1. Features

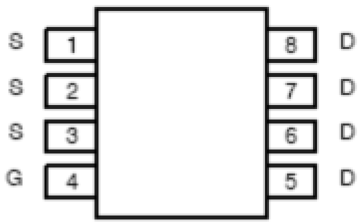
- $R_{DS(on)}$=10mΩ(typ)@ V_{GS}=10 V
- Super low gate charge
- Green device available
- Excellent Cdv/dt effect decline
- Advanced high cell density trench technology

2.Description

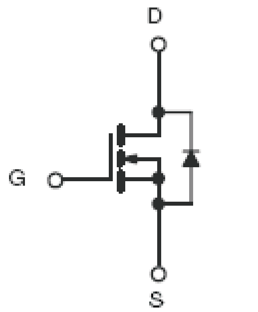
The KIA4706A is the high cell density trenched N-ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications. The KIA4706A meet the RoHs and Green Product requirement.

3.Symbol

SOP-8



Top View



N-Channel MOSFET

4.Absolute maximum ratings

(T_A=25°C,unless otherwise noted)

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[1]	T_A=25ºC	I_D	8	A
	T_A=70ºC		6.4	
Pulsed drain current[2]		I_{DM}	32	A
Single pulse avalanche energy[3]		EAS	72	mJ
Avalanche current		I_{AS}	38	A
Total power dissipation[4]	T_A=25ºC	P_D	1.5	W
Junction and storage temperature range		T_J ,T_{STG}	-55 to150	ºC
Thermal resistance-junction to ambient[1]		$R_{\theta JA}$	85	ºC/W
Thermal resistance-junction to case[1]		$R_{\theta JC}$	24	ºC/W

5.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	△BV_{DSS}/△T_J	Reference to 25°C, I_D=1mA	-	0.052	-	V/°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 leakage current	I_{GSS}	V_{GS}=±20V,V_{DS}=0V	-	-	±100	nA
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	1.2	-	2.5	V
$V_{GS(th)}$ Temperature coefficient	△$V_{GS(th)}$		-	5.76	-	mV/°C
Static drain-source on- resistance[2]	$R_{DS(on)}$	V_{GS}=10V,I_D=8A	-	10	12	mΩ
		V_{GS}=4.5V,I_D=6A	-	13	15	
Forward transcend ductance	g_{FS}	V_{DS}=5V, I_D=8A	-	45	-	S
Diode forward voltage[2]	V_{SD}	V_{GS}=0V,I_S=-1A, T_J=25°C	-	-	1.2	V
Gate resistance	R_g	V_{DS}=0V, V_{DS}=0V,f=1MHz	-	1.5	-	Ω
Total gate charge(4.5V)	Q_g	V_{DS}=48V, V_{GS}=4.5V I_D =8A	-	30	-	nC
Gate-source charge	Q_{gs}		-	10.7	-	
Gate-drain charge	Q_{gd}		-	9.4	-	
Turn-on delay time	$t_{d(on)}$	V_{DD}=30V, R_G=3.3Ω, V_{GS}=10V I_D=8A	-	10.6	-	ns
Rise time	t_r		-	9	-	
Turn-off delay time	$t_{d(off)}$		-	65.6	-	
Fall time	t_f		-	4.8	-	
Input capacitance	C_{iss}	V_{GS}=0V, V_{DS}=15V F=1.0MHZ	-	3240	-	pF
Output capacitance	C_{oss}		-	210	-	
Reverse transfer capacitance	C_{rss}		-	146	-	
Diode characteristics						
Continuous source current[1.5]	I_S	V_G=V_D=0V,Force current	-	-	8	A
Pulsed source current[2.5]	I_{SM}		-	-	32	A
Reverse recovery time	t_{rr}	I_F=8A,dI/dt=100A/us, T_J=25°C	-	18	-	nS
Reverse recovery charge	Q_{rr}		-	15.6	-	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 ≤300us,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}=38A.

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.

6. Test circuits and waveforms

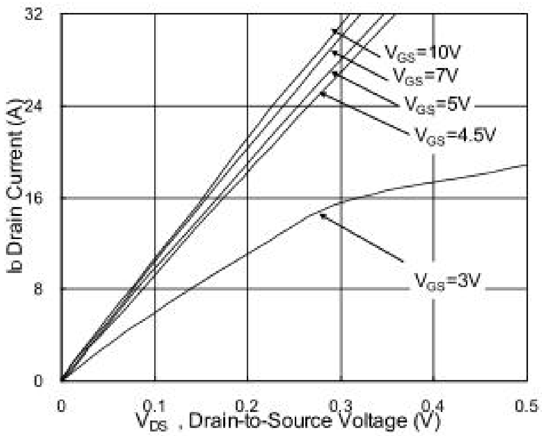


Fig.1 Typical Output Characteristics

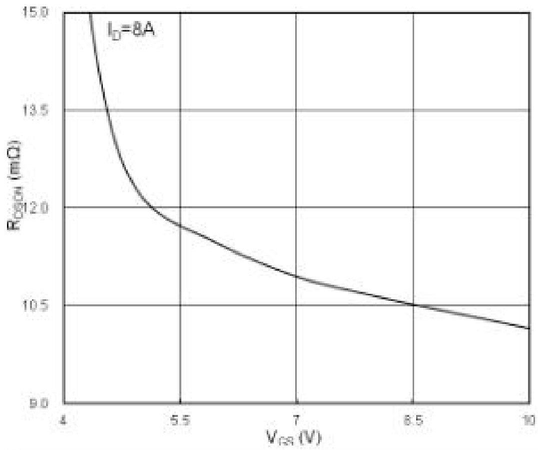


Fig.2 On-Resistance v.s Gate-Source

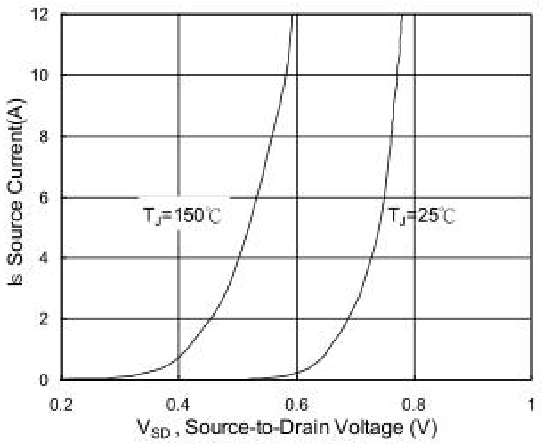


Fig.3 Forward Characteristics of Reverse

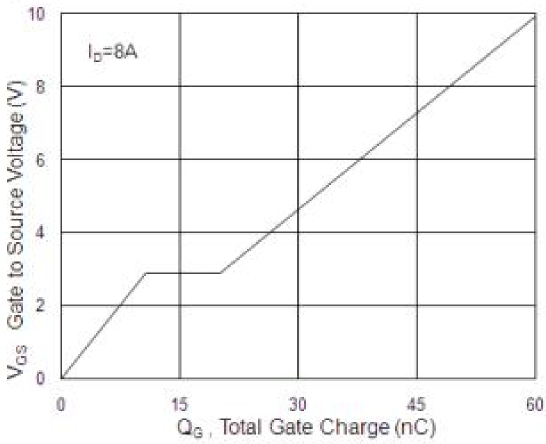


Fig.4 Gate-Charge Characteristics

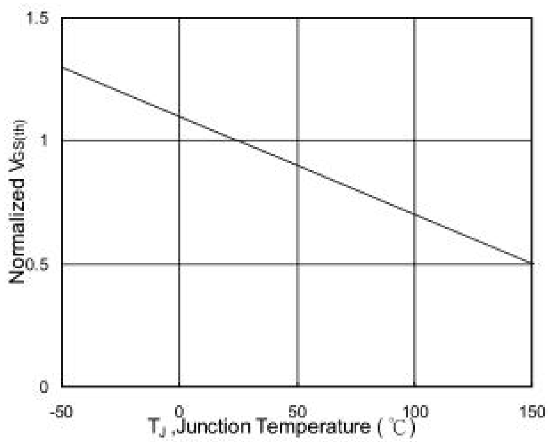


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

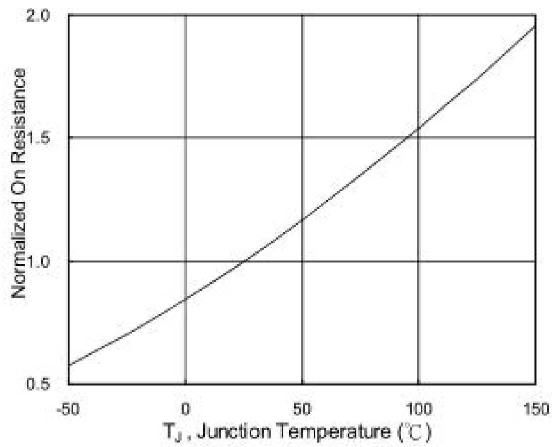


Fig.6 Normalized R_{DSON} vs. T_J

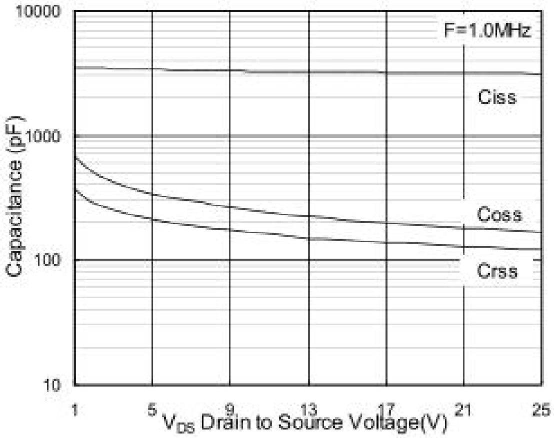


Fig.7 Capacitance

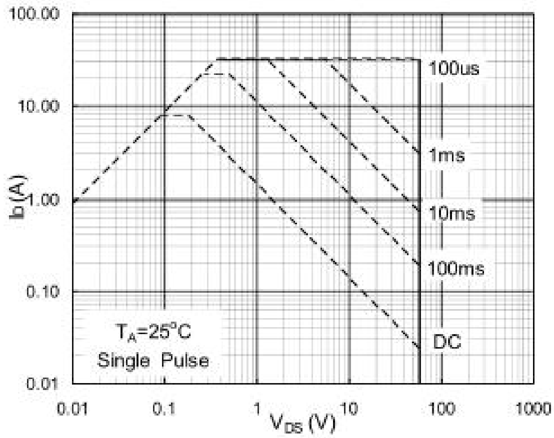


Fig.8 Safe Operating Area

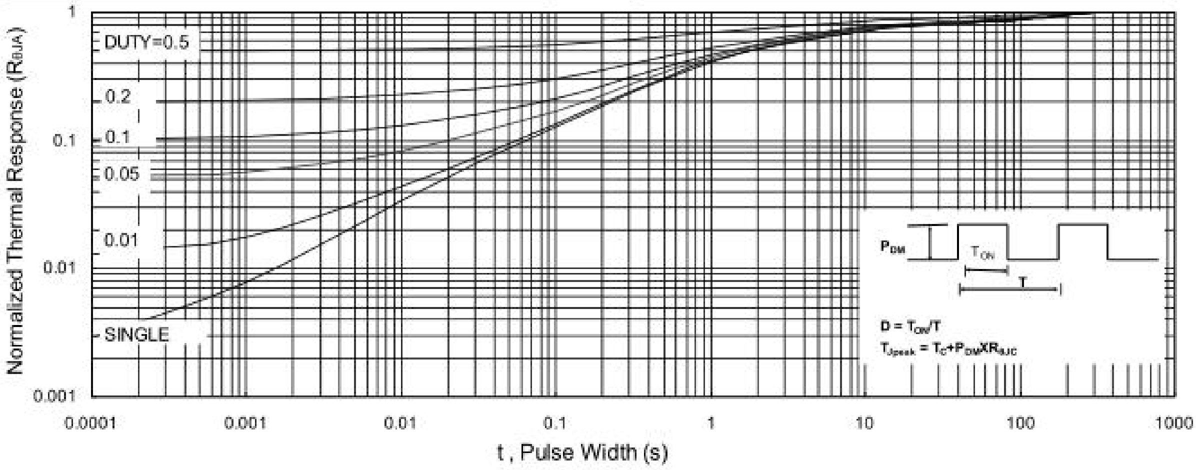


Fig.9 Normalized Maximum Transient Thermal Impedance

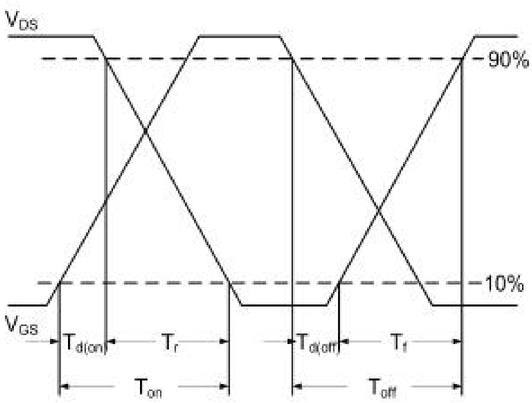


Fig.10 Switching Time Waveform

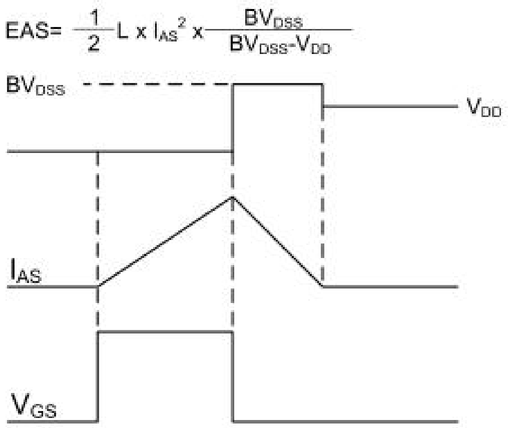


Fig.11 Unclamped Inductive Switching Waveform