

300V 59A N-Channel Enhancement Mode Power MOSFET

Description

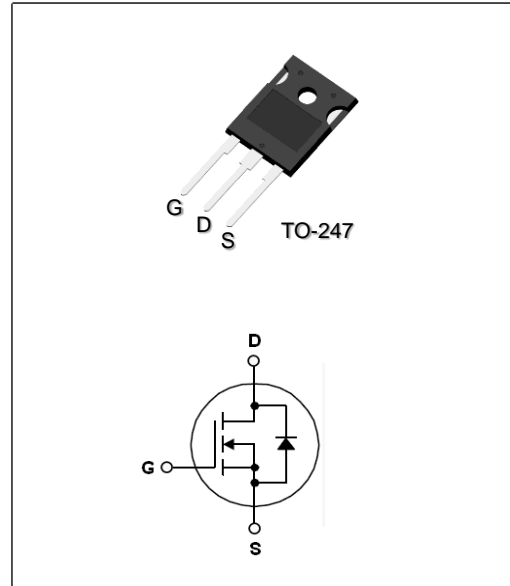
The AKQH59N30 is an N-Channel enhancement mode power MOSFET which using proprietary planar stripe and DMOS technology, it has extremely low static on-resistance and high avalanche energy strength. This device provide excellent switching performance for switched mode power supplies.

Features

- Advanced Trench Technology
- Typical on-Resistance:
 $R_{DS(on)}=55m\Omega @ V_{GS}=10V, I_D=59A$
- Rated Avalanche Energy
- RoHS Compliant

Applications

- Switched Mode Power Supplies
- Motor Control
- Synchronous Rectification



Absolute Maximum Ratings @ $T_C=25^\circ C$ unless otherwise noted

Symbol	Parameter	Ratings	Unit	
V_{DSS}	Drain to Source Voltage	300	V	
V_{GSS}	Gate to Source Voltage	± 25	V	
I_D	Drain Current	$T_C=25^\circ C$	59	A
		$T_C=100^\circ C$	35	A
I_{DM}	Pulsed Drain Current (Note1)	236	A	
P_D	Maximum Power Dissipation	$T_C=25^\circ C$	500	W
	Derate above $25^\circ C$		4	W/ $^\circ C$
E_{AS}	Single Pulsed Avalanche Energy (Note 2)	2800	mJ	
T_J	Operating Junction Temperature Range	-55~+150	$^\circ C$	
T_{STG}	Storage Temperature Range	-55~+150	$^\circ C$	

Thermal Characteristics

Symbol	Parameter	Ratings	Unit
$R_{th(J-C)}$	Thermal Resistance, Junction to case	0.25	$^\circ C/W$
$R_{th(J-A)}$	Thermal Resistance, Junction to Ambient	40	$^\circ C/W$

Electrical Characteristics @T_c=25 °C unless otherwise noted

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV _{DSS}	Drain to Source Breakdown Voltage	V _{GS} =0V, I _D =250uA	250	-	-	V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250uA	3.0	3.35	4.0	V
R _{DS(on)}	Static Drain-Source On-Resistance	V _{GS} =10V, I _D =29.5A	-	55	-	mΩ
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =V _{DSS} , V _{GS} =0V	-	-	1	uA
I _{GSS}	Gate to Source Leakage Current	V _{GS} =V _{GSS} , V _{DS} =0V	-	-	±100	nA

D-S Diode Characteristics and Maximum Rating @T_c=25 °C unless otherwise noted

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I _S	Maximum Drain to Source Diode Forward Current		-	-	59	A
V _{SD}	Drain-Source Diode Forward Voltage	V _{GS} =0V, I _S =59A	-	1.0	1.2	V
t _{rr}	Reverse Recovery Time	V _{GS} =0V, I _S =59A, di/dt=-100A/us	-	245	-	ns
Q _{rr}	Reverse Recovery Charge		-	5.9	-	uC

Switching Characteristics @T_c=25 °C unless otherwise noted

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
t _{d(on)}	Turn-on Delay Time	I _D =59A, V _{DD} =150V, V _{GS} =10V R _G =25Ω (Note 3)	-	135	-	ns
t _r	Rise Time		-	550	-	ns
t _{d(off)}	Turn-off Delay Time		-	120	-	ns
t _f	Fall Time		-	190	-	ns
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =25V, f=1.0MHz	-	3450	4560	pF
C _{oss}	Output Capacitance		-	650	870	pF
C _{rss}	Reverse Transfer Capacitance		-	78	110	pF
Q _g	Total Gate Charge	I _D =59A, V _{DS} =240V V _{GS} =10V (Note 3)	-	74	-	nC
Q _{gs}	Gate to Source Charge		-	21	-	nC
Q _{gd}	Gate to Drain Charge		-	40	-	nC

Note:

1. Repetitive rating; pulse-width limited by maximum junction temperature
2. V_{DD}=100V, L=2mH, V_G=10V, I_{AS}=57A
3. Essentially independent of operating temperature typical characteristics

Typical Performance Characteristics

Fig. 1. Typical on-Resistance Characteristics

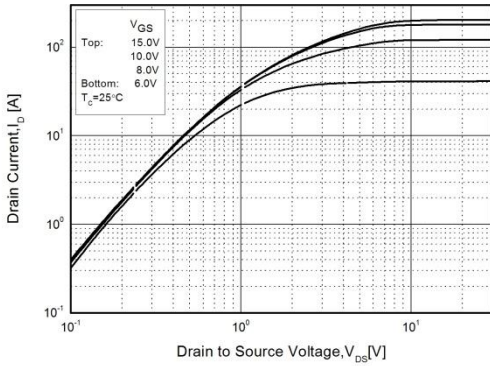


Fig. 2. Typical Transfer Characteristics

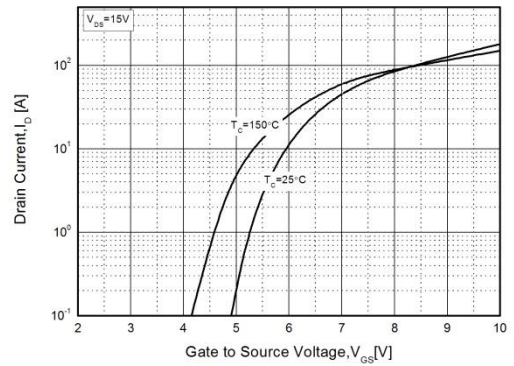


Fig. 3. Static on-Resistance vs. I_D

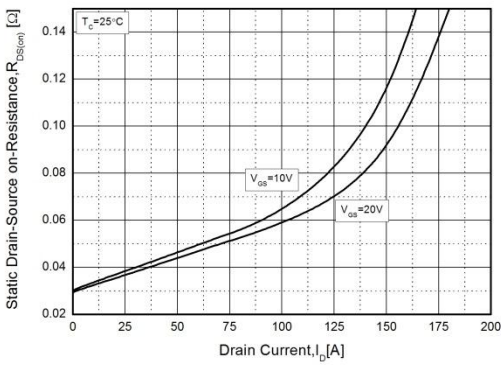


Fig. 4. Body Diode Forward Voltage vs. I_{DR}

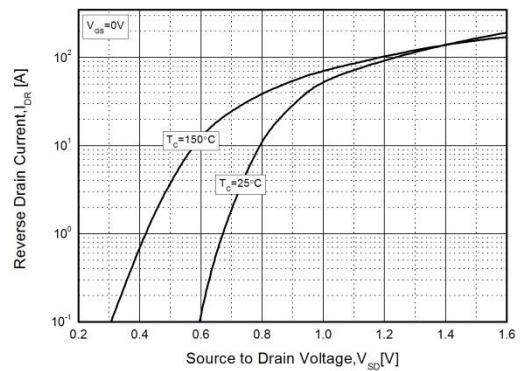


Fig. 5. Capacitance Characteristics

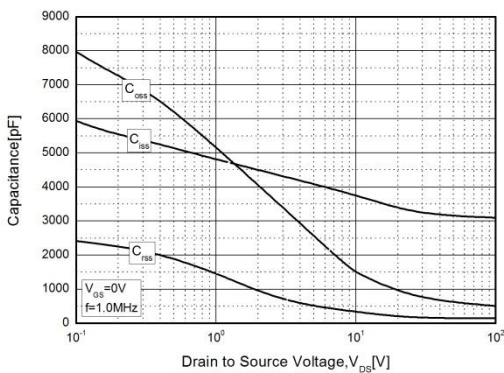
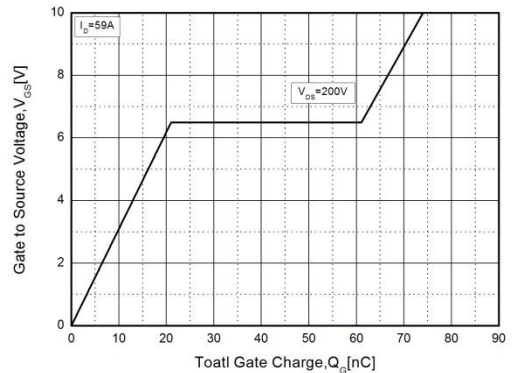


Fig. 6. Gate Charge Characteristics



Typical Performance Characteristics

Fig. 7. Breakdown Voltage vs. Temperature

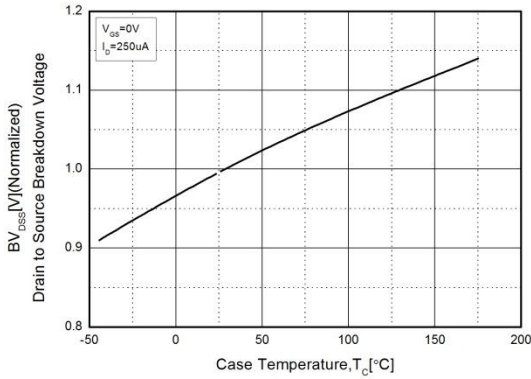


Fig. 8. Static on-Resistance vs. Temperature

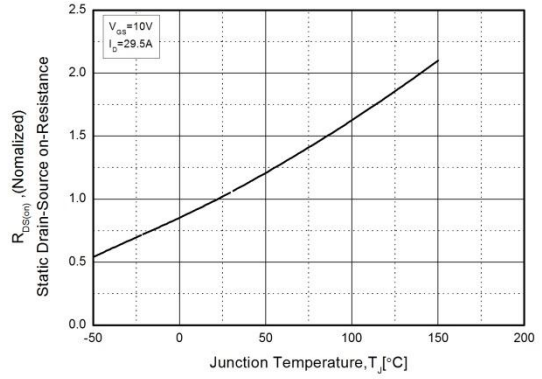


Fig. 9. Maximum Safe Operating Area

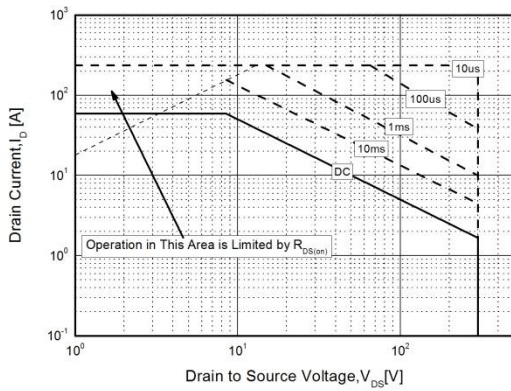


Fig. 10. Maximum Drain Current vs. Temperature

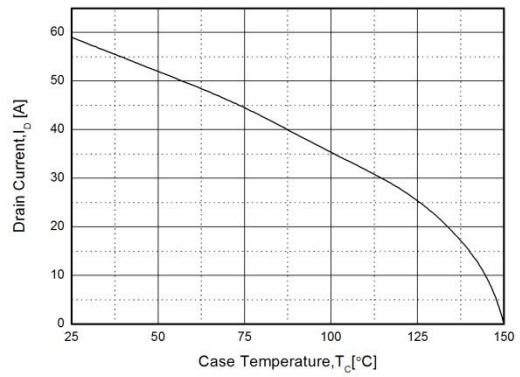
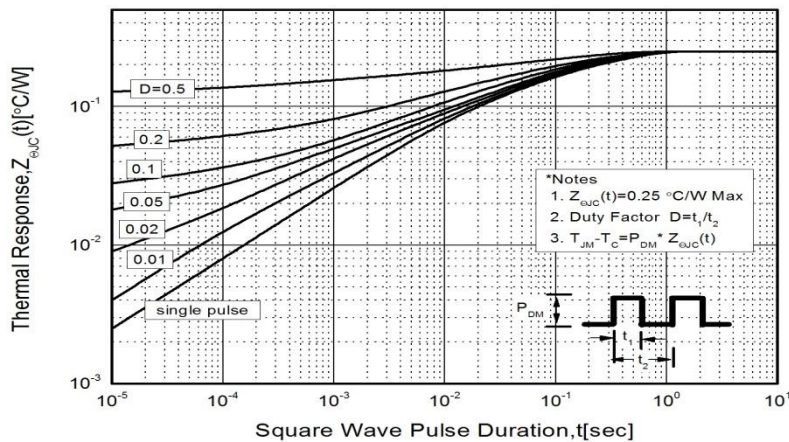


Fig. 11. Transient Thermal Response Curve



Package Dimensions

TO-247

(Dimensions in Millimeters)

