAMETERS | | | | | | |
| Q _g (10V) | Total Gate Charge (10V) | V _{GS} =-4.5V, V _{DS} =-10V, I _D =-4.5A | | 15.5 | | nC |
| Q _g (4.5V) | Total Gate Charge (4.5V) | | | 7.4 | | nC |
| Q _{gs} | Gate Source Charge | | | 1.3 | | nC |
| Q _{gd} | Gate Drain Charge | | | 2.9 | | nC |
| t _{D(on)} | Turn-On DelayTime | V _{GS} =-4.5V, V _{DS} =-10V, R _L =2Ω, R _{GEN} =3Ω | | 4.4 | | ns |
| t _r | Turn-On Rise Time | | | 7.6 | | ns |
| t _{D(off)} | Turn-Off DelayTime | | | 44 | | ns |
| t _f | Turn-Off Fall Time | | | 13.5 | | ns |
| t _{rr} | Body Diode Reverse Recovery Time | I _F =-5A, dI/dt=100A/μs | | 20 | | ns |
| Q _{rr} | Body Diode Reverse Recovery Charge | I _F =-5A, dI/dt=100A/μs | | 9 | | nC |

A: The value of R_{θJA} is measured with the device mounted on 1 in² FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C. The value in any given application depends on the user's specific board design.

B: Repetitive rating, pulse width limited by junction temperature.

C: The R_{θJA} is the sum of the thermal impedance from junction to lead R_{θJL} and lead to ambient. R_{θJL} and R_{θJC} are equivalent terms referring to thermal resistance from junction to drain lead.

D: The static characteristics in Figures 1 to 6 are obtained using <300 μs pulses, duty cycle 0.5% max.

E: These tests are performed with the device mounted on 1 in² FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C. The SOA curve provides a single pulse rating.

F: The current rating is based on the t ≤ 10s thermal resistance rating.

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS: P-CHANNEL

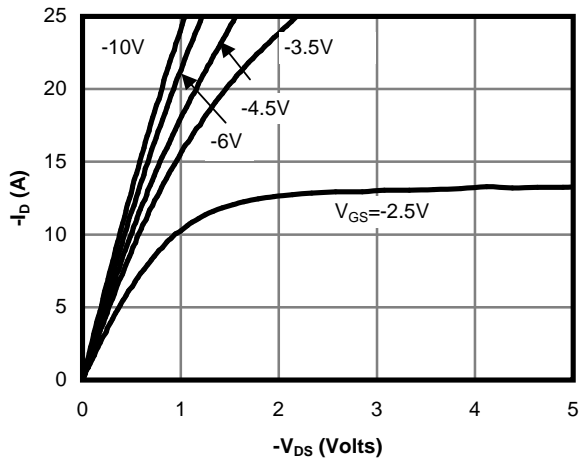


Fig 1: On-Region Characteristics

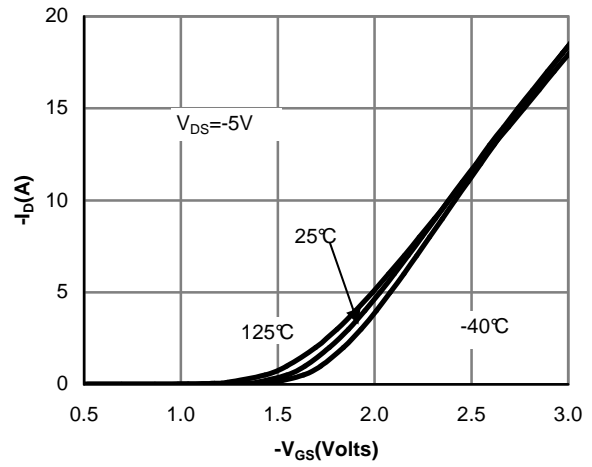


Figure 2: Transfer Characteristics

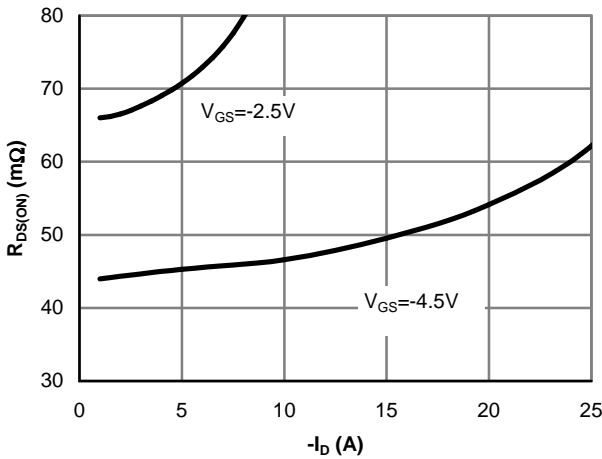


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

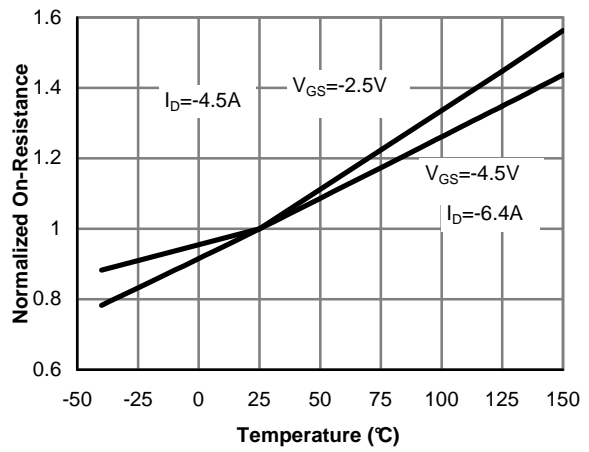


Figure 4: On-Resistance vs. Junction Temperature

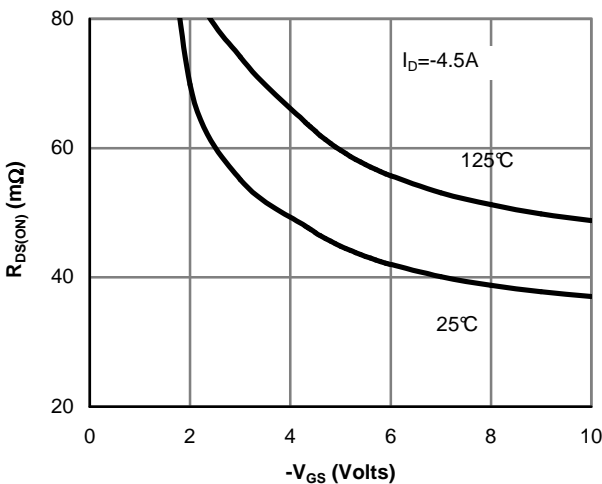


Figure 5: On-Resistance vs. Gate-Source Voltage

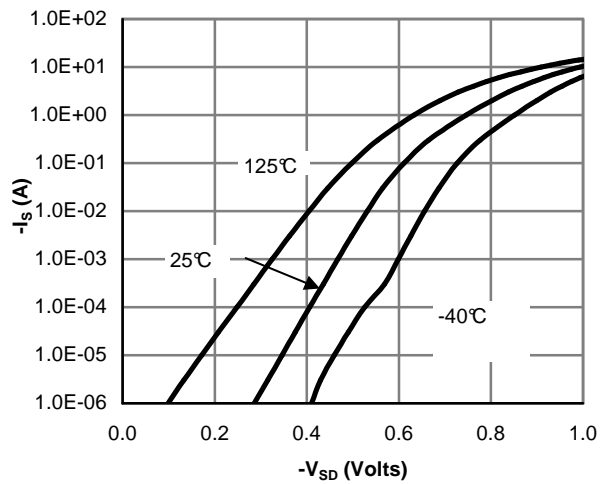


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS: P-CHANNEL

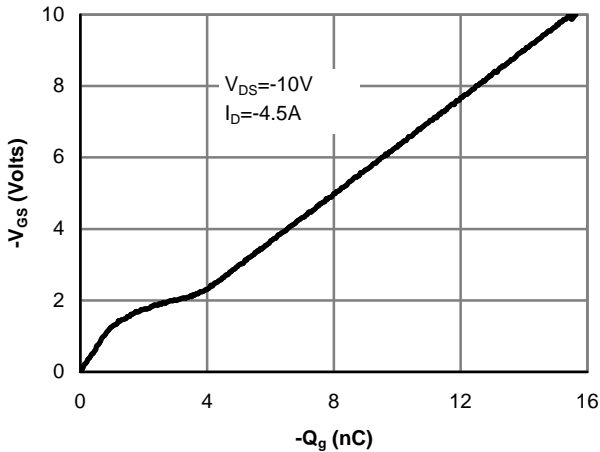


Figure 7: Gate-Charge Characteristics

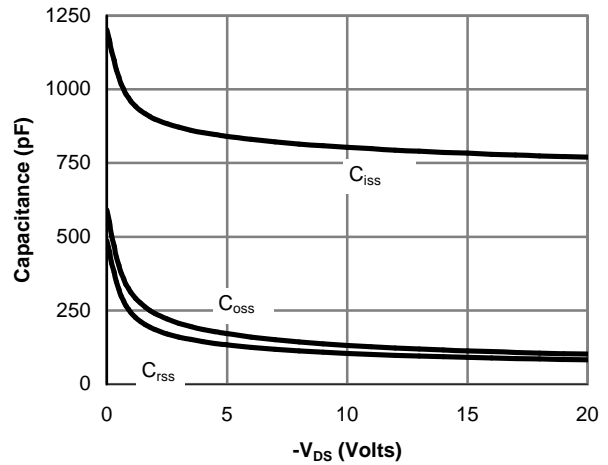


Figure 8: Capacitance Characteristics

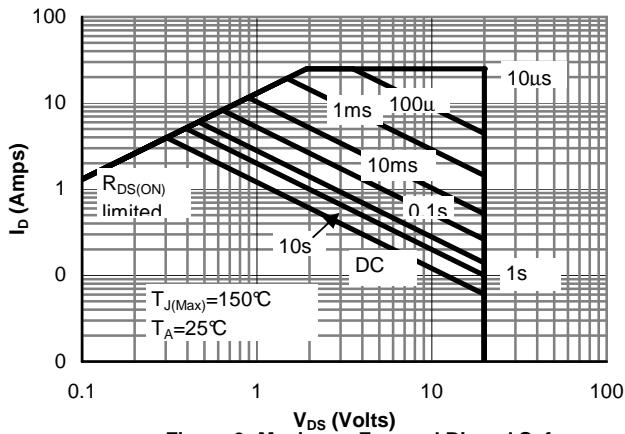


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

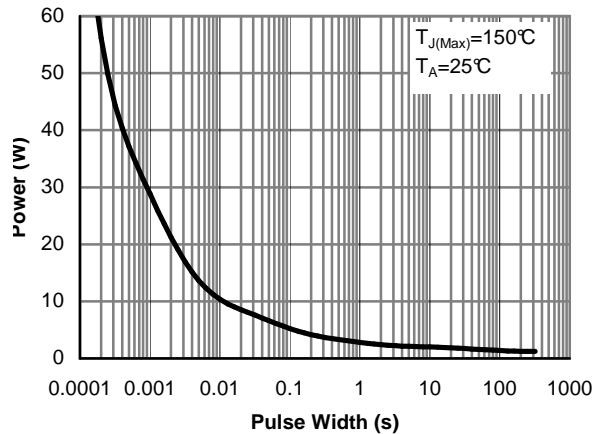


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

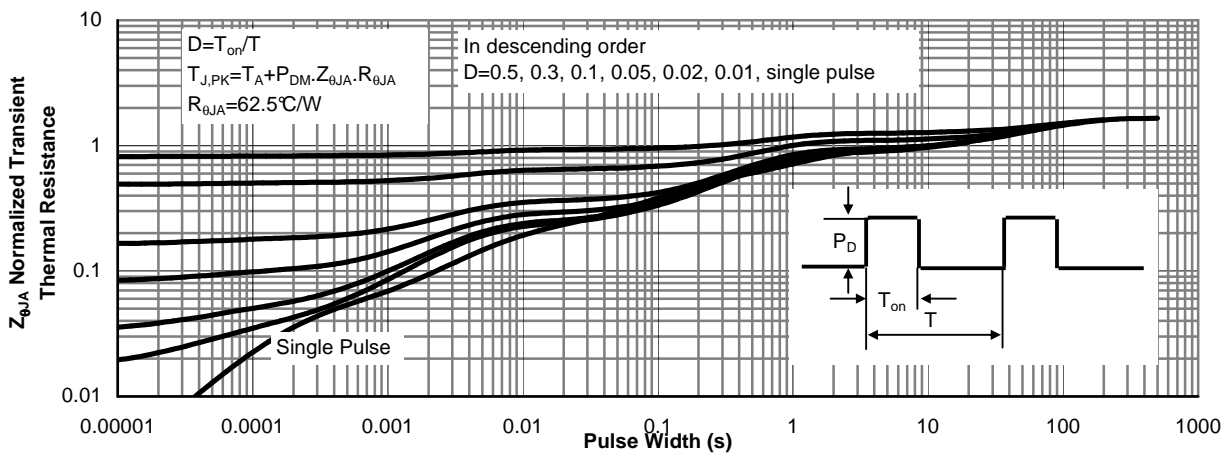


Figure 11: Normalized Maximum Transient Thermal Impedance