

60V 210A N-Channel Trench MOSFET

Description

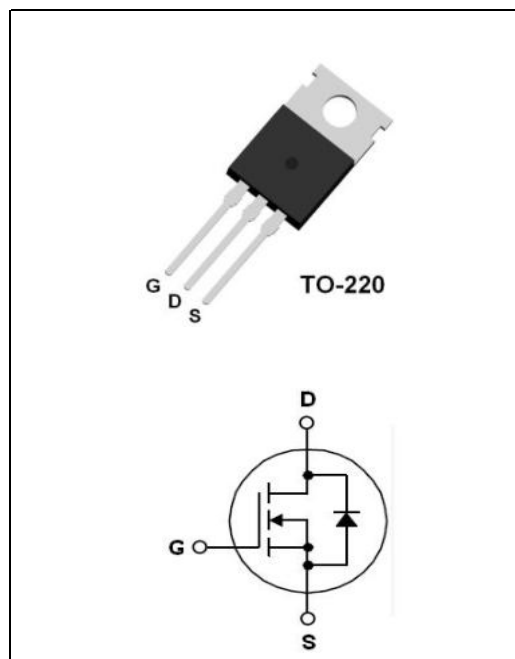
The AKT210N06TT is an N-Channel enhancement mode power MOSFET and based on advanced trench technology, it has extremely low static on-resistance and high avalanche energy strength. This device provide excellent switching performance for switched mode power supplies.

Features

- Advanced Trench Technology
- Typical on-Resistance:
 $R_{DS(on)}=2.8m\Omega$ @ $V_{GS}=10V$, $I_D=105A$
- Rated Avalanche Energy
- RoHS Compliant

Applications

- Switched Mode Power Supplies
- Motor Control
- Synchronous Rectification



Absolute Maximum Ratings @ $T_C=25^\circ C$ 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	$T_C=25^\circ C$	210	A
		$T_C=100^\circ C$	132	A
I_{DM}	Pulsed Drain Current	(Note1)	840	A
P_D	Maximum Power Dissipation	$T_C=25^\circ C$	220	W
	Derate above $25^\circ C$		1.67	W/ $^\circ C$
E_{AS}	Single Pulsed Avalanche Energy	(Note 2)	1082	mJ
T_J	Operating Junction Temperature Range		-55~+150	$^\circ C$
T_{STG}	Storage Temperature Range		-55~+150	$^\circ C$

Thermal Characteristics

Symbol	Parameter	Ratings	Unit
$R_{th(J-C)}$	Thermal Resistance, Junction to case	0.6	$^\circ C/W$
$R_{th(J-A)}$	Thermal Resistance, Junction to Ambient	45	$^\circ C/W$

Electrical Characteristics @T_C=25 °C 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	-	4	V
R _{DS(on)}	Static Drain-Source On-Resistance	V _{GS} =10V, I _D =105A	-	2.8	4.2	mΩ
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 °C unless otherwise noted

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I _S	Maximum Drain to Source Diode Forward Current		-	-	210	A
V _{SD}	Drain-Source Diode Forward Voltage	V _{GS} =0V, I _S =210A	-	1.1	1.3	V
t _{rr}	Reverse Recovery Time	V _{GS} =0V, I _S =105A, di/dt=-100A/us	-	46	-	ns
Q _{rr}	Reverse Recovery Charge		-	48	-	nC

Switching Characteristics @T_C=25 °C unless otherwise noted

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
t _{d(on)}	Turn-on Delay Time	I _D =105A, V _{DD} =30V, V _{GS} =10V R _G =10Ω (Note 3)	-	30.5	-	ns
t _r	Rising Time		-	29	-	ns
t _{d(off)}	Turn-off Delay Time		-	95	-	ns
t _f	Falling Time		-	34.5	-	ns
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =30V, f=1.0MHz	-	8500	-	pF
C _{oss}	Output Capacitance		-	1520	-	pF
C _{rss}	Reverse Transfer Capacitance		-	81	-	pF
Q _g	Total Gate Charge	I _D =105A, V _{DD} =30V V _{GS} =10V (Note 3)	-	115	-	nC
Q _{gs}	Gate to Source Charge		-	39	-	nC
Q _{gd}	Gate to Drain Charge		-	28	-	nC

Note:

1. Repetitive rating: pulse-width limited by maximum junction temperature
2. V_{DD}=50V, L=500uH, V_G=10V
3. Essentially independent of operating temperature typical characteristics

Typical Performance Characteristics

Fig. 1. Typical on-Resistance Characteristics

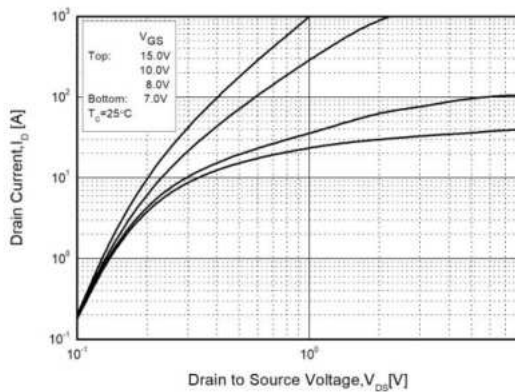


Fig. 2. Typical Transfer Characteristics

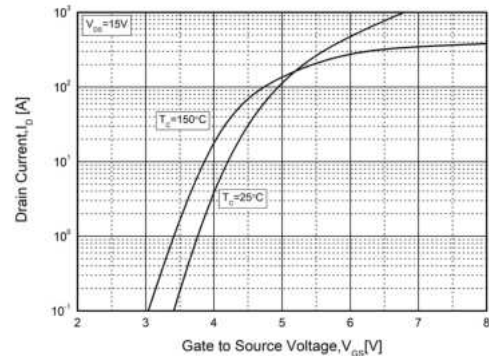


Fig. 3. Static on-Resistance vs. I_D

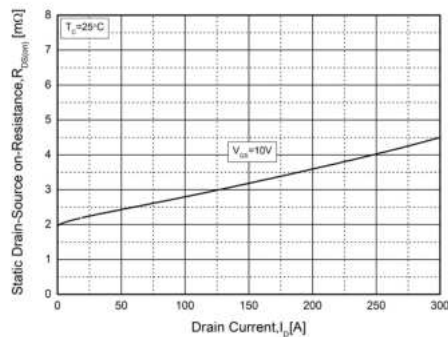


Fig. 4. Body Diode Forward Voltage vs. I_{DR}

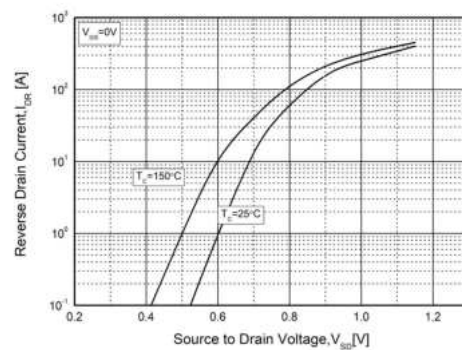


Fig. 5. Capacitance Characteristics

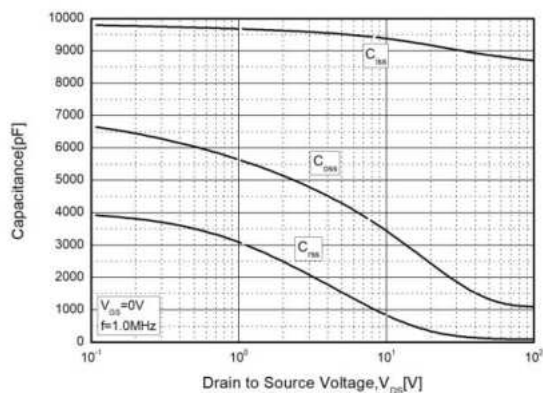
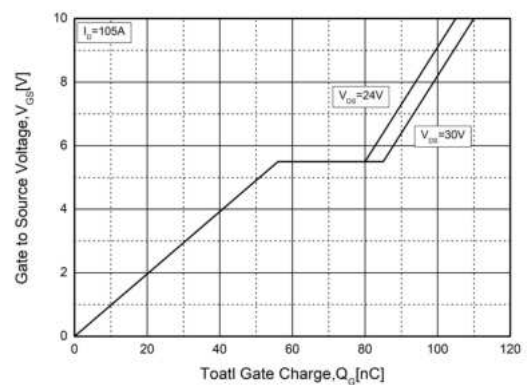


Fig. 6. Gate Charge Characteristics



Typical Performance Characteristics

Fig. 7. Breakdown Voltage vs. Temperature

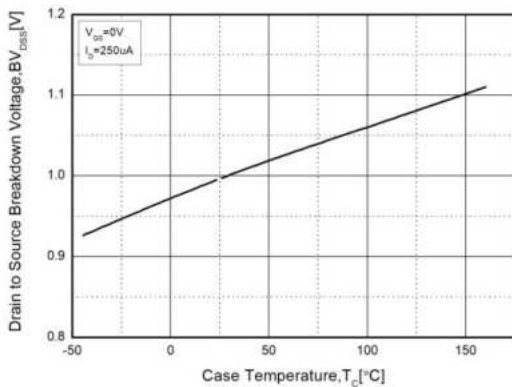


Fig. 8. Static on-Resistance vs. Temperature

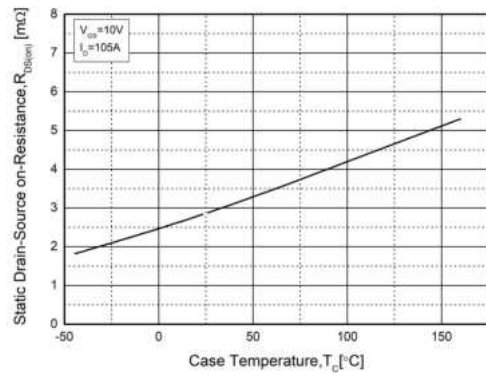


Fig. 9. Maximum Safe Operating Area

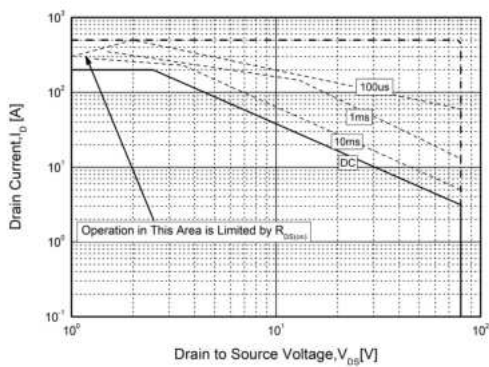


Fig. 10. Maximum Drain Current vs. Temperature

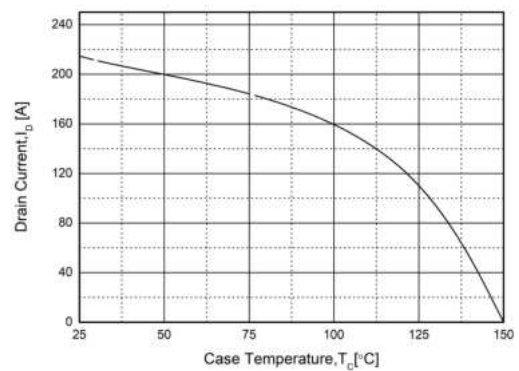
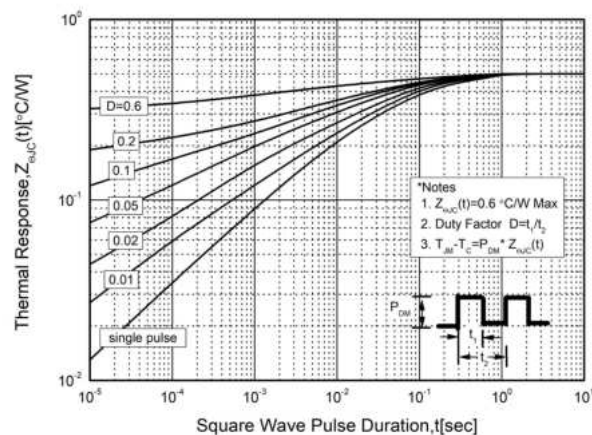


Fig. 11. Transient Thermal Response Curve



Package Dimensions

TO-220

(Dimensions in Millimeters)

