

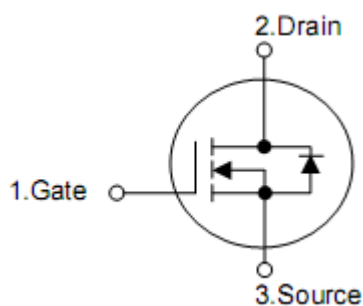
1. Features

- $R_{DS(on)}=10.5m\Omega@ V_{GS}=10V$
- Lead free and green device available
- Low Rds-on to minimize conductive loss
- High avalanche current

2. Applications

- Power supply
- UPS
- Battery management system

3. Symbol



Pin	Function
1	Gate
2	Drain
3	Source

4. Ordering Information

Part Number	Package	Brand
KIA50N06BD	TO-252	KIA
KIA50N06BU	TO-251	KIA
KIA50N06BP	TO-220	KIA

5. Absolute maximum ratings

($T_A=25^\circ\text{C}$, unless otherwise noted)

Parameter		Symbol	Rating	Units
Drain-source voltage		V_{DSS}	60	V
Gate-source voltage		V_{GSS}	± 25	V
Continuous drain current ³⁾	$T_C=25^\circ\text{C}$	I_D	50	A
	$T_C=100^\circ\text{C}$		35	A
Pulse drain current ⁴⁾		I_{DP}	250	A
Avalanche current ⁵⁾		I_{AS}	15	A
Avalanche energy ⁵⁾		E_{AS}	120	mJ
Maximum power dissipation	$T_C=25^\circ\text{C}$	P_D	88	W
	$T_C=100^\circ\text{C}$		44	W
Junction & storage temperature range		T_J, T_{STG}	-55-175	$^\circ\text{C}$

6. Thermal characteristics

Parameter	Symbol	Rating		Unit
		TO-252/TO-251	TO-220	
Thermal resistance, Junction-ambient	$R_{\theta JA}$	100	62.5	$^\circ\text{C/W}$
Thermal resistance, Junction-case	$R_{\theta JC}$	1.1	1.7	$^\circ\text{C/W}$

7. Electrical characteristics

(T_A=25°C, unless otherwise noted)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Drain-source breakdown voltage	BV _{DSS}	V _{GS} =0V, I _{DS} =250uA	60	-	-	V
Zero gate voltage drain current	I _{DSS}	V _{DS} =48V, V _{GS} =0V	-	-	1	uA
		T _J =125°C	-	-	20	
Gate threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250uA	2.0	3.0	4.0	V
Gate leakage current	I _{GSS}	V _{GS} =±25V, V _{DS} =0V	-	-	±100	nA
Drain-source on-resistance ¹⁾	R _{DS(on)}	V _{GS} =10V, I _D =30A	-	10.5	12.5	mΩ
Gate resistance	R _g	V _{DS} =0V, V _{GS} =0V, f=1MHz	-	1.0	-	Ω
Diode forward voltage ¹⁾	V _{SD}	I _{SD} =30A, V _{GS} =0V	-	0.8	1.3	V
Diode continuous forward current ³⁾	I _S		-	-	50	A
Reverse recovery time	t _{rr}	I _F =30A , dI _{SD} /dt=100A/us	-	32	-	nS
Reverse recovery charge	Q _{rr}		-	60	-	nC
Input capacitance	C _{iss}	V _{DS} =25V, V _{GS} =0V, f=1MHz	-	2060	-	pF
Output capacitance	C _{oss}		-	755	-	
Reverse transfer capacitance	C _{rss}		-	375	-	
Turn-on delay time	t _{d(on)}	V _{DD} =30V, I _D =30A, R _G =5Ω, V _{GS} =10V	-	14	-	nS
Rise time	t _r		-	13	-	
Turn-off delay time	t _{d(off)}		-	20	-	
Fall time	t _f		-	7.5	-	
Total gate charge	Q _g	V _{DS} =48V, V _{GS} =10V I _{DS} =30A	-	50	-	nC
Gate-source charge	Q _{gs}		-	12	--	
Gate-drain charge	Q _{gd}		-	17	--	

Note:

1) Pulse test; pulse width ≤ 300us duty cycle ≤ 2%.

2) Guaranteed by design, not subject to production testing.

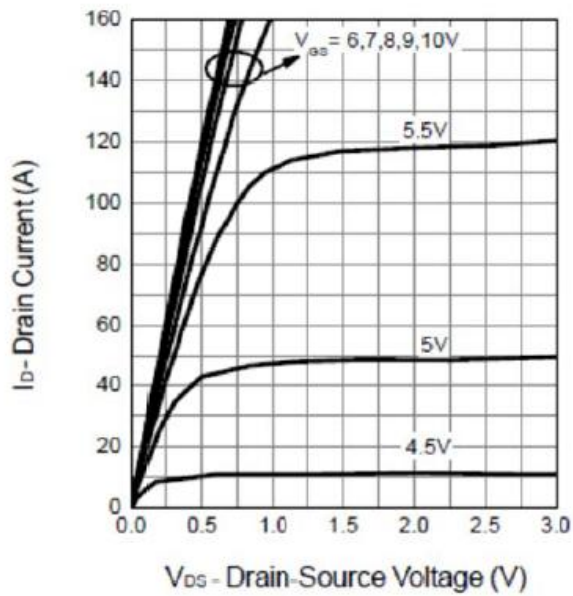
3) Package limitation current is 50A. Calculated continuous current based on maximum allowable junction temperature.

4) Repetitive rating, pulse width limited by max junction temperature.

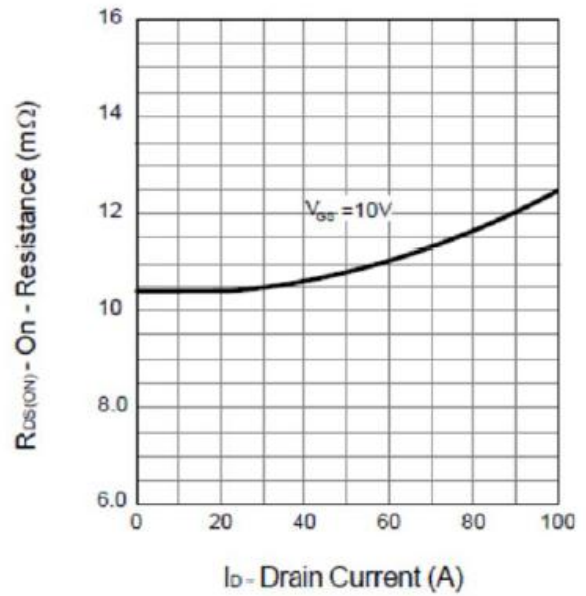
5) Starting T_J=25°C, L=0.5mH, I_{AS}=31A.

8. Test circuits and waveforms

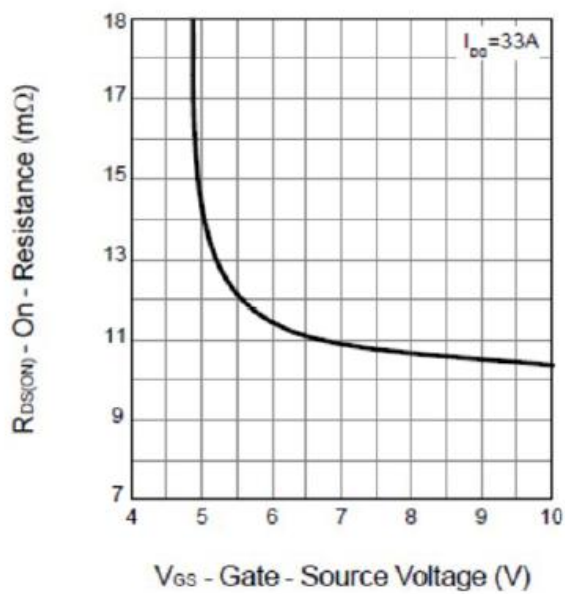
Output Characteristics



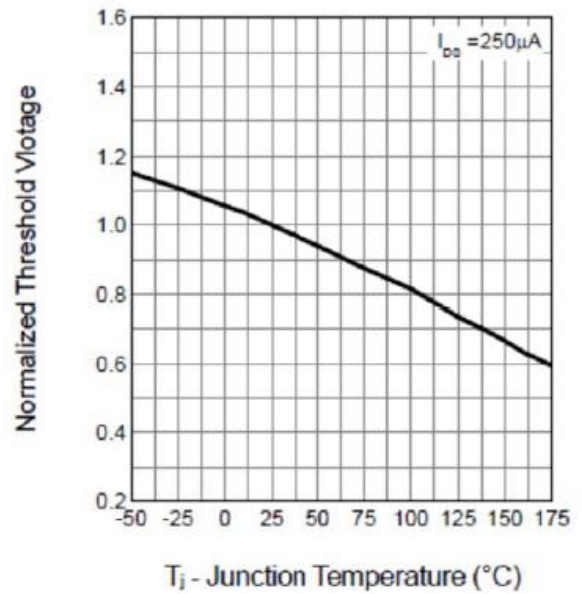
Drain-Source On Resistance



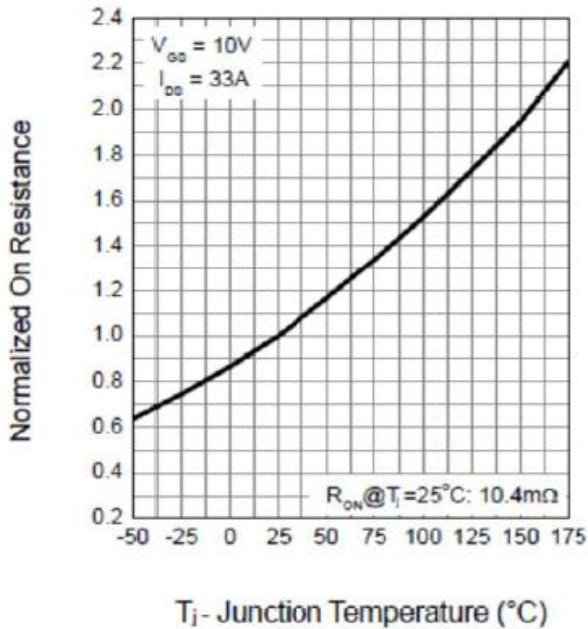
Drain-Source On Resistance



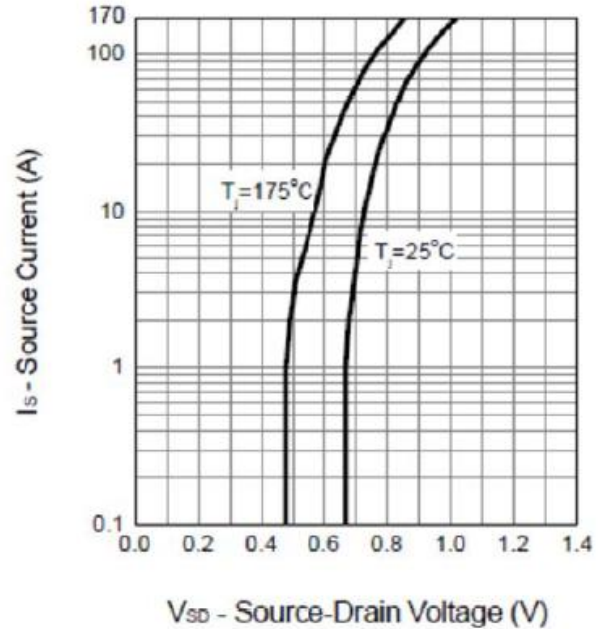
Gate Threshold Voltage



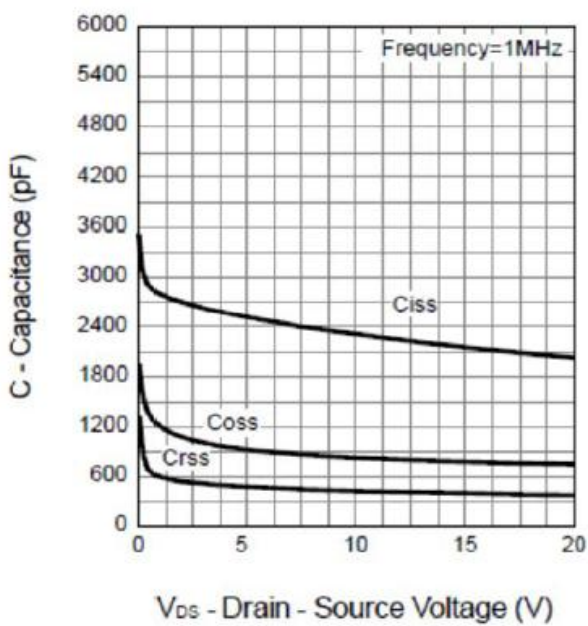
Drain-Source On Resistance



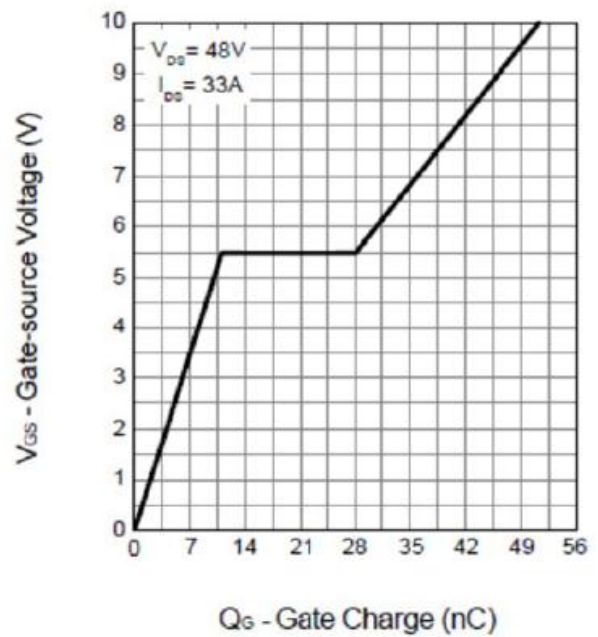
Source-Drain Diode Forward



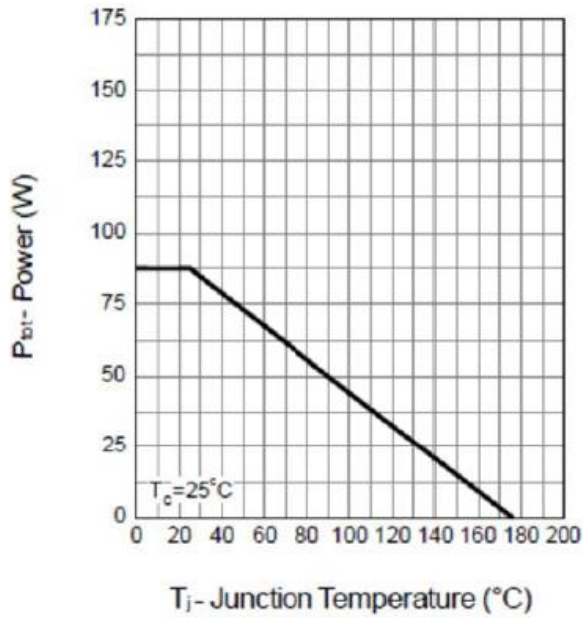
Capacitance



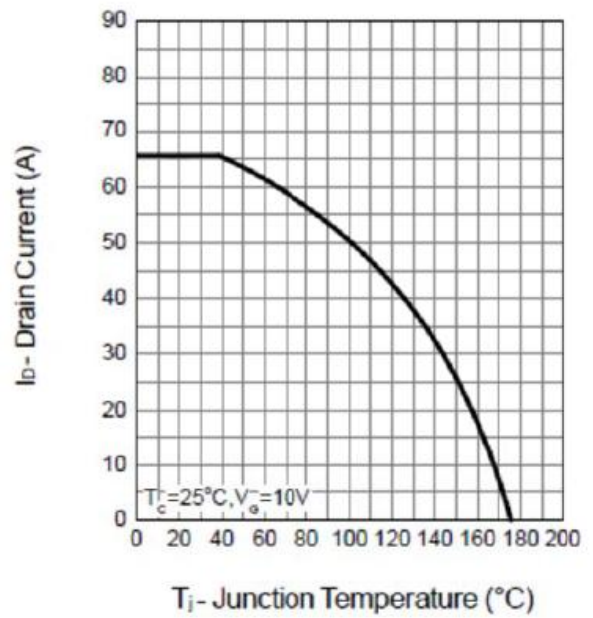
Gate Charge



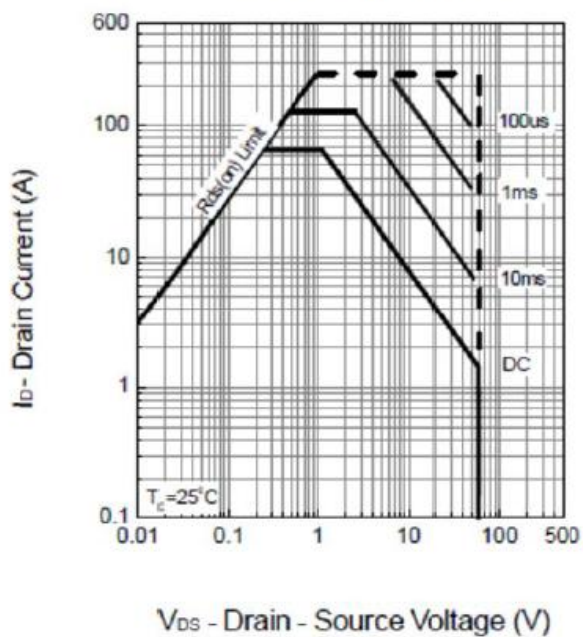
Power Dissipation



Drain Current



Safe Operation Area



Thermal Transient Impedance

