

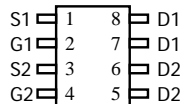
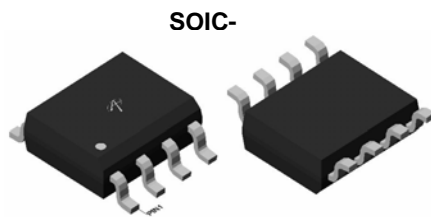
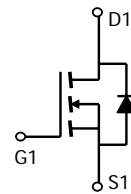
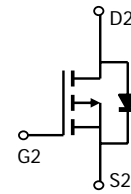
AO4622
Complementary Enhancement Mode Field Effect Transistor
General Description

The AO4622/L uses advanced trench technology MOSFETs to provide excellent $R_{DS(ON)}$ and low gate charge. The complementary MOSFETs may be used to form a level shifted high side switch, and for a host of other applications. AO4622 and AO4622L are electrically identical.

-RoHS Compliant
 -AO4622L is Halogen Free

Features

n-channel	p-channel
$V_{DS} (V) = 20V$	-20V
$I_D = 7.3A (V_{GS}=4.5V)$	-5A ($V_{GS}=-4.5V$)
$R_{DS(ON)}$	$R_{DS(ON)}$
< 23m Ω ($V_{GS}=10V$)	< 53m Ω ($V_{GS} = -4.5V$)
< 30m Ω ($V_{GS}=4.5V$)	< 87m Ω ($V_{GS} = -2.5V$)
< 84m Ω ($V_{GS}=2.5V$)	


SOIC-8

n-channel

p-channel
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}	$T_A=25^\circ C$	7.3	-5	A
	$T_A=70^\circ C$	6.2	-4.2	
Pulsed Drain Current ^B	I_{DM}	35	-25	
Power Dissipation	$T_A=25^\circ C$	2	2	W
	$T_A=70^\circ C$	1.44	1.44	
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	$^\circ C/W$
	Steady-State		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	$^\circ C/W$
	Steady-State		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	$V_{DS}=16\text{V}$, $V_{GS}=0\text{V}$ $T_J=55^\circ\text{C}$			1	uA
					5	
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	$V_{GS}=10\text{V}$, $I_D=7.3\text{A}$ $T_J=125^\circ\text{C}$		19	23	m Ω
				28	33.6	
			$V_{GS}=4.5\text{V}$, $I_D=6.4\text{A}$		24	
	$V_{GS}=2.5\text{V}$, $I_D=2\text{A}$		67	84	m Ω	
g_{FS}	Forward Transconductance	$V_{DS}=5\text{V}$, $I_D=7.3\text{A}$		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 Delay Time	$V_{GS}=10\text{V}$, $V_{DS}=10\text{V}$, $R_L=1.4\Omega$, $R_{GEN}=3\Omega$		4.5		ns
t_r	Turn-On Rise Time			9.2		ns
$t_{D(off)}$	Turn-Off Delay Time			18.7		ns
t_f	Turn-Off Fall Time			3.3		ns
t_{rr}	Body Diode Reverse Recovery Time	$I_F=7.3\text{A}$, $dI/dt=100\text{A}/\mu\text{s}$		18		ns
Q_{rr}	Body Diode Reverse Recovery Charge	$I_F=7.3\text{A}$, $dI/dt=100\text{A}/\mu\text{s}$		9.5		nC

A: The value of $R_{\theta JA}$ is measured with the device mounted on 1in^2 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 1in^2 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.

Rev4: Nov 2008

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N-CHANNEL TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

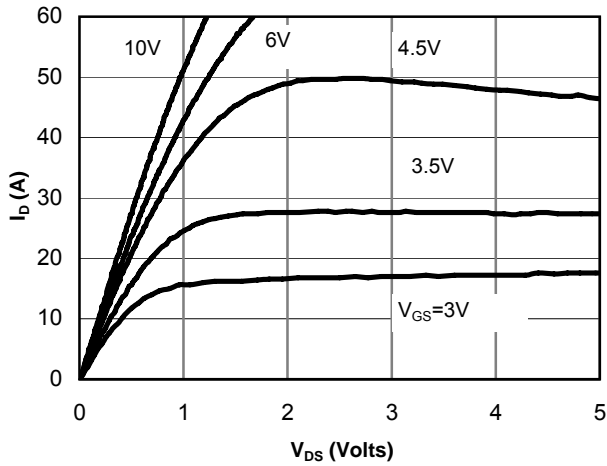


Figure 1: On-Region Characteristics

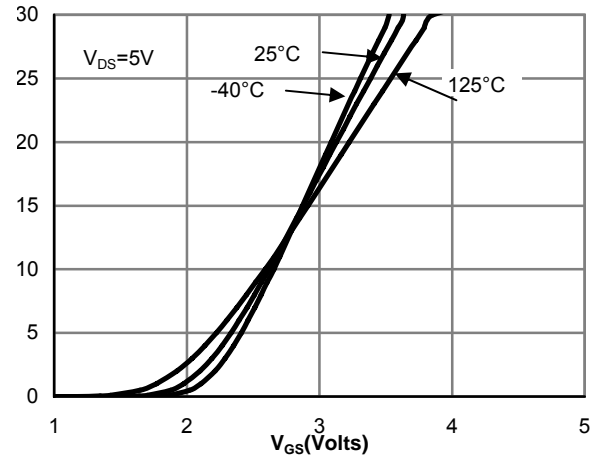


Figure 2: Transfer Characteristics

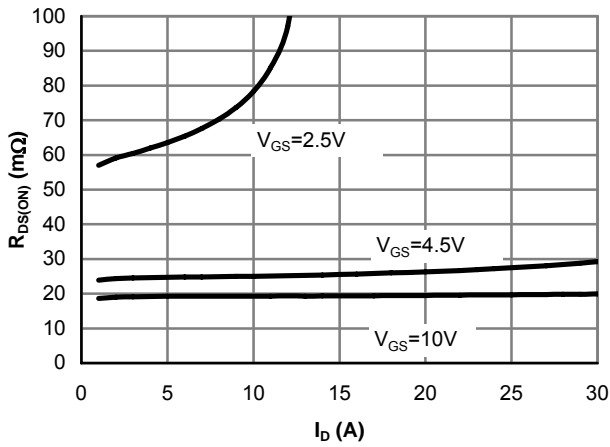


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

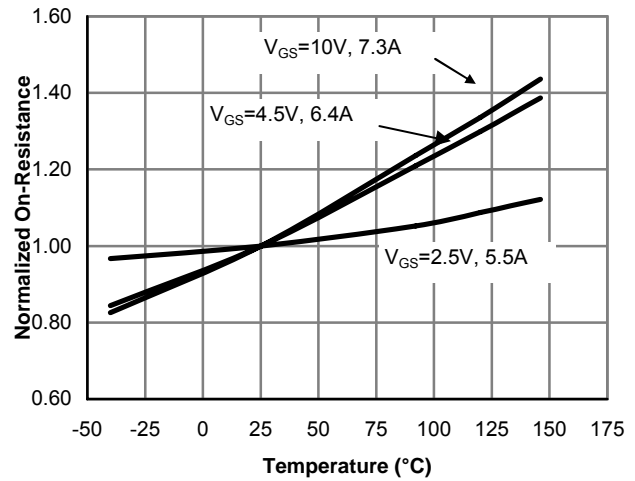


Figure 4: On-Resistance vs. Junction Temperature

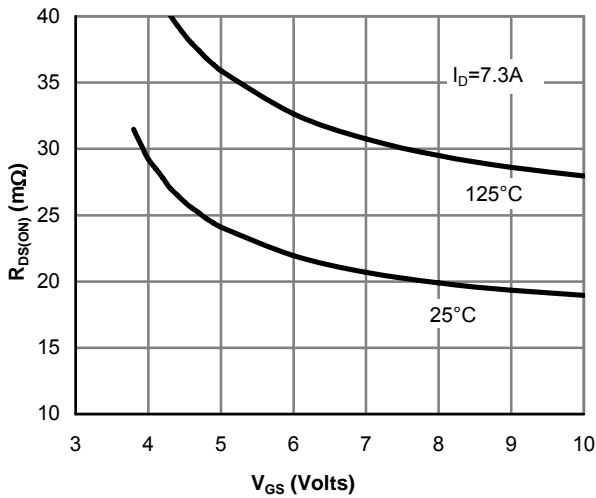


Figure 5: On-Resistance vs. Gate-Source Voltage

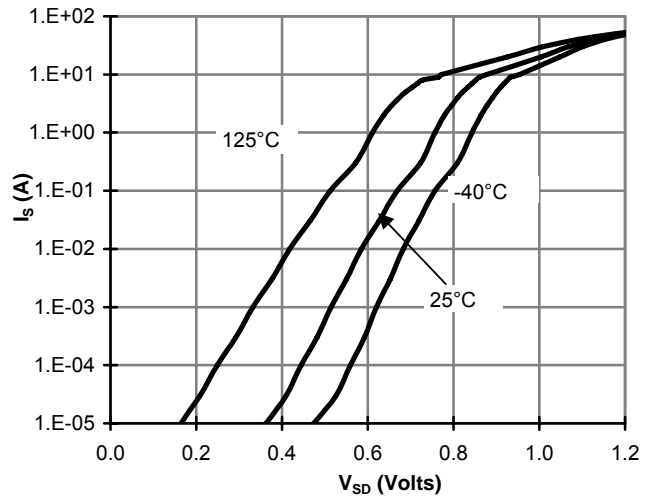


Figure 6: Body-Diode Characteristics

N-Channel TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

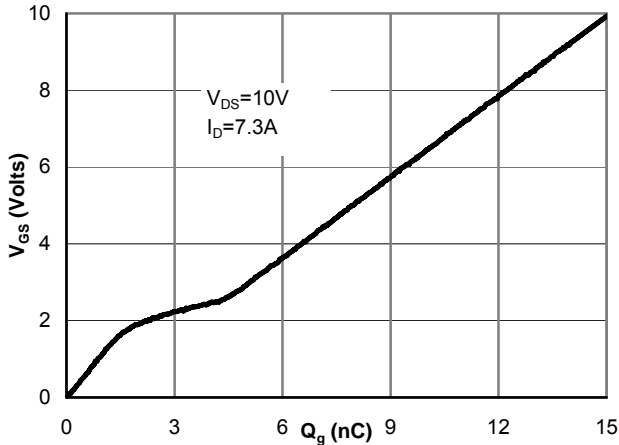


Figure 7: Gate-Charge Characteristics

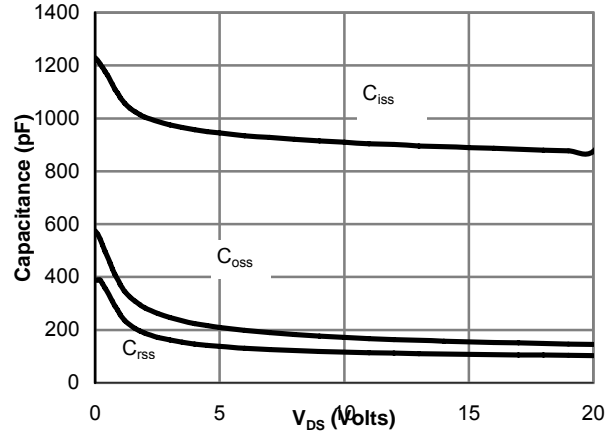


Figure 8: Capacitance Characteristics

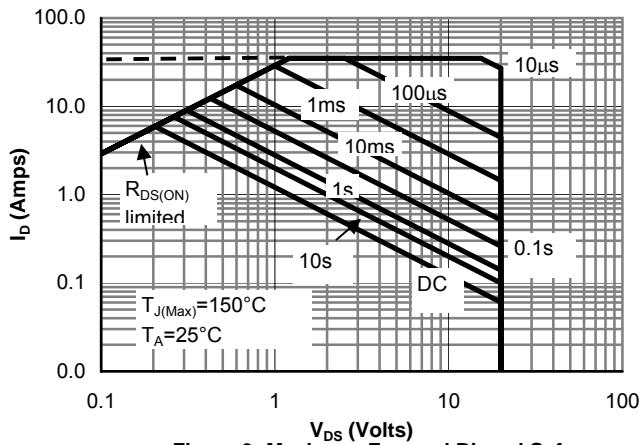


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

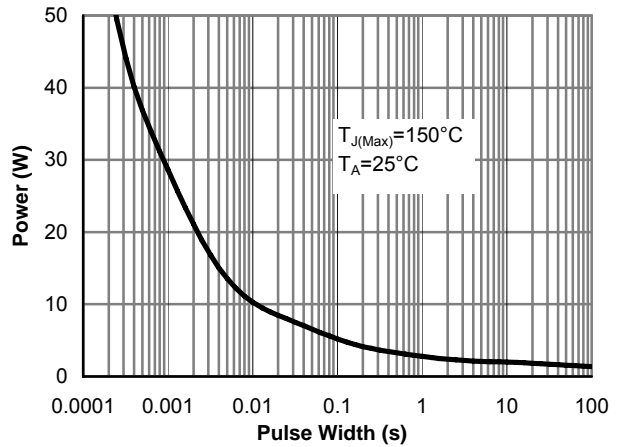


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

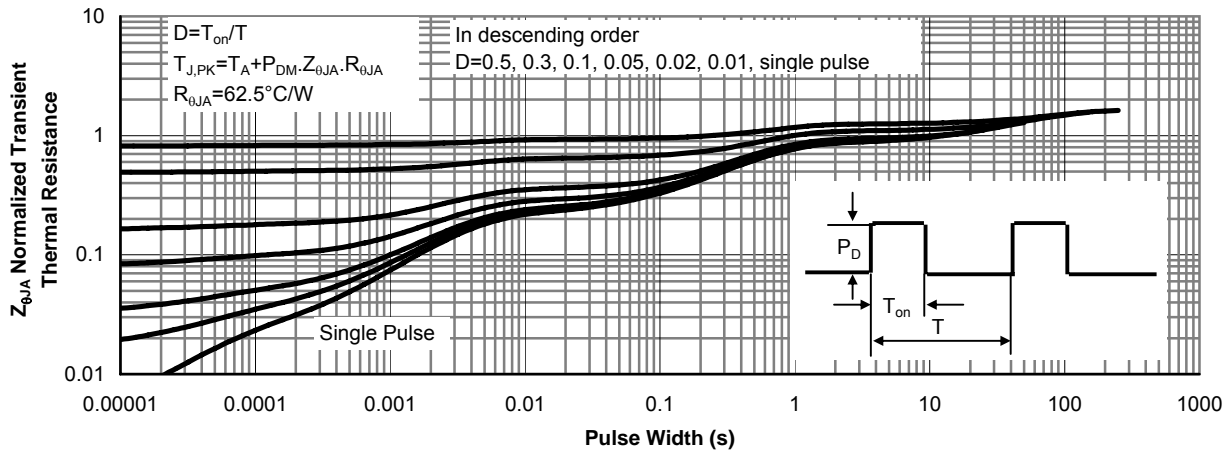
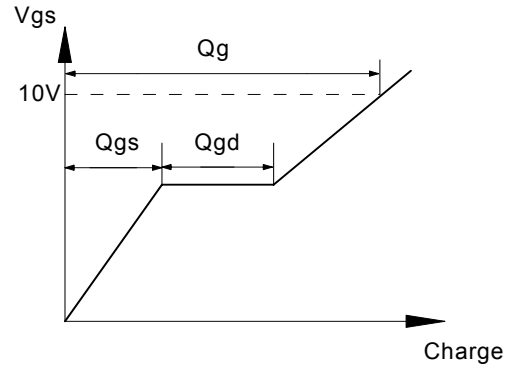
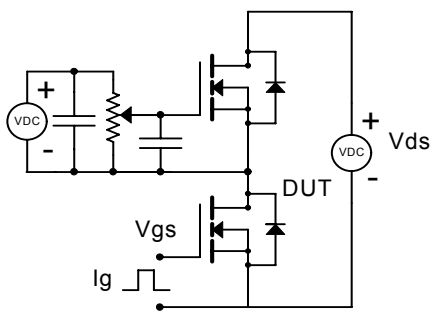
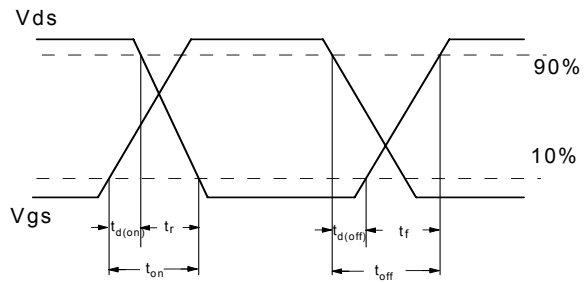
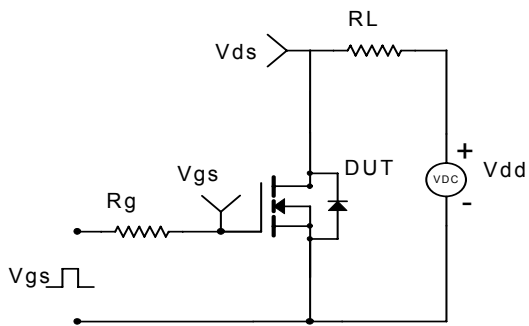


Figure 11: Normalized Maximum Transient Thermal Impedance

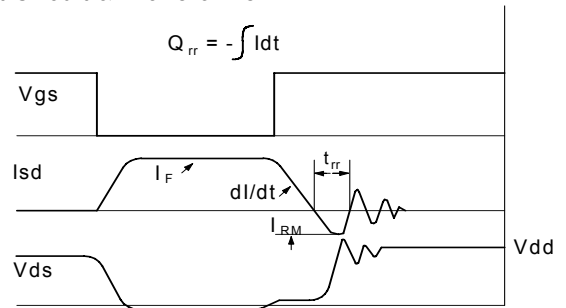
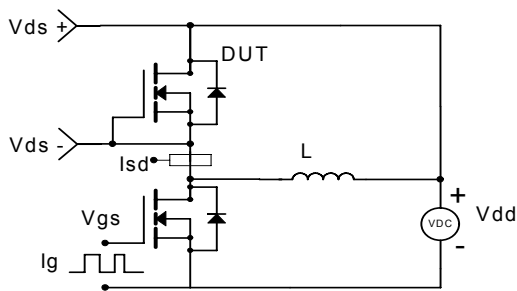
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



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 T _J =55°C			-1 -5	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 =-5A T _J =125°C		44 59	53 71	mΩ
		V _{GS} =-2.5V, I _D =-4.2A		67	87	
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

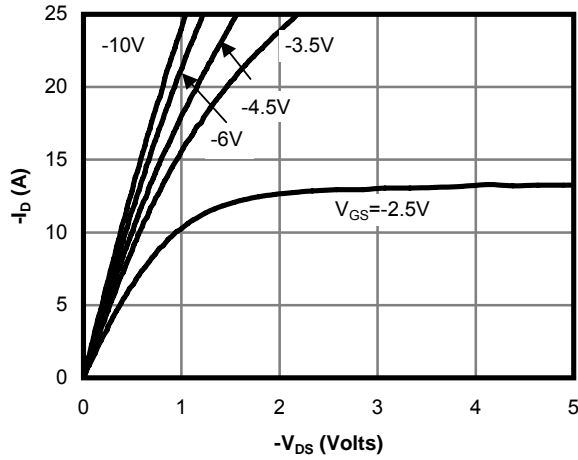


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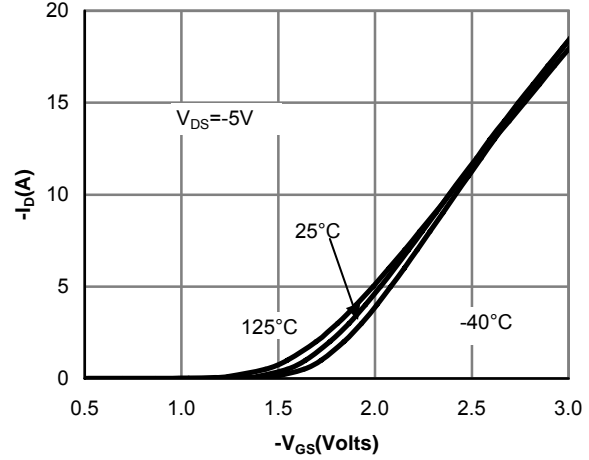


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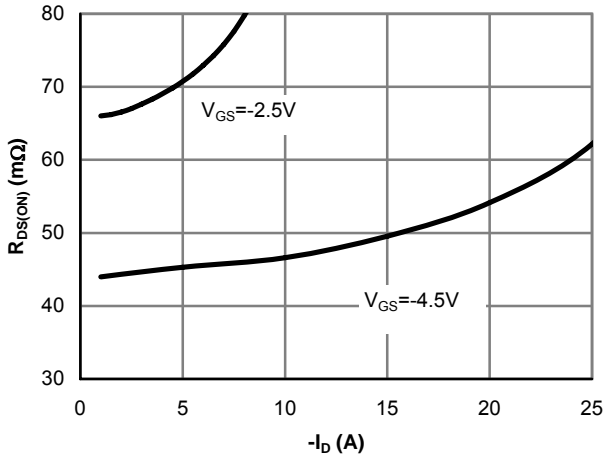


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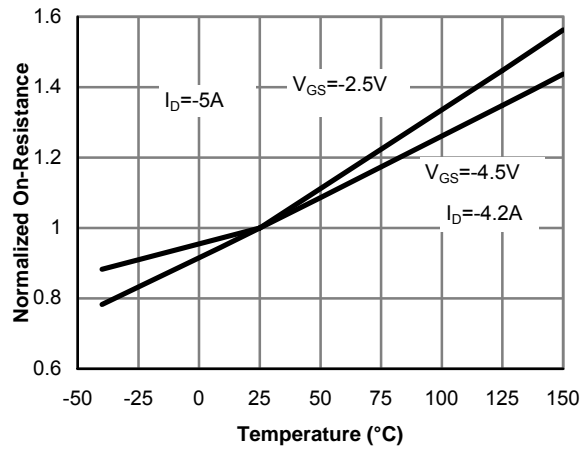


Figure 4: On-Resistance vs. Junction Temperature

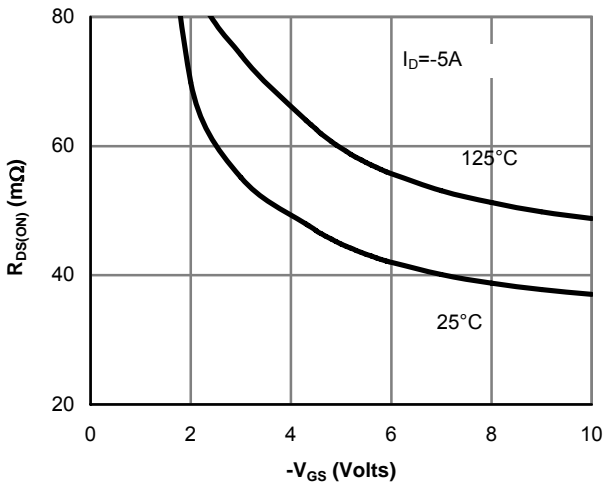


Figure 5: On-Resistance vs. Gate-Source Voltage

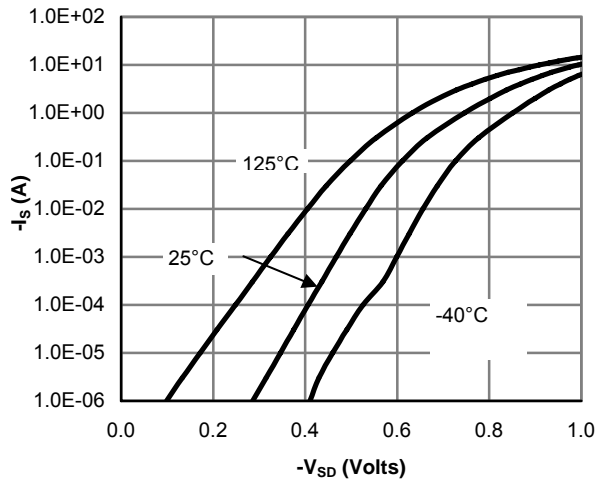


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS: P-CHANNEL

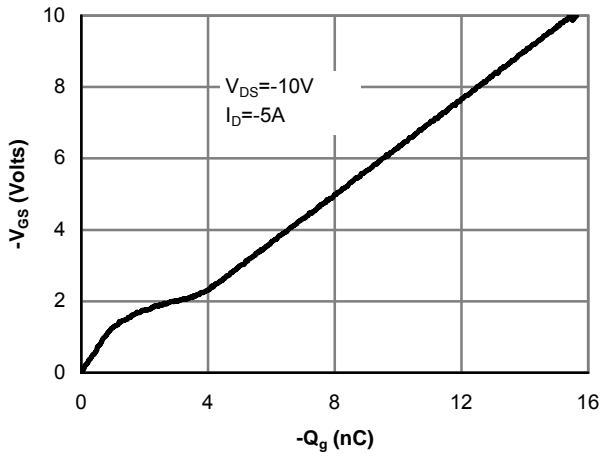


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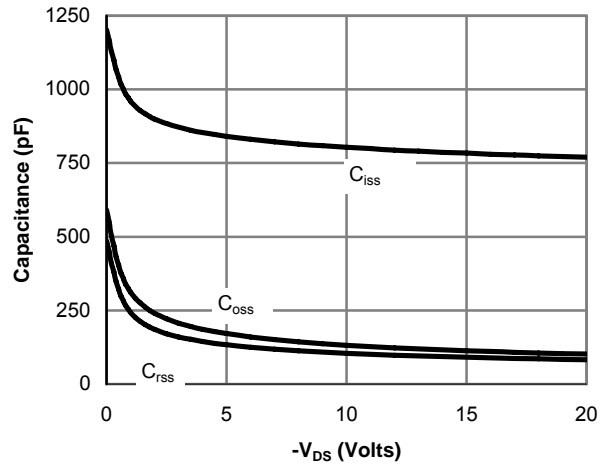


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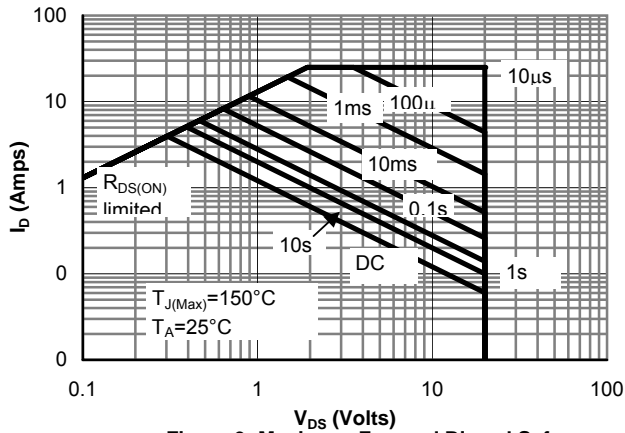


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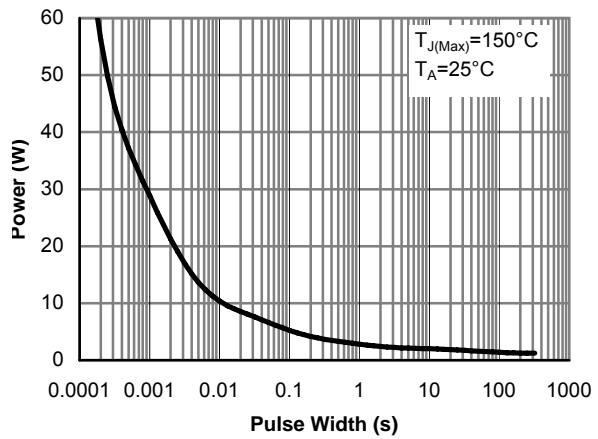


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

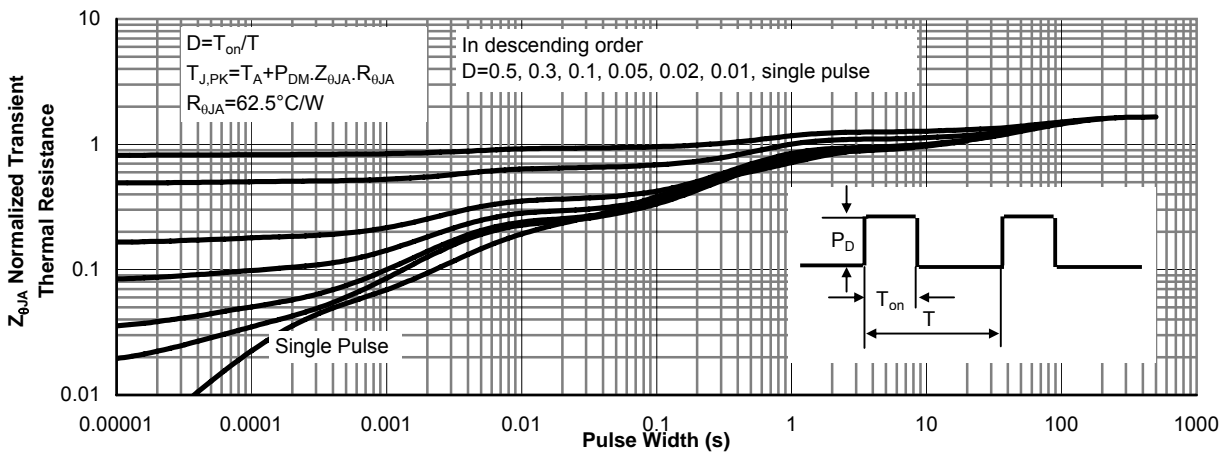
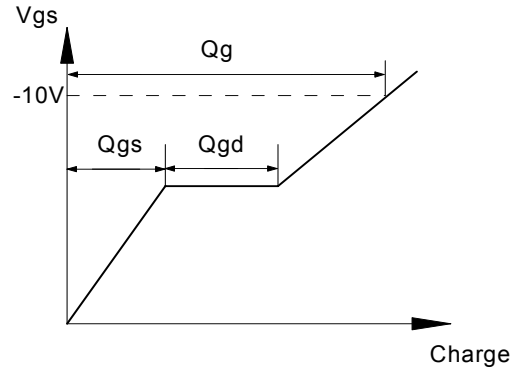
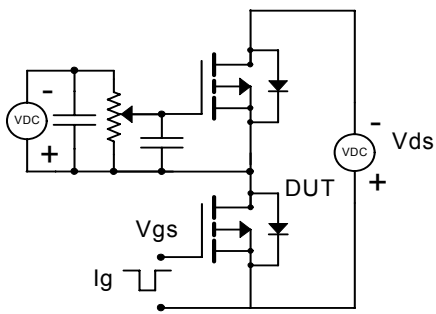
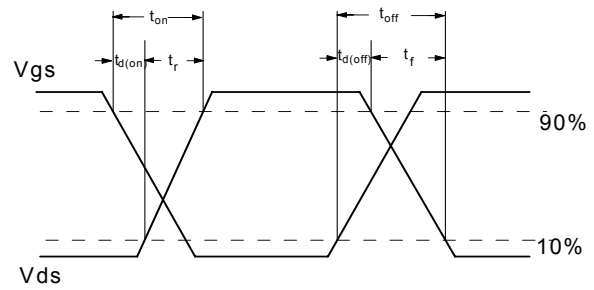
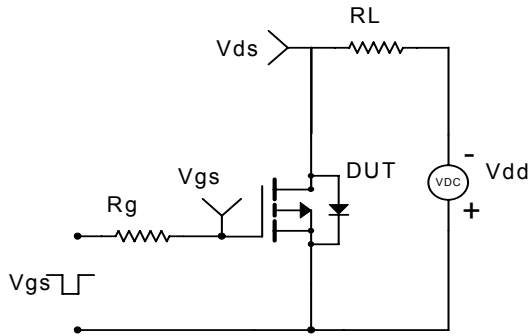


Figure 11: Normalized Maximum Transient Thermal Impedance

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Resistive Switching Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

