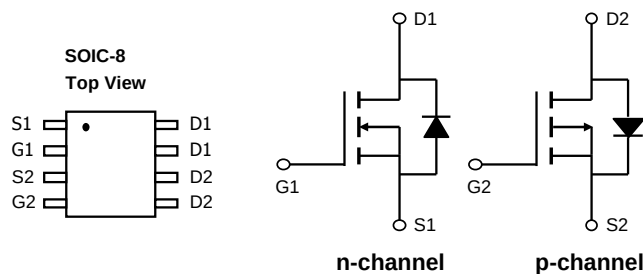




Product Summary

N-Channel	P-Channel
$V_{DS} = 20V$	-20V
$I_D = 6.4A (V_{GS}=4.5V)$	-6.4A ($V_{GS} = -4.5V$)
$R_{DS(ON)}$	$R_{DS(ON)}$
$< 23m\Omega (V_{GS}=4.5V)$	$< 40m\Omega (V_{GS} = -4.5V)$
$< 30m\Omega (V_{GS}=2.5V)$	$< 50m\Omega (V_{GS} = -2.5V)$
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 ^A	$T_A=25^\circ C$ I_D	6.4	-6.4	A
Pulsed Drain Current ^B		35	-25	
Power Dissipation	$T_A=25^\circ C$ P_D	2	2	W
Avalanche Current ^B	I_{AR}	13	13	A
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	$^\circ C$

Thermal Characteristics: n-channel and p-channel

Parameter	Symbol	Device	Typ	Max	Units
Maximum Junction-to-Ambient ^A	$t \leq 10s$ $R_{\theta JA}$	n-ch	48	62.5	$^\circ C/W$
Maximum Junction-to-Ambient ^A		n-ch	74	110	$^\circ C/W$
Maximum Junction-to-Lead ^C	Steady-State $R_{\theta JL}$	n-ch	35	40	$^\circ C/W$
Maximum Junction-to-Ambient ^A	$t \leq 10s$ $R_{\theta JA}$	p-ch	48	62.5	$^\circ C/W$
Maximum Junction-to-Ambient ^A		p-ch	74	110	$^\circ C/W$
Maximum Junction-to-Lead ^C	Steady-State $R_{\theta JL}$	p-ch	35	40	$^\circ C/W$

**N-Channel Electrical Characteristics ($T_J=25^{\circ}\text{C}$ unless otherwise noted)**

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
BV_{DSS}	Drain-Source Breakdown Voltage	$I_D=250\mu\text{A}$, $V_{GS}=0\text{V}$	20			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=16\text{V}$, $V_{GS}=0\text{V}$			1	μA
I_{GSS}	Gate-Body leakage current	$V_{DS}=0\text{V}$, $V_{GS}=\pm 16\text{V}$			100	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$	0.6	1.25	2	V
$I_{D(ON)}$	On state drain current	$V_{GS}=4.5\text{V}$, $V_{DS}=5\text{V}$	35			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=4.5\text{V}$, $I_D=6.4\text{A}$		15	23	$\text{m}\Omega$
		$V_{GS}=2.5\text{V}$, $I_D=4.5\text{A}$		20	30	Ω
g_{FS}	Forward Transconductance	$V_{DS}=5\text{V}$, $I_D=6.4\text{A}$		17		S
V_{SD}	Diode Forward Voltage	$I_S=1\text{A}$		0.7	1	V
I_S	Maximum Body-Diode Continuous Current				3	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	$V_{GS}=0\text{V}$, $V_{DS}=10\text{V}$, $f=1\text{MHz}$		900	1100	pF
C_{oss}	Output Capacitance			162		pF
C_{rss}	Reverse Transfer Capacitance			105		pF
R_g	Gate resistance	$V_{GS}=0\text{V}$, $V_{DS}=0\text{V}$, $f=1\text{MHz}$		0.9	1.35	Ω
SWITCHING PARAMETERS						
$Q_g(10\text{V})$	Total Gate Charge	$V_{GS}=10\text{V}$, $V_{DS}=10\text{V}$, $I_D=6.5\text{A}$		15	18	nC
$Q_g(4.5\text{V})$	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	$V_{GS}=10\text{V}$, $V_{DS}=10\text{V}$, $R_L=1.4\Omega$, $R_{GEN}=3\Omega$		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	$I_F=6.4\text{A}$, $dI/dt=100\text{A}/\mu\text{s}$		18		ns
Q_{rr}	Body Diode Reverse Recovery Charge	$I_F=6.4\text{A}$, $dI/dt=100\text{A}/\mu\text{s}$		9.5		nC

A: The value of $R_{\theta JA}$ is measured with the device mounted on 1 in² FR-4 board with 2oz. Copper, in a still air environment with $T_A=25^{\circ}\text{C}$. 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 $R_{\theta JA}$ is the sum of the thermal impedance from junction to lead $R_{\theta JL}$ and lead to ambient. $R_{\theta JL}$ and $R_{\theta JC}$ are equivalent terms referring to thermal resistance from junction to drain lead.

D: The static characteristics in Figures 1 to 6 are obtained using $<300\mu\text{s}$ 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 $T_A=25^{\circ}\text{C}$. The SOA curve provides a single pulse rating.

F: The current rating is based on the $t \leq 10\text{s}$ thermal resistance rating.

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N-CHANNEL TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

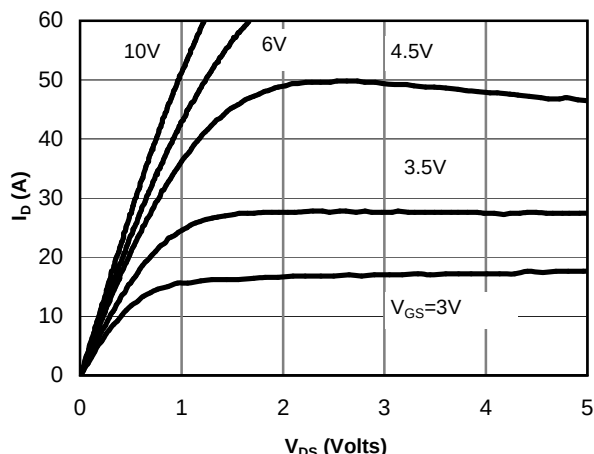


Figure 1: On-Region Characteristics

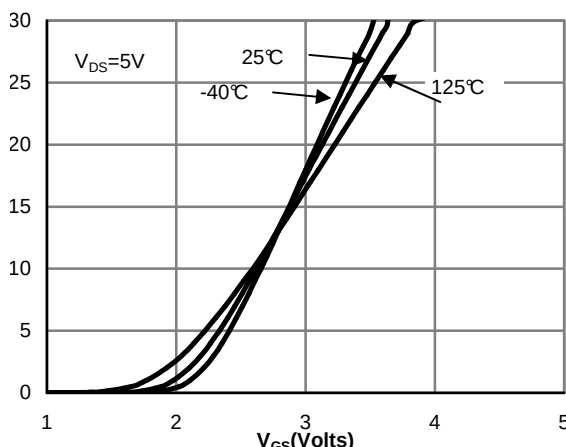


Figure 2: Transfer Characteristics

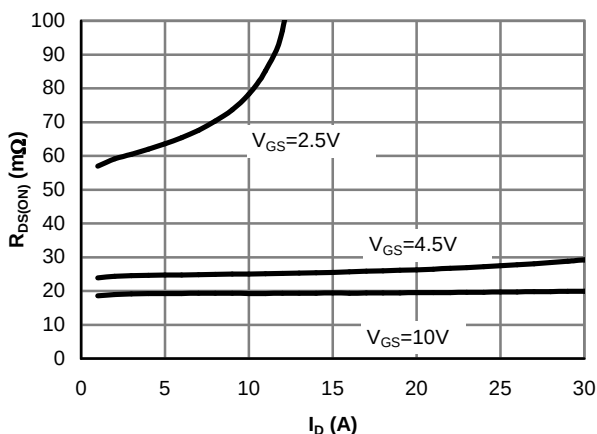


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

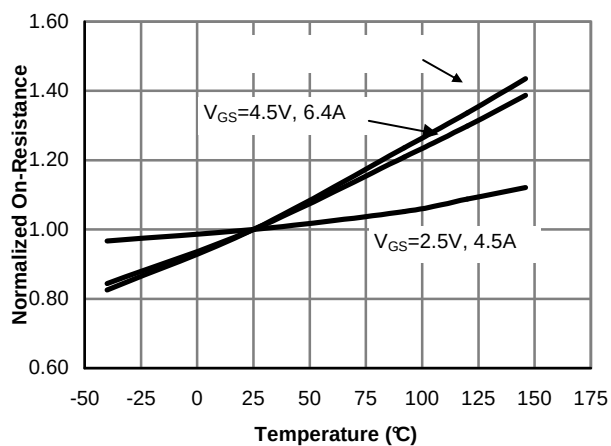


Figure 4: On-Resistance vs. Junction Temperature

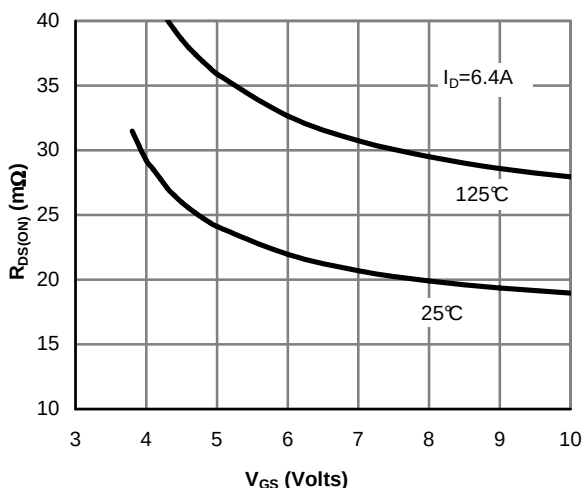


Figure 5: On-Resistance vs. Gate-Source Voltage

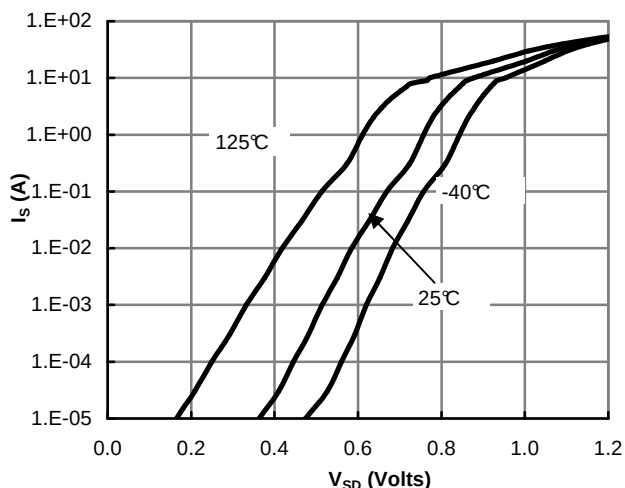


Figure 6: Body-Diode Characteristics

N-Channel TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

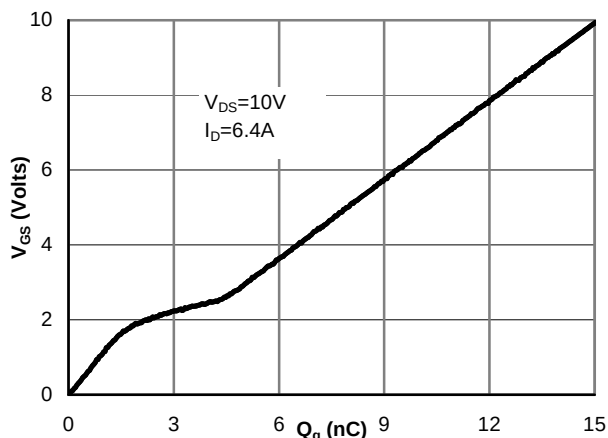


Figure 7: Gate-Charge Characteristics

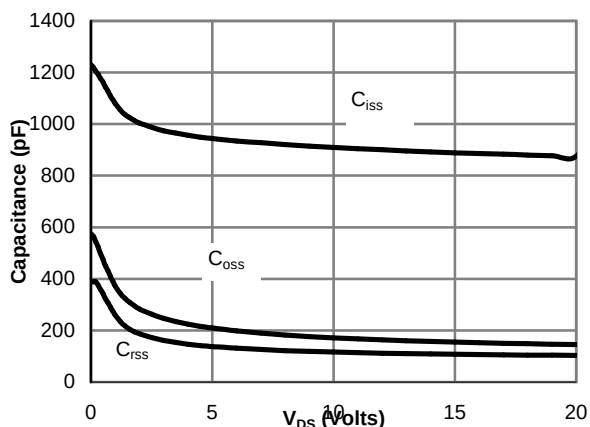


Figure 8: Capacitance Characteristics

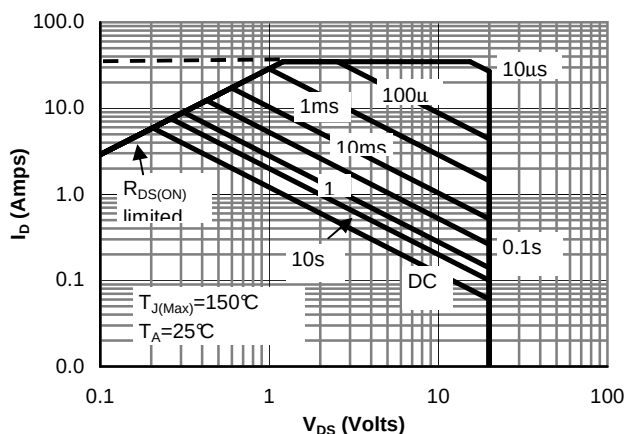


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

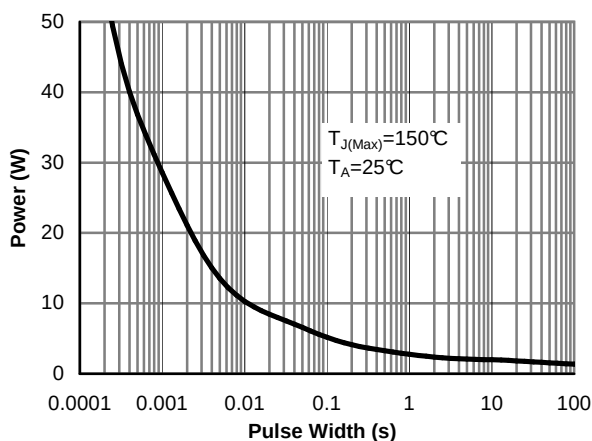


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

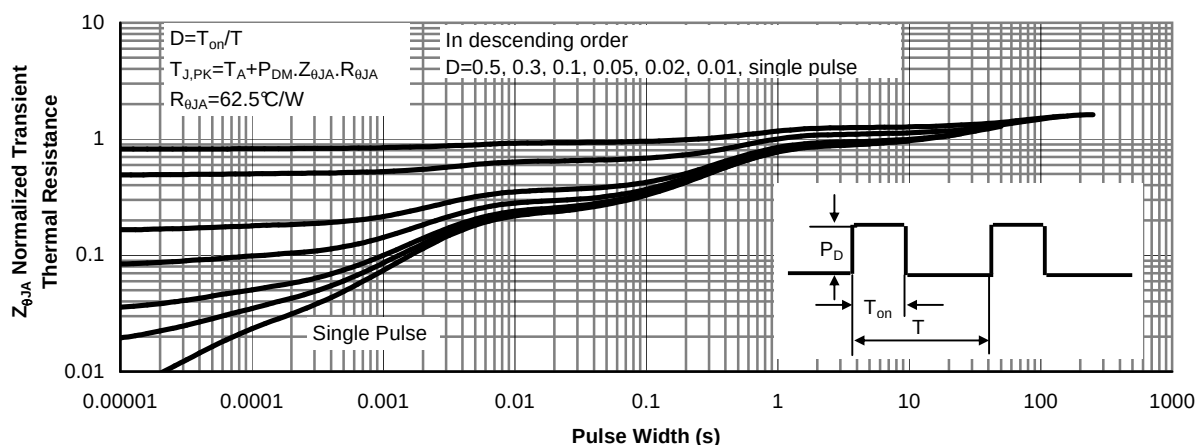


Figure 11: Normalized Maximum Transient Thermal Impedance

**P-Channel Electrical Characteristics ($T_J=25^{\circ}\text{C}$ unless otherwise noted)**

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
BV_{DSS}	Drain-Source Breakdown Voltage	$I_D=-250\mu\text{A}$, $V_{GS}=0\text{V}$	-20			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=-16\text{V}$, $V_{GS}=0\text{V}$			-1	μA
I_{GSS}	Gate-Body leakage current	$V_{DS}=0\text{V}$, $V_{GS}=\pm 12\text{V}$			± 100	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}$, $I_D=-250\mu\text{A}$	-1.3	-0.9	-0.5	V
$I_{D(ON)}$	On state drain current	$V_{GS}=-4.5\text{V}$, $V_{DS}=-5\text{V}$	-25			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=-4.5\text{V}$, $I_D=-6.4\text{A}$		30	40	$\text{m}\Omega$
		$V_{GS}=-2.5\text{V}$, $I_D=-4.5\text{A}$		40	50	$\text{m}\Omega$
g_{FS}	Forward Transconductance	$V_{DS}=-5\text{V}$, $I_D=-5\text{A}$		13		S
V_{SD}	Diode Forward Voltage	$I_S=-1\text{A}$, $V_{GS}=0\text{V}$		-0.76	-1	V
I_S	Maximum Body-Diode Continuous Current				-2.5	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	$V_{GS}=0\text{V}$, $V_{DS}=-10\text{V}$, $f=1\text{MHz}$		800	960	pF
C_{oss}	Output Capacitance			131		pF
C_{rss}	Reverse Transfer Capacitance			103		pF
R_g	Gate resistance	$V_{GS}=0\text{V}$, $V_{DS}=0\text{V}$, $f=1\text{MHz}$		6.7	10	Ω
SWITCHING PARAMETERS						
$Q_g(10\text{V})$	Total Gate Charge (10V)	$V_{GS}=-4.5\text{V}$, $V_{DS}=-10\text{V}$, $I_D=-4.5\text{A}$		15.5		nC
$Q_g(4.5\text{V})$	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	$V_{GS}=-4.5\text{V}$, $V_{DS}=-10\text{V}$, $R_L=2\Omega$, $R_{GEN}=3\Omega$		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	$I_F=-5\text{A}$, $dI/dt=100\text{A}/\mu\text{s}$		20		ns
Q_{rr}	Body Diode Reverse Recovery Charge	$I_F=-5\text{A}$, $dI/dt=100\text{A}/\mu\text{s}$		9		nC

A: The value of $R_{\theta JA}$ is measured with the device mounted on 1 in² FR-4 board with 2oz. Copper, in a still air environment with $T_A=25^{\circ}\text{C}$. 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 $R_{\theta JA}$ is the sum of the thermal impedance from junction to lead $R_{\theta JL}$ and lead to ambient. $R_{\theta JL}$ and $R_{\theta JC}$ are equivalent terms referring to thermal resistance from junction to drain lead.

D: The static characteristics in Figures 1 to 6 are obtained using $<300\mu\text{s}$ 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 $T_A=25^{\circ}\text{C}$. The SOA curve provides a single pulse rating.

F: The current rating is based on the $t \leq 10\text{s}$ thermal resistance rating.

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS: P-CHANNEL

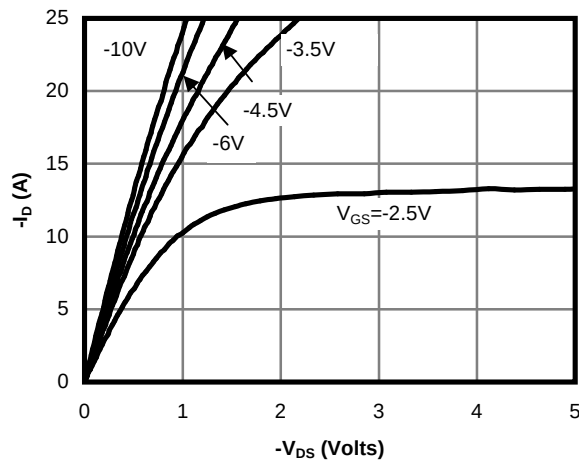


Fig 1: On-Region Characteristics

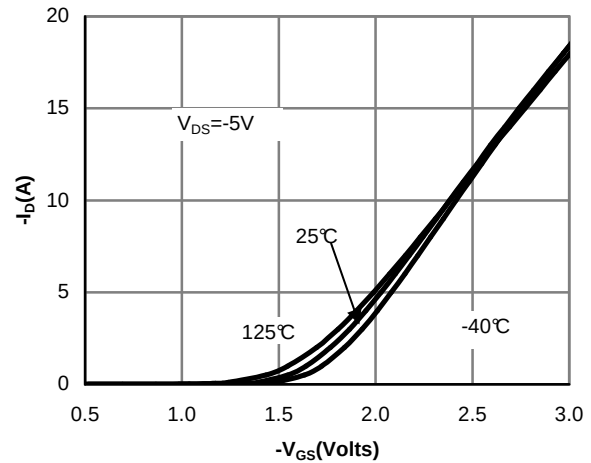


Figure 2: Transfer Characteristics

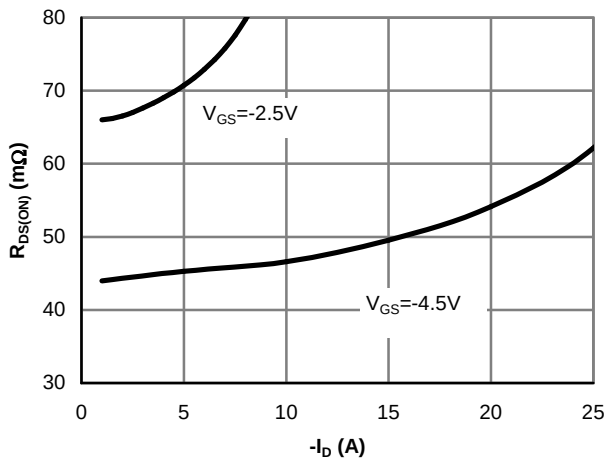


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

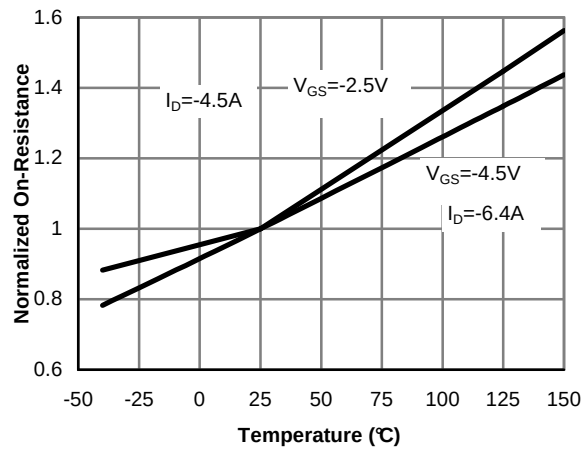


Figure 4: On-Resistance vs. Junction Temperature

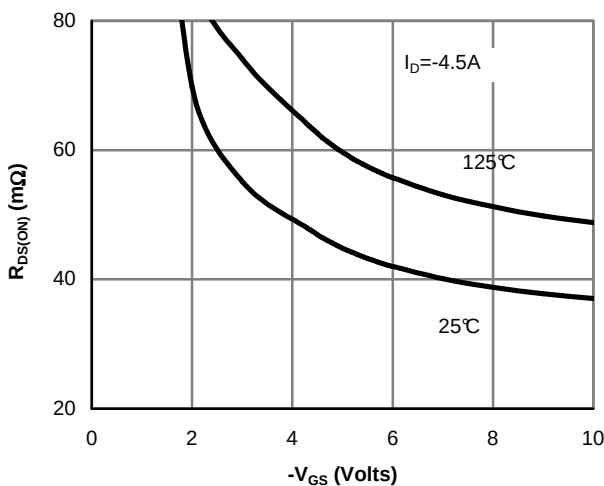


Figure 5: On-Resistance vs. Gate-Source Voltage

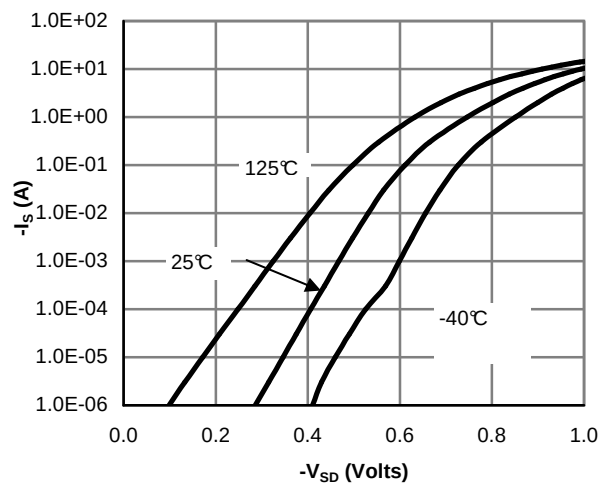


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS: P-CHANNEL

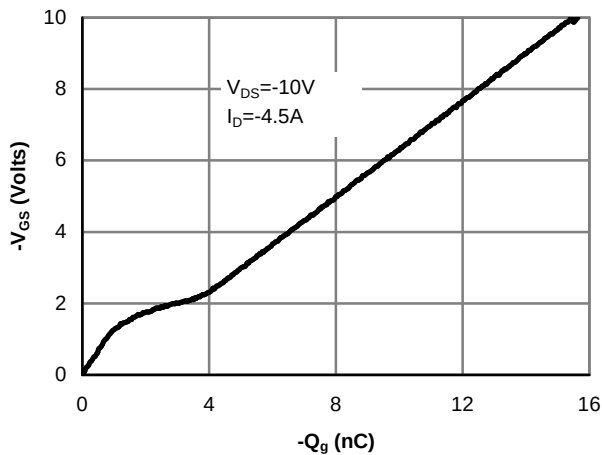


Figure 7: Gate-Charge Characteristics

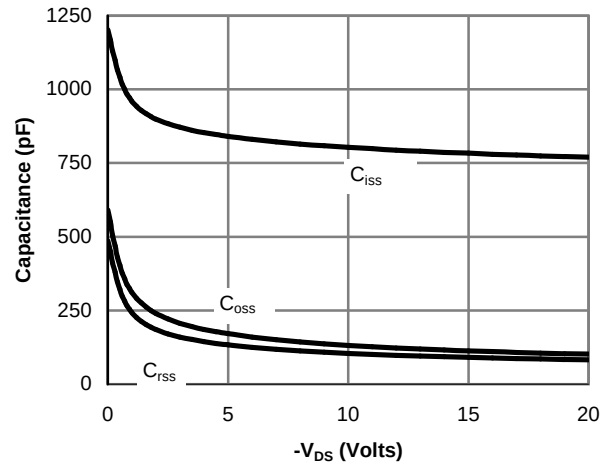


Figure 8: Capacitance Characteristics

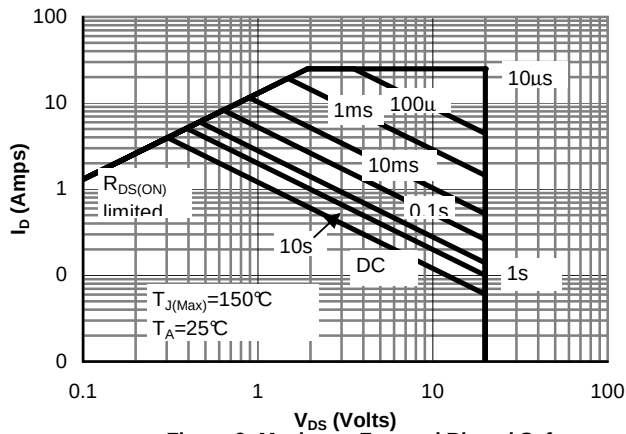


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

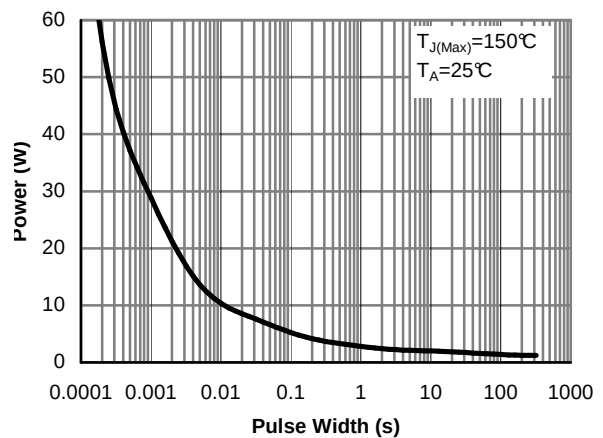


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

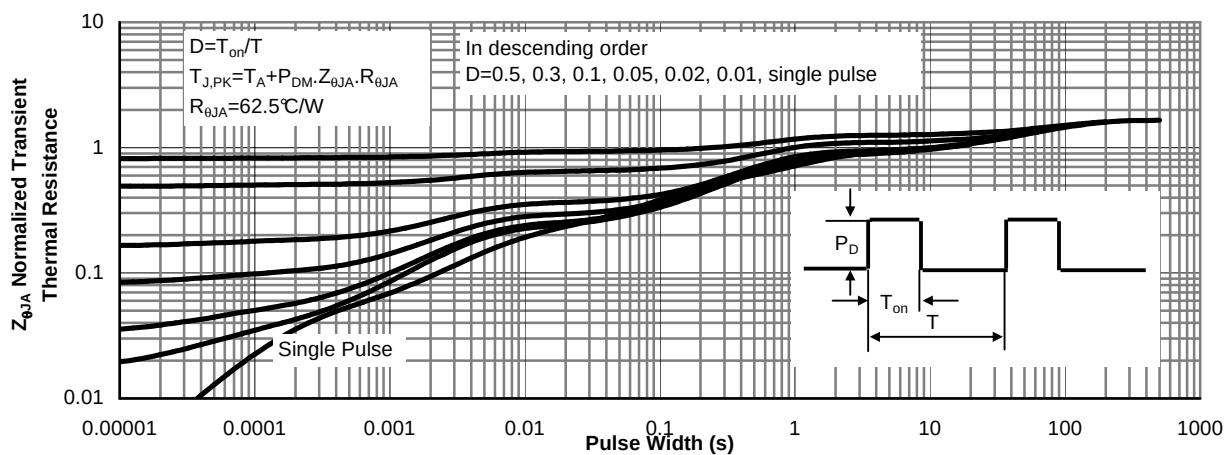


Figure 11: Normalized Maximum Transient Thermal Impedance