

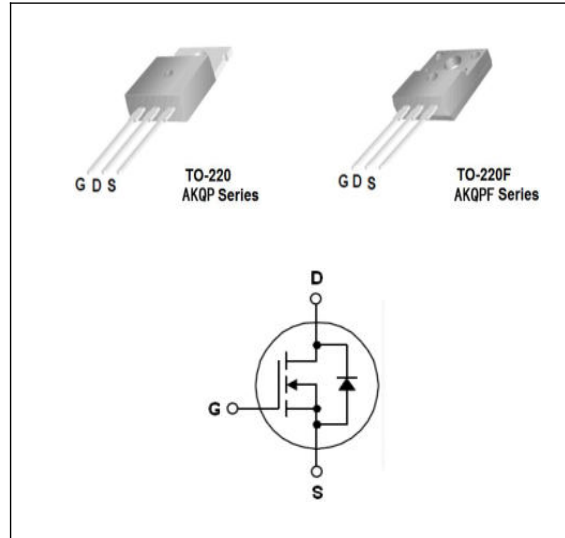
900V 4A N-channel Enhancement Mode Power MOSFET

Description

The AKT4N90FC / AKT4N90TC is an high blocking voltage N-Channel power MOSFET. This device provide excellent performance for high voltage power supplies or pulse circuits.

Features

- Lower on-Resistance: $R_{DS(on)}=2.3\Omega$
- Good Stability and Uniformity with High E_{AS}
- 100% Avalanche Test
- Special Process Technology for High ESD Capability



Applications

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

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

Symbol	Parameter	SQP4N90C	SQPF4N90C	Unit	
V_{DSS}	Drain to Source Voltage	900		V	
V_{GSS}	Gate to Source Voltage	± 30		V	
I_D	Drain Current	$T_C=25^\circ\text{C}$	4	A	
		$T_C=100^\circ\text{C}$	2.5	A	
I_{DM}	Pulsed Drain Current (Note1)	19		A	
P_D	Maximum Power Dissipation	$T_C=25^\circ\text{C}$	145	46	W
	Derate above 25°C		1.12	0.40	W/ $^\circ\text{C}$
E_{AS}	Single Pulsed Avalanche Energy (Note 2)	550		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	SQP4N90C	SQPF4N90C	Unit
$R_{th(J-C)}$	Thermal Resistance, Junction to case	0.88	2.68	$^\circ\text{C}/\text{W}$
$R_{th(J-A)}$	Thermal Resistance, Junction to Ambient	62.5	62.5	$^\circ\text{C}/\text{W}$

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	$V_{GS}=0V, I_D=1mA$	900	-	-	V
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	3.0	4.0	5.0	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	$V_{GS}=10V, I_D=2A$	-	2.3	2.8	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		-	-	4	A
V_{SD}	Drain-Source Diode Forward Voltage	$V_{GS}=0V, I_S=4A$	-	1.0	1.3	V
t_{rr}	Reverse Recovery Time	$V_{GS}=0V, I_S=4A,$	-	650	-	ns
Q_{rr}	Reverse Recovery Charge	$di/dt=-100A/\mu s$	-	6.5	-	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	$I_D=4A,$ $V_{DD}=450V,$ $R_G=25\Omega$ (Note 3)	-	27	58	ns
t_r	Turn-on Rise Time		-	46	95	ns
$t_{d(off)}$	Turn-off Delay Time		-	40	82	ns
t_f	Turn-off Fall Time		-	33	75	ns
C_{iss}	Input Capacitance	$V_{GS}=0V, V_{DS}=25V,$ $f=1.0MHz$	-	975	1100	pF
C_{oss}	Output Capacitance		-	86	105	pF
C_{rss}	Reverse Transfer Capacitance		-	2.3	4.5	pF
Q_g	Total Gate Charge	$I_D=4A,$ $V_{DD}=720V$ $V_{GS}=10V$ (Note 3)	-	17	22	nC
Q_{gs}	Gate to Emitter Charge		-	4.5	-	nC
Q_{gd}	Gate to Collector Charge		-	7.0	-	nC

Note:

1. Repetitive rating: pulse-width limited by maximum junction temperature
2. $L=67mH, I_D=4A, V_G=10V, V_{DD}=50V$
3. Essentially independent of operating temperature typical characteristics

Typical Performance Characteristics

Fig. 1. Typical on-Resistance Characteristics

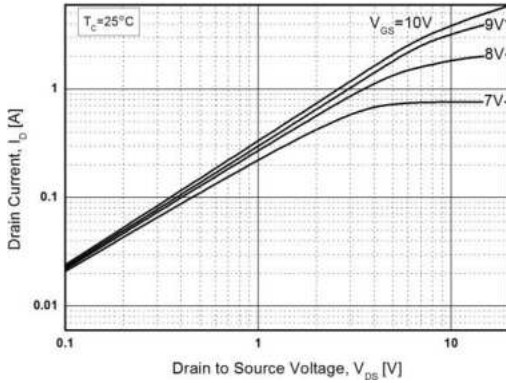


Fig. 2. Typical Transfer Characteristics

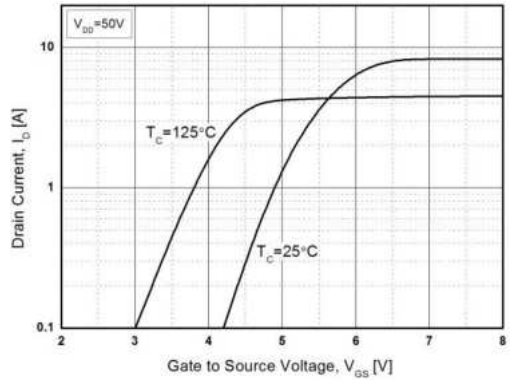


Fig. 3. Static on-Resistance vs. I_D

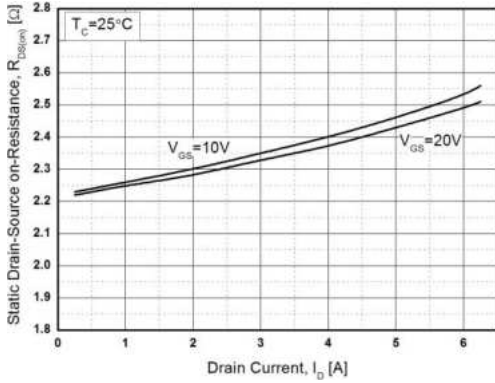


Fig. 4. Body Diode Forward Voltage vs. I_{DR}

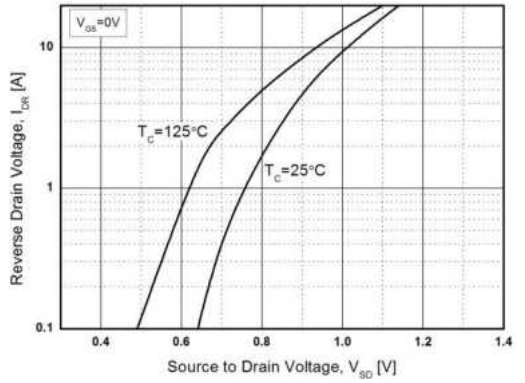


Fig. 5. Capacitance Characteristics

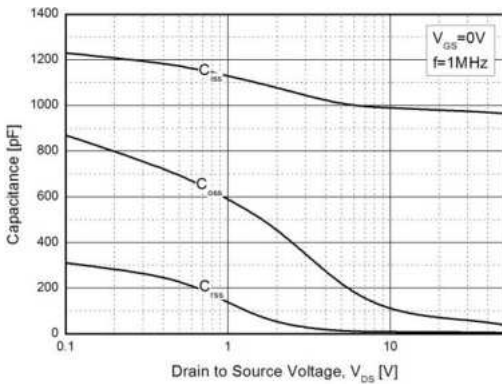
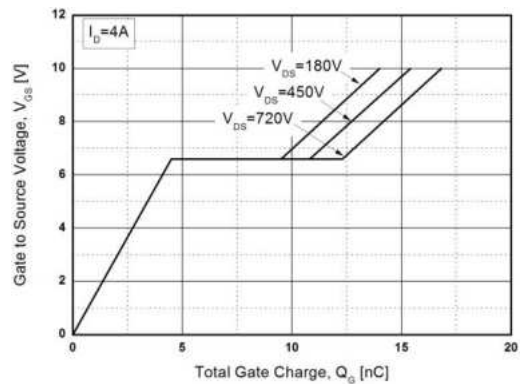


Fig. 6. Gate Charge Characteristics



Typical Performance Characteristics

Fig. 7. Breakdown Voltage vs. Temperature

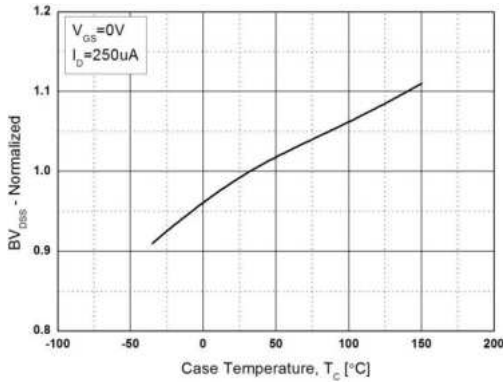


Fig. 8. Static on-Resistance vs. Temperature

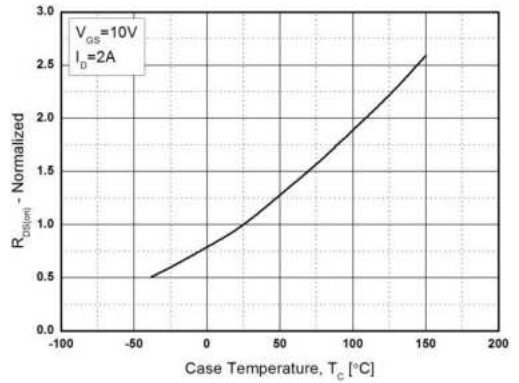


Fig. 9. Maximum Safe Operating Area-SQP4N90

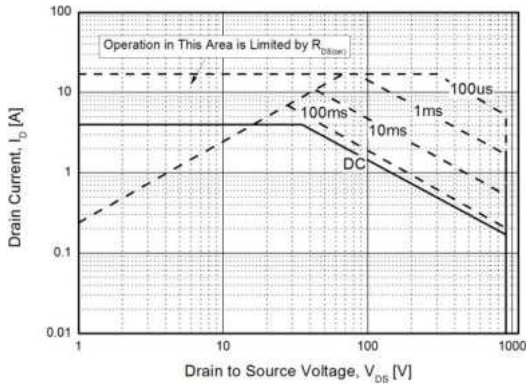


Fig. 10. Maximum Safe Operating Area-SQPF4N90

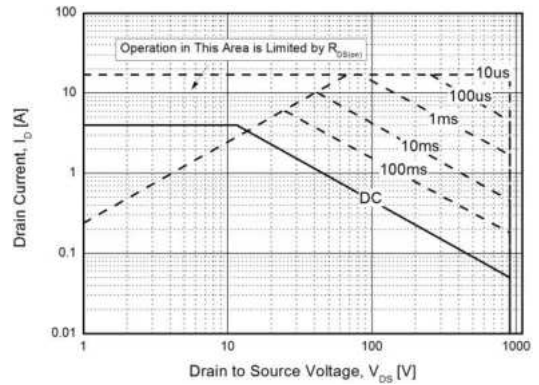
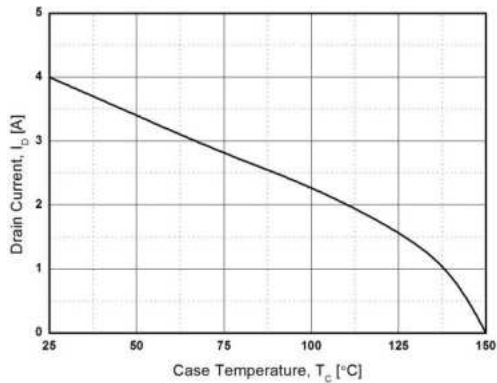


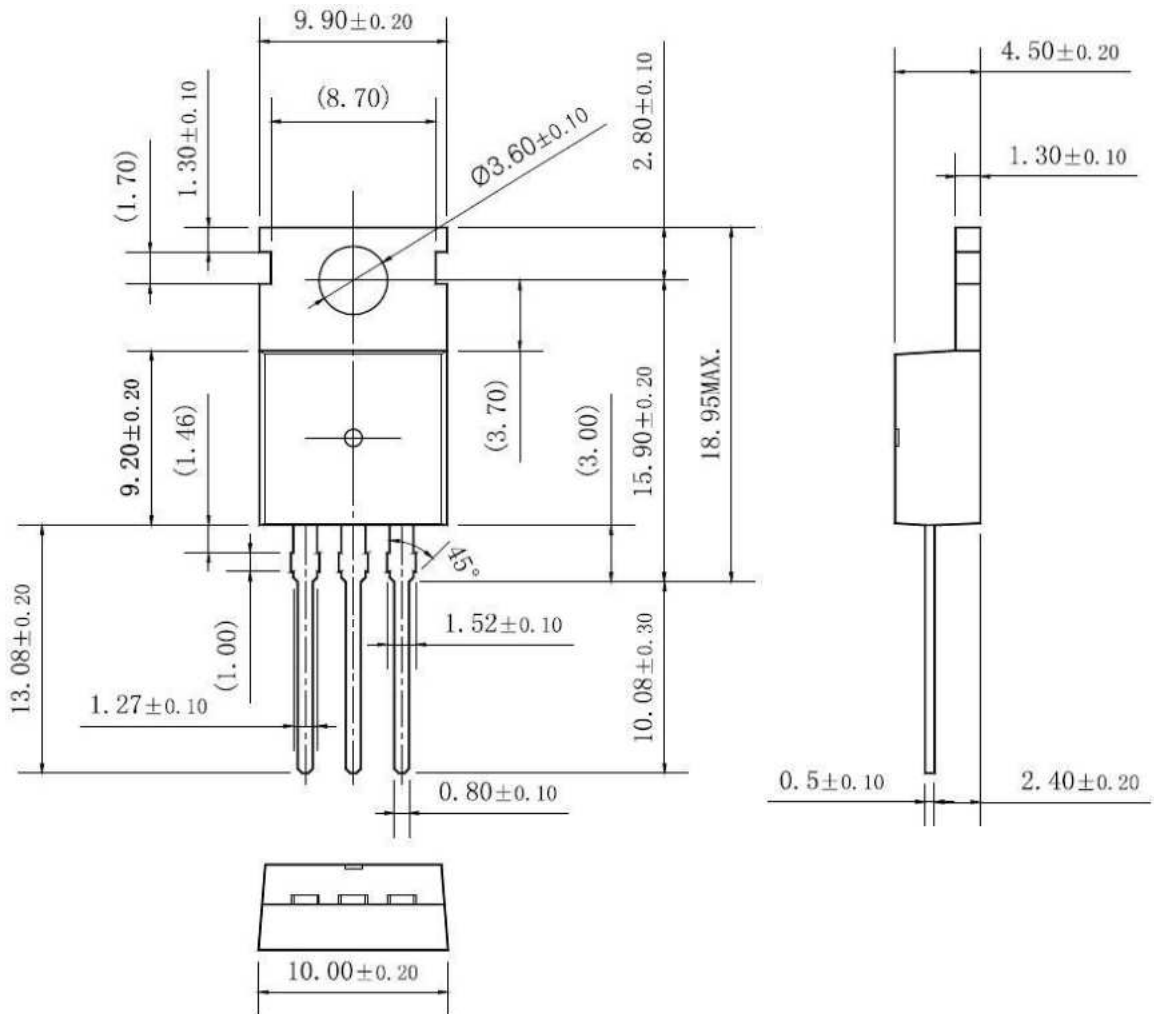
Fig. 11. Maximum Drain Current vs. Temperature



Package Dimensions

TO-220

(Dimensions in Millimeters)



Package Dimensions

TO-220F

(Dimensions in Millimeters)

