

General Description

- Latest Trench Power MOSFET technology
- Very Low $R_{DS(ON)}$ at 1.8V V_{GS}
- Low Gate Charge
- ESD protection
- RoHS and Halogen-Free Compliant

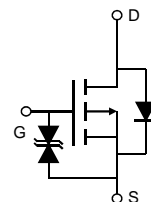
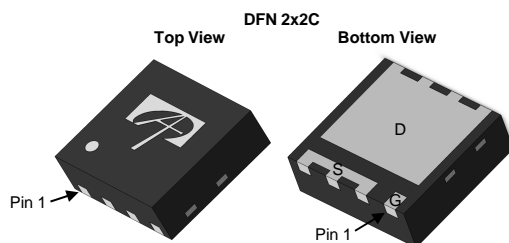
Application

- Battery path load switch
- System load switch

Product Summary

V_{DS}	-12V
I_D (at $V_{GS}=-4.5V$)	-20A
$R_{DS(ON)}$ (at $V_{GS}=-4.5V$)	< 8m Ω
$R_{DS(ON)}$ (at $V_{GS}=-3.0V$)	< 10.2m Ω
$R_{DS(ON)}$ (at $V_{GS}=-2.5V$)	< 11.6m Ω
$R_{DS(ON)}$ (at $V_{GS}=-1.8V$)	< 17.5m Ω

Typical ESD protection

HBM Class 2


Orderable Part Number	Package Type	Form	Minimum Order Quantity
AON2411	DFN 2x2C	Tape & Reel	3000

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

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	V_{DS}	-12	V
Gate-Source Voltage	V_{GS}	± 8	V
Continuous Drain Current ^G	I_D	-20	A
		$T_A=70^\circ\text{C}$	
Pulsed Drain Current ^C	I_{DM}	-80	
Power Dissipation ^B	P_D	$T_A=25^\circ\text{C}$	5.0
		$T_A=70^\circ\text{C}$	3.2
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 $t \leq 10s$	$R_{\theta JA}$	20	25	$^\circ\text{C/W}$
Maximum Junction-to-Ambient ^{A, D} Steady-State		45	55	$^\circ\text{C/W}$

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	-12			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =-12V, V _{GS} =0V T _J =55°C			-1 -5	μA
I _{GSS}	Gate-Body leakage current	V _{DS} =0V, V _{GS} =±8V			±10	μA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =-250μA	-0.3	-0.6	-0.9	V
R _{DS(on)}	Static Drain-Source On-Resistance	V _{GS} =-4.5V, I _D =-12A T _J =125°C		6.6	8.0	mΩ
				8.6	10.4	
		V _{GS} =-3.0V, I _D =-11A		8.1	10.2	mΩ
		V _{GS} =-2.5V, I _D =-10A		9.2	11.6	mΩ
		V _{GS} =-1.8V, I _D =-8A		13.7	17.5	mΩ
g _{FS}	Forward Transconductance	V _{DS} =-5V, I _D =-12A		60		S
V _{SD}	Diode Forward Voltage	I _S =1A, V _{GS} =0V		-0.59	-1	V
I _S	Maximum Body-Diode Continuous Current				-7	A
DYNAMIC PARAMETERS						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =-6V, f=1MHz		2180		pF
C _{oss}	Output Capacitance			675		pF
C _{riss}	Reverse Transfer Capacitance			425		pF
R _g	Gate resistance	f=1MHz		13.5		Ω
SWITCHING PARAMETERS						
Q _g	Total Gate Charge	V _{GS} =-4.5V, V _{DS} =-6V, I _D =-12A		20	30	nC
Q _{gs}	Gate Source Charge			4		nC
Q _{gd}	Gate Drain Charge			5.5		nC
t _{D(on)}	Turn-On DelayTime	V _{GS} =-4.5V, V _{DS} =-6V, R _L =0.5Ω, R _{GEN} =3Ω		15		ns
t _r	Turn-On Rise Time			45		ns
t _{D(off)}	Turn-Off DelayTime			135		ns
t _f	Turn-Off Fall Time			185		ns
t _{rr}	Body Diode Reverse Recovery Time	I _F =-12A, di/dt=100A/μs		28		ns
Q _{rr}	Body Diode Reverse Recovery Charge	I _F =-12A, di/dt=100A/μs		13		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.

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

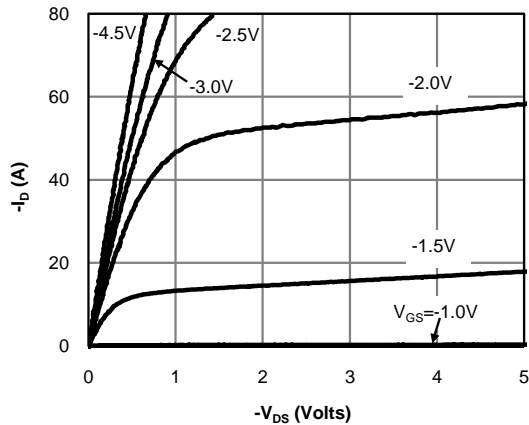


Figure 1: On-Region Characteristics (Note E)

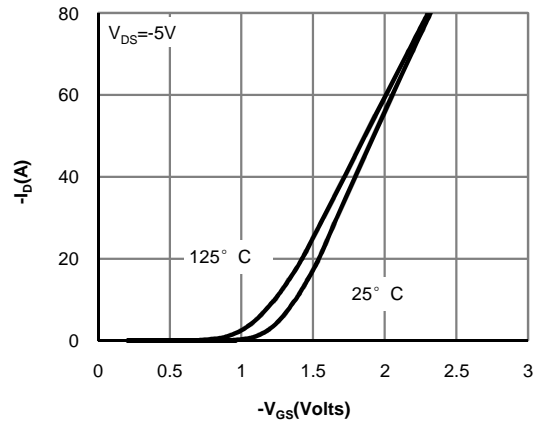


Figure 2: Transfer Characteristics (Note E)

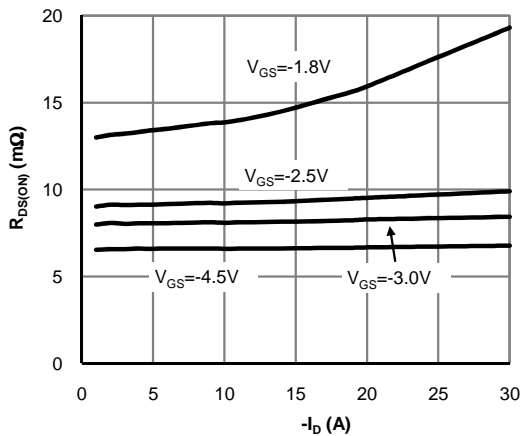


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

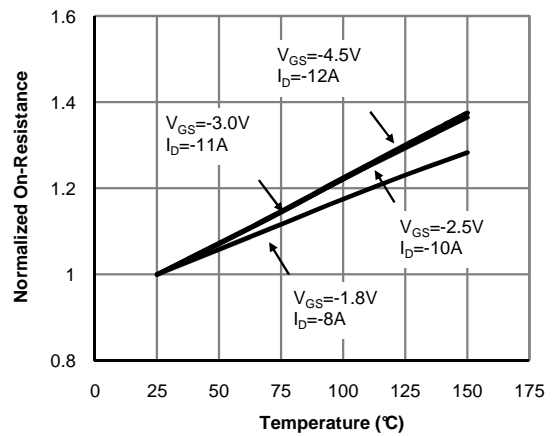


Figure 4: On-Resistance vs. Junction Temperature (Note E)

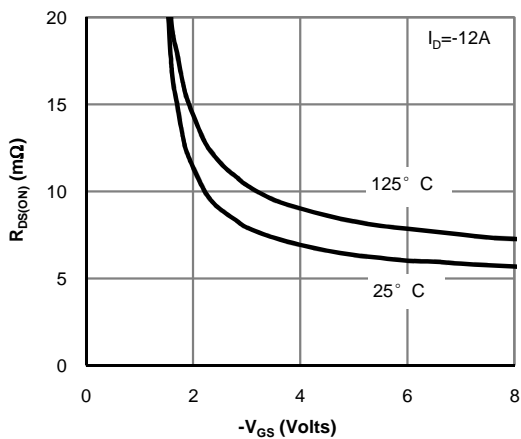


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

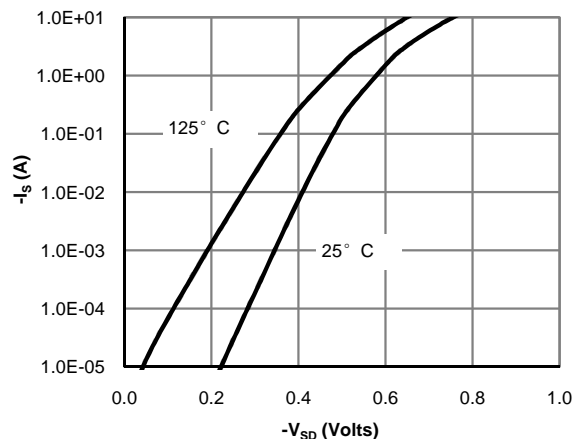


Figure 6: Body-Diode Characteristics (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

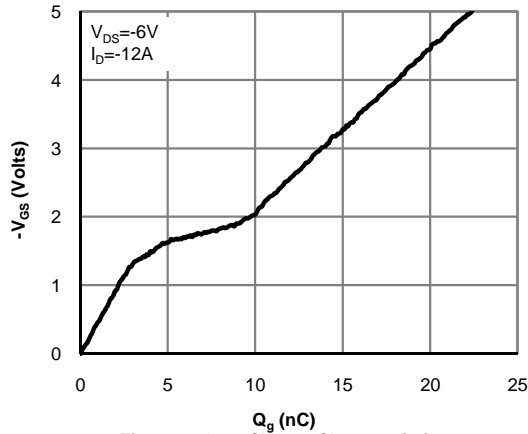


Figure 7: Gate-Charge Characteristics

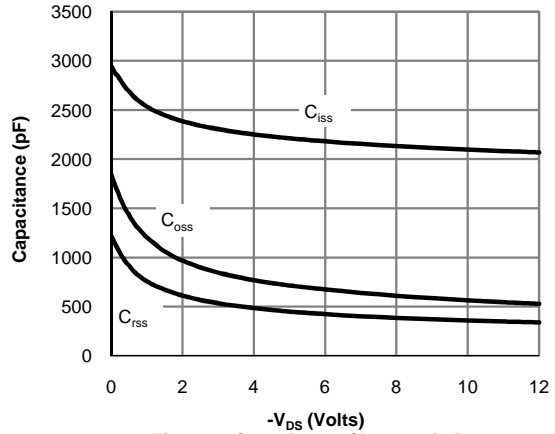


Figure 8: Capacitance Characteristics

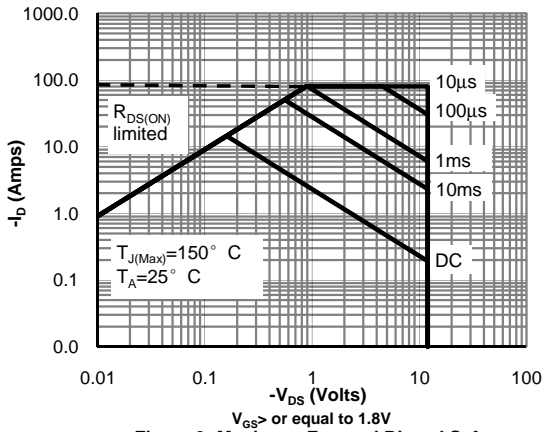


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

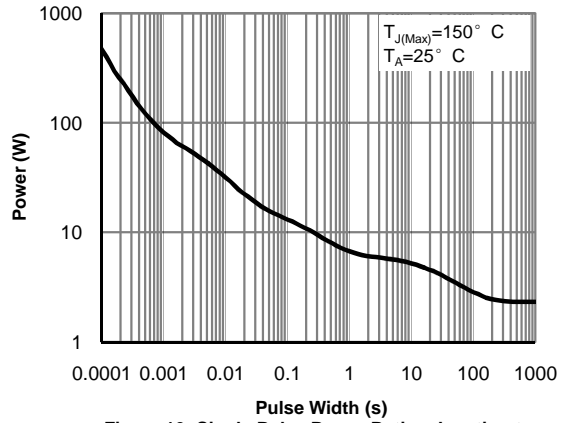


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note F)

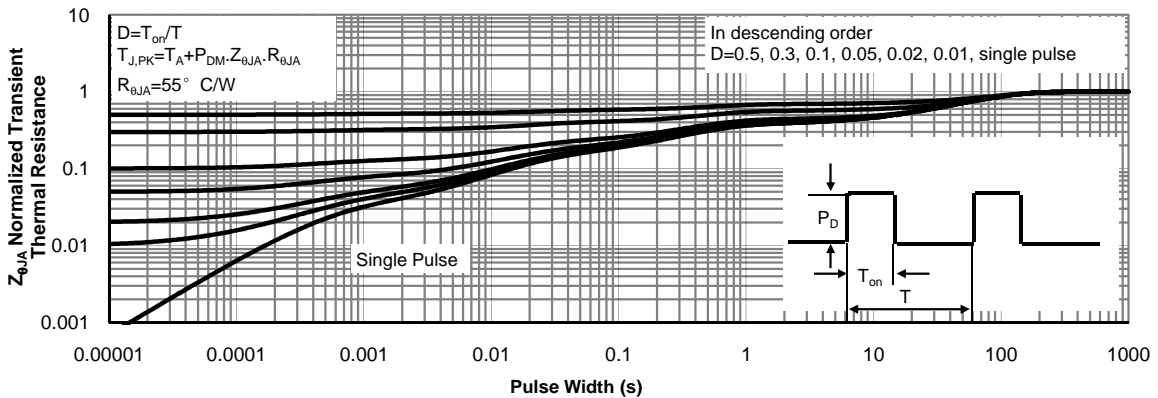
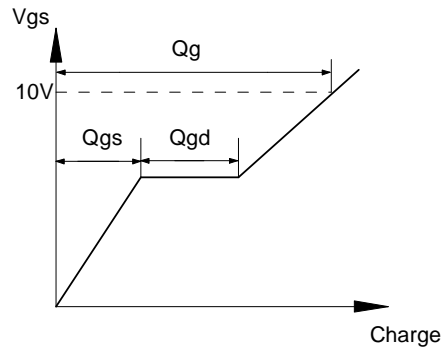
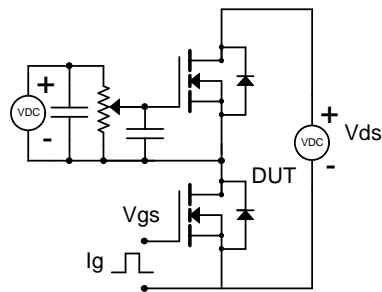
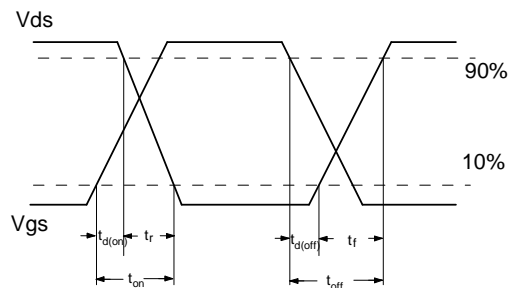
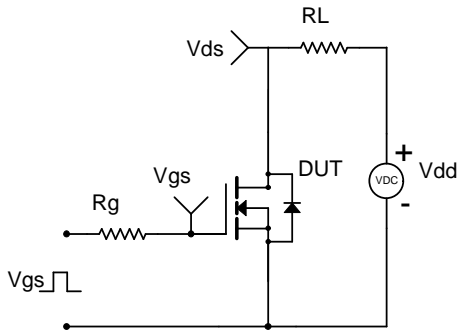


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

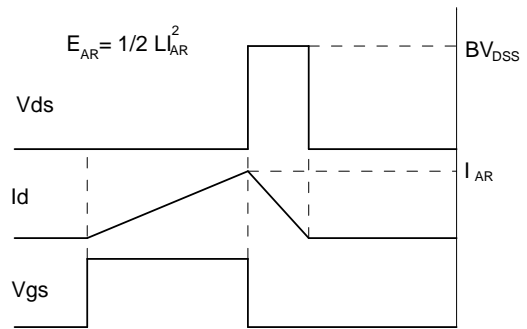
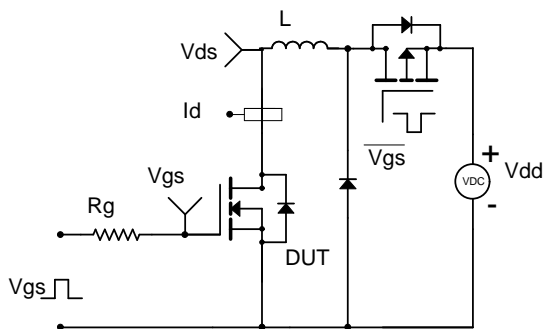
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

