



ALPHA & OMEGA
SEMICONDUCTOR

AON7400

N-Channel Enhancement Mode Field Effect Transistor

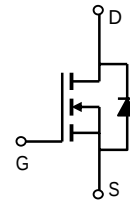
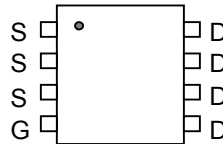
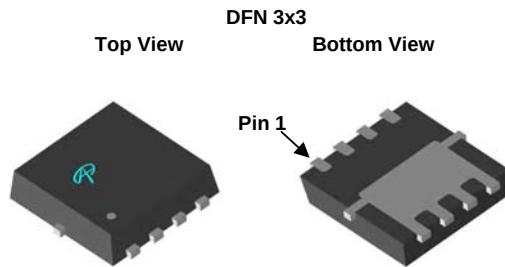


General Description

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)
 $R_{DS(ON)} < 12.5m\Omega$ (V_{GS} = 10V)
 $R_{DS(ON)} < 14.5m\Omega$ (V_{GS} = 4.5V)



Absolute Maximum Ratings $T_A=25^\circ\text{C}$ 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}	$T_C=25^\circ\text{C}$	20	A
	$T_C=100^\circ\text{C}$	16	
Pulsed Drain Current ^C	I_{DM}	80	
Continuous Drain Current ^G	$T_A=25^\circ\text{C}$	10	
	$T_A=70^\circ\text{C}$	9	W
Power Dissipation ^B	$T_C=25^\circ\text{C}$	35	
	$T_C=100^\circ\text{C}$	14	
Power Dissipation ^A	$T_A=25^\circ\text{C}$	3.1	
	$T_A=70^\circ\text{C}$	2	
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	$t \leq 10\text{s}$	$R_{\theta JA}$	30	40	$^\circ\text{C/W}$
Maximum Junction-to-Ambient ^A	Steady-State		60	75	$^\circ\text{C/W}$
Maximum Junction-to-Case ^D	Steady-State	$R_{\theta JC}$	3	3.5	$^\circ\text{C/W}$

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	$I_D=250\mu\text{A}$, $V_{GS}=0\text{V}$	30			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=30\text{V}$, $V_{GS}=0\text{V}$ $T_J=55^{\circ}\text{C}$			1 5	μA
I_{GSS}	Gate-Body leakage current	$V_{DS}=0\text{V}$, $V_{GS}=\pm 12\text{V}$			0.1	μA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$	1	1.55	2.5	V
$I_{D(ON)}$	On state drain current	$V_{GS}=10\text{V}$, $V_{DS}=5\text{V}$	80			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=10\text{V}$, $I_D=10\text{A}$ $T_J=125^{\circ}\text{C}$		10.5 14.7	12.5	$\text{m}\Omega$
		$V_{GS}=4.5\text{V}$, $I_D=10\text{A}$		12.2	14.5	$\text{m}\Omega$
g_{FS}	Forward Transconductance	$V_{DS}=5\text{V}$, $I_D=13.4\text{A}$		40		S
V_{SD}	Diode Forward Voltage	$I_S=1\text{A}$, $V_{GS}=0\text{V}$		0.74	1.0	V
I_S	Maximum Body-Diode Continuous Current				5	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	$V_{GS}=0\text{V}$, $V_{DS}=15\text{V}$, $f=1\text{MHz}$		1210	1452	pF
C_{oss}	Output Capacitance			330	396	pF
C_{rss}	Reverse Transfer Capacitance			85	119	pF
R_g	Gate resistance	$V_{GS}=0\text{V}$, $V_{DS}=0\text{V}$, $f=1\text{MHz}$	0.8	1.2	1.6	Ω
SWITCHING PARAMETERS						
$Q_g(10\text{V})$	Total Gate Charge	$V_{GS}=10\text{V}$, $V_{DS}=15\text{V}$, $I_D=10\text{A}$		22	28	nC
$Q_g(4.5\text{V})$	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	$V_{GS}=10\text{V}$, $V_{DS}=15\text{V}$, $R_L=1.1\Omega$, $R_{GEN}=3\Omega$		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	$I_F=10\text{A}$, $dI/dt=100\text{A}/\mu\text{s}$		36	45	ns
Q_{rr}	Body Diode Reverse Recovery Charge	$I_F=10\text{A}$, $dI/dt=100\text{A}/\mu\text{s}$		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

$T_A=25^{\circ}\text{C}$. 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 impedance from junction to lead $R_{\theta JL}$ and lead to ambient.

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

E: These tests are performed with the device mounted on 1in 2 FR-4 board with 2oz. Copper, in a still air environment with $T_A=25^{\circ}\text{C}$. The SOA curve provides a single pulse rating.

F: The current rating is based on the $t \leq 10\text{s}$ junction to ambient thermal resistance rating.

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

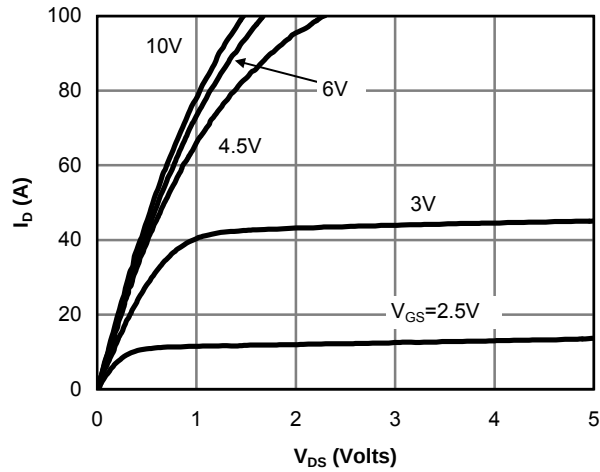


Fig 1: On-Region Characteristics

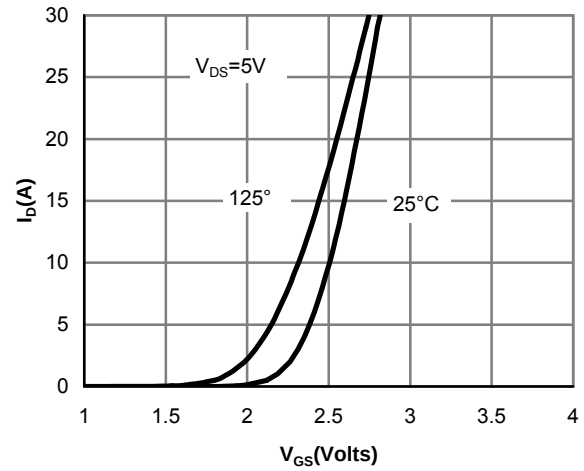


Figure 2: Transfer Characteristics

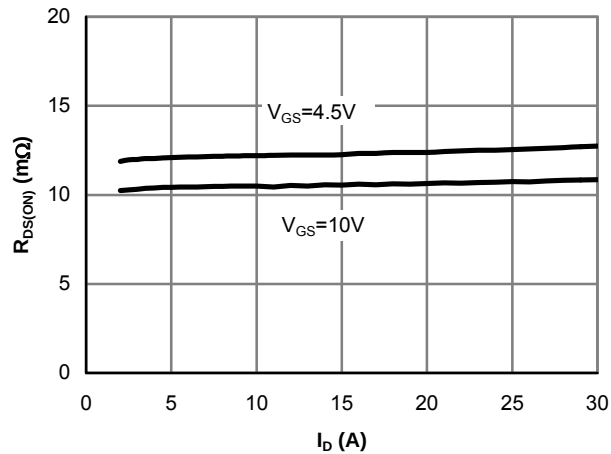


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

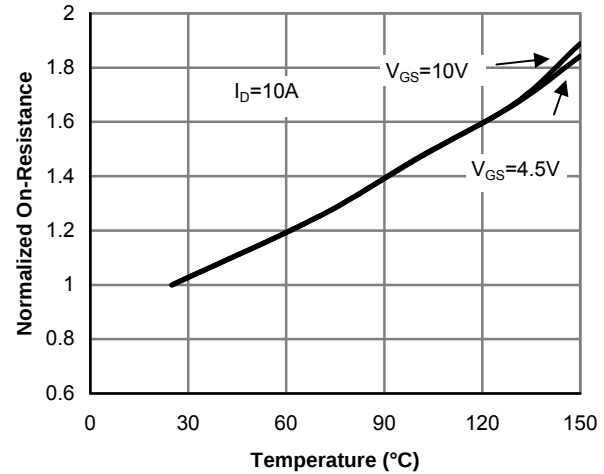


Figure 4: On-Resistance vs. Junction Temperature

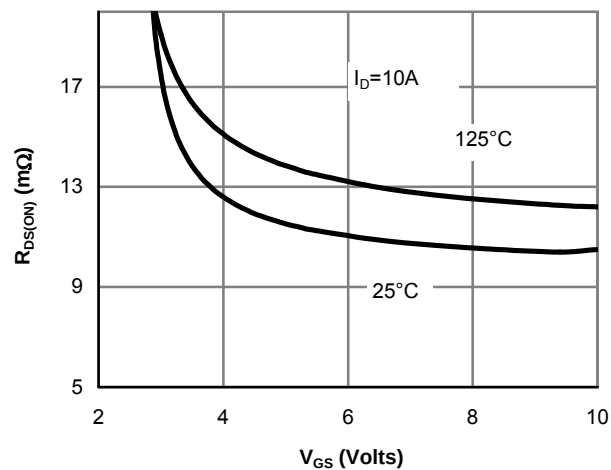


Figure 5: On-Resistance vs. Gate-Source Voltage

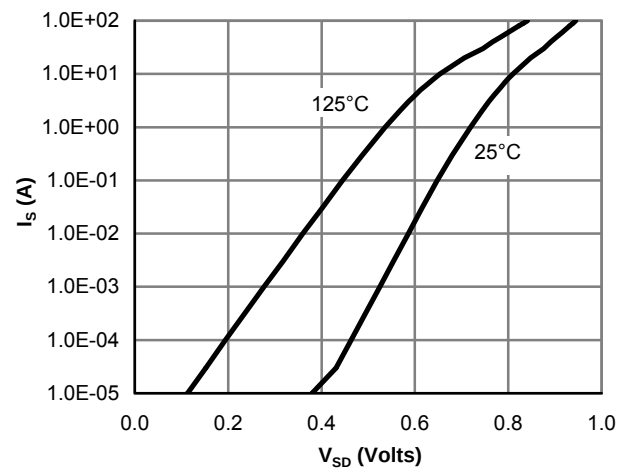


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

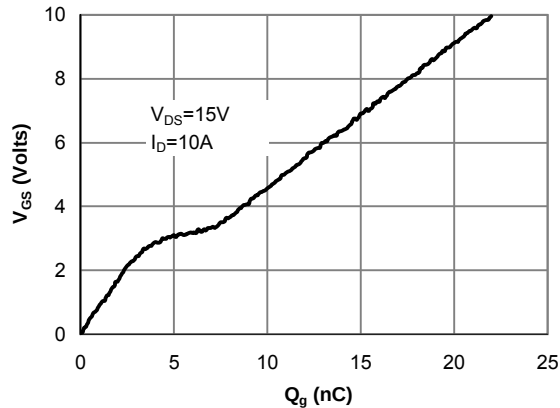


Figure 7: Gate-Charge Characteristics

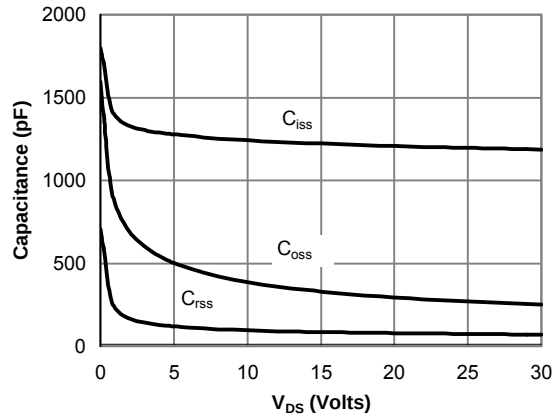


Figure 8: Capacitance Characteristics

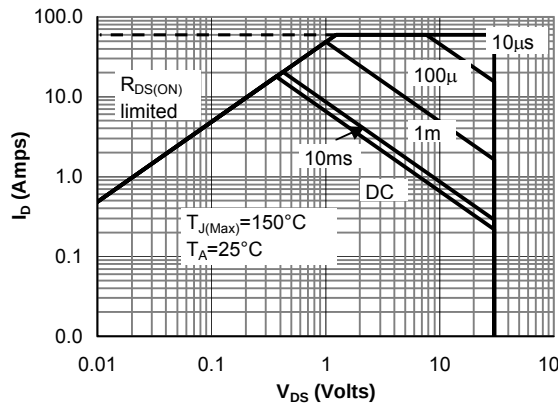


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

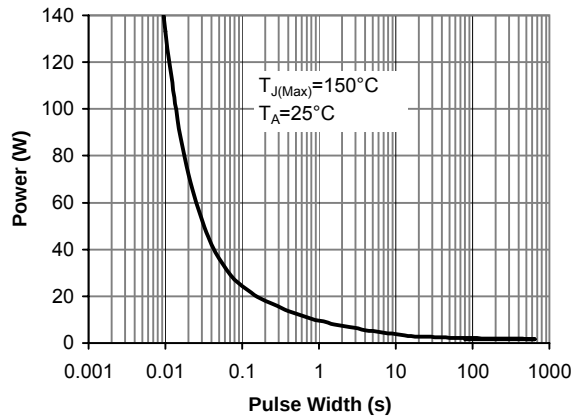


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note G)

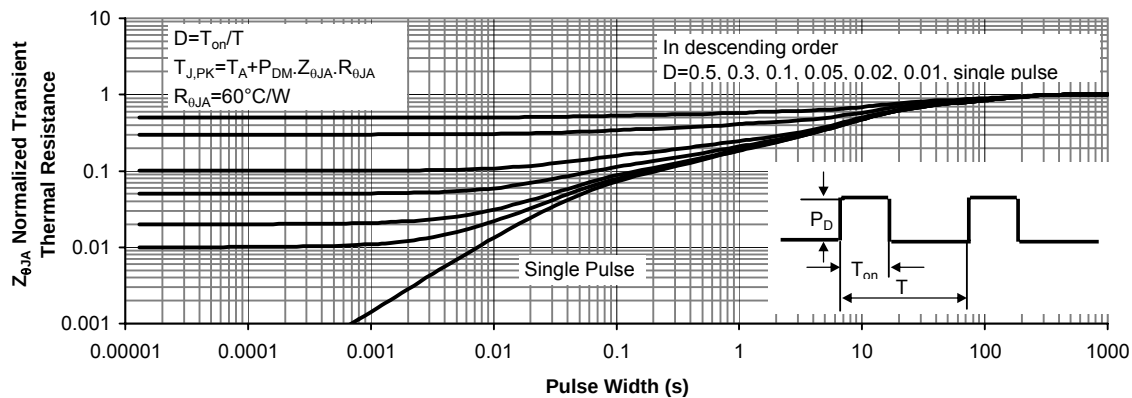


Figure 11: Normalized Maximum Transient Thermal Impedance (Note G)