

AON5802

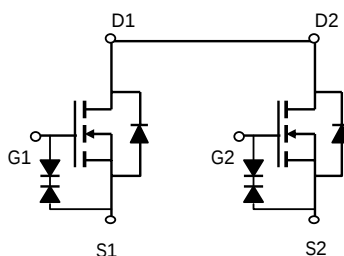
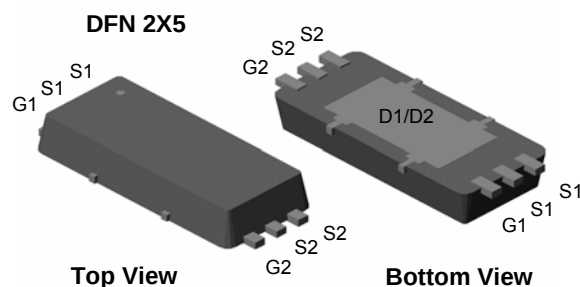
Common-Drain Dual N-Channel Enhancement Mode Field Effect Transistor

General Description

The AON5802 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V while retaining a 12V $V_{GS(MAX)}$ rating. It is ESD protected. This device is suitable for use as a uni-directional or bi-directional load switch, facilitated by its common-drain configuration. *Standard Product AON5802 is Pb-free (meets ROHS & Sony 259 specifications).*

Features

$V_{DS} (V) = 30V$
 $I_D = 7.2A (V_{GS} = 4.5V)$
 $R_{DS(ON)} < 20 m\Omega (V_{GS} = 4.5V)$
 $R_{DS(ON)} < 22 m\Omega (V_{GS} = 4.0V)$
 $R_{DS(ON)} < 24 m\Omega (V_{GS} = 3.1V)$
 $R_{DS(ON)} < 30 m\Omega (V_{GS} = 2.5V)$
 ESD Protected



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

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	± 12	
Continuous Drain Current $R_{\theta JA}=75^\circ C/W$	I_D	7.2	A
$T_A=25^\circ C$		5.6	
$T_A=70^\circ C$	I_{DM}	65	
Pulsed Drain Current ^B		65	
Power Dissipation ^A	P_{DSM}	1.7	W
$R_{\theta JA}=75^\circ C/W$		1.0	
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	$^\circ C$

Thermal Characteristics

Parameter	Symbol	Typ	Max	Units
Maximum Junction-to-Ambient ^A	$R_{\theta JA}$	30	40	$^\circ C/W$
$t \leq 10s$		61	75	$^\circ C/W$
Maximum Junction-to-Ambient ^A	$R_{\theta JL}$	4.5	6	$^\circ C/W$
Steady-State				
Maximum Junction-to-Lead ^C				

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} =24V, V _{GS} =0V T _J =55°C			1 5	μA
I _{GSS}	Gate-Body leakage current	V _{DS} =0V, V _{GS} =±10V			10	μA
BV _{GSO}	Gate-Source Breakdown Voltage	V _{DS} =0V, I _G =±250μA	±12			V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	0.6	1	1.5	V
I _{D(ON)}	On state drain current	V _{GS} =4.5V, V _{DS} =5V	65			A
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =4.5V, I _D =7.2A T _J =125°C	13 20	17 26	20 30	mΩ
		V _{GS} =4.0V, I _D =4A	13	17.2	22	
		V _{GS} =3.1V, I _D =4A	15	19	24	
		V _{GS} =2.5V, I _D =3A	16	22	30	
g _{FS}	Forward Transconductance	V _{DS} =5V, I _D =7.2A		37		S
V _{SD}	Diode Forward Voltage	I _S =1A, V _{GS} =0V	0.5	0.76	0.9	V
I _S	Maximum Body-Diode Continuous Current				4.5	A
DYNAMIC PARAMETERS						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =15V, f=1MHz		1115		pF
C _{oss}	Output Capacitance			125		pF
C _{rss}	Reverse Transfer Capacitance			100		pF
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz		1.5		Ω
SWITCHING PARAMETERS						
Q _g (4.5V)	Total Gate Charge	V _{GS} =4.5V, V _{DS} =15V, I _D =7.2A		10.7		nC
Q _{gs}	Gate Source Charge			2.1		nC
Q _{gd}	Gate Drain Charge			4.3		nC
t _{D(on)}	Turn-On DelayTime	V _{GS} =10V, V _{DS} =15V, R _L =2.1Ω, R _{GEN} =3Ω		3.4		ns
t _r	Turn-On Rise Time			11.2		ns
t _{D(off)}	Turn-Off DelayTime			27.2		ns
t _f	Turn-Off Fall Time			6.7		ns
t _{rr}	Body Diode Reverse Recovery Time	I _F =7.2A, dI/dt=100A/μs		24.6		ns
Q _{rr}	Body Diode Reverse Recovery Charge	I _F =7.2A, dI/dt=100A/μs		12.9		nC

A: The value of R_{θJA} is measured with the device mounted on 1in² 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. The current rating is based on the steady state thermal resistance rating.

B: Repetitive rating, pulse width limited by junction temperature.

C: The R_{θJA} is the sum of the thermal impedance from junction to lead R_{θJL} 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 in² FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C. The SOA curve provides a single pulse rating.

Rev 4: Sep 2007

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

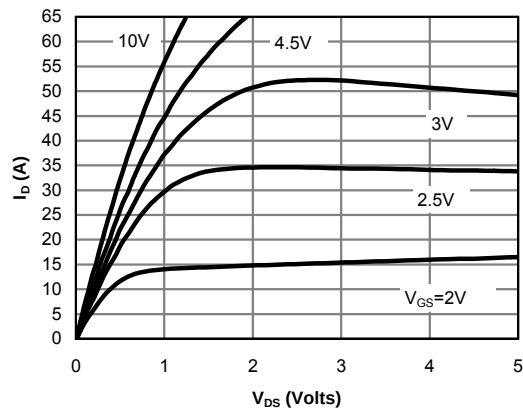


Fig 1: On-Region Characteristics

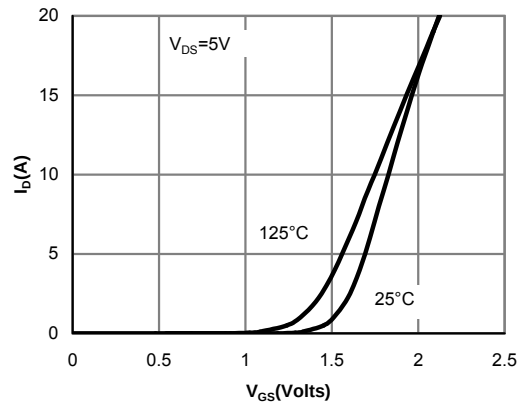


Figure 2: Transfer Characteristics

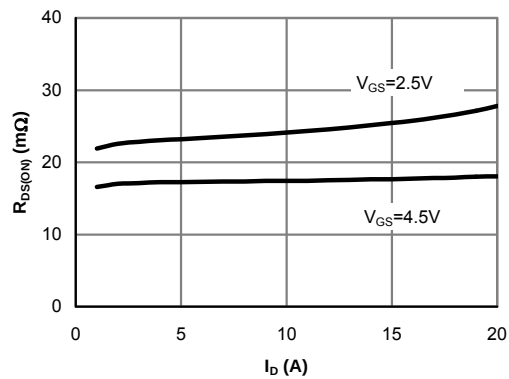


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

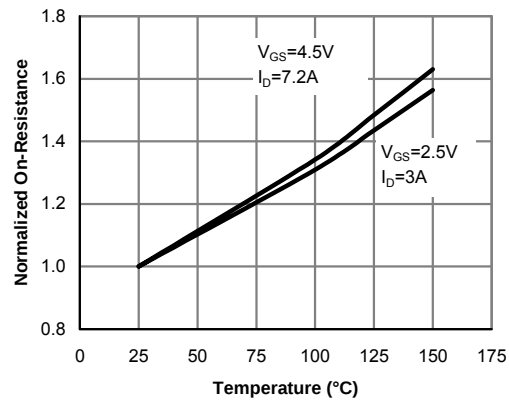


Figure 4: On-Resistance vs. Junction Temperature

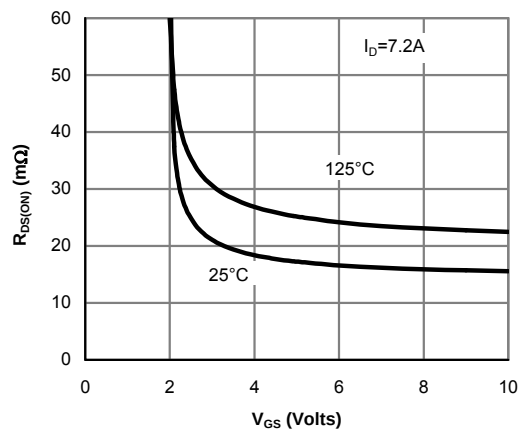


Figure 5: On-Resistance vs. Gate-Source Voltage

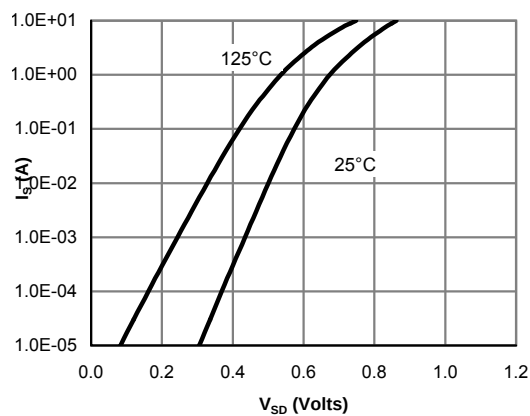


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

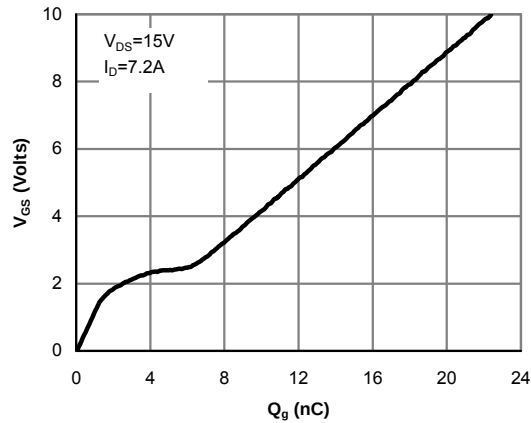


Figure 7: Gate-Charge Characteristics

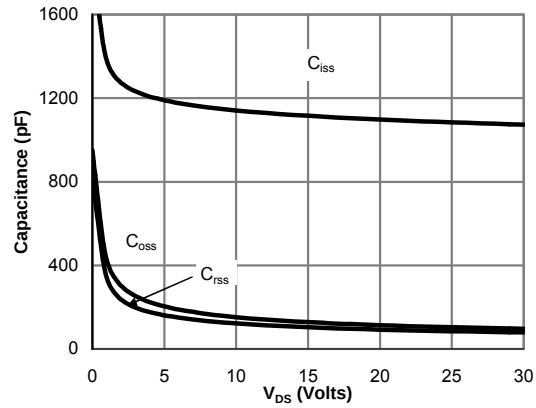


Figure 8: Capacitance Characteristics

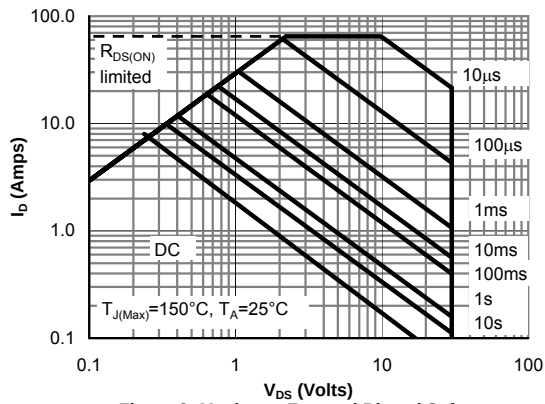


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

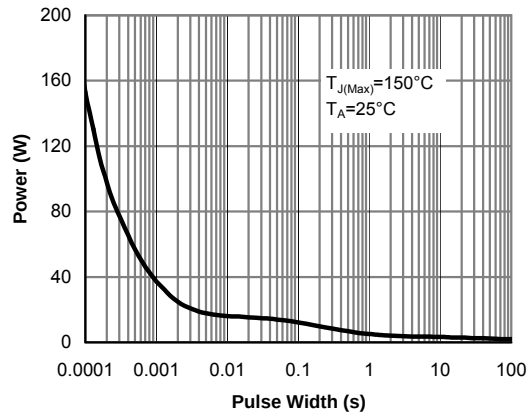


Figure 10: Single Pulse Power Rating Junction-to-Case (Note E)

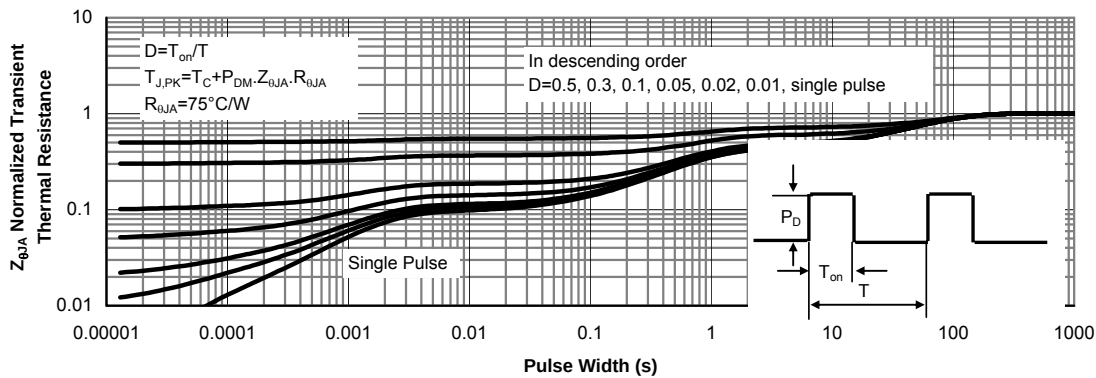


Figure 11: Normalized Maximum Transient Thermal Impedance (Note E)