

**General Description**

- Proprietary α MOS5™ technology
- Low $R_{DS(ON)}$
- Optimized switching parameters for better EMI performance
- Enhanced body diode for robustness and fast reverse recovery

Applications

- PFC and PWM stages (LLC, FSFB, TTF) of Server, Telecom, Industrial, UPS, and Solar Inverters

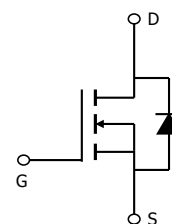
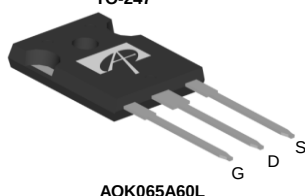
Product Summary

$V_{DS} @ T_{j,max}$	700V
I_{DM}	168A
$R_{DS(ON),max}$	< 0.065 Ω
$Q_{g,typ}$	106nC
$E_{oss} @ 400V$	11.8 μ J

100% UIS Tested
100% R_g Tested



Top View
TO-247



Orderable Part Number	Package Type	Form	Minimum Order Quantity
AOK065A60L	TO-247	Tube	240

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

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	V_{DS}	600	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current	I_D	50	A
$T_C=25^\circ\text{C}$		32	
$T_C=100^\circ\text{C}$			
Pulsed Drain Current ^C	I_{DM}	168	
Avalanche Current ^C	I_{AR}	15	A
Repetitive avalanche energy ^C	E_{AR}	112	mJ
Single pulsed avalanche energy ^G	E_{AS}	1080	mJ
MOSFET dv/dt ruggedness	dv/dt	100	V/ns
Diode reverse recovery		20	
Power Dissipation ^B	P_D	446	W
$T_C=25^\circ\text{C}$		3.6	W/ $^\circ\text{C}$
Derate above 25 $^\circ\text{C}$			
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	$^\circ\text{C}$
Maximum lead temperature for soldering purpose, 1/8" from case for 5 seconds	T_L	300	$^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	Maximum	Units
Maximum Junction-to-Ambient ^{A,D}	$R_{\theta JA}$	40	$^\circ\text{C/W}$
Maximum Case-to-sink ^A	$R_{\theta CS}$	0.5	$^\circ\text{C/W}$
Maximum Junction-to-Case	$R_{\theta JC}$	0.28	$^\circ\text{C/W}$

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

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
BV _{DSS}	Drain-Source Breakdown Voltage	I _D =250μA, V _{GS} =0V, T _J =25°C	600			V
		I _D =250μA, V _{GS} =0V, T _J =125°C		700		
BV _{DSS} /ΔT _J	Breakdown Voltage Temperature Coefficient	I _D =1mA, V _{GS} =0V		0.63		V/°C
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =600V, V _{GS} =0V			1	μA
		V _{DS} =480V, T _J =125°C			10	
I _{GSS}	Gate-Body leakage current	V _{DS} =0V, V _{GS} =±20V			±100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =5V, I _D =250μA	2.4	3	3.6	V
R _{DS(on)}	Static Drain-Source On-Resistance	V _{GS} =10V, I _D =16A		0.057	0.065	Ω
g _{FS}	Forward Transconductance	V _{DS} =10V, I _D =16A		32		S
V _{SD}	Diode Forward Voltage	I _S =16A, V _{GS} =0V		0.83	1.2	V
I _S	Maximum Body-Diode Continuous Current				50	A
I _{SM}	Maximum Body-Diode Pulsed Current ^C				168	A
DYNAMIC PARAMETERS						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =100V, f=200kHz		5960		pF
C _{oss}	Output Capacitance			160		pF
C _{o(er)}	Effective output capacitance, energy related ^H	V _{GS} =0V, V _{DS} =0 to 480V, f=200KHz		135		pF
C _{o(tr)}	Effective output capacitance, time related ^I			563		pF
C _{rss}	Reverse Transfer Capacitance	V _{GS} =0V, V _{DS} =100V, f=200KHz		1.4		pF
R _g	Gate resistance	f=1MHz		1.9		Ω
SWITCHING PARAMETERS						
Q _g	Total Gate Charge	V _{GS} =10V, V _{DS} =480V, I _D =25A		106		nC
Q _{gs}	Gate Source Charge			36		nC
Q _{gd}	Gate Drain Charge			32		nC
t _{D(on)}	Turn-On DelayTime	V _{GS} =10V, V _{DS} =400V, I _D =25A, R _G =5Ω		50		ns
t _r	Turn-On Rise Time			75		ns
t _{D(off)}	Turn-Off DelayTime			107		ns
t _f	Turn-Off Fall Time			45		ns
t _{rr}	Body Diode Reverse Recovery Time	I _F =25A, dI/dt=100A/μs, V _{DS} =400V		470		ns
I _{rm}	Peak Reverse Recovery Current			41		A
Q _{rr}	Body Diode Reverse Recovery Charge			14		μC

A. The value of R_{θJA} is measured with the device in a still air environment with T_A=25° C.

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. L=60mH, I_{AS}=6A, R_G=25Ω, Starting T_J=25° C.

H. C_{o(er)} is a fixed capacitance that gives the same stored energy as C_{oss} while V_{DS} is rising from 0 to 80% V_{(BR)DSS}.

I. C_{o(tr)} is a fixed capacitance that gives the same charging time as C_{oss} while V_{DS} is rising from 0 to 80% V_{(BR)DSS}.

APPLICATIONS OR USES AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS ARE NOT AUTHORIZED. AOS DOES NOT ASSUME ANY LIABILITY ARISING OUT OF SUCH APPLICATIONS OR USES OF ITS PRODUCTS. AOS RESERVES THE RIGHT TO MAKE CHANGES TO PRODUCT SPECIFICATIONS WITHOUT NOTICE. IT IS THE RESPONSIBILITY OF THE CUSTOMER TO EVALUATE SUITABILITY OF THE PRODUCT FOR THEIR INTENDED APPLICATION. CUSTOMER SHALL COMPLY WITH APPLICABLE LEGAL REQUIREMENTS, INCLUDING ALL APPLICABLE EXPORT CONTROL RULES, REGULATIONS AND LIMITATIONS.

AOS' products are provided subject to AOS' terms and conditions of sale which are set forth at:

http://www.aosmd.com/terms_and_conditions_of_sale

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

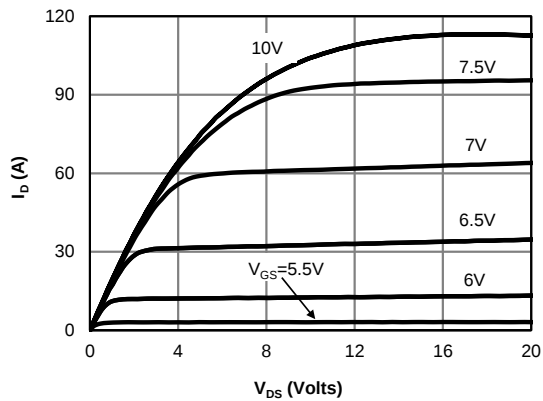


Figure 1: On-Region Characteristics

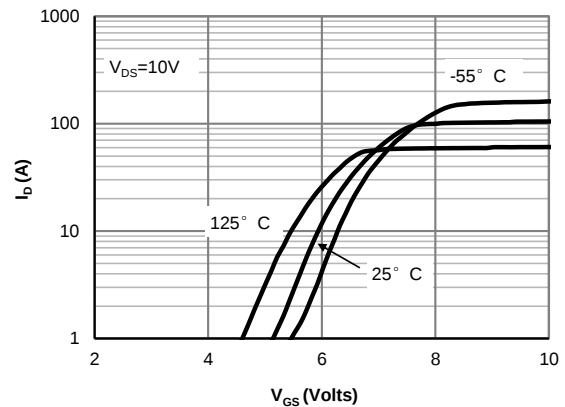


Figure 2: Transfer Characteristics

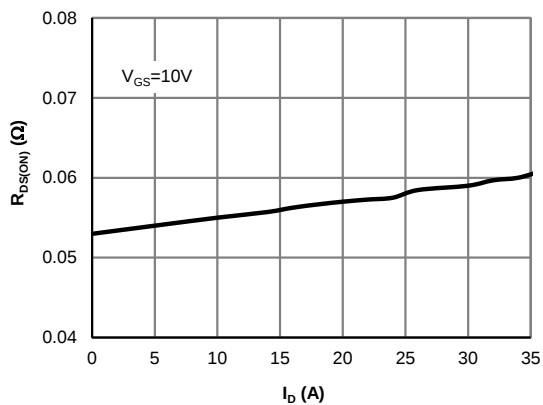


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

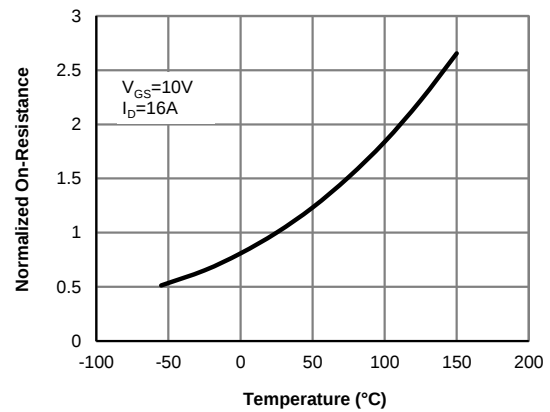


Figure 4: On-Resistance vs. Junction Temperature

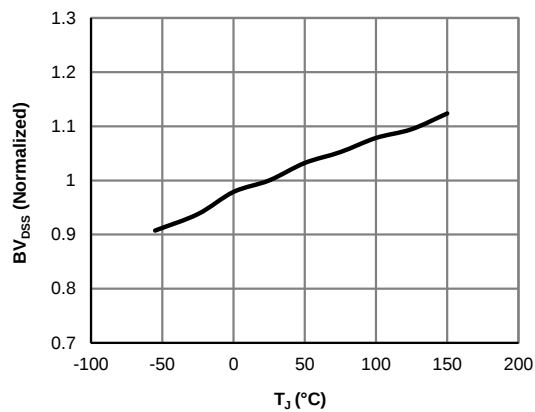


Figure 5: Break Down vs. Junction Temperature

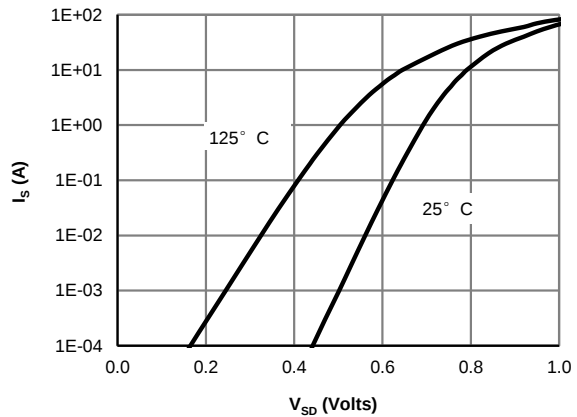


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

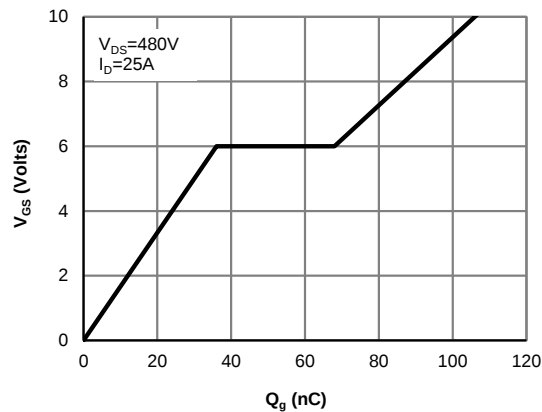


Figure 7: Gate-Charge Characteristics

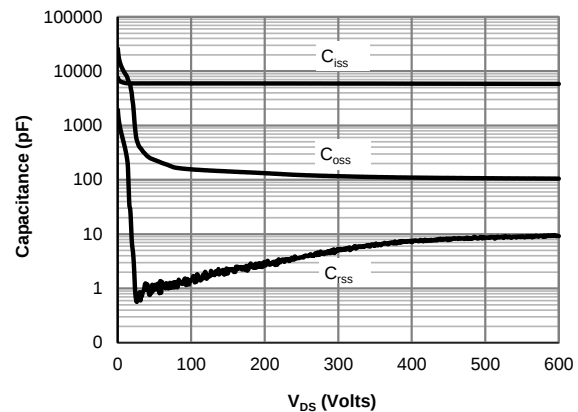


Figure 8: Capacitance Characteristics

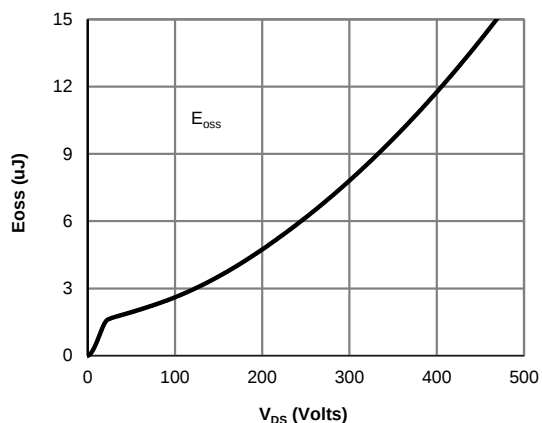


Figure 9: Coss stored Energy

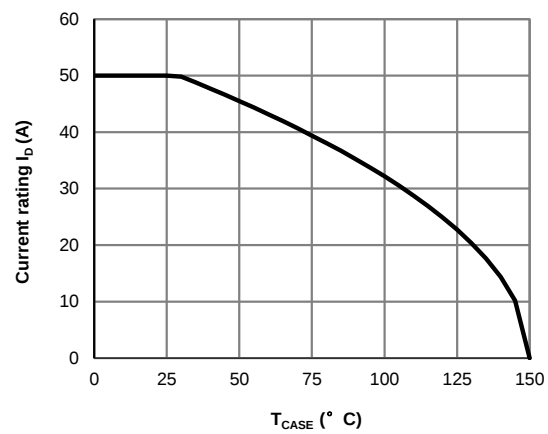


Figure 10: Current De-rating (Note F)

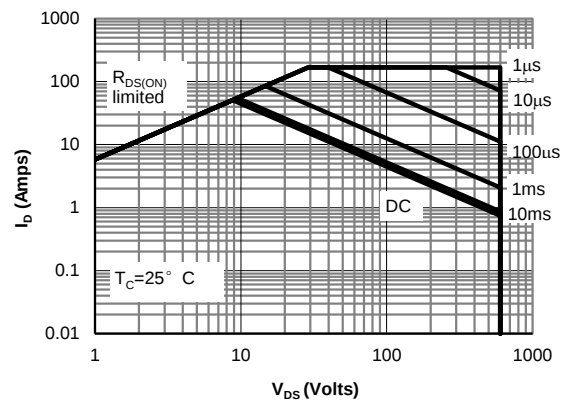


Figure 11: Maximum Forward Biased Safe Operating Area (Note F)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

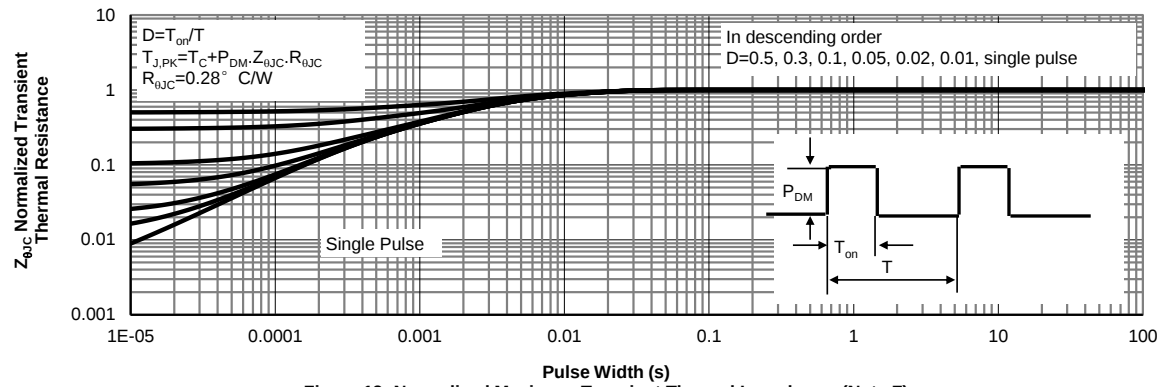
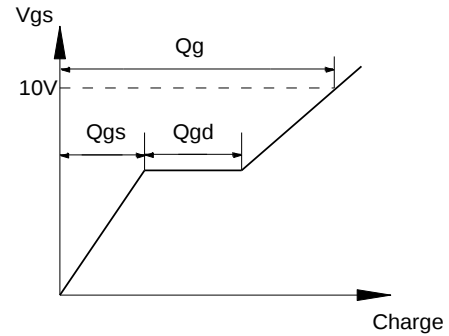
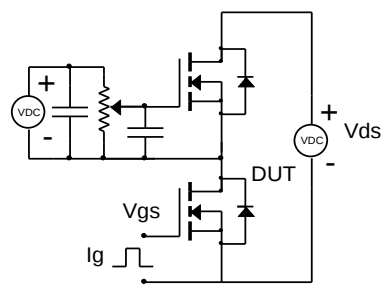
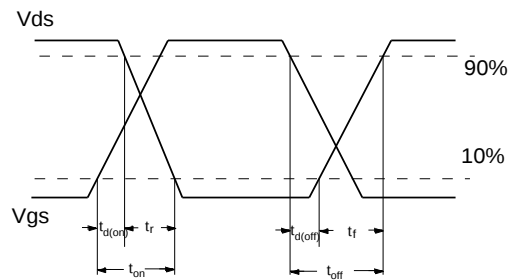
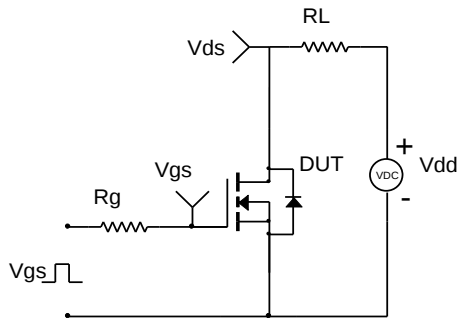


Figure 12: Normalized Maximum Transient Thermal Impedance (Note F)

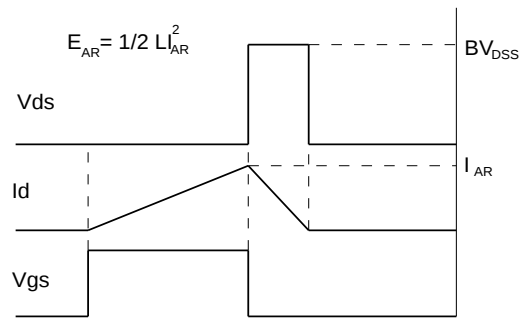
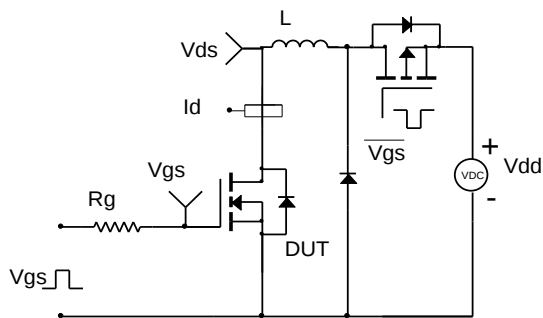
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

