



ALPHA & OMEGA
SEMICONDUCTOR

AON6754
30V N-Channel AlphaMOS

General Description

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

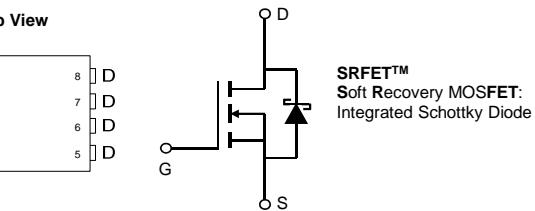
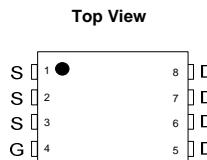
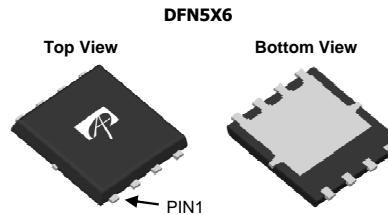
Application

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

Product Summary

V _{DS}	30V
I _D (at V _{GS} =10V)	85A
R _{DS(ON)} (at V _{GS} =10V)	< 1.8mΩ
R _{DS(ON)} (at V _{GS} = 4.5V)	< 3.3mΩ

100% UIS Tested
100% R_g Tested



Absolute Maximum Ratings T_A=25°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	85	A
T _C =100°C		66	
Pulsed Drain Current ^C	I _{DM}	329	A
T _A =25°C	I _{DSM}	52	
T _A =70°C		42	
Avalanche Current ^C	I _{AS}	65	A
Avalanche energy L=0.05mH ^C	E _{AS}	106	mJ
V _{DS} Spike	100ns	V _{SPIKE}	V
T _C =25°C	P _D	83	W
T _C =100°C		33	
T _A =25°C	P _{DSM}	7.3	W
T _A =70°C		4.7	
Junction and Storage Temperature Range	T _J , T _{STG}	-55 to 150	°C

Thermal Characteristics

Parameter	Symbol	Typ	Max	Units
Maximum Junction-to-Ambient ^A	R _{θJA}	14	17	°C/W
t ≤ 10s		40	55	°C/W
Maximum Junction-to-Ambient ^{A D}	R _{θJC}	1.1	1.5	°C/W
Steady-State				

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	$I_D=10\text{mA}, V_{GS}=0\text{V}$	30			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=30\text{V}, V_{GS}=0\text{V}$ $T_J=125^\circ\text{C}$			0.5 100	mA
I_{GSS}	Gate-Body leakage current	$V_{DS}=0\text{V}, V_{GS}=\pm 20\text{V}$			100	nA
$V_{\text{GS(th)}}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	1.4	1.7	2.4	V
$R_{\text{DS(ON)}}$	Static Drain-Source On-Resistance	$V_{GS}=10\text{V}, I_D=20\text{A}$ $T_J=125^\circ\text{C}$		1.5 2.1	1.8 2.6	$\text{m}\Omega$
		$V_{GS}=4.5\text{V}, I_D=20\text{A}$		2.1	3.3	$\text{m}\Omega$
g_{FS}	Forward Transconductance	$V_{DS}=5\text{V}, I_D=20\text{A}$		90		S
V_{SD}	Diode Forward Voltage	$I_S=1\text{A}, V_{GS}=0\text{V}$		0.39	0.6	V
I_s	Maximum Body-Diode Continuous Current ^G				85	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	$V_{GS}=0\text{V}, V_{DS}=15\text{V}, f=1\text{MHz}$		2796		pF
C_{oss}	Output Capacitance			1200		pF
C_{rss}	Reverse Transfer Capacitance			165		pF
R_g	Gate resistance	$V_{GS}=0\text{V}, V_{DS}=0\text{V}, f=1\text{MHz}$	0.7	1.5	2.3	Ω
SWITCHING PARAMETERS						
$Q_g(10\text{V})$	Total Gate Charge	$V_{GS}=10\text{V}, V_{DS}=15\text{V}, I_D=20\text{A}$		46.8	64	nC
$Q_g(4.5\text{V})$	Total Gate Charge			22.3	30	nC
Q_{gs}	Gate Source Charge			8.4		nC
Q_{gd}	Gate Drain Charge			8.6		nC
$t_{\text{D(on)}}$	Turn-On Delay Time	$V_{GS}=10\text{V}, V_{DS}=15\text{V}, R_L=0.75\Omega, R_{\text{GEN}}=3\Omega$		9.5		ns
t_r	Turn-On Rise Time			6.3		ns
$t_{\text{D(off)}}$	Turn-Off Delay Time			35.8		ns
t_f	Turn-Off Fall Time			12.3		ns
t_{rr}	Body Diode Reverse Recovery Time	$I_F=20\text{A}, dI/dt=500\text{A}/\mu\text{s}$		20		ns
Q_{rr}	Body Diode Reverse Recovery Charge	$I_F=20\text{A}, dI/dt=500\text{A}/\mu\text{s}$		40		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 $T_A=25^\circ\text{C}$. 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 $T_{J(\text{MAX})}=150^\circ\text{C}$, 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 $T_{J(\text{MAX})}=150^\circ\text{C}$.

D. The R_{0JA} is the sum of the thermal impedance from junction to case R_{0JC} and case to ambient.

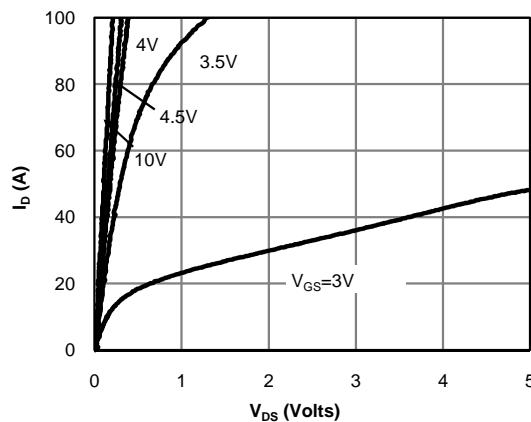
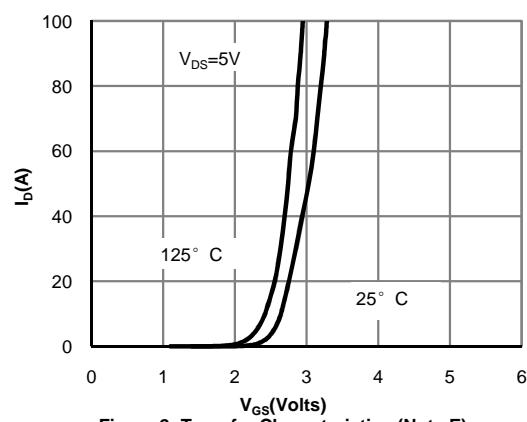
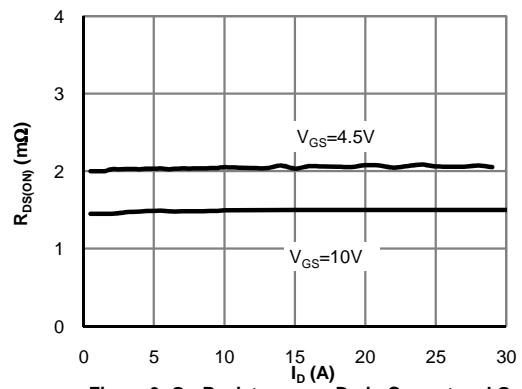
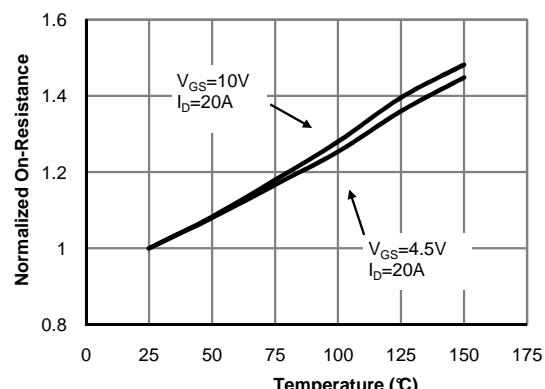
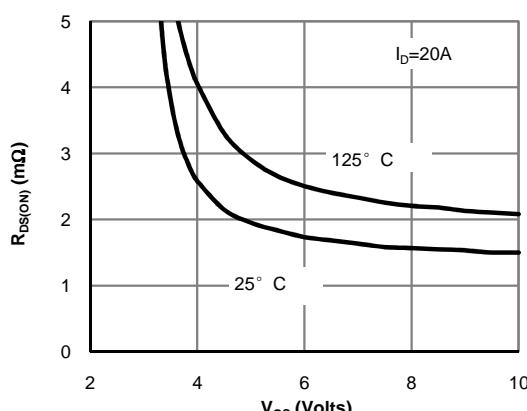
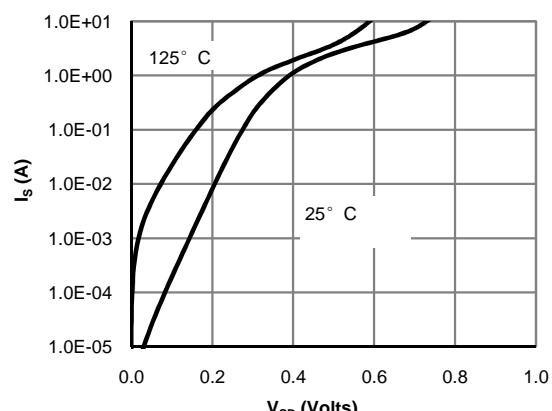
E. The static characteristics in Figures 1 to 6 are obtained using <300 μs pulses, duty cycle 0.5% max.

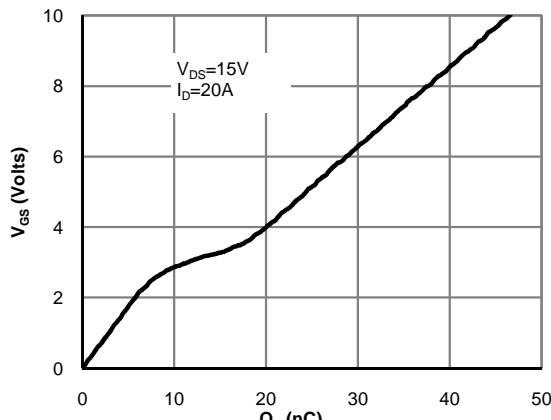
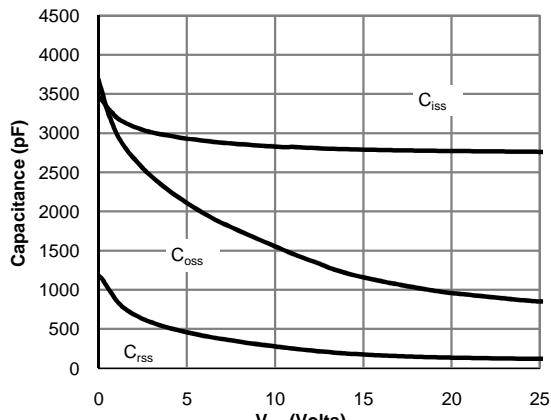
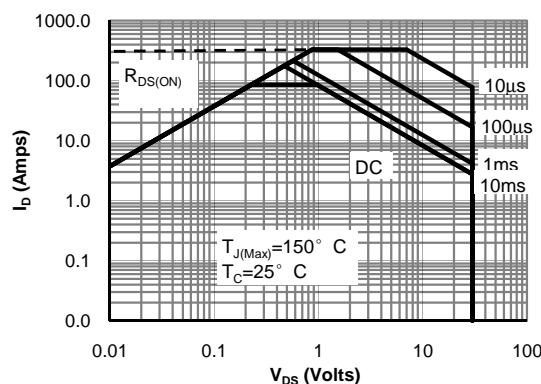
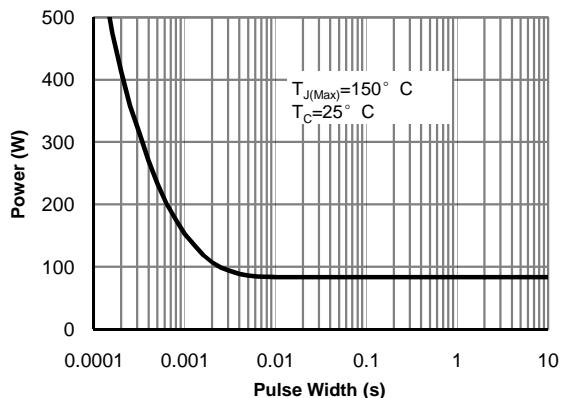
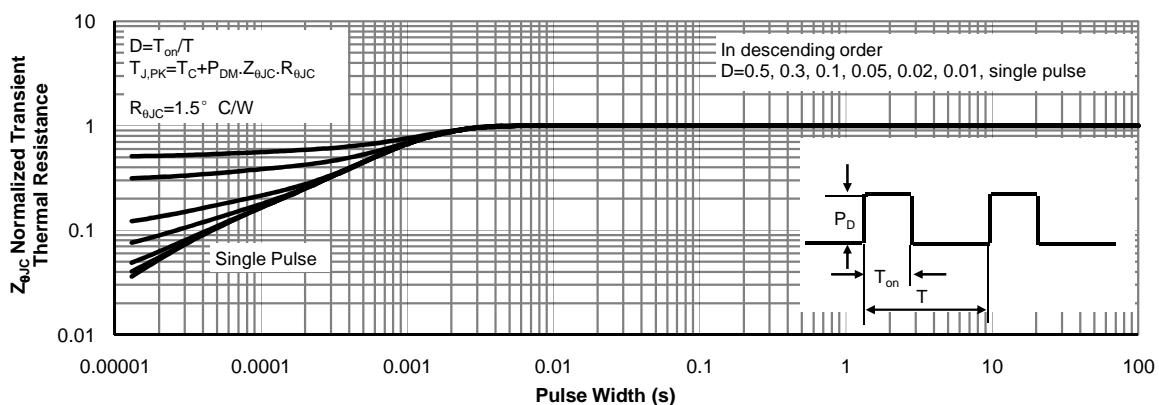
F. These curves are based on the junction-to-case thermal impedance which is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of $T_{J(\text{MAX})}=150^\circ\text{C}$. The SOA curve provides a single pulse rating.

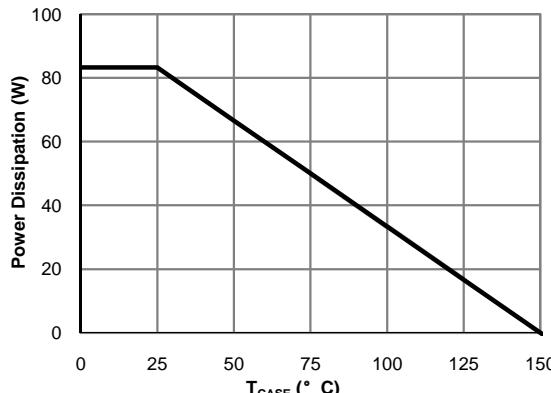
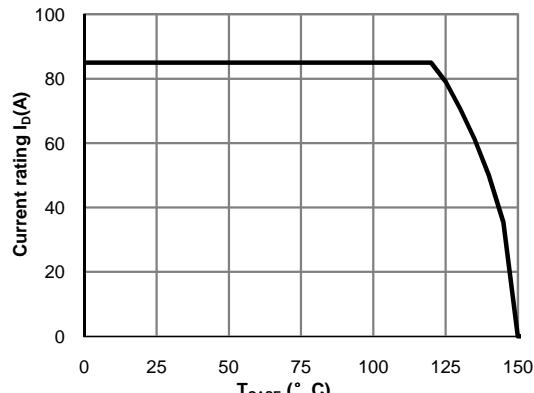
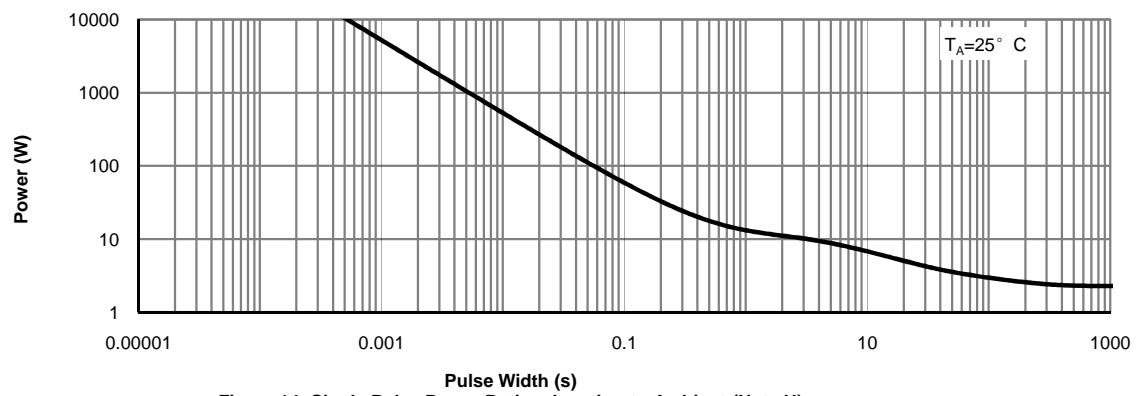
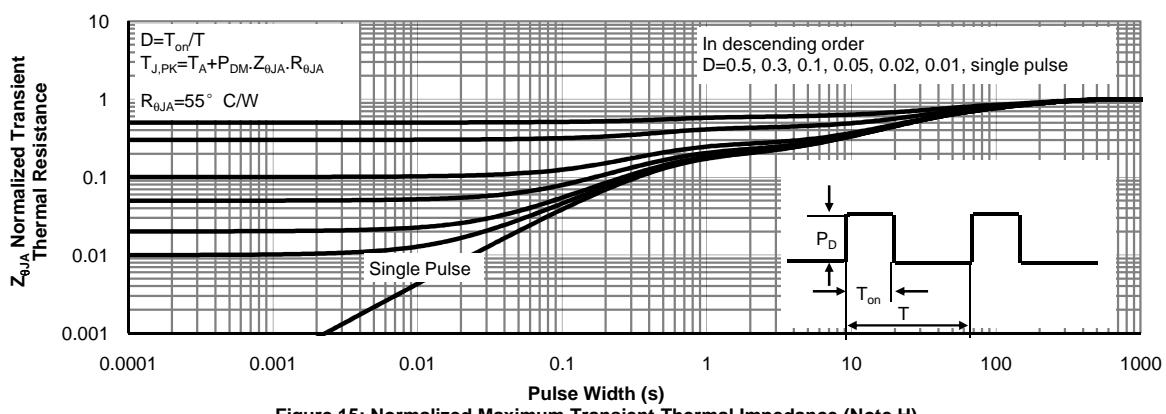
G. The maximum current rating is package limited.

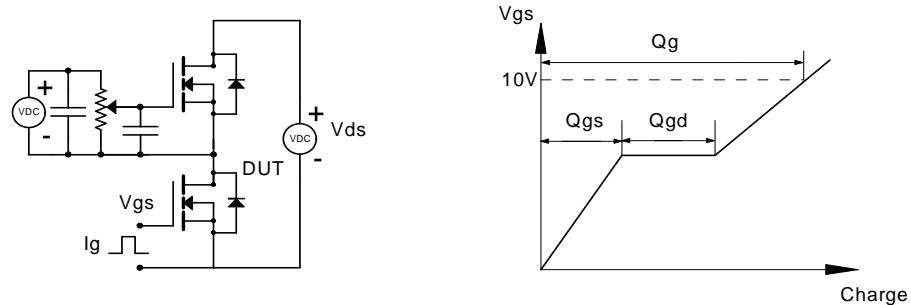
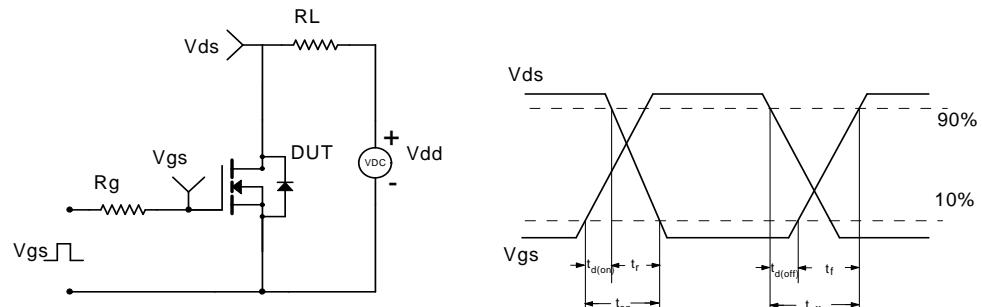
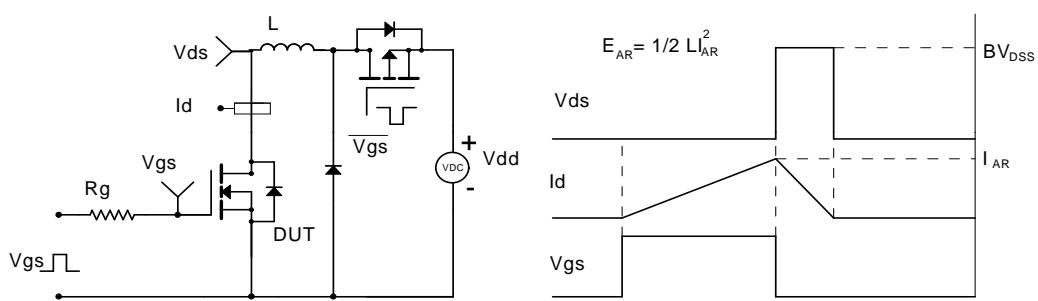
H. These tests are performed with the device mounted on 1 in² FR-4 board with 2oz. Copper, in a still air environment with $T_A=25^\circ\text{C}$.

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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

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 Derating (Note F)

Figure 13: Current Derating (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
