

900V 13A N-Channel Enhancement Mode Power MOSFET

Description

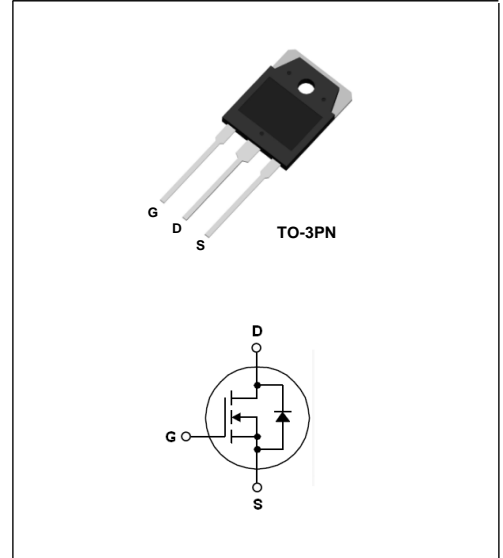
The AKQA13N90 is an high blocking voltage N-Channel power MOSFET which using proprietary planar stripe and DMOS technology. This device provide excellent performance for high voltage power supplies or pulse circuits.

Features

- Typical on-Resistance: $R_{DS(on)}=0.57\Omega$
- High Blocking Voltage
- 100% Avalanche Test
- Good Stability and Uniformity with High E_{AS}

Applications

- High Voltage Power Supplies
- Capacitor Discharge Applications
- Pulse Circuits



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

Symbol	Parameter	Ratings	Unit
V_{DSS}	Drain to Source Voltage	900	V
V_{GSS}	Gate to Source Voltage	± 30	V
I_D	Drain Current	$T_C=25\text{ }^\circ\text{C}$	13
		$T_C=100\text{ }^\circ\text{C}$	6.3
I_{DM}	Pulsed Drain Current (Note1)	52	A
P_D	Maximum Power Dissipation	$T_C=25\text{ }^\circ\text{C}$	300
	Derate above $25\text{ }^\circ\text{C}$		2.38
E_{AS}	Single Pulsed Avalanche Energy (Note 2)	1100	mJ
T_J	Operating Junction Temperature Range	-50~+150	$^\circ\text{C}$
T_{STG}	Storage Temperature Range	-50~+150	$^\circ\text{C}$

Thermal Characteristics

Symbol	Parameter	Ratings	Unit
$R_{th(J-C)}$	Thermal Resistance, Junction to case	0.41	$^\circ\text{C/W}$
$R_{th(J-A)}$	Thermal Resistance, Junction to Ambient	40	$^\circ\text{C/W}$

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	900	-	-	V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250uA	3.0	3.8	5.0	V
R _{DS(on)}	Static Drain-Source On-Resistance	V _{GS} =10V, I _D =6.3A	-	0.57	1.2	Ω
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =V _{DSS} , V _{GS} =0V	-	-	10	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		-	-	11.0	A
V _{SD}	Drain-Source Diode Forward Voltage	V _{GS} =0V, I _S =13A	-	0.85	1.4	V
t _{rr}	Reverse Recovery Time	V _{GS} =0V, I _S =13A, di/dt=-100A/us	-	1000	-	ns
Q _{rr}	Reverse Recovery Charge		-	20	-	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 =13A , V _{DD} =450V, R _G =25Ω (Note 3)	-	65	140	ns
t _r	Rising Time		-	140	280	ns
t _{d(off)}	Turn-off Delay Time		-	140	260	ns
t _f	Falling Time		-	90	190	ns
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =25V, f=1.0MHz	-	2750	3300	pF
C _{oss}	Output Capacitance		-	240	310	pF
C _{rss}	Reverse Transfer Capacitance		-	26	32	pF
Q _g	Total Gate Charge	I _D =13A, V _{DD} =720V V _{GS} =10V (Note 3)	-	68	90	nC
Q _{gs}	Gate to Source Charge		-	14	-	nC
Q _{gc}	Gate to Drain Charge		-	26	-	nC

Note:

1. Repetitive rating: pulse-width limited by maximum junction temperature
2. V_{DD}=60V, L=13mH, V_{clamp}=1100V, V_G=10V, I_D=14.5A
3. Essentially independent of operating temperature typical characteristics

Typical Performance Characteristics

Fig. 1. Typical on-Region Characteristics

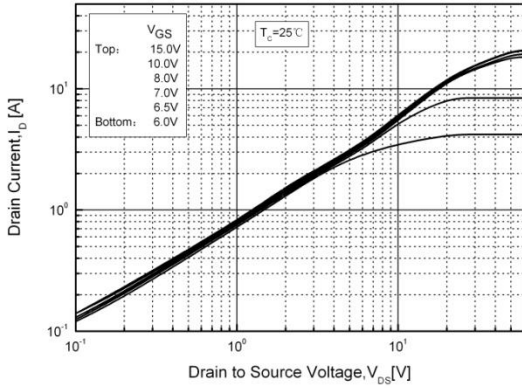


Fig. 2. Typical Transfer Characteristics

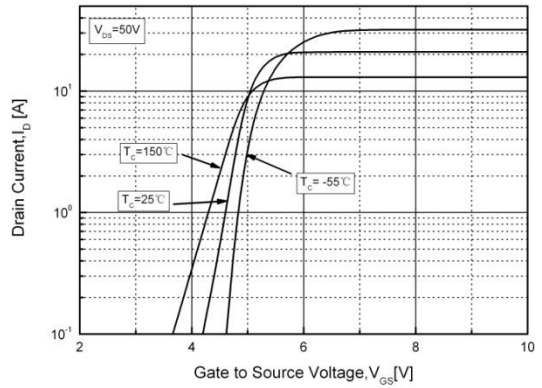


Fig. 3. Static on-Resistance vs. I_D

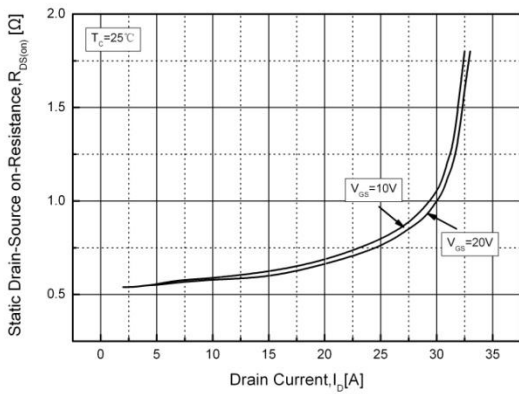


Fig. 4. Body Diode Forward Voltage vs. I_DR

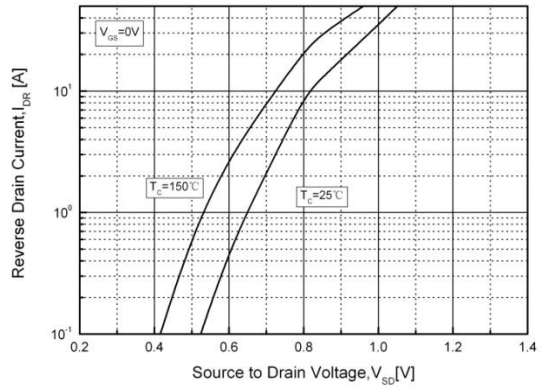


Fig. 5. Capacitance Characteristics

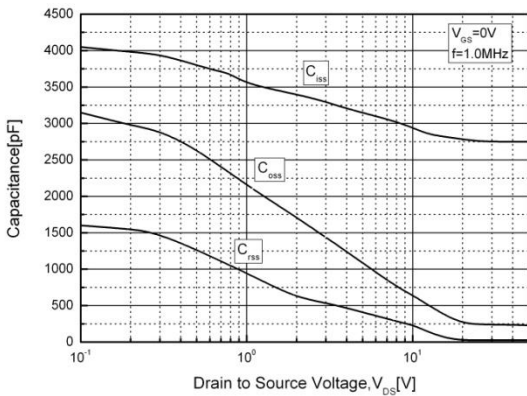
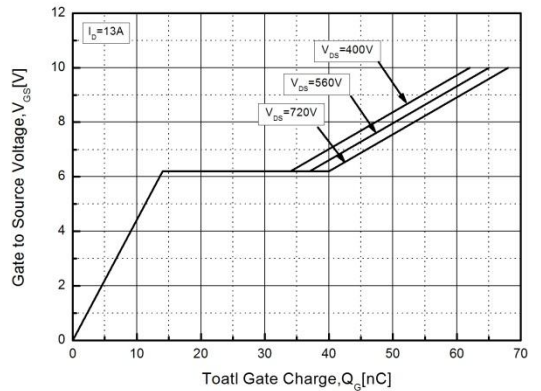


Fig. 6. Gate Charge Characteristics



Typical Performance Characteristics

Fig. 7. Breakdown Voltage vs. Temperature

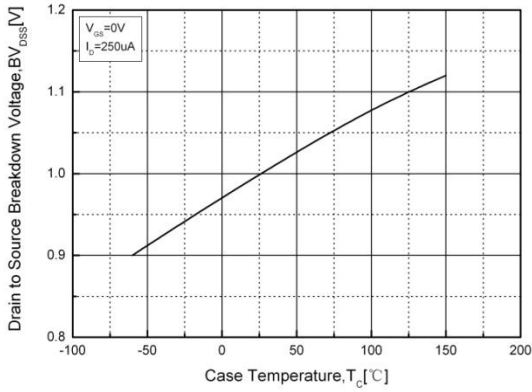


Fig. 8. Static on-Resistance vs. Temperature

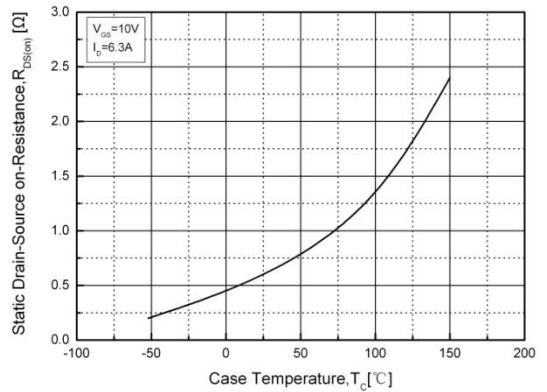


Fig. 9. Maximum Safe Operating Area

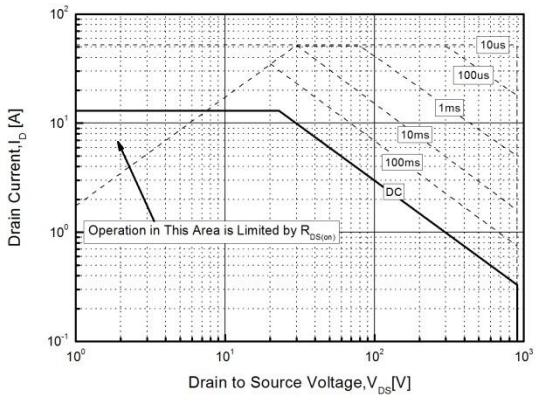


Fig. 10. Maximum Drain Current vs. Temperature

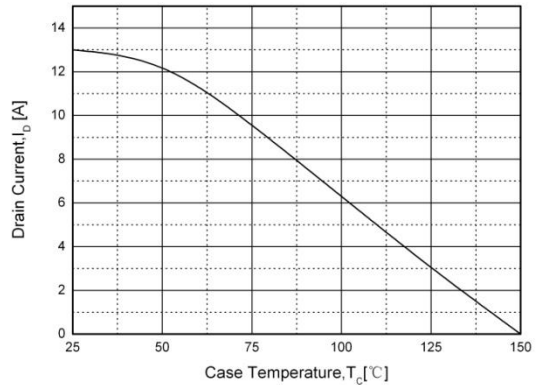
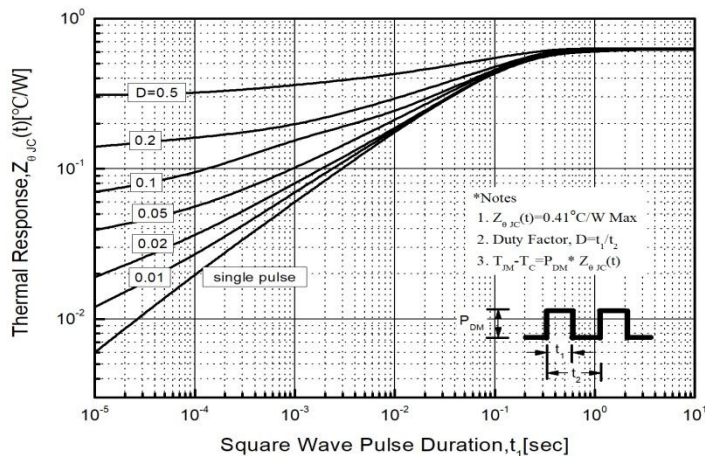


Fig. 11. Transient Thermal Response Curve



Package Dimensions

TO-3PN

(Dimensions in Millimeters)

