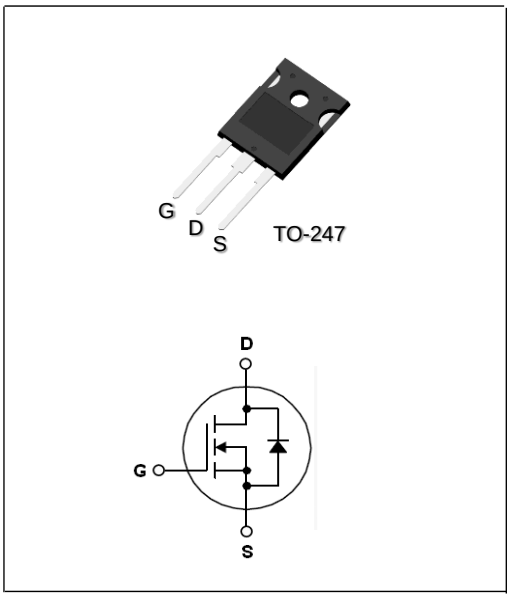
300V 59A N-Channel Enhancement Mode Power MOSFET

Description

The AKT59N30H 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:
  $R_{DS\ (on)}$=55mΩ @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 ℃ 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℃	59	A
		T_C=100℃	35	A
I_{DM}	Pulsed Drain Current	(Note1)	236	A
P_D	Maximum Power Dissipation	T_C=25℃	500	W
	Derate above 25℃		4	W/℃
E_{AS}	Single Pulsed Avalanche Energy	(Note 2)	2800	mJ
T_J	Operating Junction Temperature Range		-55~+150	℃
T_{STG}	Storage Temperature Range		-55~+150	℃

Thermal Characteristics

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

Electrical Characteristics @T_C=25 ℃ 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 ℃ 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 ℃ 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

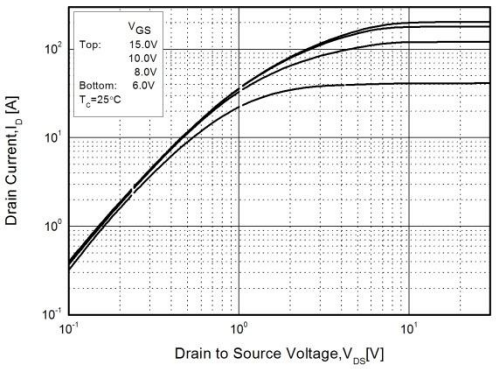


Fig. 2. Typical Transfer Characteristics

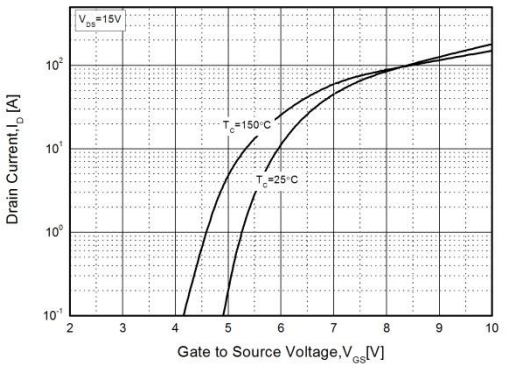


Fig. 3. Static on-Resistance vs. I_D

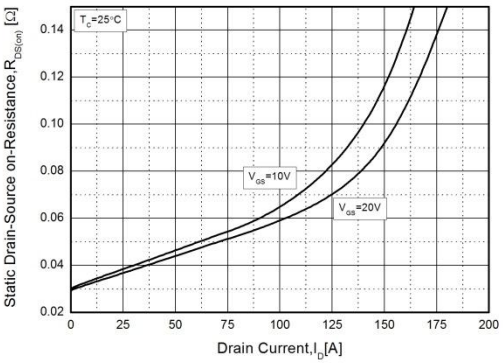


Fig. 4. Body Diode Forward Voltage vs. I_{DR}

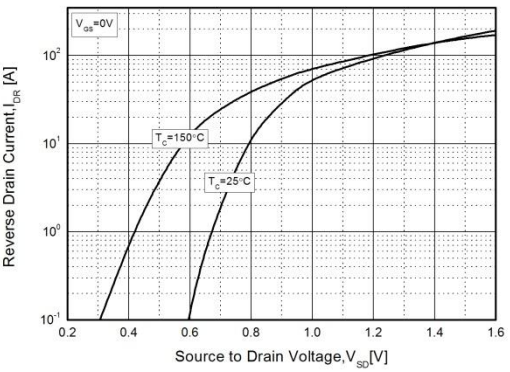


Fig. 5. Capacitance Characteristics

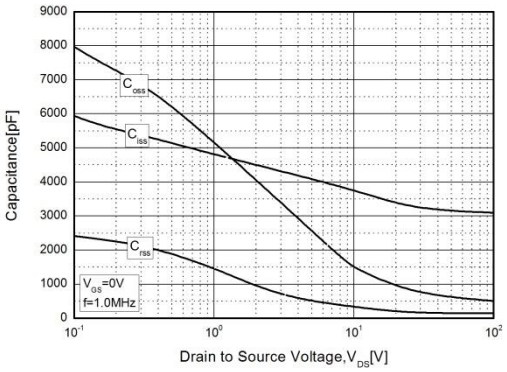
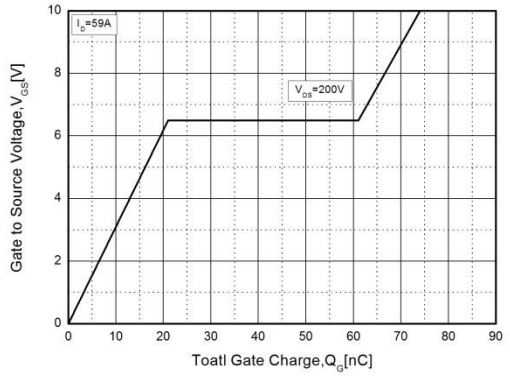


Fig. 6. Gate Charge Characteristics



Typical Performance Characteristics

Fig. 7. Breakdown Voltage vs. Temperature

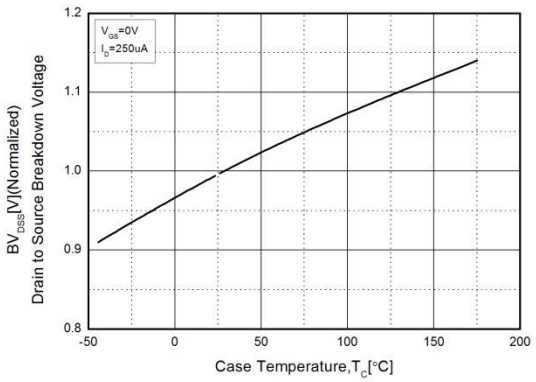


Fig. 8. Static on-Resistance vs. Temperature

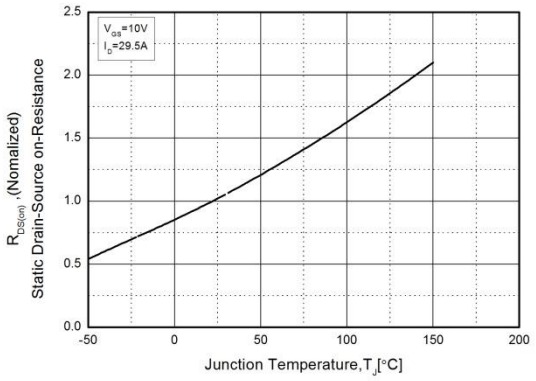


Fig. 9. Maximum Safe Operating Area

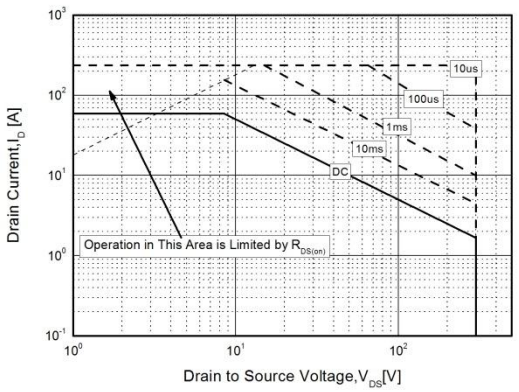


Fig. 10. Maximum Drain Current vs. Temperature

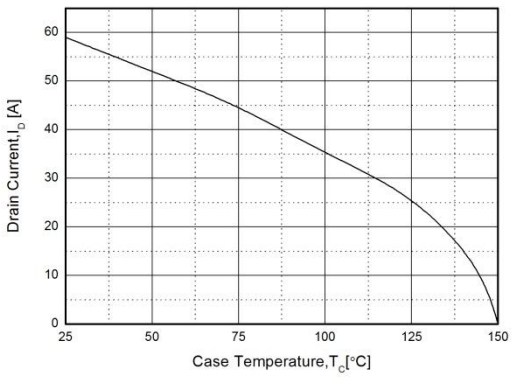
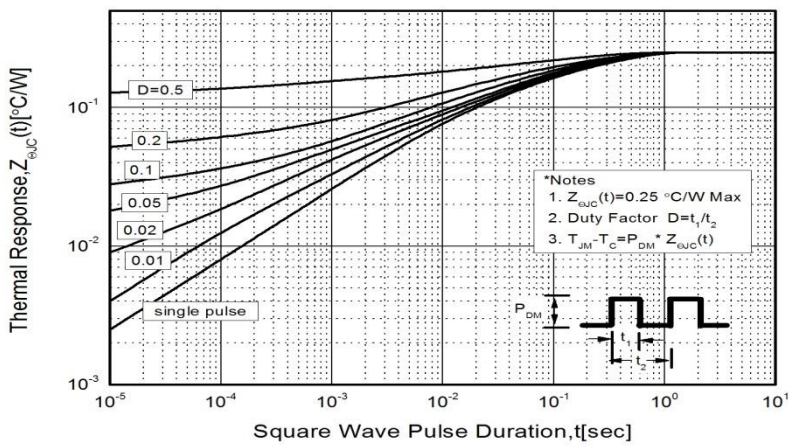


Fig. 11. Transient Thermal Response Curve



Package Dimensions

TO-247

(Dimensions in Millimeters)