

500V 28A N-channel Enhancement Mode Power MOSFET

Description

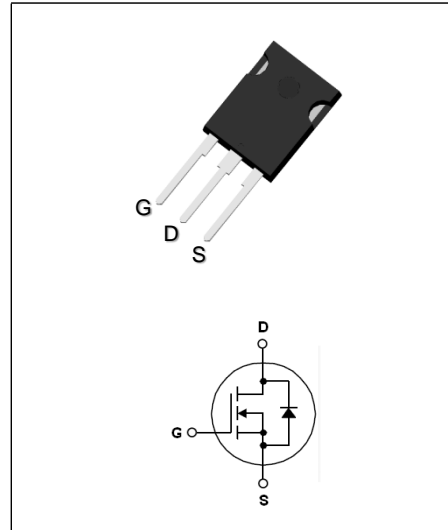
The AKQHS28N50 is an N-Channel enhancement mode power MOSFET which using proprietary planar stripe and DMOS technology. This MOSFET has low static on-resistance and high avalanche energy strength. This device provide excellent switching performance for UPS,DC-DC converters and AC-DC power supply.

Features

- Low on-Resistance: $R_{DS(on)}=0.14\Omega(\text{typ.})$
- Special Process Technology for high ESD Capability
- 100% Avalanche Test
- Good Stability and Uniformity with High E_{AS}

Applications

- UPS Applications
- DC-DC Converters and AC-DC Power Supply



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

Symbol	Parameter	Ratings	Unit	
V_{DSS}	Drain to Source Voltage	500	V	
V_{GSS}	Gate to Source Voltage	± 30	V	
I_D	Drain Current	$T_C=25^\circ\text{C}$	28	A
		$T_C=100^\circ\text{C}$	18	A
I_{DM}	Pulsed Drain Current (Note1)	126	A	
P_D	Maximum Power Dissipation	$T_C=25^\circ\text{C}$	310	W
	Derate above 25°C		2.5	W/ $^\circ\text{C}$
E_{AS}	Single Pulsed Avalanche Energy (Note 2)	3048	mJ	
T_J	Operating Junction Temperature Range	-55~+150	$^\circ\text{C}$	
T_{STG}	Storage Temperature Range	-55~+150	$^\circ\text{C}$	

Thermal Characteristics

Symbol	Parameter	Ratings	Unit
$R_{th(J-C)}$	Thermal Resistance, Junction to case	0.40	$^\circ\text{C}/\text{W}$
$R_{th(J-A)}$	Thermal Resistance, Junction to Ambient	40	$^\circ\text{C}/\text{W}$

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	$V_{GS}=0V, I_D=250\mu A$	500	-	-	V
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	3.0	3.59	5	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	$V_{GS}=10V, I_D=14A$	-	0.14	-	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		-	-	28	A
V_{SD}	Drain-Source Diode Forward Voltage	$V_{GS}=0V, I_S=28A$	-	0.935	1.1	V
t_{rr}	Reverse Recovery Time	$V_{GS}=0V, I_S=28A,$	-	-	0.4	μs
Q_{rr}	Reverse Recovery Charge	$di/dt=-100A/\mu s$	-	6.1	-	μC

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	$I_D=28A,$ $V_{DD}=250V,$ $R_G=25\Omega$ (Note 3)	-	110	-	ns
t_r	Rising Time		-	310	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	210	-	ns
t_f	Falling Time		-	195	-	ns
C_{iss}	Input Capacitance	$V_{GS}=0V, V_{DS}=25V,$ $f=1.0MHz$	-	4700	-	pF
C_{oss}	Output Capacitance		-	680	-	pF
C_{riss}	Reverse Transfer Capacitance		-	70	-	pF
Q_g	Total Gate Charge	$I_D=28A,$ $V_{DS}=400V$ $V_{GS}=10V$ (Note 3)	-	115	-	nC
Q_{gs}	Gate to Source Charge		-	30	-	nC
Q_{gd}	Gate to Drain Charge		-	54	-	nC

Note:

1. Repetitive rating: pulse-width limited by maximum junction temperature
2. $L=5mH, V_{DD}=100V, V_G=10V, @T_C=25\text{ }^\circ\text{C}$
3. Essentially independent of operating temperature typical characteristics

Typical Characteristics

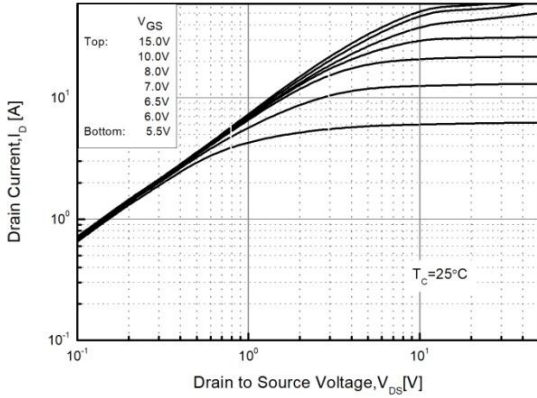


Figure 1. On-Region Characteristics

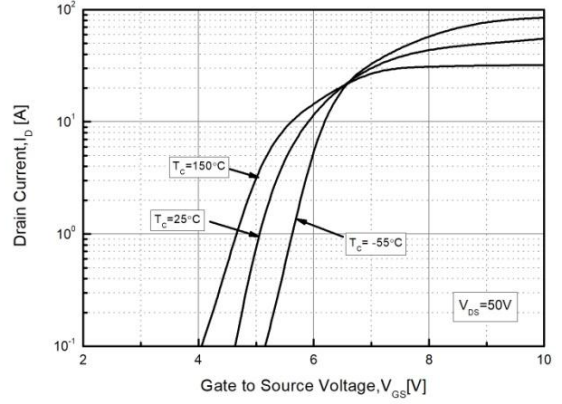


Figure 2. Transfer Characteristics

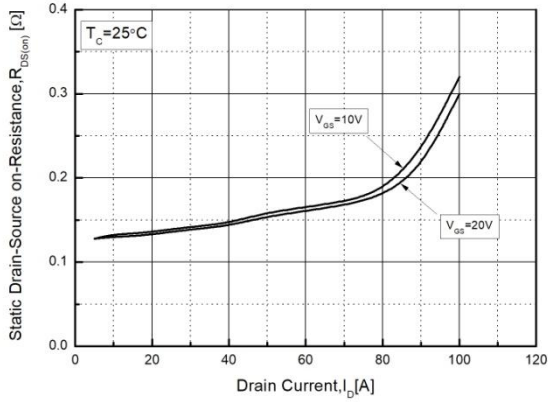


Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage

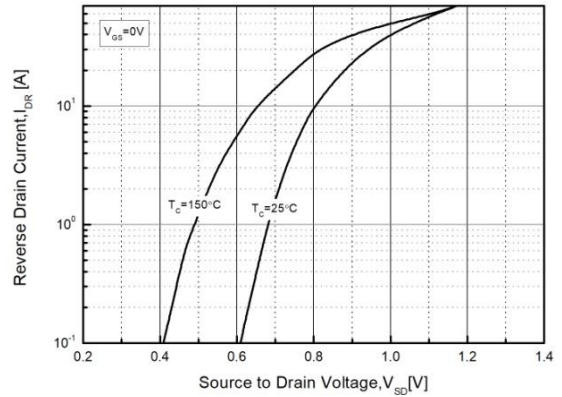


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

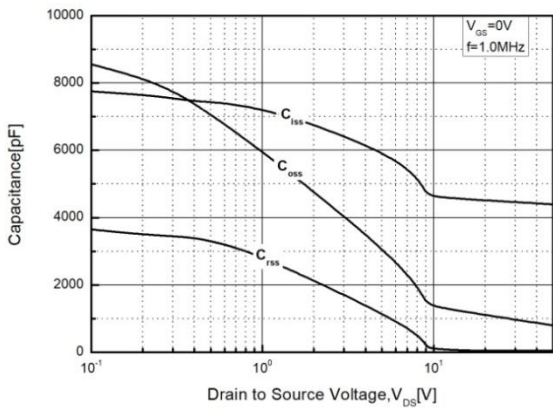


Figure 5. Capacitance Characteristics

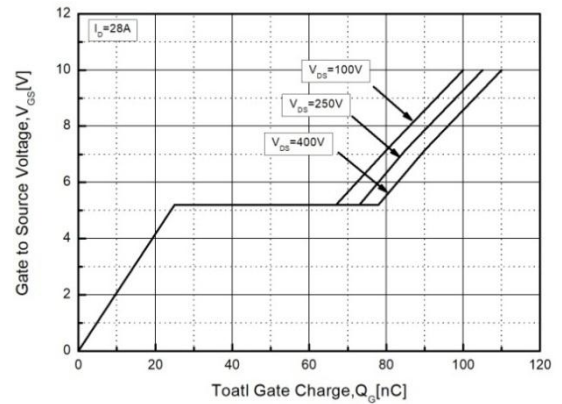


Figure 6. Gate Charge Characteristics

Typical Characteristics (Continued)

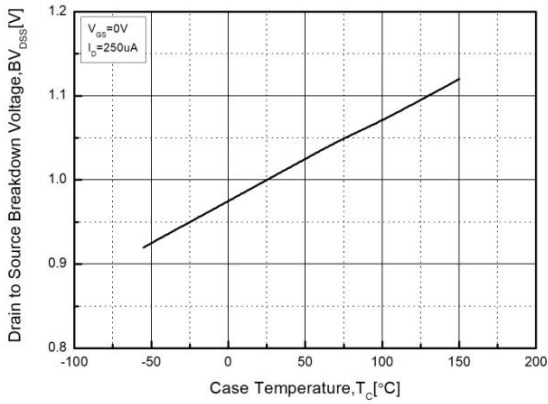


Figure 7. Breakdown Voltage Variation vs. Temperature

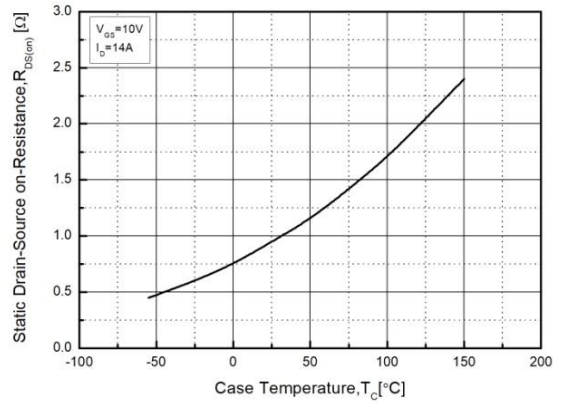


Figure 8. On-Resistance Variation vs. Temperature

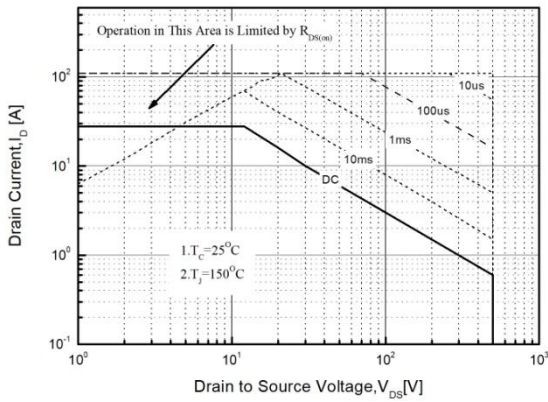


Figure 9. Maximum Safe Operating Area

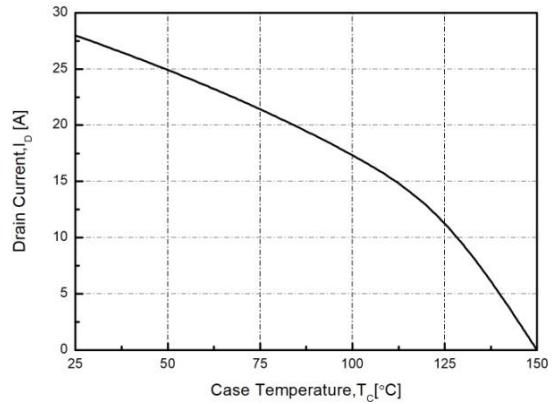


Figure 10. Maximum Drain Current vs. Case Temperature

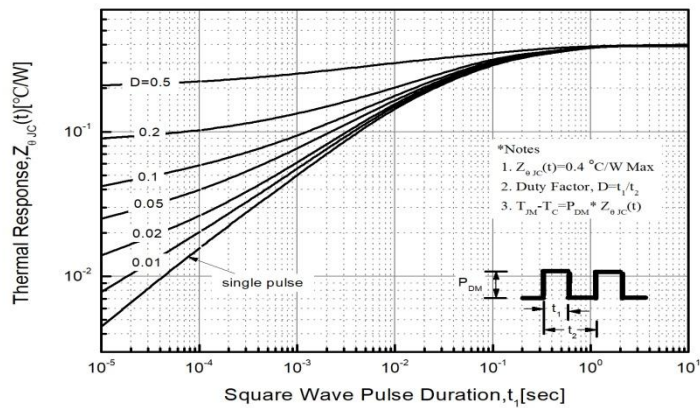


Figure 11. Transient Thermal Response Curve

Package Dimensions

Super TO-247

(Dimensions in Millimeters)

