ALPHA & OMEGA SEMICONDUCTOR

AON7400
N-Channel Enhancement Mode Field Effect Transistor

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 SMPS and general purpose applications. *Standard Product AON7400 is Pb-free (meets ROHS & Sony 259 specifications).*

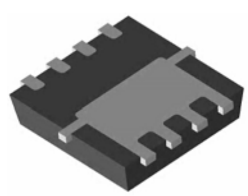
Features

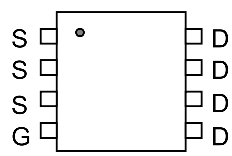
V_{DS} (V) = 30V
I_D = 10A (${V_{GS}}$ = 10V)
$R_{DS(ON)}$ < 14mΩ (V_{GS} = 10V)
$R_{DS(ON)}$ < 16mΩ (V_{GS} = 4.5V)

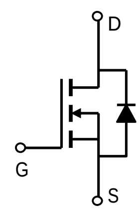
DFN 3x3

Top View

Bottom View







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 [B,H]	T_C=25°C	I_D	20	A
	T_C=100°C		16	
Pulsed Drain Current [C]		I_{DM}	80	
Continuous Drain Current [G]	T_A=25°C	I_{DSM}	10	
	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	
	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]	Steady-State		60	75	°C/W
Maximum Junction-to-Case [D]	Steady-State	$R_{\theta JC}$	3	3.5	°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	uA
		T_J=55°C			5	
I_{GSS}	Gate-Body leakage current	V_{DS}=0V, V_{GS}= ±12V			0.1	µA
$V_{GS(th)}$	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		11.5	14.0	mΩ
		T_J=125°C		18.4		
		V_{GS}=4.5V, I_D=10A		13	16.0	mΩ
g_{FS}	Forward Transconductance	V_{DS}=5V, I_D=13.4A		40		S
V_{SD}	Diode Forward Voltage	I_S=1A,V_{GS}=0V		0.74	1.0	V
I_S	Maximum Body-Diode Continuous Current				5	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=100A/µs		36	45	ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F=10A, dI/dt=100A/µs		47		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: Repetitive rating, pulse width limited by junction temperature.
C. The $R_{\theta JA}$ is the sum of the thermal impedence from junction to lead $R_{\theta JL}$ and lead to ambient.
D. The static characteristics in Figures 1 to 6 are obtained using <300 µs pulses, duty cycle 0.5% max.
E. These tests are performed with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C. The SOA curve provides a single pulse rating.
F. The current rating is based on the t≤ 10s junction to ambient thermal resistance rating.
Rev0: Sept 2007

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

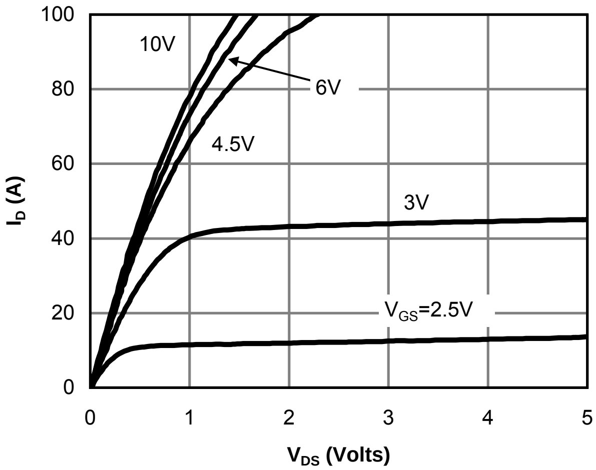

Fig 1: On-Region Characteristics

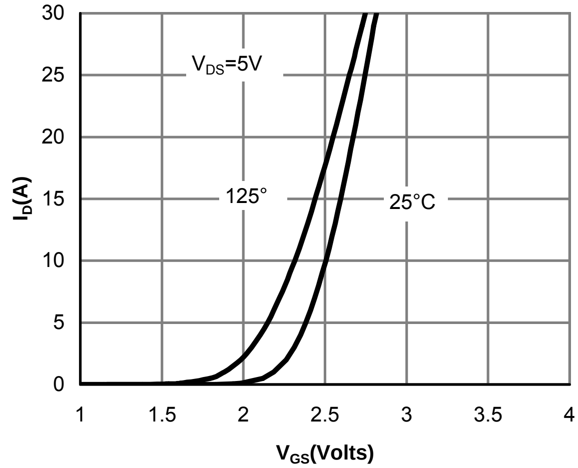

Figure 2: Transfer Characteristics

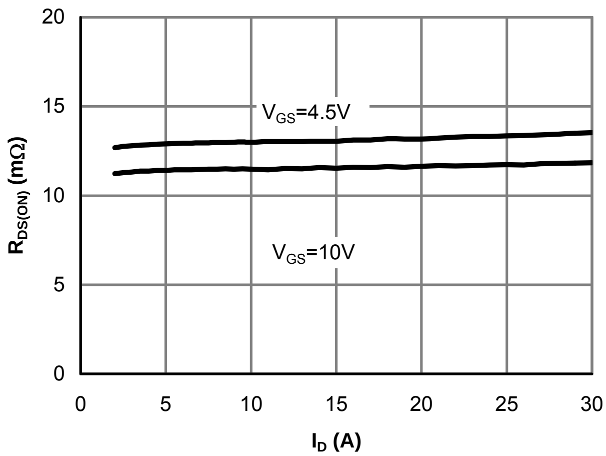

Figure 3: On-Resistance vs. Drain Current and Gate Voltage

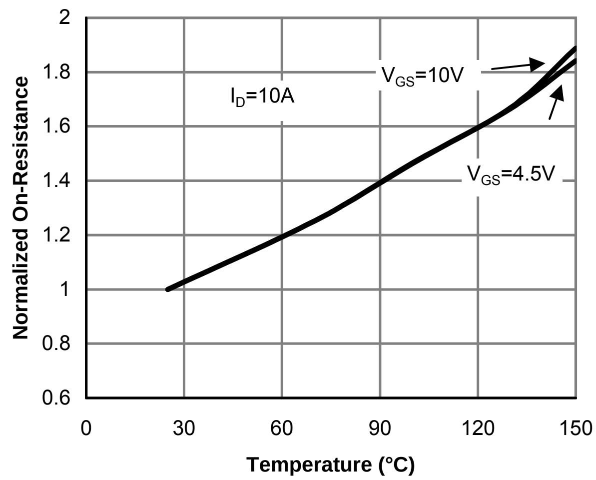

Figure 4: On-Resistance vs. Junction Temperature

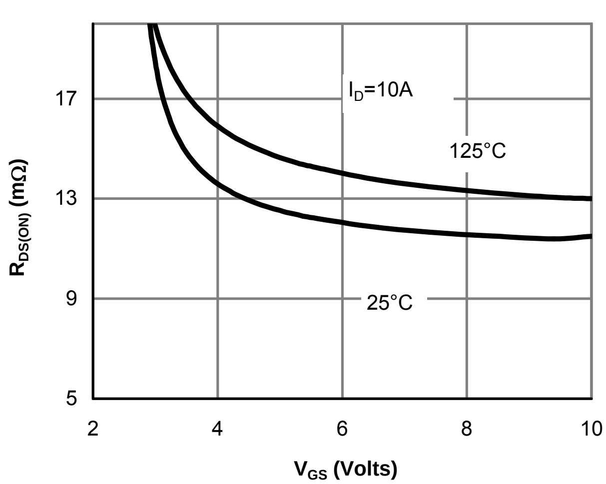

Figure 5: On-Resistance vs. Gate-Source Voltage

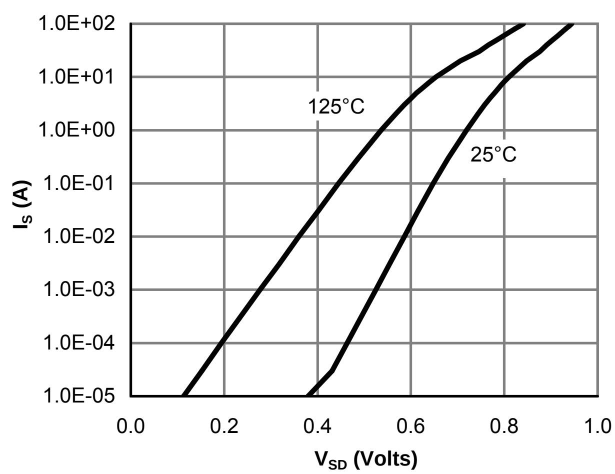

Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

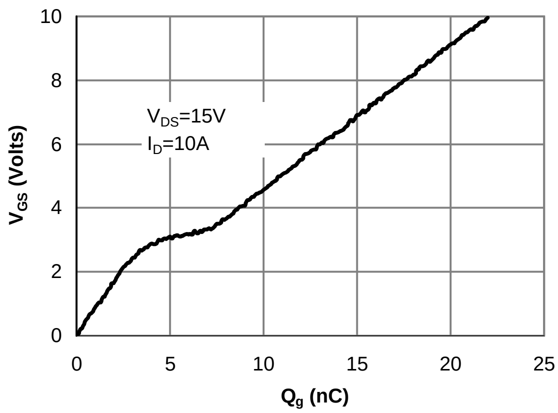

Figure 7: Gate-Charge Characteristics

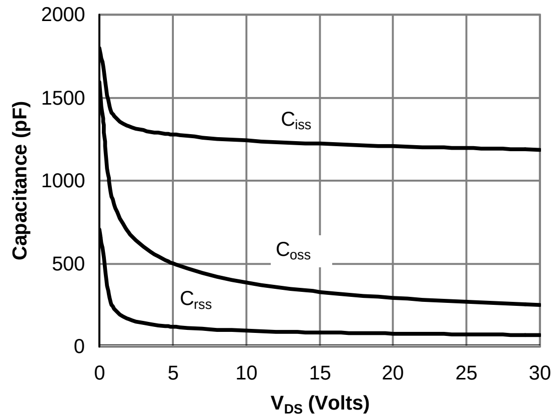

Figure 8: Capacitance Characteristics

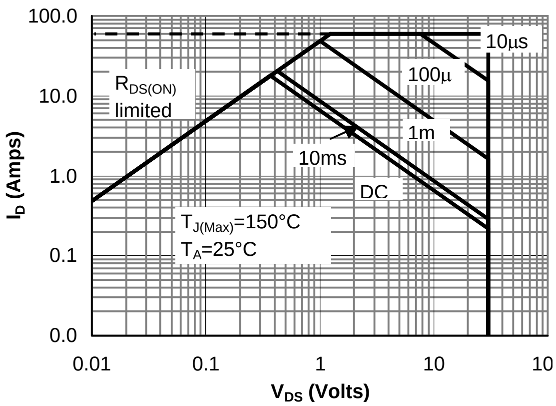

Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

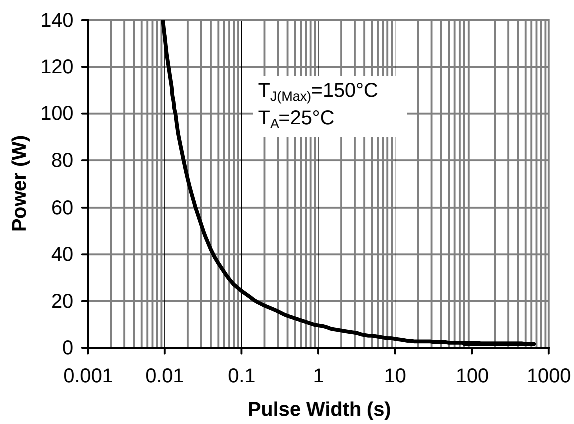

Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note G)

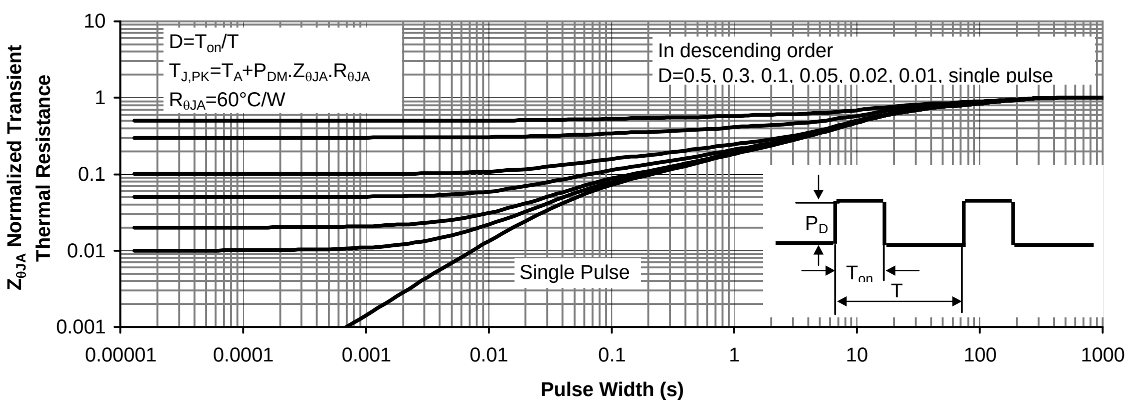

Figure 11: Normalized Maximum Transient Thermal Impedance (Note G)