

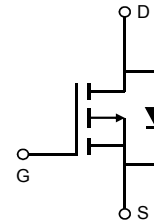
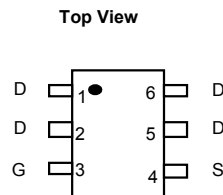
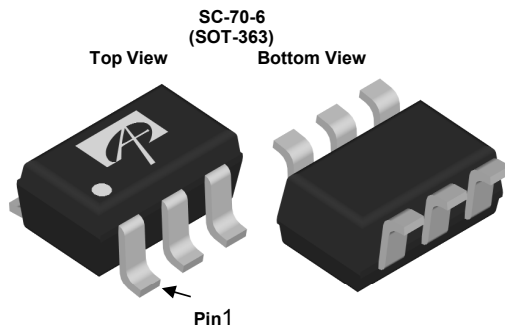


General Description

The AO7408 uses advanced trench technology to provide excellent RDS(ON), low gate charge and operation with gate voltages as low as 1.8V. This device is suitable for use as a load switch or in PWM applications.

Product Summary

V_{DS}	20V
I_D (at $V_{GS}=10V$)	2A
$R_{DS(ON)}$ (at $V_{GS}=4.5V$)	< 62m Ω
$R_{DS(ON)}$ (at $V_{GS}=2.5V$)	< 75m Ω
$R_{DS(ON)}$ (at $V_{GS}=1.8V$)	< 85m Ω



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

Parameter	Pin 1	Symbol	Maximum	Units
Drain-Source Voltage		V_{DS}	20	V
Gate-Source Voltage		V_{GS}	± 8	V
Continuous Drain Current	$T_A=25^\circ\text{C}$	I_D	2	A
	$T_A=70^\circ\text{C}$		1.5	
Pulsed Drain Current ^C		I_{DM}	16	
Power Dissipation ^B	$T_A=25^\circ\text{C}$	P_D	0.35	W
	$T_A=70^\circ\text{C}$		0.22	
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	$^\circ\text{C}$

Thermal Characteristics

Parameter		Symbol	Typ	Max	Units
Maximum Junction-to-Ambient ^A	$t \leq 10\text{s}$	$R_{\theta JA}$	300	360	$^\circ\text{C/W}$
Maximum Junction-to-Ambient ^{A,D}	Steady-State		340	425	$^\circ\text{C/W}$
Maximum Junction-to-Lead	Steady-State	$R_{\theta JL}$	280	320	$^\circ\text{C/W}$

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 T _J =55°C			1 5	μA
I _{GSS}	Gate-Body leakage current	V _{DS} =0V, V _{GS} =±8V			±100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	0.4	0.7	1	V
I _{D(ON)}	On state drain current	V _{GS} =4.5V, V _{DS} =5V	16			A
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =4.5V, I _D =2A T _J =125°C		50 70	62 90	mΩ
		V _{GS} =2.5V, I _D =1.8A		56	75	mΩ
		V _{GS} =1.8V, I _D =1A		66	85	mΩ
g _{FS}	Forward Transconductance	V _{DS} =5V, I _D =2A		15		S
V _{SD}	Diode Forward Voltage	I _S =1A, V _{GS} =0V		0.7	1	V
I _S	Maximum Body-Diode Continuous Current				0.35	A
DYNAMIC PARAMETERS						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =10V, f=1MHz		260	320	pF
C _{oss}	Output Capacitance			48		pF
C _{rss}	Reverse Transfer Capacitance			27		pF
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz		3	4.5	Ω
SWITCHING PARAMETERS						
Q _g	Total Gate Charge	V _{GS} =4.5V, V _{DS} =10V, I _D =2A		2.9	4	nC
Q _{gs}	Gate Source Charge			0.4		nC
Q _{gd}	Gate Drain Charge			0.6		nC
t _{D(on)}	Turn-On DelayTime	V _{GS} =10V, V _{DS} =10V, R _L =5Ω, R _{GEN} =3Ω		2.5		ns
t _r	Turn-On Rise Time			3.2		ns
t _{D(off)}	Turn-Off DelayTime			21		ns
t _f	Turn-Off Fall Time			3		ns
t _{rr}	Body Diode Reverse Recovery Time	I _F =2A, dI/dt=100A/μs		14	19	ns
Q _{rr}	Body Diode Reverse Recovery Charge	I _F =2A, dI/dt=100A/μs		3.8		nC

A. The value of R_{θJA} 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 initial T_J=25° C.

D. The R_{θJA} is the sum of the thermal impedance from junction to lead R_{θJL} 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 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° C. The SOA curve provides a single pulse rating.

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

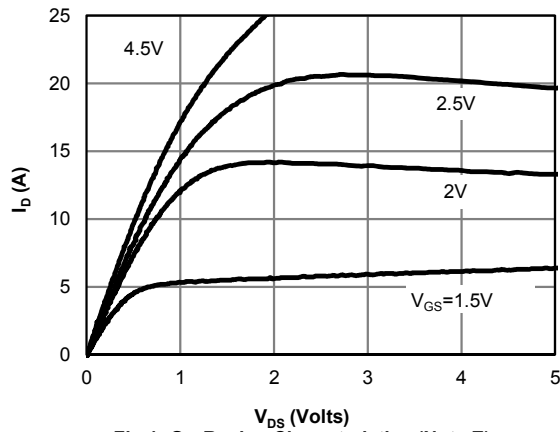


Figure 1: On-Region Characteristics (Note E)

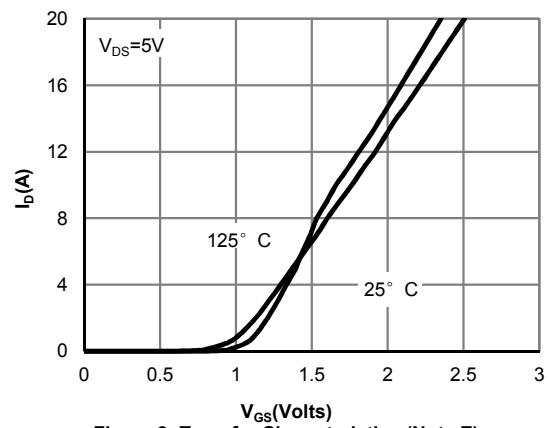


Figure 2: Transfer Characteristics (Note E)

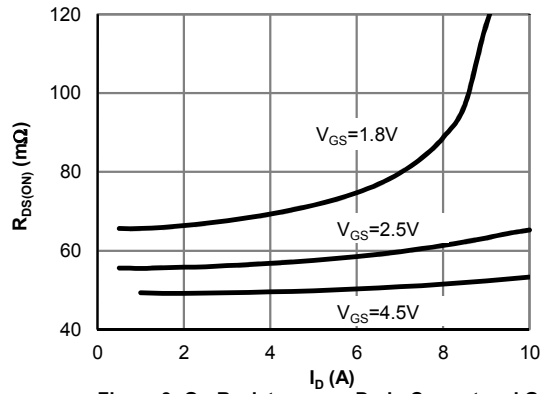


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

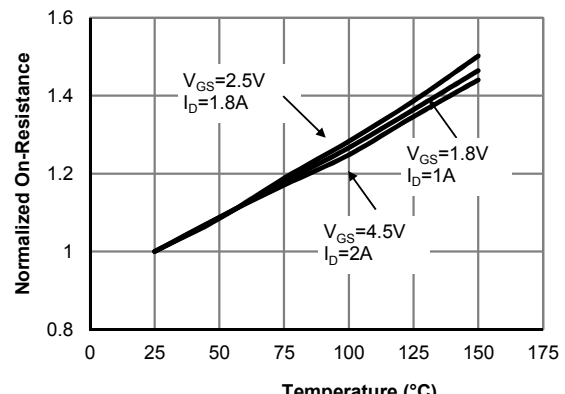


Figure 4: On-Resistance vs. Junction Temperature (Note E)

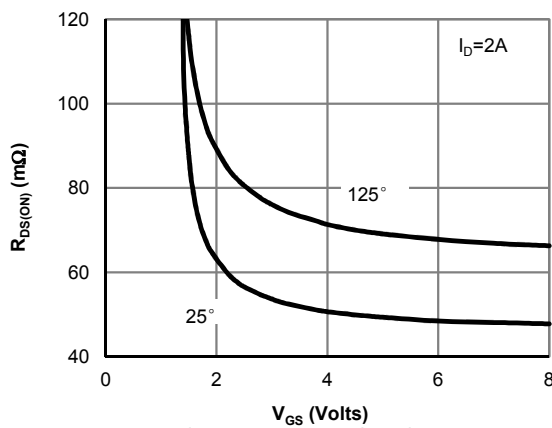


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

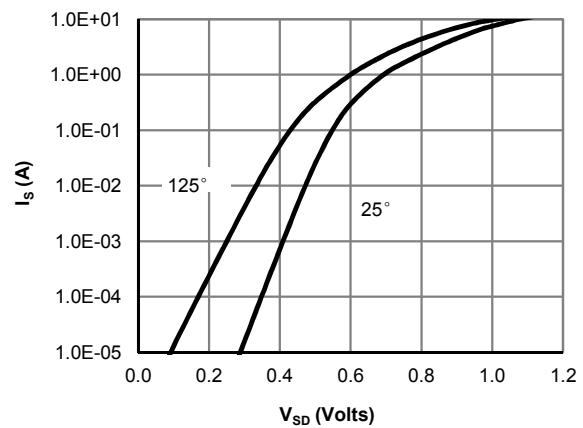
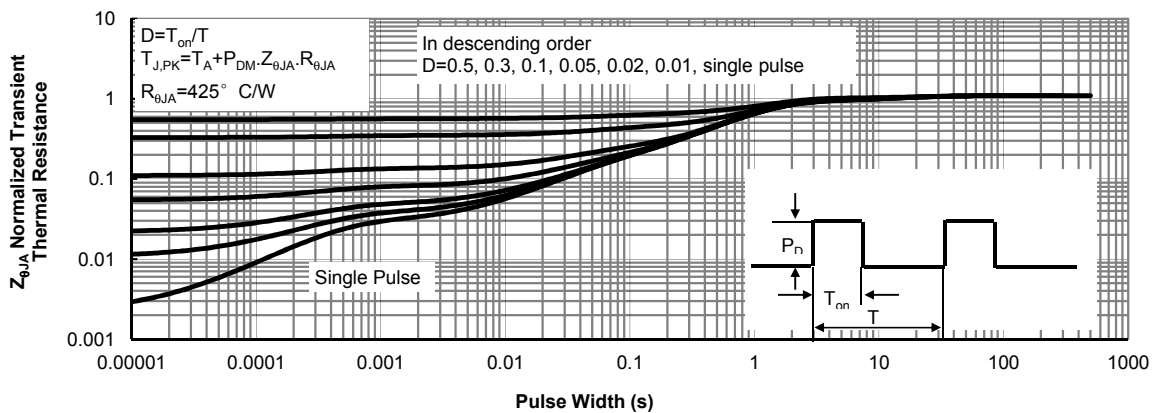
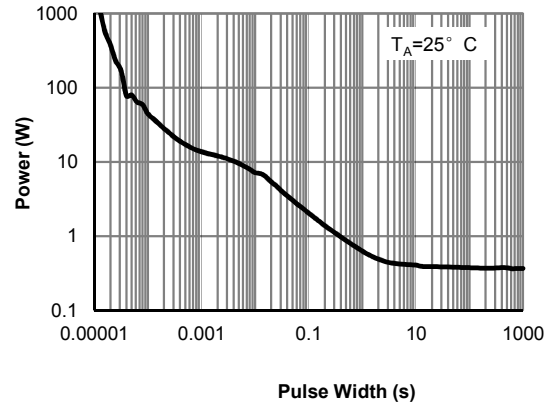
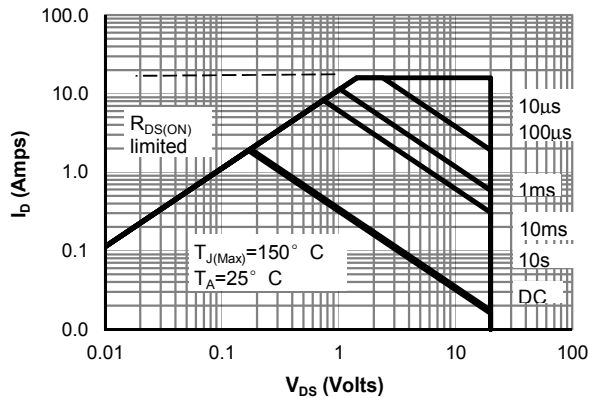
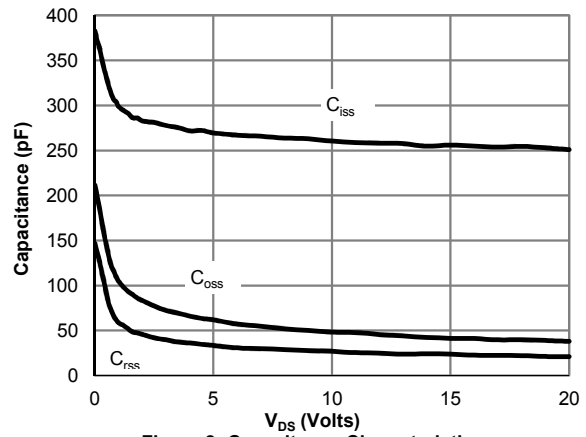
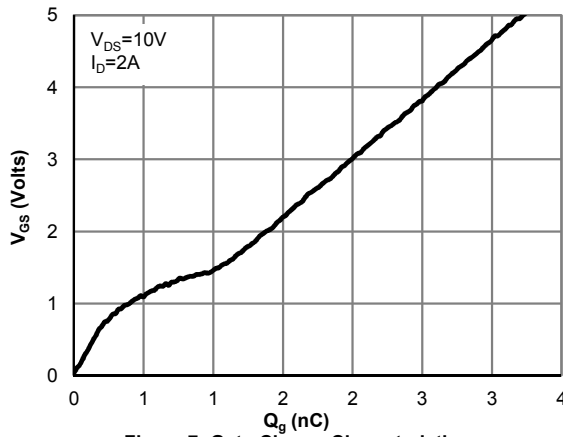
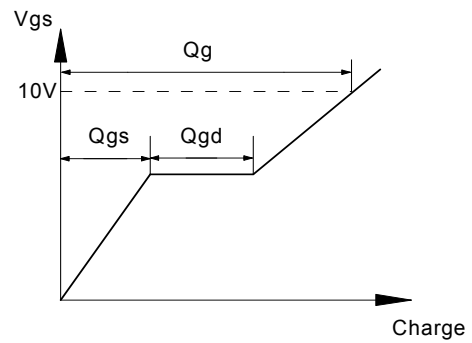
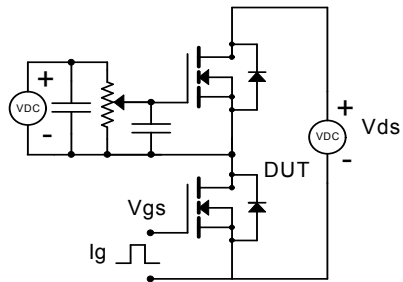


Figure 6: Body-Diode Characteristics (Note E)

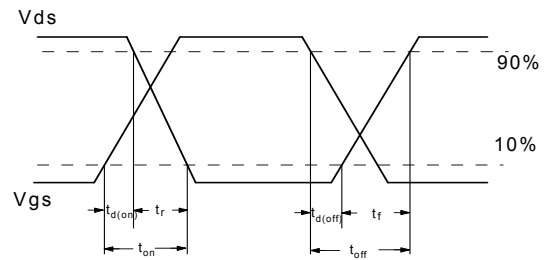
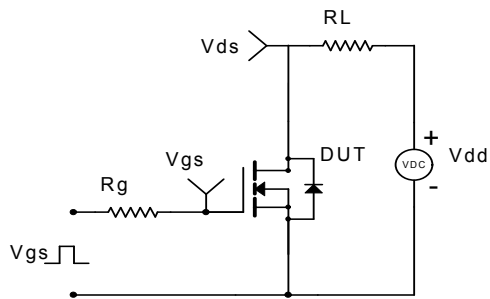
TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS



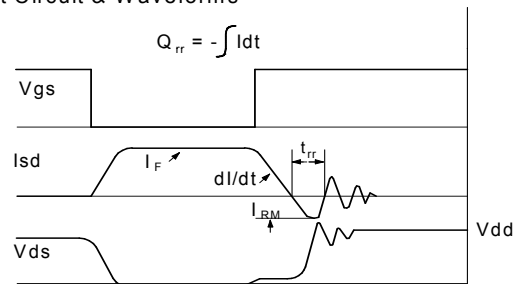
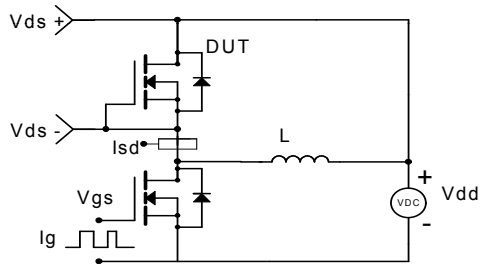
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



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