

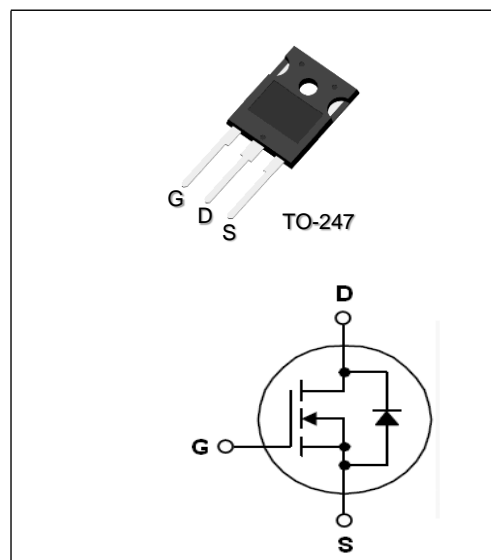
250V 40A N-Channel Enhancement Mode Power MOSFET

Description

The AKQH40N25 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:
 $R_{DS(on)}=43m\Omega$ @ $V_{GS}=10V$, $I_D=40A$
- 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	250	V
V_{GSS}	Gate to Source Voltage	± 25	V
I_D	Drain Current	$T_C=25^\circ C$	40
		$T_C=100^\circ C$	25
I_{DM}	Pulsed Drain Current (Note1)	160	A
P_D	Maximum Power Dissipation	$T_C=25^\circ C$	280
	Derate above $25^\circ C$		2.2
E_{AS}	Single Pulsed Avalanche Energy (Note 2)	3200	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	0.45	$^\circ C/W$
$R_{th(J-A)}$	Thermal Resistance, Junction to Ambient	40	$^\circ C/W$

Electrical Characteristics @ $T_c=25\text{ }^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain to Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	250	-	-	V
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	3	3.35	4	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	$V_{GS}=10V, I_D=20A$	-	43	-	m Ω
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=V_{DSS}, V_{GS}=0V$	-	-	1	μA
I_{GSS}	Gate to Source Leakage Current	$V_{GS}=V_{GSS}, V_{DS}=0V$	-	-	± 100	nA

D-S Diode Characteristics and Maximum Rating @ $T_c=25\text{ }^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Maximum Drain to Source Diode Forward Current		-	-	40	A
V_{SD}	Drain-Source Diode Forward Voltage	$V_{GS}=0V, I_S=40A$	-	0.92	1.2	V
t_{rr}	Reverse Recovery Time	$V_{GS}=0V, I_S=70A,$	-	215	-	ns
Q_{rr}	Reverse Recovery Charge	$di/dt=-100A/\mu s$	-	2000	-	nC

Switching Characteristics @ $T_c=25\text{ }^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on Delay Time	$I_D=40A,$ $V_{DD}=125V, V_{GS}=10V$ $R_G=25\Omega$ (Note 3)	-	70	-	ns
t_r	Rise Time		-	550	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	120	-	ns
t_f	Fall Time		-	160	-	ns
C_{iss}	Input Capacitance	$V_{GS}=0V, V_{DS}=25V,$ $f=1.0MHz$	-	3150	3800	pF
C_{oss}	Output Capacitance		-	650	810	pF
C_{riss}	Reverse Transfer Capacitance		-	84	90	pF
Q_g	Total Gate Charge	$I_D=40A,$ $V_{DS}=200V$ $V_{GS}=10V$ (Note 3)	-	86	-	nC
Q_{gs}	Gate to Source Charge		-	25	-	nC
Q_{gd}	Gate to Drain Charge		-	45	-	nC

Note:

1. Repetitive rating; pulse-width limited by maximum junction temperature
2. $V_{DD}=100V, L=2mH, V_G=10V, I_{AS}=59A$
3. Essentially independent of operating temperature typical characteristics

Typical Performance Characteristics

Fig. 1. Typical on-Resistance Characteristics

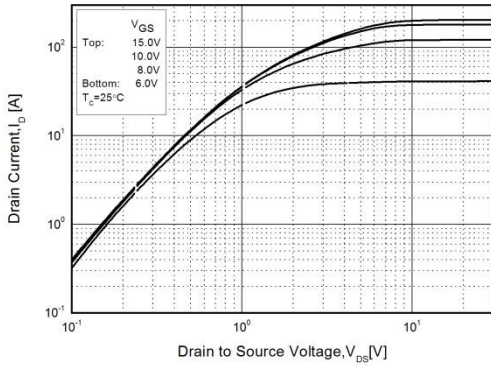


Fig. 2. Typical Transfer Characteristics

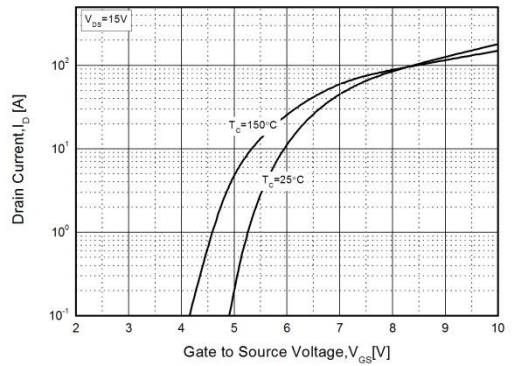


Fig. 3. Static on-Resistance vs. I_D

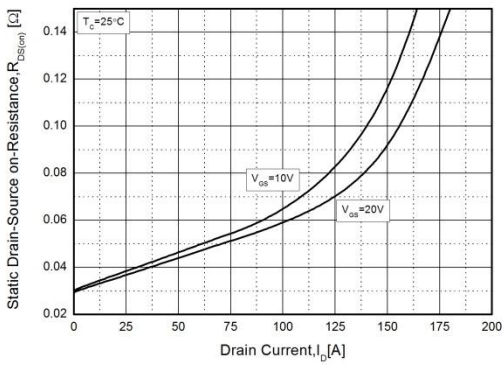


Fig. 4. Body Diode Forward Voltage vs. I_{DR}

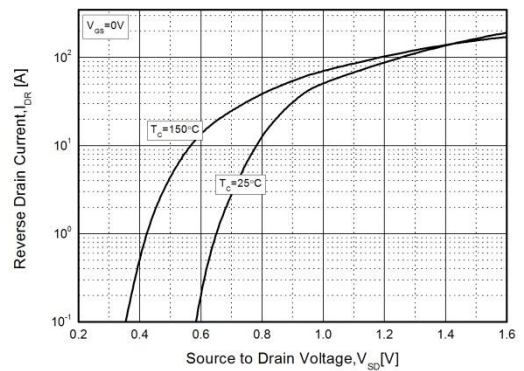


Fig. 5. Capacitance Characteristics

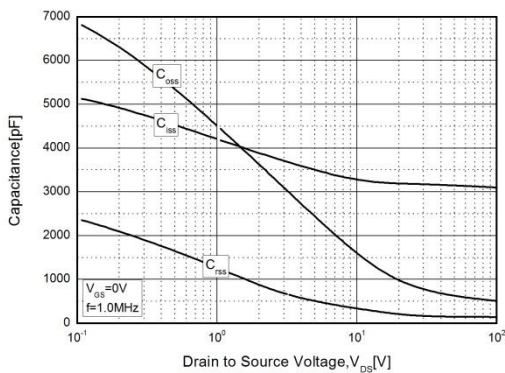
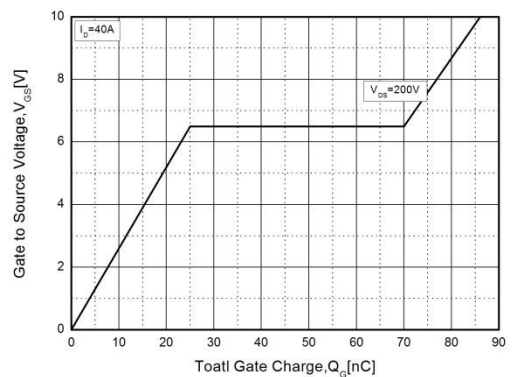


Fig. 6. Gate Charge Characteristics



Typical Performance Characteristics

Fig. 7. Breakdown Voltage vs. Temperature

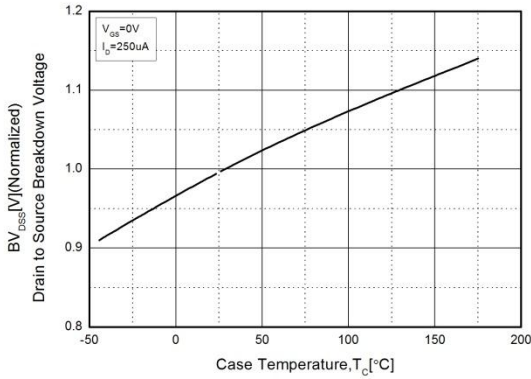


Fig. 8. Static on-Resistance vs. Temperature

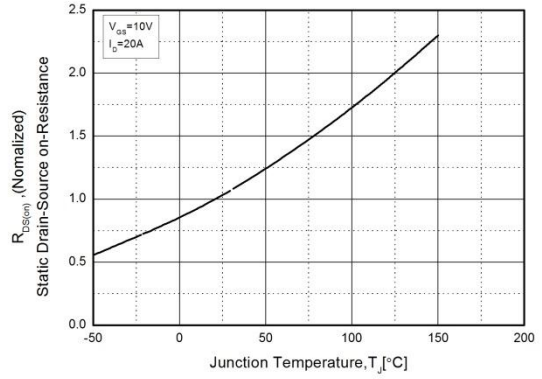


Fig. 9. Maximum Safe Operating Area

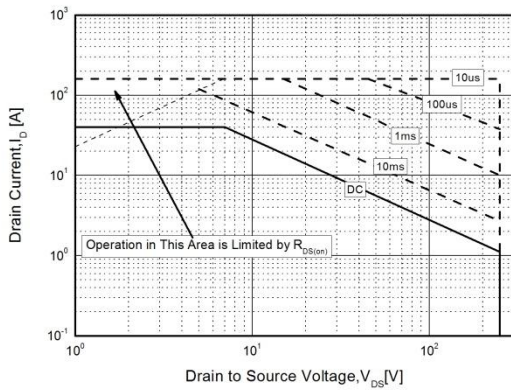


Fig. 10. Maximum Drain Current vs. Temperature

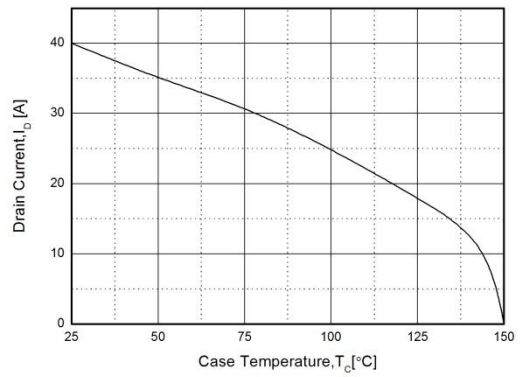
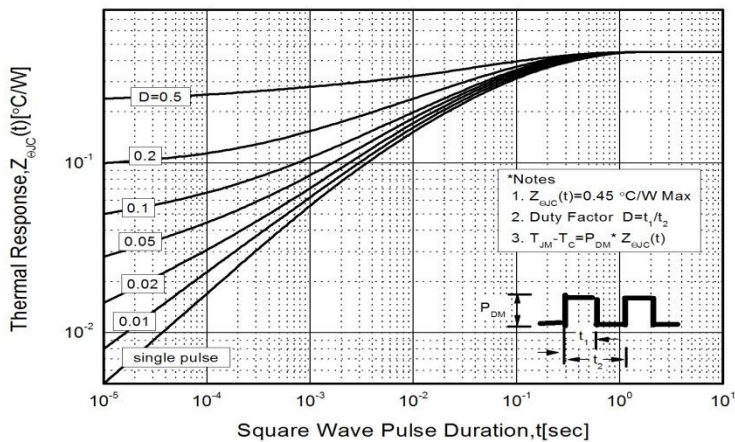


Fig. 11. Transient Thermal Response Curve



Package Dimensions

TO-247

(Dimensions in Millimeters)

