

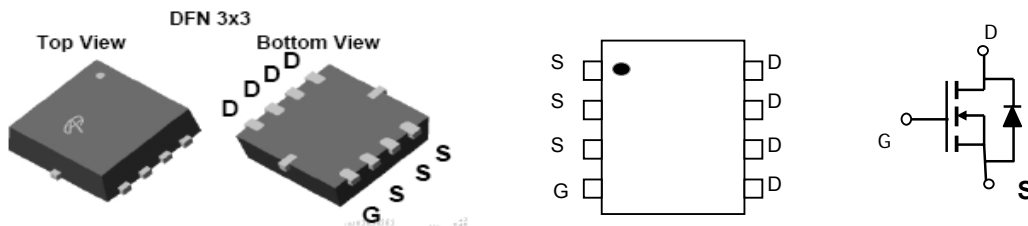
AON3408
N-Channel Enhancement Mode Field Effect Transistor

General Description

The AON3408 uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. This device is suitable for use as a load switch or in PWM applications. The source leads are separated to allow a Kelvin connection to the source, which may be used to bypass the source inductance. *Standard Product AON3408 is Pb-free (meets ROHS & Sony 259 specifications).*

Features

V_{DS} (V) = 30V
 I_D = 8.8A (V_{GS} = 10V)
 $R_{DS(ON)}$ < 24m Ω (V_{GS} = 10V)
 $R_{DS(ON)}$ < 29m Ω (V_{GS} = 4.5V)
 $R_{DS(ON)}$ < 45m Ω (V_{GS} = 2.5V)


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 ^A	I_{DSM}	$T_A=25^\circ\text{C}$	8.5
		$T_A=70^\circ\text{C}$	7.2
Pulsed Drain Current ^B	I_{DM}	40	A
Power Dissipation	P_{DSM}	$T_A=25^\circ\text{C}$	3.0
		$T_A=70^\circ\text{C}$	1.9
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	$R_{\theta JA}$	$t \leq 10\text{s}$	32	$^\circ\text{C/W}$
Maximum Junction-to-Ambient ^A		Steady-State	65	100
Maximum Junction-to-Lead ^C	$R_{\theta JL}$	25	35	$^\circ\text{C/W}$

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	$V_{DS}=24\text{V}$, $V_{GS}=0\text{V}$ $T_J=125^\circ\text{C}$			1 5	μA
I_{GSS}	Gate-Body leakage current	$V_{DS}=0\text{V}$, $V_{GS}=\pm 12\text{V}$			100	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$	0.7	1	1.5	V
$I_{D(ON)}$	On state drain current	$V_{GS}=4.5\text{V}$, $V_{DS}=5\text{V}$	40			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=10\text{V}$, $I_D=8.8\text{A}$ $T_J=125^\circ\text{C}$		20 28	24 34	m Ω
		$V_{GS}=4.5\text{V}$, $I_D=8\text{A}$		23	29	
		$V_{GS}=2.5\text{V}$, $I_D=5\text{A}$		34.5	45	
g_{FS}	Forward Transconductance	$V_{DS}=5\text{V}$, $I_D=8.8\text{A}$		26		S
V_{SD}	Diode Forward Voltage	$I_S=1\text{A}$, $V_{GS}=0\text{V}$		0.72	1.0	V
I_S	Maximum Body-Diode Continuous Current				4.0	A
DYNAMIC PARAMETERS						
C_{ISS}	Input Capacitance	$V_{GS}=0\text{V}$, $V_{DS}=15\text{V}$, $f=1\text{MHz}$		900	1100	pF
C_{OSS}	Output Capacitance			88		pF
C_{RSS}	Reverse Transfer Capacitance			65		pF
R_g	Gate resistance	$V_{GS}=0\text{V}$, $V_{DS}=0\text{V}$, $f=1\text{MHz}$		0.95	1.5	Ω
SWITCHING PARAMETERS						
Q_g	Total Gate Charge	$V_{GS}=4.5\text{V}$, $V_{DS}=15\text{V}$, $I_D=8.5\text{A}$		10	13	
Q_{gs}	Gate Source Charge			1.8		nC
Q_{gd}	Gate Drain Charge			3.75		nC
$t_{D(on)}$	Turn-On Delay Time	$V_{GS}=10\text{V}$, $V_{DS}=15\text{V}$, $R_L=1.7\Omega$, $R_{GEN}=3\Omega$		3.2		ns
t_r	Turn-On Rise Time			3.5		ns
$t_{D(off)}$	Turn-Off Delay Time			21.5		ns
t_f	Turn-Off Fall Time			2.7		ns
t_{rr}	Body Diode Reverse Recovery Time	$I_F=8.8\text{A}$, $dI/dt=100\text{A}/\mu\text{s}$		16.8	20	ns
Q_{rr}	Body Diode Reverse Recovery Charge	$I_F=8.8\text{A}$, $dI/dt=100\text{A}/\mu\text{s}$		8		nC

A: The value of $R_{\theta JA}$ is measured with the device in a still air environment with $T_A=25^\circ\text{C}$. The power dissipation P_{DSM} and current rating I_{DSM} are based on $T_{J(MAX)}=150^\circ\text{C}$, using $t \leq 10\text{s}$ junction-to-ambient thermal resistance.

B: Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}=150^\circ\text{C}$.

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 in 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.

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

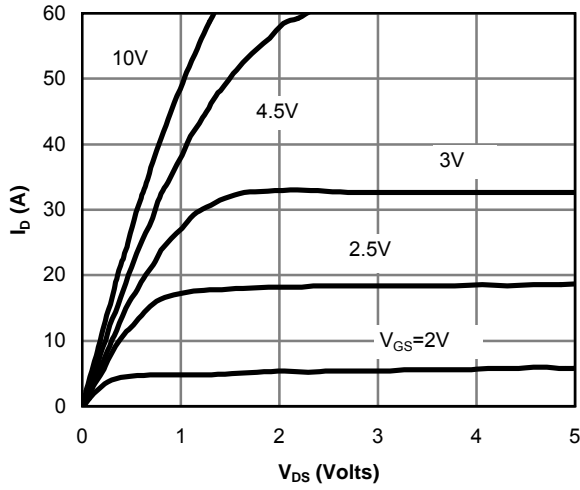


Figure 1: On-Region Characteristics

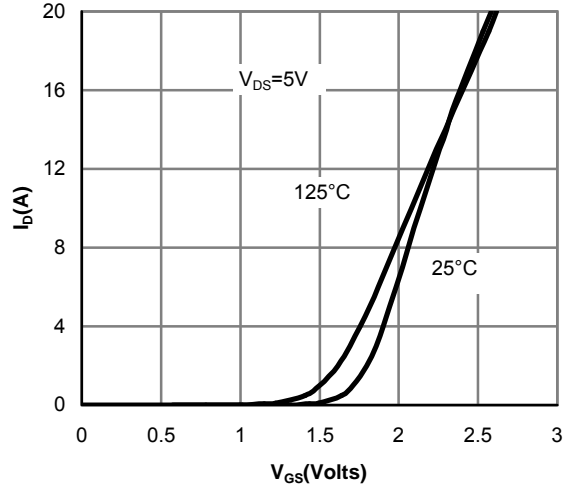


Figure 2: Transfer Characteristics

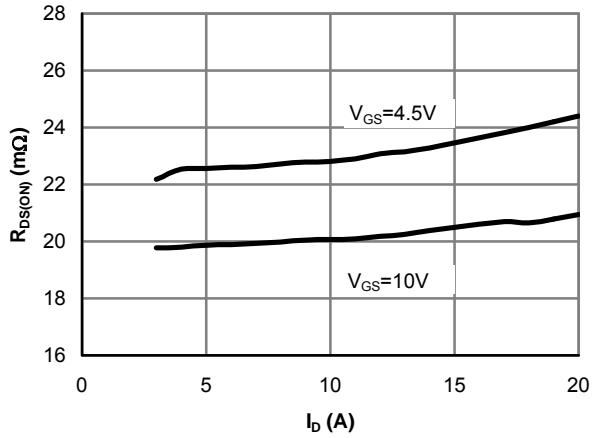


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

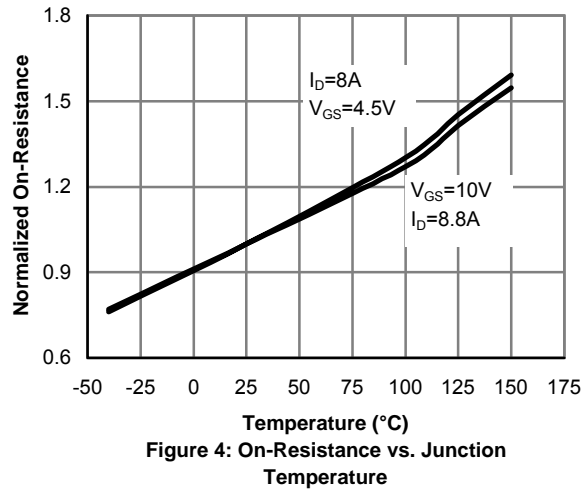


Figure 4: On-Resistance vs. Junction Temperature

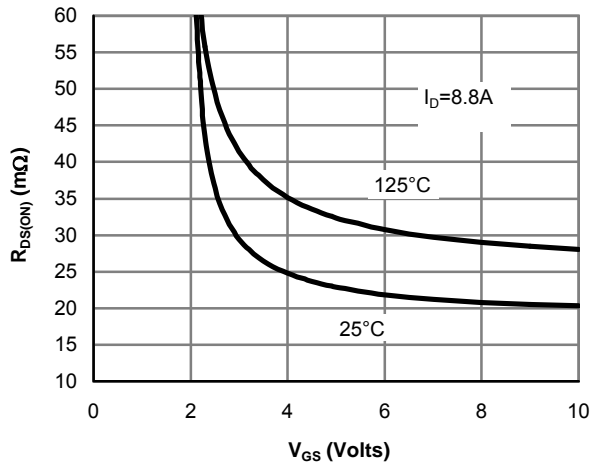


Figure 5: On-Resistance vs. Gate-Source Voltage

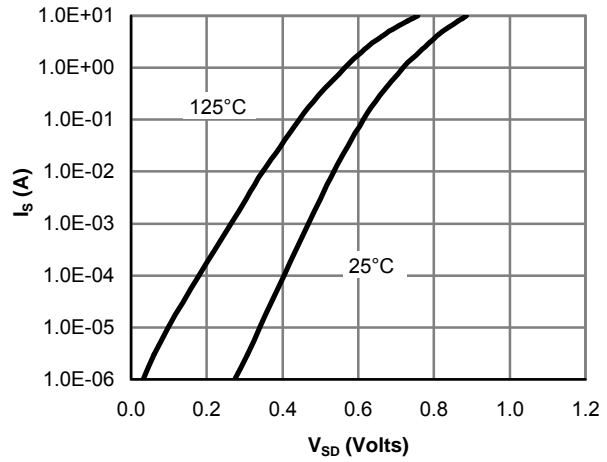


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

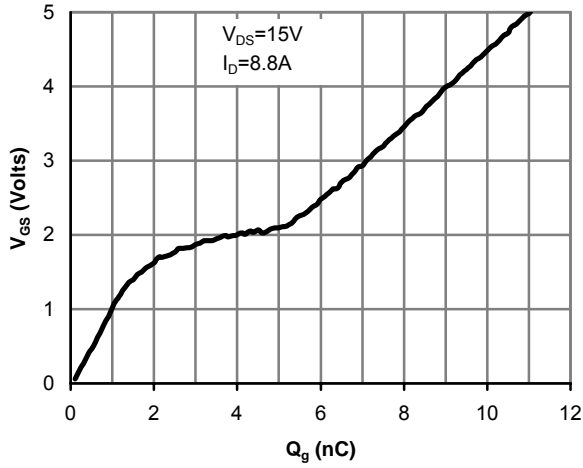


Figure 7: Gate-Charge Characteristics

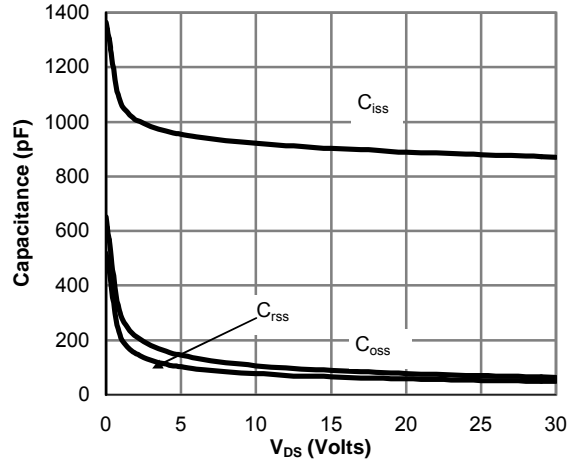


Figure 8: Capacitance Characteristics

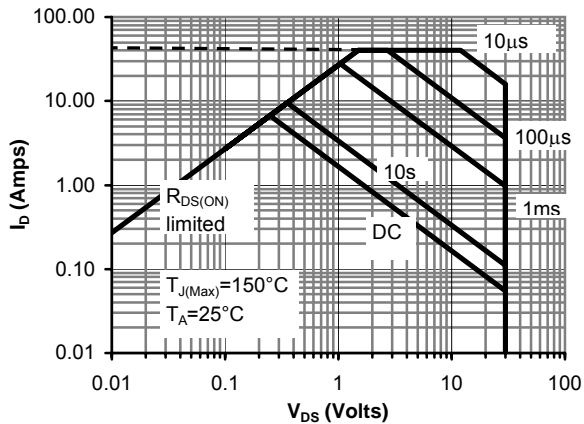


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

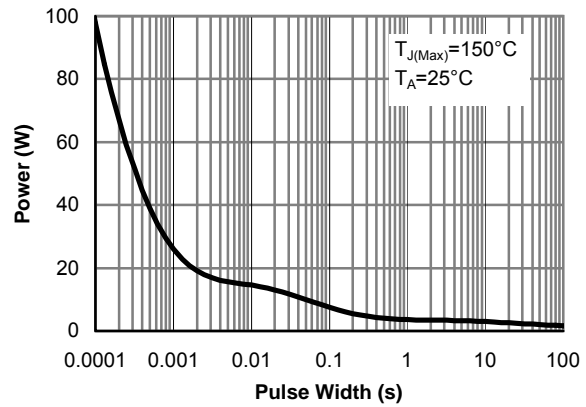


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

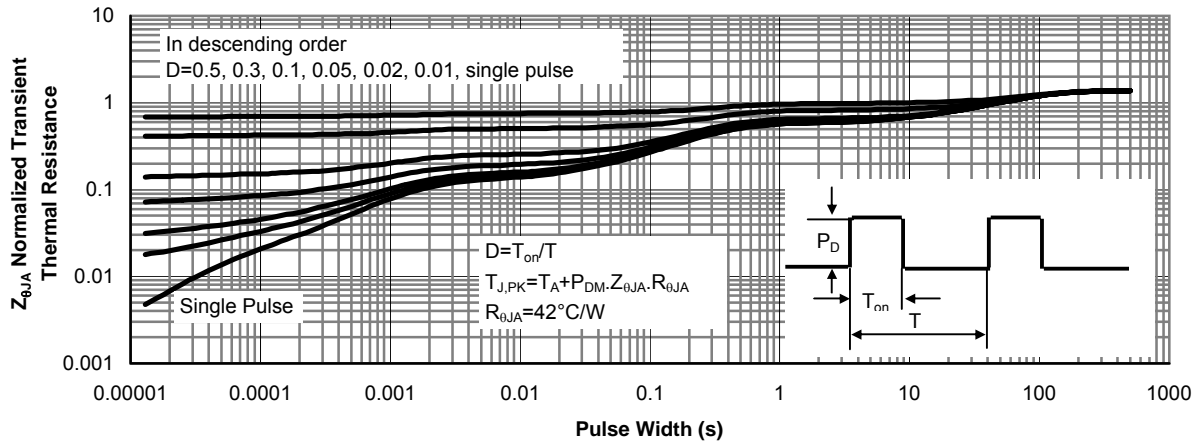


Figure 11: Normalized Maximum Transient Thermal Impedance