

General Description

- Trench Power AlphaMOS (αMOS LV) technology
- Low $R_{DS(ON)}$
- Low Gate Charge
- High Current Capability
- RoHS and Halogen-Free Compliant

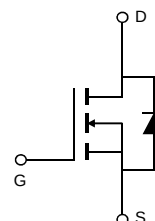
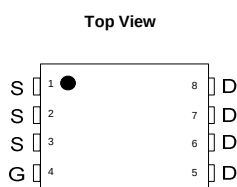
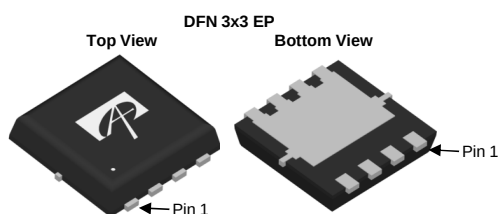
Applications

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

Product Summary

V_{DS}	30V
I_D (at $V_{GS}=10V$)	12A
$R_{DS(ON)}$ (at $V_{GS}=10V$)	< 10.5mΩ
$R_{DS(ON)}$ (at $V_{GS}=4.5V$)	< 16.5mΩ

100% UIS Tested
 100% Rg Tested



Orderable Part Number	Package Type	Form	Minimum Order Quantity
AON7556	DFN 3x3 EP	Tape & Reel	5000

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 ^G	I_D	12	A
$T_C=25^\circ\text{C}$		9.4	
Pulsed Drain Current ^C	I_{DM}	48	A
Continuous Drain Current ^G	I_{DSM}	12	A
$T_A=25^\circ\text{C}$		10.5	
Avalanche Current ^C	I_{AS}	18	A
Avalanche energy $L=0.05\text{mH}$ ^C	E_{AS}	8	mJ
V_{DS} Spike	V_{SPIKE}	36	V
Power Dissipation ^B	P_D	12.5	W
$T_C=25^\circ\text{C}$		5	
Power Dissipation ^A	P_{DSM}	4.1	W
$T_A=25^\circ\text{C}$		2.6	
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	$R_{\theta JA}$	24	30	$^\circ\text{C/W}$
$t \leq 10\text{s}$		47	60	$^\circ\text{C/W}$
Maximum Junction-to-Ambient ^{A D}	$R_{\theta JC}$	8	10	$^\circ\text{C/W}$
Steady-State		8	10	$^\circ\text{C/W}$

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

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
BV _{DSS}	Drain-Source Breakdown Voltage	ID=250μA, VGS=0V	30			V
IDSS	Zero Gate Voltage Drain Current	VDS=30V, VGS=0V Tj=55°C			1 5	μA
IGSS	Gate-Body leakage current	VDS=0V, VGS=±20V			±100	nA
VGS(th)	Gate Threshold Voltage	VDS=VGS, ID=250μA	1.4	1.8	2.2	V
RDS(on)	Static Drain-Source On-Resistance	VGS=10V, ID=12A Tj=125°C		8.5 12	10.5 14.8	mΩ
		VGS=4.5V, ID=10A		13	16.5	mΩ
gFS	Forward Transconductance	VDS=5V, ID=12A		40		S
VSD	Diode Forward Voltage	IS=1A, VGS=0V		0.73	1	V
IS	Maximum Body-Diode Continuous Current				10	A
DYNAMIC PARAMETERS						
Ciss	Input Capacitance	VGS=0V, VDS=15V, f=1MHz		600		pF
Coss	Output Capacitance			230		pF
Crss	Reverse Transfer Capacitance			30		pF
Rg	Gate resistance	f=1MHz	0.7	1.5	2.3	Ω
SWITCHING PARAMETERS						
Qg(10V)	Total Gate Charge	VGS=10V, VDS=15V, ID=12A		9	15	nC
Qg(4.5V)	Total Gate Charge			4.4	10	nC
Qgs	Gate Source Charge			1.4		nC
Qgd	Gate Drain Charge			1.9		nC
tD(on)	Turn-On DelayTime	VGS=10V, VDS=15V, RL=1.25Ω, RGEN=3Ω		5		ns
tr	Turn-On Rise Time			2.5		ns
tD(off)	Turn-Off DelayTime			17.5		ns
tf	Turn-Off Fall Time			2.5		ns
trr	Body Diode Reverse Recovery Time	IF=12A, dI/dt=500A/μs		8.6		ns
Qrr	Body Diode Reverse Recovery Charge	IF=12A, dI/dt=500A/μs		10.5		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 Power dissipation P_{DSM} is based on R_{θJA} ≤ 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_{θJA} is the sum of the thermal impedance from junction to case R_{θJC} 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

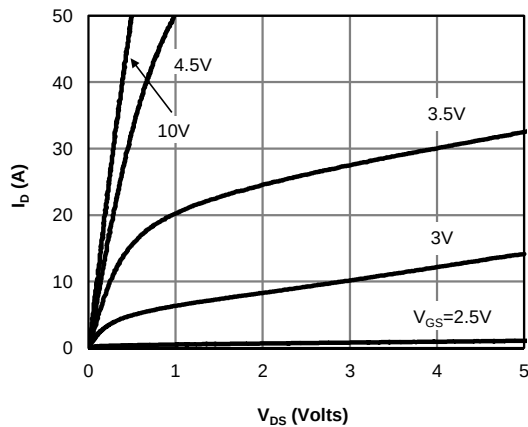


Figure 1: On-Region Characteristics (Note E)

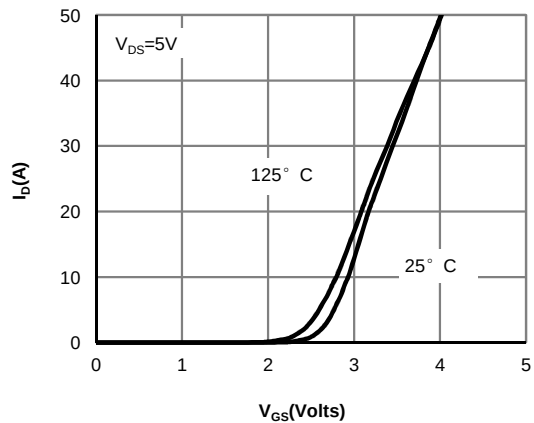


Figure 2: Transfer Characteristics (Note E)

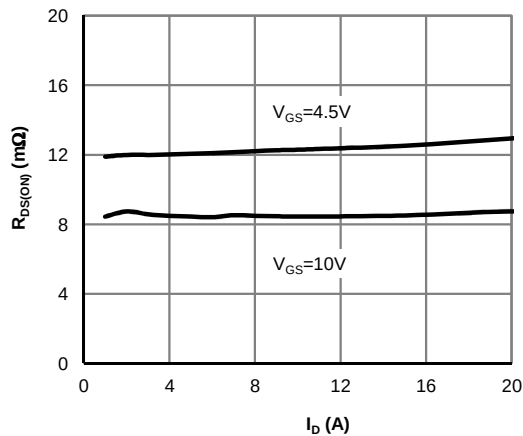


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

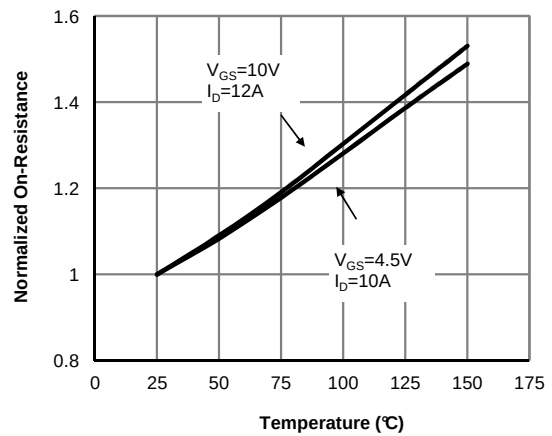


Figure 4: On-Resistance vs. Junction Temperature (Note E)

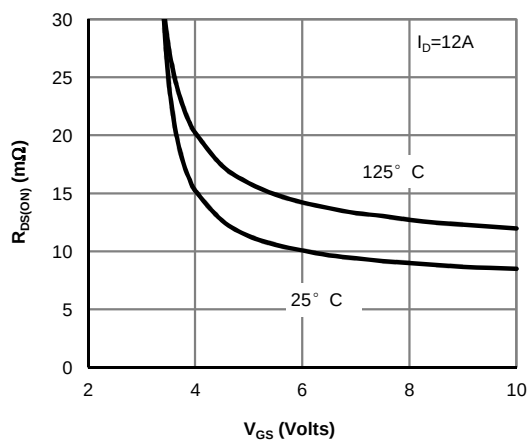


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

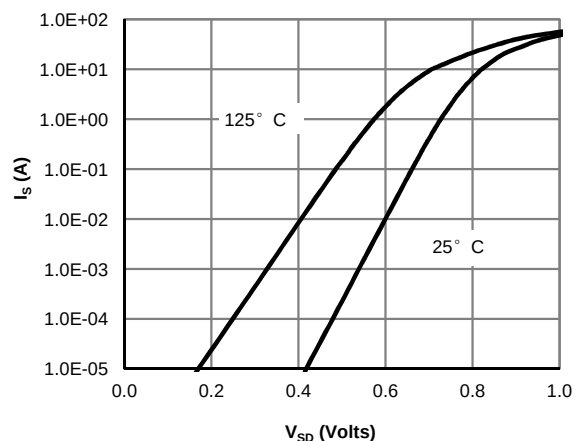


Figure 6: Body-Diode Characteristics (Note E)

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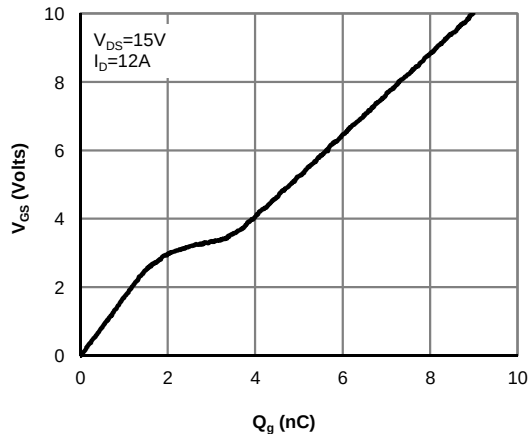


Figure 7: Gate-Charge Characteristics

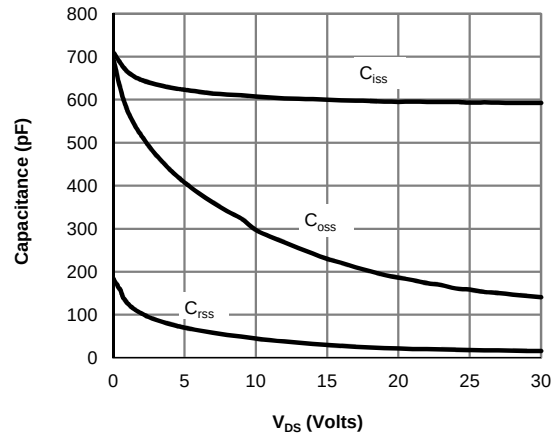


Figure 8: Capacitance Characteristics

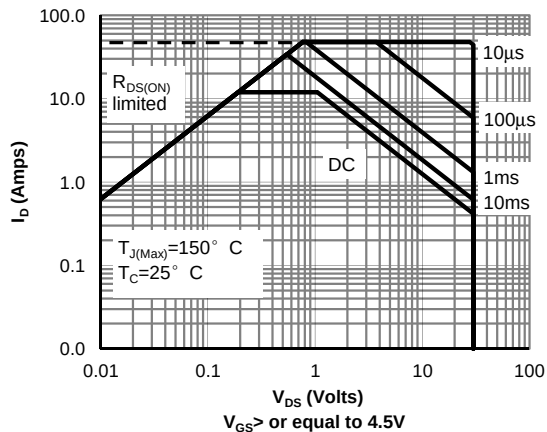


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

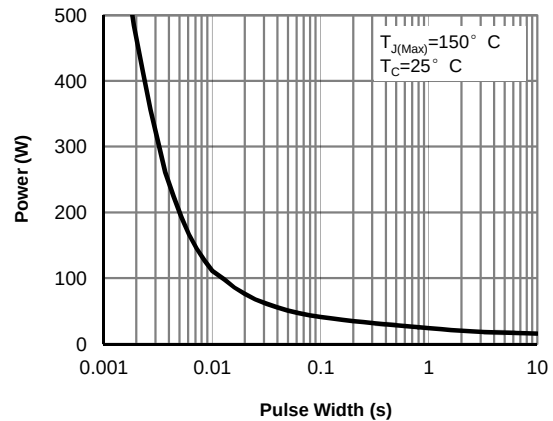


Figure 10: Single Pulse Power Rating Junction-to-Case (Note F)

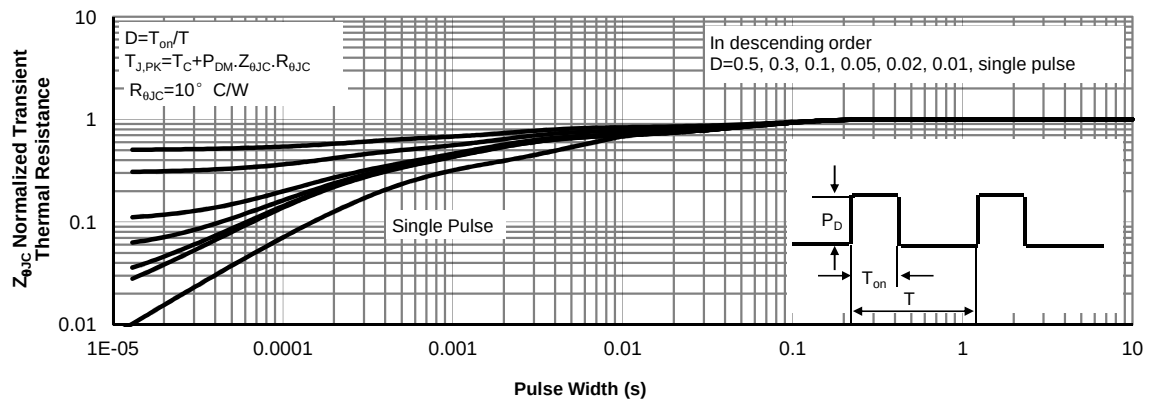
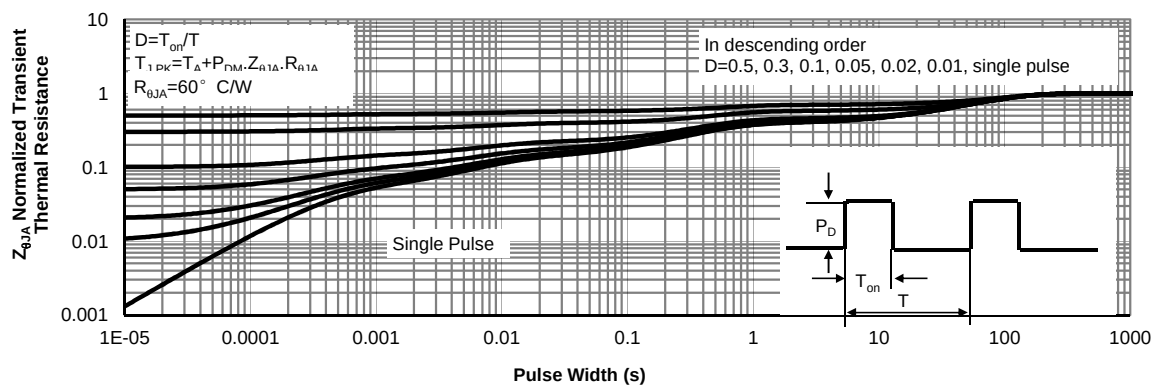
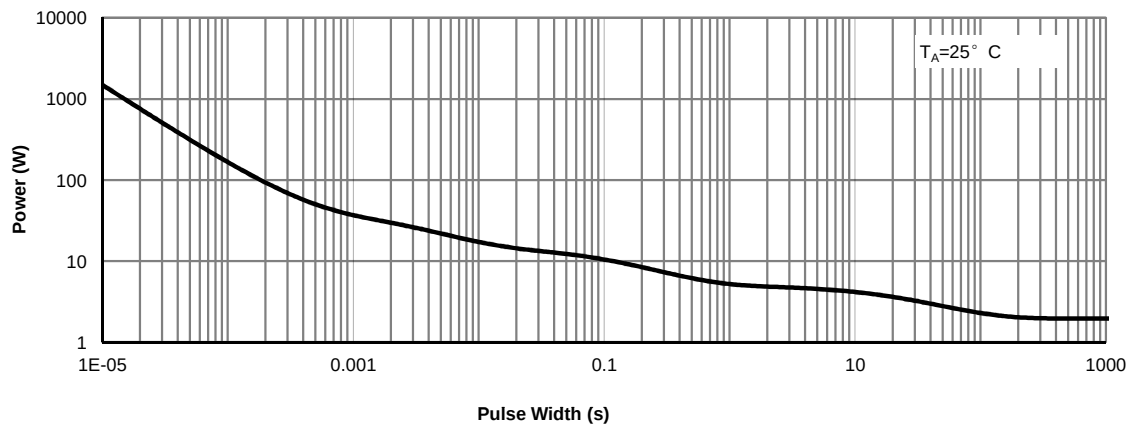
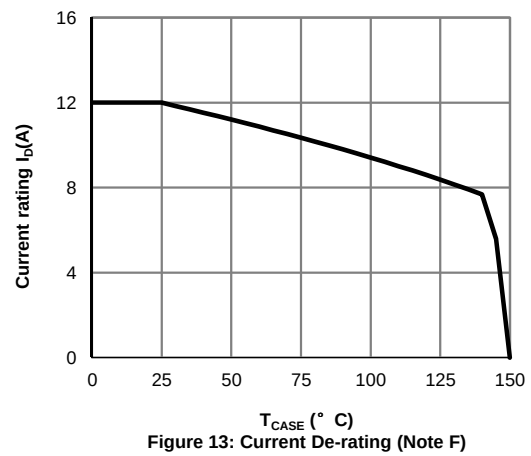
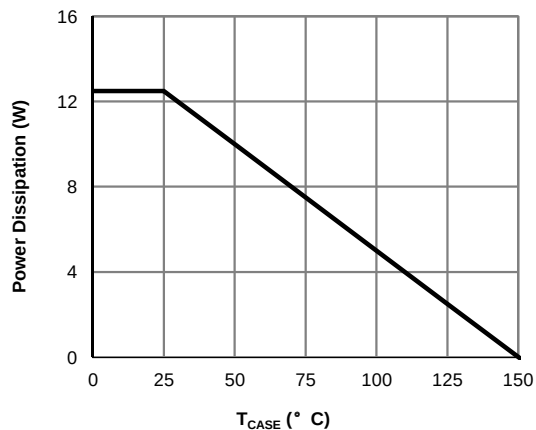
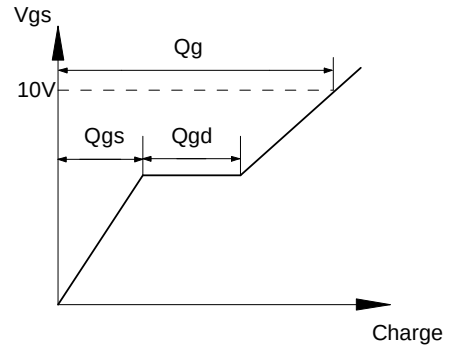
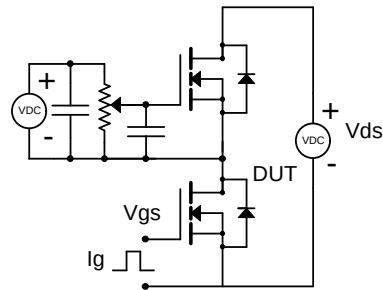


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

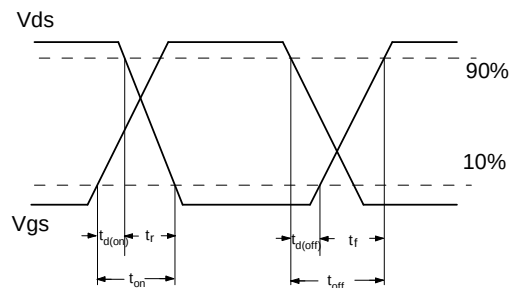
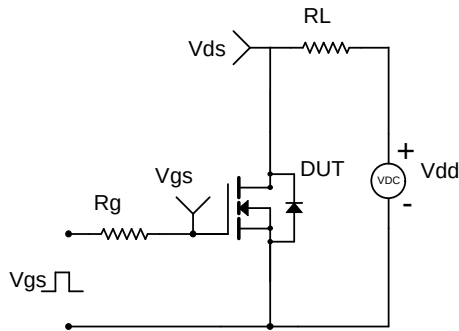
TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS



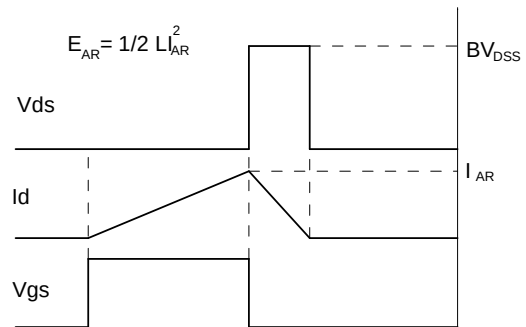
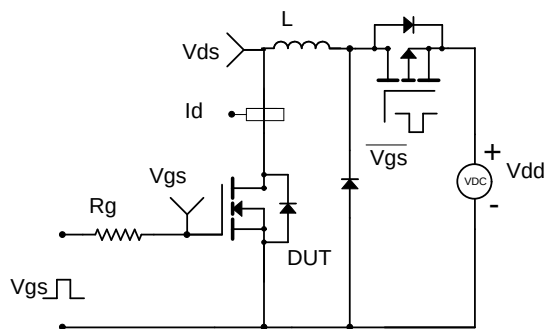
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

