

AON7820

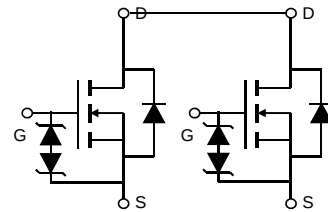
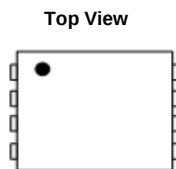
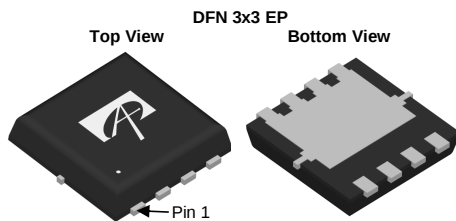
20V Dual N-Channel MOSFET

General Description

The AON7820 combines advanced trench MOSFET technology with a low resistance package to provide extremely low $R_{SS(ON)}$. This device is ideal for load switch and battery protection applications.

Product Summary

V_{DS}	20V
I_S (at $V_{GS}=4.5V$)	35A
$R_{SS(ON)}$ (at $V_{GS}=4.5V$)	< 16m Ω
$R_{SS(ON)}$ (at $V_{GS}=3.5V$)	< 17m Ω
$R_{SS(ON)}$ (at $V_{GS}=2.5V$)	< 20m Ω
Typical ESD protection	HBM Class 2



Absolute Maximum Ratings $T_A=25^\circ\text{C}$ 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_S	35	A
$T_C=25^\circ\text{C}$		22	
Pulsed Drain Current ^C	I_{SM}	80	
Continuous Drain Current	I_{SSM}	11	A
$T_A=25^\circ\text{C}$		9	
Power Dissipation ^B	P_D	31	W
$T_C=25^\circ\text{C}$		12.5	
Power Dissipation ^A	P_{DSM}	3.1	W
$T_A=25^\circ\text{C}$		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	$R_{\theta JA}$	30	40	$^\circ\text{C/W}$
$t \leq 10s$		60	75	$^\circ\text{C/W}$
Maximum Junction-to-Ambient ^{A D}	$R_{\theta JC}$	3.2	4	$^\circ\text{C/W}$
Steady-State				

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	0.4	0.7	1.0	V
I _{D(ON)}	On state drain current	V _{GS} =4.5V, V _{DS} =5V	80			A
R _{SS(ON)}	Static Drain-Source On-Resistance	V _{GS} =4.5V, I _S =11A T _J =125°C		13 18.7	16 23	mΩ
		V _{GS} =3.5V, I _S =10A		13.8	17	mΩ
		V _{GS} =2.5V, I _S =9A		15.6	20	mΩ
g _{FS}	Forward Transconductance	V _{DS} =5V, I _D =11A		65		S
V _{SD}	Diode Forward Voltage	I _S =1A, V _{GS} =0V		0.58	1	V
I _S	Maximum Body-Diode Continuous Current				35	A
DYNAMIC PARAMETERS						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =10V, f=1MHz	1375	1720	2065	pF
C _{oss}	Output Capacitance		215	312	410	pF
C _{rss}	Reverse Transfer Capacitance		105	177	250	pF
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz		2.65		KΩ
SWITCHING PARAMETERS						
Q _g	Total Gate Charge	V _{GS} =4.5V, V _{DS} =10V, I _S =11A	14	18.2	22	nC
Q _{gs}	Gate Source Charge			9.5		nC
Q _{gd}	Gate Drain Charge			7.6		nC
t _{D(on)}	Turn-On DelayTime	V _{GS} =4.5V, V _{DS} =10V, R _L =0.9Ω, R _{GEN} =3Ω		1.65		μs
t _r	Turn-On Rise Time			3.7		μs
t _{D(off)}	Turn-Off DelayTime			5.4		μs
t _f	Turn-Off Fall Time			10		μs
t _{rr}	Body Diode Reverse Recovery Time	I _F =11A, dI/dt=500A/μs	11	14.5	18	ns
Q _{rr}	Body Diode Reverse Recovery Charge	I _F =11A, dI/dt=500A/μs	17	21.5	26	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} t ≤ 10s value 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.

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

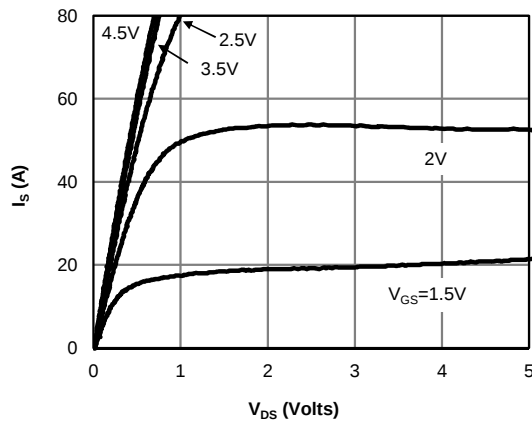


Fig 1: On-Region Characteristics (Note E)

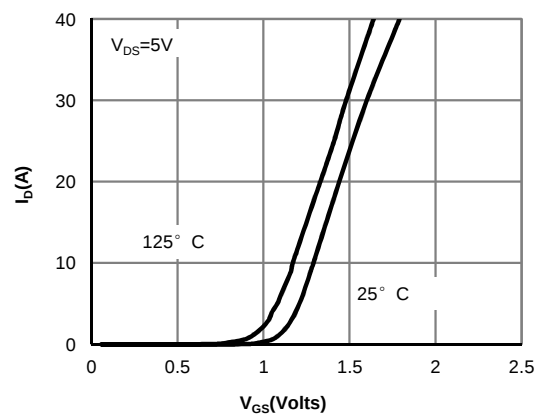


Figure 2: Transfer Characteristics (Note E)

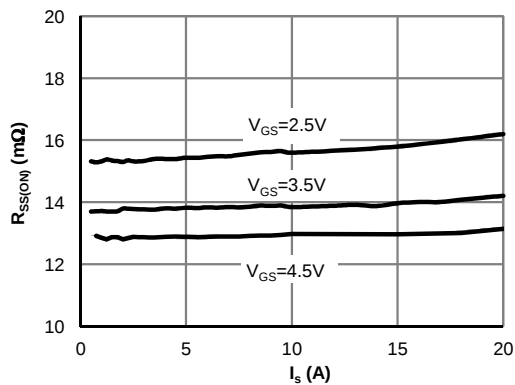


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

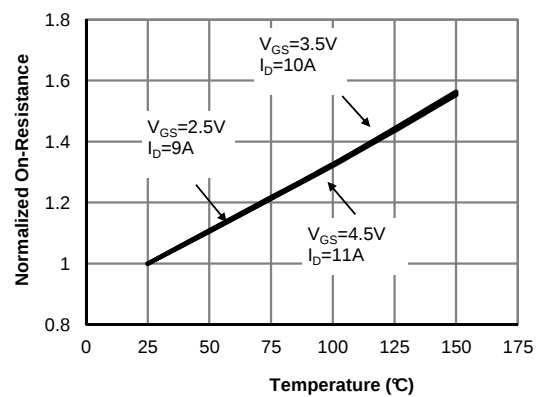


Figure 4: On-Resistance vs. Junction Temperature (Note E)

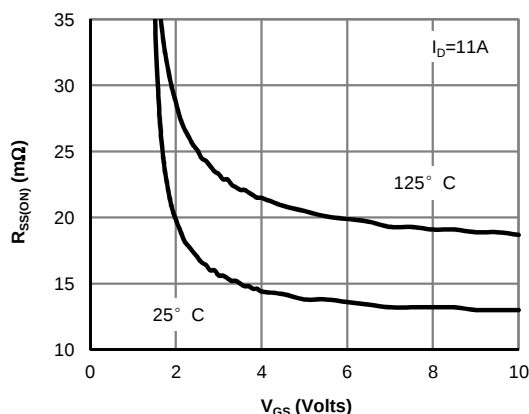


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

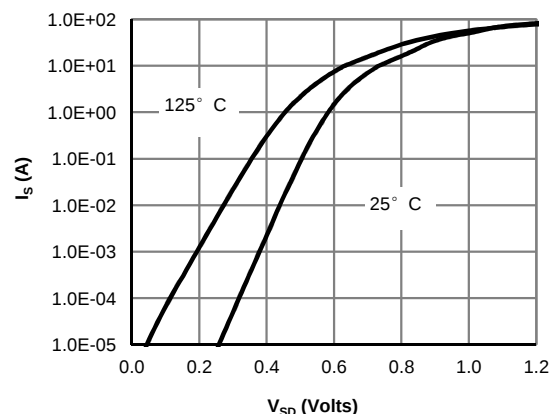
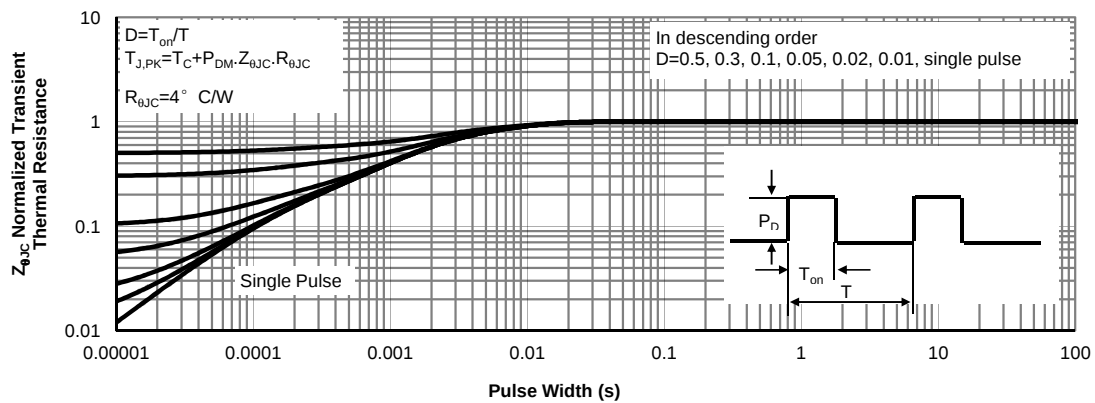
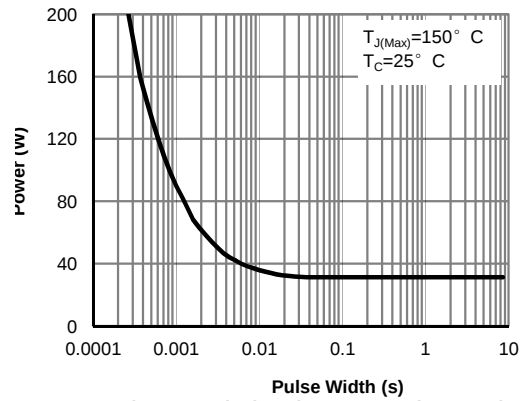
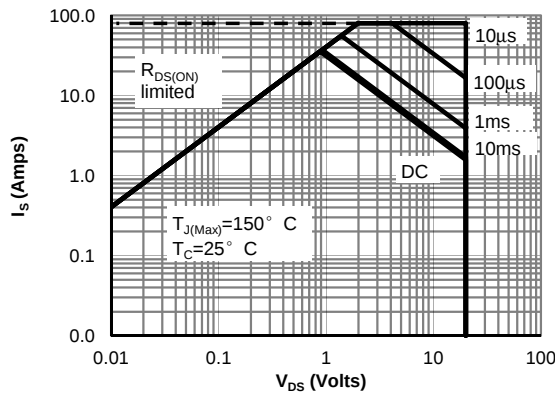
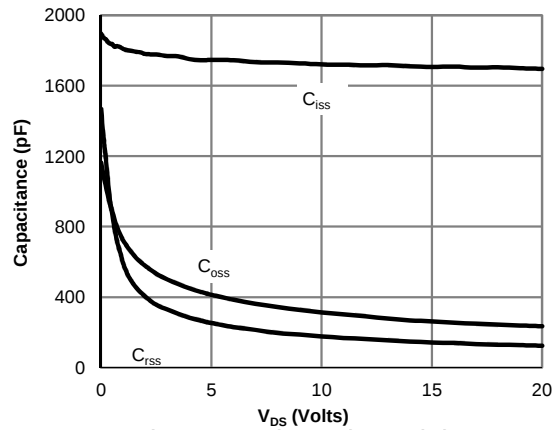
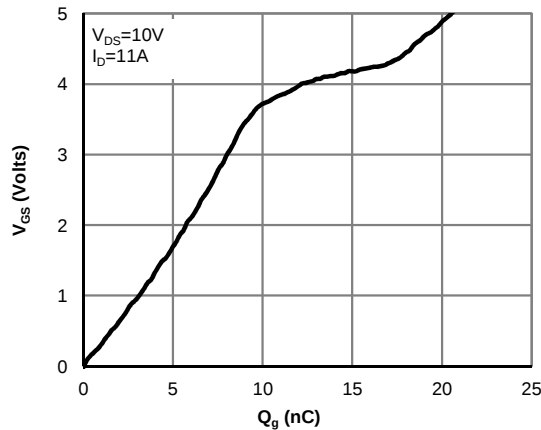


Figure 6: Body-Diode Characteristics (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS



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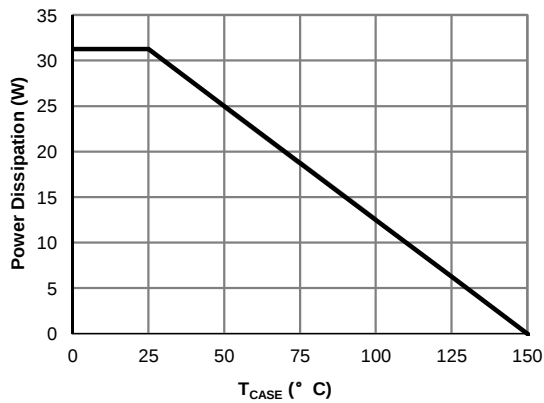


Figure 12: Power De-rating (Note F)

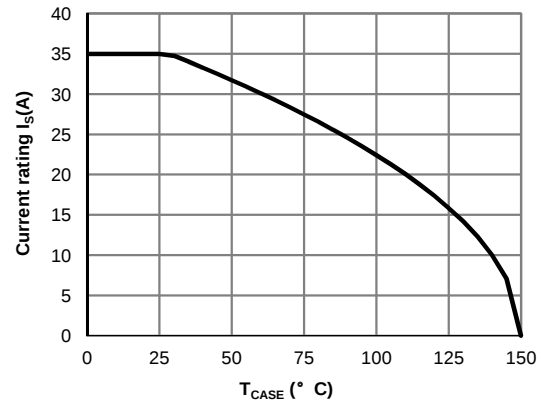


Figure 13: Current De-rating (Note F)

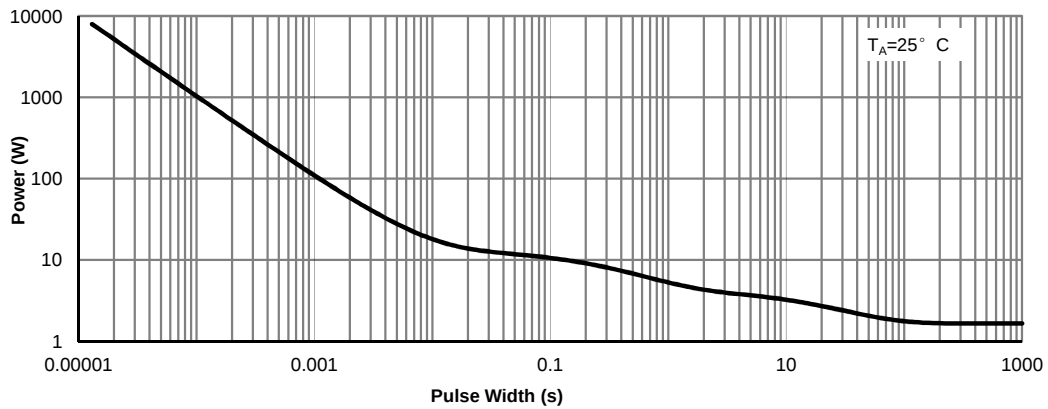


Figure 14: Single Pulse Power Rating Junction-to-Ambient (Note H)

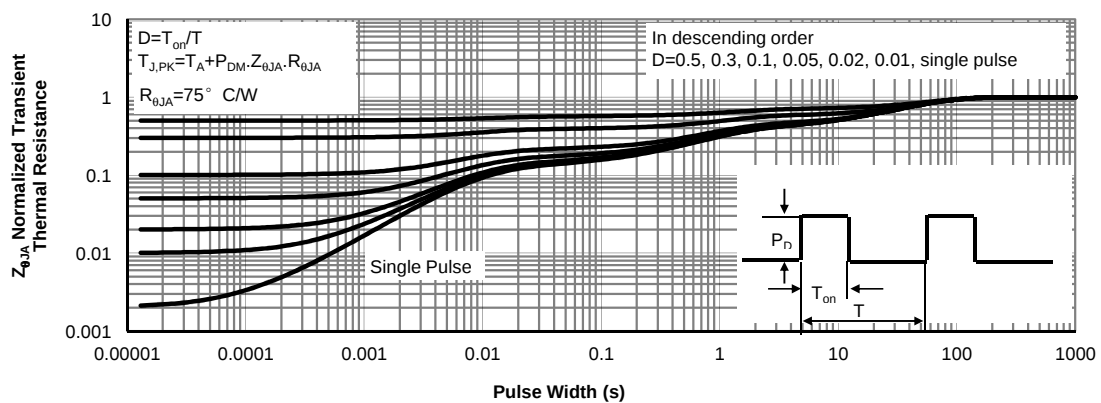
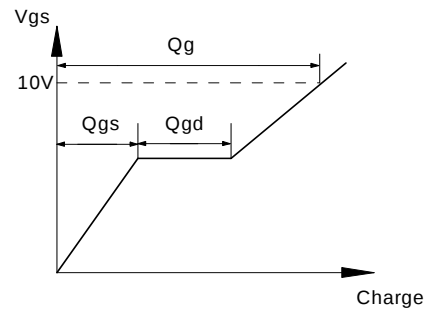
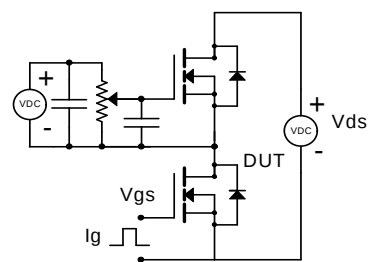
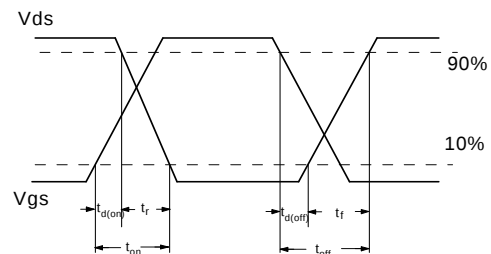
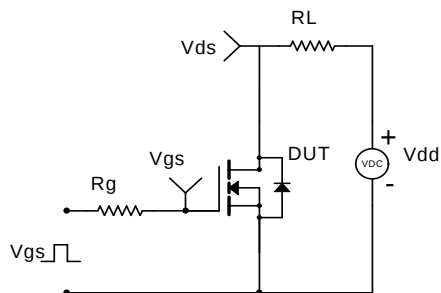


Figure 15: Normalized Maximum Transient Thermal Impedance (Note H)

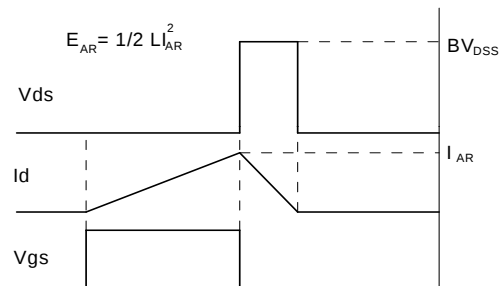
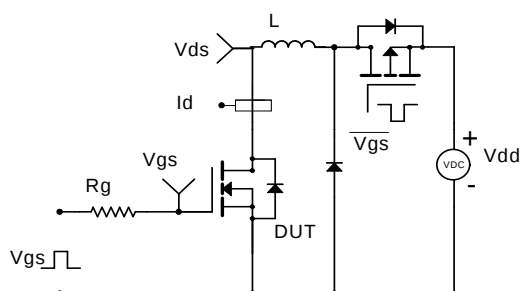
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

