

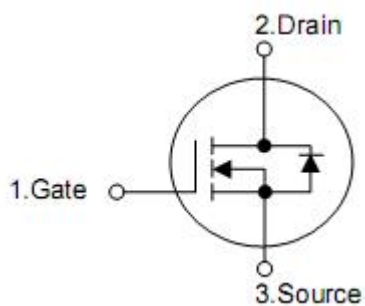
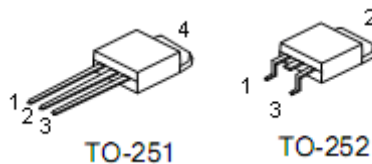
1. Description

The KIA8606A is the high cell density trench 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}	± 20	V
Continuous drain current , $V_{GS}@10V$ ¹	$T_C=25^\circ C$	I_D	35	A
	$T_C=100^\circ C$		22	
	$T_A=25^\circ C$		7.4	
	$T_A=70^\circ C$		6	
Pulsed drain current ²		I_{DM}	80	
Power dissipation ⁴	$T_C=25^\circ C$	P_D	45	W
	$T_A=25^\circ C$		2	
Single pulse avalanche energy ³		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. Thermal characteristics

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

6. 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	ΔBV _{DSS} /ΔT _J	Reference 25°C I _D =1mA	-	0.057	-	V/°C
Drain-source on-resistance ²	R _{DS(on)}	V _{GS} =10V, I _D =20A	-	-	20	mΩ
		V _{GS} =4.5V, I _D =10A	-	-	24	
Gate threshold voltage	V _{GS(TH)}	V _{DS} = V _{GS} , I _D =250uA	1.2	-	2.5	V
V _{GS(TH)} temperature coefficient	ΔV _{GS(TH)}		-	-5.68	-	mV/°C
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	g _{fs}	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 inch² 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 °C 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.

7. Typical operating characteristics

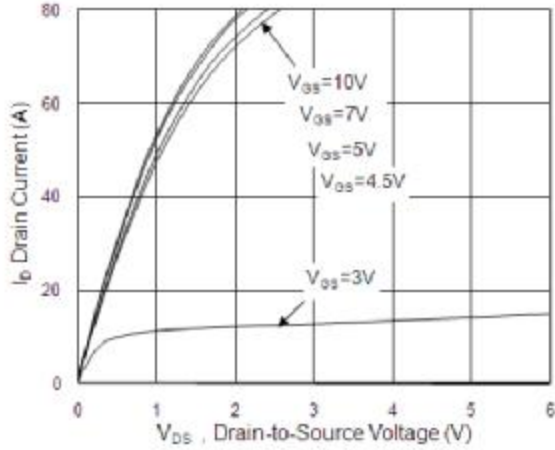


Fig.1 Typical Output Characteristics

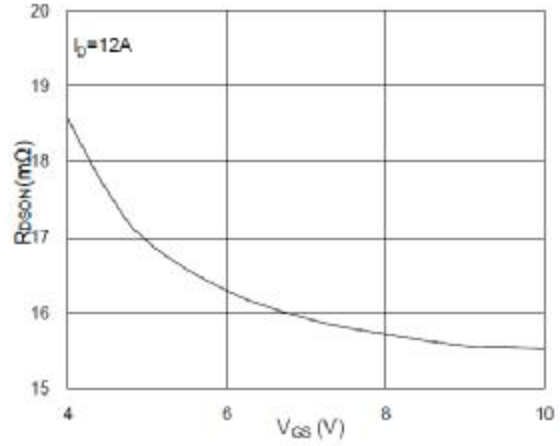


Fig.2 On-Resistance v.s Gate-Source

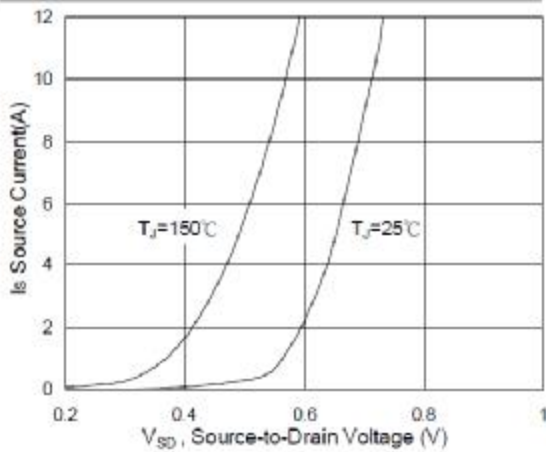


Fig.3 Forward Characteristics of Reverse

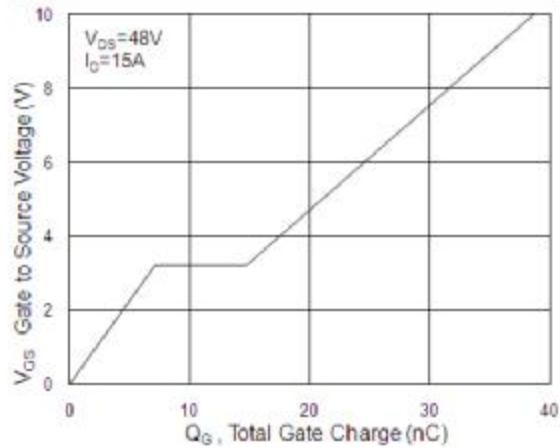


Fig.4 Gate-Charge Characteristics

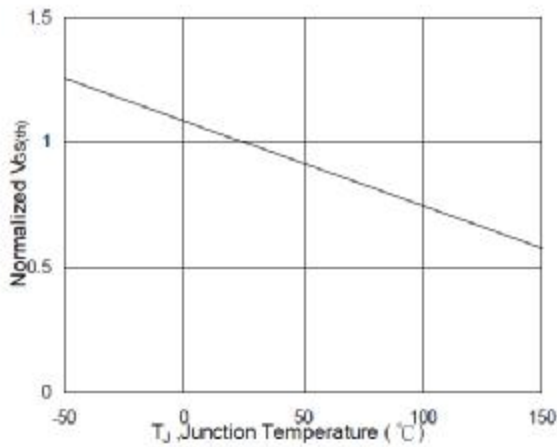


Fig.5 Normalized $V_{GS(th)}$ v.s T_J

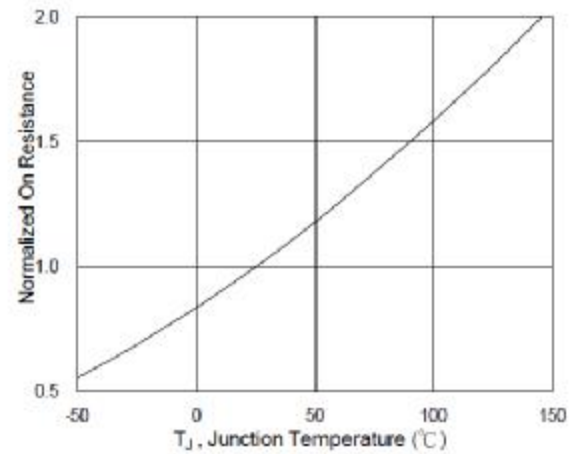


Fig.6 Normalized $R_{DS(on)}$ v.s T_J

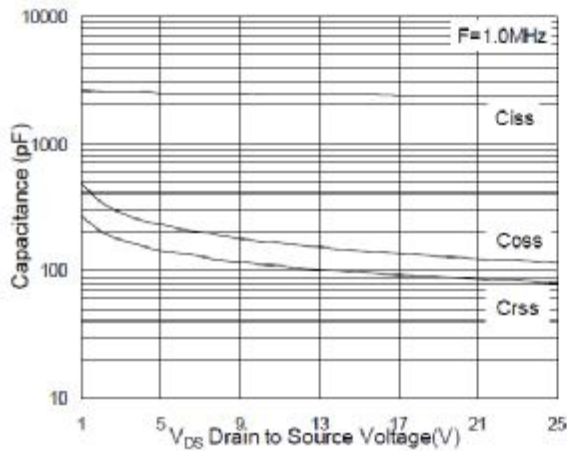


Fig.7 Capacitance

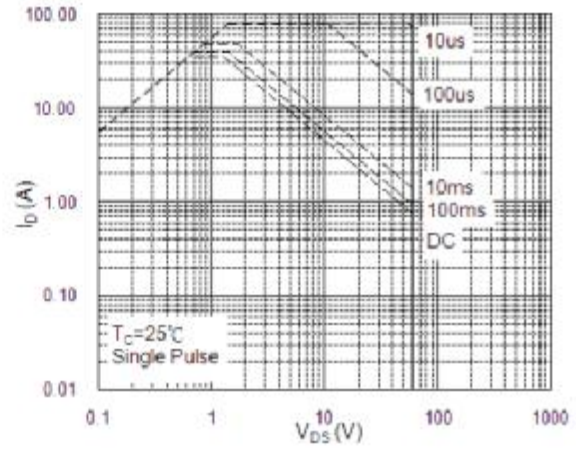


Fig.8 Safe Operating Area

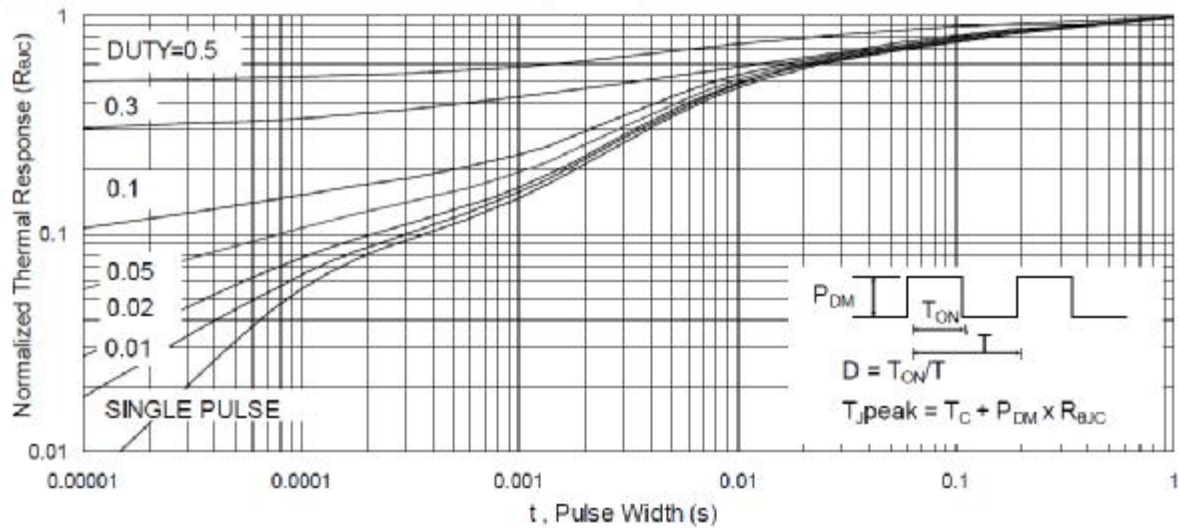


Fig.9 Normalized Maximum Transient Thermal Impedance

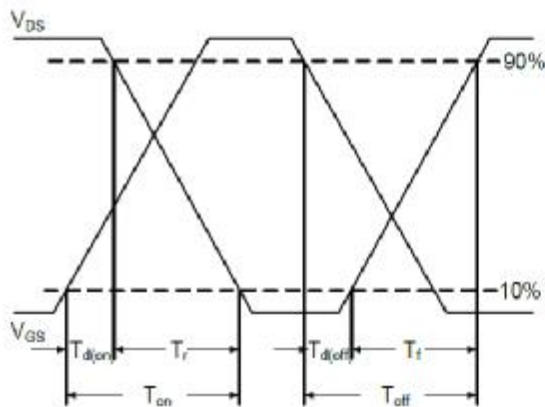


Fig.10 Switching Time Waveform

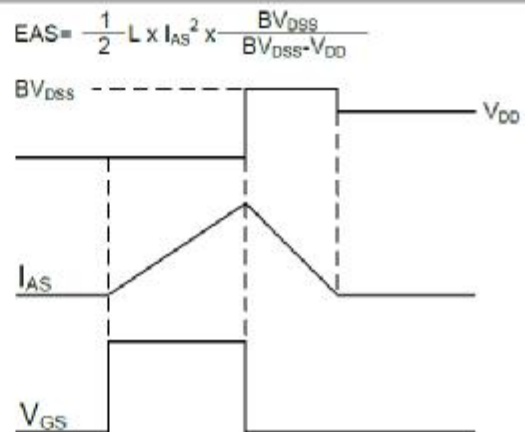


Fig.11 Unclamped Inductive Switching Waveform