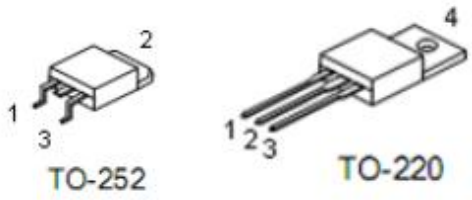
1. General Description

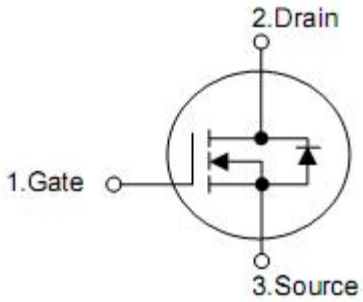
KIA50N06C is an N-channel enhancement mode power Mosfet field effect transistor which is produced using KIA's LVMosfet technology.the improved process and cell structure have been especially tailored to minimize on-state resistance,provide superior switching performance. This device is widely used in UPS,Power Management for Inverter Systems.

2. Features

- 50A, 60V, R_{DS}(on) typ. = 11mΩ(typ.)@V_{GS} = 10 V
- Low gate charge
- Low Crss
- Fast switching
- Improved dv/dt capability

3. Pin configuration





Pin	Function
1	Gate
2	Drain
3	Source
4	Drain

4. Ordering Information

Part Number	Package	Brand
KIA50N06CD	TO-252	KIA
KIA50N06CP	TO-220	KIA

5. Absolute maximum ratings

(T_C= 25ºC , unless otherwise noted)

Symbol	Parameter	Ratings		Units
		TO-252	TO-220	
V_{DSS}	Drain-Source Voltage	60		V
I_D	Drain Current -Continuous (T_C = 25 ºC)	50		A
	-Continuous (T_C = 100 ºC)	30		A
I_{DM}	Drain Current -Pulsed	200		A
V_{GSS}	Gate-Source Voltage	±20		V
E_{AS}	Single Pulsed Avalanche Energy (Note 1)	405		mJ
P_D	Power Dissipation (T_C = 25 ºC)	90	110	W
	-Derate above 25 ºC	0.72	0.88	W/ºC
T_J,T_{STG}	Operating and Storage Temperature Range	-55 to +150		ºC

6. Thermal Characteristics

Symbol	Parameter	Ratings		Units
		TO-252	TO-220	
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	1.39	1.14	ºC /W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	62.5	62.5	ºC /W

7. Electrical characteristics

(T_C= 25ºC , unless otherwise noted)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Off Characteristics						
B_{VDSS}	Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_D = 250 uA	60	--	--	V
I_{DSS}	Drain-Source Leakage Current	V_{DS} = 60 V, V_{GS} = 0 V	--	--	1	uA
I_{GSS}	Gate- Source Leakage Current	V_{GS} = ±20 V, V_{DS} = 0 V	--	--	±100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250 uA	1.1	1.6	2.5	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	V_{GS} = 10 V, I_D = 20 A	--	11	13	mΩ
R_G	Gate Resistance	f = 1.0 MHz	--	3.5	--	Ω
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = 25 V, V_{GS} = 0 V, f = 1.0 MHz	--	2450	--	pF
C_{oss}	Output Capacitance		--	170	--	pF
C_{rss}	Reverse Transfer Capacitance		--	130	--	pF
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{DD} = 30 V,V_{GS}=10V, I_D = 30 A, R_G = 25 Ω (Note2.3)	--	15	--	ns
t_r	Turn-On Rise Time		--	72	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	180	--	ns
t_f	Turn-Off Fall Time		--	79	--	ns
Q_g	Total Gate Charge	V_{DD} = 48 V, I_D = 60A, V_{GS} = 10 V (Note 2,3)	--	52	--	nC
Q_{gs}	Gate-Source Charge		--	11	--	nC
Q_{gd}	Gate-Drain Charge		--	12	--	nC
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Continuous Source Current	Integral Reverse P-N Junction Diode in the MOSFET	--	--	50	A
I_{SM}	Pulsed Source Current		--	--	200	A
V_{SD}	Drain-Source Diode Forward Voltage	V_{GS} = 0 V, I_S = 20 A	--	--	1.4	V
t_{rr}	Reverse Recovery Time	V_{GS} = 0 V, I_S = 30 A, dI_F / dt = 100 A/us (Note 4)	--	20	--	ns
Qrr	Reverse Recovery Charge		--	0.02	--	uC

Notes:
1. L = 10mH, V_{DD} = 50V, R_G = 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

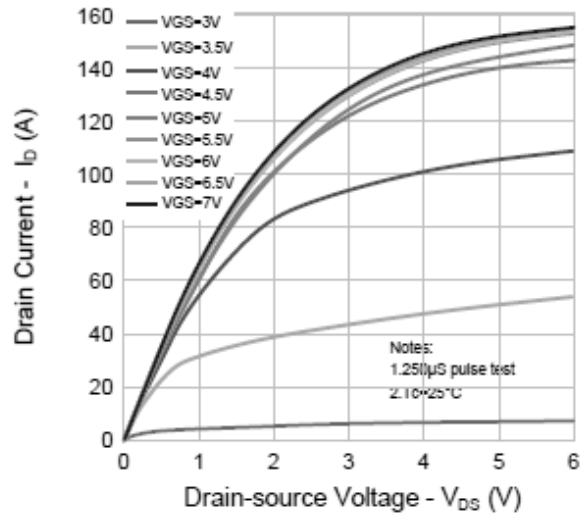


Figure 2. Transfer Characteristics

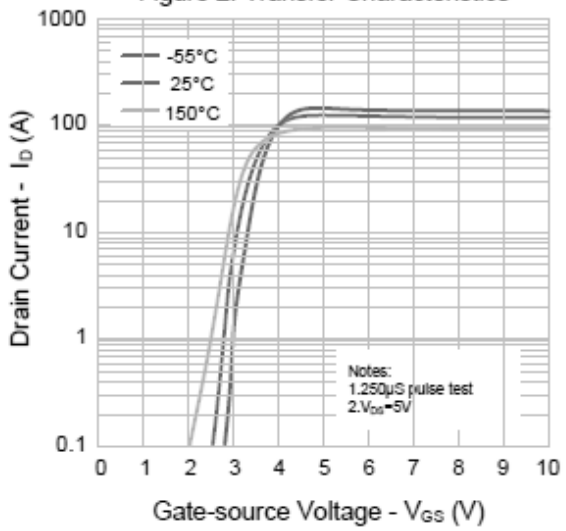


Figure 3. On-resistance vs. Drain Current

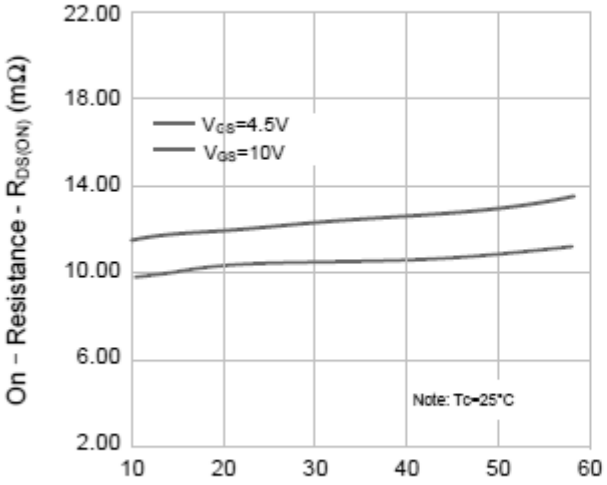


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

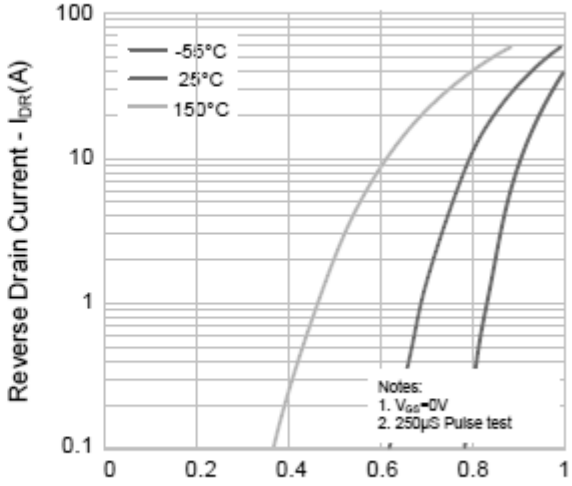


Figure 5. Capacitance Characteristics

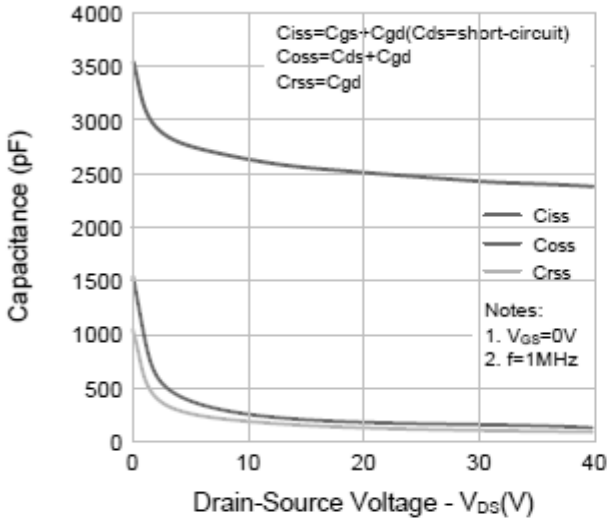


Figure 6. Gate Charge

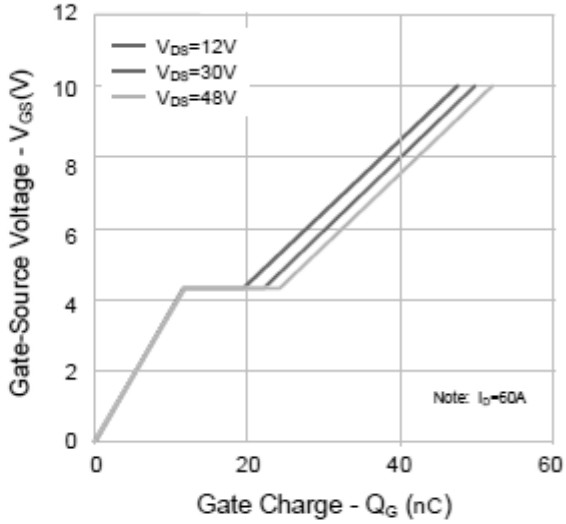


Figure 7. Breakdown Voltage vs. Temperature Characteristics

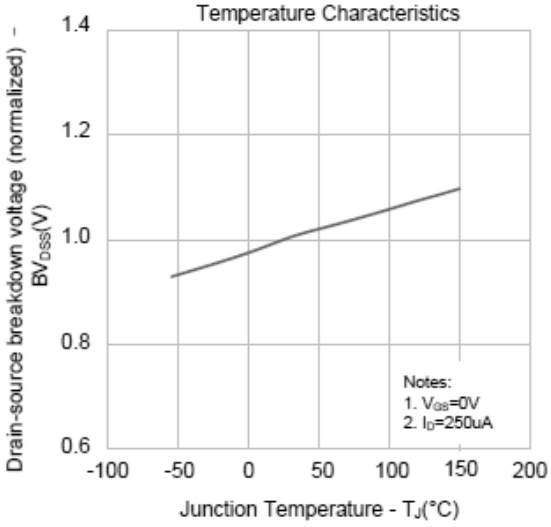


Figure 8. On-resistance vs. Temperature Characteristics

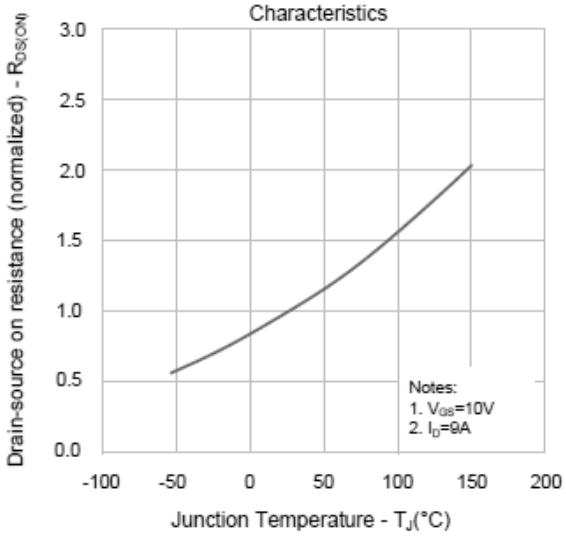


Figure 9-1. Max. Safe Operating Area (TO-220)

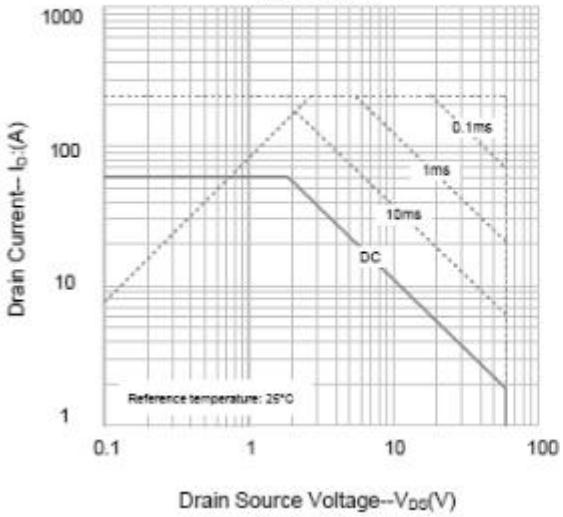


Figure 9-2. Max. Safe Operating Area (TO-252)