

AOK8N80 Datasheet



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DiGi Electronics Part Number	AOK8N80-DG
Manufacturer	Alpha & Omega Semiconductor Inc.
Manufacturer Product Number	AOK8N80
Description	MOSFET N-CH 800V 7.4A TO247
Detailed Description	N-Channel 800 V 7.4A (Tc) 245W (Tc) Through Hole TO-247



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Purchase and inquiry

Manufacturer Product Number:

AOK8N80

Series:

-

FET Type:

N-Channel

Drain to Source Voltage (Vdss):

800 V

Drive Voltage (Max Rds On, Min Rds On):

10V

Vgs(th) (Max) @ Id:

4.5V @ 250µA

Vgs (Max):

±30V

FET Feature:

-

Operating Temperature:

-55°C ~ 150°C (Tj)

Supplier Device Package:

TO-247

Base Product Number:

AOK8

Manufacturer:

Alpha & Omega Semiconductor Inc.

Product Status:

Obsolete

Technology:

MOSFET (Metal Oxide)

Current - Continuous Drain (Id) @ 25°C:

7.4A (Tc)

Rds On (Max) @ Id, Vgs:

1.630hm @ 4A, 10V

Gate Charge (Qg) (Max) @ Vgs:

32 nC @ 10 V

Input Capacitance (Ciss) (Max) @ Vds:

1650 pF @ 25 V

Power Dissipation (Max):

245W (Tc)

Mounting Type:

Through Hole

Package / Case:

TO-247-3

Environmental & Export classification

RoHS Status:

ROHS3 Compliant

REACH Status:

REACH Unaffected

HTSUS:

8541.29.0095

Moisture Sensitivity Level (MSL):

1 (Unlimited)

ECCN:

EAR99



AOK8N80

800V, 7.4A N-Channel MOSFET

General Description

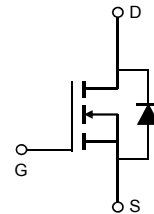
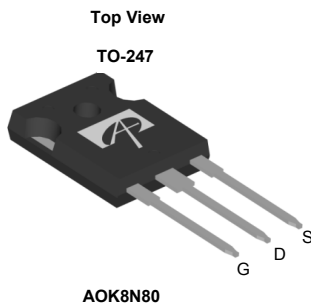
The AOK8N80 is fabricated using an advanced high voltage MOSFET process that is designed to deliver high levels of performance and robustness in popular AC-DC applications. By providing low $R_{DS(on)}$, C_{iss} and C_{rss} along with guaranteed avalanche capability this part can be adopted quickly into new and existing offline power supply designs.

For Halogen Free add "L" suffix to part number:
AOK8N80L

Product Summary

V_{DS}	900@150°C
I_D (at $V_{GS}=10V$)	7.4A
$R_{DS(ON)}$ (at $V_{GS}=10V$)	< 1.63Ω

100% UIS Tested
100% R_g Tested



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

Parameter	Symbol	AOK8N80	Units
Drain-Source Voltage	V_{DS}	800	V
Gate-Source Voltage	V_{GS}	±30	V
Continuous Drain Current	I_D	$T_C=25^\circ\text{C}$	7.4
		$T_C=100^\circ\text{C}$	4.6
Pulsed Drain Current ^C	I_{DM}	26	A
Avalanche Current ^C	I_{AR}	3.8	A
Repetitive avalanche energy ^C	E_{AR}	217	mJ
Single plused avalanche energy ^G	E_{AS}	433	mJ
Peak diode recovery dv/dt	dv/dt	5	V/ns
Power Dissipation ^B	P_D	$T_C=25^\circ\text{C}$	245
		Derate above 25°C	2
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	°C
Maximum lead temperature for soldering purpose, 1/8" from case for 5 seconds	T_L	300	°C

Thermal Characteristics

Parameter	Symbol	AOK8N80	Units
Maximum Junction-to-Ambient ^{A,D}	$R_{\theta JA}$	40	°C/W
Maximum Case-to-sink ^A	$R_{\theta CS}$	0.5	°C/W
Maximum Junction-to-Case	$R_{\theta JC}$	0.51	°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	800			V
		I _D =250μA, V _{GS} =0V, T _J =150°C		900		
BV _{DSS} /ΔT _J	Breakdown Voltage Temperature Coefficient	I _D =250μA, V _{GS} =0V		0.86		V/°C
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =800V, V _{GS} =0V			1	μA
		V _{DS} =640V, T _J =125°C			10	
I _{GSS}	Gate-Body leakage current	V _{DS} =0V, V _{GS} =±30V			±100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =5V, I _D =250μA	3.3	3.9	4.5	V
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =10V, I _D =4A		1.35	1.63	Ω
g _{FS}	Forward Transconductance	V _{DS} =40V, I _D =4A		9		S
V _{SD}	Diode Forward Voltage	I _S =1A, V _{GS} =0V		0.72	1	V
I _S	Maximum Body-Diode Continuous Current				7.4	A
I _{SM}	Maximum Body-Diode Pulsed Current				26	A
DYNAMIC PARAMETERS						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =25V, f=1MHz	1100	1375	1650	pF
C _{oss}	Output Capacitance		70	101	132	pF
C _{rss}	Reverse Transfer Capacitance		6	11	16	pF
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz	1.7	3.5	5.3	Ω
SWITCHING PARAMETERS						
Q _g	Total Gate Charge	V _{GS} =10V, V _{DS} =640V, I _D =8A	20	26	32	nC
Q _{gs}	Gate Source Charge		7.3			nC
Q _{gd}	Gate Drain Charge		9.1			nC
t _{D(on)}	Turn-On DelayTime	V _{GS} =10V, V _{DS} =400V, I _D =8A, R _G =25Ω		35		ns
t _r	Turn-On Rise Time		51			ns
t _{D(off)}	Turn-Off DelayTime		69			ns
t _f	Turn-Off Fall Time		41			ns
t _{rr}	Body Diode Reverse Recovery Time	I _F =8A, di/dt=100A/μs, V _{DS} =100V	380	484	585	ns
Q _{rr}	Body Diode Reverse Recovery Charge	I _F =8A, di/dt=100A/μs, V _{DS} =100V	4.5	6	7.5	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. Repetitive rating, pulse width limited by junction temperature T_{J(MAX)}=150° C. Ratings are based on low frequency and duty cycles to keep initial T_J=25° 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 <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(MAX)}=150° C. The SOA curve provides a single pulse rating.

G. L=60mH, I_{AS}=3.8A, V_{DD}=150V, R_G=25Ω, Starting T_J=25° C

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

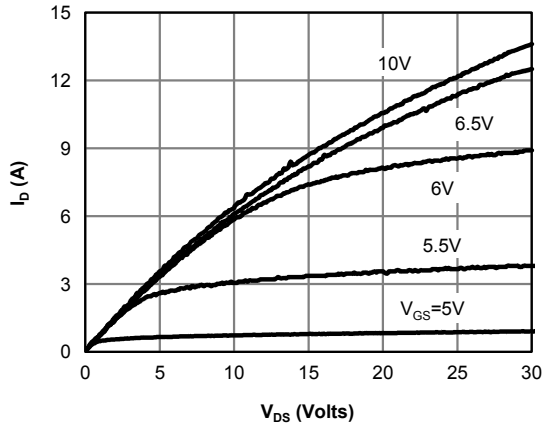


Fig 1: On-Region Characteristics

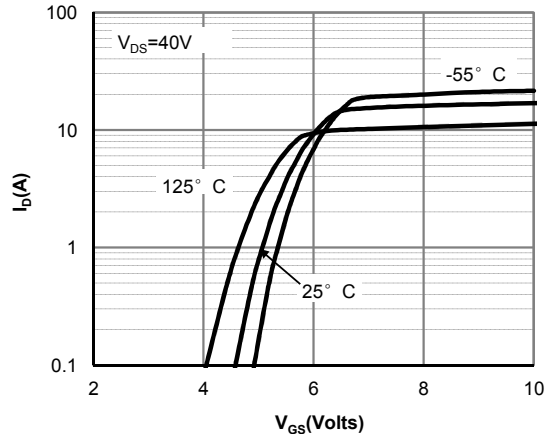


Figure 2: Transfer Characteristics

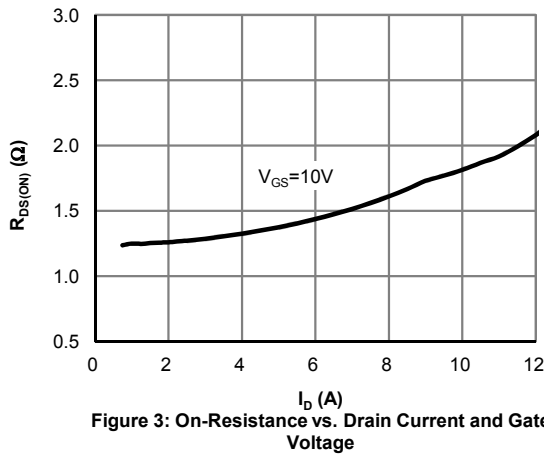


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

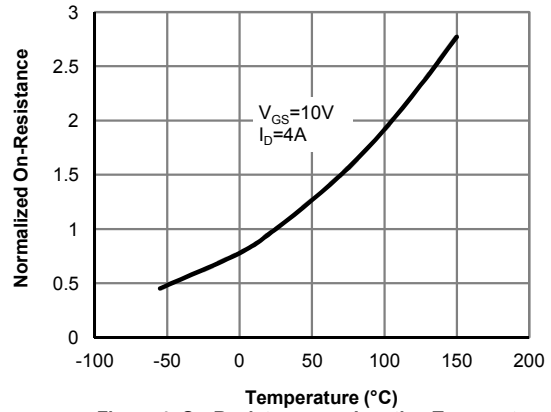


Figure 4: On-Resistance vs. Junction Temperature

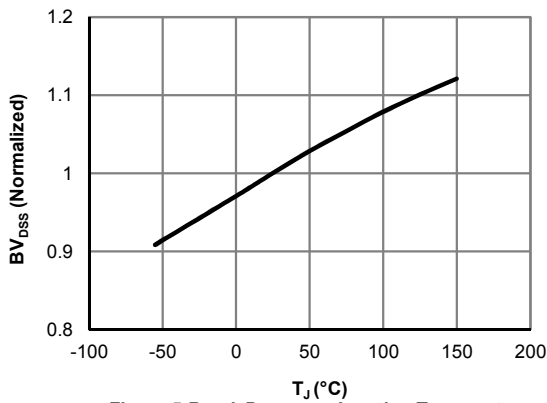


Figure 5: Break Down vs. Junction Temperature

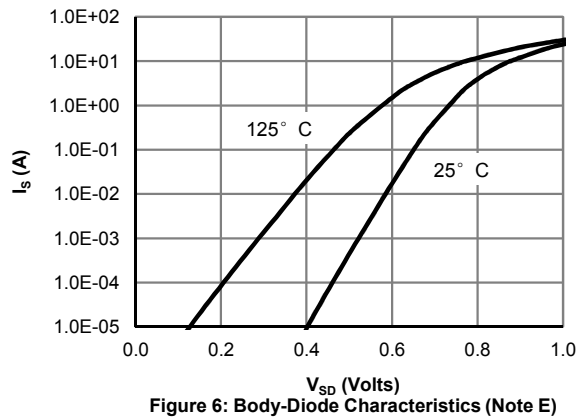


Figure 6: Body-Diode Characteristics (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

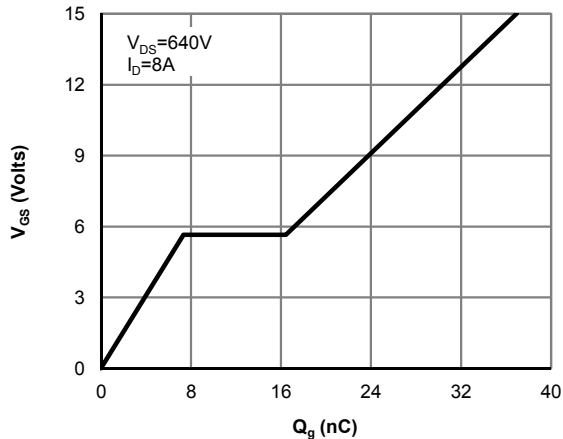


Figure 7: Gate-Charge Characteristics

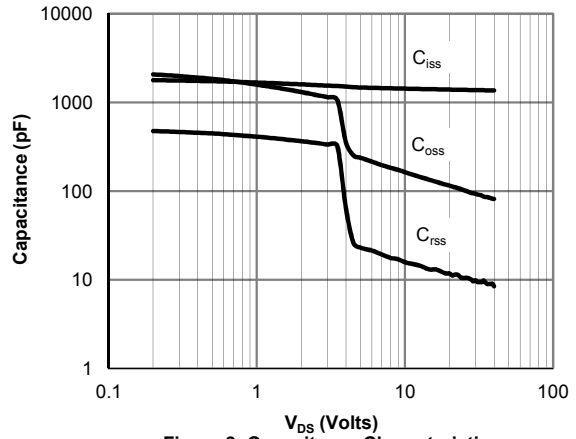


Figure 8: Capacitance Characteristics

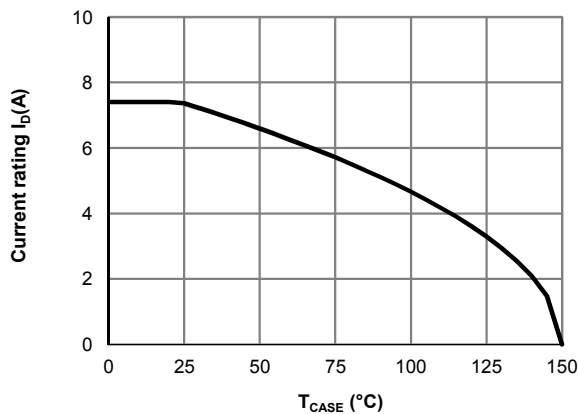


Figure 9: Current De-rating (Note B)

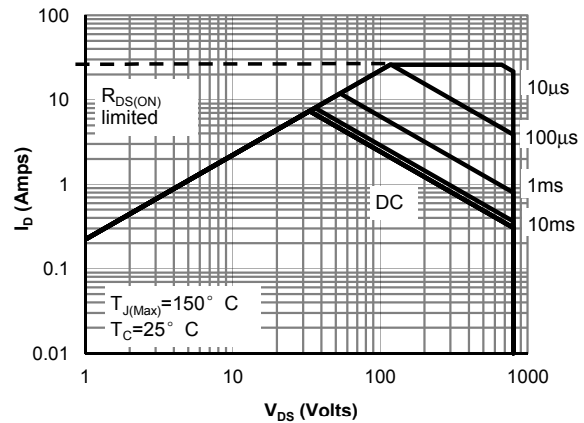


Figure 10: Maximum Forward Biased Safe Operating Area for AOK5N100 (Note F)

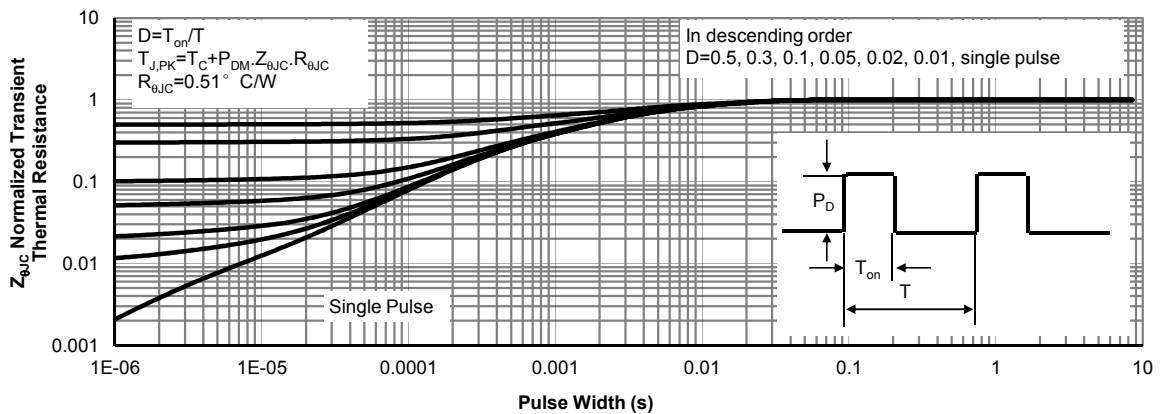
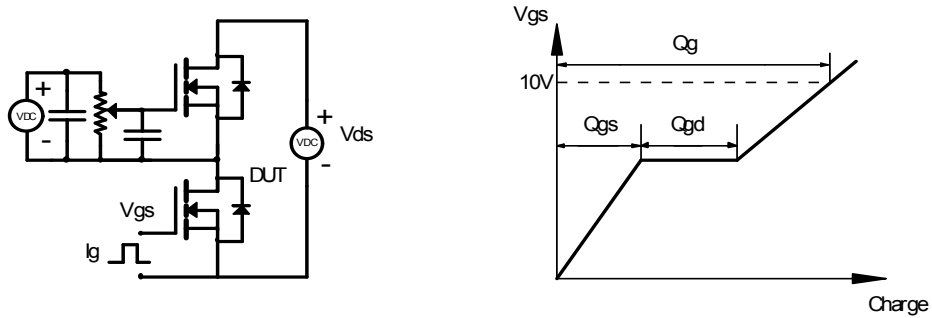
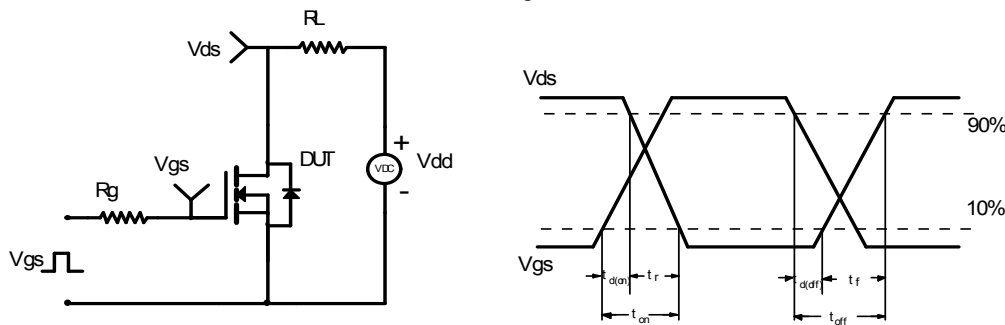


Figure 11: Normalized Maximum Transient Thermal Impedance for AOK5N100 (Note F)

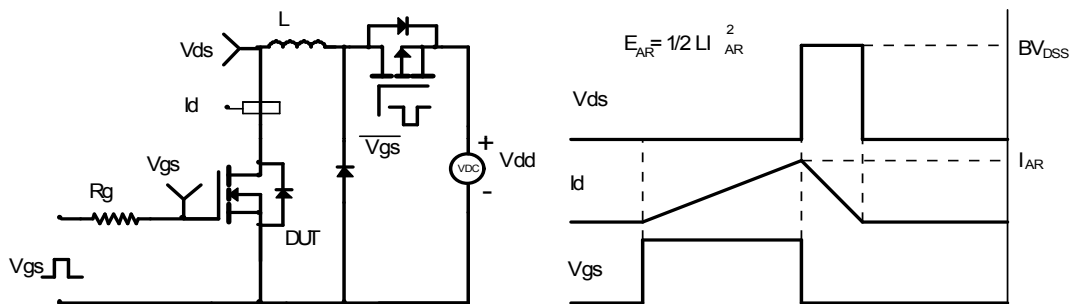
Gate Charge Test Circuit & Waveform



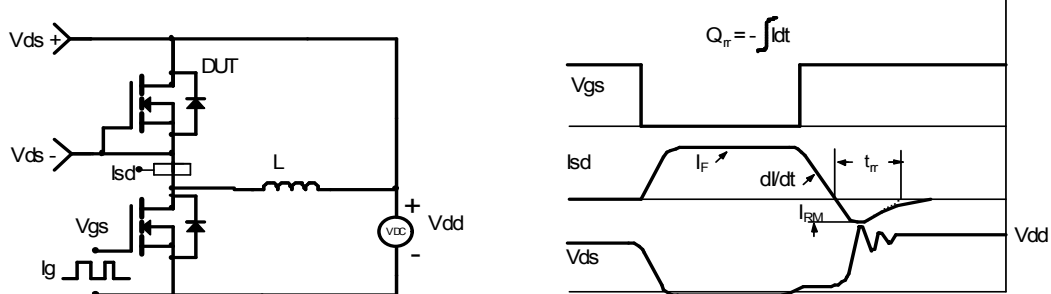
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



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