ALPHA & OMEGA SEMICONDUCTOR

# AON7400
30V N-Channel MOSFET

General Description

The AON7400 uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. This device is suitable for use in DC - DC converters and Load Switch applications.

Product Summary

V_{DS}	30V
I_D (at V_{GS}=10V)	26A
$R_{DS(ON)}$ (at V_{GS}=10V)	< 12.5mΩ
$R_{DS(ON)}$ (at V_{GS} = 4.5V)	< 14.5mΩ

Green Product

DFN 3x3 EP

Top View   **Bottom View**

Pin 1

Top View

S	1	8	D
S	2	7	D
S	3	6	D
G	4	5	D
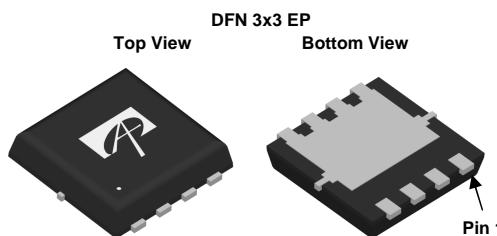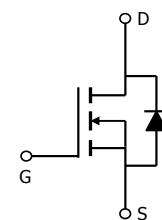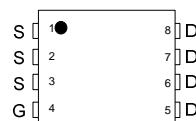
Absolute Maximum Ratings T_A=25°C unless otherwise noted

Parameter		Symbol	Maximum	Units
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	±12	V
Continuous Drain Current	T_C=25°C	I_D	26	A
	T_C=100°C		20	
Pulsed Drain Current ^{C}		I_{DM}	80	
Continuous Drain Current	T_A=25°C	I_{DSM}	10	A
	T_A=70°C		9	
Power Dissipation ^{B}	T_C=25°C	P_D	35	W
	T_C=100°C		14	
Power Dissipation ^{A}	T_A=25°C	P_{DSM}	3.1	W
	T_A=70°C		2	
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	$R_{\theta JA}$	30	40	°C/W
Maximum Junction-to-Ambient $^{A D}$	Steady-State		60	75	°C/W
Maximum Junction-to-Case	Steady-State	$R_{\theta JC}$	3.1	3.7	°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		30			V
I$_{DSS}$	Zero Gate Voltage Drain Current	V$_{DS}$=30V, 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		1	1.55	2.5	V
I$_{D(ON)}$	On state drain current	V$_{GS}$=10V, V$_{DS}$=5V		80			A
R$_{DS(ON)}$	Static Drain-Source On-Resistance	V$_{GS}$=10V, I$_D$=10A			10.5	12.5	mΩ
			T$_J$=125°C		14.7		
		V$_{GS}$=4.5V, I$_D$=10A			12.2	14.5	mΩ
g$_{FS}$	Forward Transconductance	V$_{DS}$=5V, I$_D$=10A			40		S
V$_{SD}$	Diode Forward Voltage	I$_S$=1A,V$_{GS}$=0V			0.74	1	V
I$_S$	Maximum Body-Diode Continuous Current					35	A
DYNAMIC PARAMETERS							
C$_{iss}$	Input Capacitance	V$_{GS}$=0V, V$_{DS}$=15V, f=1MHz			1210	1452	pF
C$_{oss}$	Output Capacitance				330	396	pF
C$_{rss}$	Reverse Transfer Capacitance				85	119	pF
R$_g$	Gate resistance	V$_{GS}$=0V, V$_{DS}$=0V, f=1MHz		0.8	1.2	1.6	Ω
SWITCHING PARAMETERS							
Q$_g$(10V)	Total Gate Charge	V$_{GS}$=10V, V$_{DS}$=15V, I$_D$=10A			22	28	nC
Q$_g$(4.5V)	Total Gate Charge				10	13	nC
Q$_{gs}$	Gate Source Charge				3.7		nC
Q$_{gd}$	Gate Drain Charge				2.7		nC
t$_{D(on)}$	Turn-On DelayTime	V$_{GS}$=10V, V$_{DS}$=15V, R$_L$=1.1Ω, R$_{GEN}$=3Ω			10		ns
t$_r$	Turn-On Rise Time				6.3		ns
t$_{D(off)}$	Turn-Off DelayTime				21		ns
t$_f$	Turn-Off Fall Time				2.8		ns
t$_{rr}$	Body Diode Reverse Recovery Time	I$_F$=10A, dI/dt=500A/µs			36	45	ns
Q$_{rr}$	Body Diode Reverse Recovery Charge	I$_F$=10A, dI/dt=500A/µs			47		nC

A. The value of R$_{θJA}$ 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$_{θJA}$ is the sum of the thermal impedence 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 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 ratin g.

**TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS**
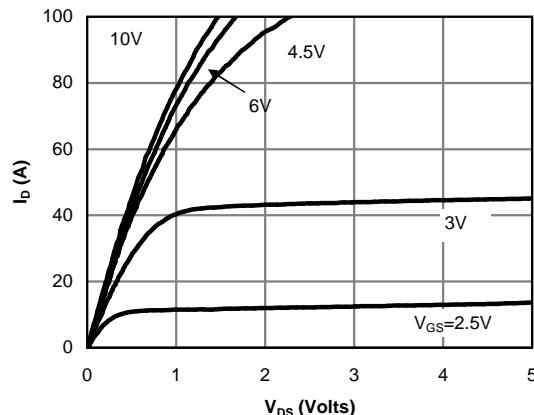

Fig 1: On-Region Characteristics (Note E)
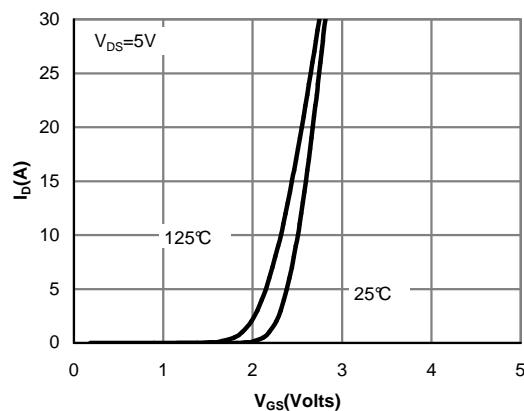
Figure 2: Transfer Characteristics (Note E)
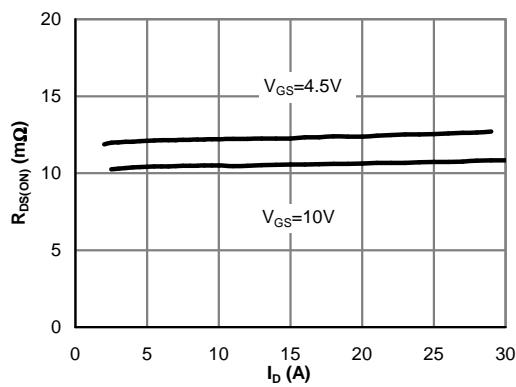
Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)
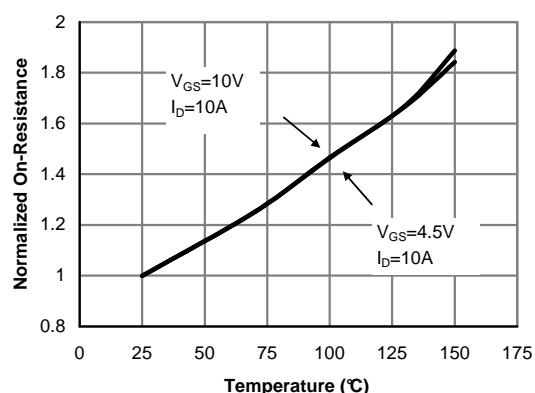
Figure 4: On-Resistance vs. Junction Temperature (Note E)
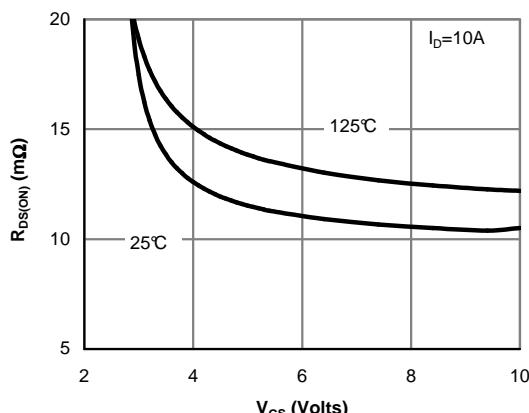
Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)
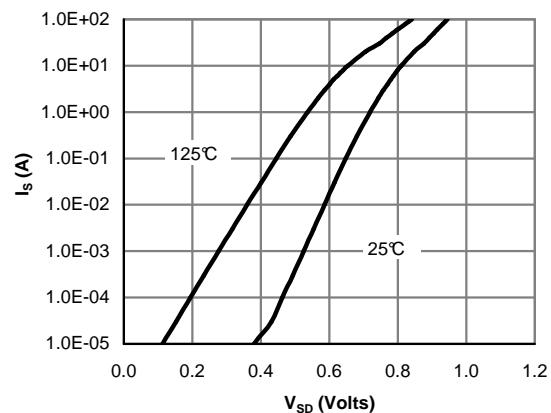
Figure 6: Body-Diode Characteristics (Note E)

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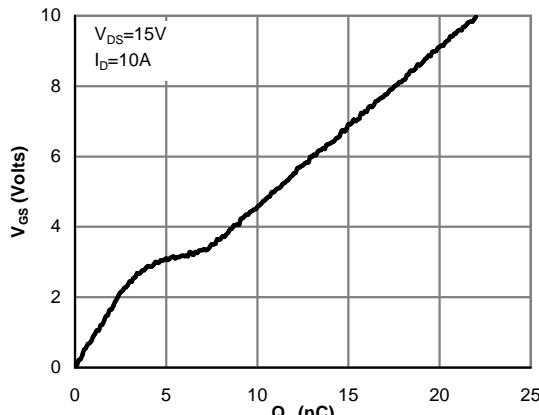
Figure 7: Gate-Charge Characteristics
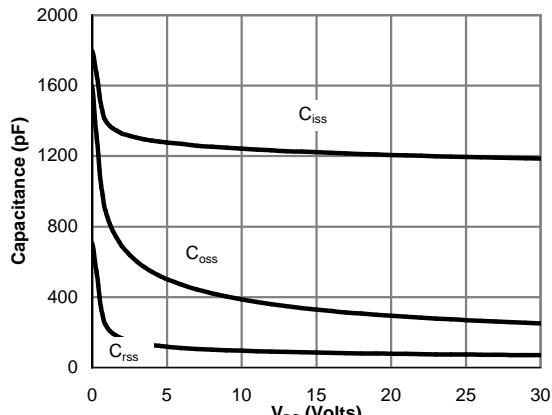
Figure 8: Capacitance Characteristics
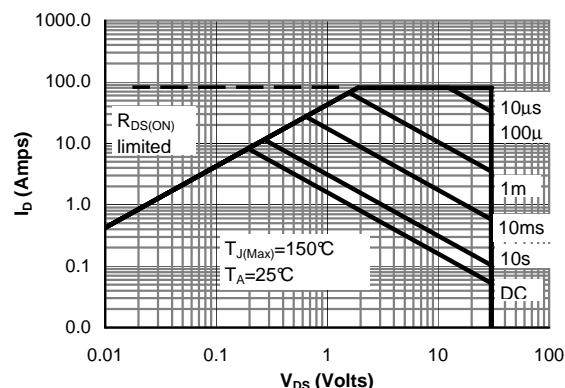
Figure 9: Maximum Forward Biased Safe Operating Area (Note F)
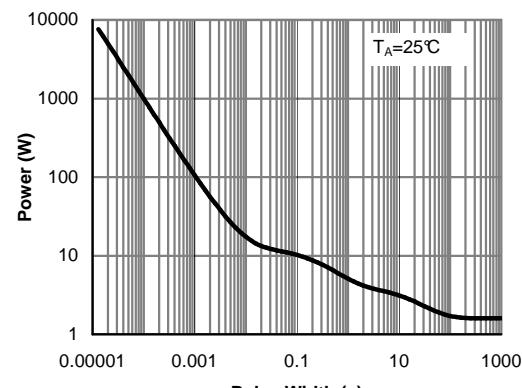
Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note F)
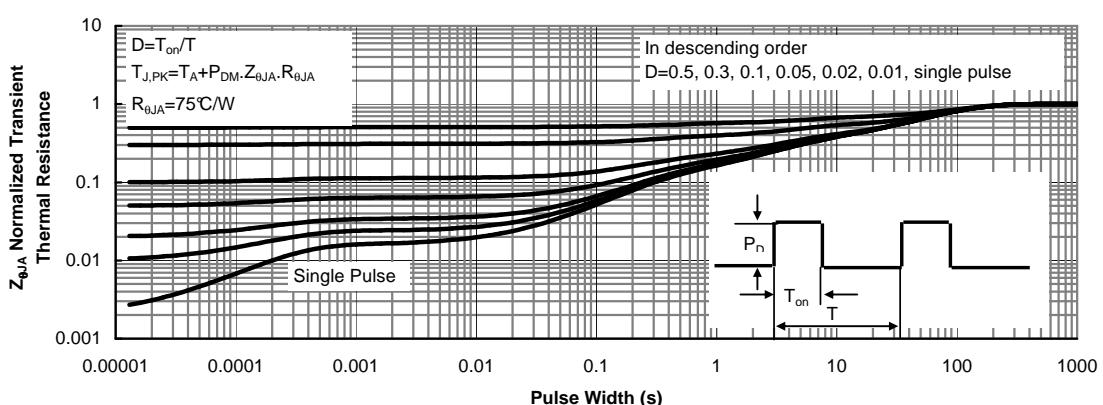

Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

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Gate Charge Test Circuit & Waveform
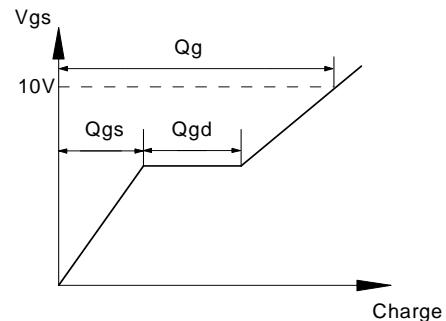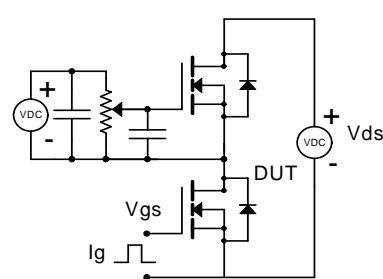
Resistive Switching Test Circuit & Waveforms
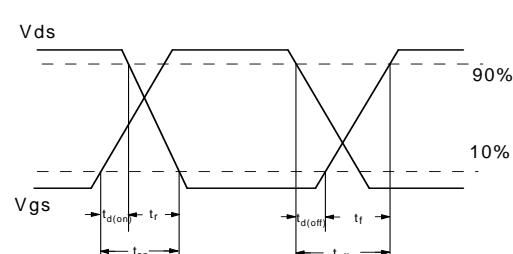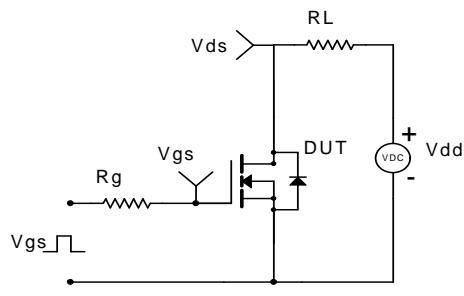
Diode Recovery Test Circuit & Waveforms

$$Q_{rr} = -\int I dt$$