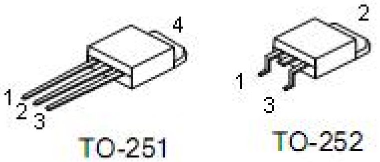
1. Description

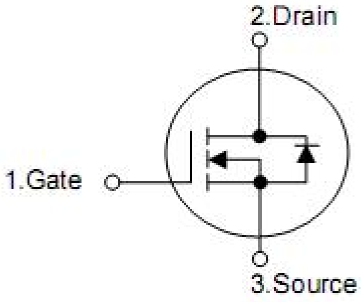
The KNX8606A is the high cell density trenched N-ch MOSFETS with provide excellent RDSON and gate charge for most of the synchronous buck converter applications. The KIA8606 meet the RoHS and green product requirement, 100% EAS guaranteed with full function reliability approved.

2. Features

- Super low gate charge
- 100% EAS guaranteed
- Excellent Cdv/dt effect desline
- Green device available
- Advanced high cell density trench technology

3.Symbol





Pin	Function
1	Gate
2	Drain
3	Source
4	Drain

4. Absolute maximum ratings

Parameter		Symbol	Rating	Units
Drain-source voltage		V_{DSS}	60	V
Gate-source voltage		V_{GS}	± 20	V
Continuous drain current , V_{GS}@10V [1]	T_C=25°C	I_D	35	A
	T_C=100°C		22	
	T_A=25°C		7.4	
	T_A=70°C		6	
Pulsed drain current[2]		I_{DM}	80	
Power dissipation[4]	T_C=25°C	P_D	45	W
	T_A=25°C		2	
Single pulse avalanche engergy [3]		E_{AS}	39.2	mJ
Avalanche current		I_{AS}	28	A
Operating junction and storage temperature range		T_J ,T_{STG}	-55 to150	ºC

5. Ordering Information

Part Number	Package	Brand
KND8606A	TO-252	KIA
KNU8606A	TO-251	KIA

6. Thermal characteristics

Parameter	Symbol	Typ	Max	Unit
Thermal resistance junction-case[1]	$R_{\theta JC}$	-	2.8	ºC/W
Thermal resistance junction-ambient[1]	$R_{\theta JA}$	-	62	

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	60	-	-	V
BV_{DSS} temperature coefficient	$\triangle BV_{DSS}/\triangle T_J$	Reference 25℃ I_D=1mA	-	0.057	-	V/ºC
Drain-source on-resistance[2]	$R_{DS(on)}$	V_{GS}=10V,I_D=20A	-	13	20	mΩ
		V_{GS}=4.5V,I_D=10A	-	16	24	
Gate threshold voltage	$V_{GS(TH)}$	V_{DS}= V_{GS},I_D=250uA	1.2	-	2.5	V
$V_{GS(TH)}$ temperature coefficient	$\triangle V_{GS(TH)}$		-	-5.68	-	mV/ºC
Drain-source leakage current	I_{DSS}	V_{DS}=48V, V_{GS}=0V T_J=25°C	-	-	1	μA
		V_{DS}=48V, V_{GS}=0V T_J=55°C	-	-	5	
Gate-source forward leakage	I_{GSS}	V_{GS}=±20V, V_{DS}=0V	-	-	±100	nA
Forward transconductance	gfs	V_{DS}=5V, I_D=15A	-	45	-	S
Gate resistance	R_g	V_{DS}=0V, V_{GS}=0V f=1MHz	-	1.7	-	Ω
Total gate charge(4.5V)	Q_g	V_{DS}=48V, I_D=15A V_{GS}=4.5V	-	19.3	-	nC
Gate-source charge	Q_{gs}		-	7.1	-	
Gate-drain charge	Q_{gd}		-	7.6	-	
Turn-on delay time	$t_{d(on)}$	V_{DD}=30V, I_D=15A, R_G=3.3Ω,V_{GS}=10V	-	7.2	-	ns
Rise time	t_r		-	50	-	
Turn-off delay time	$t_{d(off)}$		-	36.4	-	
Fall time	t_f		-	7.6	-	
Input capacitance	C_{iss}	V_{DS}=15V,V_{GS}=0V f=1MHz	-	2423	-	pF
Output capacitance	C_{oss}		-	145	-	
Reverse transfer capacitance	C_{rss}		-	97	-	
Continuous source current[1,6]	I_S	V_D=V_G=0V, Force current	-	-	35	A
Maximum pulsed current[2,6]	I_{SM}		-	-	80	
Diode forward voltage[2]	V_{SD}	I_S=1A, V_{GS}=0V T_J=25°C	-	-	1	V
Reverse recovery time	t_{rr}	I_F=15A,dI/dt=100A/μs T_J=25°C	-	16.3	-	ns
Reverse recovery charge	Q_{rr}		-	11	-	nC

Note:

1. The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ 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}=28A
4. The power dissipation is limited by 150 ºC junction temperature.
5. The data is theoretically the same as I_D and I_{DM}, in real applications, should be limited by total power dissipation.

8. Typical operating characteristics

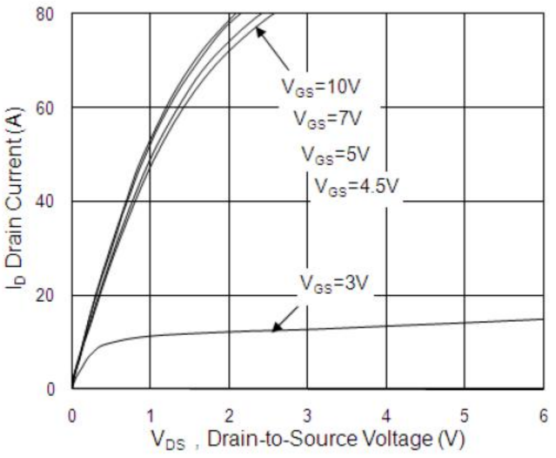


Fig.1 Typical Output Characteristics

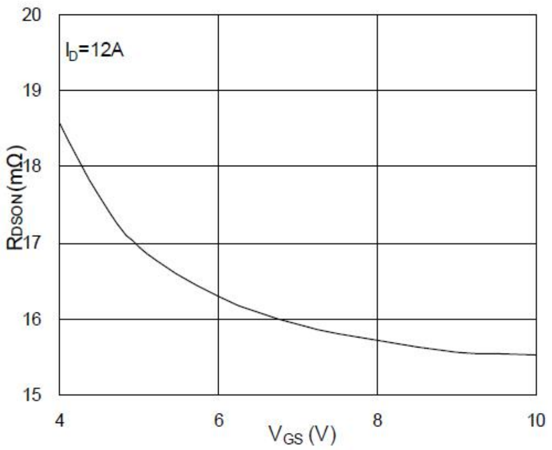


Fig.2 On-Resistance v.s Gate-Source

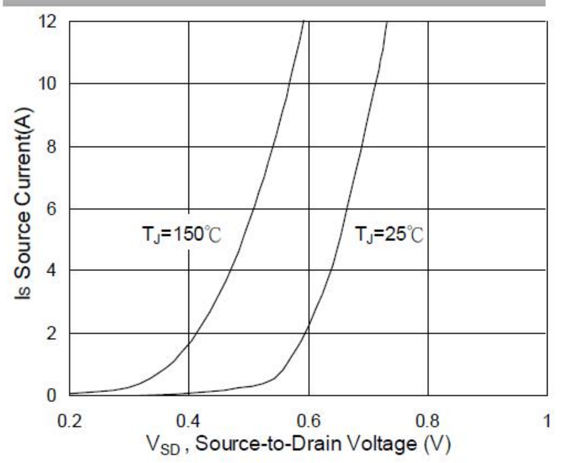


Fig.3 Forward Characteristics of Reverse

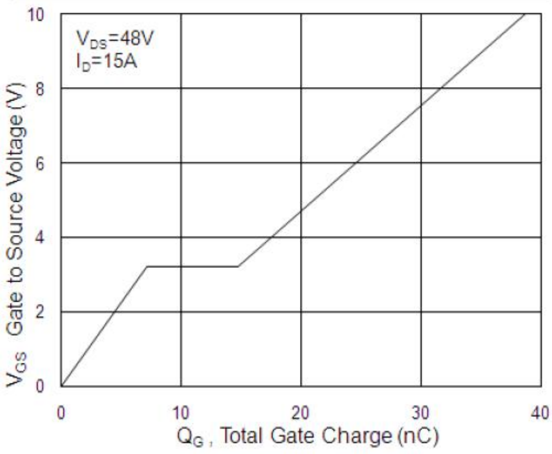


Fig.4 Gate-Charge Characteristics

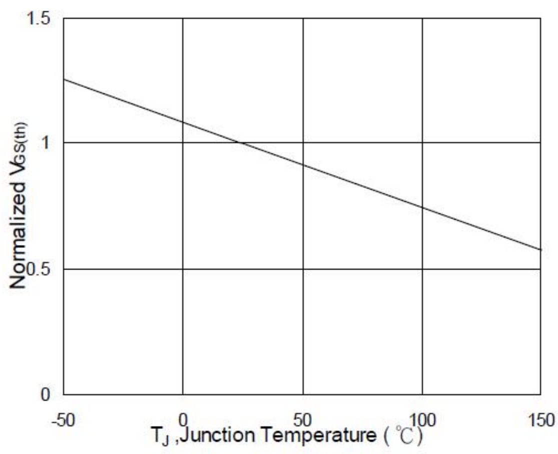


Fig.5 Normalized $V_{GS(th)}$ v.s T_J

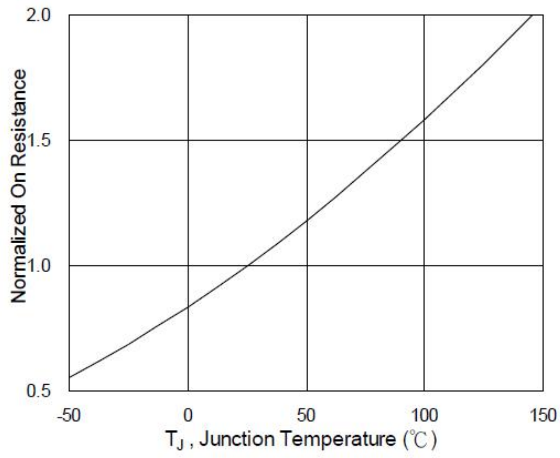


Fig.6 Normalized R_{DSON} v.s T_J

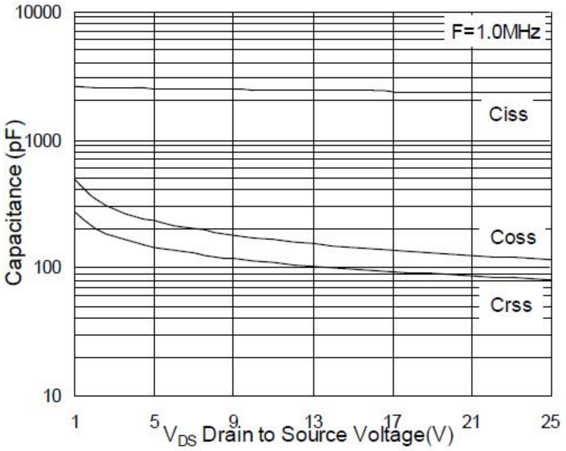


Fig.7 Capacitance

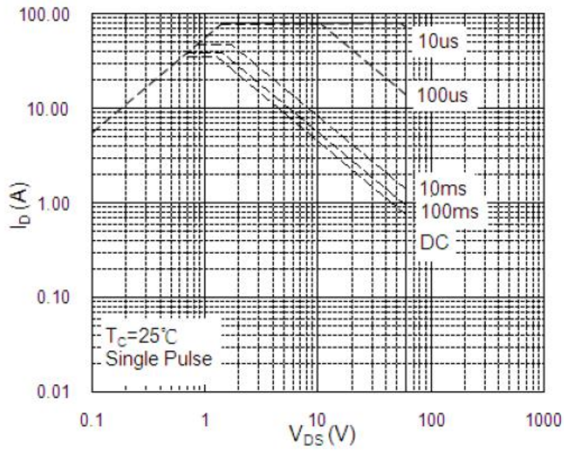


Fig.8 Safe Operating Area

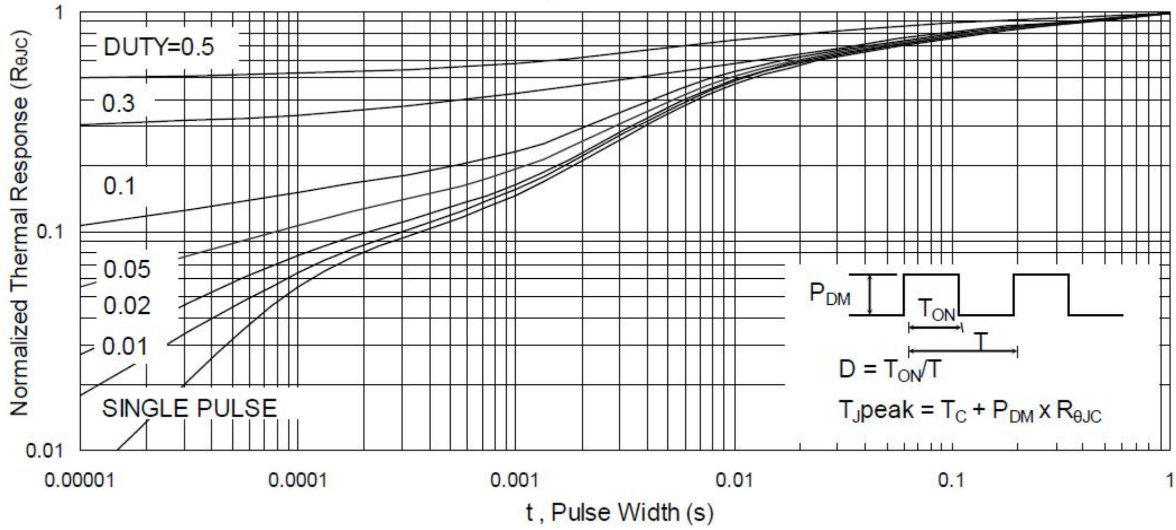


Fig.9 Normalized Maximum Transient Thermal Impedance

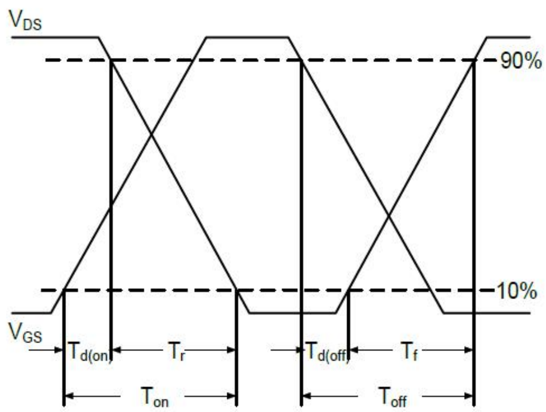


Fig.10 Switching Time Waveform

$$EAS=\frac{1}{2}L \times I_{AS}^2 \times \frac{BV_{DSS}}{BV_{DSS}-V_{DD}}$$

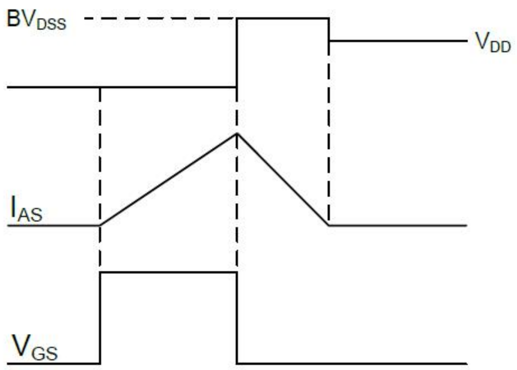


Fig.11 Unclamped Inductive Switching Waveform