

General Description

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

Applications

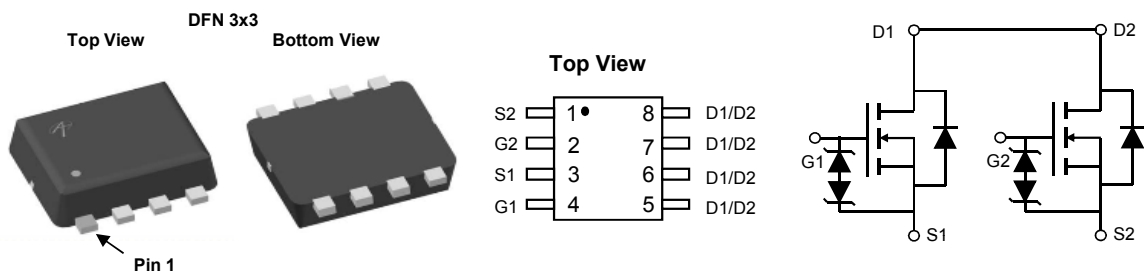
- Battery protection switch
- Mobile device battery charging and discharging

Product Summary

V_{DS}	24V
I_D (at $V_{GS}=4.5V$)	8A
$R_{DS(ON)}$ (at $V_{GS}=4.5V$)	< 8.9mΩ
$R_{DS(ON)}$ (at $V_{GS}=4.0V$)	< 9.5mΩ
$R_{DS(ON)}$ (at $V_{GS}=3.7V$)	< 9.6mΩ
$R_{DS(ON)}$ (at $V_{GS}=3.1V$)	< 10mΩ
$R_{DS(ON)}$ (at $V_{GS}=2.5V$)	< 11.8mΩ

Typical ESD protection

HBM Class 3A



Orderable Part Number	Package Type	Form	Minimum Order Quantity
AON3820	DFN 3x3	Tape & Reel	3000

Absolute Maximum Ratings $T_A=25^\circ C$ 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	$T_A=25^\circ C$	8
		$T_A=70^\circ C$	6.2
Pulsed Drain Current ^C	I_{DM}	32	A
Power Dissipation ^B	P_D	$T_A=25^\circ C$	2.0
		$T_A=70^\circ C$	1.3
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	°C

Thermal Characteristics

Parameter	Symbol	Typ	Max	Units
Maximum Junction-to-Ambient ^A	$R_{\theta JA}$	50	60	°C/W
Maximum Junction-to-Ambient ^{A,D}		Steady-State	70	85
Maximum Junction-to-Lead	$R_{\theta JL}$	30	35	°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	0.5	0.9	1.3	V
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =4.5V, I _D =8A T _J =125°C	5	7.1	8.9	mΩ
		V _{GS} =4.0V, I _D =6A	5.1	7.3	9.5	
		V _{GS} =3.8V, I _D =6A	5.2	7.4	9.6	
		V _{GS} =3.1V, I _D =4A	5.4	7.8	10	
		V _{GS} =2.5V, I _D =4A	6.2	9.0	11.8	
g _{FS}	Forward Transconductance	V _{DS} =5V, I _D =8A		70		S
V _{SD}	Diode Forward Voltage	I _S =1A, V _{GS} =0V		0.65	1	V
I _S	Maximum Body-Diode Continuous Current				3	A
DYNAMIC PARAMETERS						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =12V, f=1MHz		1325		pF
C _{oss}	Output Capacitance			250		pF
C _{riss}	Reverse Transfer Capacitance			220		pF
R _g	Gate resistance	f=1MHz		1.35		kΩ
SWITCHING PARAMETERS						
Q _g	Total Gate Charge	V _{GS} =4.5V, V _{DS} =12V, I _D =8A		12.5	20	nC
Q _{gs}	Gate Source Charge			4.1		nC
Q _{gd}	Gate Drain Charge			6.0		nC
t _{D(on)}	Turn-On DelayTime	V _{GS} =4.5V, V _{DS} =12V, R _L =1.5Ω, R _{GEN} =3Ω		0.9		μs
t _r	Turn-On Rise Time			1.9		μs
t _{D(off)}	Turn-Off DelayTime			1.8		μs
t _f	Turn-Off Fall Time			3.4		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 <300μs 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

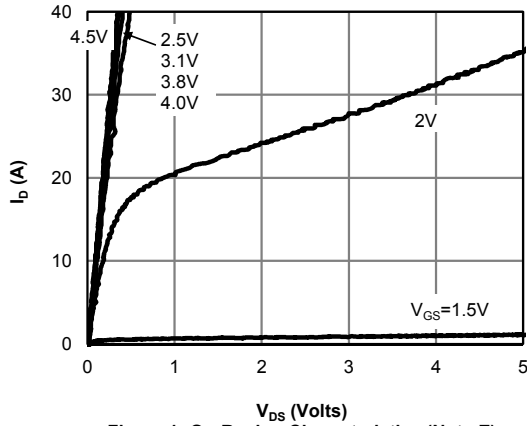


Figure 1: On-Region Characteristics (Note E)

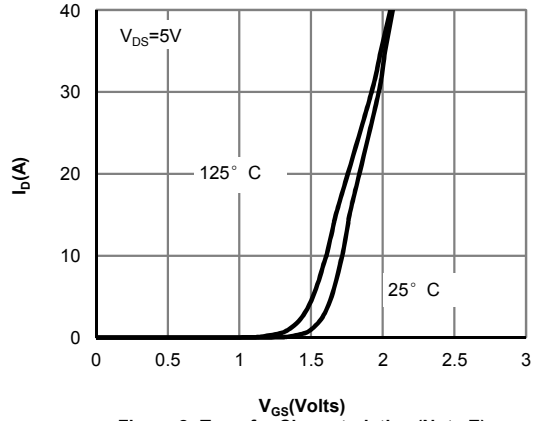


Figure 2: Transfer Characteristics (Note E)

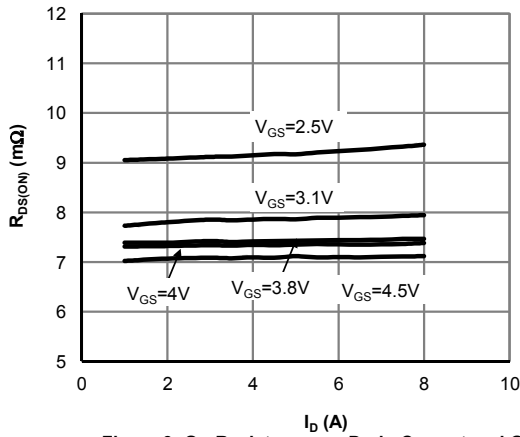


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

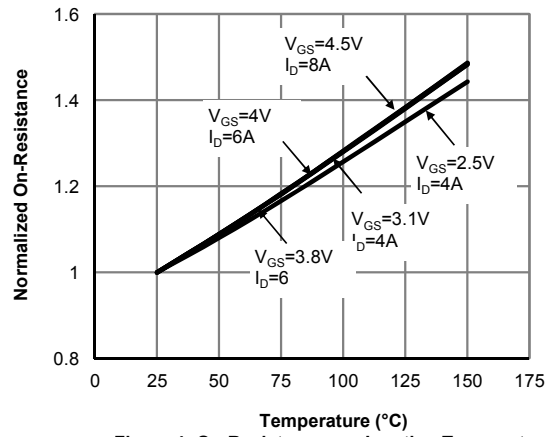


Figure 4: On-Resistance vs. Junction Temperature (Note E)

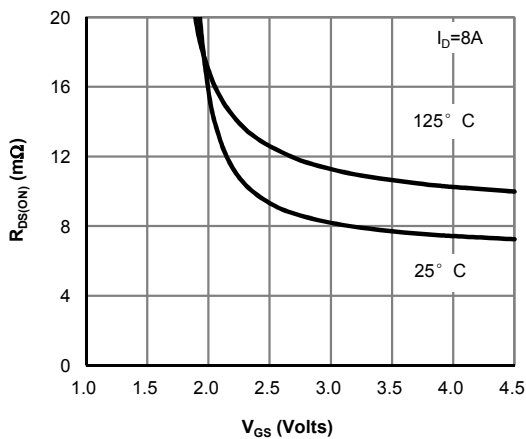


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

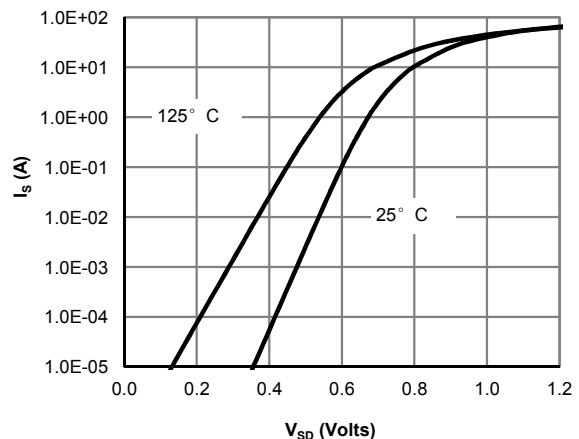


Figure 6: Body-Diode Characteristics (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

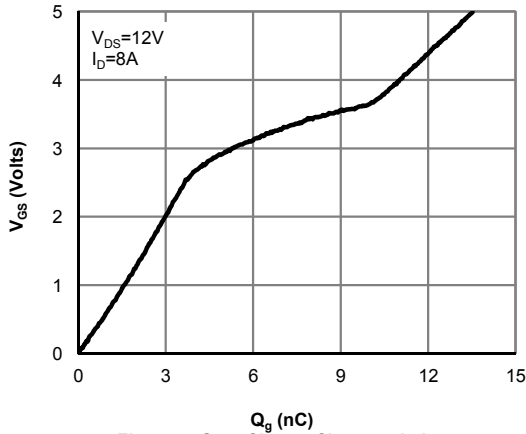


Figure 7: Gate-Charge Characteristics

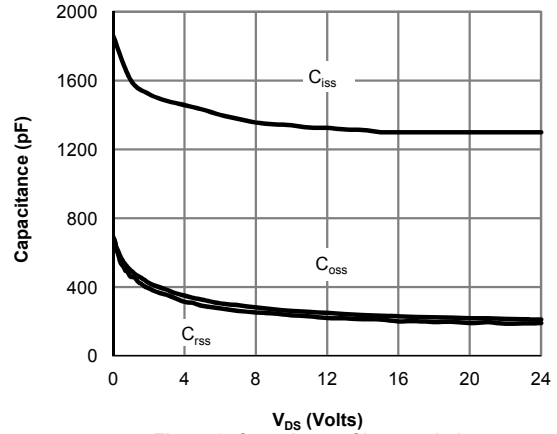


Figure 8: Capacitance Characteristics

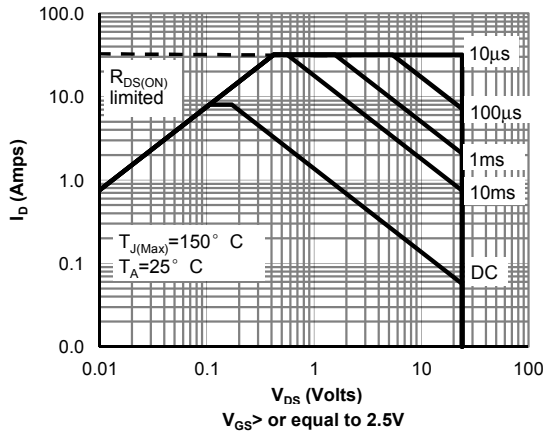


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

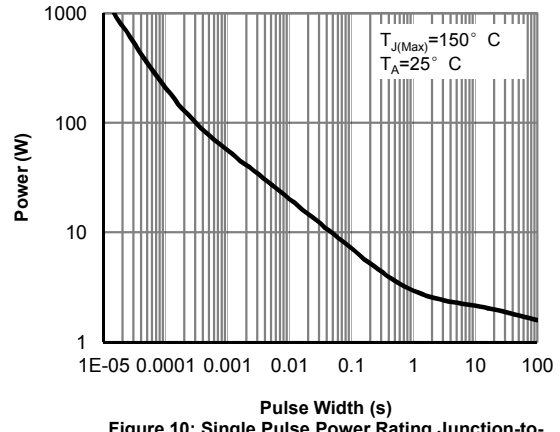


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note F)

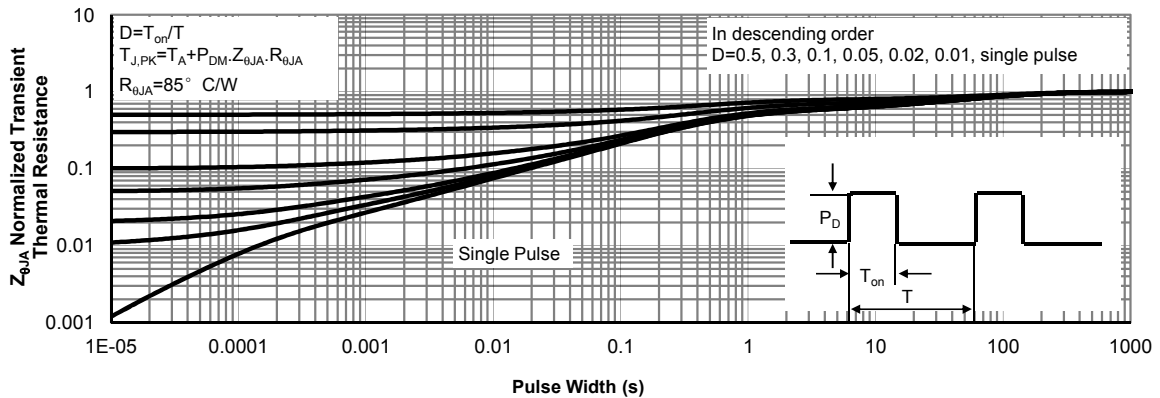
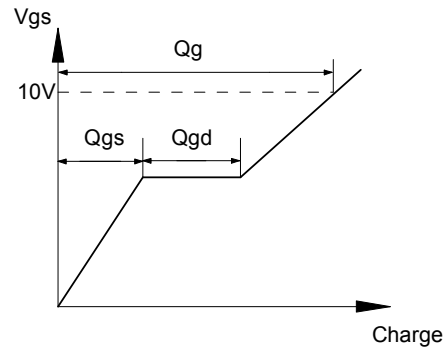
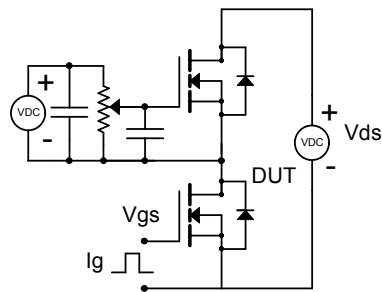
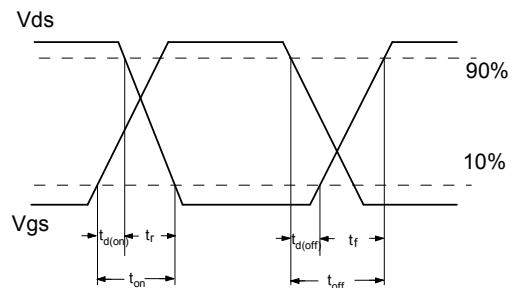
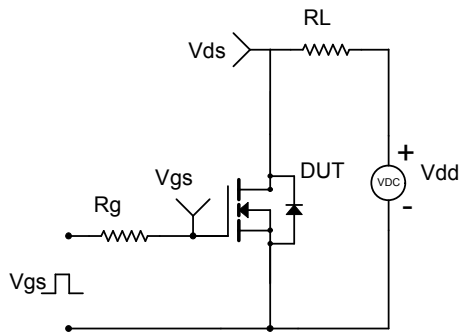


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

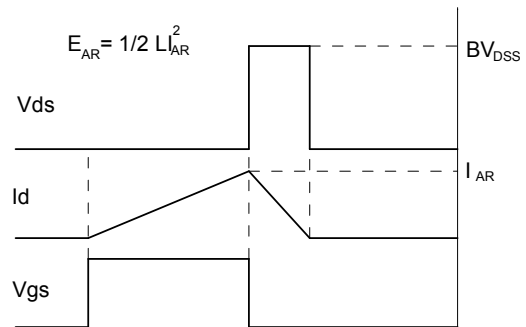
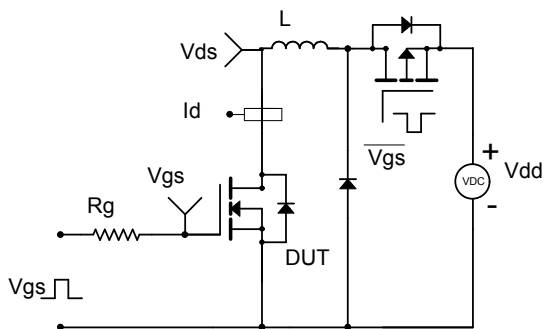
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

