

General Description

- Latest advanced trench technology
- Low $R_{DS(ON)}$
- High Current capability
- RoHS and Halogen-Free Compliant

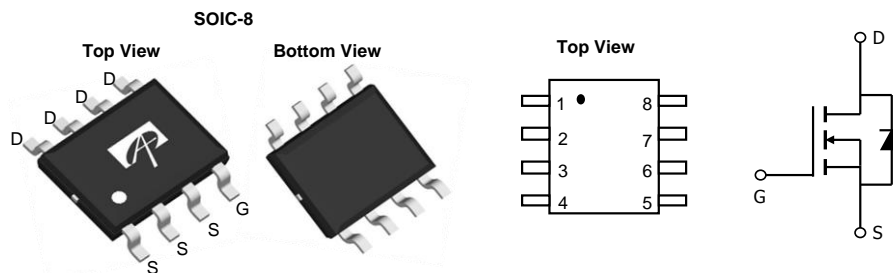
Applications

- Notebook AC-in load switch
- Battery protection charge/discharge

Product Summary

V_{DS}	30V
I_D (at $V_{GS}=10V$)	14.5A
$R_{DS(ON)}$ (at $V_{GS}=10V$)	< 9m Ω
$R_{DS(ON)}$ (at $V_{GS}=4.5V$)	< 12.6m Ω

100% UIS Tested
 100% Rg Tested



Orderable Part Number	Package Type	Form	Minimum Order Quantity
AOSP32314	SO-8	Tape & Reel	3000

Absolute Maximum Ratings $T_A=25^\circ\text{C}$ 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	$T_A=25^\circ\text{C}$	14.5
		$T_A=70^\circ\text{C}$	11.5
Pulsed Drain Current ^C	I_{DM}	58	A
Avalanche Current ^C	I_{AS}	33	A
Avalanche energy $L=0.05\text{mH}$ ^C	E_{AS}	27	mJ
Power Dissipation ^B	P_D	$T_A=25^\circ\text{C}$	3.1
		$T_A=70^\circ\text{C}$	2.0
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	$R_{\theta JA}$	31	40	$^\circ\text{C/W}$
Maximum Junction-to-Ambient ^{A,D}		Steady-State	59	75
Maximum Junction-to-Lead	$R_{\theta JL}$	16	24	$^\circ\text{C/W}$

Electrical Characteristics ($T_J=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
BV_{DSS}	Drain-Source Breakdown Voltage	$I_D=250\mu\text{A}$, $V_{GS}=0\text{V}$	30			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=30\text{V}$, $V_{GS}=0\text{V}$ $T_J=55^\circ\text{C}$			1 5	μA
I_{GSS}	Gate-Body leakage current	$V_{DS}=0\text{V}$, $V_{GS}=\pm 20\text{V}$			± 100	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$	1.25	1.75	2.25	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	$V_{GS}=10\text{V}$, $I_D=14.5\text{A}$ $T_J=125^\circ\text{C}$		7.5	9	m Ω
		$V_{GS}=4.5\text{V}$, $I_D=12\text{A}$		11.6	14	
g_{FS}	Forward Transconductance	$V_{DS}=5\text{V}$, $I_D=14.5\text{A}$		48		S
V_{SD}	Diode Forward Voltage	$I_S=1\text{A}$, $V_{GS}=0\text{V}$		0.7	1	V
I_S	Maximum Body-Diode Continuous Current				4	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	$V_{GS}=0\text{V}$, $V_{DS}=15\text{V}$, $f=1\text{MHz}$		1420		pF
C_{oss}	Output Capacitance			150		pF
C_{riss}	Reverse Transfer Capacitance			95		pF
R_g	Gate resistance	$f=1\text{MHz}$	1	2	3	Ω
SWITCHING PARAMETERS						
$Q_g(10\text{V})$	Total Gate Charge	$V_{GS}=10\text{V}$, $V_{DS}=15\text{V}$, $I_D=14.5\text{A}$		22	32	nC
$Q_g(4.5\text{V})$	Total Gate Charge			10	15	
Q_{gs}	Gate Source Charge			4.7		
Q_{gd}	Gate Drain Charge			4		
$t_{D(on)}$	Turn-On Delay Time	$V_{GS}=10\text{V}$, $V_{DS}=15\text{V}$, $R_L=1.05\Omega$, $R_{GEN}=3\Omega$		6.5		ns
t_r	Turn-On Rise Time			2.5		
$t_{D(off)}$	Turn-Off Delay Time			22.5		
t_f	Turn-Off Fall Time			3		
t_{rr}	Body Diode Reverse Recovery Time	$I_F=14.5\text{A}$, $di/dt=500\text{A}/\mu\text{s}$		7.5		ns
Q_{rr}	Body Diode Reverse Recovery Charge	$I_F=14.5\text{A}$, $di/dt=500\text{A}/\mu\text{s}$		9.0		nC

A. The value of $R_{\theta JA}$ is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with $T_A=25^\circ\text{C}$. The value in any given application depends on the user's specific board design.

B. The power dissipation P_D is based on $T_{J(MAX)}=150^\circ\text{C}$, using $\leq 10\text{s}$ junction-to-ambient thermal resistance.

C. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}=150^\circ\text{C}$. Ratings are based on low frequency and duty cycles to keep initial $T_J=25^\circ\text{C}$.

D. The $R_{\theta JA}$ is the sum of the thermal impedance from junction to lead $R_{\theta JL}$ and lead to ambient.

E. The static characteristics in Figures 1 to 6 are obtained using $<300\mu\text{s}$ 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 $T_{J(MAX)}=150^\circ\text{C}$. The SOA curve provides a single pulse rating.

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

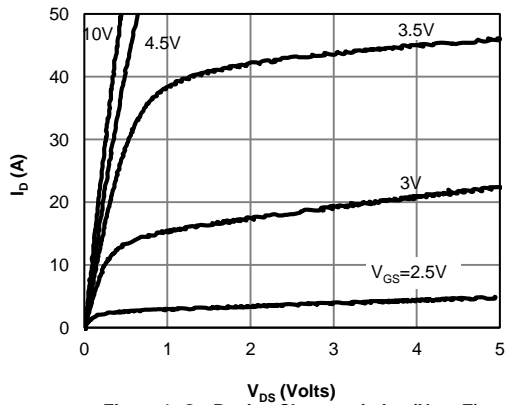


Figure 1: On-Region Characteristics (Note E)

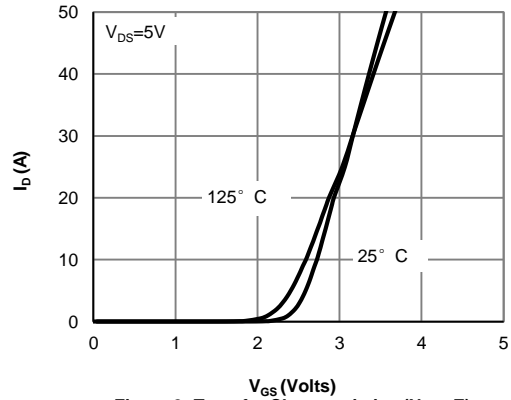


Figure 2: Transfer Characteristics (Note E)

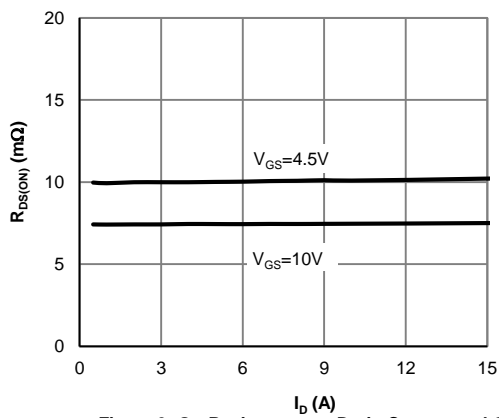


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

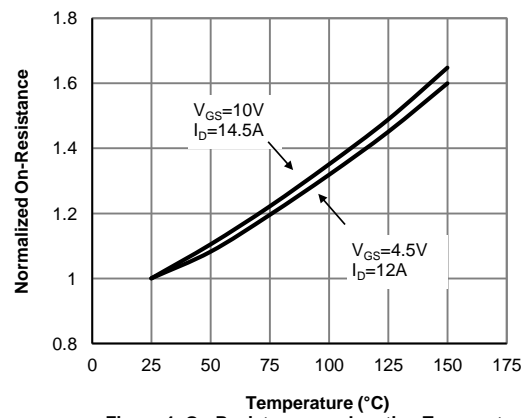


Figure 4: On-Resistance vs. Junction Temperature (Note E)

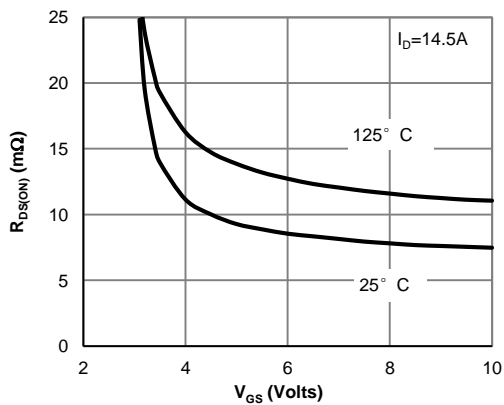


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

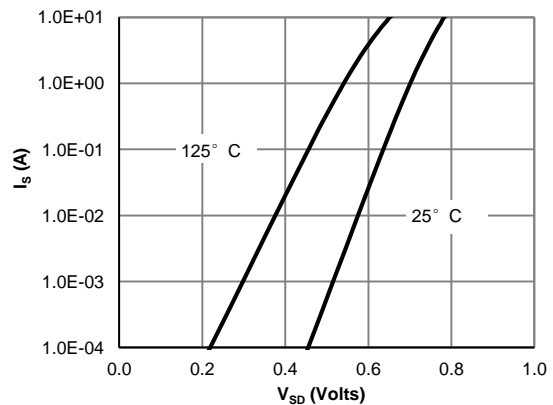


Figure 6: Body-Diode Characteristics (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

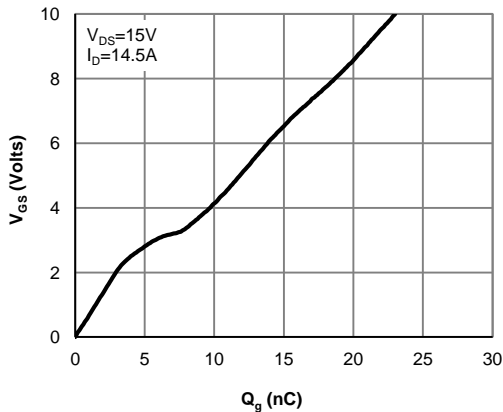


Figure 7: Gate-Charge Characteristics

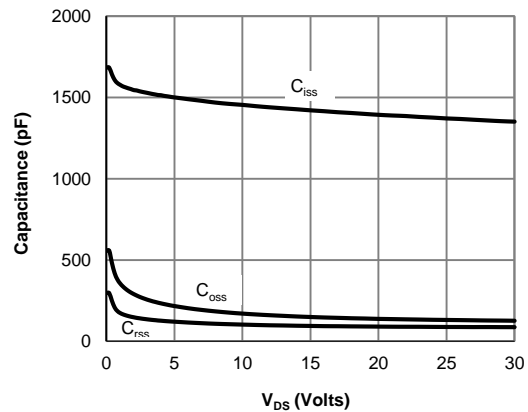


Figure 8: Capacitance Characteristics

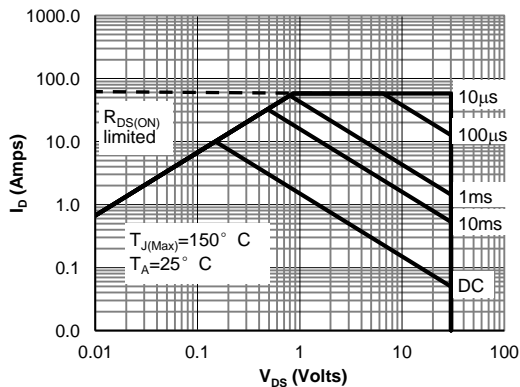


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

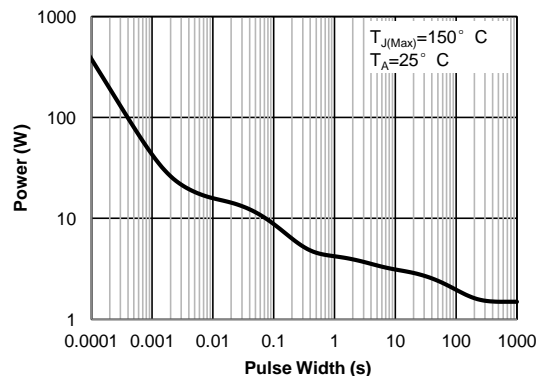


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note F)

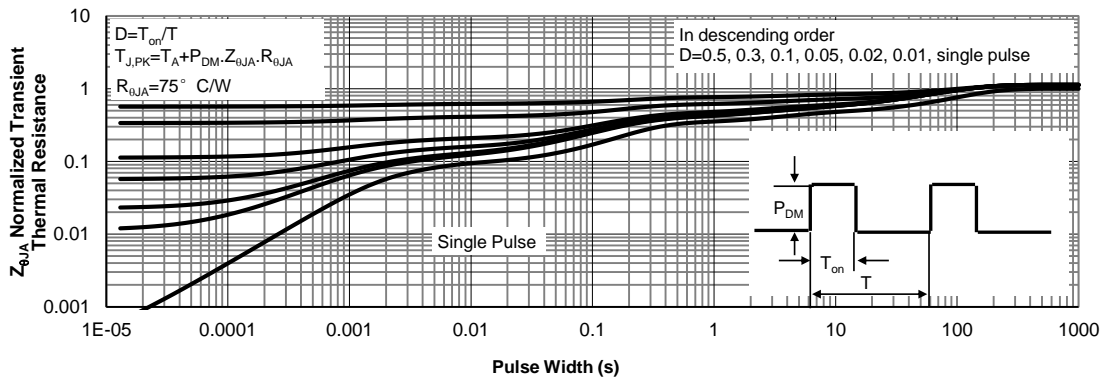


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

Figure A: Gate Charge Test Circuit & Waveforms

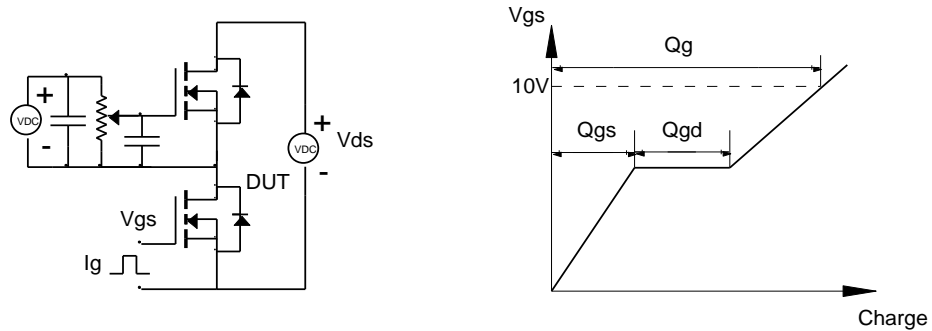


Figure B: Resistive Switching Test Circuit & Waveforms

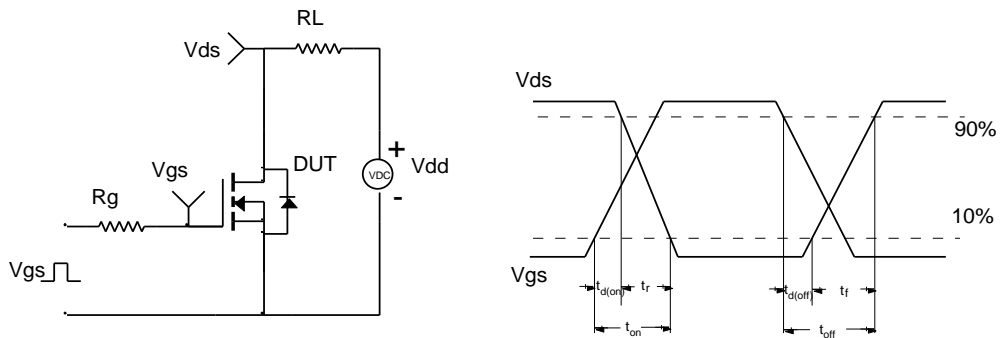


Figure C: Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

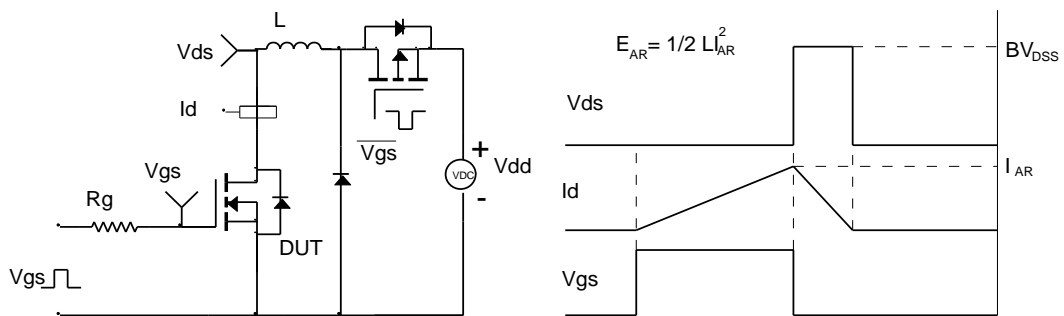
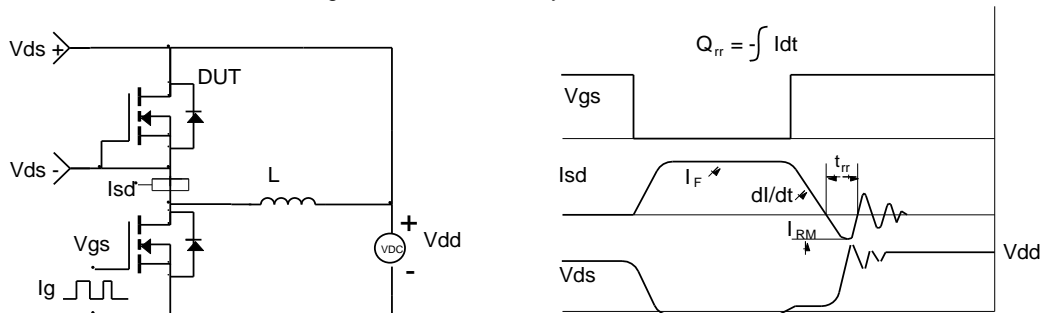


Figure D: Diode Recovery Test Circuit & Waveforms



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