Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!

Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832
Email & Skype: info@chipsmall.com Web: www.chipsmall.com
Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China

ALPHA & OMEGA SEMICONDUCTOR

AO6601

30V Complementary MOSFET

General Description

The AO6601 uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. The complementary MOSFETs form a high-speed power inverter, suitable for a multitude of applications.

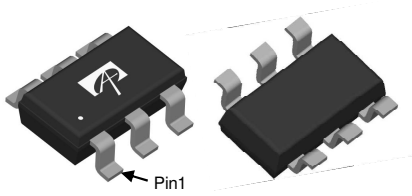
Product Summary

N-Channel	P-Channel
V_{DS}= 30V	-30V
I_D= 3.4A (V_{GS}=10V)	-2.3A (V_{GS}=-10V)
$R_{DS(ON)}$	$R_{DS(ON)}$
< 60mΩ (V_{GS}=10V)	< 115mΩ (VGS=-10V)
< 70mΩ (V_{GS}=4.5V)	< 150mΩ (VGS=-4.5V)
< 90mΩ (V_{GS}=2.5V)	< 200mΩ (VGS=-2.5V)

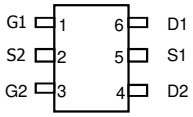
Green Product

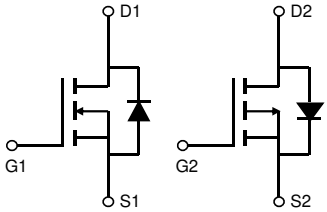
TSOP6

Top View Bottom View



Top View





n-channel p-channel

Absolute Maximum Ratings T_A=25°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}	±12	±12	V
Continuous Drain Current	T_A=25°C	I_D	3.4	-2.3	A
	T_A=70°C		2.7	-1.8	
Pulsed Drain Current [C]		I_{DM}	20	-15	
Power Dissipation [B]	T_A=25°C	P_D	1.15	1.15	W
	T_A=70°C		0.73	0.73	
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150		°C

Thermal Characteristics

Parameter		Symbol	Typ	Max	Units
Maximum Junction-to-Ambient [A]	t ≤ 10s	$R_{\theta JA}$	78	110	°C/W
Maximum Junction-to-Ambient [A D]	Steady-State		106	150	°C/W
Maximum Junction-to-Lead	Steady-State	$R_{\theta JL}$	64	80	°C/W

N-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	30			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=30V, V_{GS}=0V			1	µA
		T_J=55°C			5	
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	0.5	1	1.5	V
$I_{D(ON)}$	On state drain current	V_{GS}=10V, V_{DS}=5V	20			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V, I_D=3.4A		46	60	mΩ
		T_J=125°C		73	88	
		V_{GS}=4.5V, I_D=3A		50	70	mΩ
		V_{GS}=2.5V, I_D=2A		62	90	mΩ
g_{FS}	Forward Transconductance	V_{DS}=5V, I_D=3.4A		14		S
V_{SD}	Diode Forward Voltage	I_S=1A,V_{GS}=0V		0.75	1	V
I_S	Maximum Body-Diode Continuous Current				1.5	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=15V, f=1MHz	185	235	285	pF
C_{oss}	Output Capacitance		25	35	45	pF
C_{rss}	Reverse Transfer Capacitance		10	18	25	pF
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1MHz	0.9	1.8	2.7	Ω
SWITCHING PARAMETERS						
Q_g(10V)	Total Gate Charge	V_{GS}=10V, V_{DS}=15V, I_D=3.4A		10	12	nC
Q_g(4.5V)	Total Gate Charge			4.7	6	nC
Q_{gs}	Gate Source Charge			0.95		nC
Q_{gd}	Gate Drain Charge			1.6		nC
$t_{D(on)}$	Turn-On DelayTime	V_{GS}=10V, V_{DS}=15V, R_L=4.4Ω, R_{GEN}=3Ω		3.5		ns
t_r	Turn-On Rise Time			1.5		ns
$t_{D(off)}$	Turn-Off DelayTime			17.5		ns
t_f	Turn-Off Fall Time			2.5		ns
t_{rr}	Body Diode Reverse Recovery Time	I_F=3.4A, dI/dt=100A/µs		8.5	12	ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F=3.4A, dI/dt=100A/µs		2.55	4	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° C. The value in any given application depends on the user's specific board design.
B. The power dissipation P_D is based on $T_{J(MAX)}$=150° C, using ≤ 10s junction-to-ambient thermal resistance.
C. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$=150° C. Ratings are based on low frequency and duty cycles to keep initialT_J=25° C.
D. The $R_{\theta JA}$ is the sum of the thermal impedence from junction to lead $R_{\theta JL}$ and lead to ambient.
E. The static characteristics in Figures 1 to 6 are obtained using <300µs pulses, duty cycle 0.5% max.
F. These curves are based on the junction-to-ambient thermal impedence which is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, assuming a maximum junction temperature of $T_{J(MAX)}$=150° C. The SOA curve provides a single pulse rating.

THIS PRODUCT HAS BEEN DESIGNED AND QUALIFIED FOR THE CONSUMER MARKET. APPLICATIONS OR USES AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS ARE NOT AUTHORIZED. AOS DOES NOT ASSUME ANY LIABILITY ARISING OUT OF SUCH APPLICATIONS OR USES OF ITS PRODUCTS. AOS RESERVES THE RIGHT TO IMPROVE PRODUCT DESIGN, FUNCTIONS AND RELIABILITY WITHOUT NOTICE.

N-Channel: TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

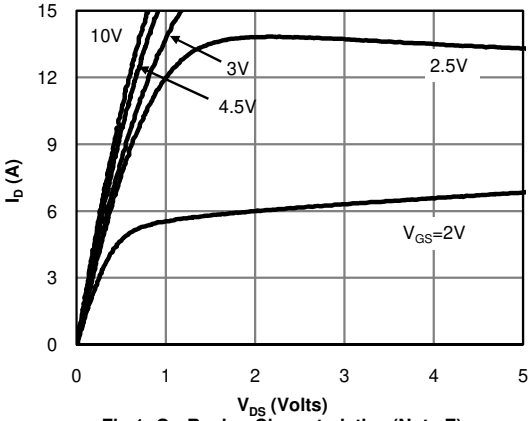


Fig 1: On-Region Characteristics (Note E)

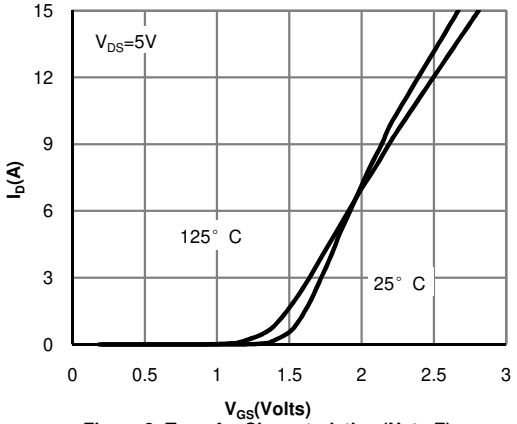


Figure 2: Transfer Characteristics (Note E)

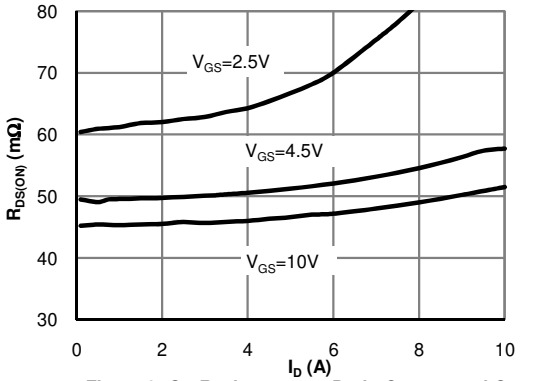


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

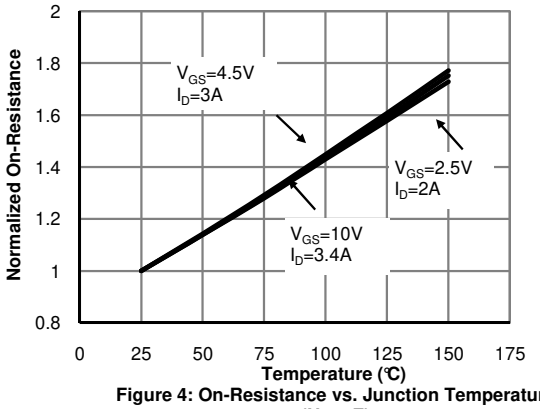


Figure 4: On-Resistance vs. Junction Temperature (Note E)

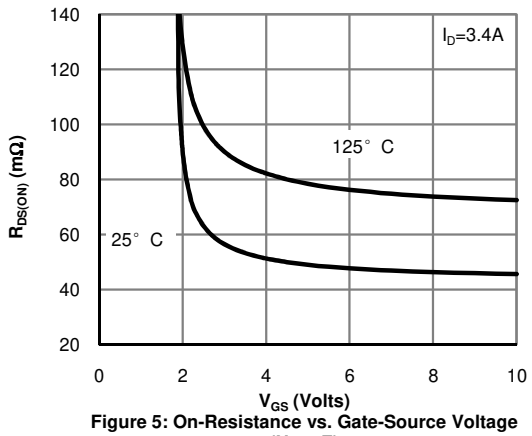


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

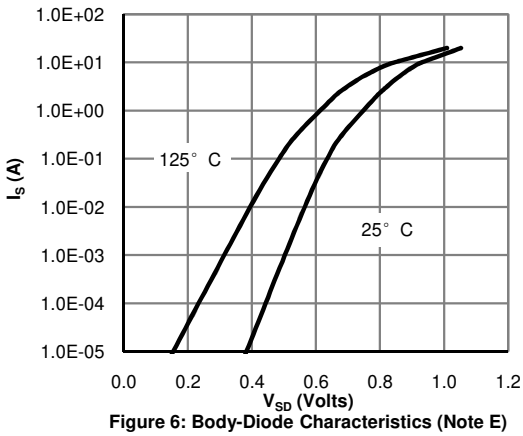


Figure 6: Body-Diode Characteristics (Note E)

N-Channel: TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

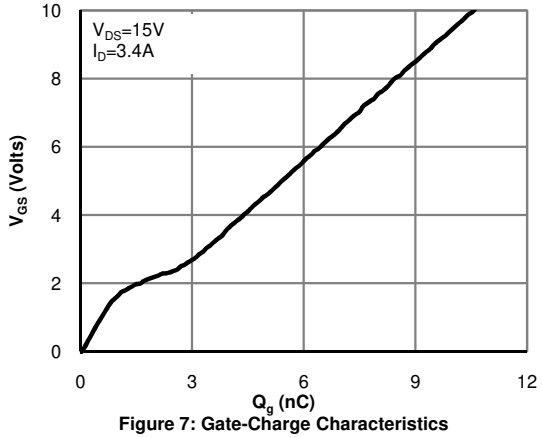


Figure 7: Gate-Charge Characteristics

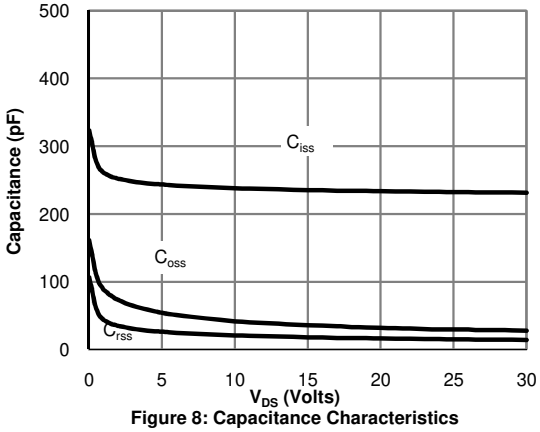


Figure 8: Capacitance Characteristics

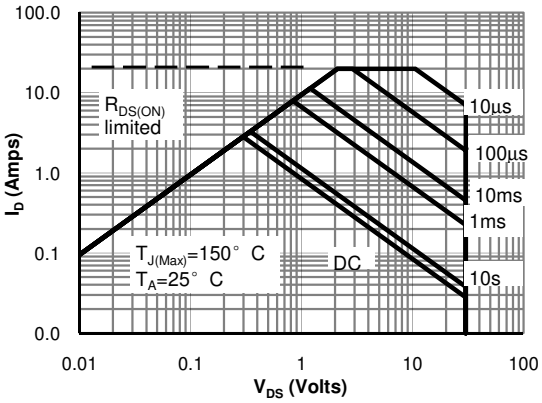


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

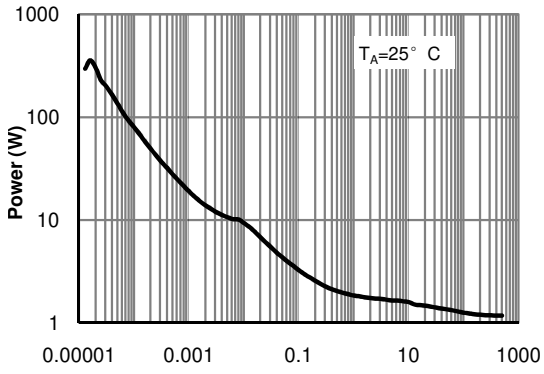


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note F)

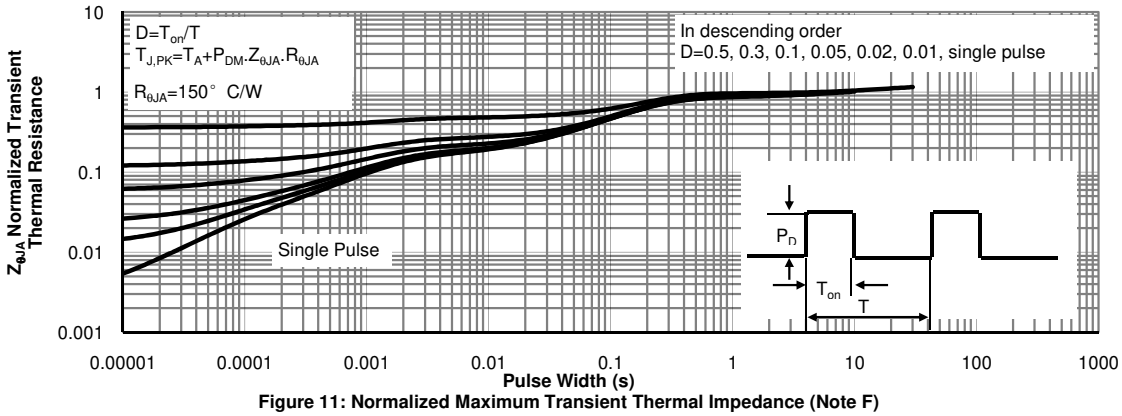
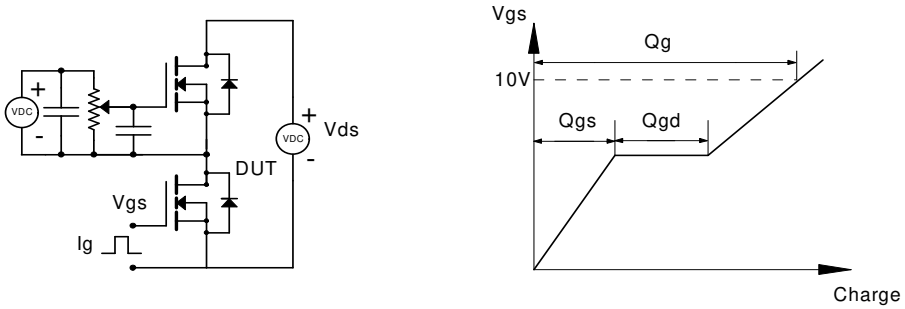
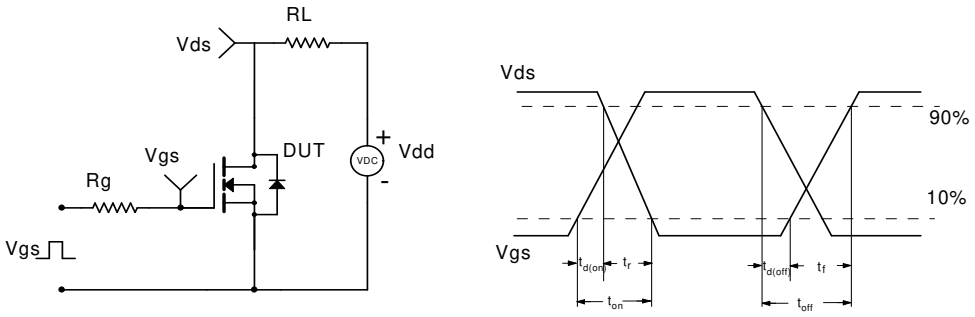


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

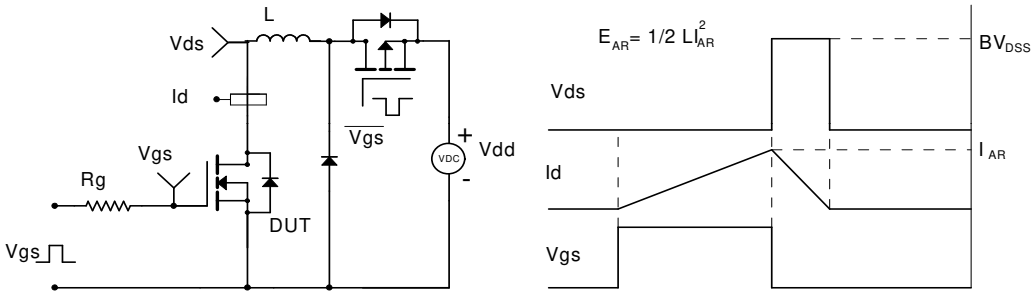
Gate Charge Test Circuit & Waveform



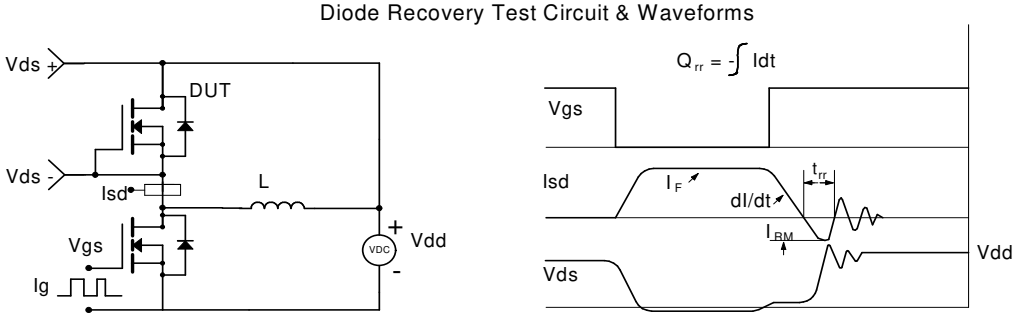
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) 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	-30			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=-30V, V_{GS}=0V			-1	µA
		T_J=55°C			-5	
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	-0.6	-1	-1.4	V
$I_{D(ON)}$	On state drain current	V_{GS}=-10V, V_{DS}=-5V	-15			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=-10V, I_D=-2.3A		88	115	mΩ
		T_J=125°C		143	200	
		V_{GS}=-4.5V, I_D=-2A		103	150	mΩ
		V_{GS}=-2.5V, I_D=-1A		139	200	mΩ
g_{FS}	Forward Transconductance	V_{DS}=-5V, I_D=-2.3A		8		S
V_{SD}	Diode Forward Voltage	I_S=-1A,V_{GS}=0V		-0.78	-1	V
I_S	Maximum Body-Diode Continuous Current				-1.5	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=-15V, f=1MHz	205	260	315	pF
C_{oss}	Output Capacitance		25	37	50	pF
C_{rss}	Reverse Transfer Capacitance		10	20	30	pF
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1MHz	4	8	12	Ω
SWITCHING PARAMETERS						
Q_g(10V)	Total Gate Charge	V_{GS}=10V, V_{DS}=-15V, I_D=-2.3A	4.5	5.9	7	nC
Q_g(4.5V)	Total Gate Charge		2	2.8	4	nC
Q_{gs}	Gate Source Charge			0.7		nC
Q_{gd}	Gate Drain Charge			1		nC
$t_{D(on)}$	Turn-On DelayTime	V_{GS}=10V, V_{DS}=-15V, R_L=6Ω, R_{GEN}=3Ω		6		ns
t_r	Turn-On Rise Time			3.5		ns
$t_{D(off)}$	Turn-Off DelayTime			20		ns
t_f	Turn-Off Fall Time			5		ns
t_{rr}	Body Diode Reverse Recovery Time	I_F=-2.3A, dI/dt=100A/µs		11.5	15	ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F=-2.3A, dI/dt=100A/µs		4.5	6	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° C. The value in any given application depends on the user's specific board design.
B. The power dissipation P_D is based on $T_{J(MAX)}$=150° C, using ≤ 10s junction-to-ambient thermal resistance.
C. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$=150° C. Ratings are based on low frequency and duty cycles to keep initialT_J=25° C.
D. The $R_{\theta JA}$ is the sum of the thermal impedence from junction to lead $R_{\theta JL}$ and lead to ambient.
E. The static characteristics in Figures 1 to 6 are obtained using <300µs pulses, duty cycle 0.5% max.
F. These curves are based on the junction-to-ambient thermal impedence which is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, assuming a maximum junction temperature of $T_{J(MAX)}$=150° C. The SOA curve provides a single pulse rating.

THIS PRODUCT HAS BEEN DESIGNED AND QUALIFIED FOR THE CONSUMER MARKET. APPLICATIONS OR USES AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS ARE NOT AUTHORIZED. AOS DOES NOT ASSUME ANY LIABILITY ARISING OUT OF SUCH APPLICATIONS OR USES OF ITS PRODUCTS. AOS RESERVES THE RIGHT TO IMPROVE PRODUCT DESIGN, FUNCTIONS AND RELIABILITY WITHOUT NOTICE.

P-Channel: TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

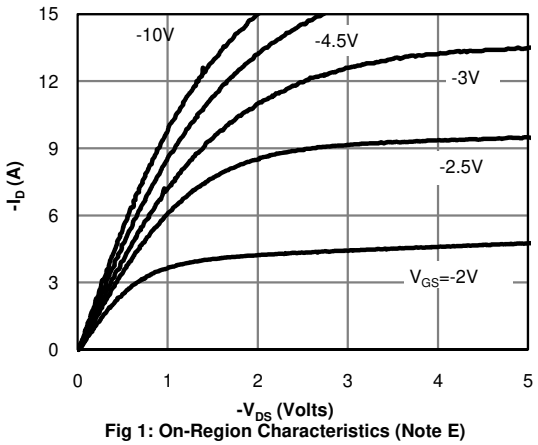


Fig 1: On-Region Characteristics (Note E)

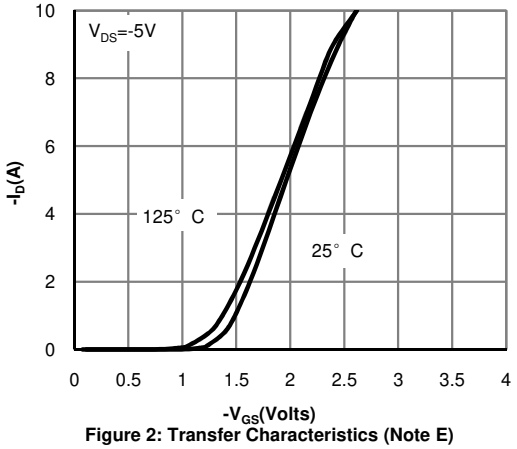


Figure 2: Transfer Characteristics (Note E)

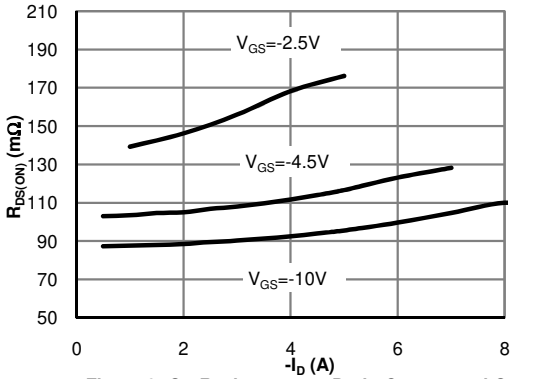


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

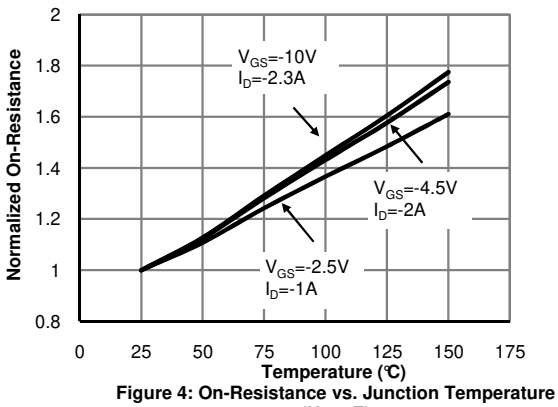


Figure 4: On-Resistance vs. Junction Temperature (Note E)

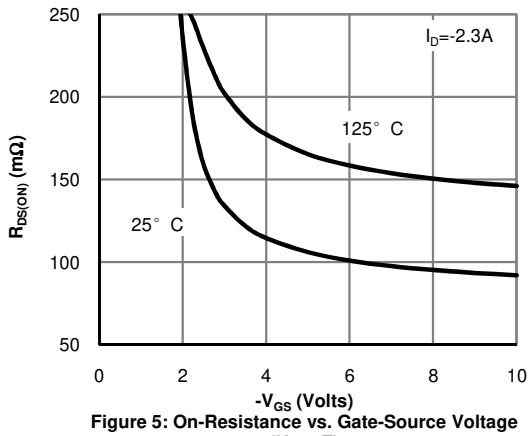


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

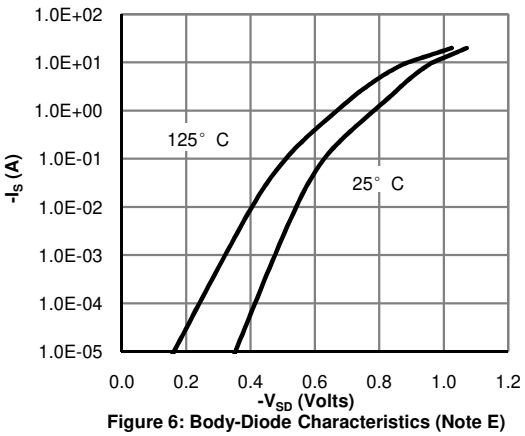


Figure 6: Body-Diode Characteristics (Note E)

P-Channel: TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

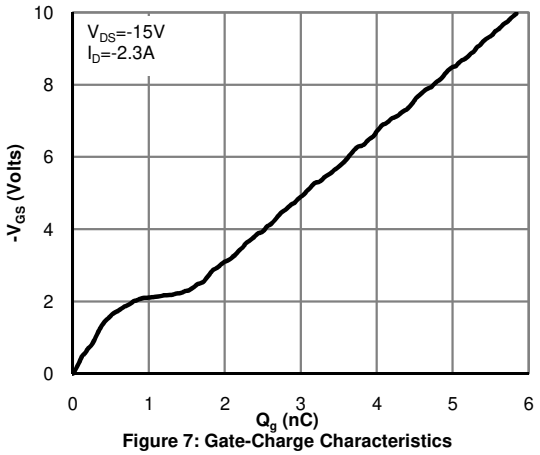


Figure 7: Gate-Charge Characteristics

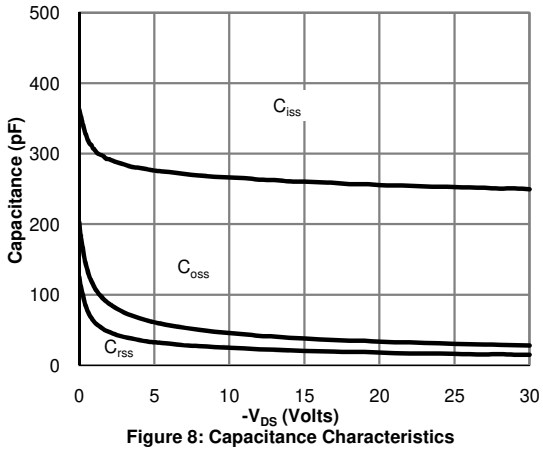


Figure 8: Capacitance Characteristics

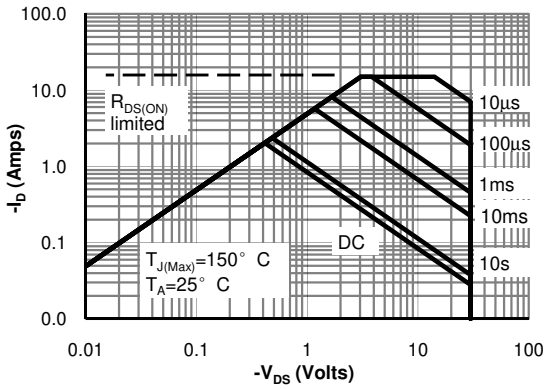


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

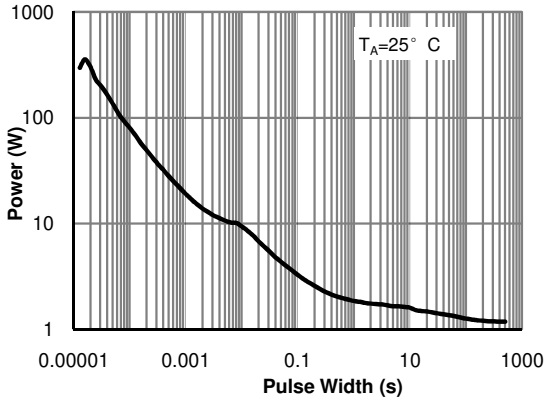


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note F)

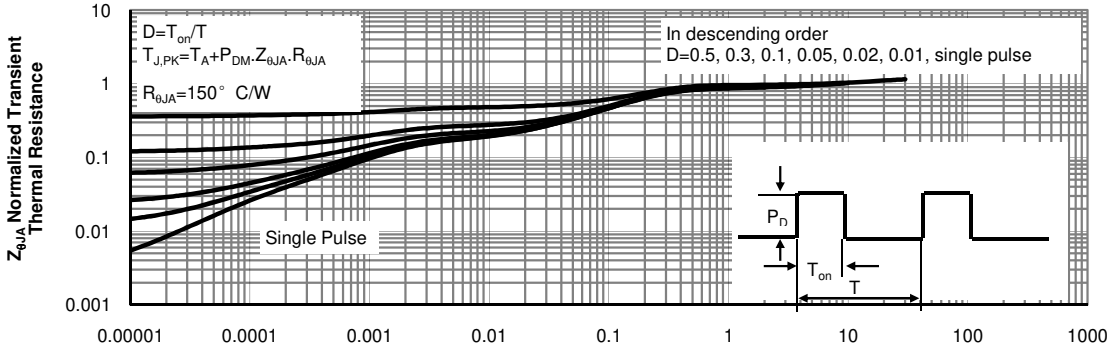
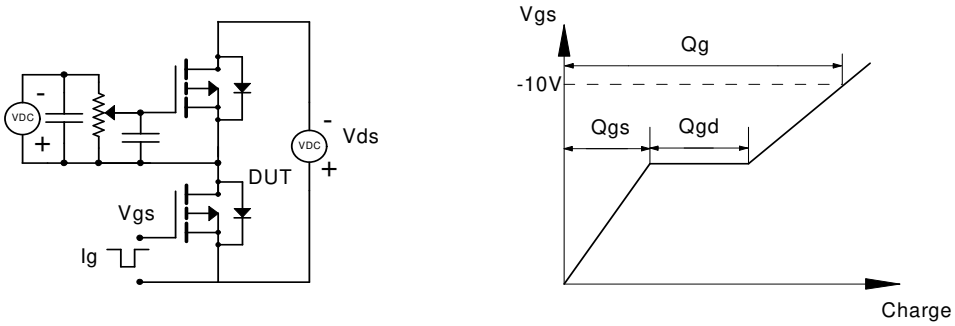
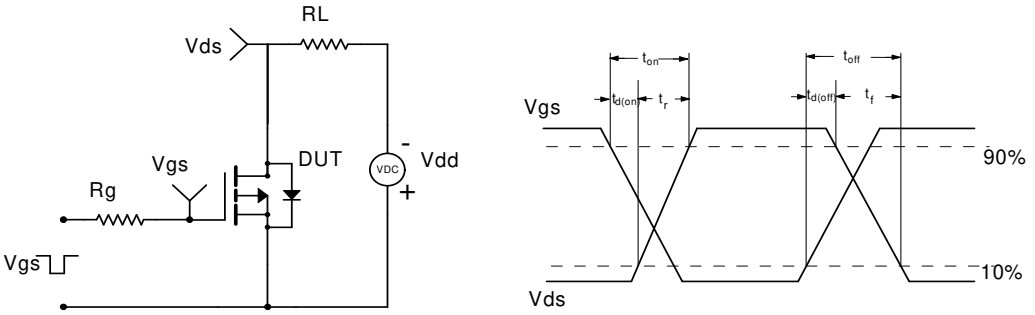


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

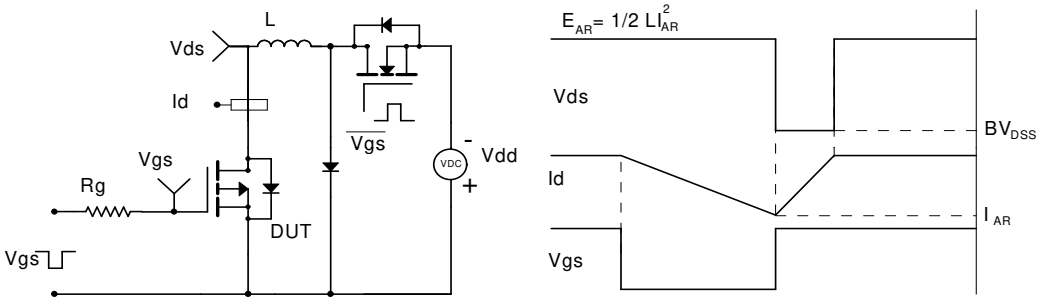
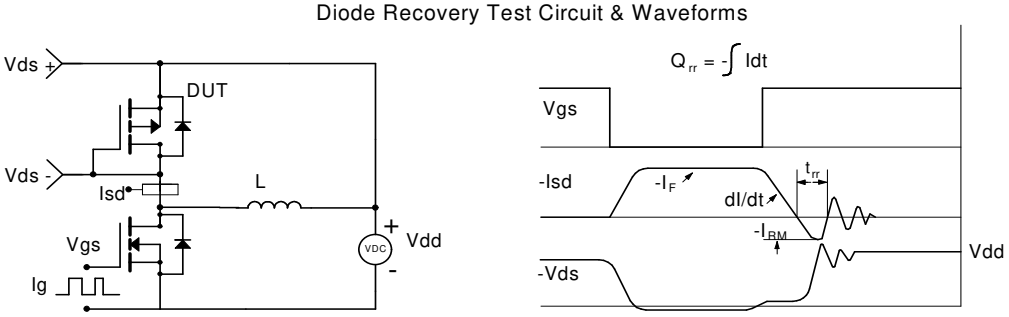
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms