KIA
SEMICONDUCTORS

90A，30V
N-CHANNEL MOSFET

KNX3303A

1. Description

This Power MOSFET is produced using KIA`s advanced planar stripe DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency switched mode power supplies, active power factor correction based on half bridge topology.

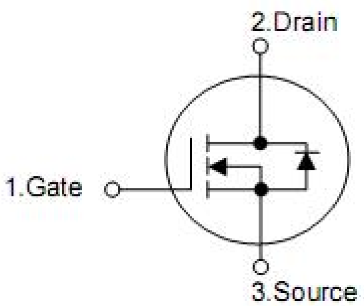
2. Features

- $R_{DS(on)}$=3.1mΩ@ V_{GS}=10V
- Improved dv/dt capability
- Fast switching
- Green device available

3.Symbol

DFN3*3

DFN5*6



Pin	Function
4	Gate
5,6,7,8	Drain
1,2,3	Source

4. Ordering information

Part Number	Package	Brand
KNG3303A	DFN3*3	KIA
KNY3303A	DFN5*6	KIA

5. Absolute maximum ratings

(T_A=25°C,unless otherwise noted)

Parameter		Symbol	Rating		Units
			DFN3*3	DFN5*6	
Drain-source voltage		V_{DSS}	30		V
Gate-source voltage		V_{GSS}	$\pm$20		V
Continuous drain current	T_C=25ºC	I_D	90*		A
	T_C=100ºC		57*		A
Pulse drain current (note 1)	T_C=25ºC	I_{DP}	360*		A
Avalanche current (note 2)		I_{AS}	50		A
Avalanche energy, (note 2)		E_{AS}	125		mJ
Maximum power dissipation	T_C=25 ºC	P_D	43.4	69	W
	Derate above 25 ºC		0.35	0.55	W/℃
Junction & storage temperature range		T_J,T_{STG}	-55-150		℃

*Drain current limited by maximum junction temperature.

6. Thermal characteristics

Parameter	Symbol	Rating		Unit
		DFN3*3	DFN5*6	
Thermal resistance, Junction-ambient	$R_{\theta JA}$	95	62	ºC/W
Thermal resistance, Junction-case	$R_{\theta JC}$	2.88	1.81	ºC/W

7. Electrical characteristics

(T_A=25°C,unless otherwise noted)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Drain-source breakdown voltage	BV_{DSS}	V_{GS}=0V,I_{DS}=250μA	30	-	-	V
BV_{DSS} temperature coefficient	△BV_{DSS} /△T_J	Reference to 25°C, I_D=1mA	-	0.03	-	V/°C
Zero gate voltage drain current	I_{DSS}	V_{DS}=30V, V_{GS}=0V, T_J=25°C	-	-	1	μA
		V_{DS}=24V, V_{GS}=0V, T_J=125°C	-	-	10	
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	1.2	1.6	2.5	V
$V_{GS(th)}$ temperature coefficient	△$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	-	-5	-	mV/°C
Gate leakage current	I_{GSS}	V_{GS}=±20V, V_{DS}=0V	-	-	±100	nA
Drain-source on-resistance(note3)	$R_{DS(on)}$	V_{GS}=10V,I_D=24A	-	3.1	4	mΩ
		V_{GS}=4.5V,I_D=12A	-	4.5	6	
Forward transconductance	gfs	V_{DS}=10V,I_D=10A	-	15.5	-	S
Gate resistance	R_g	V_{DS}=0V, V_{GS}=0V,f=1MHz	-	2	4	Ω
Input capacitance	C_{iss}	V_{DS}=15V,V_{GS}=0V, f=1MHz	-	3070		pF
Output capacitance	C_{oss}		-	400		
Reverse transfer capacitance	C_{rss}		-	315		
Turn-on delay time(note 3,4)	$t_{d(on)}$	V_{DD}=15V, I_D=15A, R_G=3.3Ω,V_{GS}=10V	-	12.6		nS
Rise time(note 3,4)	t_r		-	19.5		
Turn-off delay time(note 3,4)	$t_{d(off)}$		-	42.8		
Fall time(note 3,4)	t_f		-	13.2		
Total gate charge(note 3,4)	Q_g	V_{DS}=15V, V_{GS}=4.5V I_{DS}=24A	-	24		nC
Gate-source charge(note 3,4)	Q_{gs}		-	4.2		
Gate-drain charge(note 3,4)	Q_{gd}		-	13		
Single pulse avalanche energy	EAS	V_{DD}=25V,L=0.1mH,I_{AS}=24A	31	-	-	mJ
Continuous source current	I_S	V_{GS}=V_{DS}=0V,force current	-	-	90	A
Pulsed source current (note 3)	I_{SM}		-	-	360	A
Diode forward voltage(note 3)	V_{SD}	V_{GS}=0V,I_S=1A,T_J=25°C	-	-	1	V
Reverse recovery time	t_{rr}	V_{DS}=30V,I_S=1A, di/dt=100A/μs	-	-	-	nS
Reverse recovery charge	Q_{rr}		-	-	-	nC

Note:1: Repetitive rating, pulse width limited by max junction temperature.

2: V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=50A, R_G=25Ω, starting T_J=25°C

3: The data tested by pulsed, pulse width≦300us, duty cycle ≦2%

4: Essentially independent of operating temperature.

8. Test circuits and waveforms

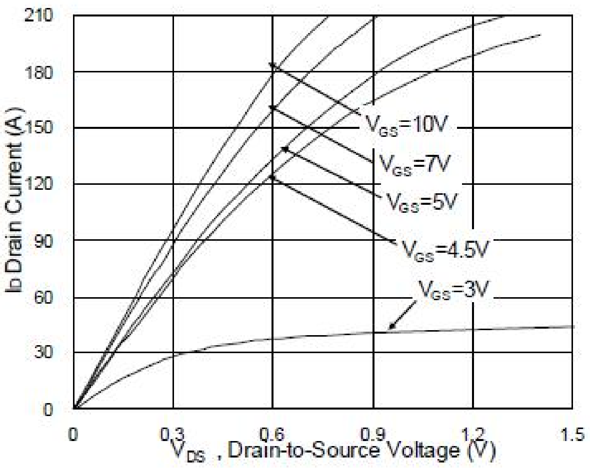


Fig.1 Typical Output Characteristics

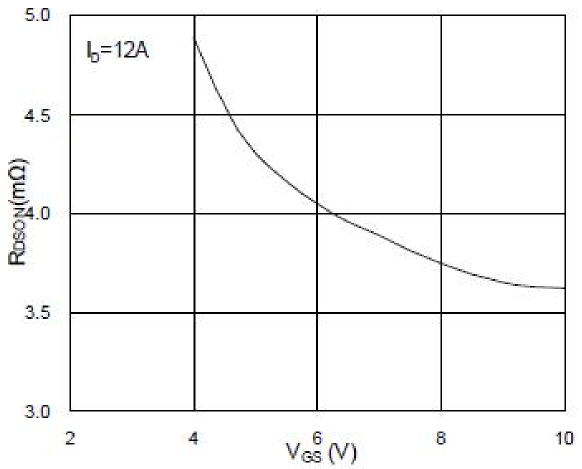


Fig.2 On-Resistance vs. G-S Voltage

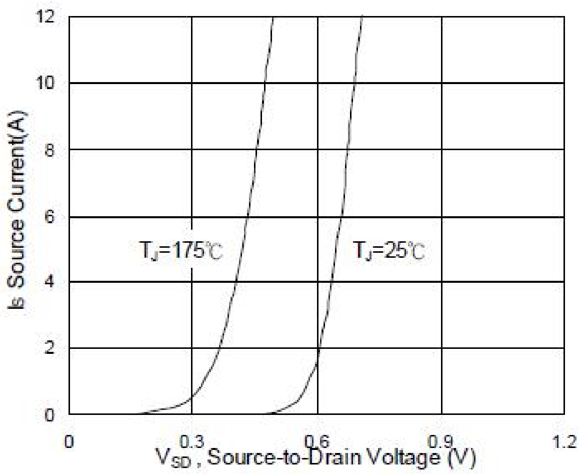


Fig.3 Forward Characteristics of Reverse

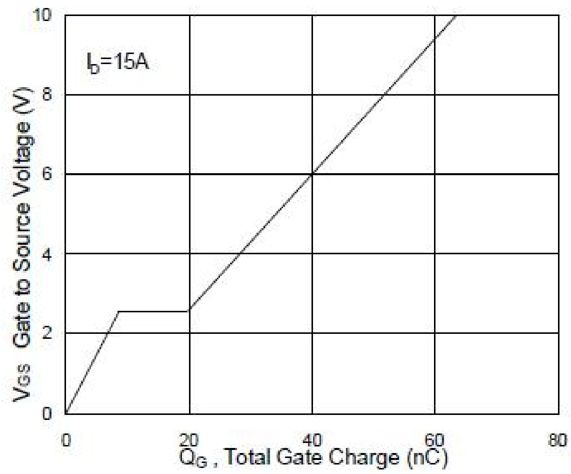


Fig.4 Gate-charge Characteristics

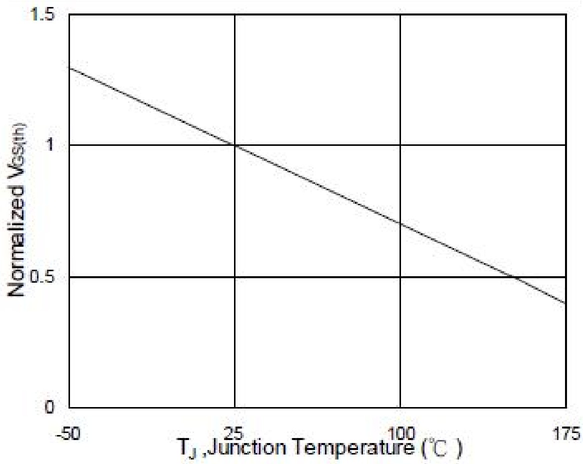


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

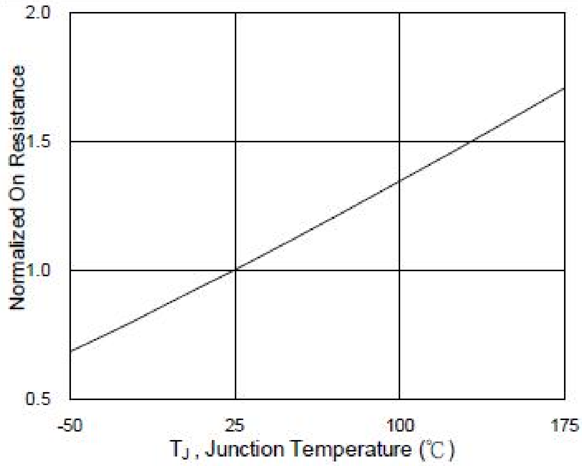


Fig.6 Normalized R_{DSON} vs. T_J

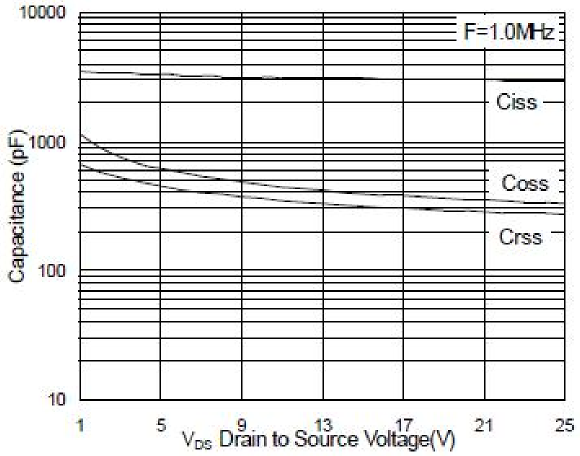


Fig.7 Capacitance

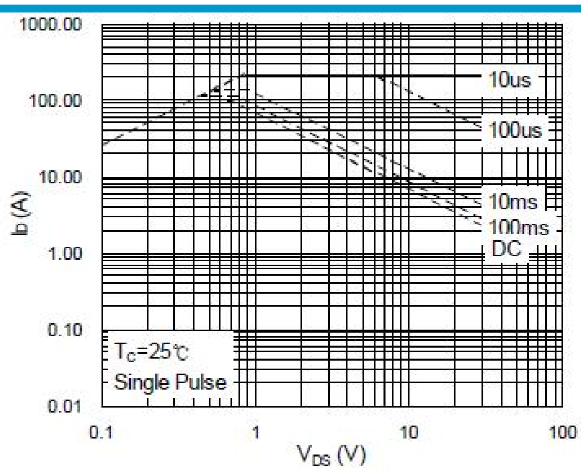


Fig.8 Safe Operating Area

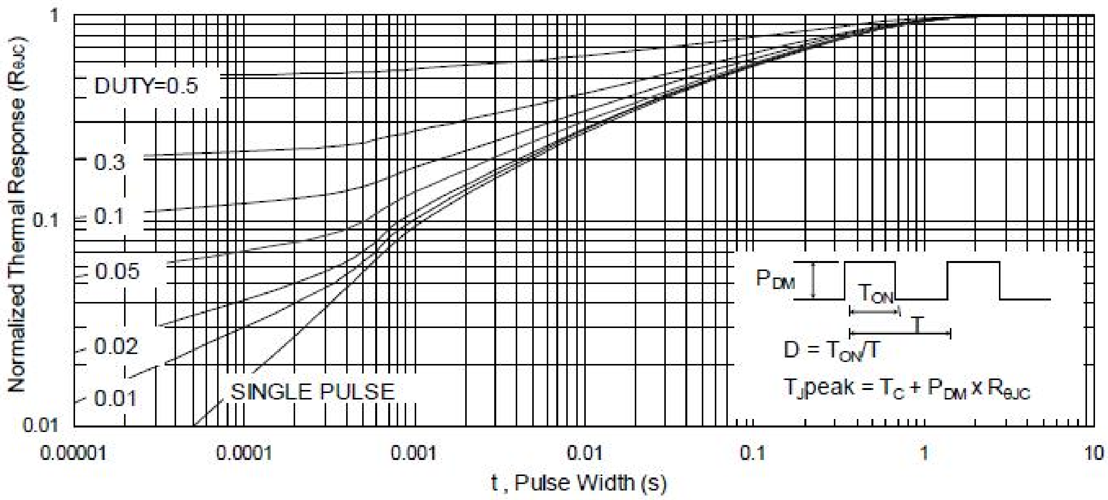


Fig.9 Normalized Maximum Transient Thermal Impedance

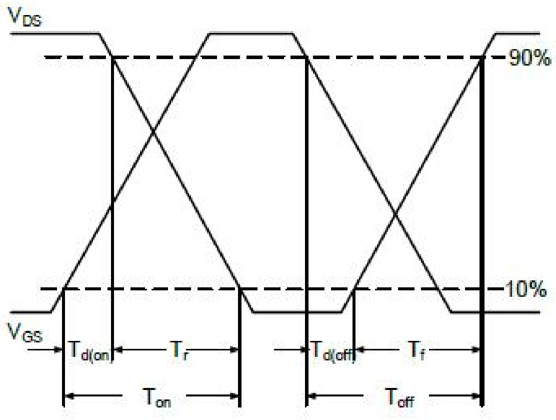


Fig.10 Switching Time Waveform

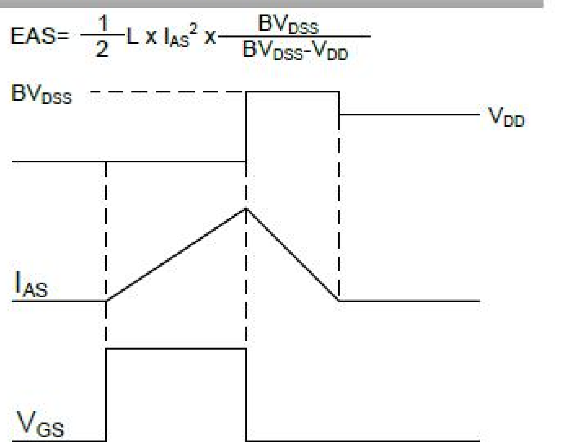


Fig.11 Unclamped Inductive Switching Waveform

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