



AON7406

N-Channel Enhancement Mode Field Effect Transistor



General Description

The AON7406 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 AON7406 is Pb-free (meets ROHS & Sony 259 specifications).*

Features

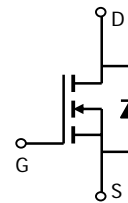
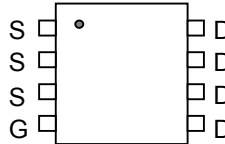
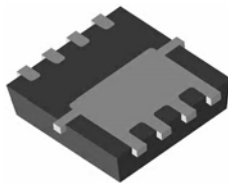
V_{DS} (V) = 30V
 I_D = 11A (V_{GS} = 10V)
 $R_{DS(ON)} < 16m\Omega$ (V_{GS} = 10V)
 $R_{DS(ON)} < 24m\Omega$ (V_{GS} = 4.5V)

DFN 3x3

Top View



Bottom View



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}	± 20	V	
Continuous Drain Current ^{B,H}	$T_C=25^\circ\text{C}$	20	A	
	$T_C=100^\circ\text{C}$	20		
Pulsed Drain Current ^C	I_{DM}	50		
Continuous Drain Current ^G	$T_A=25^\circ\text{C}$	11		I_{DSM}
	$T_A=70^\circ\text{C}$	8.8		
Power Dissipation ^B	$T_C=25^\circ\text{C}$	27	P_D	
	$T_C=100^\circ\text{C}$	11		
Power Dissipation ^A	$T_A=25^\circ\text{C}$	3.1		P_{DSM}
	$T_A=70^\circ\text{C}$	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	$R_{\theta JA}$	$t \leq 10s$	30	40	$^\circ\text{C/W}$
		Steady-State	60	75	$^\circ\text{C/W}$
Maximum Junction-to-Case ^D	$R_{\theta JC}$	4	4.5	$^\circ\text{C/W}$	

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	$V_{DS}=0\text{V}$, $V_{GS}=\pm 20\text{V}$			± 100	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$	1	1.6	3	V
$I_{D(ON)}$	On state drain current	$V_{GS}=10\text{V}$, $V_{DS}=5\text{V}$	50			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=10\text{V}$, $I_D=11\text{A}$ $T_J=125^\circ\text{C}$ $V_{GS}=4.5\text{V}$, $I_D=8.5\text{A}$		13 18 19	16 23 24	$\text{m}\Omega$
g_{FS}	Forward Transconductance	$V_{DS}=5\text{V}$, $I_D=10\text{A}$		19		S
V_{SD}	Diode Forward Voltage	$I_S=1\text{A}$, $V_{GS}=0\text{V}$		0.73	1	V
I_S	Maximum Body-Diode Continuous Current				3	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	$V_{GS}=0\text{V}$, $V_{DS}=15\text{V}$, $f=1\text{MHz}$		955	1200	pF
C_{oss}	Output Capacitance			145		pF
C_{riss}	Reverse Transfer Capacitance			112		pF
R_g	Gate resistance	$V_{GS}=0\text{V}$, $V_{DS}=0\text{V}$, $f=1\text{MHz}$		0.5	0.85	Ω
SWITCHING PARAMETERS						
$Q_g(10\text{V})$	Total Gate Charge	$V_{GS}=10\text{V}$, $V_{DS}=15\text{V}$, $I_D=10\text{A}$		17	24	nC
$Q_g(4.5\text{V})$	Total Gate Charge			9	12	nC
Q_{gs}	Gate Source Charge			3.4		nC
Q_{gd}	Gate Drain Charge			4.7		nC
$t_{D(on)}$	Turn-On DelayTime	$V_{GS}=10\text{V}$, $V_{DS}=15\text{V}$, $R_L=1.5\Omega$, $R_{GEN}=3\Omega$		5		ns
t_r	Turn-On Rise Time			6		ns
$t_{D(off)}$	Turn-Off DelayTime			19		ns
t_f	Turn-Off Fall Time			4.5		ns
t_{rr}	Body Diode Reverse Recovery Time	$I_F=11\text{A}$, $dI/dt=100\text{A}/\mu\text{s}$		19	25	ns
Q_{rr}	Body Diode Reverse Recovery Charge	$I_F=11\text{A}$, $dI/dt=100\text{A}/\mu\text{s}$		9		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 $<300\text{ms}$ 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.

G: The maximum current rating is limited by bond-wires.

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

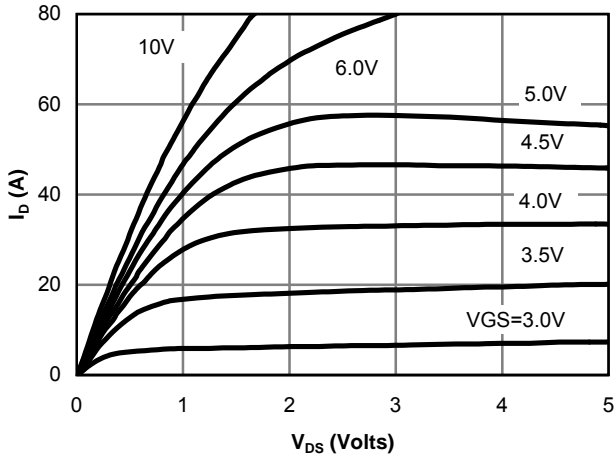


Figure 1: On-Region Characteristics

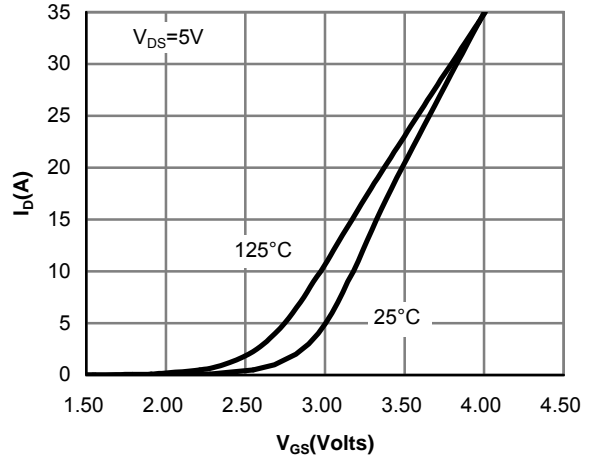


Figure 2: Transfer Characteristics

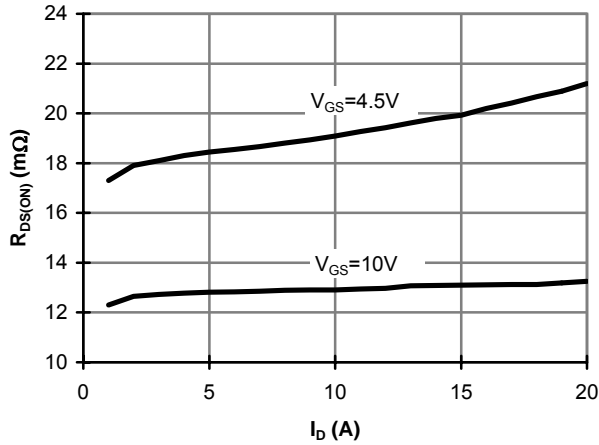


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

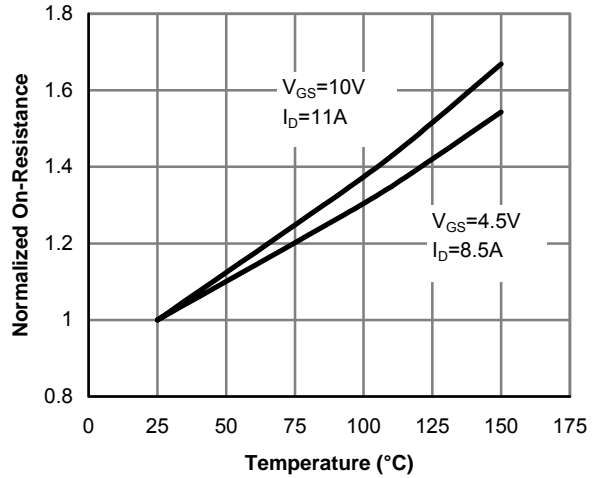


Figure 4: On-Resistance vs. Junction Temperature

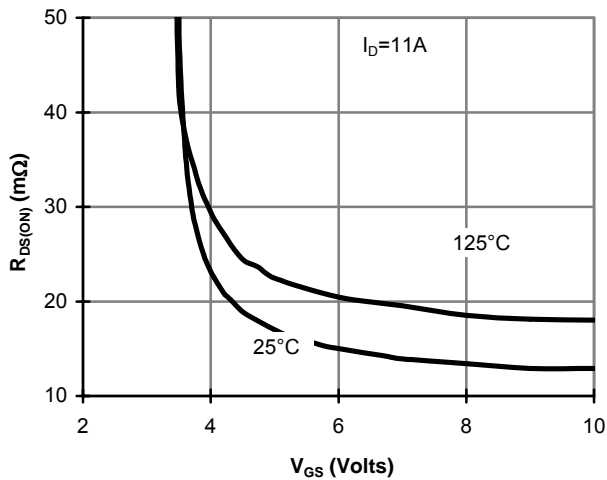


Figure 5: On-Resistance vs. Gate-Source Voltage

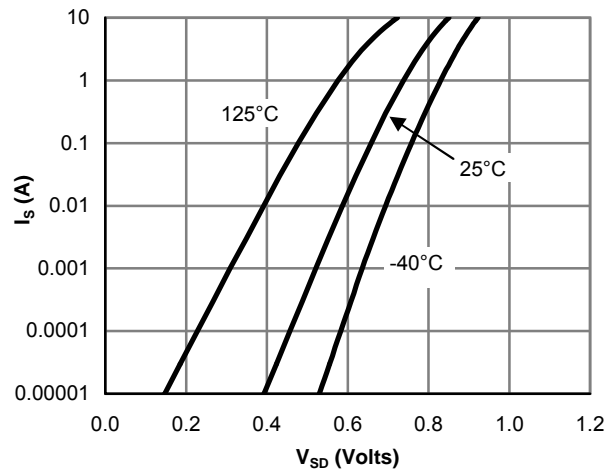


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

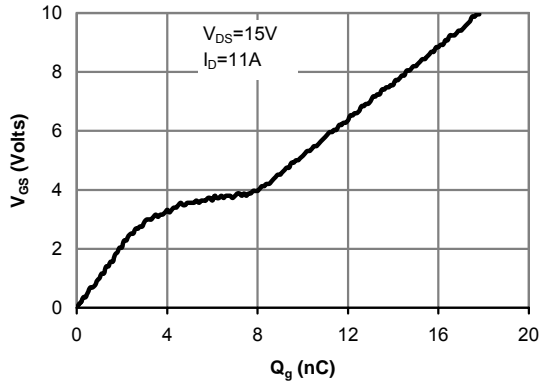


Figure 7: Gate-Charge Characteristics

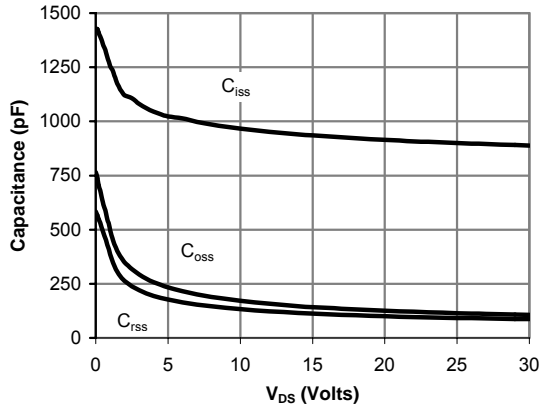


Figure 8: Capacitance Characteristics

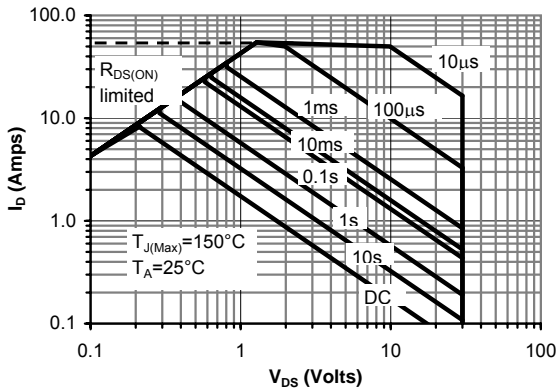


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

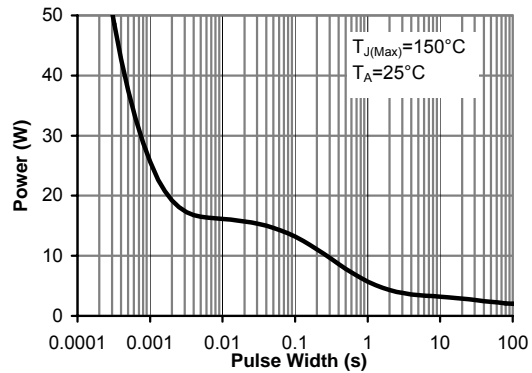


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

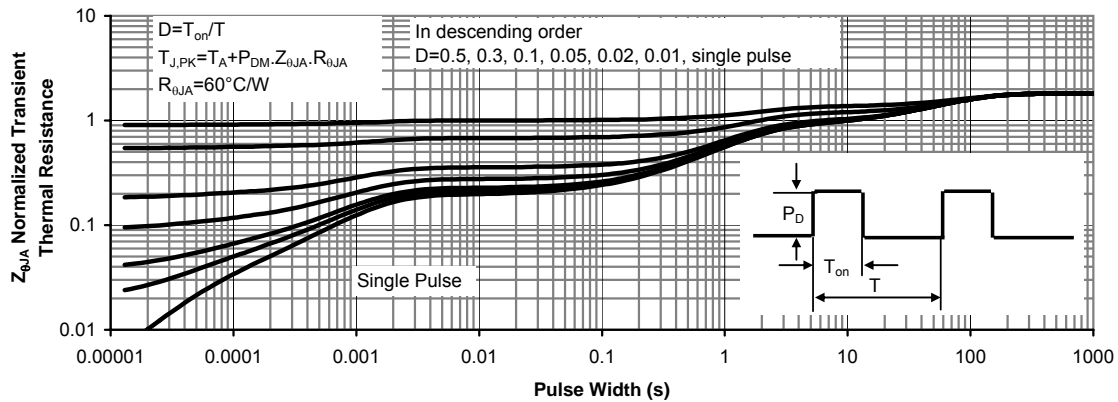


Figure 11: Normalized Maximum Transient Thermal Impedance