ALPHA & OMEGA SEMICONDUCTOR

AO8822

20V Common-Drain Dual N-Channel MOSFET

General Description

The AO8822 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 1.8V while retaining a 12V $V_{GS(MAX)}$ rating. This device is suitable for use as a uni-directional or bi-directional load switch, facilitated by its common-drain configuration.

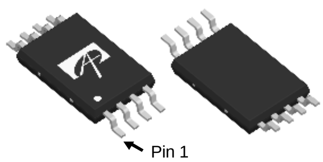
Product Summary

V_{DS}	20V
I_D (at V_{GS}=10V)	7A
$R_{DS(ON)}$ (at V_{GS}=10V)	< 18mΩ
$R_{DS(ON)}$ (at V_{GS} = 4.5V)	< 22mΩ
$R_{DS(ON)}$ (at V_{GS} = 3.6V)	< 23mΩ
$R_{DS(ON)}$ (at V_{GS} = 2.5V)	< 27mΩ

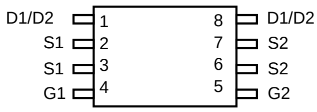
ESD Protected

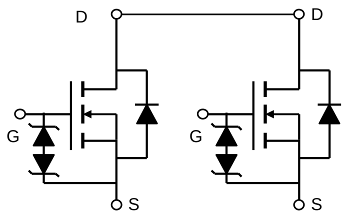
TSSOP8

Top View Bottom View



Pin 1





Absolute Maximum Ratings T_A=25℃ unless otherwise noted				
Parameter		**Symbol**	**Maximum**	**Units**
Drain-Source Voltage		V_{DS}	20	V
Gate-Source Voltage		V_{GS}	±12	V
Continuous Drain Current	T_A=25℃	I_D	7	A
	T_A=70℃		6	
Pulsed Drain Current [C]		I_{DM}	30	
Power Dissipation [B]	T_A=25℃	P_D	1.5	W
	T_A=70℃		1	
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	℃

Thermal Characteristics					
Parameter		**Symbol**	**Typ**	**Max**	**Units**
Maximum Junction-to-Ambient [A]	t ≤ 10s	$R_{\theta JA}$	63	83	℃/W
Maximum Junction-to-Ambient [A D]	Steady-State		101	130	℃/W
Maximum Junction-to-Lead	Steady-State	$R_{\theta JL}$	64	83	℃/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}= ±10V				10	µA
BV_{GSO}	Gate-Source Breakdown Voltage	V_{DS}=0V, I_G=±250µA		±12			V
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS} I_D=250µA		0.5	0.8	1	V
$I_{D(ON)}$	On state drain current	V_{GS}=10V, V_{DS}=5V		30			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V, I_D=7A		13	15	18	mΩ
			T_J=125°C		22	27	
		V_{GS}=4.5V, I_D=6.6A		15	17	22	mΩ
		V_{GS}=3.6V, I_D=6A		16	18	23	mΩ
		V_{GS}=2.5V, I_D=5.5A		18	21	27	mΩ
		V_{GS}=1.8V, I_D=2A			28		mΩ
g_{FS}	Forward Transconductance	V_{DS}=5V, I_D=7A			31		S
V_{SD}	Diode Forward Voltage	I_S=1A,V_{GS}=0V			0.7	1	V
I_S	Maximum Body-Diode Continuous Current					2	A
DYNAMIC PARAMETERS							
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=10V, f=1MHz		520	650	780	pF
C_{oss}	Output Capacitance				140		pF
C_{rss}	Reverse Transfer Capacitance				60		pF
SWITCHING PARAMETERS							
Q_g(10V)	Total Gate Charge	V_{GS}=10V, V_{DS}=10V, I_D=7A		12	15	18	nC
Q_g(4.5V)	Total Gate Charge			5	6.7	8	nC
Q_{gs}	Gate Source Charge				3.6		nC
Q_{gd}	Gate Drain Charge				3		nC
$t_{D(on)}$	Turn-On DelayTime	V_{GS}=10V, V_{DS}=10V, R_L=1.5Ω, R_{GEN}=3Ω			0.25		us
t_r	Turn-On Rise Time				0.45		us
$t_{D(off)}$	Turn-Off DelayTime				11		us
t_f	Turn-Off Fall Time				4		us
t_{rr}	Body Diode Reverse Recovery Time	I_F=7A, dI/dt=500A/µs		8	10	12	ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F=7A, dI/dt=500A/µs		8	11	13.5	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°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 1in^2 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.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

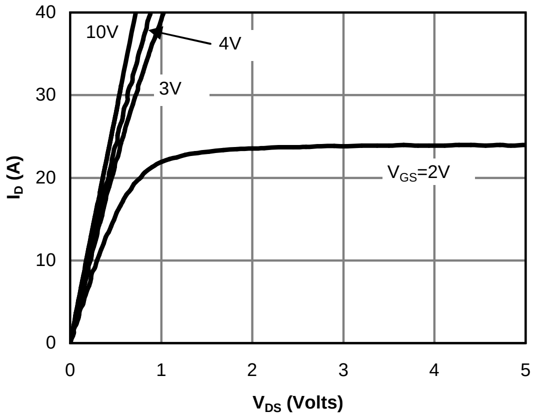


Fig 1: On-Region Characteristics (Note E)

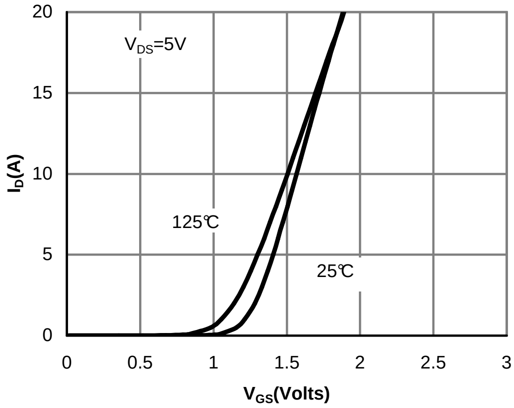


Figure 2: Transfer Characteristics (Note E)

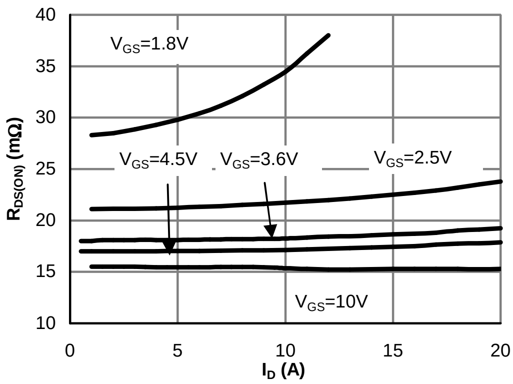


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

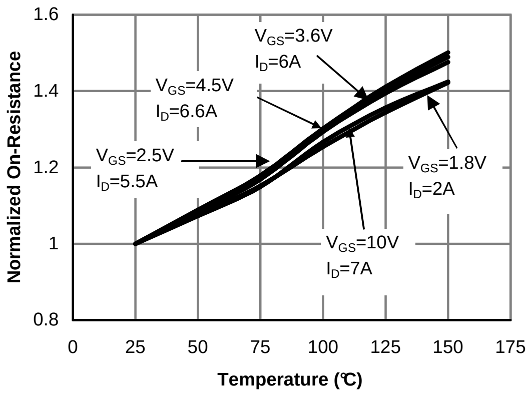


Figure 4: On-Resistance vs. Junction Temperature (Note E)

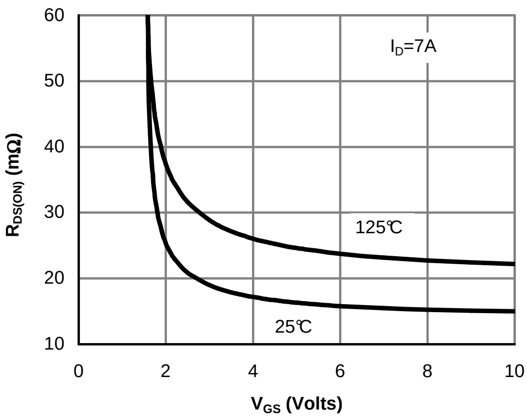


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

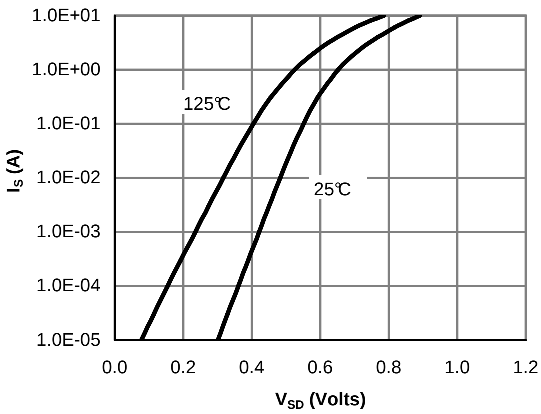


Figure 6: Body-Diode Characteristics (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

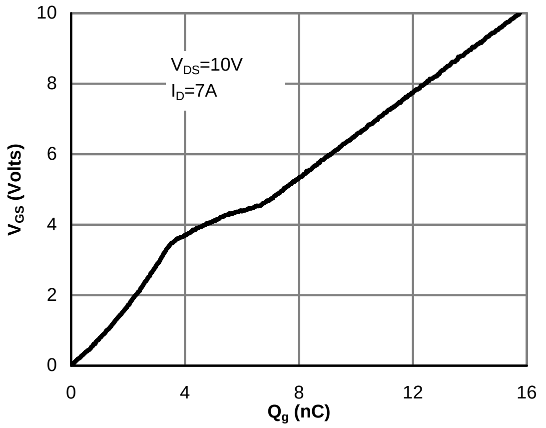


Figure 7: Gate-Charge Characteristics

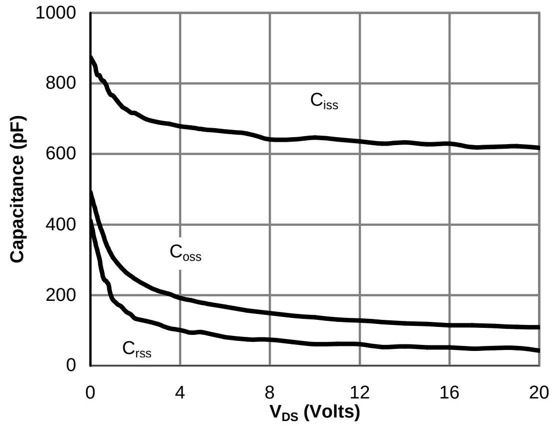


Figure 8: Capacitance Characteristics

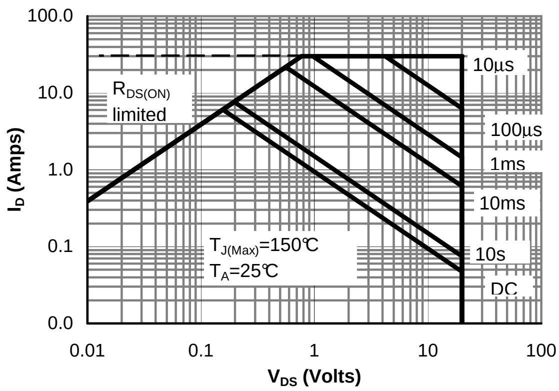


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

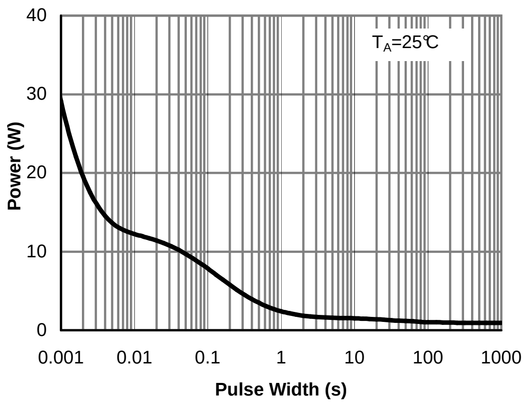


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note F)

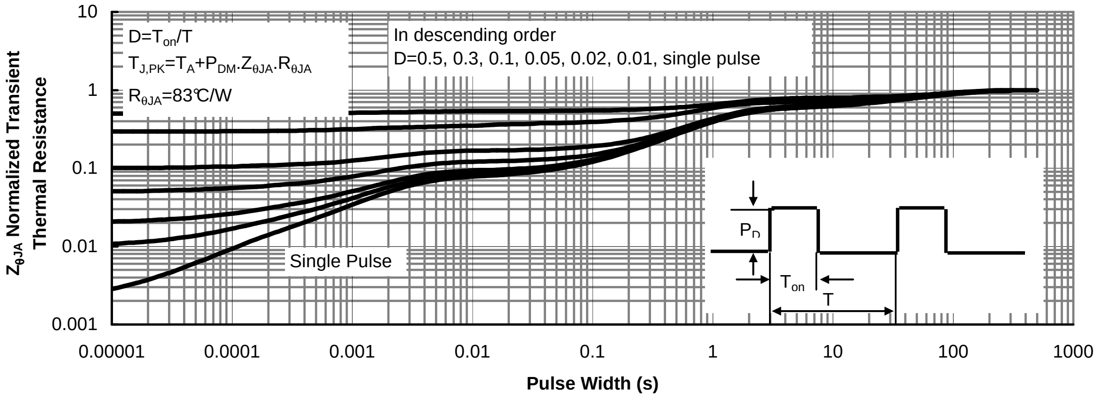
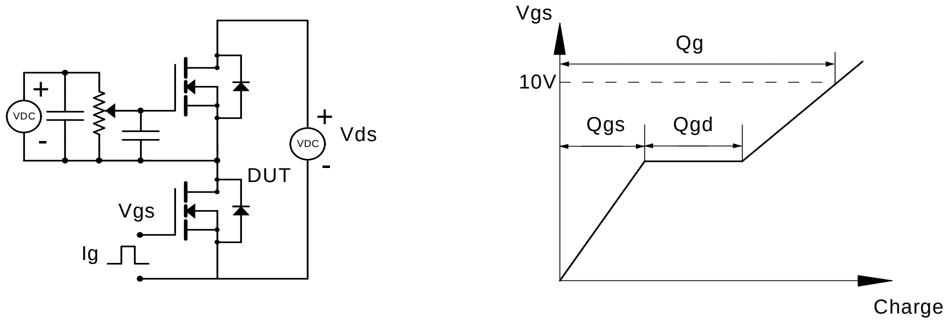
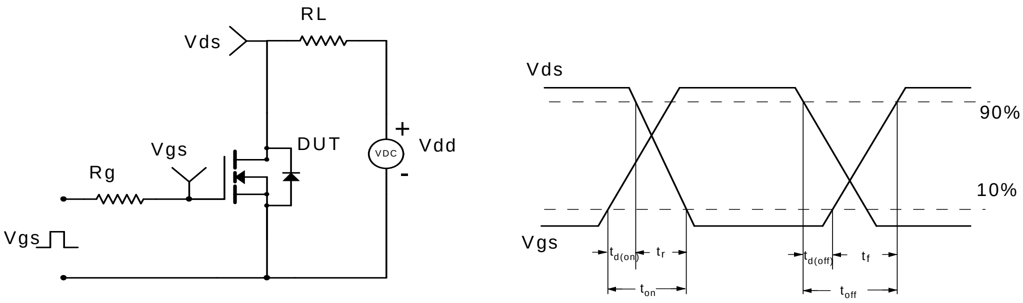


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms