

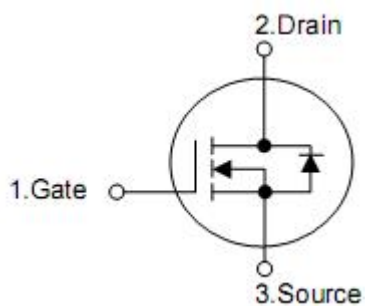
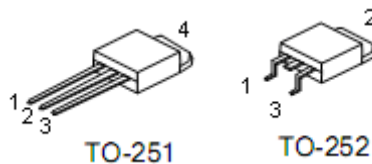
## 1. Description

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

- n Super low gate charge
- n 100% EAS guaranteed
- n Excellent Cdv/dt effect desline
- n Green device available
- n 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	$V_{GS}$	$\pm 20$	V
Continuous drain current , $V_{GS}@10V$ <sup>1</sup>	$I_D$	$T_C=25^\circ C$	35
		$T_C=100^\circ C$	22
		$T_A=25^\circ C$	7.4
		$T_A=70^\circ C$	6
Pulsed drain current <sup>2</sup>	$I_{DM}$	80	
Power dissipation <sup>4</sup>	$P_D$	$T_C=25^\circ C$	45
		$T_A=25^\circ C$	2
Single pulse avalanche energy <sup>3</sup>	$E_{AS}$	39.2	mJ
Avalanche current	$I_{AS}$	28	A
Operating junction and storage temperature range	$T_J, T_{STG}$	-55 to 150	$^\circ C$

#### 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 <sup>1</sup>	$R_{\theta JC}$	-	2.8	$^\circ C/W$
Thermal resistance junction-ambient <sup>1</sup>	$R_{\theta JA}$	-	62	

## 7. Electrical characteristics

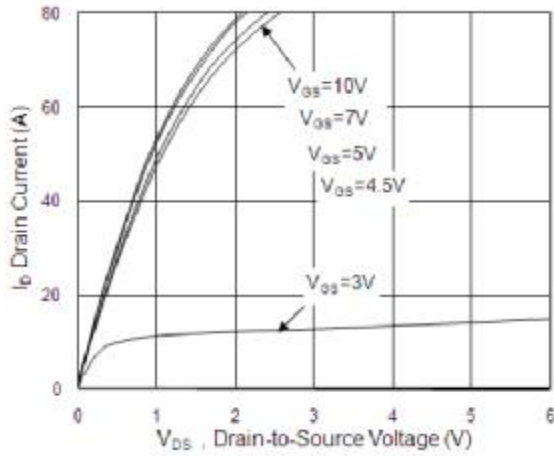
(T<sub>J</sub>=25°C, unless otherwise noted)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Drain-source breakdown voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	60	-	-	V
BV <sub>DSS</sub> temperature coefficient	ΔBV <sub>DSS</sub> /ΔT <sub>J</sub>	Reference 25°C I <sub>D</sub> =1mA	-	0.057	-	V/°C
Drain-source on-resistance <sup>2</sup>	R <sub>DS(on)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =20A	-	-	20	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =10A	-	-	24	
Gate threshold voltage	V <sub>GS(TH)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> =250uA	1.2	-	2.5	V
V <sub>GS(TH)</sub> temperature coefficient	ΔV <sub>GS(TH)</sub>		-	-5.68	-	mV/°C
Drain-source leakage current	I <sub>DSS</sub>	V <sub>DS</sub> =48V, V <sub>GS</sub> =0V T <sub>J</sub> =25°C	-	-	1	μA
		V <sub>DS</sub> =48V, V <sub>GS</sub> =0V T <sub>J</sub> =55°C	-	-	5	
Gate-source forward leakage	I <sub>GSS</sub>	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	-	-	±100	nA
Forward transconductance	g <sub>fs</sub>	V <sub>DS</sub> =5V, I <sub>D</sub> =15A	-	45	-	S
Gate resistance	R <sub>g</sub>	V <sub>DS</sub> =0V, V <sub>GS</sub> =0V f=1MHz	-	1.7	-	Ω
Total gate charge(4.5V)	Q <sub>g</sub>	V <sub>DS</sub> =48V, I <sub>D</sub> =15A V <sub>GS</sub> =4.5V	-	19.3	-	nC
Gate-source charge	Q <sub>gs</sub>		-	7.1	-	
Gate-drain charge	Q <sub>gd</sub>		-	7.6	-	
Turn-on delay time	t <sub>d(on)</sub>	V <sub>DD</sub> =30V, I <sub>D</sub> =15A, R <sub>G</sub> =3.3Ω, V <sub>GS</sub> =10V	-	7.2	-	ns
Rise time	t <sub>r</sub>		-	50	-	
Turn-off delay time	t <sub>d(off)</sub>		-	36.4	-	
Fall time	t <sub>f</sub>		-	7.6	-	
Input capacitance	C <sub>iss</sub>	V <sub>DS</sub> =15V, V <sub>GS</sub> =0V f=1MHz	-	2423	-	pF
Output capacitance	C <sub>oss</sub>		-	145	-	
Reverse transfer capacitance	C <sub>rss</sub>		-	97	-	
Continuous source current <sup>1,6</sup>	I <sub>S</sub>	V <sub>D</sub> =V <sub>G</sub> =0V, Force current	-	-	35	A
Maximum pulsed current <sup>2,6</sup>	I <sub>SM</sub>		-	-	80	
Diode forward voltage <sup>2</sup>	V <sub>SD</sub>	I <sub>S</sub> =1A, V <sub>GS</sub> =0V T <sub>J</sub> =25°C	-	-	1	V
Reverse recovery time	t <sub>rr</sub>	I <sub>F</sub> =15A, dI/dt=100A/μs T <sub>J</sub> =25°C	-	16.3	-	ns
Reverse recovery charge	Q <sub>rr</sub>		-	11	-	nC

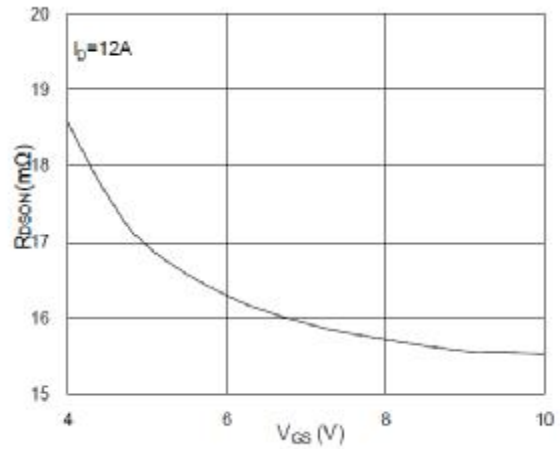
Note:

1. The data tested by surface mounted on a 1 inch<sup>2</sup> 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<sub>DD</sub>=25V, V<sub>GS</sub>=10V, L=0.1mH, I<sub>AS</sub>=28A
4. The power dissipation is limited by 150 °C junction temperature.
5. The data is theoretically the same as I<sub>D</sub> and I<sub>DM</sub>, in real applications, should be limited by total power dissipation.

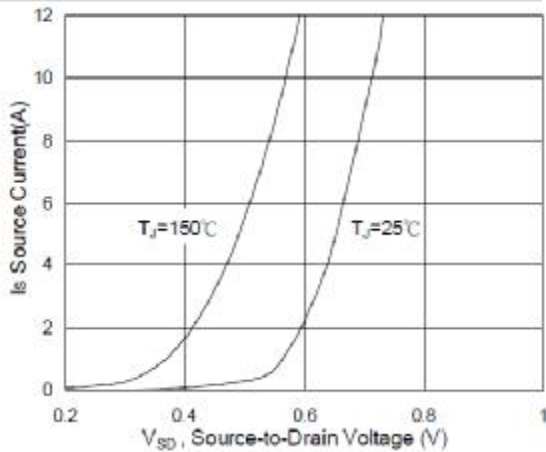
**8. Typical operating characteristics**



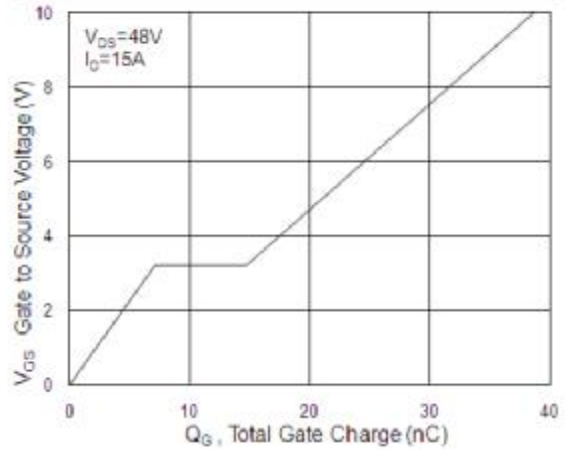
**Fig.1 Typical Output Characteristics**



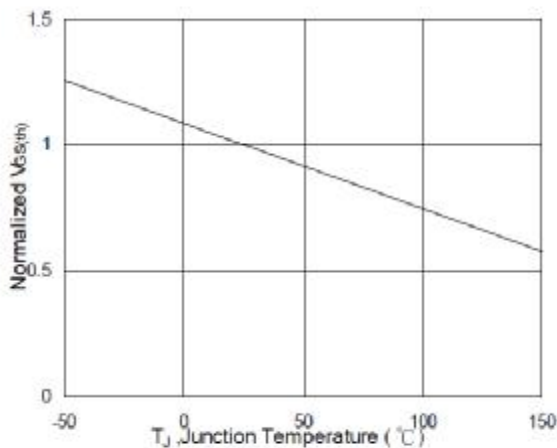
**Fig.2 On-Resistance v.s Gate-Source**



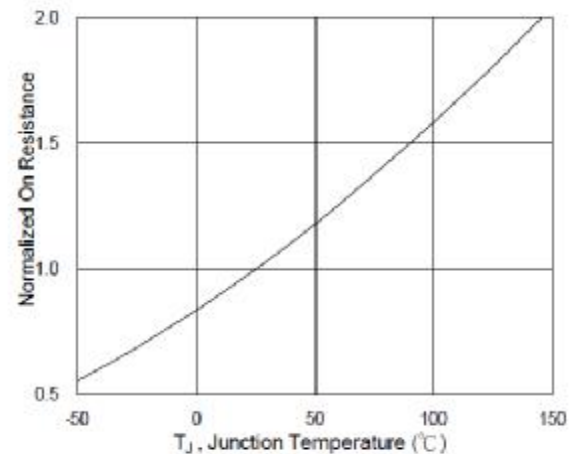
**Fig.3 Forward Characteristics of Reverse**



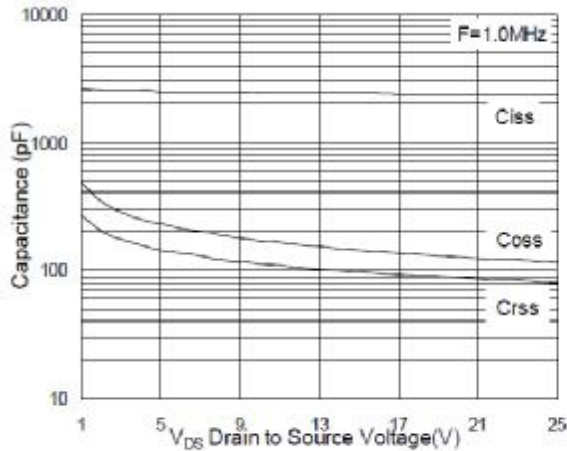
**Fig.4 Gate-Charge Characteristics**



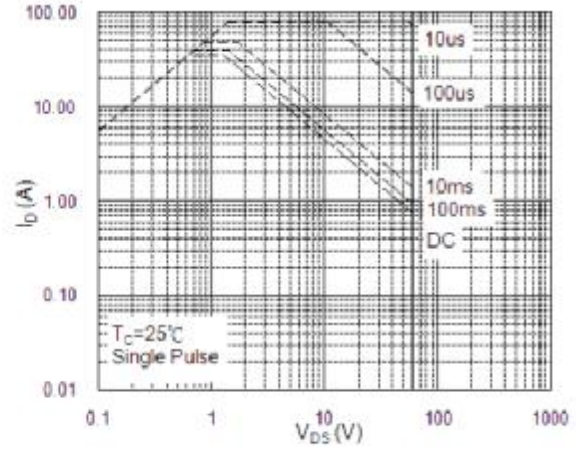
**Fig.5 Normalized  $V_{GS(th)}$  v.s  $T_J$**



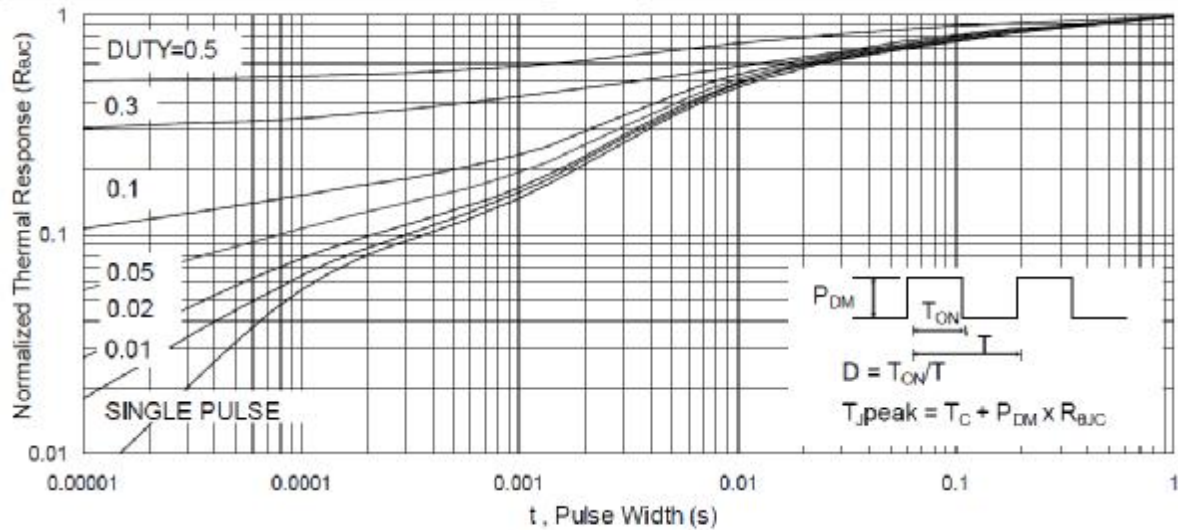
**Fig.6 Normalized  $R_{DS(on)}$  v.s  $T_J$**



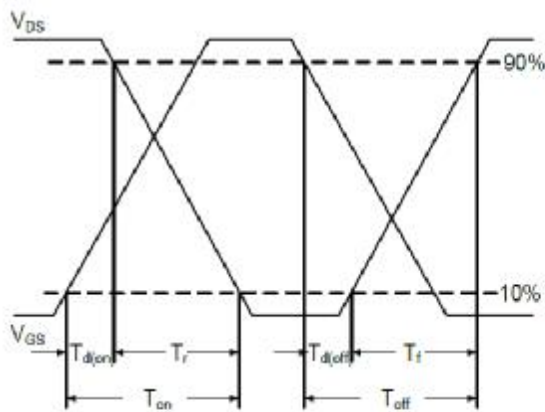
**Fig.7 Capacitance**



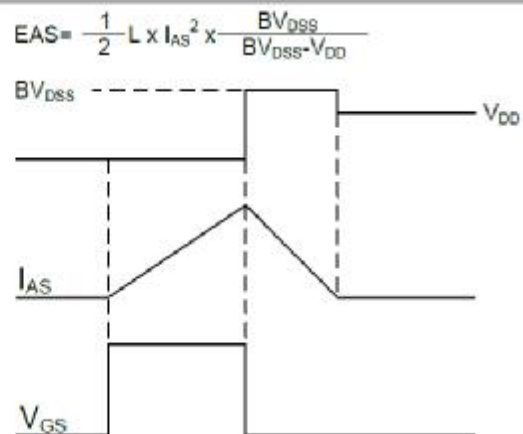
**Fig.8 Safe Operating Area**



**Fig.9 Normalized Maximum Transient Thermal Impedance**



**Fig.10 Switching Time Waveform**



**Fig.11 Unclamped Inductive Switching Waveform**