

General Description

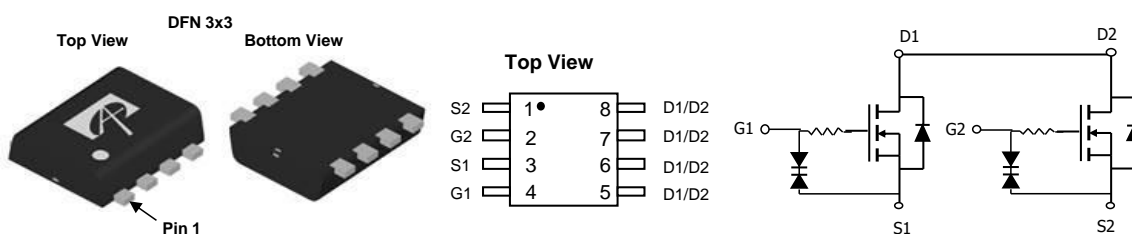
- Trench Power αMOS LV technology
- Low $R_{DS(ON)}$
- Low Gate Charge
- ESD protection
- RoHS and Halogen-Free Compliant

Applications

- Battery protection switch
- Mobile device battery charging and discharging

Product Summary

V_{DS}	24V
I_D (at $V_{GS}=4.5V$)	8A
$R_{DS(ON)}$ (at $V_{GS}=4.5V$)	< 13.5mΩ
$R_{DS(ON)}$ (at $V_{GS}=4.0V$)	< 14mΩ
$R_{DS(ON)}$ (at $V_{GS}=3.7V$)	< 15mΩ
$R_{DS(ON)}$ (at $V_{GS}=3.1V$)	< 17mΩ
$R_{DS(ON)}$ (at $V_{GS}=2.5V$)	< 21mΩ

Typical ESD protection
HBM Class 2


Orderable Part Number	Package Type	Form	Minimum Order Quantity
AON3818	DFN 3x3	Tape & Reel	3000

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

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	V_{DS}	24	V
Gate-Source Voltage	V_{GS}	± 12	V
Continuous Drain Current ^G	I_D	$T_A=25^\circ\text{C}$	8
		$T_A=70^\circ\text{C}$	6
Pulsed Drain Current ^C	I_{DM}	32	A
Power Dissipation ^B	P_D	$T_A=25^\circ\text{C}$	2.7
		$T_A=70^\circ\text{C}$	1.7
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 $t \leq 10\text{s}$	$R_{\theta JA}$	35	45	$^\circ\text{C/W}$
Maximum Junction-to-Ambient ^{A,D} Steady-State		60	75	$^\circ\text{C/W}$
Maximum Junction-to-Lead	$R_{\theta JL}$	15	20	$^\circ\text{C/W}$

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	24			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
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	0.4	0.8	1.2	V
R _{DS(on)}	Static Drain-Source On-Resistance	V _{GS} =4.5V, I _D =8A T _J =125°C	7.5	10.8	13.5	mΩ
		V _{GS} =4.0V, I _D =6A	7.8	11.2	14	
		V _{GS} =3.7V, I _D =6A	8	11.5	15	
		V _{GS} =3.1V, I _D =4A	8	12.5	17	
		V _{GS} =2.5V, I _D =4A	8.6	14.8	21	
g _{FS}	Forward Transconductance	V _{DS} =5V, I _D =8A		42		S
V _{SD}	Diode Forward Voltage	I _S =1A, V _{GS} =0V		0.66	1	V
I _S	Maximum Body-Diode Continuous Current				4	A
DYNAMIC PARAMETERS						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =12V, f=1MHz		840		pF
C _{oss}	Output Capacitance			210		pF
C _{riss}	Reverse Transfer Capacitance			205		pF
R _g	Gate resistance	f=1MHz		2		kΩ
SWITCHING PARAMETERS						
Q _g	Total Gate Charge	V _{GS} =4.5V, V _{DS} =12V, I _D =8A		9.5	15	nC
Q _{gs}	Gate Source Charge			1.5		nC
Q _{gd}	Gate Drain Charge			4.5		nC
t _{D(on)}	Turn-On DelayTime	V _{GS} =4.5V, V _{DS} =12V, R _L =1.5Ω, R _{GEN} =3Ω		0.3		μs
t _r	Turn-On Rise Time			0.8		μs
t _{D(off)}	Turn-Off DelayTime			1.7		μs
t _f	Turn-Off Fall Time			5.2		μs

- 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.
- B. The power dissipation P_D is based on T_{J(MAX)}=150° C, using ≤ 10s junction-to-ambient thermal resistance.
- 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 lead R_{θJL} and lead to ambient.
- E. The static characteristics in Figures 1 to 6 are obtained using <300 μs pulses, duty cycle 0.5% max.
- F. These curves are based on the junction -to-ambient thermal impedance which is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, assuming a maximum junction temperature of T_{J(MAX)}=150° C. The SOA curve provides a single pulse rating.

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

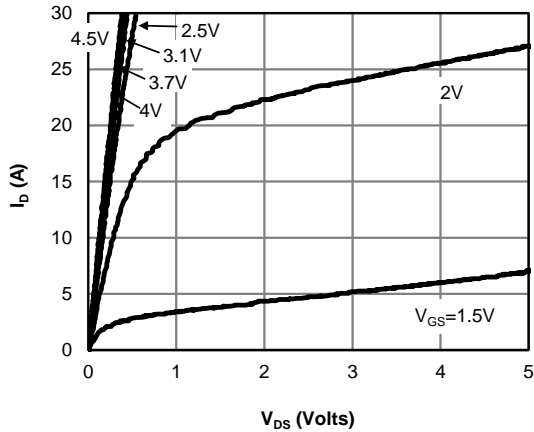


Figure 1: On-Region Characteristics (Note E)

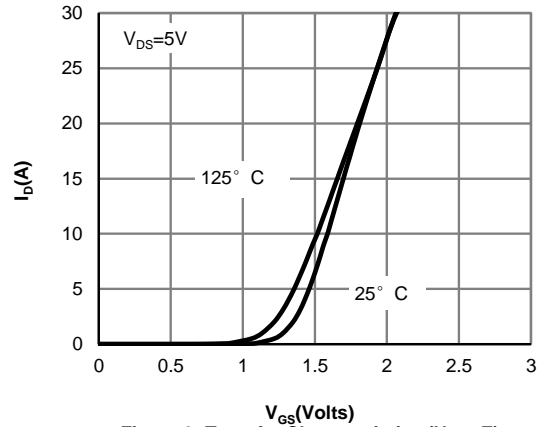


Figure 2: Transfer Characteristics (Note E)

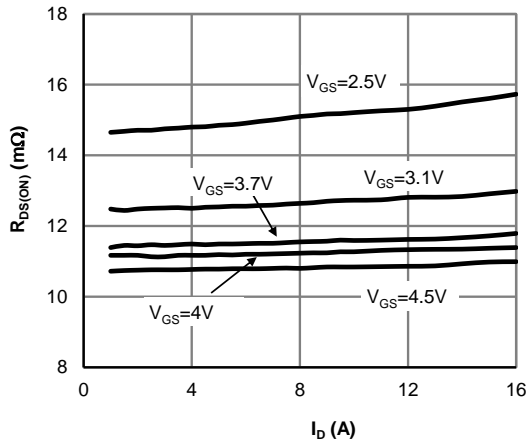


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

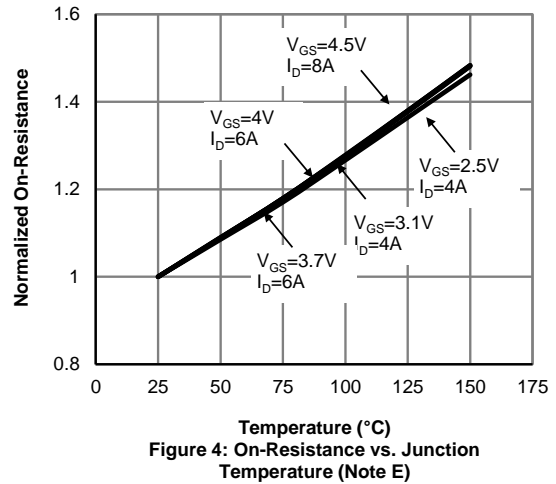


Figure 4: On-Resistance vs. Junction Temperature (Note E)

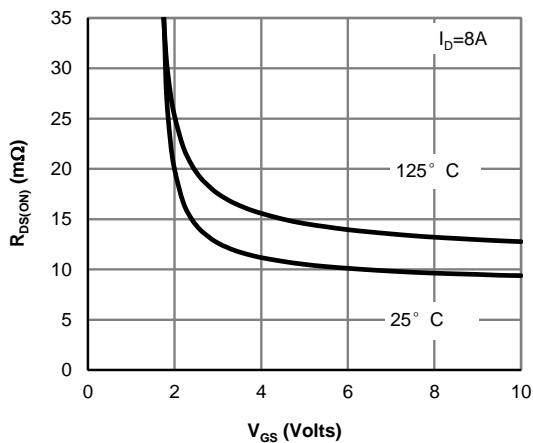


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

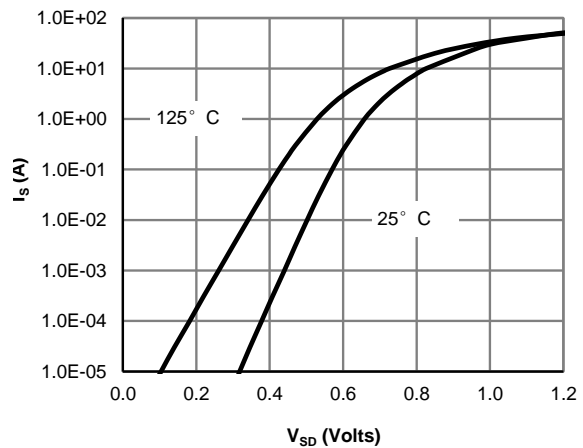


Figure 6: Body-Diode Characteristics (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

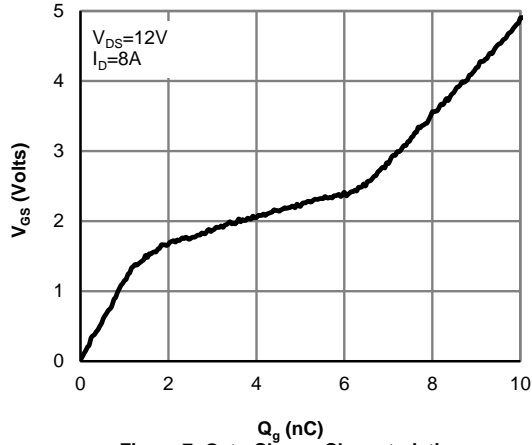


Figure 7: Gate-Charge Characteristics

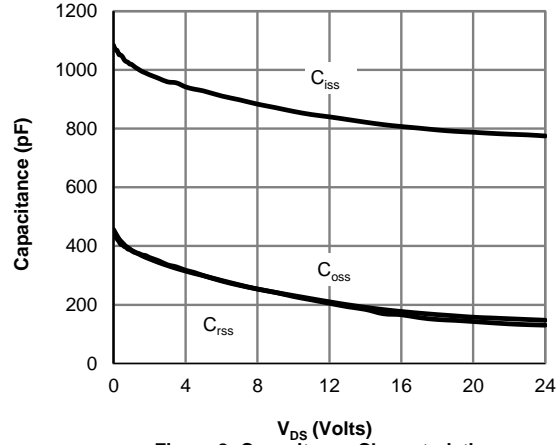


Figure 8: Capacitance Characteristics

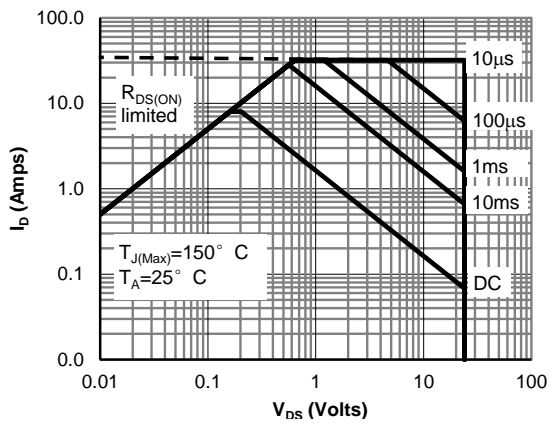


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

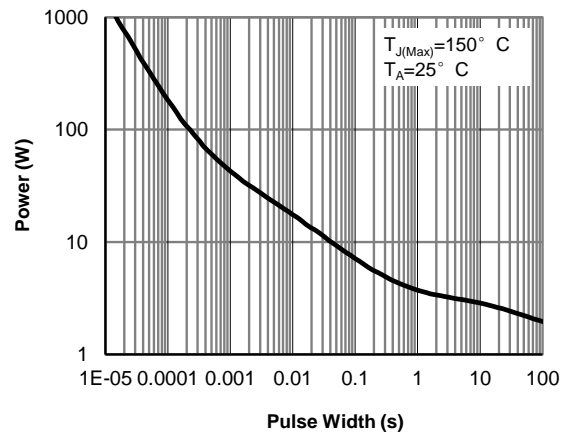


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note F)

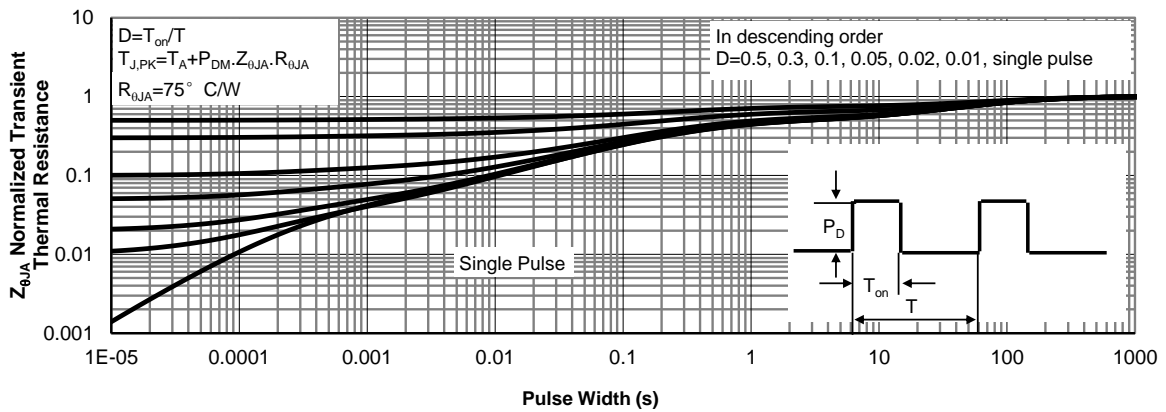
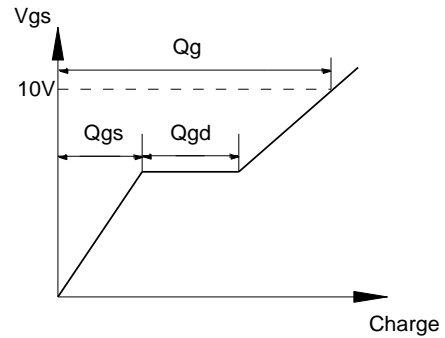
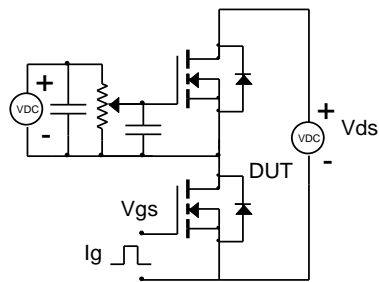
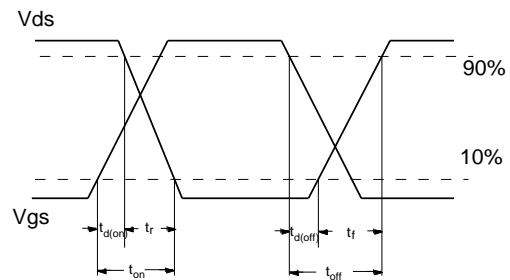
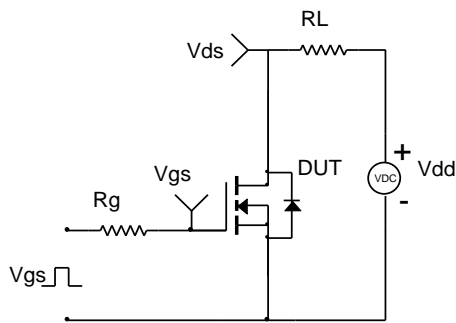


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

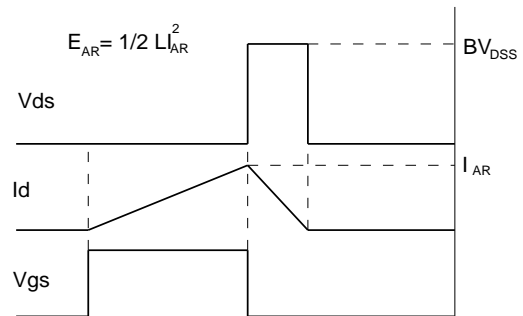
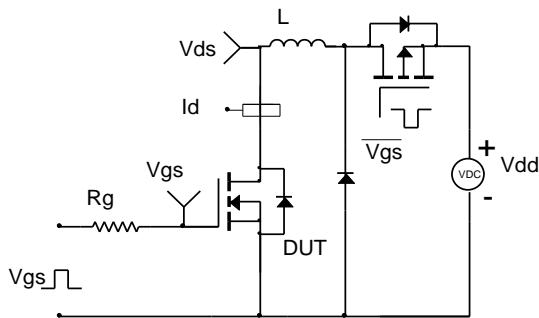
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

