

General Description

The AO8807 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 1.8V. This device is suitable for use as a load switch. AO8807 and AO8807L are electrically identical.

-RoHS Compliant

-Halogen Free

Features

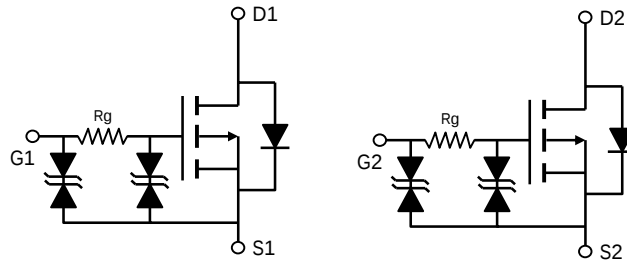
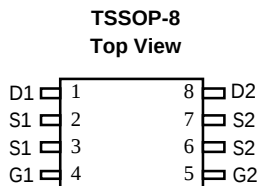
$$V_{DS} (V) = -12V$$

$$I_D = -6.5 A (V_{GS} = -4.5V)$$

$$R_{DS(ON)} < 20m\Omega (V_{GS} = -4.5V)$$

$$R_{DS(ON)} < 24m\Omega (V_{GS} = -2.5V)$$

$$R_{DS(ON)} < 30m\Omega (V_{GS} = -1.8V)$$



Absolute Maximum Ratings $T_A=25^\circ C$ unless otherwise noted

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	V_{DS}	-12	V
Gate-Source Voltage	V_{GS}	± 8	V
Continuous Drain Current	I_D	-6.5	A
$T_A=25^\circ C$		-5	
Pulsed Drain Current ^C	I_{DM}	-60	
Power Dissipation ^B	P_D	1.4	W
$T_A=25^\circ C$		0.9	
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	$^\circ C$

Thermal Characteristics

Parameter	Symbol	Typ	Max	Units
Maximum Junction-to-Ambient ^A	$R_{\theta JA}$	73	90	$^\circ C/W$
$t \leq 10s$		96	125	$^\circ C/W$
Maximum Junction-to-Ambient ^{AD}	$R_{\theta JL}$	63	75	$^\circ C/W$
Steady-State				

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	$I_D=-250\mu\text{A}$, $V_{GS}=0\text{V}$	-12			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=-12\text{V}$, $V_{GS}=0\text{V}$ $T_J=55^\circ\text{C}$			-1 -5	μA
I_{GSS}	Gate-Body leakage current	$V_{DS}=0\text{V}$, $V_{GS}=\pm 8\text{V}$			± 10	μA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}$, $I_D=-250\mu\text{A}$	-0.35	-0.53	-0.85	
$I_{D(ON)}$	On state drain current	$V_{GS}=-4.5\text{V}$, $V_{DS}=-5\text{V}$	-60			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=-4.5\text{V}$, $I_D=-6.5\text{A}$ $T_J=125^\circ\text{C}$		16 23	20 28	$\text{m}\Omega$
		$V_{GS}=-2.5\text{V}$, $I_D=-6\text{A}$		19	24	$\text{m}\Omega$
		$V_{GS}=-1.8\text{V}$, $I_D=-5.5\text{A}$		23	30	$\text{m}\Omega$
		$V_{GS}=-1.5\text{V}$, $I_D=-5\text{A}$		28	36	$\text{m}\Omega$
g_{FS}	Forward Transconductance	$V_{DS}=-5\text{V}$, $I_D=-6.5\text{A}$		45		S
V_{SD}	Diode Forward Voltage	$I_S=-1\text{A}$, $V_{GS}=0\text{V}$		-0.56	-1	V
I_S	Maximum Body-Diode Continuous Current				-1.4	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	$V_{GS}=0\text{V}$, $V_{DS}=-6\text{V}$, $f=1\text{MHz}$		1740	2100	pF
C_{oss}	Output Capacitance			334		pF
C_{rss}	Reverse Transfer Capacitance			200		pF
R_g	Gate resistance	$V_{GS}=0\text{V}$, $V_{DS}=0\text{V}$, $f=1\text{MHz}$		1.3	1.7	$\text{k}\Omega$
SWITCHING PARAMETERS						
Q_g	Total Gate Charge	$V_{GS}=-4.5\text{V}$, $V_{DS}=-6\text{V}$, $I_D=-6.5\text{A}$		19	23	nC
Q_{gs}	Gate Source Charge			4.5		nC
Q_{gd}	Gate Drain Charge			5.3		nC
$t_{D(on)}$	Turn-On Delay Time	$V_{GS}=-4.5\text{V}$, $V_{DS}=-6\text{V}$, $R_L=0.9\Omega$, $R_{GEN}=3\Omega$		240		ns
t_r	Turn-On Rise Time			580		ns
$t_{D(off)}$	Turn-Off Delay Time			7		μs
t_f	Turn-Off Fall Time			4.2		μs
t_{rr}	Body Diode Reverse Recovery Time	$I_F=-6.5\text{A}$, $dI/dt=100\text{A}/\mu\text{s}$		22	27	ns
Q_{rr}	Body Diode Reverse Recovery Charge	$I_F=-6.5\text{A}$, $dI/dt=100\text{A}/\mu\text{s}$		17		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 $T_A=25^\circ\text{C}$. The value in any given application depends on the user's specific board design.

B: The power dissipation P_D is based on $T_{J(MAX)}=150^\circ\text{C}$, using $\leq 10\text{s}$ junction-to-ambient thermal resistance.

C: Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}=150^\circ\text{C}$. Ratings are based on low frequency and duty cycles to keep initial $T_J=25^\circ\text{C}$.

D: The $R_{\theta JA}$ is the sum of the thermal impedance from junction to lead $R_{\theta JL}$ and lead to ambient.

E: The static characteristics in Figures 1 to 6 are obtained using $<300\mu\text{s}$ pulses, duty cycle 0.5% max.

F: These curves are based on the junction-to-ambient thermal impedance which is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, assuming a maximum junction temperature of $T_{J(MAX)}=150^\circ\text{C}$. The SOA curve provides a single pulse rating.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

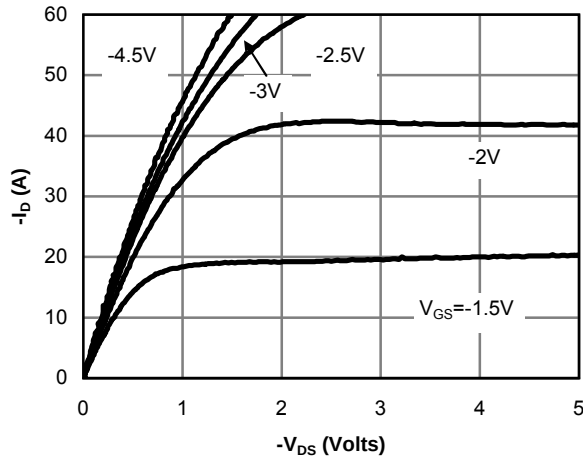


Figure 1: On-Region Characteristics(Note E)

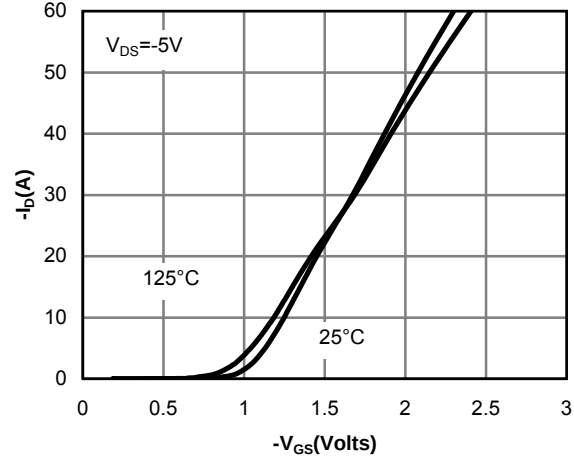


Figure 2: Transfer Characteristics(Note E)

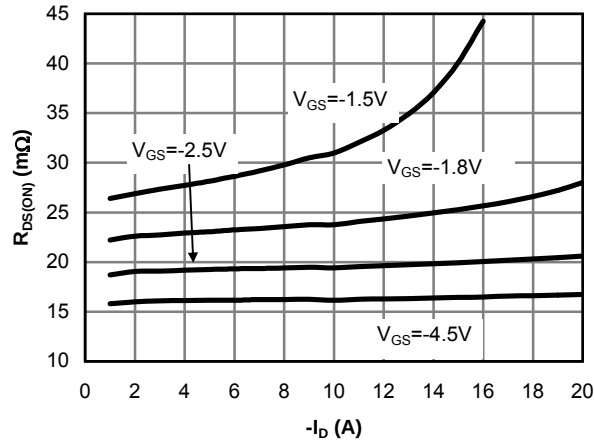


Figure 3: On-Resistance vs. Drain Current and Gate Voltage(Note E)

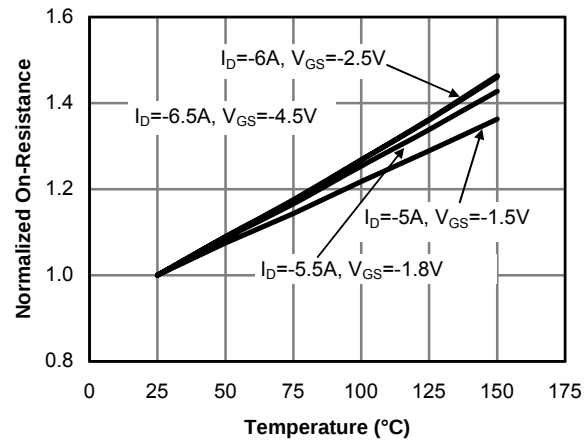


Figure 4: On-Resistance vs. Junction Temperature(Note E)

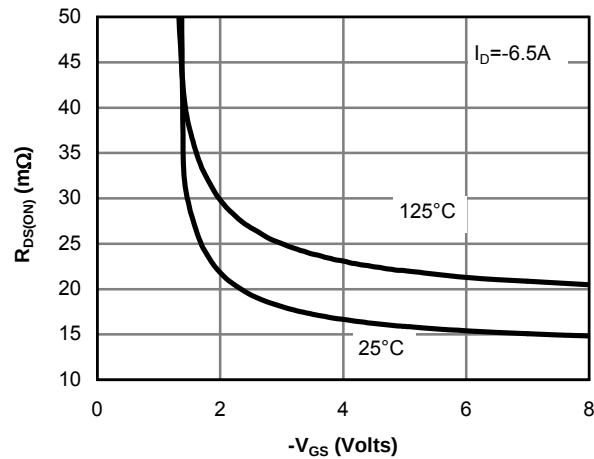


Figure 5: On-Resistance vs. Gate-Source Voltage(Note E)

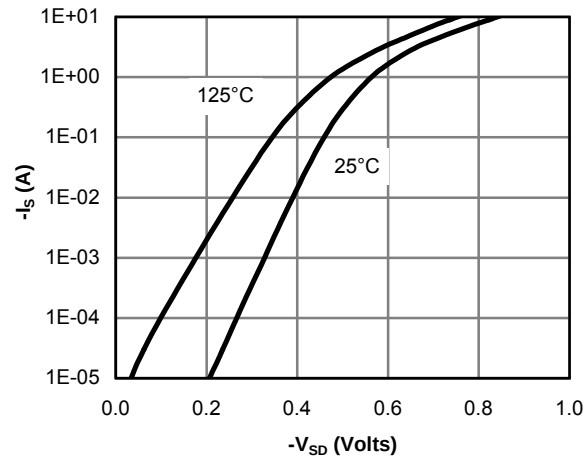
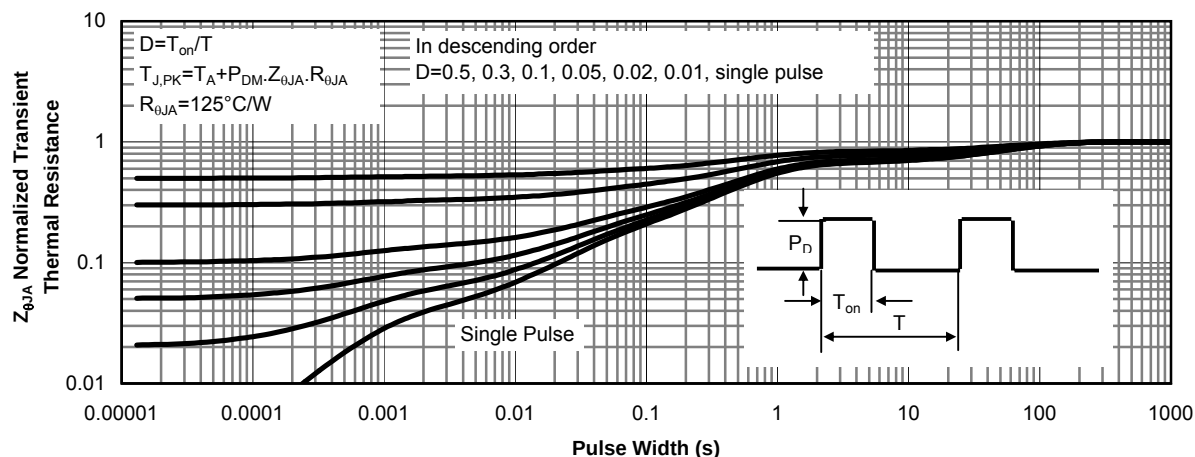
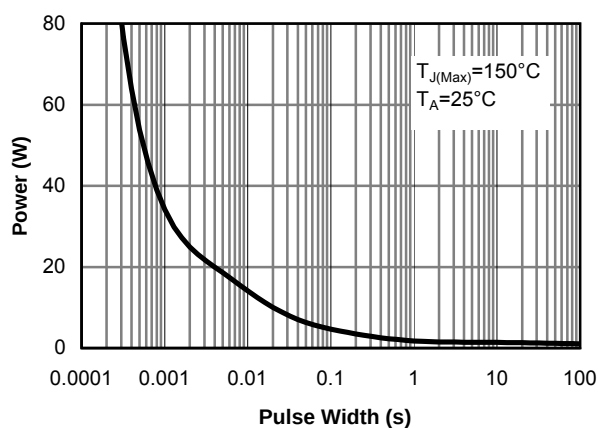
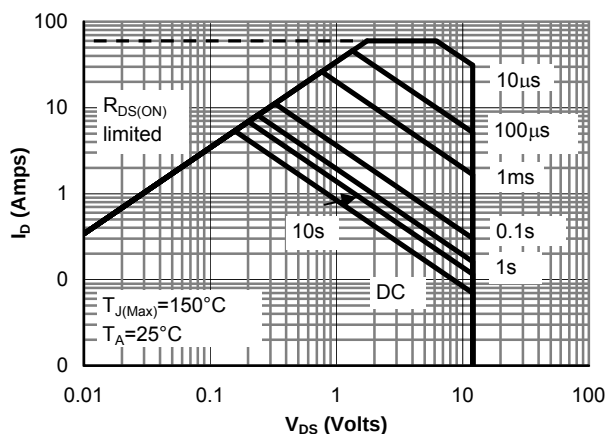
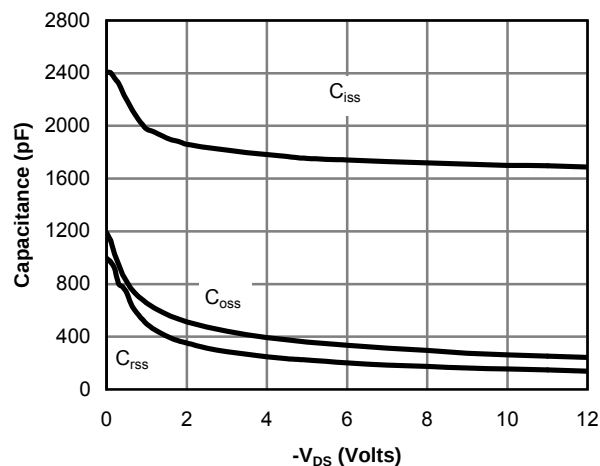
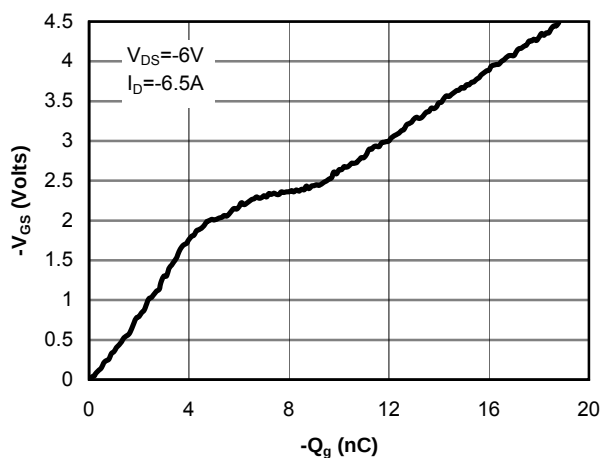
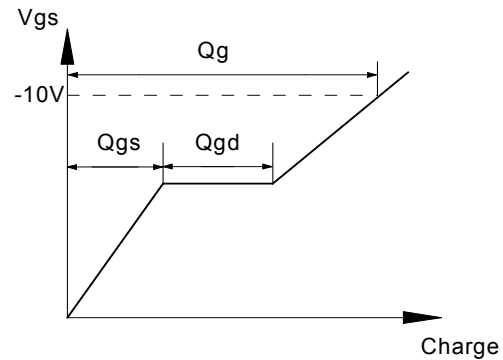
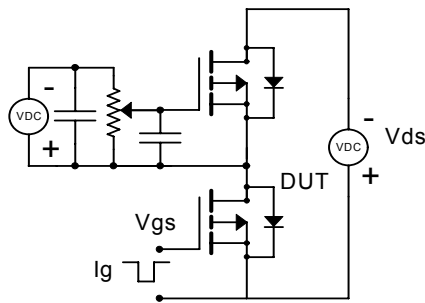


Figure 6: Body-Diode Characteristics(Note E)

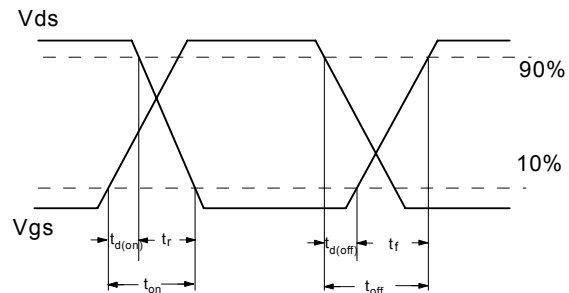
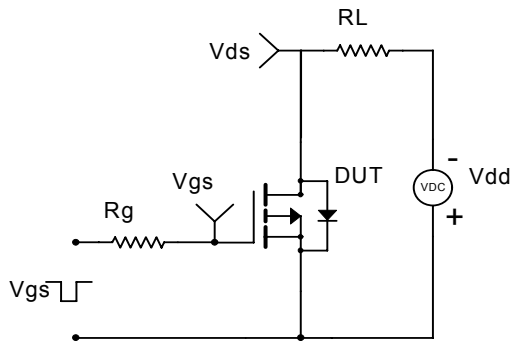
TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS



Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

