AIKO ELECTRO

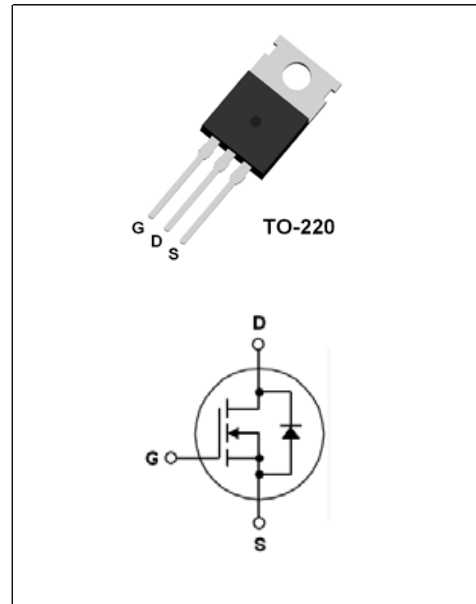# 60V 50A N-channel Enhancement Mode Power MOSFET

Description

The AKT50N06T is an N-Channel enhancement mode power MOSFET, it has low static on-resistance and high avalanche energy strength. This device provide excellent switching performance for switched mode power supplies, low voltage applications such as DC/DC converters.

Features

• Low on-Resistance: $R_{DS (on)}$=0.018Ω(typ.)

• Special Process Technology for high ESD Capability

• 100% Avalanche Test

• Good Stability and Uniformity with High E_{AS}

Applications

• Switched Mode Power Supplies

• Low Voltage Applications Such as DC/DC Converters

TO-220

Absolute Maximum Ratings @T_C=25 ℃ unless otherwise noted

Symbol	Parameter		Ratings	Unit
V_{DSS}	Drain to Source Voltage		60	V
V_{GSS}	Gate to Source Voltage		±25	V
I_D	Drain Current	T_C=25℃	50	A
		T_C=100℃	35.4	A
I_{DM}	Pulsed Drain Current (Note1)		200	A
P_D	Maximum Power Dissipation	T_C=25℃	130	W
	Derate above 25℃		0.8	W/℃
E_{AS}	Single Pulsed Avalanche Energy (Note 2)		720	mJ
T_J	Operating Junction Temperature Range		-55~+175	℃
T_{STG}	Storage Temperature Range		-55~+175	℃

Thermal Characteristics

Symbol	Parameter	Ratings	Unit
$R_{th (J-C)}$	Thermal Resistance, Junction to case	1.24	℃/W
$R_{th (J-A)}$	Thermal Resistance, Junction to Ambient	62.5	℃/W

Electrical Characteristics @T_C=25 ℃ unless otherwise noted

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV$_{DSS}$	Drain to Source Breakdown Voltage	V$_{GS}$=0V, I$_D$=250uA	60	-	-	V
V$_{GS(th)}$	Gate Threshold Voltage	V$_{DS}$=V$_{GS}$, I$_D$=250uA	2	3.35	4	V
R$_{DS(on)}$	Static Drain-Source On-Resistance	V$_{GS}$=10V, I$_D$=25A	-	0.018	-	Ω
I$_{DSS}$	Zero Gate Voltage Drain Current	V$_{DS}$=V$_{DSS}$, V$_{GS}$=0V	-	-	1	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 ℃ unless otherwise noted

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I$_S$	Maximum Drain to Source Diode Forward Current		-	-	50	A
V$_{SD}$	Drain-Source Diode Forward Voltage	V$_{GS}$=0V, I$_S$=50A	-	1.03	1.5	V
T$_{rr}$	Reverse Recovery Time	V$_{GS}$=0V, I$_S$=50A, di/dt=-100A/us	-	50	-	ns
Q$_{rr}$	Reverse Recovery Charge		-	75	-	nC

Switching Characteristics @T_C=25 ℃ unless otherwise noted

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
t$_{d(on)}$	Turn-on Delay Time	I$_D$=25A, V$_{DD}$=30V, R$_G$=25Ω (Note 3)	-	15	40	ns
t$_r$	Turn-on Rise Time		-	105	220	ns
t$_{d(off)}$	Turn-off Delay Time		-	60	130	ns
t$_f$	Turn-off Fall Time		-	65	140	ns
C$_{iss}$	Input Capacitance	V$_{GS}$=0V, V$_{DS}$=25V, f=1.0MHz	-	1180	1540	pF
C$_{oss}$	Output Capacitance		-	440	580	pF
C$_{rss}$	Reverse Transfer Capacitance		-	65	90	pF
Q$_g$	Total Gate Charge	I$_D$=50A, V$_{DD}$=48V V$_{GS}$=10V (Note 3)	-	31	41	nC
Q$_{gs}$	Gate to Emitter Charge		-	8	-	nC
Q$_{gd}$	Gate to Collector Charge		-	13	-	nC

Note:

1. Repetitive rating: pulse-width limited by maximum junction temperature

2. V$_{DD}$=25V, L=0.5mH, V$_{clamp}$=1500V, V$_g$=10V, I$_d$=50A

3. Essentially independent of operating temperature typical characteristics

Typical Performance Characteristics

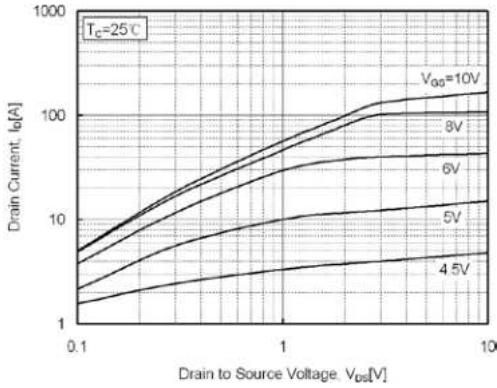Fig. 1. Typical on-Resistance Characteristics
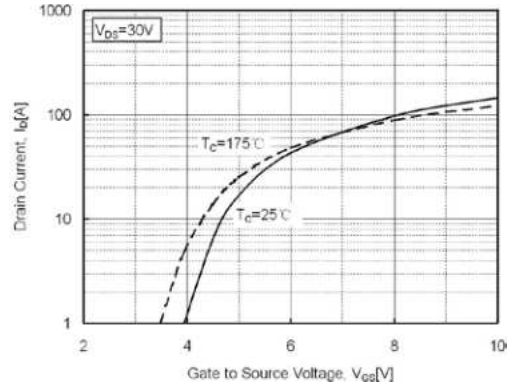
Fig. 2. Typical Transfer Characteristics

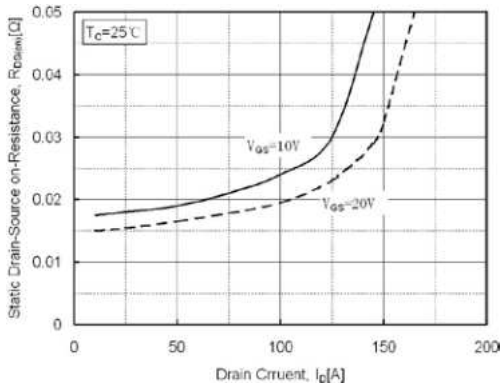Fig. 3. Static on-Resistance vs. I_D
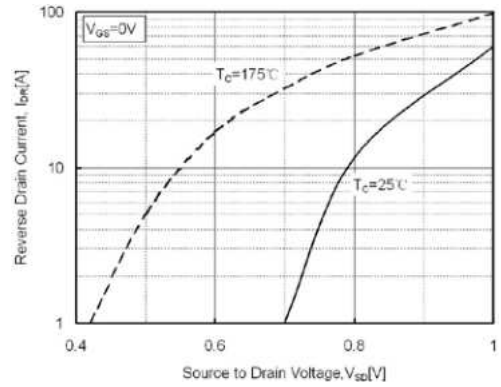
Fig. 4. Body Diode Forward Voltage vs. I_{DR}

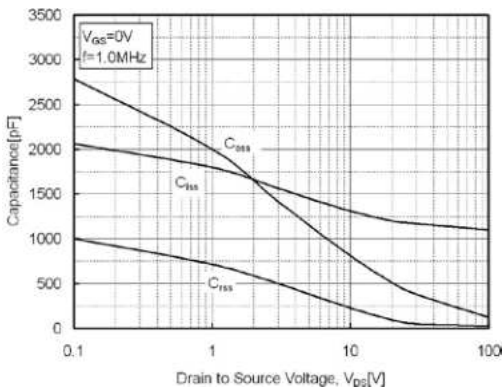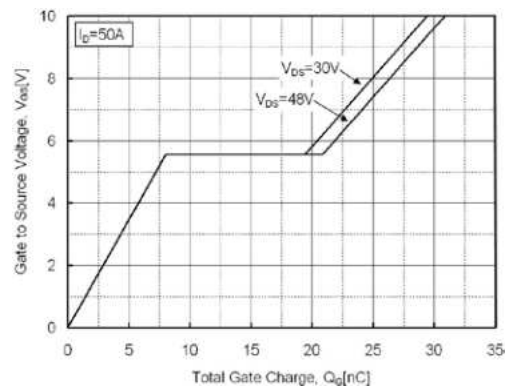Fig. 5. Capacitance Characteristics

Fig. 6. Gate Charge Characteristics

Typical Performance Characteristics
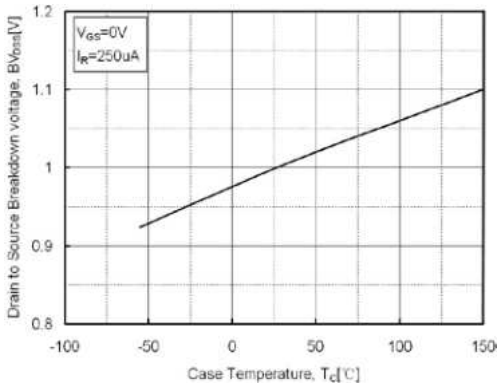
Fig. 7. Breakdown Voltage vs. Temperature

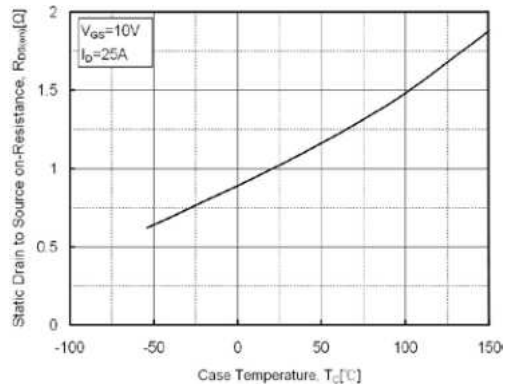Fig. 8. Static on-Resistance vs. Temperature
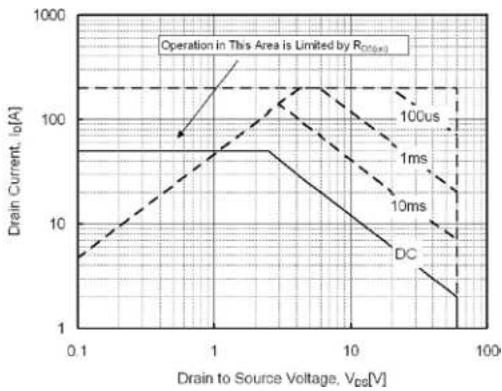

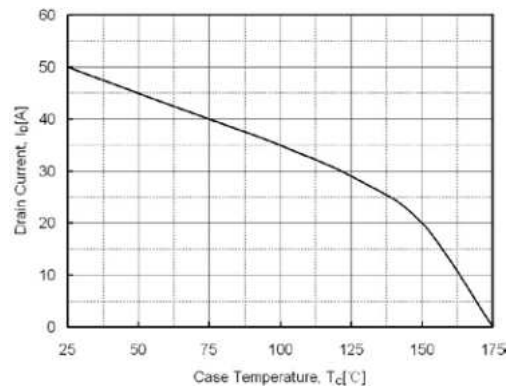Fig. 9. Maximum Safe Operating Area

Fig. 10. Maximum Drain Current vs. Temperature

Fig. 11. Transient Thermal Response Curve

Package Dimensions

TO-220

(Dimensions in Millimeters)