ALPHA & OMEGA SEMICONDUCTOR

AON1605
20V P-Channel MOSFET

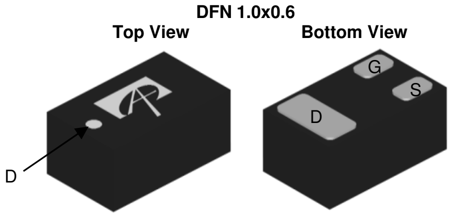
General Description

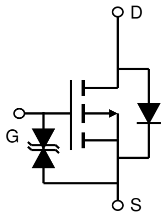
The AON1605 utilize advanced trench MOSFET technology in small DFN 1.0 x 0.6 package. This device is ideal for load switch applications.

Product Summary

V_{DS}	-20V
I_D (at V_{GS}=-4.5V)	-0.7A
$R_{DS(ON)}$ (at V_{GS} =-4.5V)	< 710mΩ
$R_{DS(ON)}$ (at V_{GS} =-2.5V)	< 930mΩ
$R_{DS(ON)}$ (at V_{GS} =-1.8V)	< 1250mΩ

Typical ESD protection **HBM Class 1C**





Absolute Maximum Ratings T_A=25°C unless otherwise noted				
Parameter		**Symbol**	**Maximum**	**Units**
Drain-Source Voltage		V_{DS}	-20	V
Gate-Source Voltage		V_{GS}	±8	V
Continuous Drain Current [E]	T_A=25°C	I_D	-0.7	A
	T_A=70°C		-0.55	
Pulsed Drain Current [C]		I_{DM}	-2	A
Power Dissipation [A]	T_A=25°C	P_D	0.9	W
	T_A=70°C		0.55	
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	$R_{\theta JA}$	80	100	°C/W
Maximum Junction-to-Ambient [A]	Steady-State		110	140	°C/W
Maximum Junction-to-Ambient [B]	t ≤ 10s	$R_{\theta JA}$	200	245	°C/W
Maximum Junction-to-Ambient [B]	Steady-State		280	340	°C/W

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}=-20V, V_{GS}=0V				-1	µA
			T_J=55°C			-5	
I_{GSS}	Gate-Body leakage current	V_{DS}=0V, V_{GS}=±8V				±10	µA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=-250µA		-0.4	-0.7	-1.1	V
$I_{D(ON)}$	On state drain current	V_{GS}=-4.5V, V_{DS}=-5V		-2			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=-4.5V, I_D=-0.4A			590	710	mΩ
			T_J=125°C		835	1010	
		V_{GS}=-2.5V, I_D=-0.3A			745	930	mΩ
		V_{GS}=-1.8V, I_D=-0.2A			955	1250	mΩ
		V_{GS}=-1.5V, I_D=-0.1A			1115		mΩ
g_{FS}	Forward Transconductance	V_{DS}=-5V, I_D=-0.4A			1		S
V_{SD}	Diode Forward Voltage	I_S=-0.4A,V_{GS}=0V			-0.85	-1.2	V
I_S	Maximum Body-Diode Continuous Current [E]					-0.7	A
DYNAMIC PARAMETERS							
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=-10V, f=1MHz			50		pF
C_{oss}	Output Capacitance				12		pF
C_{rss}	Reverse Transfer Capacitance				7.5		pF
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1MHz			45		Ω
SWITCHING PARAMETERS							
Q_g	Total Gate Charge	V_{GS}=-4.5V, V_{DS}=-10V, I_D=-0.4A			0.75		nC
Q_{gs}	Gate Source Charge				0.15		nC
Q_{gd}	Gate Drain Charge				0.2		nC
$t_{D(on)}$	Turn-On DelayTime	V_{GS}=-4.5V, V_{DS}=-10V, R_L=25Ω, R_{GEN}=3Ω			6		ns
t_r	Turn-On Rise Time				5		ns
$t_{D(off)}$	Turn-Off DelayTime				22		ns
t_f	Turn-Off Fall Time				8		ns

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° C. The Power dissipation P_{DSM} is based on $R_{\theta JA}$ and the maximum allowed junction temperature of 150° C. The value in any given application depends on the user's specific board design, and the maximum temperature of 150° C may be used if the PCB allows it to.
B. The value of $R_{\theta JA}$ is measured with the device mounted on FR-4 minimum pad board, in a still air environment with T_A =25° C. The Power dissipation P_{DSM} is based on $R_{\theta JA}$ and the maximum allowed junction temperature of 150° C. The value in any given application depends on the user's specific board design, and the maximum temperature of 150° C may be used if the PCB allows it to.
C. The static characteristics in Figures 1 to 6 are obtained using <300 µs pulses, duty cycle 0.5% max.
D. These tests are performed with the device mounted on 1 in^2 FR-4 board with 2oz. Copper, in a still air environment with T_A=25° C. The SOA curve provides a single pulse rating.
E. The maximum current limited by package.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

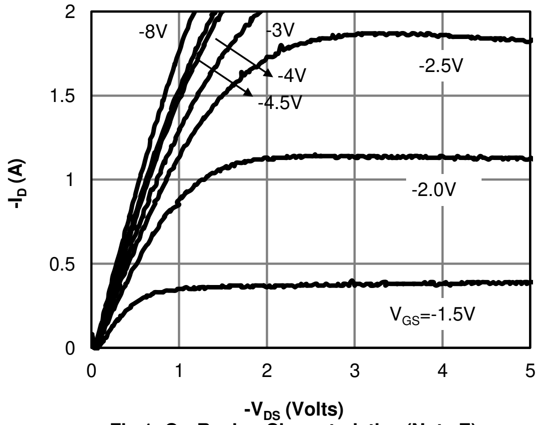


Fig 1: On-Region Characteristics (Note E)

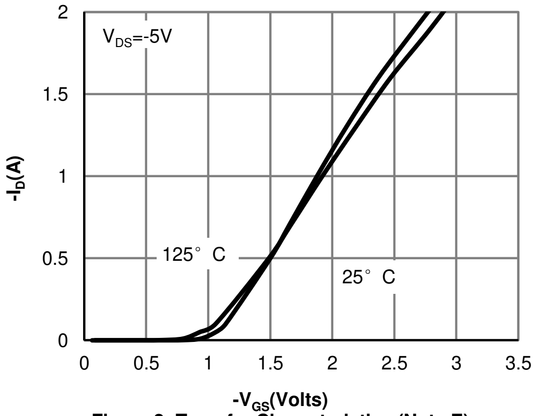


Figure 2: Transfer Characteristics (Note E)

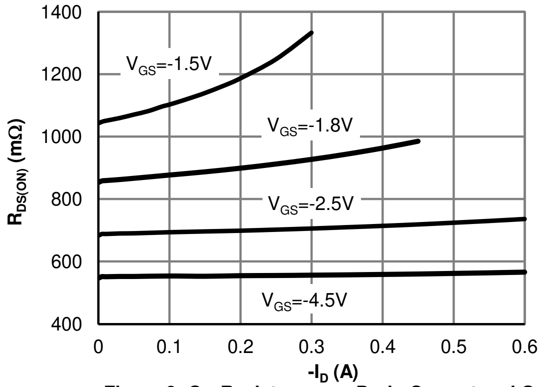


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

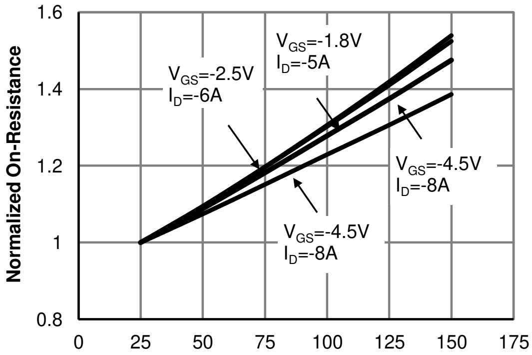


Figure 4: On-Resistance vs. Junction Temperature (Note E)

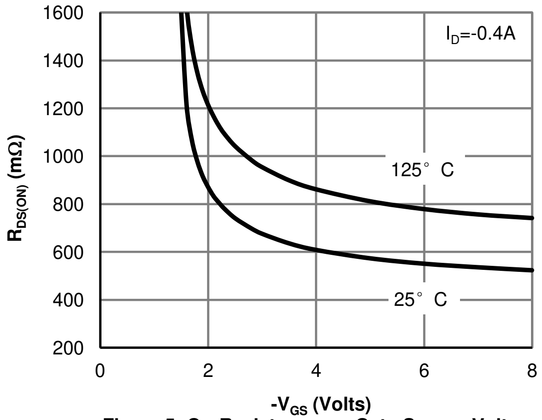


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

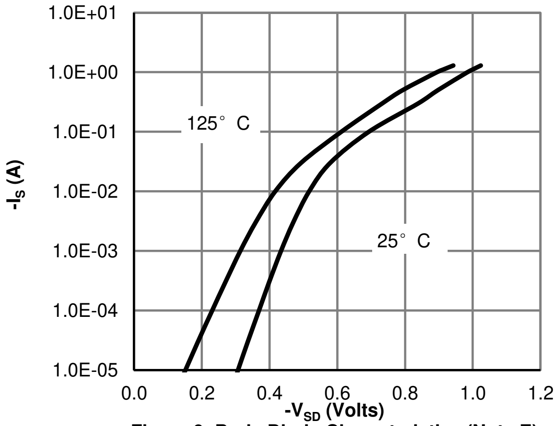


Figure 6: Body-Diode Characteristics (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

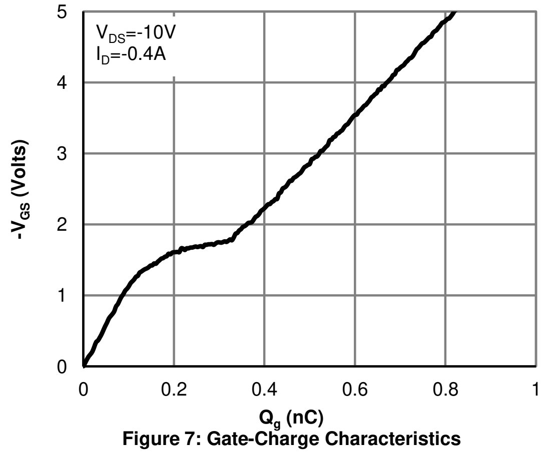


Figure 7: Gate-Charge Characteristics

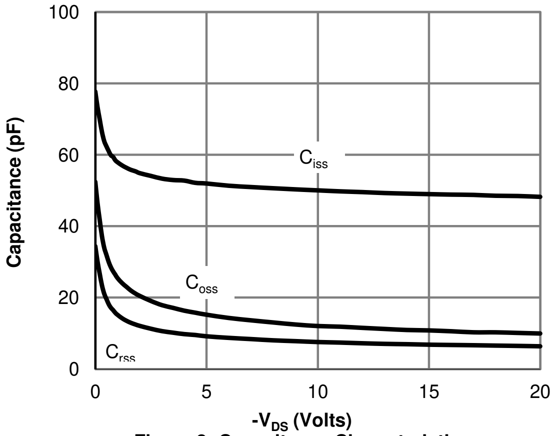


Figure 8: Capacitance Characteristics

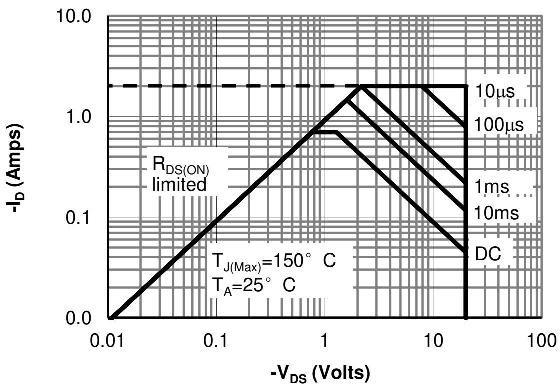


Figure 9: Maximum Forward Biased Safe Operating Area (Note B)

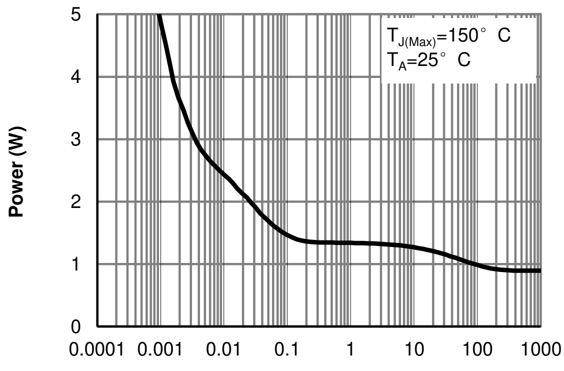


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note B)

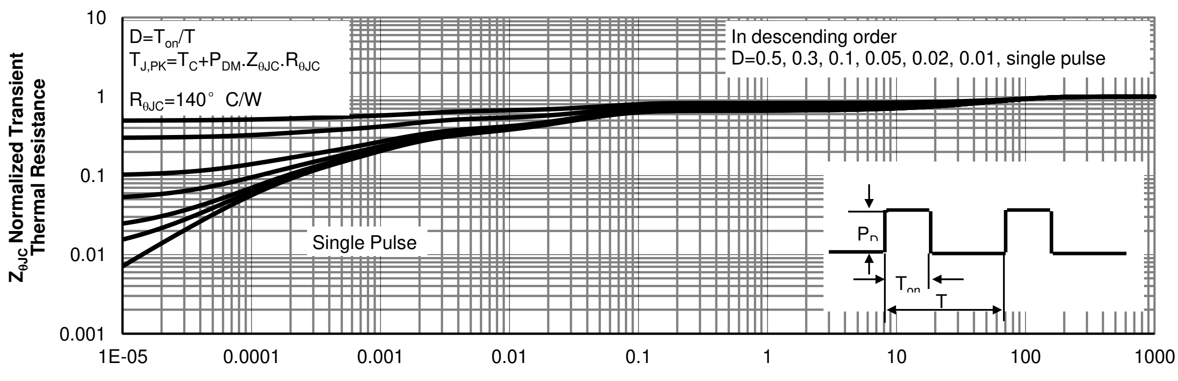
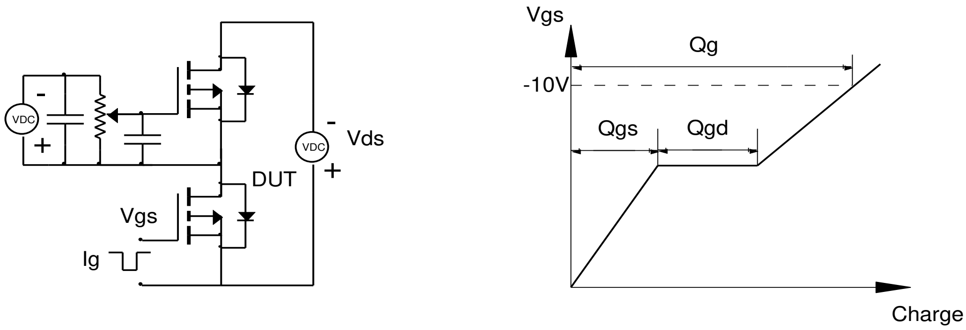


Figure 11: Normalized Maximum Transient Thermal Impedance (Note B)

Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms