500V 18A N-Channel Enhancement Mode Power MOSFET
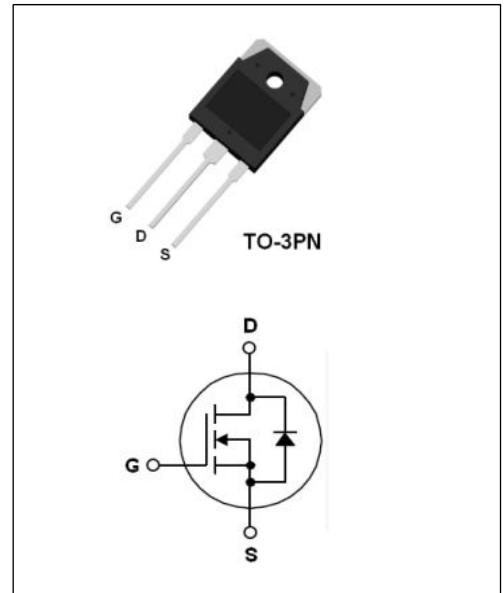
Description

The AKT18N50ND 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 UPS,DC-DC converters and AC-DC power supply.

TO-3PN

Features

• Low on-Resistance: $R_{DS\ (on)}$=0.23Ω(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 ℃ 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℃	18	A
		T_C=100℃	10.8	A
I_{DM}	Pulsed Drain Current (Note1)		72	A
P_D	Maximum Power Dissipation	T_C=25℃	230	W
	Derate above 25℃		1.78	W/℃
E_{AS}	Single Pulsed Avalanche Energy (Note 2)		400	mJ
T_J	Operating Junction Temperature Range		-55~+150	℃
T_{STG}	Storage Temperature Range		-55~+150	℃

Thermal Characteristics

Symbol	Parameter	Ratings	Unit
$R_{th\ (J-C)}$	Thermal Resistance, Junction to case	0.55	℃/W
$R_{th\ (J-A)}$	Thermal Resistance, Junction to Ambient	60	℃/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	500	-	-	V
V$_{GS(th)}$	Gate Threshold Voltage	V$_{DS}$=V$_{GS}$, I$_D$=250uA	-	3.5	-	V
R$_{DS(on)}$	Static Drain-Source On-Resistance	V$_{GS}$=10V, I$_D$=9A	-	0.23	-	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	-	-	$\pm$200	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		-	-	18	A
V$_{SD}$	Drain-Source Diode Forward Voltage	V$_{GS}$=0V, I$_S$=18A	-	0.90	1.20	V
T$_{rr}$	Reverse Recovery Time	V$_{GS}$=0V, I$_S$=18A, di/dt=-100A/us	-	0.55	-	us
Q$_{rr}$	Reverse Recovery Charge		-	5.5	-	uC

Switching Characteristics @T_C=25 ℃ unless otherwise noted

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
t$_{d(on)}$	Turn-on Delay Time	I$_D$=18A, V$_{DD}$=250V, R$_G$=25Ω (Note 3)	-	32	-	ns
t$_r$	Turn-on Rise Time		-	37	-	ns
t$_{d(off)}$	Turn-off Delay Time		-	109	-	ns
t$_f$	Turn-off Fall Time		-	25	-	ns
C$_{iss}$	Input Capacitance	V$_{GS}$=0V, V$_{DS}$=25V, f=1.0MHz	-	2560	-	pF
C$_{oss}$	Output Capacitance		-	420	-	pF
C$_{rss}$	Reverse Transfer Capacitance		-	41	-	pF
Q$_g$	Total Gate Charge	I$_D$=18A, V$_{DS}$=400V, V$_{GS}$=10V (Note 3)	-	49	-	nC
Q$_{gs}$	Gate to Emitter Charge		-	13	-	nC
Q$_{gd}$	Gate to Collector Charge		-	21	-	nC

Note:

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

2. L=2.0mH, I$_{AS}$=20A, V$_{DD}$=100V, V$_G$=10V, @T_C=25℃

3. Essentially independent of operating temperature typical characteristics

Typical Performance Characteristics

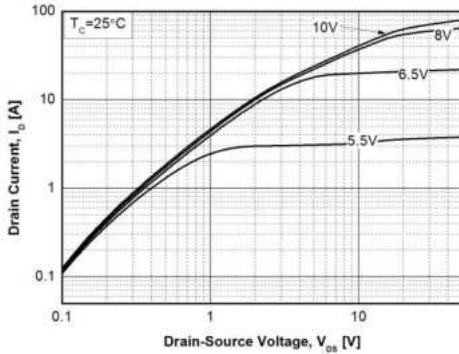Fig. 1. Typical on-Resistance Characteristics
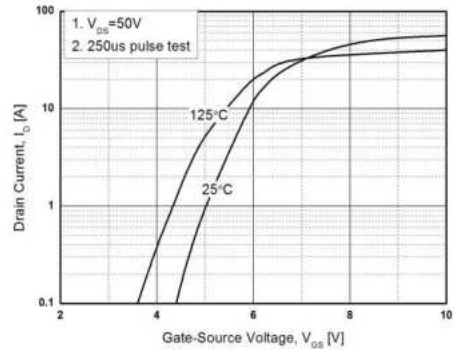
Fig. 2. Typical Transfer Characteristics
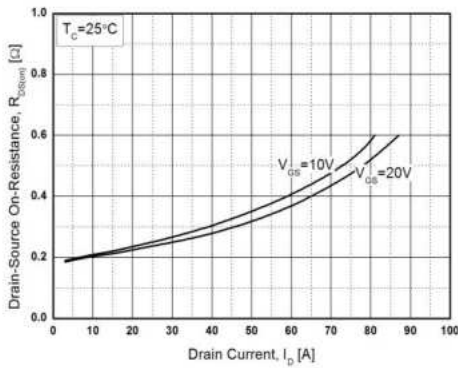
Fig. 3. Static on-Resistance vs. I_D

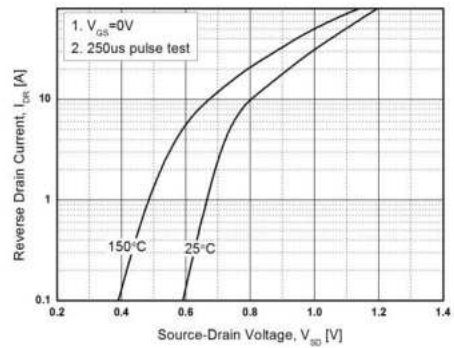Fig. 4. Body Diode Forward Voltage vs. I_{DR}
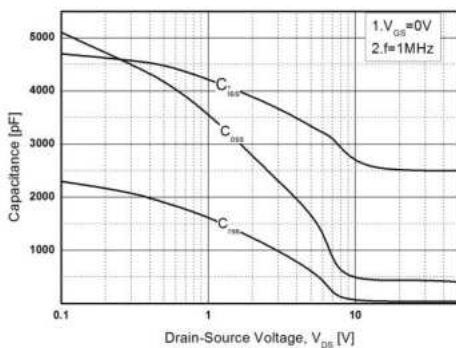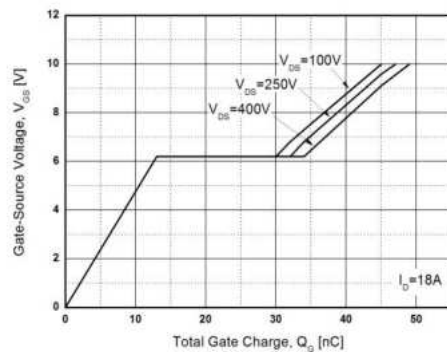
Fig. 5. Capacitance Characteristics

Fig. 6. Gate Charge Characteristics

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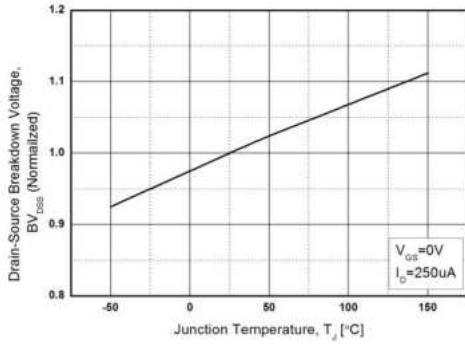
Fig. 7. Breakdown Voltage vs. Temperature

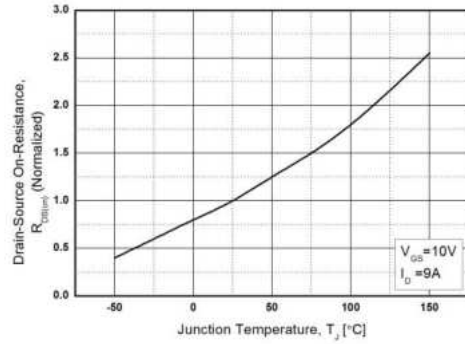Fig. 8. Static on-Resistance vs. Temperature
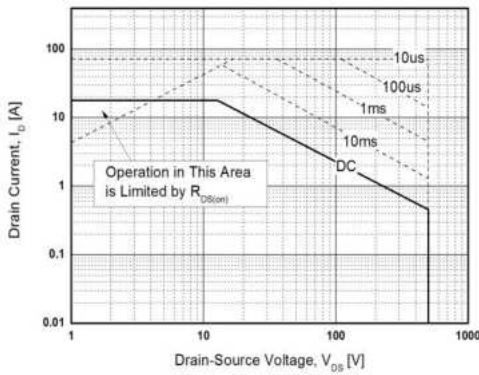
Fig. 9. Maximum Safe Operating Area

Fig. 10. Maximum Drain Current vs. Temperature

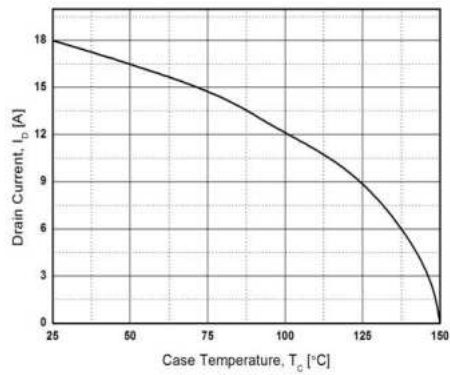Fig. 11. Transient Thermal Response Curve

AIKO ELECTRO

Package Dimensions

TO-3PN

(Dimensions in Millimeters)

15.6±0.2
13.6±0.2
9.6±0.2
⌀3.3±0.1
3.8±0.2
12.76±0.2
18.7±0.2
19.9±0.2
23.4±0.2
13.9±0.2
2±0.2
3±0.2
1±0.2
3.5±0.2
16.5±0.2
5.45±0.2
5.45±0.2

4.8±0.2
1.45±0.1
18.7±0.2
2.4±0.2
0.65±0.1