

900V 13A N-Channel Enhancement Mode Power MOSFET

Description

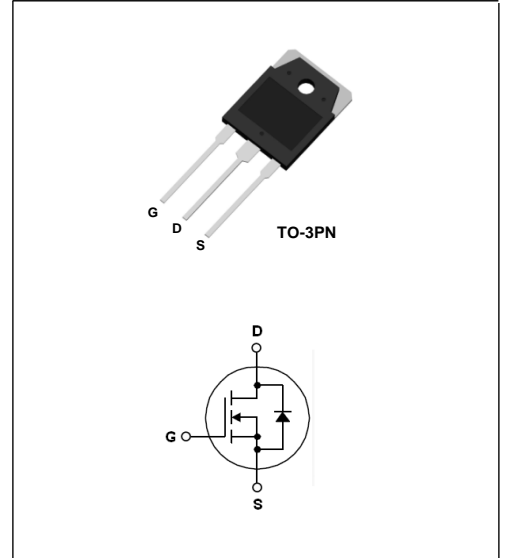
The AKT13N90N is an high blocking voltage N-Channel power MOSFET which using proprietary planar stripe and DMOS technology. This device provide excellent performance for high voltage power supplies or pulse circuits.

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 @ $T_C=25^\circ\text{C}$ 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	$T_C=25^\circ\text{C}$	13
		$T_C=100^\circ\text{C}$	6.3
I_{DM}	Pulsed Drain Current (Note1)	52	A
P_D	Maximum Power Dissipation	$T_C=25^\circ\text{C}$	300
	Derate above 25°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	$^\circ\text{C}/\text{W}$
$R_{th(J-A)}$	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	$V_{GS}=0V, I_D=250\mu A$	900	-	-	V
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	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	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		-	-	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	$V_{GS}=0V, I_S=13A,$ $di/dt=-100A/\mu s$	-	1000	-	ns
Q_{rr}	Reverse Recovery Charge		-	20	-	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	$I_D=13A,$ $V_{DD}=450V,$ $R_G=25\Omega$ (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_{riss}	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

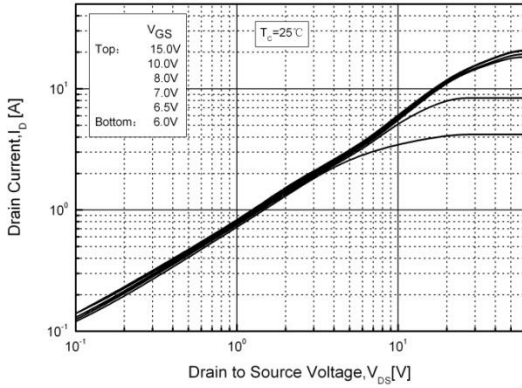


Fig. 2. Typical Transfer Characteristics

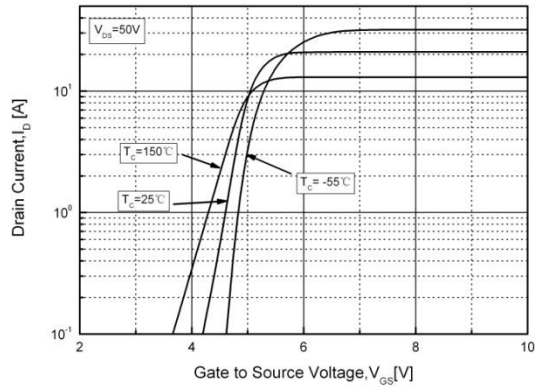


Fig. 3. Static on-Resistance vs. I_D

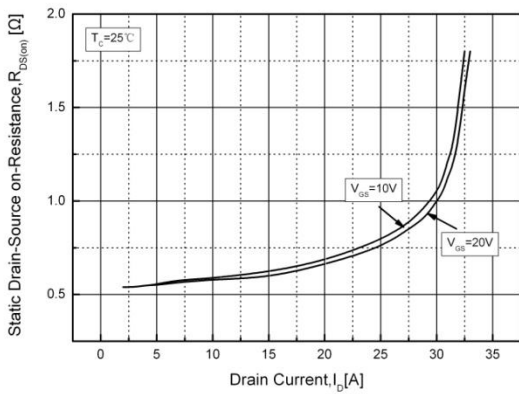


Fig. 4. Body Diode Forward Voltage vs. I_DR

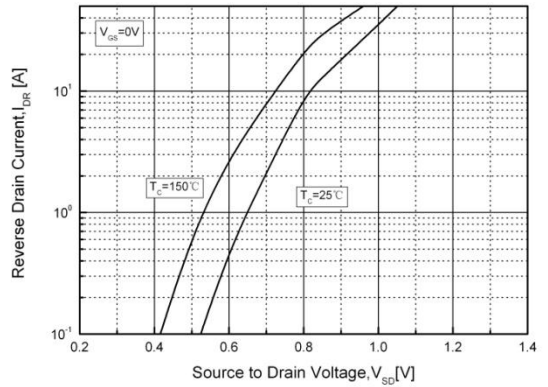


Fig. 5. Capacitance Characteristics

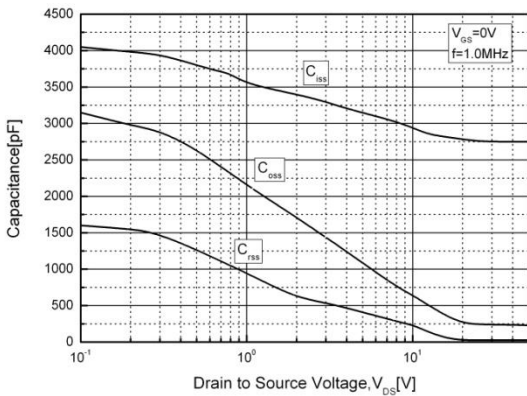
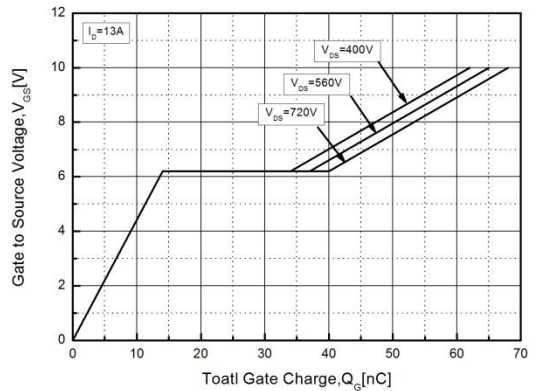


Fig. 6. Gate Charge Characteristics



Typical Performance Characteristics

Fig. 7. Breakdown Voltage vs. Temperature

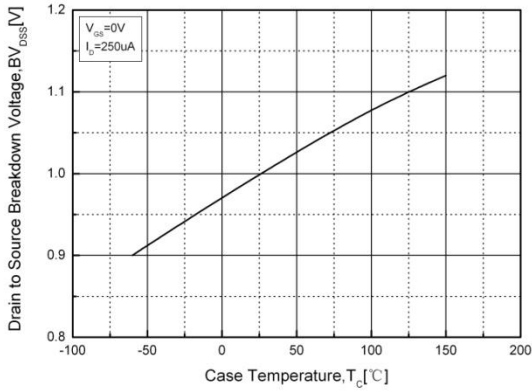


Fig. 8. Static on-Resistance vs. Temperature

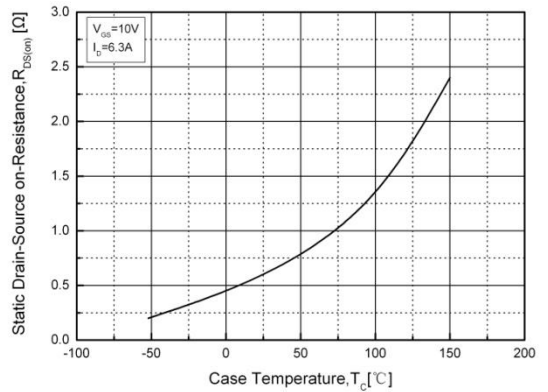


Fig. 9. Maximum Safe Operating Area

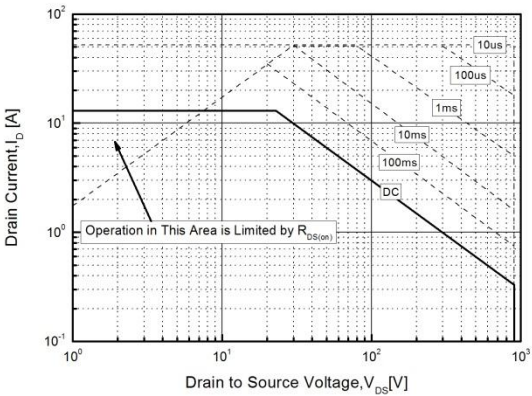


Fig. 10. Maximum Drain Current vs. Temperature

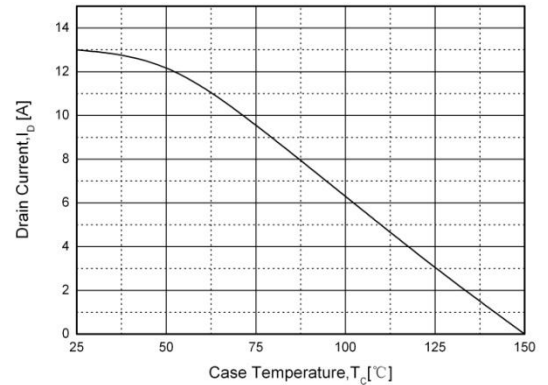
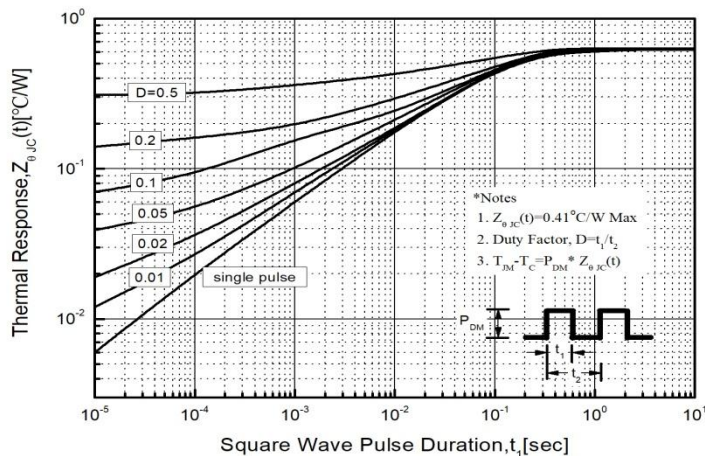


Fig. 11. Transient Thermal Response Curve



Package Dimensions

TO-3PN

(Dimensions in Millimeters)

