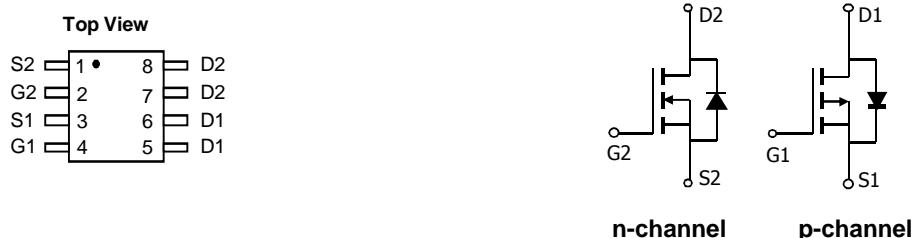


General Description

The AO4620 uses advanced trench technology MOSFETs to provide excellent $R_{DS(ON)}$ and low gate charge. The complementary MOSFETs may be used in inverter and other applications.

Features

n-channel	p-channel
V_{DS} (V) = 30V	-30V
I_D = 7.2A (V_{GS} =10V)	-5.3A (V_{GS} = -10V)
$R_{DS(ON)}$	$R_{DS(ON)}$
< 24mΩ (V_{GS} =10V)	< 32mΩ (V_{GS} = -10V)
< 36mΩ (V_{GS} =4.5V)	< 55mΩ (V_{GS} = -4.5V)



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

Parameter	Symbol	Max n-channel	Max p-channel	Units
Drain-Source Voltage	V_{DS}	30	-30	V
Gate-Source Voltage	V_{GS}	± 20	± 20	V
Continuous Drain Current ^F	I_D	7.2	-5.3	A
$T_A=70^\circ\text{C}$		6.2	-4.5	
Pulsed Drain Current ^B	I_{DM}	64	-40	
Power Dissipation ^F	P_D	2	2	W
$T_A=70^\circ\text{C}$		1.44	1.44	
Avalanche Current ^B	I_{AR}	9	17	A
Repetitive avalanche energy 0.3mH ^B	E_{AR}	12	43	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	50	62.5	°C/W
Steady-State		n-ch	80	100	°C/W
Maximum Junction-to-Lead ^C	$R_{\theta JL}$	n-ch	32	40	°C/W
Steady-State		p-ch	50	62.5	°C/W
Maximum Junction-to-Ambient ^A	$R_{\theta JA}$	p-ch	80	100	°C/W
Steady-State		p-ch	32	40	°C/W
Maximum Junction-to-Lead ^C	$R_{\theta JL}$	p-ch			

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	$I_D=250\mu\text{A}, V_{GS}=0\text{V}$	30			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=30\text{V}, V_{GS}=0\text{V}$ $T_J=55^\circ\text{C}$			1 5	μA
I_{GSS}	Gate-Body leakage current	$V_{DS}=0\text{V}, V_{GS}=\pm 20\text{V}$			100	nA
$V_{\text{GS(th)}}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	1.5	2.1	2.6	V
$I_{\text{D(ON)}}$	On state drain current	$V_{GS}=10\text{V}, V_{DS}=5\text{V}$	64			A
$R_{\text{DS(ON)}}$	Static Drain-Source On-Resistance	$V_{GS}=10\text{V}, I_D=7.2\text{A}$ $T_J=125^\circ\text{C}$		17.7 25	24 32	$\text{m}\Omega$
		$V_{GS}=4.5\text{V}, I_D=5\text{A}$		24.8	36	$\text{m}\Omega$
g_{FS}	Forward Transconductance	$V_{DS}=5\text{V}, I_D=7.2\text{A}$		20		S
V_{SD}	Diode Forward Voltage	$I_S=1\text{A}, V_{GS}=0\text{V}$		0.74	1	V
I_S	Maximum Body-Diode Continuous Current				2.5	A
I_{SM}	Pulsed Body-Diode Current ^B				64	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	$V_{GS}=0\text{V}, V_{DS}=15\text{V}, f=1\text{MHz}$		373	448	pF
C_{oss}	Output Capacitance			67		pF
C_{rss}	Reverse Transfer Capacitance			41		pF
R_g	Gate resistance	$V_{GS}=0\text{V}, V_{DS}=0\text{V}, f=1\text{MHz}$		1.8	2.8	Ω
SWITCHING PARAMETERS						
$Q_g(10\text{V})$	Total Gate Charge	$V_{GS}=10\text{V}, V_{DS}=15\text{V}, I_D=7.2\text{A}$		7.2	11	nC
$Q_g(4.5\text{V})$	Total Gate Charge			3.5		nC
Q_{gs}	Gate Source Charge			1.3		nC
Q_{gd}	Gate Drain Charge			1.7		nC
$t_{\text{D(on)}}$	Turn-On Delay Time	$V_{GS}=10\text{V}, V_{DS}=15\text{V}, R_L=2.1\Omega, R_{\text{GEN}}=3\Omega$		4.5		ns
t_r	Turn-On Rise Time			2.7		ns
$t_{\text{D(off)}}$	Turn-Off Delay Time			14.9		ns
t_f	Turn-Off Fall Time			2.9		ns
t_{rr}	Body Diode Reverse Recovery Time	$I_F=7.2\text{A}, dI/dt=100\text{A}/\mu\text{s}$		10.5	12.6	ns
Q_{rr}	Body Diode Reverse Recovery Charge	$I_F=7.2\text{A}, dI/dt=100\text{A}/\mu\text{s}$		4.5		nC

A: The value of $R_{\theta JA}$ is measured with the device mounted on 1in² 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. The current rating is based on the $t \leq 10\text{s}$ thermal resistance rating.

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.

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 $T_A=25^\circ\text{C}$. The SOA curve provides a single pulse rating.

F. The power dissipation and current rating are based on the $t \leq 10\text{s}$ thermal resistance rating.

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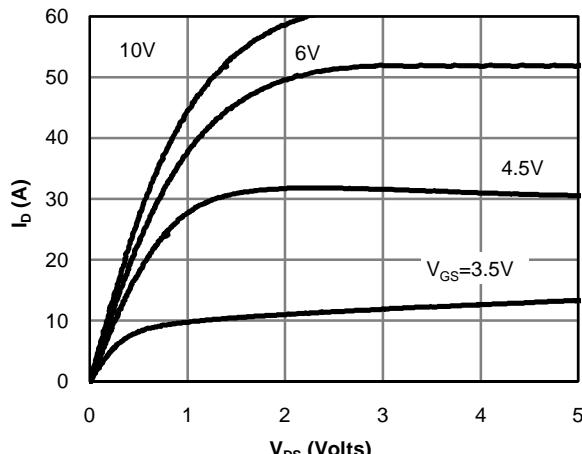
N-CHANNEL TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS


Figure 1: On-Region Characteristics

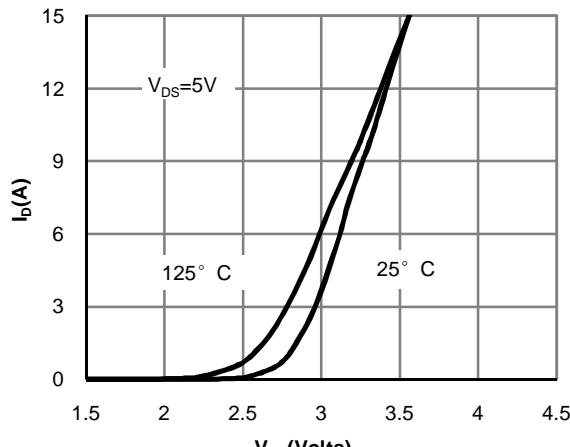


Figure 2: Transfer Characteristics

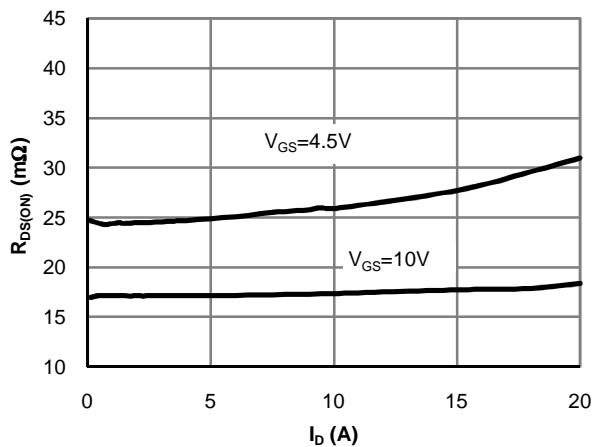


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

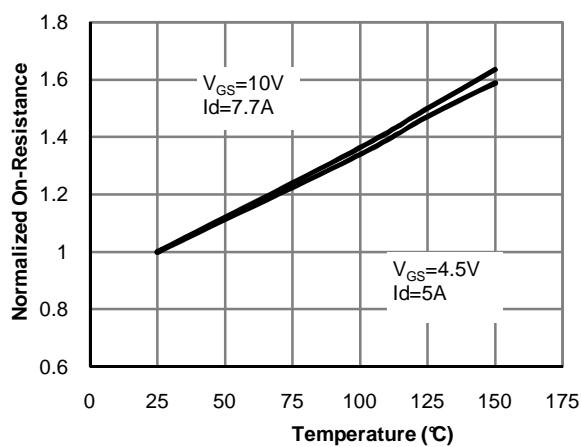


Figure 4: On-Resistance vs. Junction Temperature

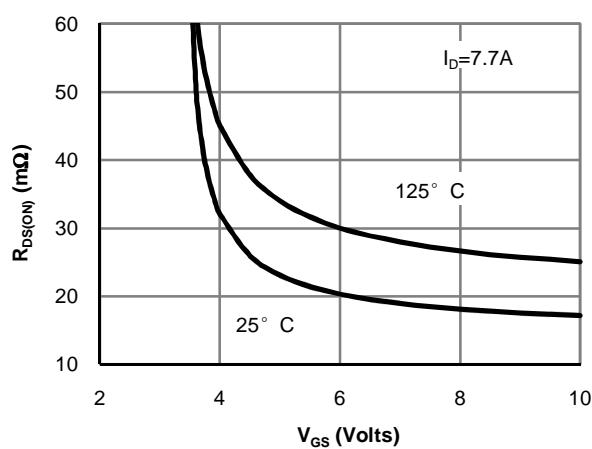


Figure 5: On-Resistance vs. Gate-Source Voltage

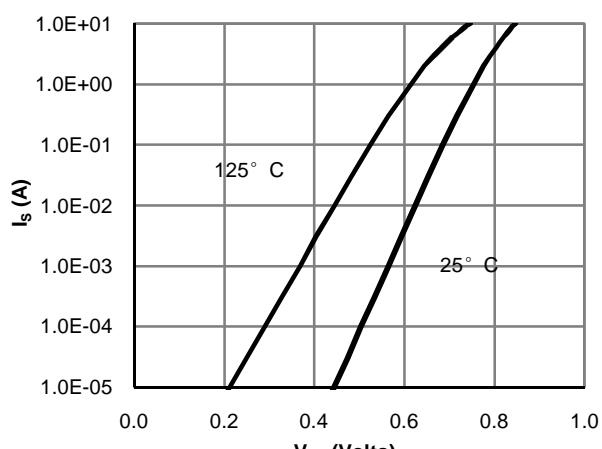


Figure 6: Body-Diode Characteristics

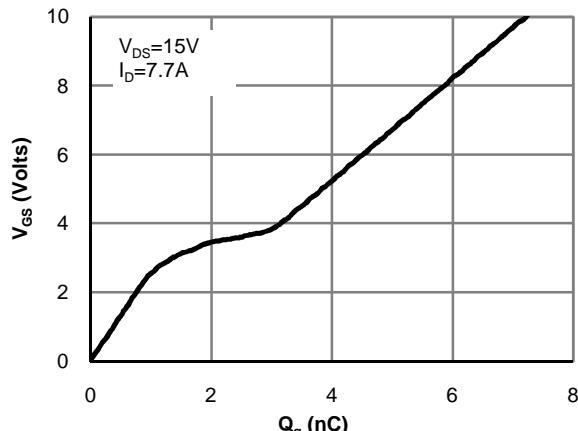
N-CHANNEL TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS


Figure 7: Gate-Charge Characteristics

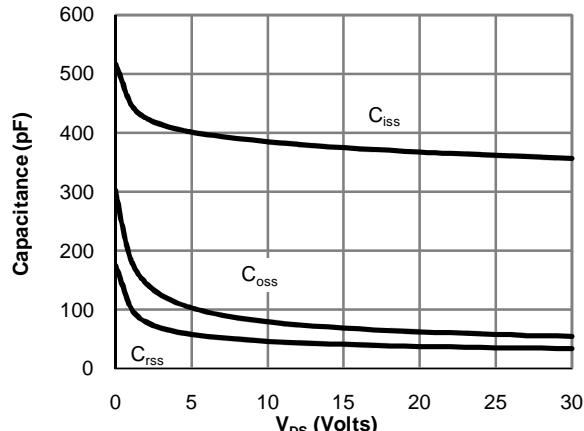


Figure 8: Capacitance Characteristics

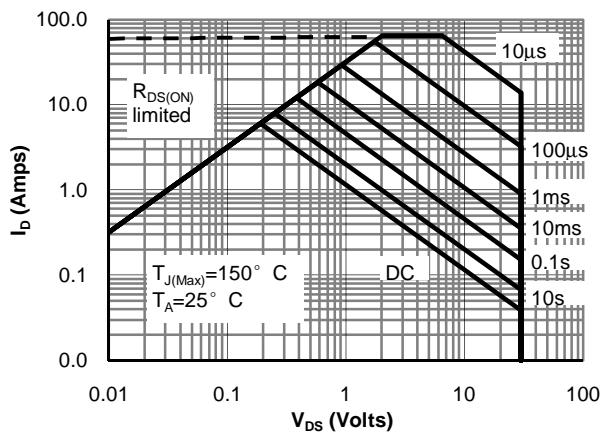


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

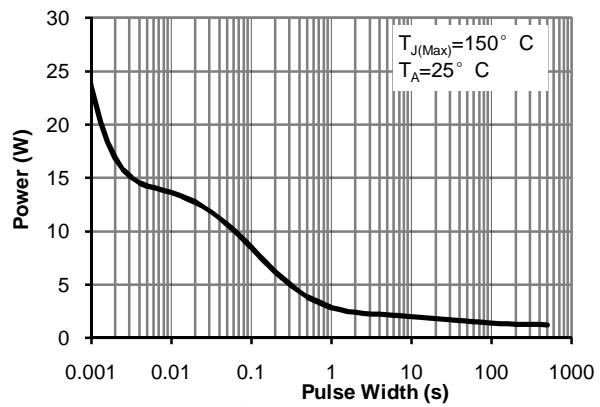


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

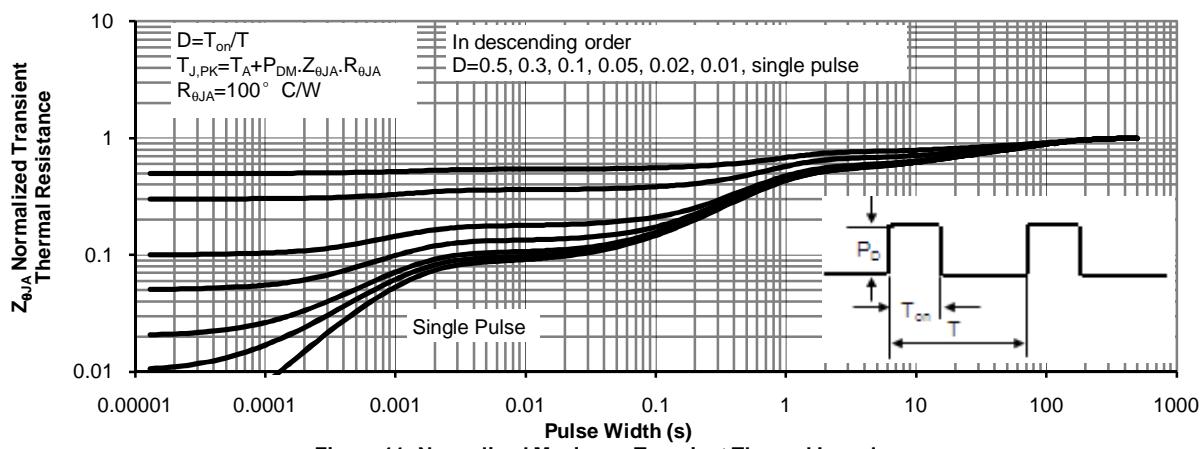


Figure 11: Normalized Maximum Transient Thermal Impedance

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	$I_D=-250\mu\text{A}, V_{GS}=0\text{V}$	-30			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=-30\text{V}, V_{GS}=0\text{V}$ $T_J=55^\circ\text{C}$			-1 -5	μA
I_{GSS}	Gate-Body leakage current	$V_{DS}=0\text{V}, V_{GS}=\pm20\text{V}$			±100	nA
$\text{V}_{\text{GS(th)}}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=-250\mu\text{A}$	-1.3	-1.85	-2.4	V
$\text{I}_{\text{D(ON)}}$	On state drain current	$V_{GS}=-10\text{V}, V_{DS}=-5\text{V}$	-40			A
$\text{R}_{\text{DS(ON)}}$	Static Drain-Source On-Resistance	$V_{GS}=-10\text{V}, I_D=-5.3\text{A}$ $T_J=125^\circ\text{C}$		23	32	$\text{m}\Omega$
		$V_{GS}=-4.5\text{V}, I_D=-4.5\text{A}$		31.5		
g_{FS}	Forward Transconductance	$V_{DS}=-5\text{V}, I_D=-5.3\text{A}$		19		S
V_{SD}	Diode Forward Voltage	$I_S=-1\text{A}, V_{GS}=0\text{V}$		-0.8	-1	V
I_S	Maximum Body-Diode Continuous Current				-3.5	A
I_{SM}	Pulsed Body-Diode Current ^B				-40	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	$V_{GS}=0\text{V}, V_{DS}=-15\text{V}, f=1\text{MHz}$		760		pF
C_{oss}	Output Capacitance			140		pF
C_{rss}	Reverse Transfer Capacitance			95		pF
R_g	Gate resistance	$V_{GS}=0\text{V}, V_{DS}=0\text{V}, f=1\text{MHz}$		3.2	5	Ω
SWITCHING PARAMETERS						
$\text{Q}_g(10\text{V})$	Total Gate Charge (10V)	$V_{GS}=-10\text{V}, V_{DS}=-15\text{V}, I_D=-5.3\text{A}$		13.6	16	nC
$\text{Q}_g(4.5\text{V})$	Total Gate Charge (4.5V)			6.7		nC
Q_{gs}	Gate Source Charge			2.5		nC
Q_{gd}	Gate Drain Charge			3.2		nC
$t_{\text{D(on)}}$	Turn-On Delay Time	$V_{GS}=-10\text{V}, V_{DS}=-15\text{V}, R_L=2.8\Omega, R_{\text{GEN}}=3\Omega$		8		ns
t_r	Turn-On Rise Time			6		ns
$t_{\text{D(off)}}$	Turn-Off Delay Time			17		ns
t_f	Turn-Off Fall Time			5		ns
t_{rr}	Body Diode Reverse Recovery Time	$I_F=-5.3\text{A}, dI/dt=100\text{A}/\mu\text{s}$		15		ns
Q_{rr}	Body Diode Reverse Recovery Charge	$I_F=-5.3\text{A}, dI/dt=100\text{A}/\mu\text{s}$		9.7		nC

A: The value of R_{BJA} is measured with the device mounted on 1in² 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. The current rating is based on the $t \leq 10\text{s}$ thermal resistance rating.

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

C. The R_{BJA} is the sum of the thermal impedance from junction to lead R_{BJL} and lead to ambient.

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 $T_A=25^\circ\text{C}$. 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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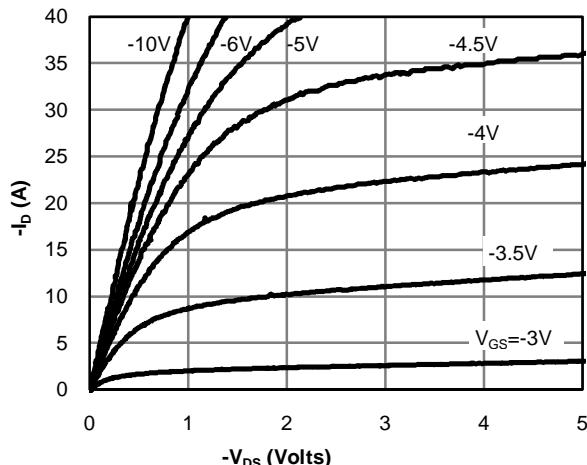
P-CHANNEL TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS


Fig 1: On-Region Characteristics

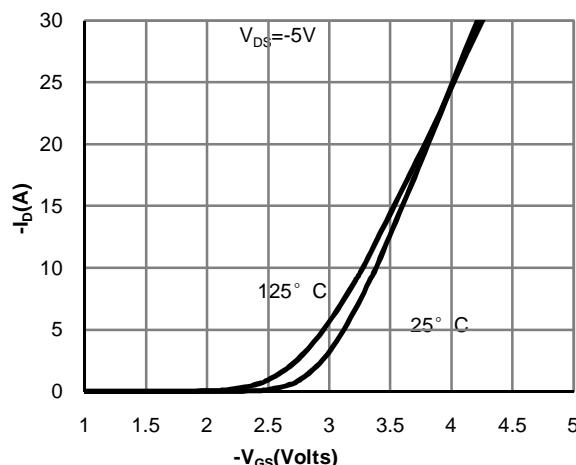


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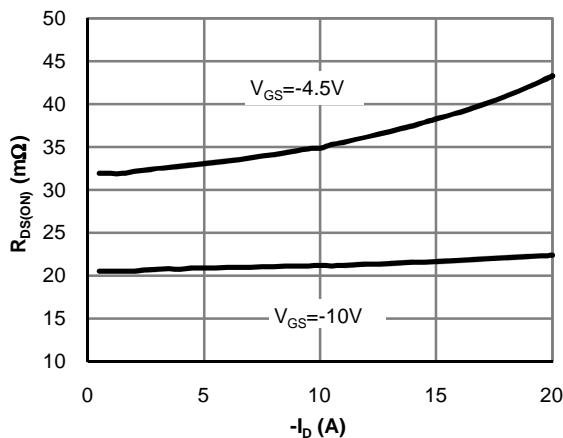


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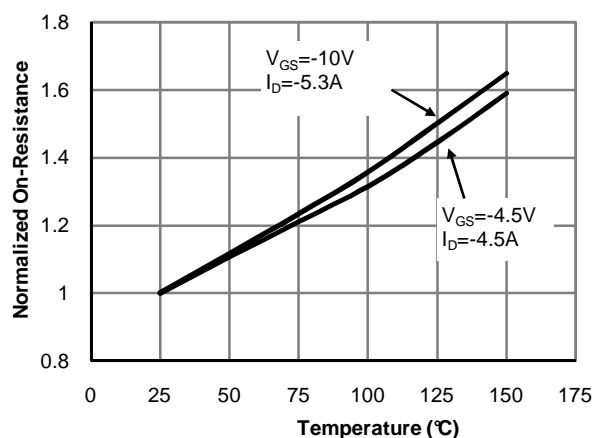


Figure 4: On-Resistance vs. Junction Temperature

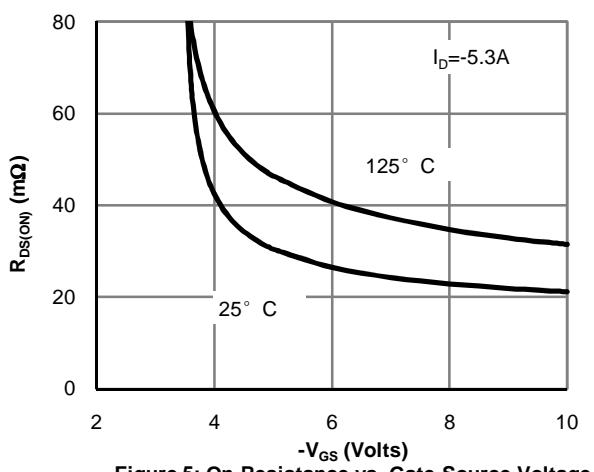


Figure 5: On-Resistance vs. Gate-Source Voltage

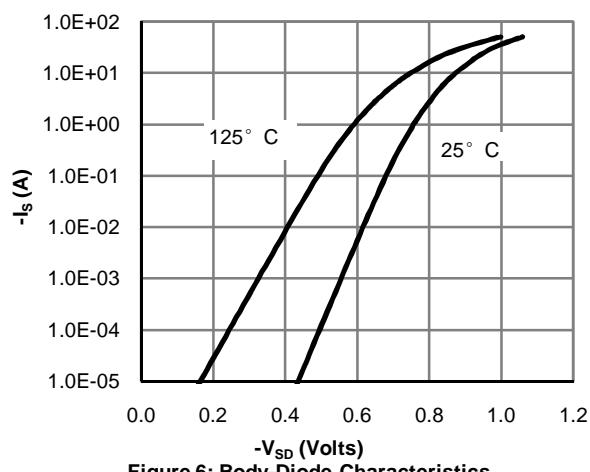


Figure 6: Body-Diode Characteristics

P-CHANNEL TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

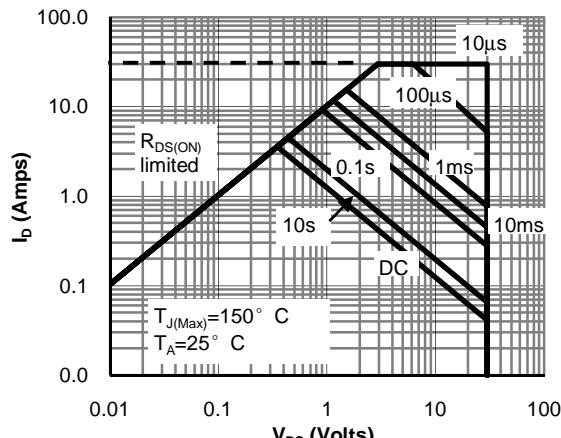
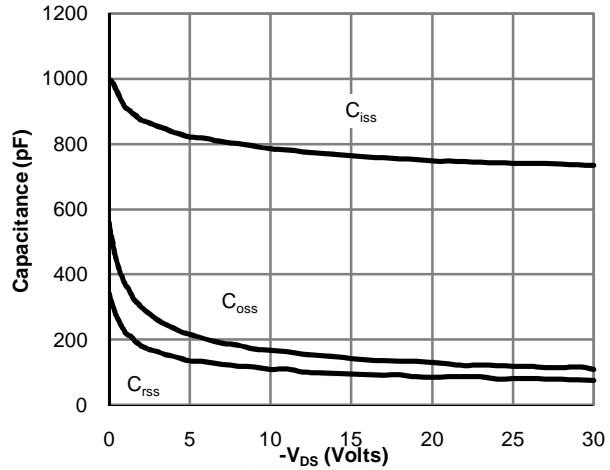
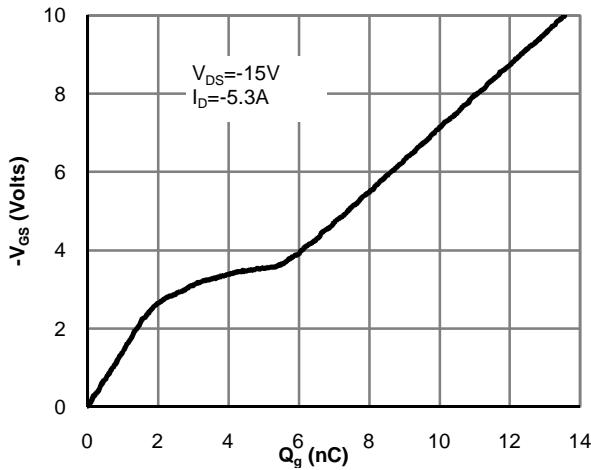


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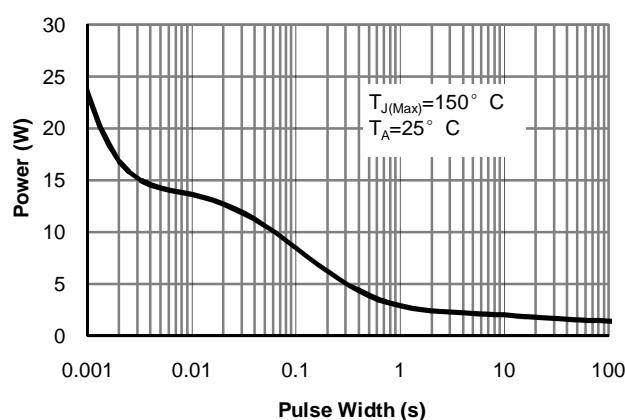


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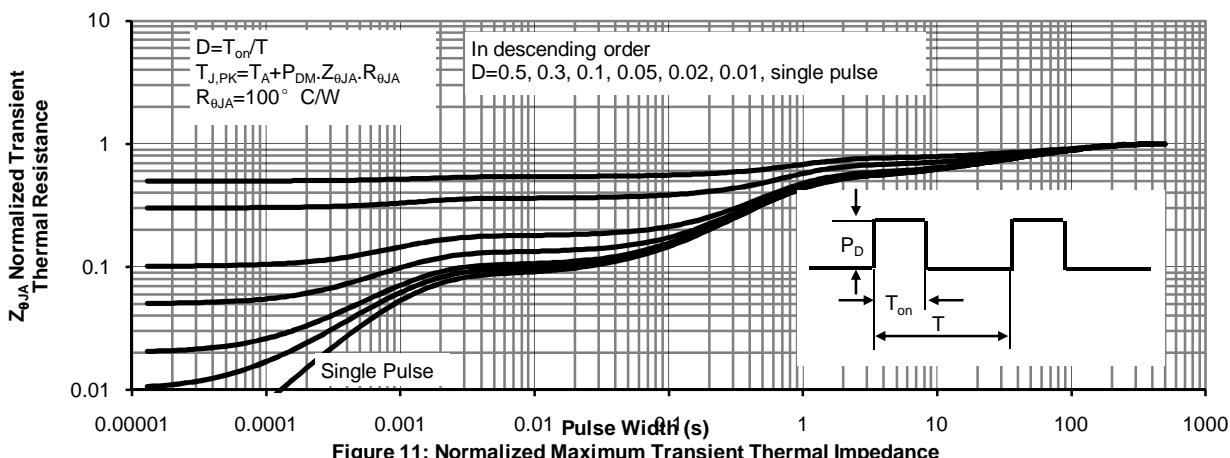


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