

General Description

- Low $R_{DS(ON)}$
- With ESD Protection to improve battery performance and safety
- Common drain configuration for design simplicity
- RoHS and Halogen-Free Compliant

Application

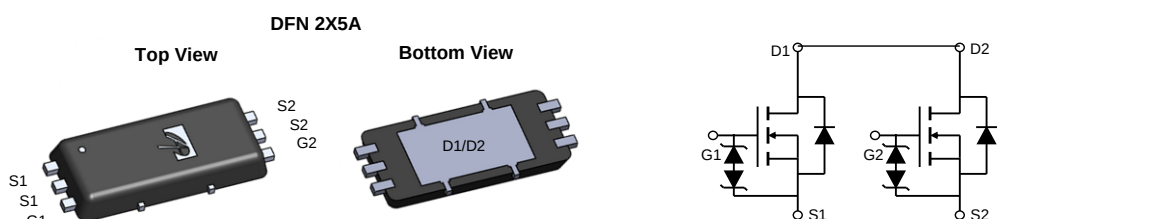
- Battery protection switch
- Mobile device battery charging and discharging

Product Summary

V_{DS}	20V
I_D (at $V_{GS}=4.5V$)	12A
$R_{DS(ON)}$ (at $V_{GS}=4.5V$)	< 6.5m Ω
$R_{DS(ON)}$ (at $V_{GS}=3.7V$)	< 7m Ω
$R_{DS(ON)}$ (at $V_{GS}=3.1V$)	< 7.8m Ω
$R_{DS(ON)}$ (at $V_{GS}=2.5V$)	< 8.5m Ω

Typical ESD protection

HBM Class 2



Orderable Part Number	Package Type	Form	Minimum Order Quantity
AON5816	DFN2X5A	Tape & Reel	5000

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_D	12	A
$T_A=25^\circ\text{C}$			
$T_A=70^\circ\text{C}$		10	
Pulsed Drain Current ^c	I_{DM}	110	
Power Dissipation ^a	P_{DSM}	1.7	W
$T_A=25^\circ\text{C}$			
$T_A=70^\circ\text{C}$		1	
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	$^\circ\text{C/W}$
$t \leq 10s$				
Maximum Junction-to-Ambient ^{A D}	$R_{\theta JA}$	61	75	$^\circ\text{C/W}$
Steady-State				
Maximum Junction-to-Case	$R_{\theta JC}$	4.5	5.5	$^\circ\text{C/W}$
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	0.5	0.9	1.3	V
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =4.5V, I _D =12A T _J =125°C		5 6.9	6.5 9	mΩ
		V _{GS} =3.7V, I _D =10A		5.2	7	mΩ
		V _{GS} =3.1V, I _D =8A		5.5	7.8	mΩ
		V _{GS} =2.5V, I _D =8A		6.2	8.5	mΩ
g _{FS}	Forward Transconductance	V _{DS} =5V, I _D =12A		100		S
V _{SD}	Diode Forward Voltage	I _S =1A, V _{GS} =0V		0.63	1	V
I _S	Maximum Body-Diode Continuous Current				3	A
DYNAMIC PARAMETERS						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =10V, f=1MHz		2170		pF
C _{oss}	Output Capacitance			330		pF
C _{rss}	Reverse Transfer Capacitance			270		pF
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz		3.5		Ω
SWITCHING PARAMETERS						
Q _g	Total Gate Charge	V _{GS} =4.5V, V _{DS} =10V, I _D =12A		22	35	nC
Q _{gs}	Gate Source Charge			3		nC
Q _{gd}	Gate Drain Charge			6		nC
t _{D(on)}	Turn-On DelayTime	V _{GS} =4.5V, V _{DS} =10V, R _L =0.8Ω, R _{GEN} =3Ω		12		ns
t _r	Turn-On Rise Time			24		ns
t _{D(off)}	Turn-Off DelayTime			65		ns
t _f	Turn-Off Fall Time			27		ns
t _{rr}	Body Diode Reverse Recovery Time	I _F =12A, dI/dt=500A/μs		23		ns
Q _{rr}	Body Diode Reverse Recovery Charge	I _F =12A, dI/dt=500A/μs		45		nC

A. The value of R_{0JA} 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_{0JA} 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_{0JA} is the sum of the thermal impedance from junction to case R_{0JC} 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

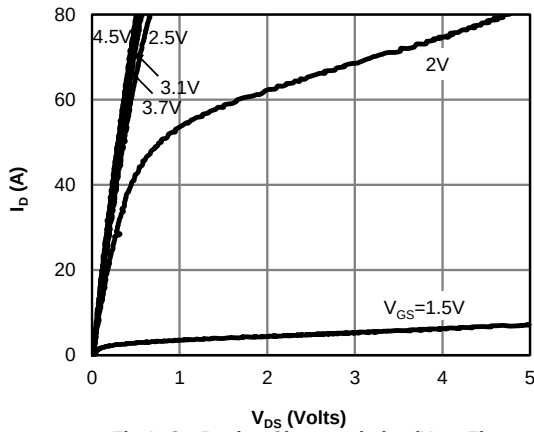


Fig 1: On-Region Characteristics (Note E)

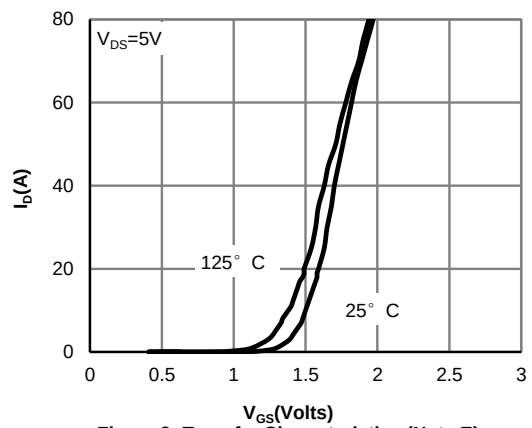


Figure 2: Transfer Characteristics (Note E)

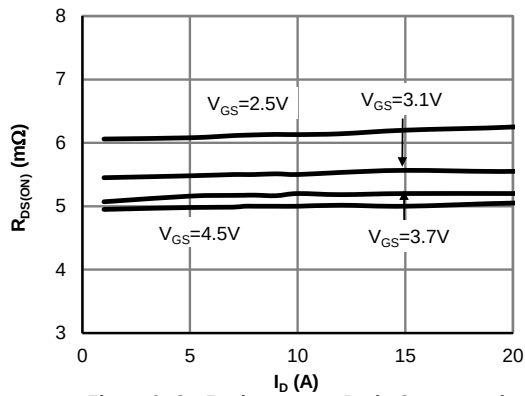


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

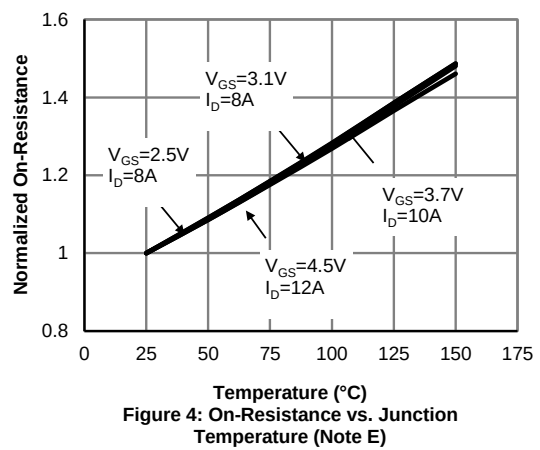


Figure 4: On-Resistance vs. Junction Temperature (Note E)

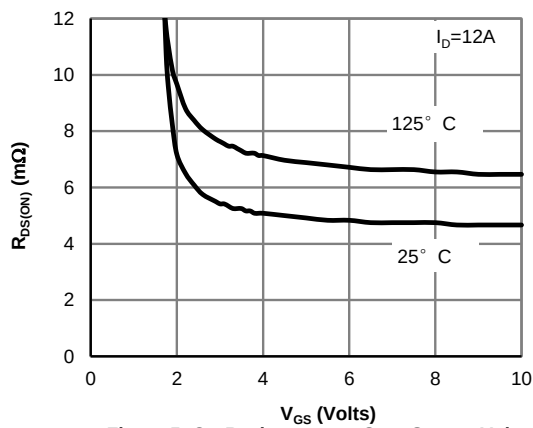


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

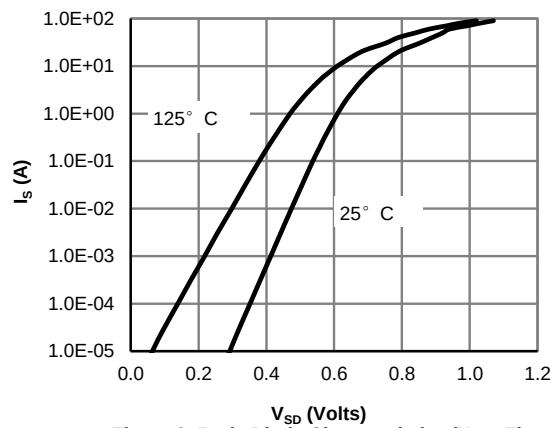
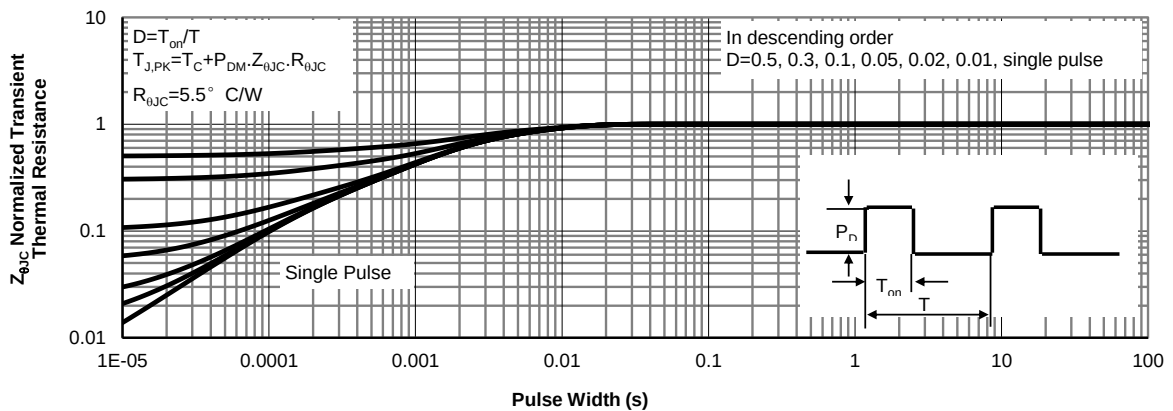
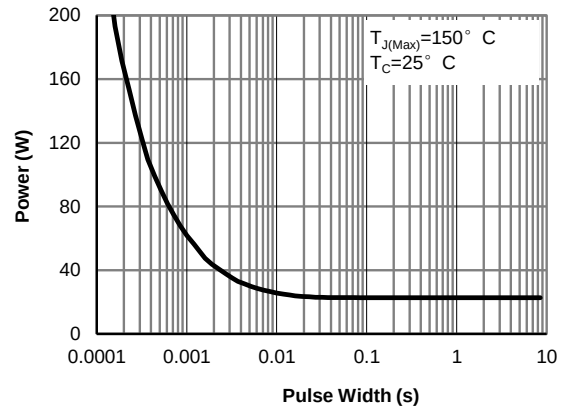
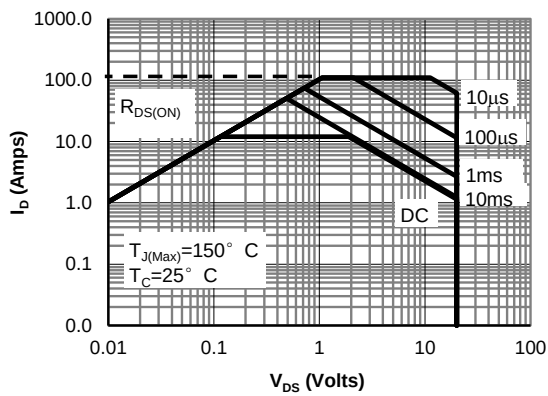
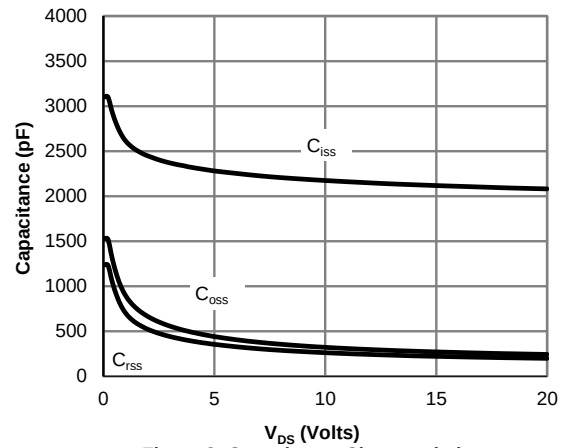
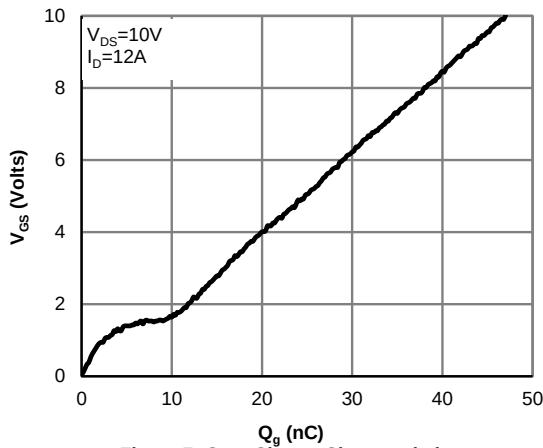


Figure 6: Body-Diode Characteristics (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS



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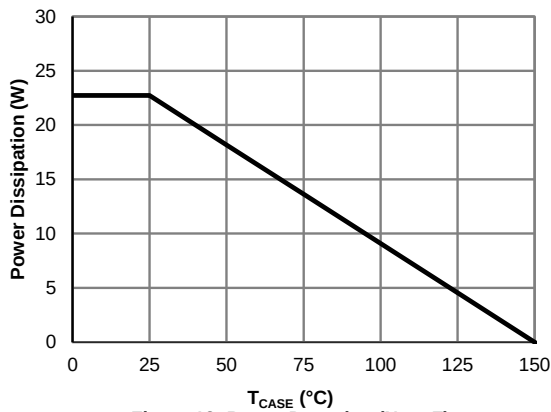


Figure 12: Power De-rating (Note F)

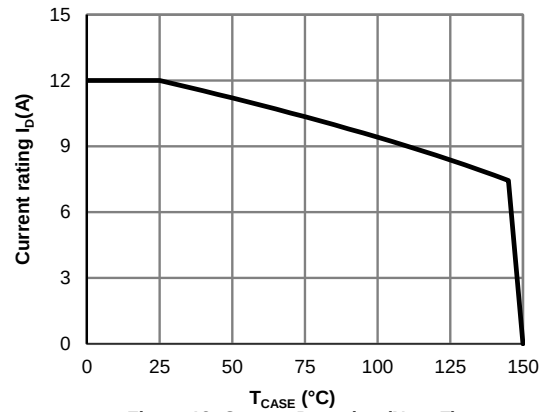


Figure 13: Current De-rating (Note F)

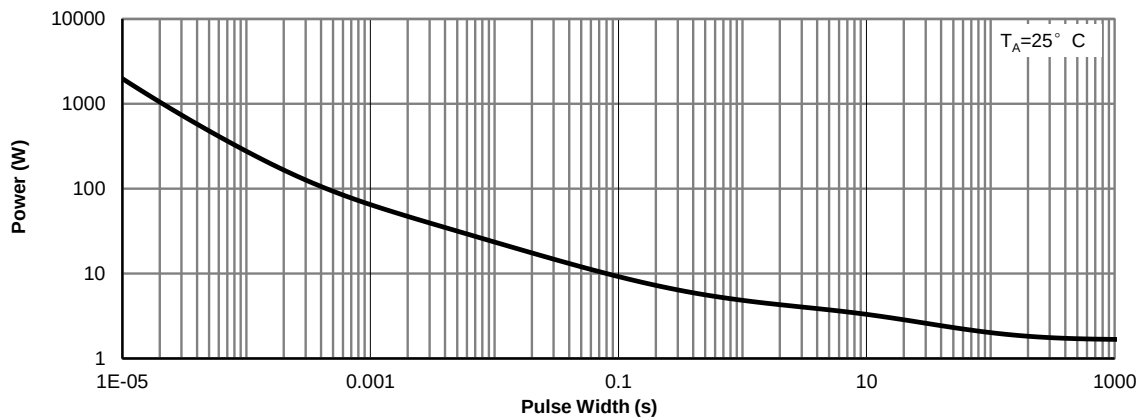


Figure 14: Single Pulse Power Rating Junction-to-Ambient (Note H)

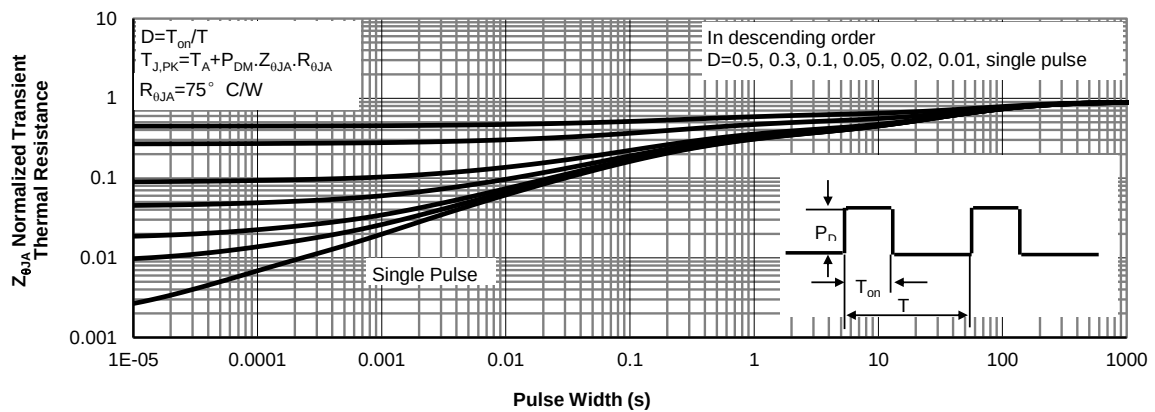
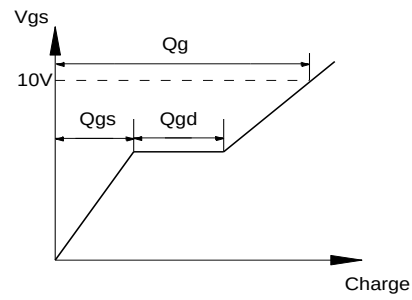
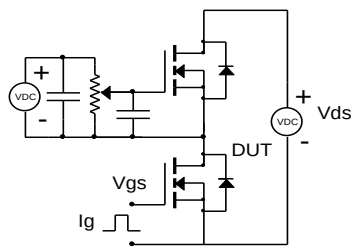
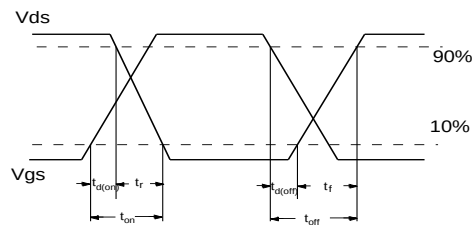
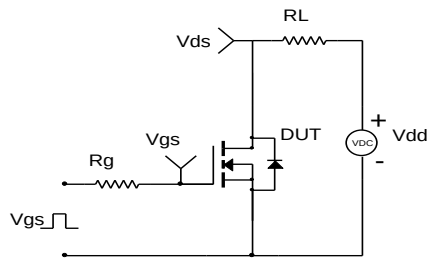


Figure 15: Normalized Maximum Transient Thermal Impedance (Note H)

Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

