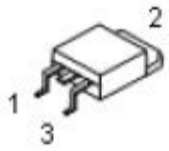
1. Features

- Advanced trench process technology
- High density cell design for ultra low on-resistance
- Fully characterized avalanche voltage and current

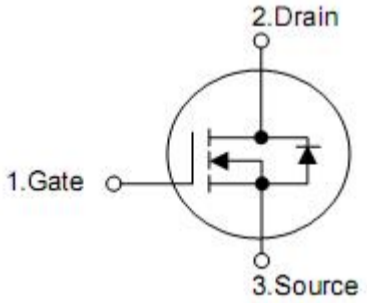
2. Features

- 50A, 30V, R_{DS}(on) typ. = 6.5mΩ(typ.)@V_{GS} = 10 V
- Low gate charge
- Low Crss
- Fast switching
- Improved dv/dt capability

3. Pin configuration



TO-252



Pin	Function
1	Gate
2	Drain
3	Source

4. Ordering Information

Part Number	Package	Brand
KIA50N03BD	TO-252	KIA

5. Absolute maximum ratings

(T_C= 25ºC , unless otherwise noted)

Symbol	Parameter	Value	Units
V_{DSS}	Drain-Source Voltage	30	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)	85	mJ
P_D	Power Dissipation (T_C = 25 ºC)	60	W
	-Derate above 25 ºC	0.5	W/ºC
T_J,T_{STG}	Operating and Storage Temperature Range	-55 to +150	ºC

6. Thermal Characteristics

Symbol	Parameter	Value	Units
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	1.8	ºC /W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	62	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	30	--	--	V
I_{DSS}	Drain-Source Leakage Current	V_{DS} = 30 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	1.0	1.6	3.0	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	V_{GS} = 10 V, I_D = 15 A	--	6.5	9.9	mΩ
R_G	Gate Resistance	f = 1.0 MHz	--	5.0	--	Ω
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = 30 V, V_{GS} = 0 V, f = 1.0 MHz	--	1200	--	pF
C_{oss}	Output Capacitance		--	150	--	pF
Crss	Reverse Transfer Capacitance		--	115	--	pF
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{DD} = 20 V,V_{GS}=10V, I_D = 15 A, R_G = 6 Ω (Note2.3)	--	4.6	--	ns
t_r	Turn-On Rise Time		--	35	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	40	--	ns
t_f	Turn-Off Fall Time		--	16	--	ns
Q_g	Total Gate Charge	V_{DD} = 24 V, I_D = 15A, V_{GS} = 10 V (Note 2,3)	--	25	--	nC
Q_{gs}	Gate-Source Charge		--	5.0	--	nC
Q_{gd}	Gate-Drain Charge		--	5.5	--	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 =15 A	--	--	1.5	V
t_{rr}	Reverse Recovery Time	V_{GS} = 0 V, I_S = 15 A, dI_F / dt = 100 A/us (Note 2)	--	12.5	--	ns
Qrr	Reverse Recovery Charge		--	0.005	--	uC

Notes:
1. L = 0.5mH, V_{DD} = 15V, V_{GS} = 10V,R_G = 25Ω, 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

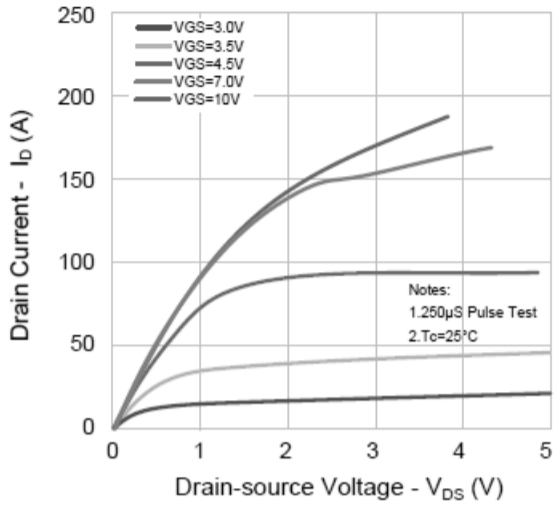


Figure 2. Transfer Characteristics

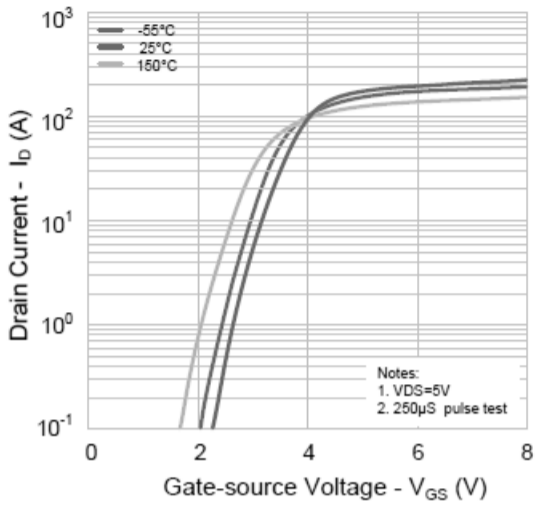


Figure 3. On-resistance vs. Drain Current

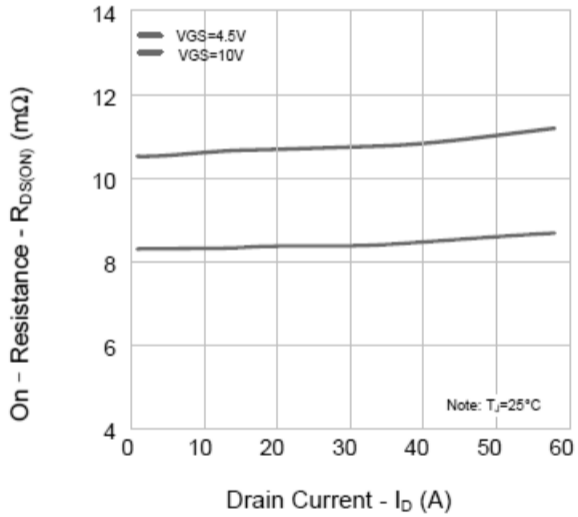


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

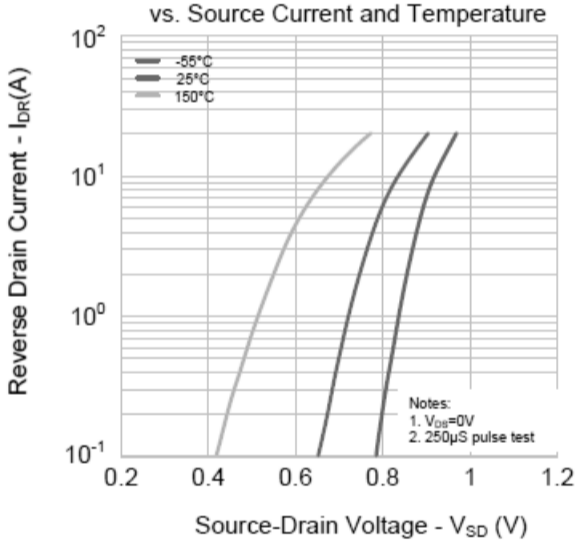


Figure 5. Capacitance Characteristics

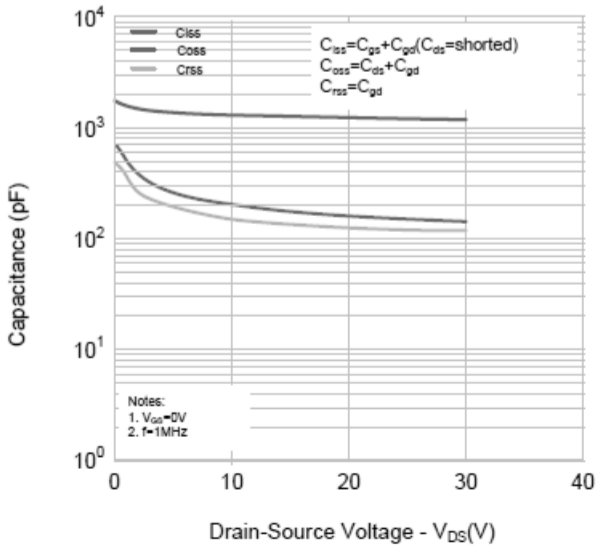


Figure 6. Gate Charge

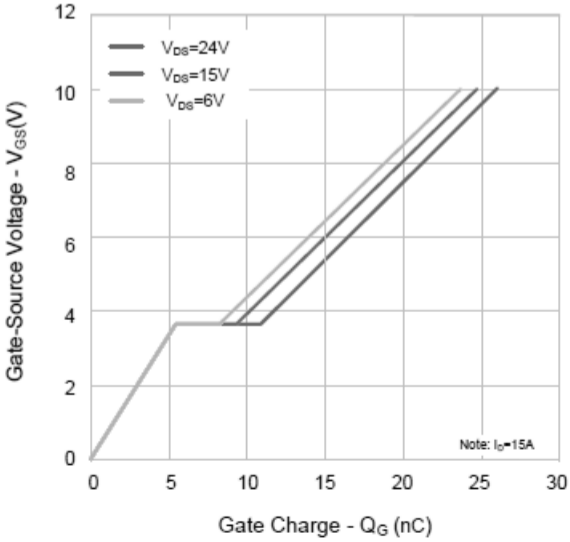


Figure 7. Breakdown Voltage vs. Temperature Characteristics

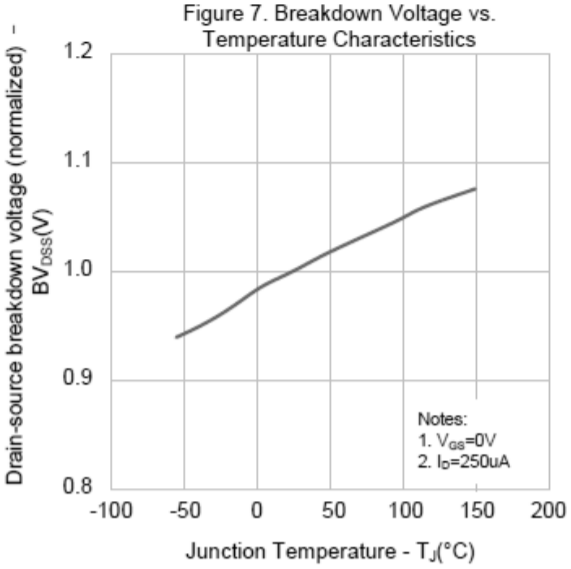


Figure 8. On-resistance vs. Temperature Characteristics

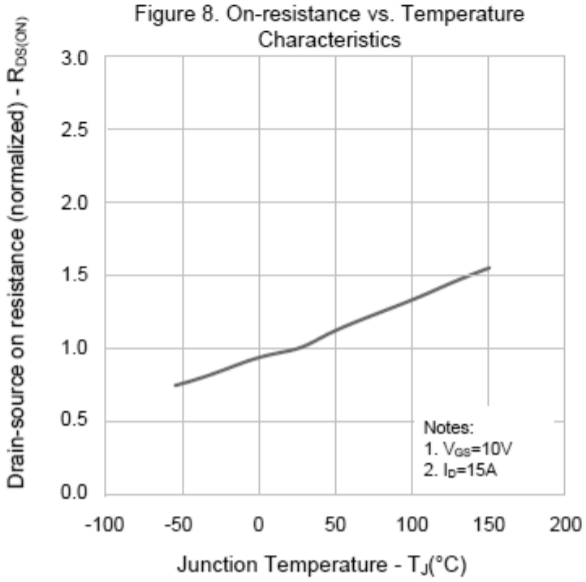


Figure 9. Max. Safe Operating Area