

General Description

The AON4413 uses advanced trench technology to provide excellent $R_{DS(ON)}$ with low gate charge. This device is suitable for use as a load switch or in PWM applications. *Standard product AON4413 is Pb-free (meets ROHS & Sony 259 specifications).*

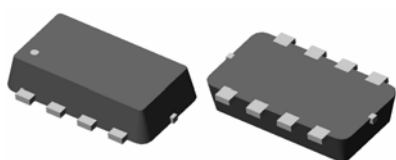
Features

V_{DS} (V) = -30V

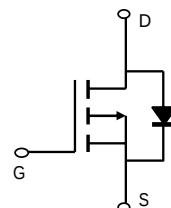
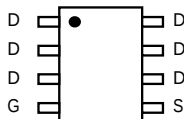
I_D = -6.5A (V_{GS} = -10V)

$R_{DS(ON)}$ < 46m Ω (V_{GS} = -10V)

$R_{DS(ON)}$ < 60m Ω (V_{GS} = -6V)



DFN 3x2



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

Parameter		Symbol	10 Sec	Steady State	Units
Drain-Source Voltage		V_{DS}	-30		V
Gate-Source Voltage		V_{GS}	± 20		V
Continuous Drain Current ^A	$T_A=25^\circ\text{C}$	I_D	-6.5	-4.7	A
	$T_A=70^\circ\text{C}$		-5.3	-3.7	
Pulsed Drain Current ^B		I_{DM}	-25		
Power Dissipation ^A	$T_A=25^\circ\text{C}$	P_D	3.1	1.6	W
	$T_A=70^\circ\text{C}$		2.0	1.0	
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	$t \leq 10\text{s}$	$R_{\theta JA}$	34	40	$^\circ\text{C/W}$
Maximum Junction-to-Ambient ^A	Steady State		66	80	$^\circ\text{C/W}$
Maximum Junction-to-Lead ^C	Steady State	$R_{\theta JL}$	20	25	$^\circ\text{C/W}$

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	$V_{DS} = V_{GS}$, $I_D = -250\mu\text{A}$	-1.5	-2	-2.5	V
$I_{D(ON)}$	On state drain current	$V_{GS} = -10\text{V}$, $V_{DS} = -5\text{V}$	-25			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS} = -10\text{V}$, $I_D = -6.5\text{A}$		38	46	$\text{m}\Omega$
		$T_J = 125^{\circ}\text{C}$		54	65	
		$V_{GS} = -6\text{V}$, $I_D = -5.3\text{A}$		48	60	$\text{m}\Omega$
g_{FS}	Forward Transconductance	$V_{DS} = -5\text{V}$, $I_D = -6.5\text{A}$		11		S
V_{SD}	Diode Forward Voltage	$I_S = -1\text{A}$, $V_{GS} = 0\text{V}$		0.77	-1	V
I_S	Maximum Body-Diode Continuous Current				-3	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	$V_{GS}=0\text{V}$, $V_{DS}=-15\text{V}$, $f=1\text{MHz}$		668	830	pF
C_{oss}	Output Capacitance			126		pF
C_{rss}	Reverse Transfer Capacitance			92		pF
R_g	Gate resistance	$V_{GS}=0\text{V}$, $V_{DS}=0\text{V}$, $f=1\text{MHz}$		6	9	Ω
SWITCHING PARAMETERS						
$Q_g(10\text{V})$	Total Gate Charge (10V)	$V_{GS}=-10\text{V}$, $V_{DS}=-15\text{V}$, $I_D=-6.5\text{A}$		12.7	17	nC
$Q_g(4.5\text{V})$	Total Gate Charge (4.5V)			6.4	8.5	nC
Q_{gs}	Gate Source Charge			2		nC
Q_{gd}	Gate Drain Charge			4		nC
$t_{D(on)}$	Turn-On DelayTime	$V_{GS}=-10\text{V}$, $V_{DS}=-15\text{V}$, $R_L=2.3\Omega$, $R_{GEN}=3\Omega$		7.7		ns
t_r	Turn-On Rise Time			6.8		ns
$t_{D(off)}$	Turn-Off DelayTime			20		ns
t_f	Turn-Off Fall Time			10		ns
t_{rr}	Body Diode Reverse Recovery Time	$I_F=-6.5\text{A}$, $dI/dt=100\text{A}/\mu\text{s}$		22	30	ns
Q_{rr}	Body Diode Reverse Recovery Charge	$I_F=-6.5\text{A}$, $dI/dt=100\text{A}/\mu\text{s}$		15		nC

A: The value of $R_{\theta JA}$ is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with $T_A = 25^{\circ}\text{C}$. The value in any a given application depends on the user's specific board design. The current rating is based on the $t \leq 10\text{s}$ thermal resistance rating.

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 1 in² 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.

Rev1: June 2007

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

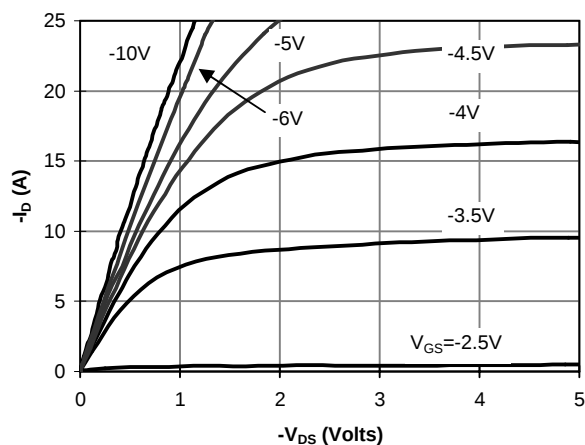


Figure 1: On-Region Characteristics

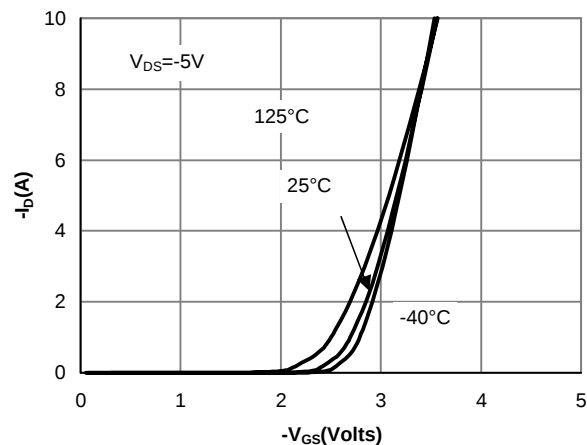


Figure 2: Transfer Characteristics

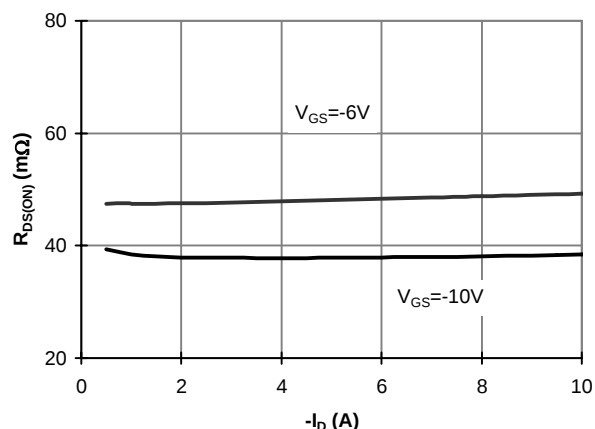


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

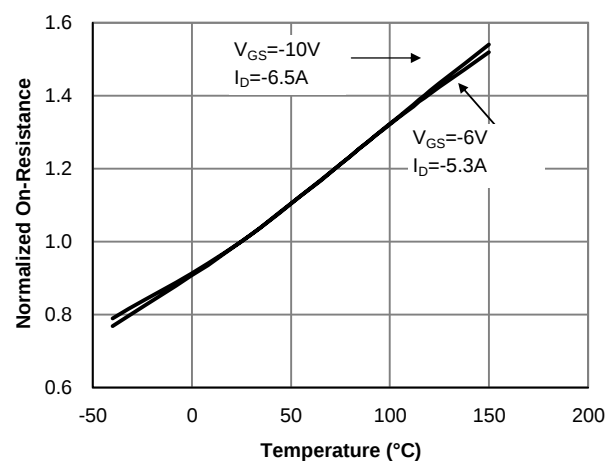


Figure 4: On-Resistance vs. Junction Temperature

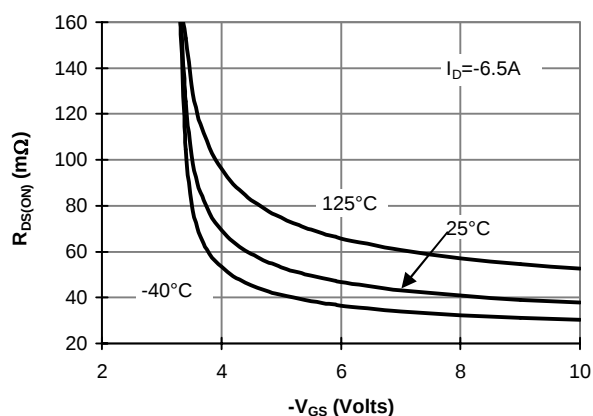


Figure 5: On-Resistance vs. Gate-Source Voltage

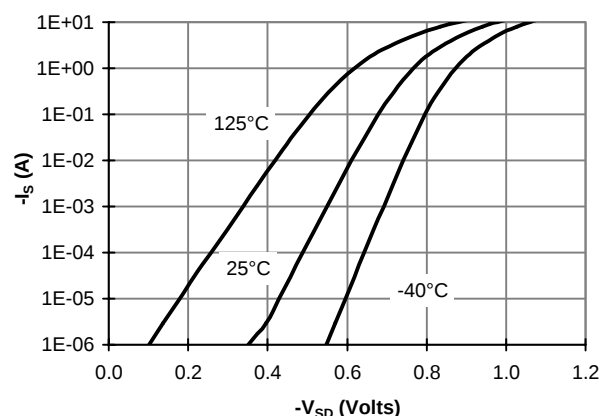


Figure 6: Body-Diode Characteristics

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