

General Description

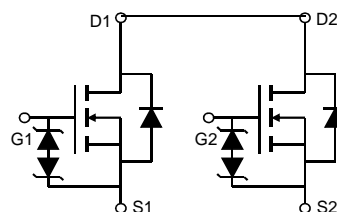
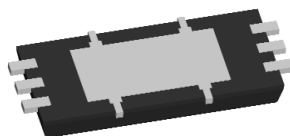
The AON5820 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V while retaining a 12V $V_{GS(MAX)}$ rating. It is ESD protected. This device is suitable for use as a uni-directional or bi-directional load switch, facilitated by its common-drain configuration.

Product Summary

V_{DS}	20V
I_D (at $V_{GS}=4.5V$)	10A
$R_{DS(ON)}$ (at $V_{GS}=4.5V$)	< 9.5m Ω
$R_{DS(ON)}$ (at $V_{GS}=4.0V$)	< 10m Ω
$R_{DS(ON)}$ (at $V_{GS}=3.5V$)	< 10.5m Ω
$R_{DS(ON)}$ (at $V_{GS}=3.1V$)	< 11.5m Ω
$R_{DS(ON)}$ (at $V_{GS}=2.5V$)	< 13m Ω

Typical ESD protection

HBM Class 2



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

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	± 12	V
Continuous Drain Current	I_D	$T_A=25^{\circ}C$	10
		$T_A=70^{\circ}C$	8
Pulsed Drain Current ^C	I_{DM}	85	A
Power Dissipation ^A	P_{DSM}	$T_A=25^{\circ}C$	1.7
		$T_A=70^{\circ}C$	1
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	$^{\circ}C/W$
Maximum Junction-to-Ambient ^{A,D}				
Maximum Junction-to-Case	$R_{\theta JC}$	4.5	5.5	$^{\circ}C/W$

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	20			V	
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =20V, V _{GS} =0V T _J =55°C			1 5	μA	
I _{GSS}	Gate-Body leakage current	V _{DS} =0V, V _{GS} =±10V			10	μA	
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	0.3	0.65	1.0	V	
I _{D(ON)}	On state drain current	V _{GS} =4.5V, V _{DS} =5V	85			A	
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =4.5V, I _D =10A T _J =125°C	5.5	7.4	9.5	mΩ	
		V _{GS} =4.0V, I _D =10A	5.8	7.6	10		
		V _{GS} =3.5V, I _D =9A	6	8	10.5		
		V _{GS} =3.1V, I _D =9A	6.3	8.3	11.5		
		V _{GS} =2.5V, I _D =8A	6.8	9.2	13		
g _{FS}	Forward Transconductance	V _{DS} =5V, I _D =10A		65		S	
V _{SD}	Diode Forward Voltage	I _S =1A, V _{GS} =0V		0.58	1	V	
I _S	Maximum Body-Diode Continuous Current				2.5	A	
DYNAMIC PARAMETERS							
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =10V, f=1MHz	1000	1255	1510	pF	
C _{oss}	Output Capacitance		150	220	290	pF	
C _{riss}	Reverse Transfer Capacitance		100	168	235	pF	
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz		2.5		KΩ	
SWITCHING PARAMETERS							
Q _g	Total Gate Charge	V _{GS} =4.5V, V _{DS} =10V, I _D =10A	10	12.5	15	nC	
Q _{gs}	Gate Source Charge				5.5		nC
Q _{gd}	Gate Drain Charge				6.5		nC
t _{D(on)}	Turn-On DelayTime	V _{GS} =4.5V, V _{DS} =10V, R _L =1Ω, R _{GEN} =3Ω		1.1		μs	
t _r	Turn-On Rise Time			2.6		μs	
t _{D(off)}	Turn-Off DelayTime			7		μs	
t _f	Turn-Off Fall Time			7.4		μs	
t _{rr}	Body Diode Reverse Recovery Time	I _F =10A, dI/dt=500A/μs	8.5	11	13.5	ns	
Q _{rr}	Body Diode Reverse Recovery Charge	I _F =10A, dI/dt=500A/μs	12	15	18	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 Power dissipation P_{DSM} is based on R_{θJA} and the maximum allowed junction temperature of 150° C. The value in any given application depends on the user's specific board design.

B. The power dissipation P_D is based on T_{J(MAX)}=150° C, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.

C. Repetitive rating, pulse width limited by junction temperature T_{J(MAX)}=150° C. Ratings are based on low frequency and duty cycles to keep initial T_J=25° C.

D. The R_{θJA} is the sum of the thermal impedance from junction to case R_{θJC} and case to ambient.

E. The static characteristics in Figures 1 to 6 are obtained using <300μs pulses, duty cycle 0.5% max.

F. These curves are based on the junction-to-case thermal impedance which is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of T_{J(MAX)}=150° C. The SOA curve provides a single pulse rating.

G. The maximum current rating is package limited.

H. 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.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

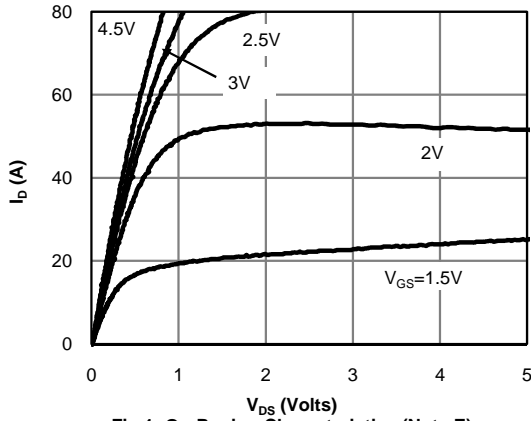


Fig 1: On-Region Characteristics (Note E)

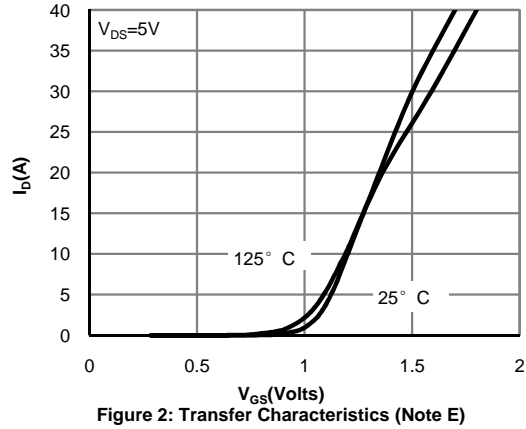


Figure 2: Transfer Characteristics (Note E)

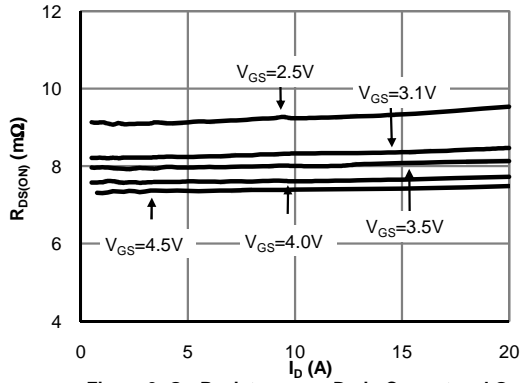


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

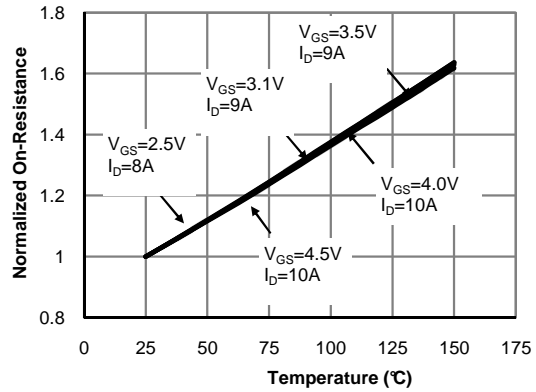


Figure 4: On-Resistance vs. Junction Temperature (Note E)

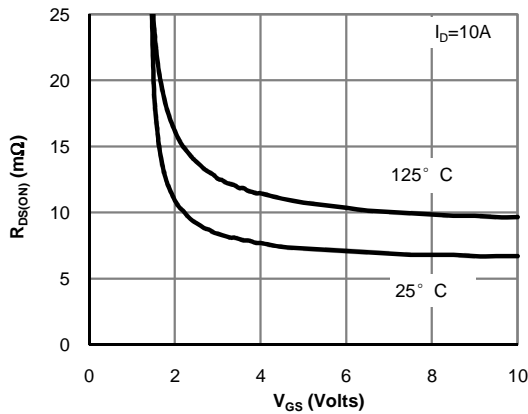


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

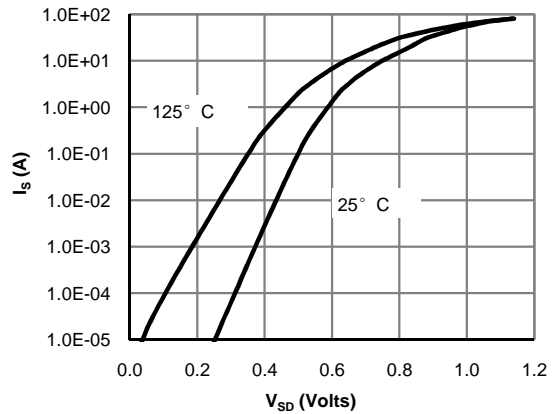


Figure 6: Body-Diode Characteristics (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

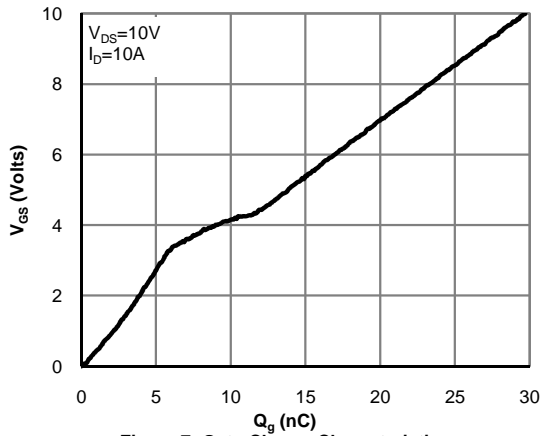


Figure 7: Gate-Charge Characteristics

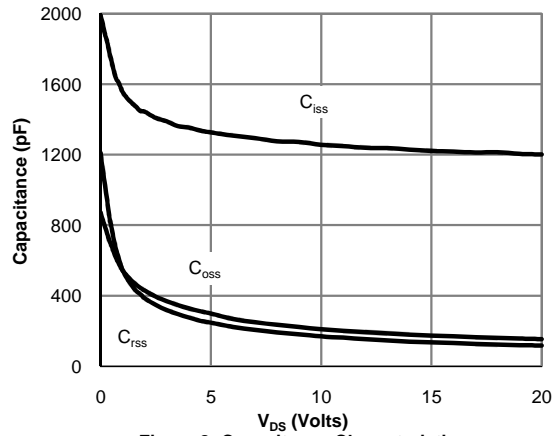


Figure 8: Capacitance Characteristics

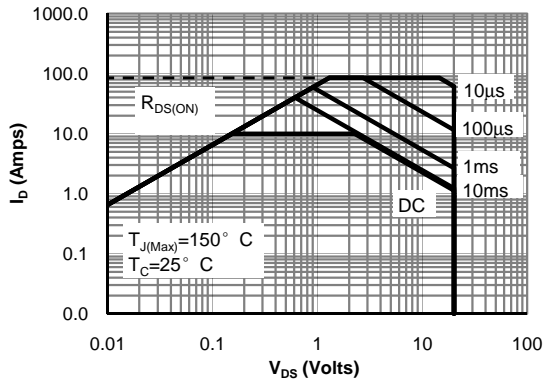


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

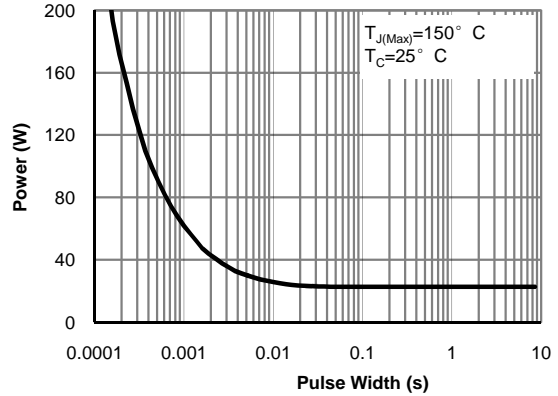


Figure 10: Single Pulse Power Rating Junction-to-C₂ (Note F)

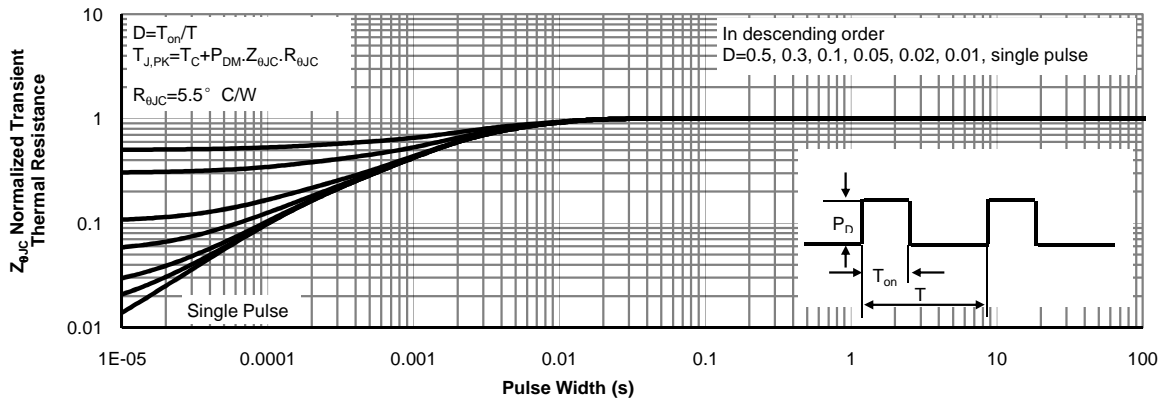


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

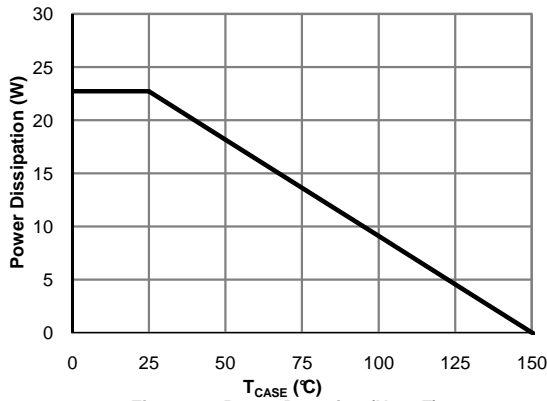


Figure 12: Power De-rating (Note F)

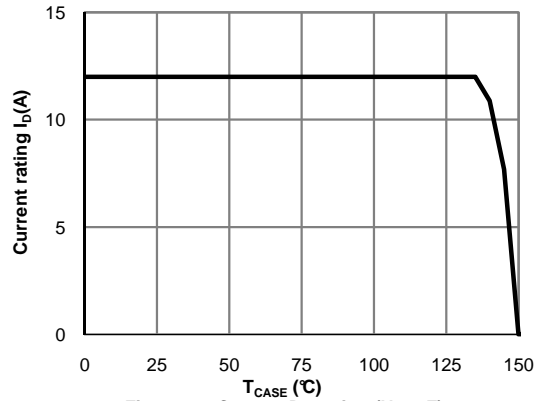


Figure 13: Current De-rating (Note F)

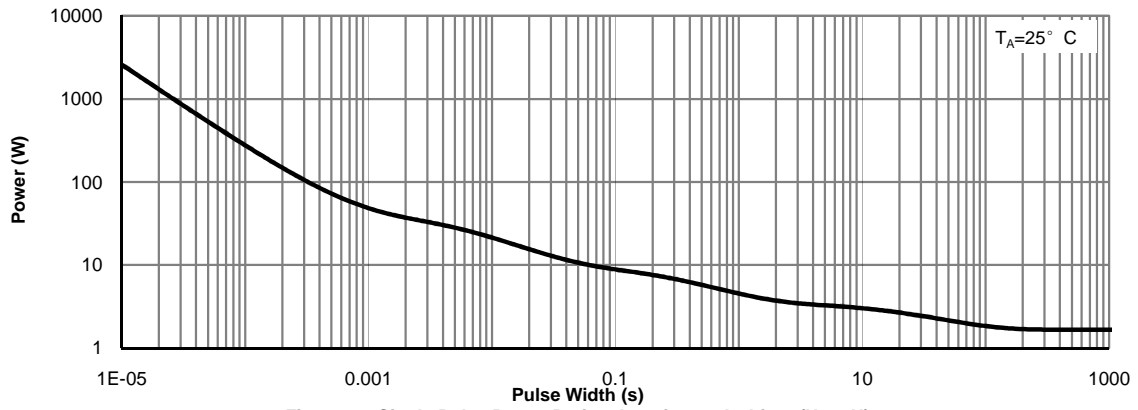


Figure 14: Single Pulse Power Rating Junction-to-Ambient (Note H)

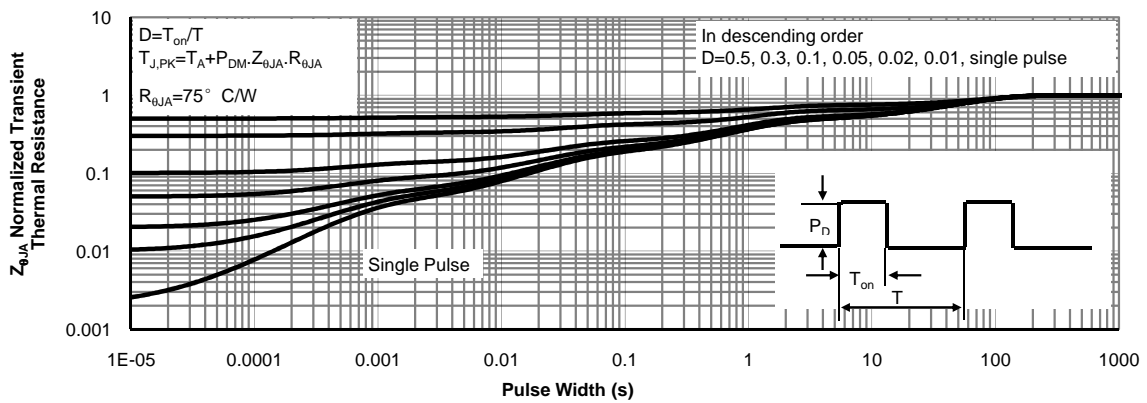
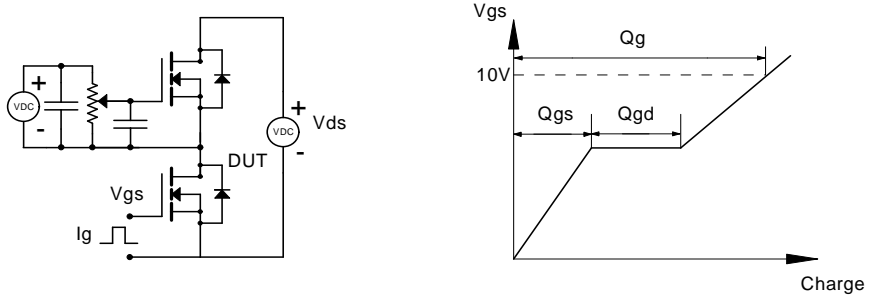
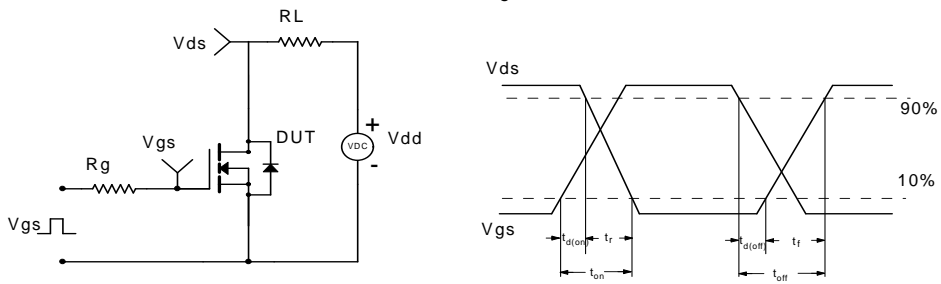


Figure 15: Normalized Maximum Transient Thermal Impedance (Note H)

Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

