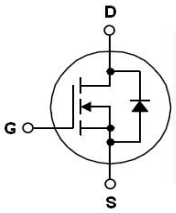
900V 4A N-Channel Enhancement Mode Power MOSFET

Description

The AKT4N90TCL is an N-Channel on-resistance and high avalanche energyenhancement mode power MOSFET which using proprietary planar stripe and DMOS technology.

This MOSFET has low static strength. This device provide excellent switching performance for switched mode power supplies, active power factor correction and electronic lamp ballasts.



Features

- Low on-Resistance: $R_{DS\ (on)}$=2.85Ω(typ.)
- Special Process Technology for high ESD Capability
- 100% Avalanche Test
- Good Stability and Uniformity with High E_{AS}

Applications

- Switched Mode Power Supplies
- Active Power Factor Correction, Electronic Ballasts

Absolute Maximum Ratings @T_C=25 ℃ 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℃	4	A
		T_C=100℃	2.3	A
I_{DM}	Pulsed Drain Current (Note1)		16	A
P_D	Maximum Power Dissipation	T_C=25℃	147	W
	Derate above 25℃		1.17	W/℃
E_{AS}	Single Pulsed Avalanche Energy (Note 2)		200	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	0.85	℃/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	900	-	-	V
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250uA	3.0	-	5.0	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	V_{GS}=10V, I_D=2A	-	2.85	3.0	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 ℃ unless otherwise noted

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Maximum Drain to Source Diode Forward Current		-	-	4.0	A
V_{SD}	Drain-Source Diode Forward Voltage	V_{GS}=0V, I_S=4A	-	-	0.9	V
T_{rr}	Reverse Recovery Time	V_{GS}=0V, I_S=4A, di/dt=-100A/us	-	405	-	ns
Q_{rr}	Reverse Recovery Charge		-	3.6	-	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=4A, V_{DD}=450V, R_G=25Ω (Note 3)	-	37	-	ns
t_r	Rise Time		-	46	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	48	-	ns
t_f	Fall Time		-	44	-	ns
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=25V, f=1.0MHz	-	813	-	pF
C_{oss}	Output Capacitance		-	69	-	pF
C_{rss}	Reverse Transfer Capacitance		-	5.3	-	pF
Q_g	Total Gate Charge	I_D=4A, V_{DD}=720V V_{GS}=10V (Note 3)	-	18	-	nC
Q_{gs}	Gate to Source Charge		-	4.6	-	nC
Q_{gd}	Gate to Drain Charge		-	8.0	-	nC

Note:

1. Repetitive rating: pulse-width limited by maximum junction temperature
2. V_{DD}=100V, L=20mH, R_G=25Ω, V_G=10V, stating T_J=25℃
3. Essentially independent of operating temperature typical characteristics

Typical Performance Characteristics

Fig. 1. Typical on-Region Characteristics

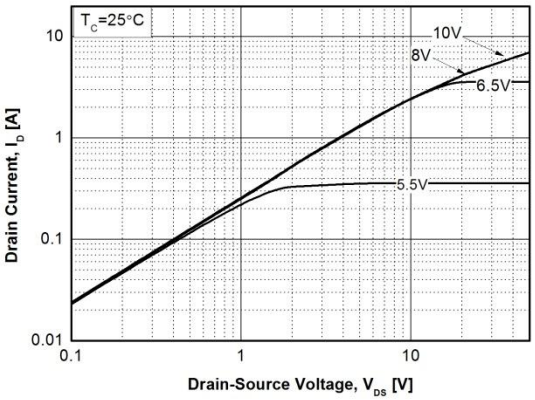


Fig. 2. Typical Transfer Characteristics

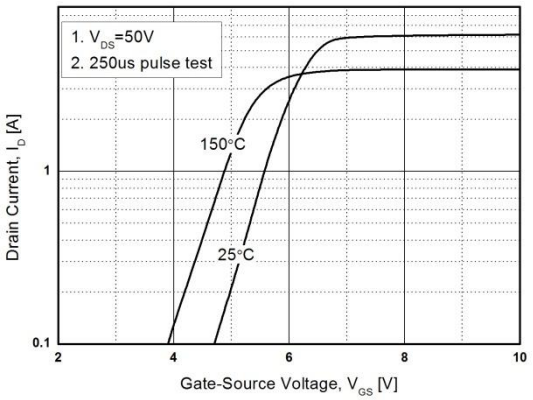


Fig. 3. Static on-Resistance vs. I_D

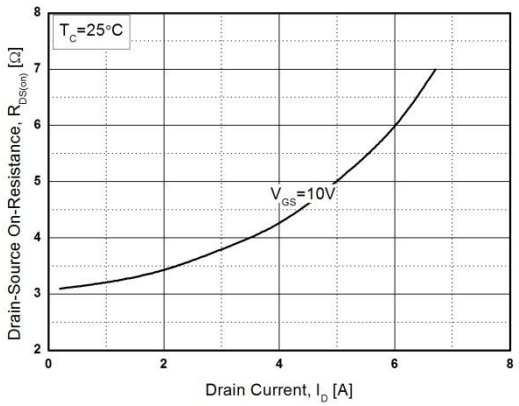


Fig. 4. Body Diode Forward Voltage vs. I_{DR}

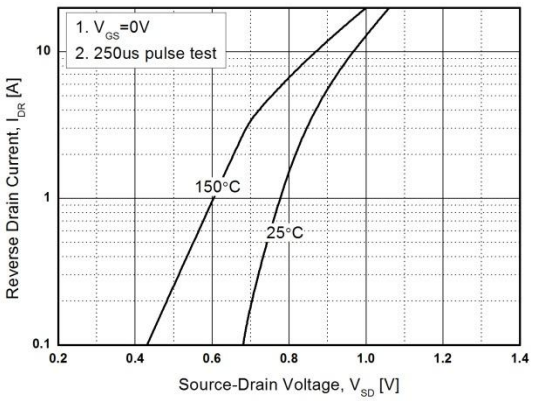


Fig. 5. Capacitance Characteristics

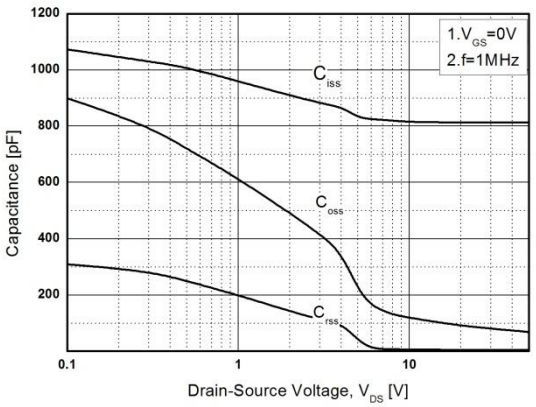
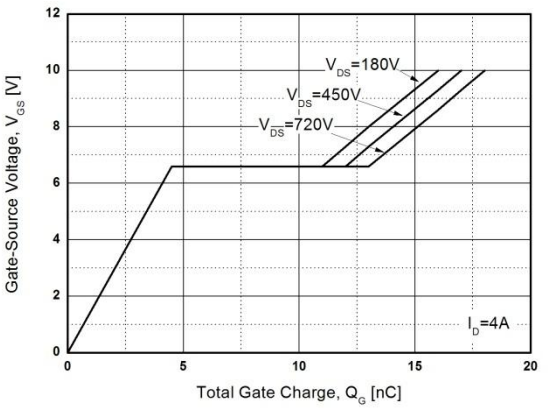


Fig. 6. Gate Charge Characteristics



Typical Performance Characteristics

Fig. 7. Breakdown Voltage vs. Temperature

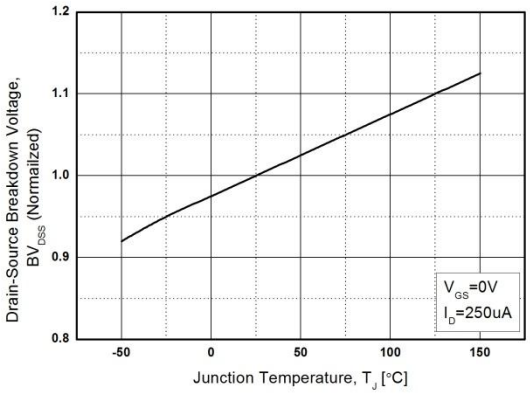


Fig. 8. Static on-Resistance vs. Temperature

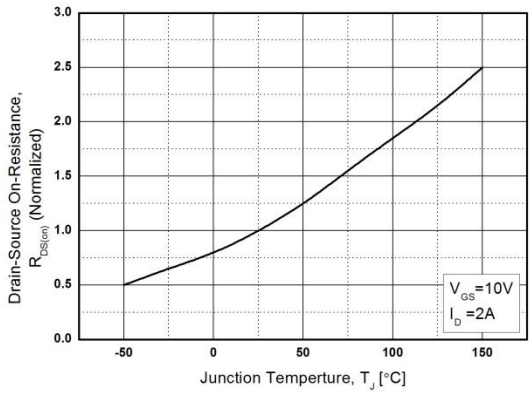


Fig. 9. Maximum Safe Operating Area

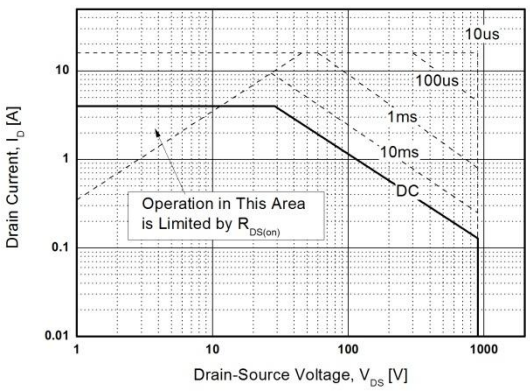


Fig. 10. Maximum Drain Current vs. Temperature

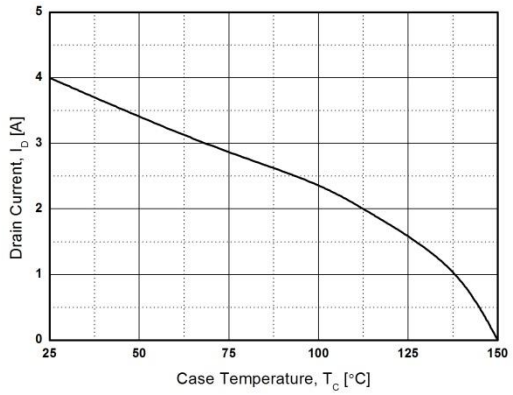
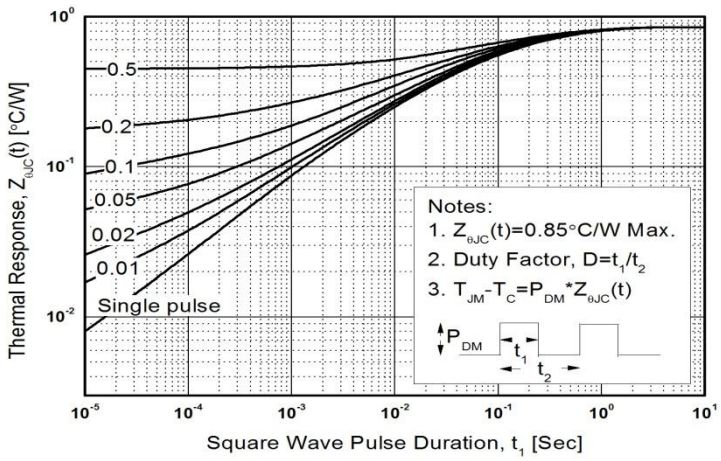


Fig. 11. Transient Thermal Response Curve



Package Dimensions

TO-220

(Dimensions in Millimeters)