

General Description

- Trench Power MOSFET technology
- Low $R_{DS(ON)}$
- ESD Protected
- RoHS and Halogen-Free Compliant

Applications

- System/Load Switch
- Battery Switch
- USB-PD Load Switch

Features

- $V_{DS(V)} = -30V$
- $I_D = -18.5A (V_{GS} = -10V)$
- $R_{DS(ON)} < 5.8m\Omega (V_{GS} = -10V)$
- $R_{DS(ON)} < 8.2 m\Omega (V_{GS} = -4.5V)$

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

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	V_{DS}	-30	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current	I_D	$T_A=25^\circ C$	-18.5
		$T_A=70^\circ C$	-14.5
Pulsed Drain Current ^C	I_{DM}	-74	A
Avalanche Current ^C	I_{AS}	54	A
Avalanche energy L=0.1mH	E_{AS}	146	mJ
Power Dissipation ^B	P_D	$T_A=25^\circ C$	3.1
		$T_A=70^\circ C$	2.0
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	$^\circ C$

Thermal Characteristics

Parameter	Symbol	Typ	Max	Units
Maximum Junction-to-Ambient	$R_{\theta JA}$	31	40	$^\circ C/W$
Maximum Junction-to-Ambient		Steady-State	59	75
Maximum Junction-to-Lead	$R_{\theta JL}$	16	24	$^\circ C/W$

Electrical Characteristics (T_J=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
BV _{DSS}	Drain-Source Breakdown Voltage	I _D =-250μA, V _{GS} =0V	-30			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =-30V, V _{GS} =0V T _J =55°C			-1 -5	μA
I _{GSS}	Gate-Body leakage current	V _{DS} =0V, V _{GS} =±16V			±10	μA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =-250μA	-1.2	-1.7	-2.2	V
R _{DS(on)}	Static Drain-Source On-Resistance	V _{GS} =-10V, I _D =-18.5A		4.7	5.8	mΩ
		V _{GS} =-4.5V, I _D =-16A		6.3	8.2	mΩ
g _{FS}	Forward Transconductance	V _{DS} =-5V, I _D =-18.5A		65		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
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =-15V, f=1MHz		5020		pF
C _{oss}	Output Capacitance			815		pF
C _{rss}	Reverse Transfer Capacitance			615		pF
R _g	Gate resistance	f=1MHz		125	250	Ω
Q _{g(10V)}	Total Gate Charge	V _{GS} =-10V, V _{DS} =-15V, I _D =-18.5A		93	130	nC
Q _{g(4.5V)}	Total Gate Charge			46		nC
Q _{gs}	Gate Source Charge			14		nC
Q _{gd}	Gate Drain Charge			21		nC
t _{D(on)}	Turn-On DelayTime				180	
t _r	Turn-On Rise Time	V _{GS} =-10V, V _{DS} =-15V, R _L =0.8Ω,		280		ns
t _{D(off)}	Turn-Off DelayTime	R _{GEN} =3Ω		1400		ns
t _{rr}	Body Diode Reverse Recovery Time	I _F =-18.5A, di/dt=500A/μs		17		ns
Q _{rr}	Body Diode Reverse Recovery Charge	I _F =-18.5A, di/dt=500A/μs		53		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.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

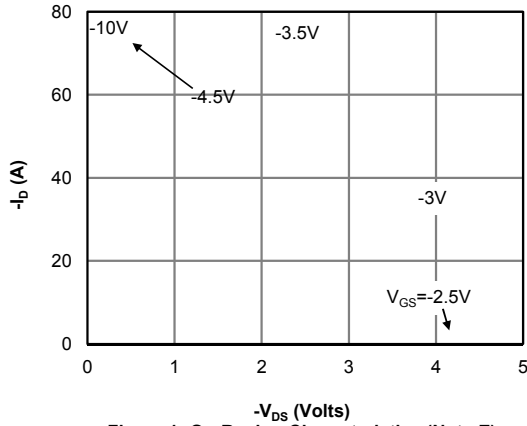


Figure 1: On-Region Characteristics (Note E)

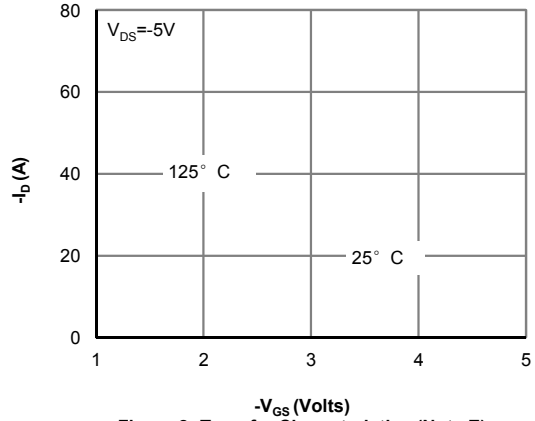


Figure 2: Transfer Characteristics (Note E)

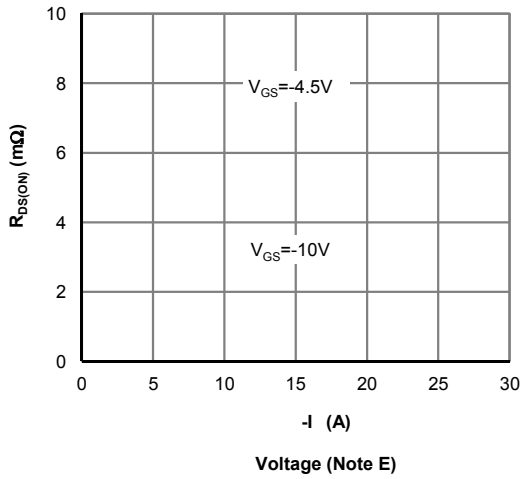


Figure 3: On-Resistance vs. Current (Note E)

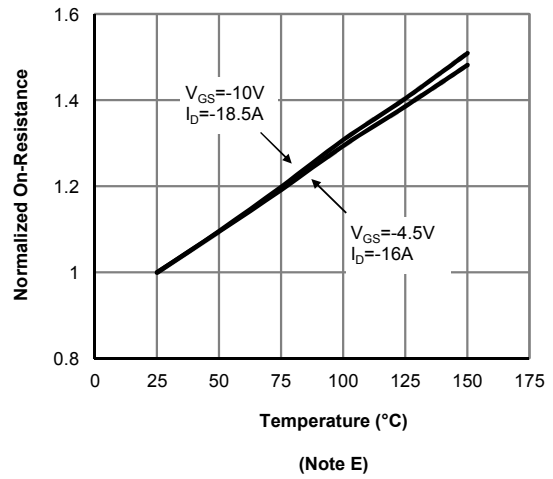


Figure 4: Normalized On-Resistance vs. Temperature (Note E)

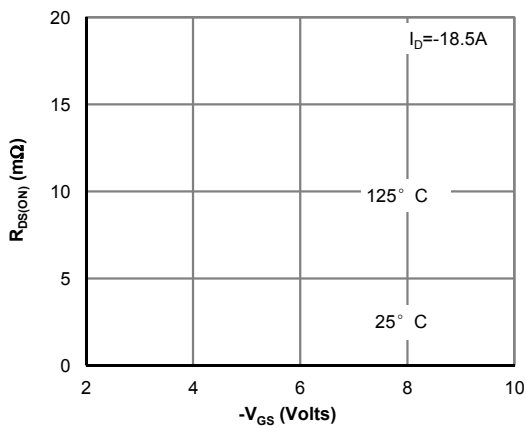


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

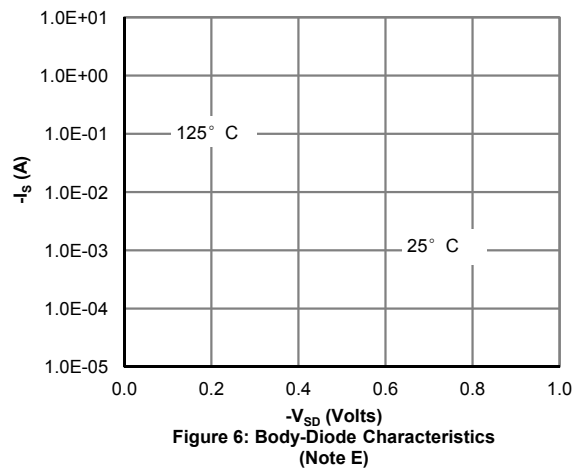


Figure 6: Body-Diode Characteristics (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

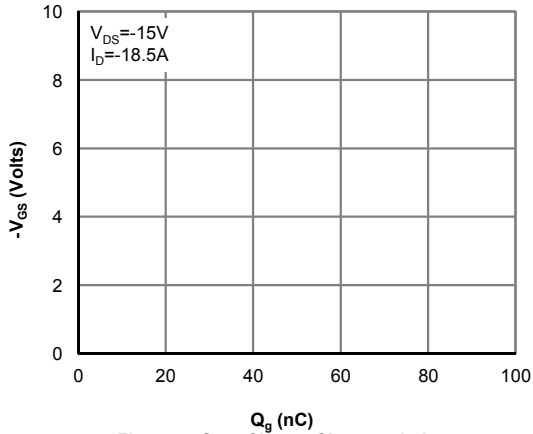


Figure 7: Gate-Charge Characteristics

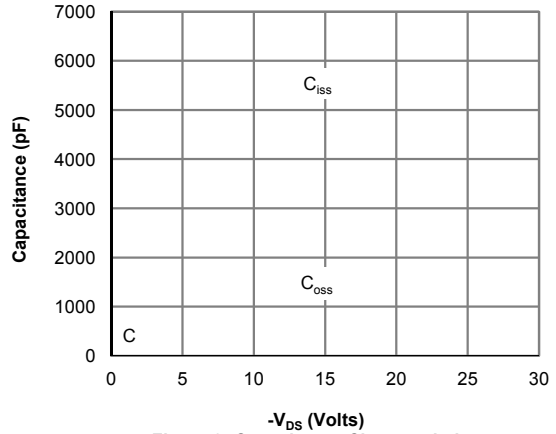


Figure 8: Capacitance Characteristics

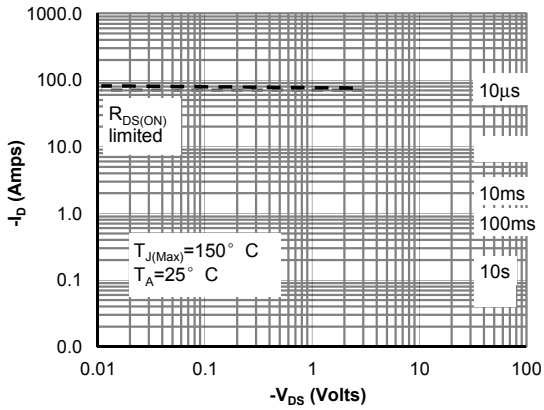
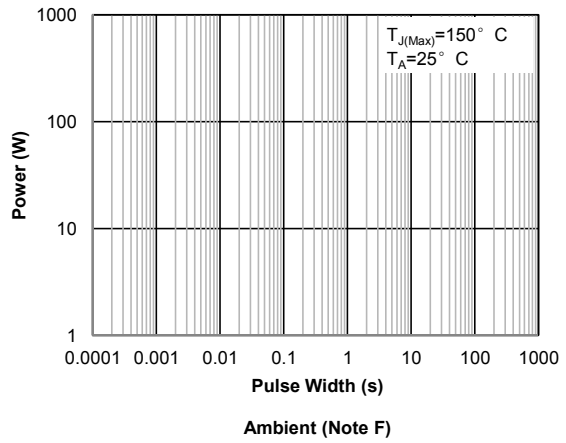


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)



Ambient (Note F)

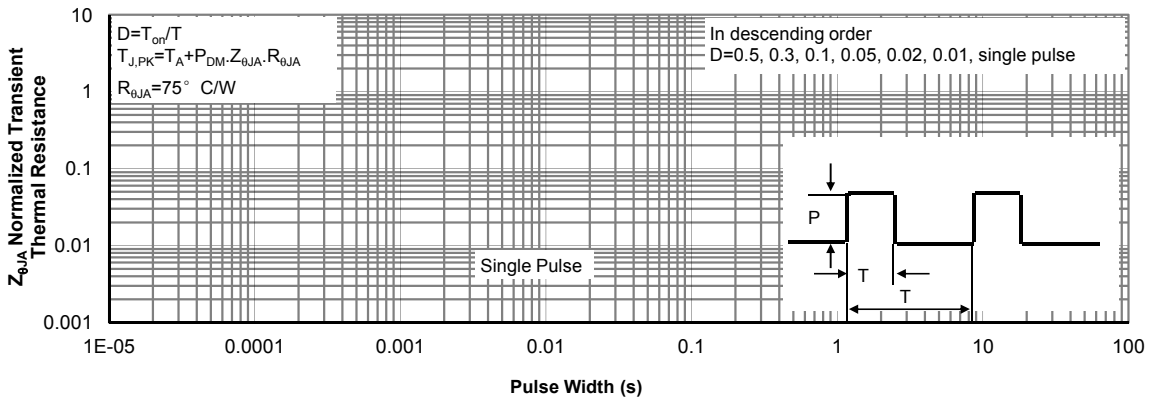
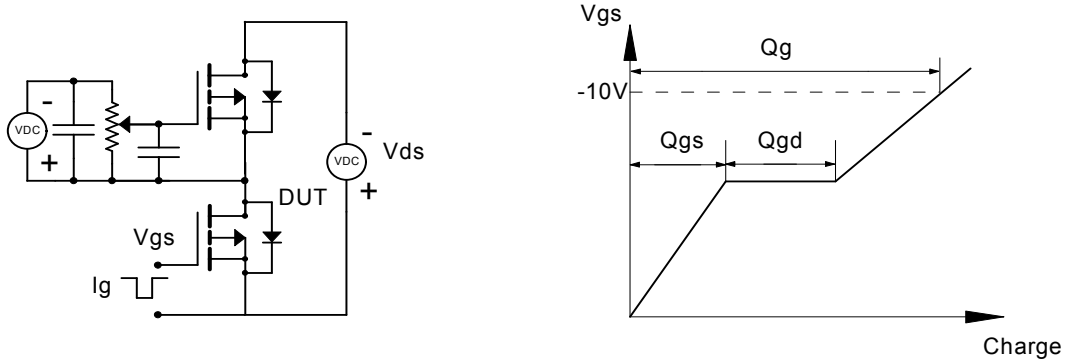
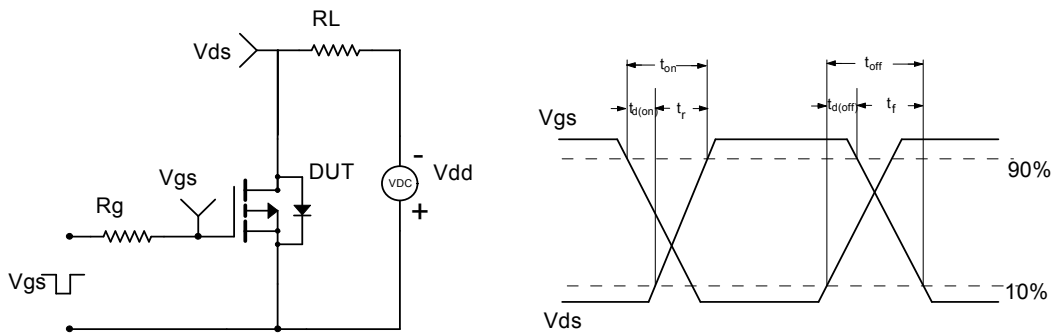


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

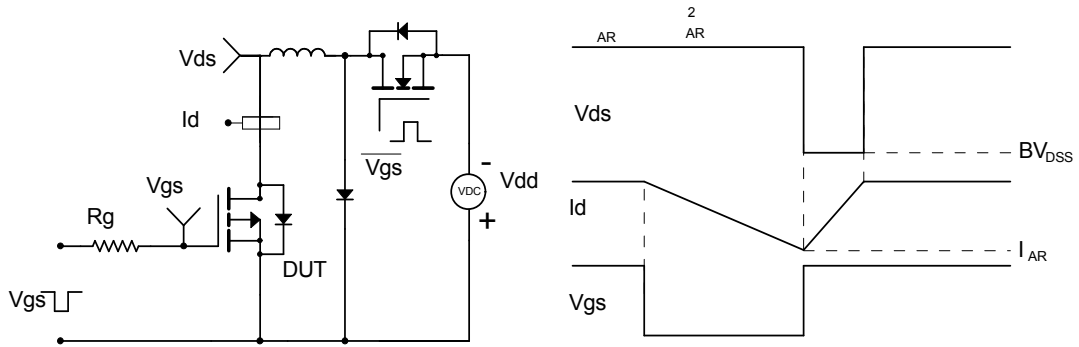
Gate Charge Test Circuit & Waveform



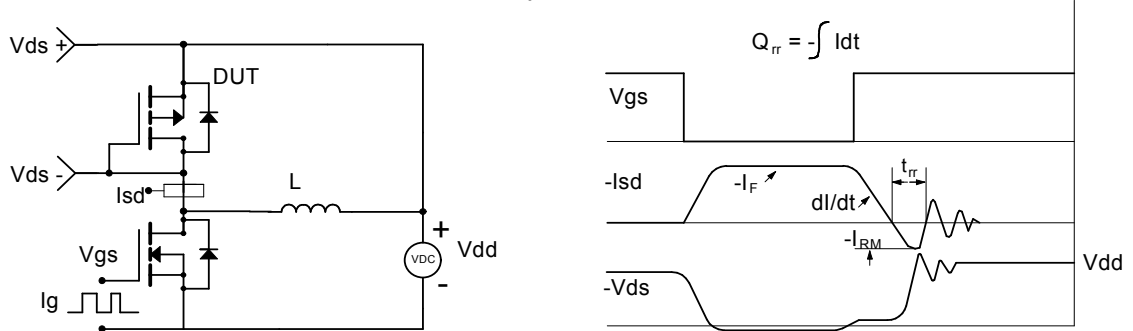
Resistive Switching Test Circuit & Waveforms



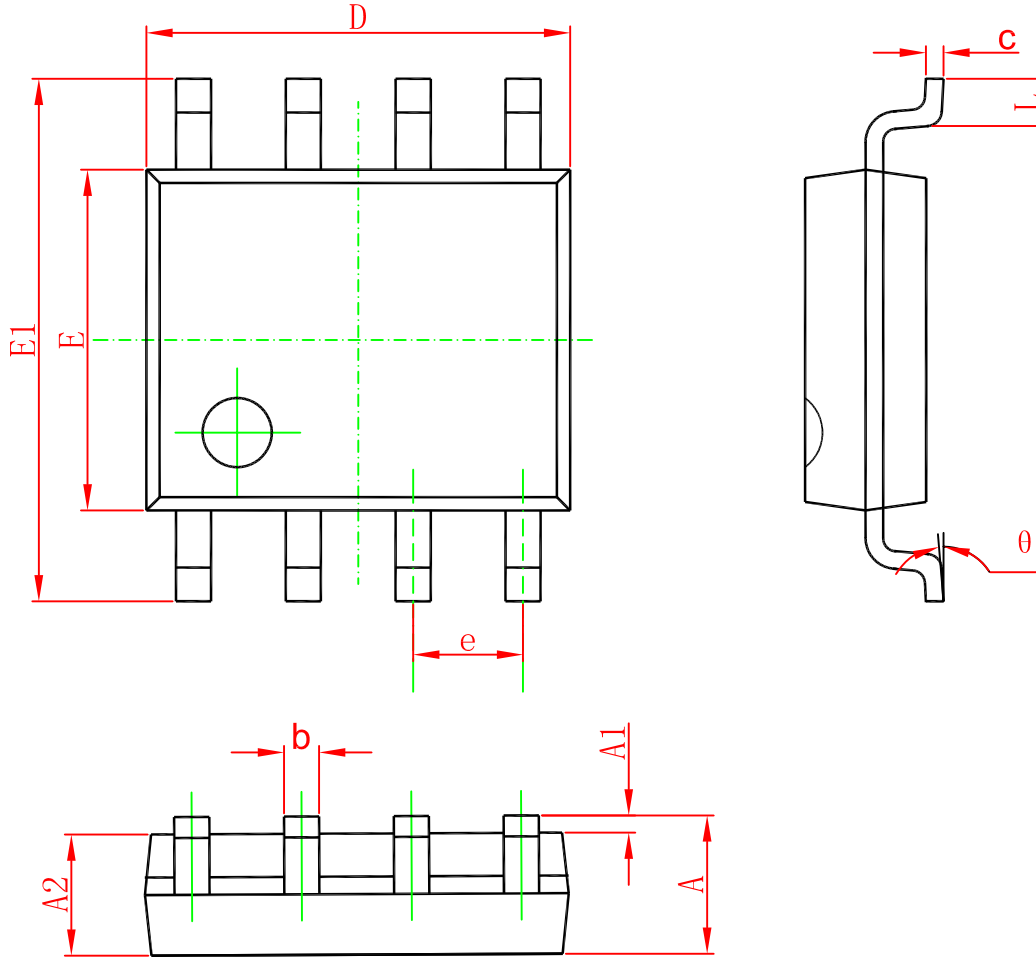
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

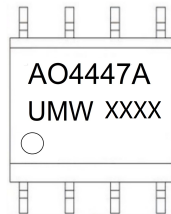


Package Mechanical Data SOP-8



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270(BSC)		0.050(BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

Marking



Ordering information

Order code	Package	Baseqty	Deliverymode
UMW AO4447A	SOP-8	3000	Tape and reel

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