AON7760

25V N-Channel AlphaMOS

General Description

- Latest Trench Power AlphaMOS (αMOS LV) technology
- Integrated Schottky Diode (SRFET)
- Very Low $R_{DS(ON)}$ at 4.5V V_{GS}
- Low Gate Charge
- High Current Capability
- RoHS and Halogen-Free Compliant

Application

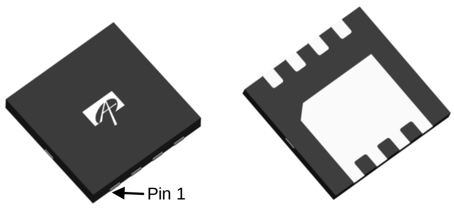
- DC/DC Converters in Computing, Servers, and POL
- Isolated DC/DC Converters in Telecom and Industrial

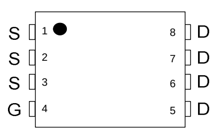
Product Summary

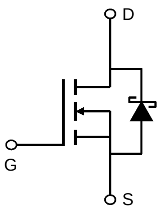
V_{DS}	25V
I_D (at V_{GS}=10V)	75A
$R_{DS(ON)}$ (at V_{GS}=10V)	< 2.0mΩ
$R_{DS(ON)}$ (at V_{GS}=4.5V)	< 2.9mΩ

100% UIS Tested
100% R_g Tested

DFN 3.3x3.3 EP







SRFET™
Soft **R**ecovery MOS**FET**:
Integrated Schottky Diode

Absolute Maximum Ratings T_A=25℃ unless otherwise noted

Parameter		Symbol	Maximum	Units
Drain-Source Voltage		V_{DS}	25	V
Gate-Source Voltage		V_{GS}	±16	V
Continuous Drain Current [G]	T_C=25℃	I_D	75	A
	T_C=100℃		59	
Pulsed Drain Current [C]		I_{DM}	175	
Continuous Drain Current	T_A=25℃	I_{DSM}	33	A
	T_A=70℃		26	
Avalanche Current [C]		I_{AS}	65	A
Avalanche energy L=0.05mH [C]		E_{AS}	106	mJ
Power Dissipation [B]	T_C=25℃	P_D	34.5	W
	T_C=100℃		14	
Power Dissipation [A]	T_A=25℃	P_{DSM}	4.1	W
	T_A=70℃		2.6	
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	℃

Thermal Characteristics

Parameter		Symbol	Typ	Max	Units
Maximum Junction-to-Ambient [A]	t ≤ 10s	$R_{\theta JA}$	25	30	℃/W
Maximum Junction-to-Ambient [A D]	Steady-State		50	60	℃/W
Maximum Junction-to-Case	Steady-State	$R_{\theta JC}$	2.4	3.6	℃/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=10mA, V_{GS}=0V	25			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=25V, V_{GS}=0V			0.5	mA
		T_J=125°C			100	
I_{GSS}	Gate-Body leakage current	V_{DS}=0V, V_{GS}=±16V			±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250µA	1.4	1.8	2.2	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V, I_D=20A		1.65	2.0	mΩ
		T_J=125°C		2.7	3.5	
		V_{GS}=4.5V, I_D=20A		2.3	2.9	mΩ
g_{FS}	Forward Transconductance	V_{DS}=5V, I_D=20A		125		S
V_{SD}	Diode Forward Voltage	I_S=1A,V_{GS}=0V		0.4	0.6	V
I_S	Maximum Body-Diode Continuous Current				45	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=12.5V, f=1MHz		4240	5520	pF
C_{oss}	Output Capacitance			540	760	pF
C_{rss}	Reverse Transfer Capacitance			210	320	pF
R_g	Gate resistance	f=1MHz	0.3	0.75	1.2	Ω
SWITCHING PARAMETERS						
Q_g(10V)	Total Gate Charge	V_{GS}=10V, V_{DS}=12.5V, I_D=20A		56	76	nC
Q_g(4.5V)	Total Gate Charge			23	32	nC
Q_{gs}	Gate Source Charge			13.5	20	nC
Q_{gd}	Gate Drain Charge			6	12	nC
$t_{D(on)}$	Turn-On DelayTime	V_{GS}=10V, V_{DS}=12.5V, R_L=0.625Ω, R_{GEN}=3Ω		10	16	ns
t_r	Turn-On Rise Time			5	10	ns
$t_{D(off)}$	Turn-Off DelayTime			40	55	ns
t_f	Turn-Off Fall Time			5	10	ns
t_{rr}	Body Diode Reverse Recovery Time	I_F=20A, dI/dt=500A/µs		13		ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F=20A, dI/dt=500A/µs		22		nC

A. The value of $R_{\theta JA}$ is measured with the device mounted on 1in[2] 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 $_{\theta JA}$ t≤ 10s 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. Single pulse width limited by junction temperature $T_{J(MAX)}$=150° C.
D. The $R_{\theta JA}$ is the sum of the thermal impedance from junction to case $R_{\theta JC}$ 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 in[2] 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

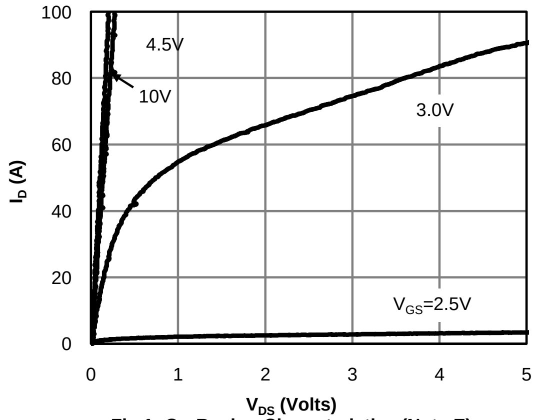


Fig 1: On-Region Characteristics (Note E)

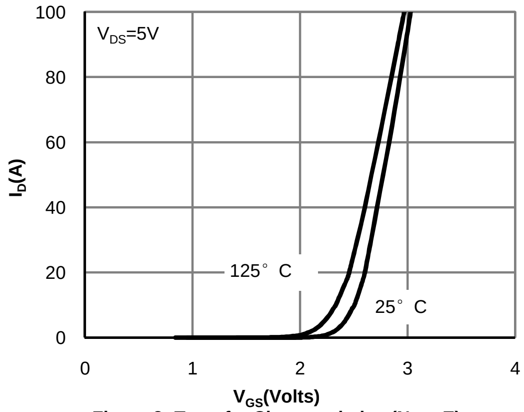


Figure 2: Transfer Characteristics (Note E)

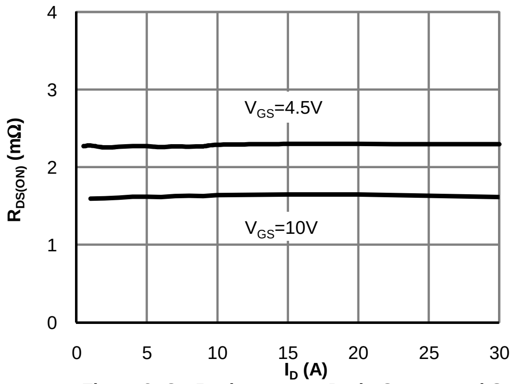


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

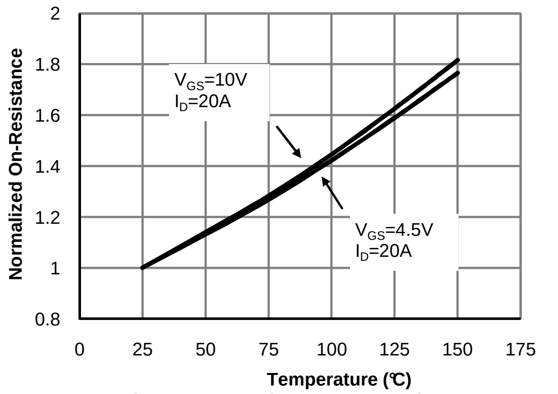


Figure 4: On-Resistance vs. Junction Temperature (Note E)

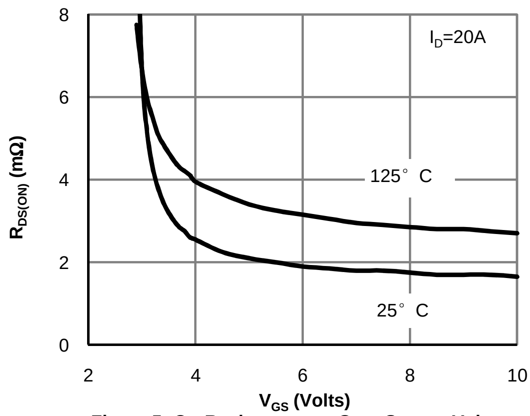


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

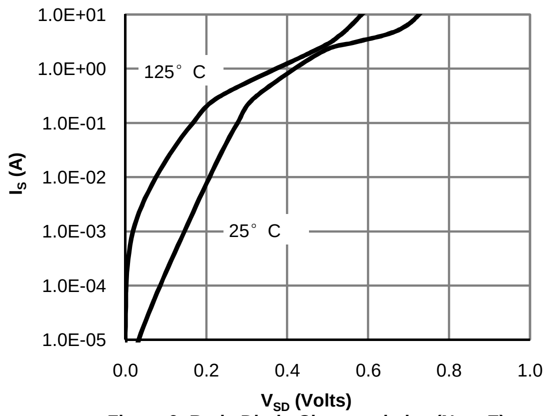


Figure 6: Body-Diode Characteristics (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

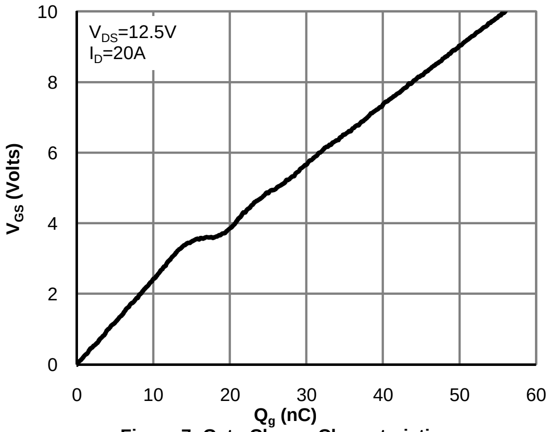


Figure 7: Gate-Charge Characteristics

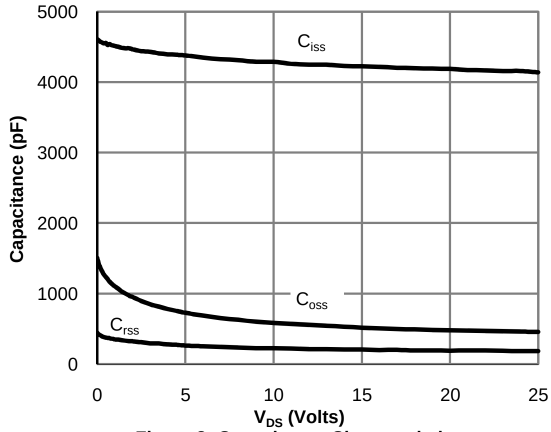
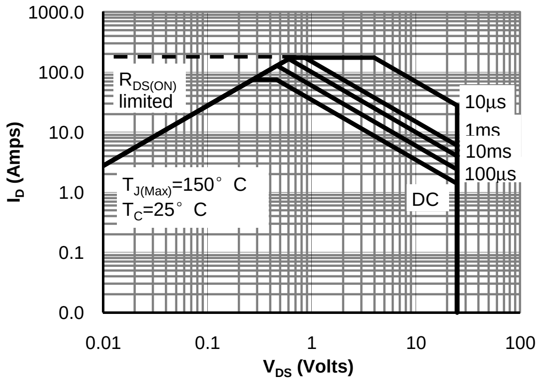


Figure 8: Capacitance Characteristics



V_{GS}> or equal to 4.5V
Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

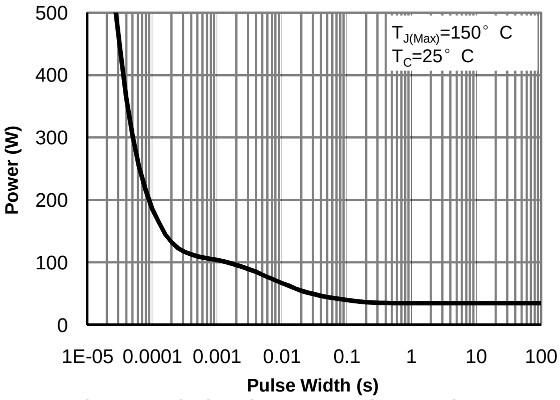


Figure 10: Single Pulse Power Rating Junction-to-Case (Note F)

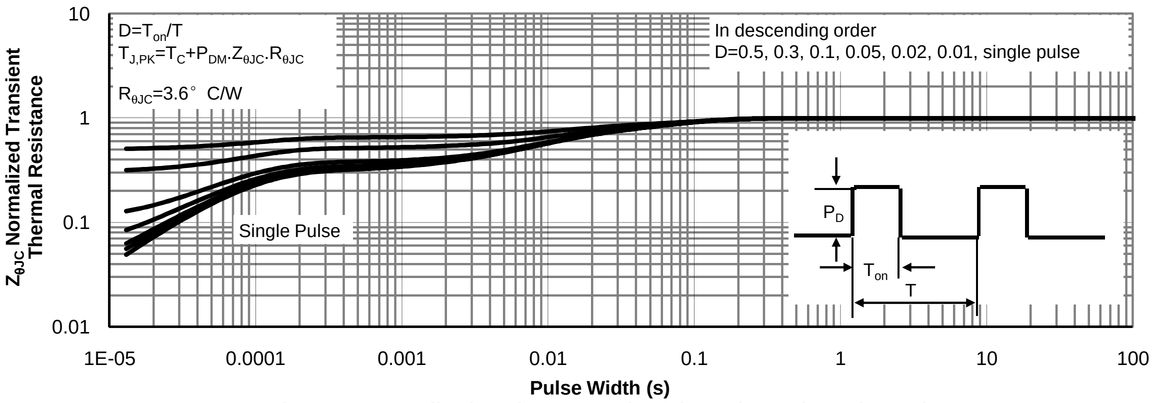


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

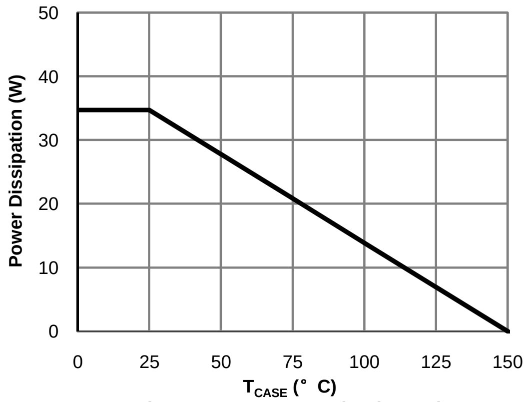


Figure 12: Power De-rating (Note F)

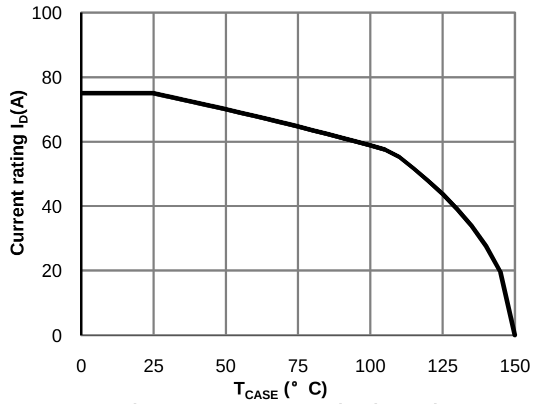


Figure 13: Current De-rating (Note F)

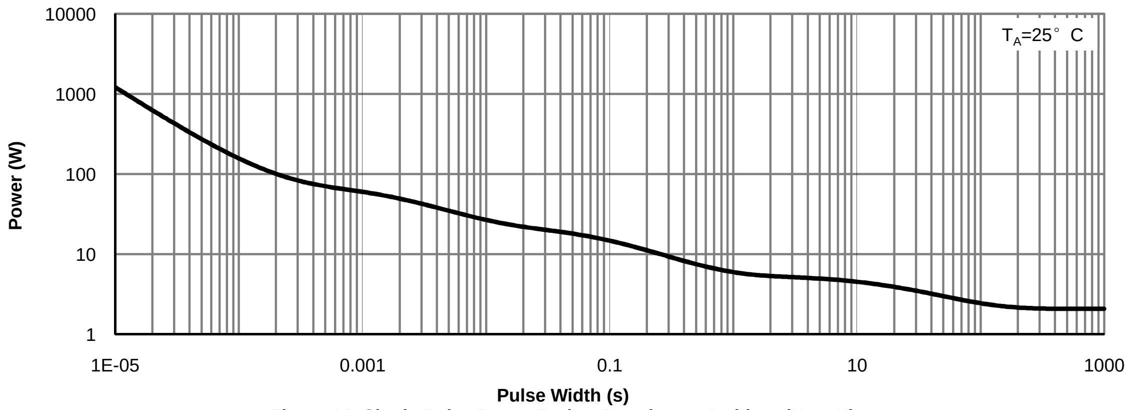


Figure 14: Single Pulse Power Rating Junction-to-Ambient (Note H)

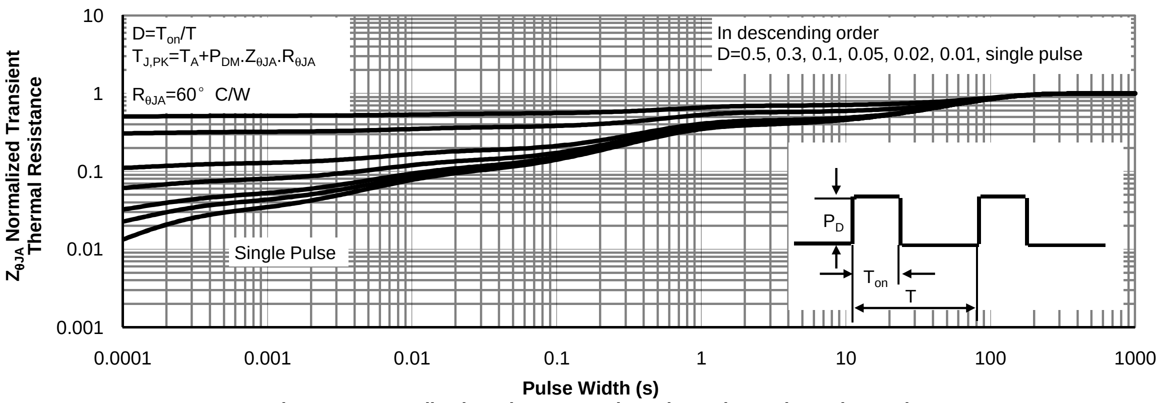
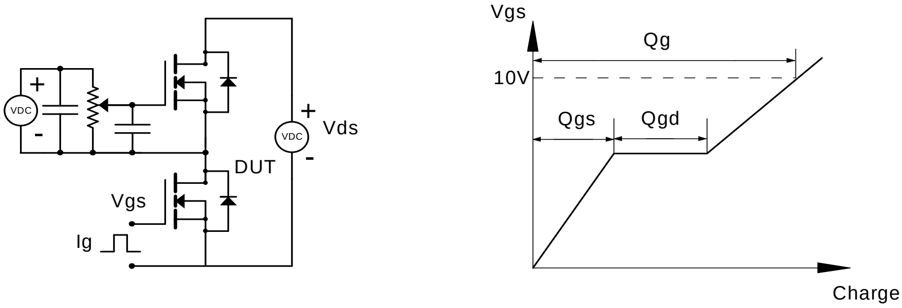
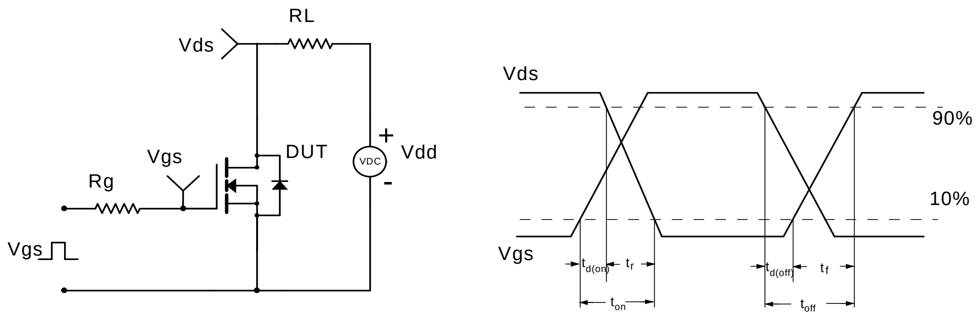


Figure 15: Normalized Maximum Transient Thermal Impedance (Note H)

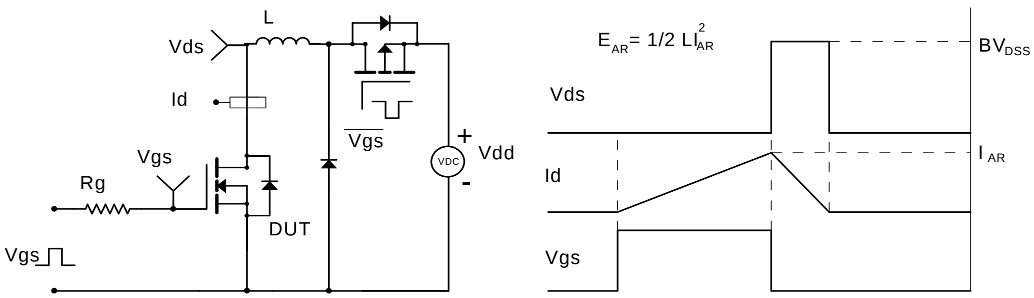
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms