

1. Description

The KIA30N03B is the highest performance trench N-ch MOSFETs with extreme high cell density, which provide excellent $R_{DS(on)}$ and gate charge for most of the synchronous buck converter applications. The KIA30N03B meet the RoHS and Green Product requirement, 100%EAS guaranteed with full function reliability approved.

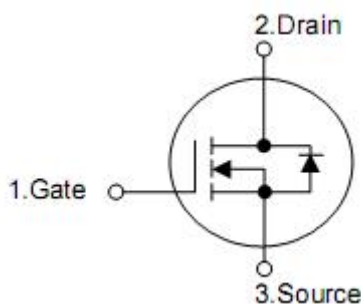
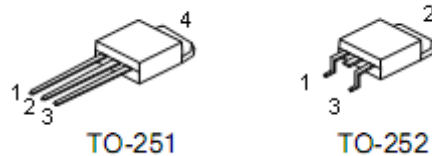
2. Features

- n $R_{DS(on)}=15m\Omega @ V_{DS}=30V$
- n Advanced high cell density Trench technology
- n Super Low Gate Charge
- n Excellent $C_{dv/dt}$ effect decline
- n 100%EAS Guaranteed
- n Green Device Available

3. Applications

- n High Frequency Point-of-Load Synchronous Buck Converter for MB/NB/UMPC/VGA
- n Networking DC-DC Power System
- n Load Switch

4. Symbol



Pin	Function
1	Gate
2	Drain
3	Source

5. Absolute maximum ratings

Parameter	Symbol	Rating	Units
Drain-source voltage	V_{DS}	30	V
Gate-source voltage	V_{GS}	+20	V
Continuous drain current, V_{GS} @10V ¹	I_D	$T_C=25^{\circ}C$	A
		$T_C=100^{\circ}C$	A
Pulsed drain current ²	I_{DM}	60	A
Single pulse avalanche energy ³	E_{AS}	72	mJ
Avalanche current	I_{AS}	21	A
Total power dissipation ⁴	P_D	25	W
Operation junction temperature range	T_J	-55 to150	$^{\circ}C$
Storage temperature range	T_{STG}	-55 to150	$^{\circ}C$

6. Thermal characteristics

Parameter	Symbol	Typ	Max	Unit
Thermal resistance,Junction-ambient($t \leq 10s$) ¹	$R_{\theta JA}$	--	25	$^{\circ}C/W$
Thermal resistance,Junction-ambient (Steady State) ¹	$R_{\theta JA}$	--	62	$^{\circ}C/W$
Thermal resistance,Junction-case ¹	$R_{\theta JC}$	--	5	$^{\circ}C/W$

7. Electrical characteristics

(T_J=25°C, unless otherwise noted)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Drain-source breakdown voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA	30	-	-	V
BV _{DSS} temperature coefficient	ΔBV _{DSS} /ΔT _J	Reference to 25 °C, I _D =1mA		0.023		V/°C
Static drain-source on-resistance ²	R _{DS(on)}	V _{GS} =10V, I _D =10A		15	18	mΩ
		V _{GS} =4.5V, I _D =5A		22	30	
Gate threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	1.0	1.5	2.5	V
V _{GS(th)} temperature coefficient	ΔV _{GS(th)}			-5.2		mV/°C
Drain-source leakage current	I _{DSS}	V _{DS} =24V, V _{GS} =0V T _J =25°C			1	μA
		V _{DS} =24V, V _{GS} =0V T _J =55°C			5	μA
Gate- source leakage current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V			±100	nA
Forward transconductance	g _{fs}	V _{DS} =15V, I _D =10A		10		S
Gate resistance	R _g	V _{DS} =24V, V _{GS} =0V, f=1MHz		2.5	5	Ω
Total gate charge(4.5V)	Q _g	V _{DS} =20V, V _{GS} =4.5V I _D =12A	-	7.2		nC
Gate-source charge	Q _{gs}			1.4		
Gate-drain charge	Q _{gd}			2.2		
Turn-on delay time	t _{d(on)}	V _{DD} =12V, I _D =5A, R _G =3.3Ω, V _{GS} =10V		4.1		ns
Rise time	t _r			9.8		
Turn-off delay time	t _{d(off)}			15.5		
Fall time	t _f			6.0		
Input capacitance	C _{iss}	V _{DS} =15V, V _{GS} =0V, f=1MHz		572		pF
Output capacitance	C _{oss}			81		
Reverse transfer capacitance	C _{rss}			65		
Single pulse avalanche energy ⁵	EAS	V _{DD} =25V, L=0.1mH, I _{AS} =10A	16			mJ
Continuous source current ^{1,6}	I _S	V _G = V _D =0V, Force current			30	A
Pulsed source current ^{2,6}	I _{SM}				60	A
Diode forward voltage ²	V _{SD}	V _{GS} =0V, I _S =15A, T _J =25°C			1.2	V

Note:1.The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper.

2.The data tested by pulsed, pulse width≤300μs, duty cycle≤2%

3.The EAS data shows Max.rating.The test condition is V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=21A

4.The power dissipation is limited by 150°C junction temperature

5.The Min, value is 100% EAS tested guarantee.

6.The data is theoretically the same as I_D and I_{DM}, in real applications, should be limited by total power dissipation.

8. Test circuits and waveforms

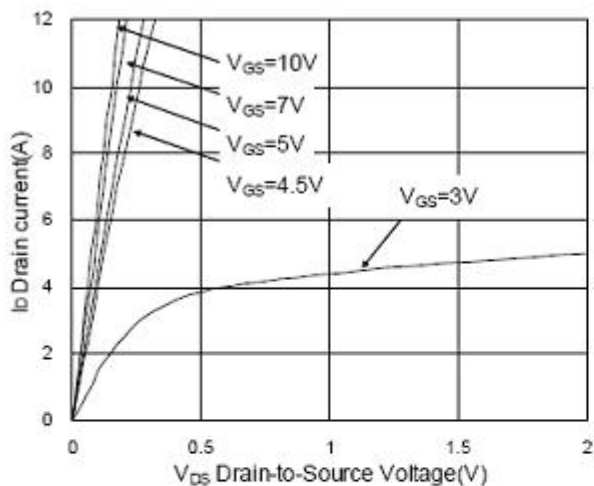


Fig.1 Typical Output Characteristics

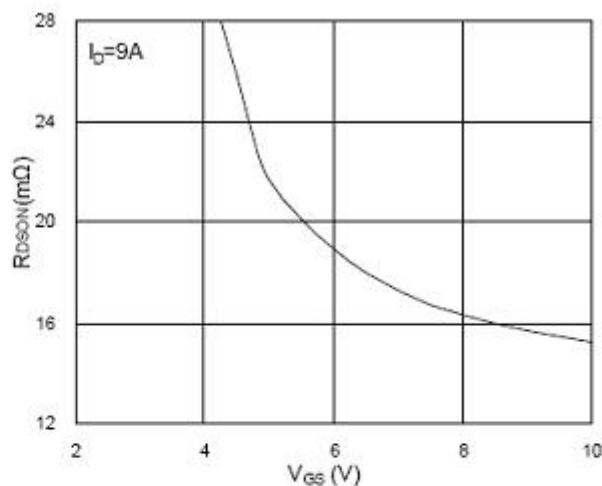


Fig.2 On-Resistance v.s Gate-Source.

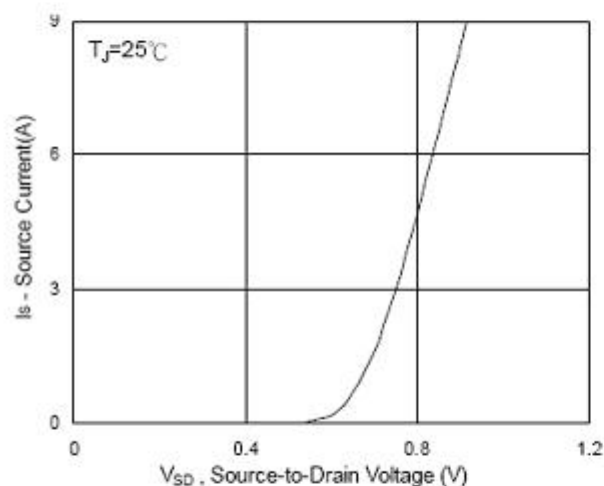


Fig.3 Forward Characteristics of Reverse

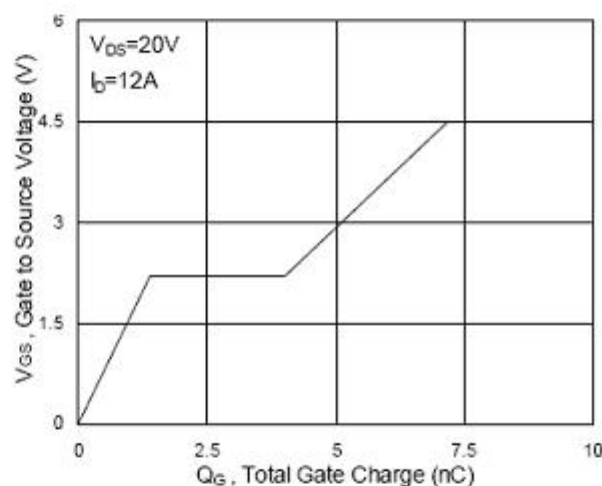


Fig.4 Gate-Charge characteristics

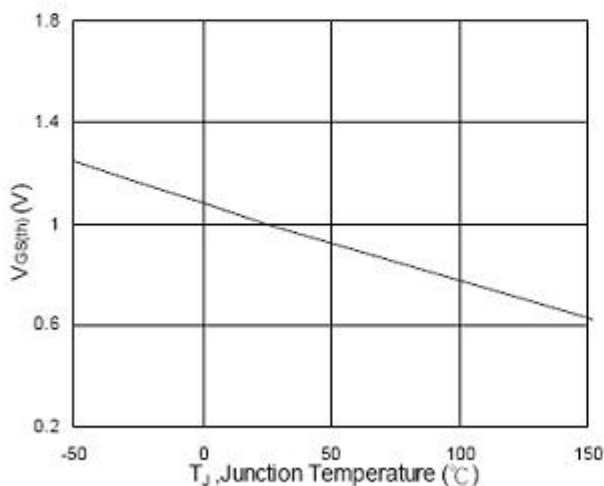


Fig.5 Normalized $V_{GS(th)}$ v.s T_J

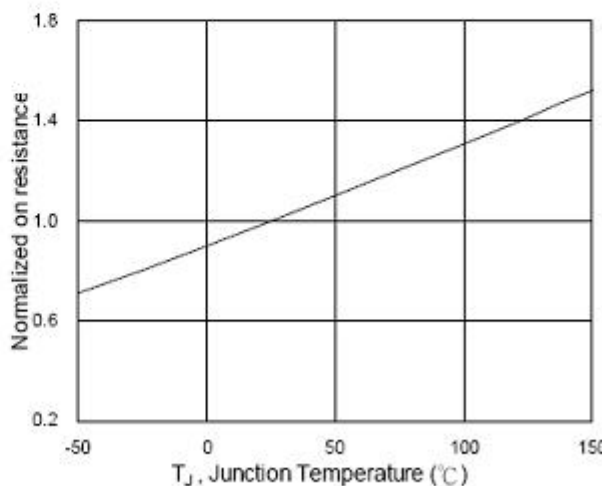


Fig.6 Normalized $R_{DS(on)}$ v.s T_J

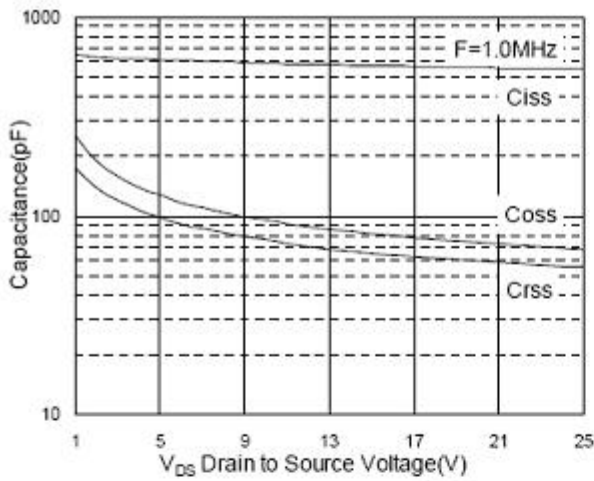


Fig.7 Capacitance

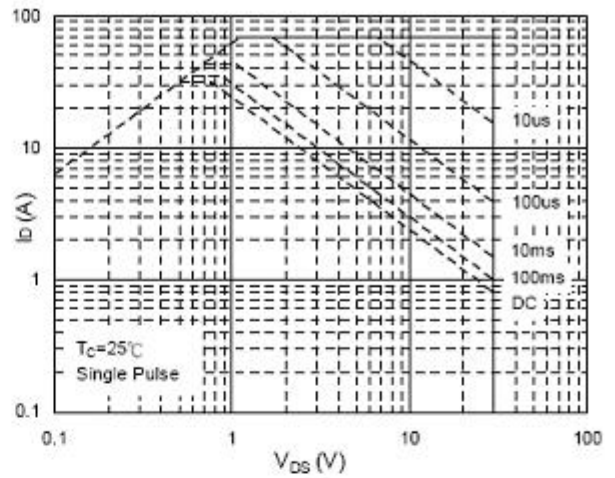


Fig.8 Safe Operating Area

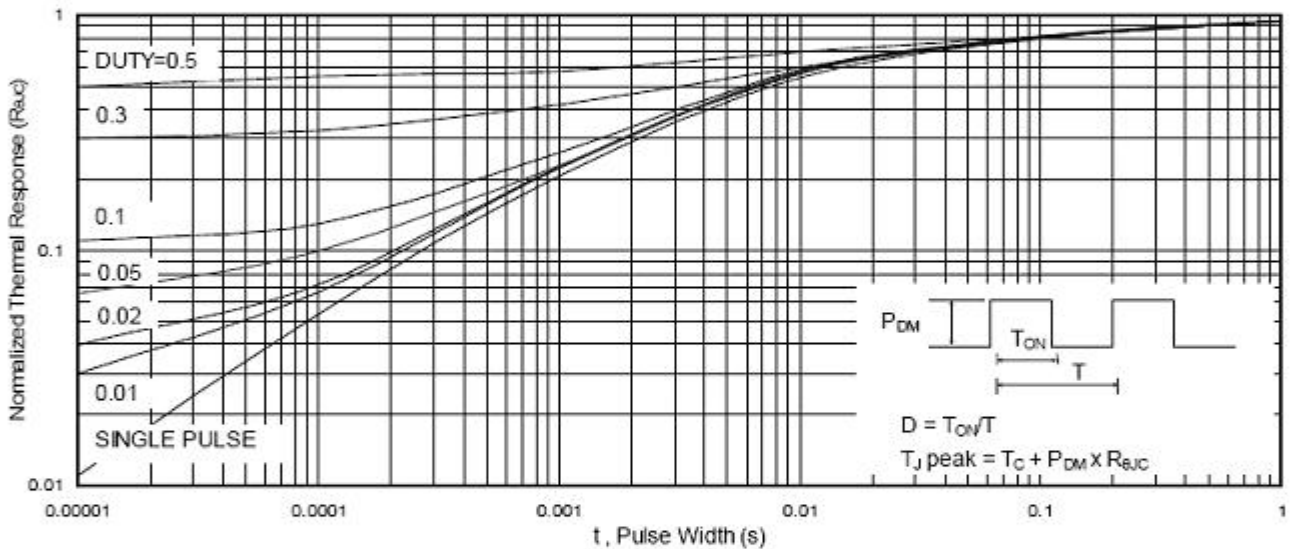


Fig.9 Normalized Maximum Transient Thermal Impedance

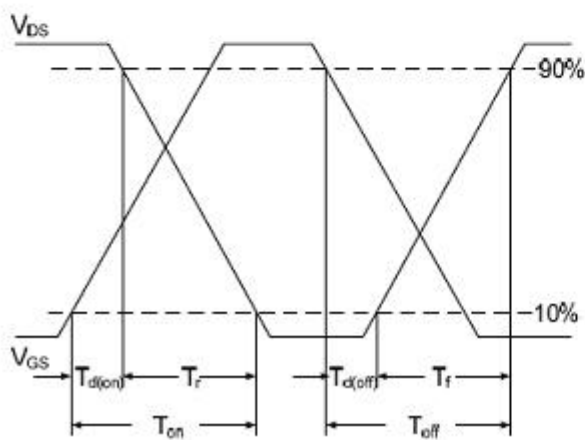


Fig.10 Switching Time Waveform

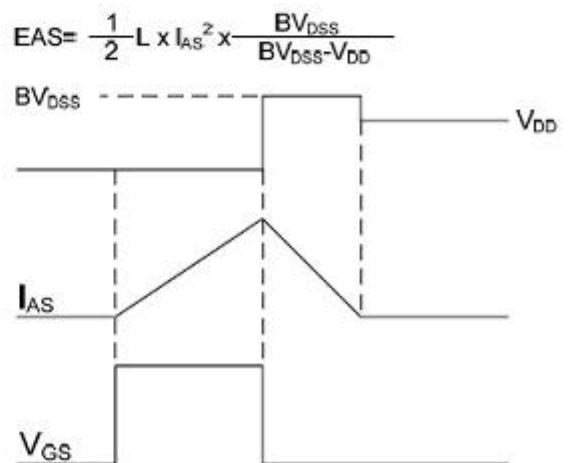


Fig.11 Unclamped Inductive Switching Waveform