1. Description

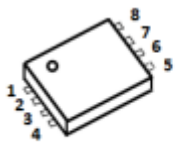
KCX3406A is an N-channel enhancement mode power MOS field effect transistor which is produced using KIA's LVMOS technology. The improved process and cell structure have been especially tailored to minimize on-state resistance, provide superior switching performance.

This device is widely used in Secondary synchronous rectifier, Power Management for Inverter Systems.

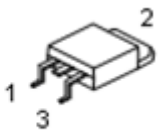
2. Features

- 80A,60V,$R_{DS(ON)(typ.)}$=8.5mΩ @ V_{GS}=10V
- SGT MOSFET
- Low Gate Charge
- Low Crss
- Fast switching
- Improved dv/dt capability

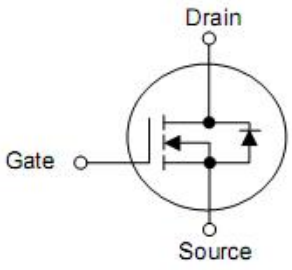
3. Pin configuration



DFN5*6



TO-252



Pin		Function
DFN5*6	TO-252	
1,2,3	3	Source
4	1	Gate
5,6,7,8	2	Drain

4. Ordering Information

Part Number	Package	Brand
KCY3406A	DFN5*6	KIA
KCD3406A	TO-252	KIA

5. Absolute maximum ratings

T_A=25℃ unless otherwise specified

Parameter		Symbol	Ratings	Unit
Drain-to-Source Voltage		V_{DSS}	60	V
Gate-to-Source Voltage		V_{GSS}	±20	V
Continuous Drain Current	T_C=25°C	I_D	80	A
	T_C=100°C		48	A
Pulsed Drain Current at VGS=10V		I_{DM}	240	A
Power Dissipation (T_C=25°C)		P_D	63	W
Derating Factor above 25°C			0.5	W/°C
Single Pulsed Avalanche Energy [1)]		EAS	81	mJ
Operation Junction Temperature Range		T_J	-55 to 150	°C
Storage Temperature Range		T_{STG}	-55 to 150	°C

6. Thermal characteristics

Parameter	Symbol	Ratings	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	2.0	°C/W
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	62	°C/W

7. Electrical characteristics

(T_J=25°C,unless otherwise notes)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Drain-to-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=250uA	60	--	--	V
Drain-to-Source Leakage Current	I_{DSS}	V_{DS}=60V, V_{GS}=0V	--	--	1	uA
Gate-to-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=250uA	1.0	2.0	3.0	V
Static Drain-to-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=13.5A	--	8.5	9.5	mΩ
		V_{GS}=4.5V, I_D=11.5A	--	13	15	mΩ
Gate Resistance	R_G	F=1MHz	--	1.8	--	Ω
Input Capacitance	C_{iss}	F=1.0MHz，VGS=0V, VDS=30V	--	1065	--	pF
Output Capacitance	C_{oss}		--	430	--	pF
Reverse Transfer Capacitance	C_{rss}		--	22	--	pF
Turn-on Delay Time	$td_{(ON)}$	V_{DD}=30V, V_{GS}=10V, R_G=3Ω,I_D=13.5A [2), 3)]	--	8	--	nS
Rise Time	t_{rise}		--	54	--	nS
Turn-Off Delay Time	$td_{(OFF)}$		--	19	--	nS
Fall Time	tf_{all}		--	8.8	--	nS
Total Gate Charge	Q_g	V_{DD}=48V,V_{GS}=10V, I_D=13.5A [2), 3)]	--	16.8	--	nC
Gate-to-Source Charge	Q_{gs}		--	5.9	--	nC
Gate-to-Drain (Miller) Charge	Q_{gd}		--	2.7	--	nC
Continuous Source Current	I_{SD}	Integral Reverse P-N Junction Diode in the MOSFET	--	--	80	A
Pulsed Source Current	I_{SM}		--	--	240	A
Diode Forward Voltage	V_{SD}	I_S=13.5A, V_{GS}=0V	--	--	1.4	V
Reverse Recovery Time	trr	I_S=13.5A,V_{GS}=0V, dIF/dt=100A/us [2)]	--	52	--	ns
Reverse Recovery Charge	Qrr		--	0.05	--	nC

Notes:

1.L=0.5mH, VDD=50V, RG=10Ω,starting T_J=25°C ;

2.Pulse Test：Pulse width≤300us,Duty cycle≤2% ;

3.Essentially independent of operating temperature.

8. Typical Characteristics

Figure 1. Output Characteristics

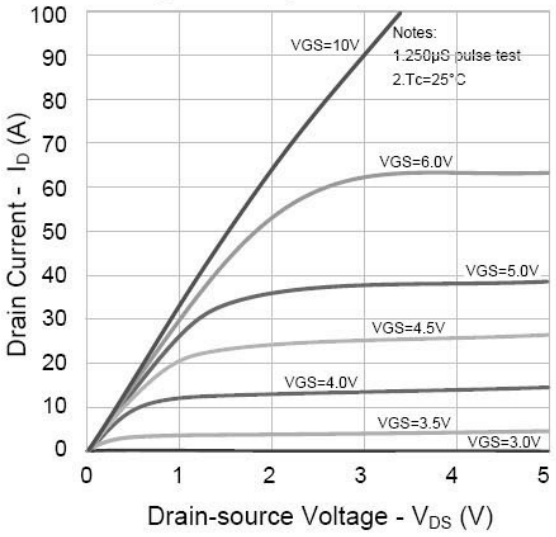


Figure 2. Transfer Characteristics

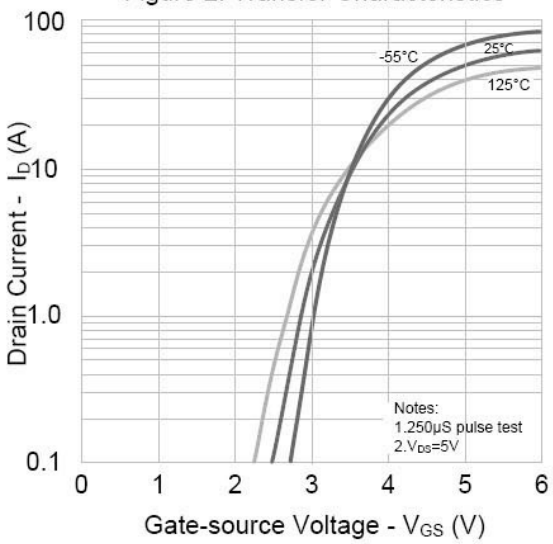


Figure 3. On-resistance vs. Drain Current

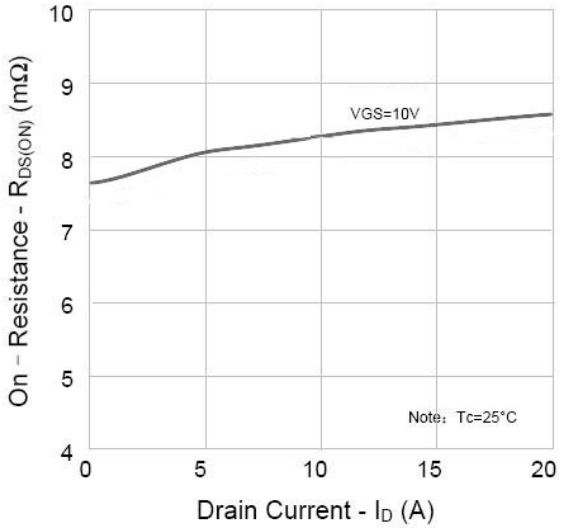


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

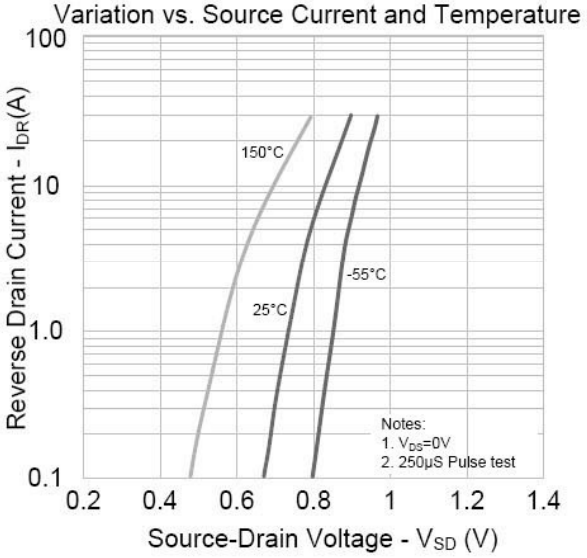


Figure 5. Capacitance Characteristics

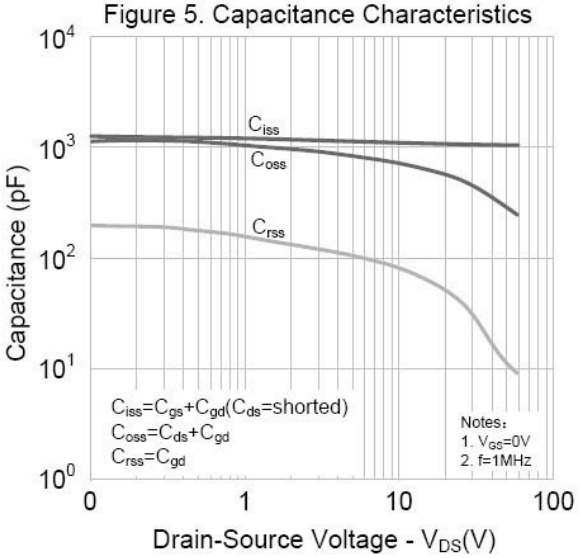


Figure 6. Gate Charge

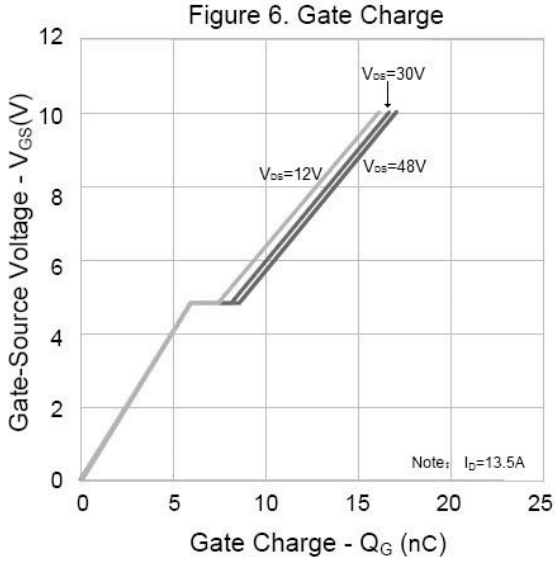


Figure 7. Breakdown Voltage vs. Temperature Characteristics

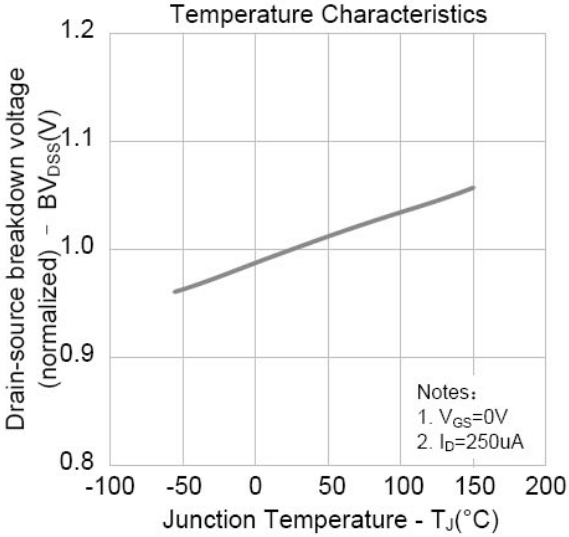


Figure 8. On-resistance vs. Temperature Characteristics

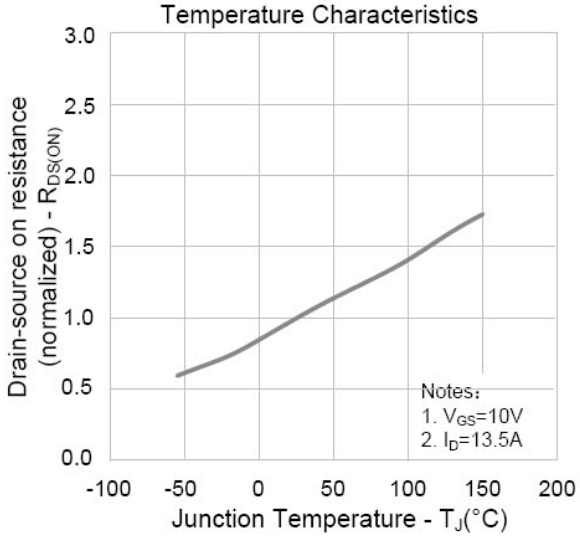


Figure 9-1. Max. Safe Operating Area(SVG069R5ND/MJ)

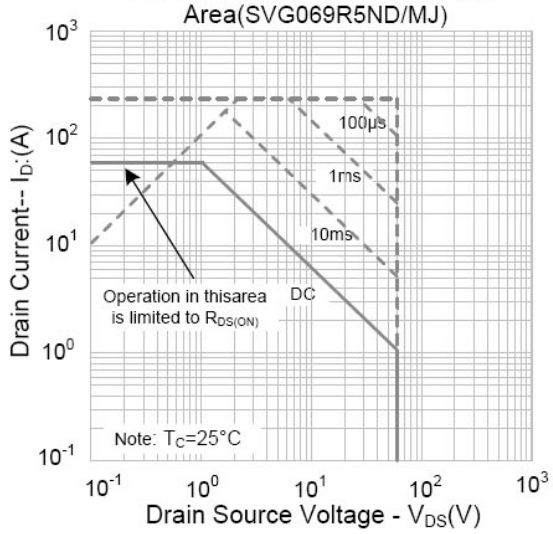
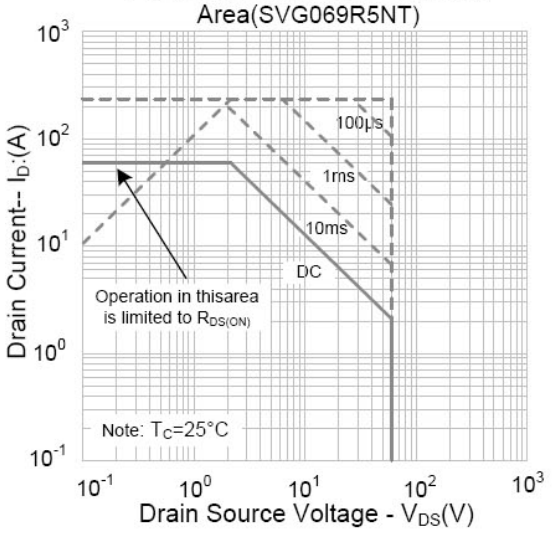
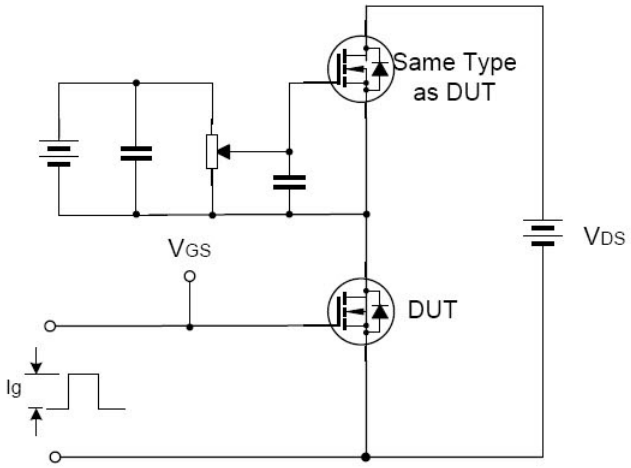


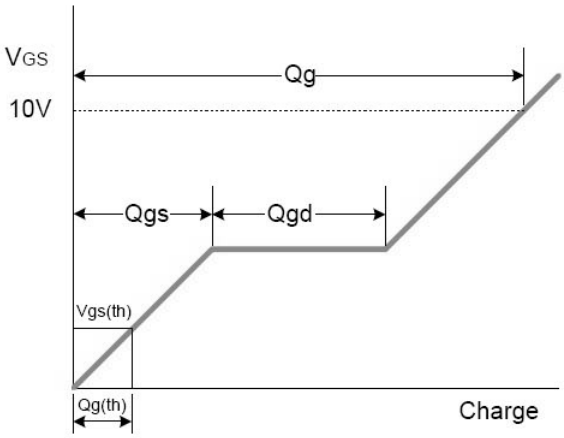
Figure 9-2. Max. Safe Operating Area(SVG069R5NT)



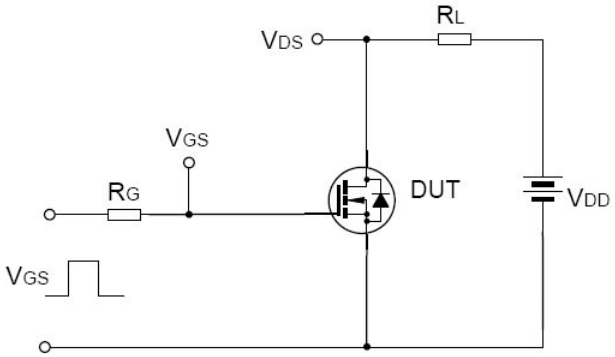
9. Test Circuits and Waveforms

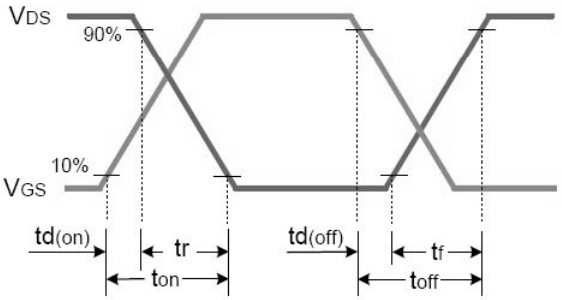
Gate Charge Test Circuit & Waveform



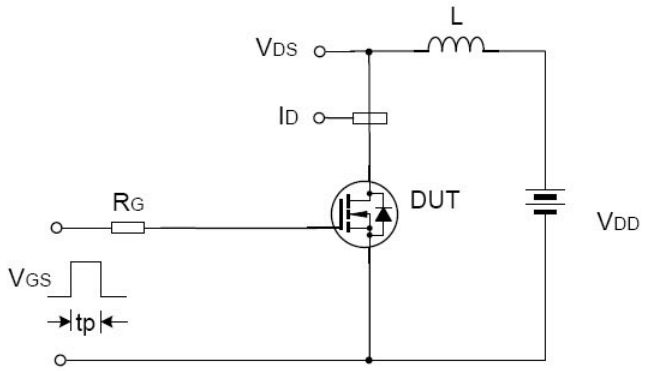


Resistive Switching Test Circuit & Waveform

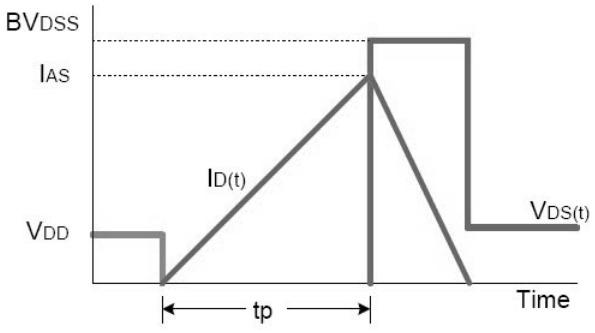




Unclamped Inductive Switching Test Circuit & Waveform



$$E_{AS} = \frac{1}{2} LI_{AS}^2 \frac{BV_{DSS}}{BV_{DSS} - V_{DD}}$$



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