ALPHA & OMEGA SEMICONDUCTOR

AON2408

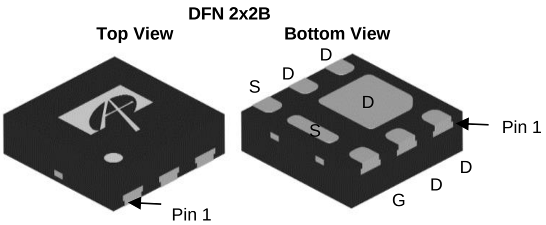
20V N-Channel MOSFET

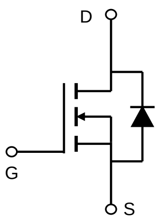
General Description

The AON2408 combines advanced trench MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$. This device is ideal for load switch and battery protection applications.

Product Summary

V_{DS}	20V
I_D (at V_{GS}=4.5V)	8A
$R_{DS(ON)}$ (at V_{GS} =4.5V)	< 14.5mΩ
$R_{DS(ON)}$ (at V_{GS} =2.5V)	< 19mΩ





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}	±12	V
Continuous Drain Current [G]	T_A=25°C	I_D	8	A
	T_A=100°C		6	
Pulsed Drain Current [C]		I_{DM}	32	
Power Dissipation [A]	T_A=25°C	P_D	2.8	W
	T_A=70°C		1.8	
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	$R_{\theta JA}$	37	45	°C/W
Maximum Junction-to-Ambient [A D]	Steady-State		66	80	°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}=±12V				±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250µA		0.5	0.83	1.2	V
$I_{D(ON)}$	On state drain current	V_{GS}=4.5V, V_{DS}=5V		32			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=4.5V, I_D=8A			11.6	14.5	mΩ
			T_J=125°C		16.3	20.5	
		V_{GS}=2.5V, I_D=4A			15	19	mΩ
g_{FS}	Forward Transconductance	V_{DS}=5V, I_D=8A			50		S
V_{SD}	Diode Forward Voltage	I_S=1A,V_{GS}=0V			0.65	1	V
I_S	Maximum Body-Diode Continuous Current					3.5	A
DYNAMIC PARAMETERS							
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=10V, f=1MHz			782		pF
C_{oss}	Output Capacitance				158		pF
C_{rss}	Reverse Transfer Capacitance				98		pF
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1MHz			2.4		Ω
SWITCHING PARAMETERS							
Q_g	Total Gate Charge	V_{GS}=4.5V, V_{DS}=10V, I_D=8A			7		nC
Q_{gs}	Gate Source Charge				1		nC
Q_{gd}	Gate Drain Charge				2.4		nC
$t_{D(on)}$	Turn-On DelayTime	V_{GS}=4.5V, V_{DS}=10V, R_L=1.25Ω, R_{GEN}=3Ω			3		ns
t_r	Turn-On Rise Time				4.5		ns
$t_{D(off)}$	Turn-Off DelayTime				28		ns
t_f	Turn-Off Fall Time				6		ns
t_{rr}	Body Diode Reverse Recovery Time	I_F=8A, dI/dt=100A/µs			11		ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F=8A, dI/dt=100A/µs			2.7		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 Power dissipation P_{DSM} is based on $R_{\theta JA}$ t ≤ 10s value and the maximum allowed junction temperature of 150°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 junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.
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 initial T_J =25°C.
D. The $R_{\theta JA}$ is the sum of the thermal impedance from junction to case $R_{\theta JC}$ and case 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-case thermal impedance which is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of $T_{J(MAX)}$=150°C. The SOA curve provides a single pulse rating.
G. The maximum current rating is package limited.

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 MAKE CHANGES TO PRODUCT SPECIFICATIONS WITHOUT NOTICE. IT IS THE RESPONSIBILITY OF THE CUSTOMER TO EVALUATE SUITABILITY OF THE PRODUCT FOR THEIR INTENDED APPLICATION. CUSTOMER SHALL COMPLY WITH APPLICABLE LEGAL REQUIREMENTS, INCLUDING ALL APPLICABLE EXPORT CONTROL RULES, REGULATIONS AND LIMITATIONS.

AOS' products are provided subject to AOS' terms and conditions of sale which are set forth at:
http://www.aosmd.com/terms_and_conditions_of_sale

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

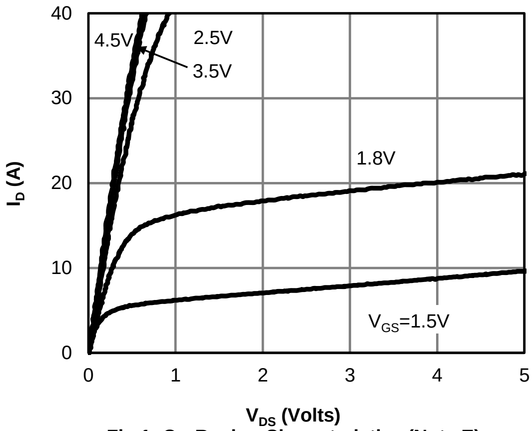


Fig 1: On-Region Characteristics (Note E)

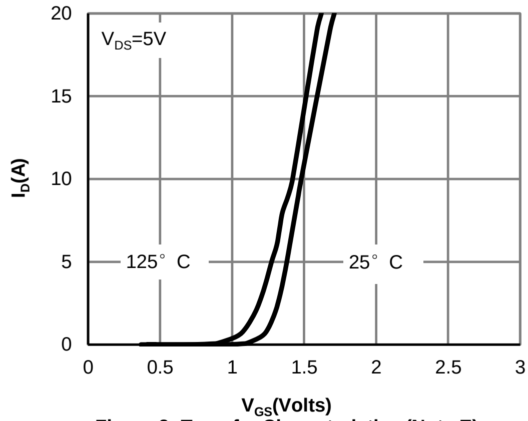


Figure 2: Transfer Characteristics (Note E)

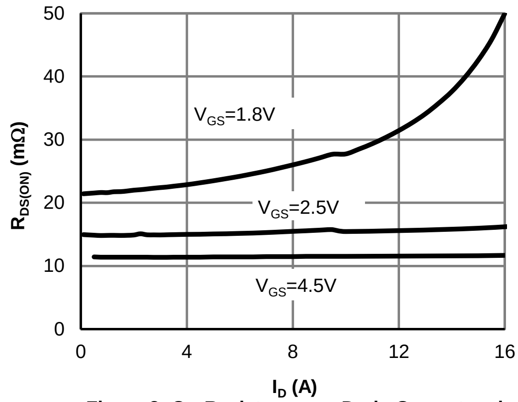


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

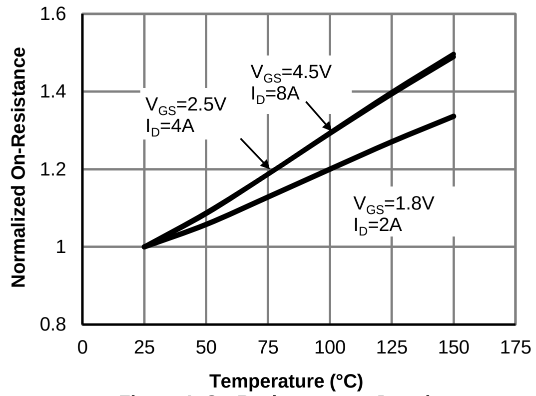


Figure 4: On-Resistance vs. Junction Temperature (Note E)

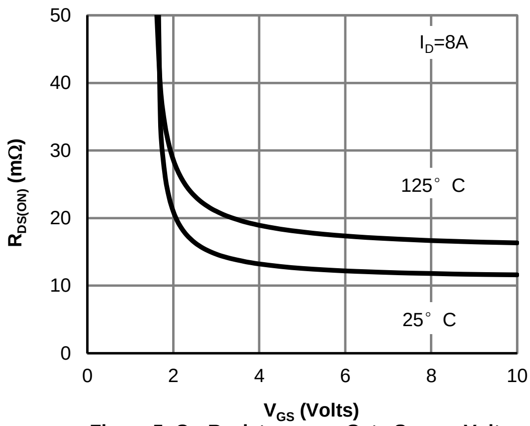


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

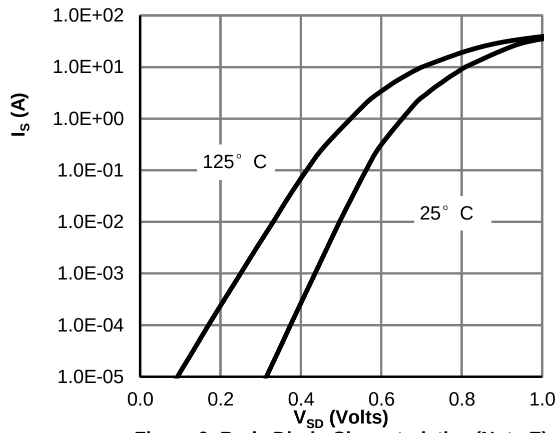


Figure 6: Body-Diode Characteristics (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

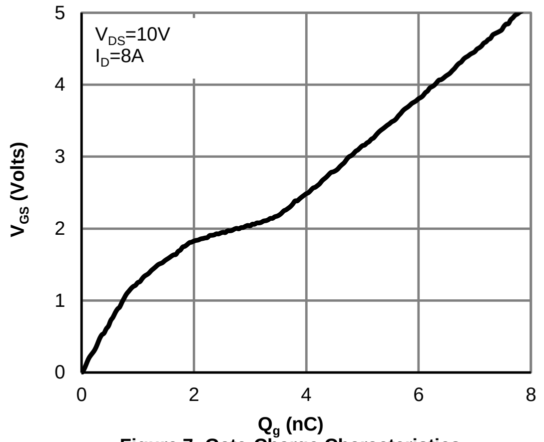


Figure 7: Gate-Charge Characteristics

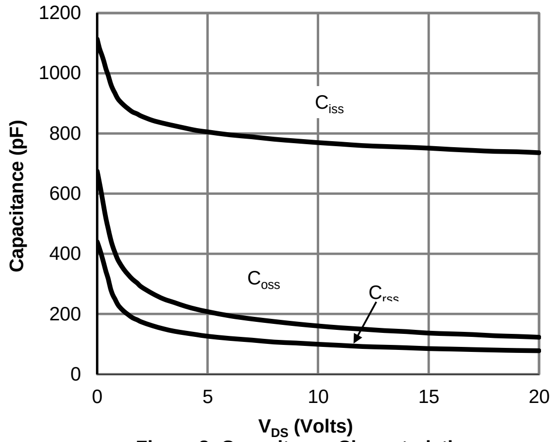


Figure 8: Capacitance Characteristics

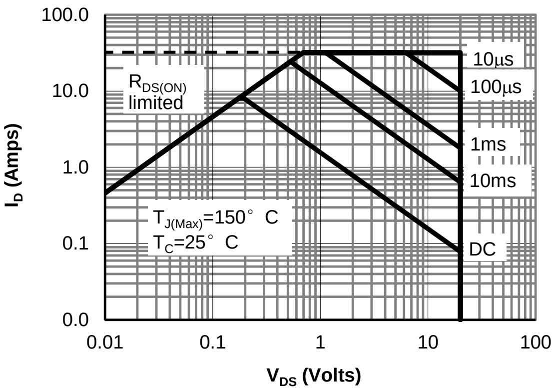


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

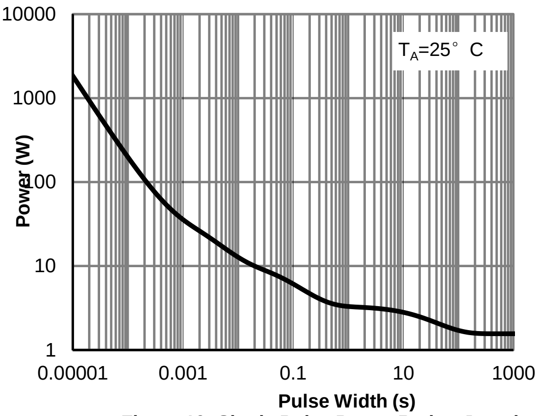


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note H)

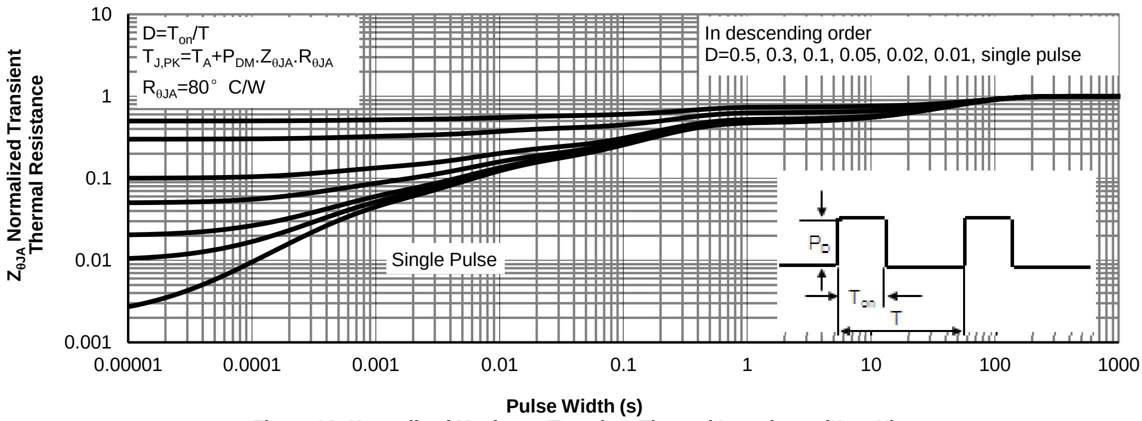
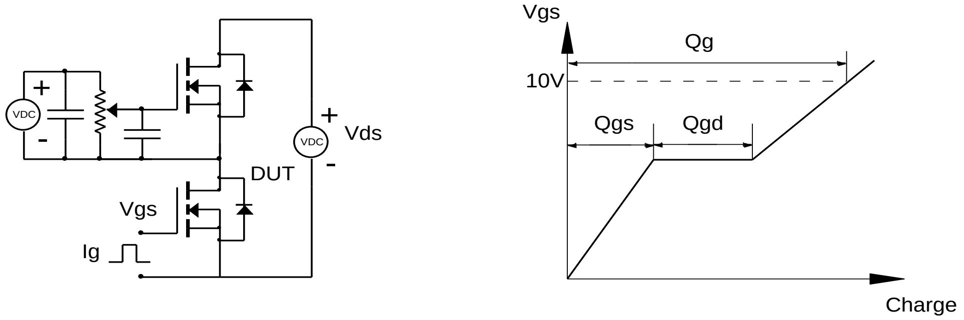
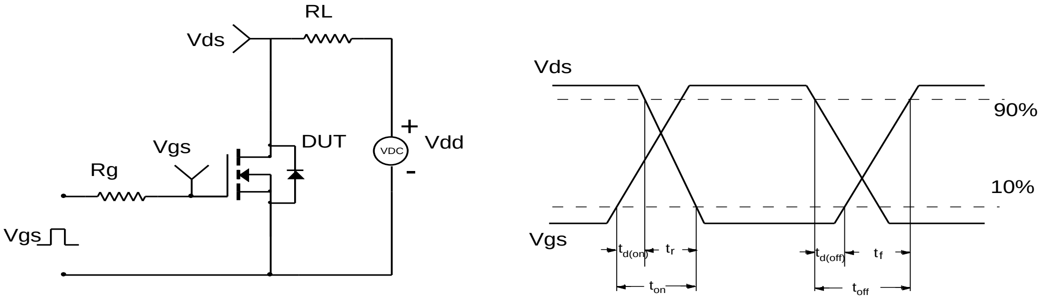


Figure 11: Normalized Maximum Transient Thermal Impedance (Note H)

Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms