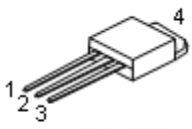
1. Description

KIA7610A designed by the trench processing techniques to achieve extremely low on-resistance. ATditional features of this design are a 175℃ junction operating temperature,fast switching speed and improved repetitive avalanche rating. These features combine to make this design an extremely efficient and reliable device for use in DC-DC Converters and Off-line UPS and a wide variety of other applications.

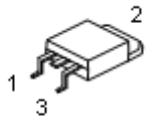
2. Features

- $R_{DS(on)}$ =32mΩ
- Low On-resistance
- Fast switching
- 100% avalanche tested
- Repetitive avalanche allowed up to tjmax
- LeAT-Free,RoHS compliant

3. Pin configuration



TO-251



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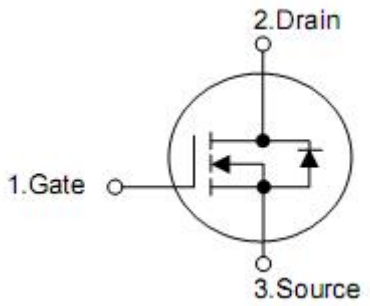

Pin	Function
1	Gate
2	Drain
3	Source
4	Drain

4. Absolute maximum ratings

(T_C=25ºC , unless otherwise noted)

Parameter		Symbol	Rating	Units
Drain-source voltage		V_{DSS}	100	V
Drain current continuous	T_C=25ºC	I_D	25	A
	T_C=100ºC		16	A
Drain current pulsed (note1)	T_C=25ºC	I_{DM}	100	A
Gate-source voltage		V_{GSS}	±20	V
Single Pulse avalanche energy (note2)		E_{AS}	90	mJ
Power dissipation	T_C=25ºC	P_D	60	W
Maximum junction temperature		T_J	175	ºC
Operating and storage temperature range		T_{STG}	-55~+175	ºC
Diode continuous forward current (note1)	T_C=25ºC	I_S	25	A

5. Thermal characteristics

Parameter	Symbol	Typ	Max	Unit
Thermal resistance junction-case	R_{thJC}	-	1.8	ºC/W
Thermal resistance junction-ambient	R_{thJA}	-	75	

6. Electrical characteristics

(T_J=25°C,unless otherwise noted)

Parameter		Symbol	Test Conditions	Min	Typ	Max	Units
Off characteristics							
Drain-source breakdown voltage		BV_{DSS}	V_{GS}=0V,I_D=250μA	100	-	-	V
Zero gate voltage drain current	T_C=25°C	I_{DSS}	V_{DS}=100V,V_{GS}=0V	-	-	10	μA
	T_C=125°C		V_{DS}=100V,V_{GS}=0V	-	-	100	μA
Gate-body leakage current		I_{GSS}	V_{GS}=±20V,V_{DS}=0V	-	-	±100	nA
On characteristics							
Gate threshold voltage		$V_{GS(TH)}$	V_{DS}=V_{GS},I_D=250μA	1.0	1.5	3.0	V
Static drain-source on-resistance		$R_{DS(ON)}$	V_{GS}=10V,I_D=14A	-	32	38	mΩ
Dynamic characteristics							
Input capacitance		C_{ISS}	V_{DS}=50V,V_{GS}=0V, f=1MHz	-	2020	-	pF
Output capacitance		C_{OSS}		-	450	-	pF
Reverse transfer capacitance		C_{RSS}		-	255	-	pF
Switching characteristics							
Turn-on delay time		$t_{D(ON)}$	V_{DD}=50V,R_G=6.8Ω, I_D=1A ,V_{GS}=10V, R_L=25Ω,	-	25	-	ns
Rise time		t_R		-	19	-	ns
Turn-off delay time		$t_{D(OFF)}$		-	58	-	ns
Fall time		t_F		-	75	-	ns
Total gate charge		Q_G	V_{DS}=50V,V_{GS}=10V I_D=10A	-	55	-	nC
Gate-source charge		Q_{GS}		-	13.6	-	nC
Gate-drain charge		Q_{GD}		-	11.2	-	nC
Drain-source diode characteristics							
Continuous drain-source current		I_S		-	-	25	A
Drain-source diode forward voltage		V_{SD}	V_{GS}=0V,I_S=12A	-	0.82	1.3	V
Reverse recovery time		t_{RR}	V_{GS}=0V,I_F=12A, di_F/dt=100A/μs	-	60	-	nS
Reverse recovery charge		Q_{RR}		-	95	-	nC

Note:1. Pulse width ≤300μs, duty cycle≤2% pulse width limited by maximum junction temperature

2. Limited by Tjmax,starting TJ=25℃,L=0.5mH,RG=25Ω,IAS=19A,VGS=10V

7. Test circuits and waveforms

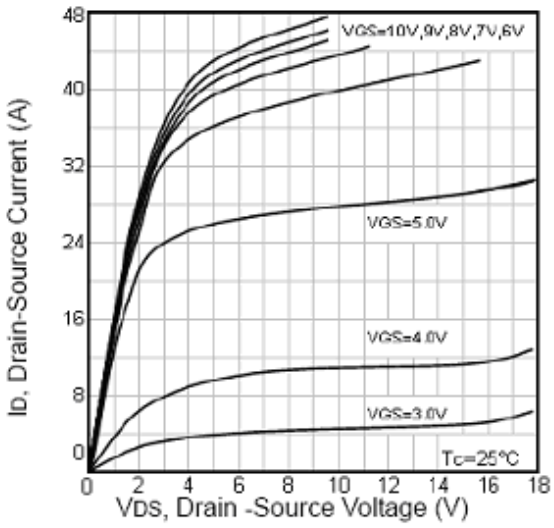

Fig1. Typical Output Characteristics

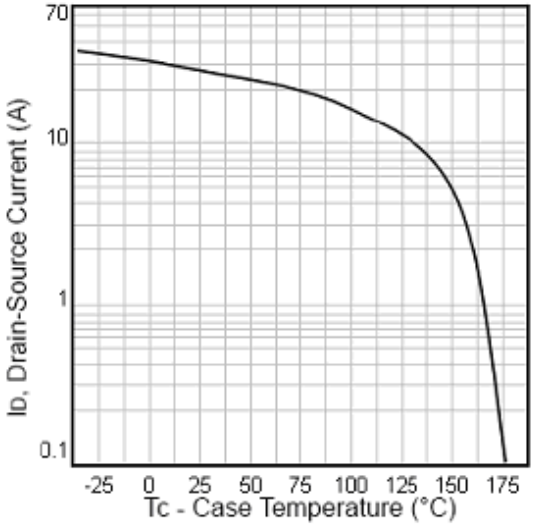

Fig2. Maximum Drain Current Vs.Case Temperature

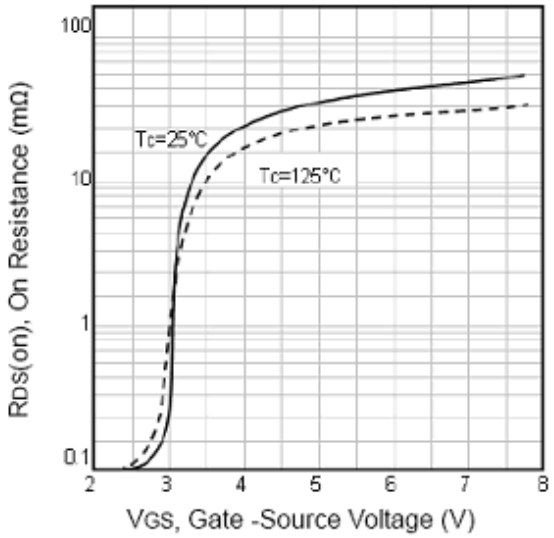

Fig3. Typical On Resistance Vs. Gate -Source

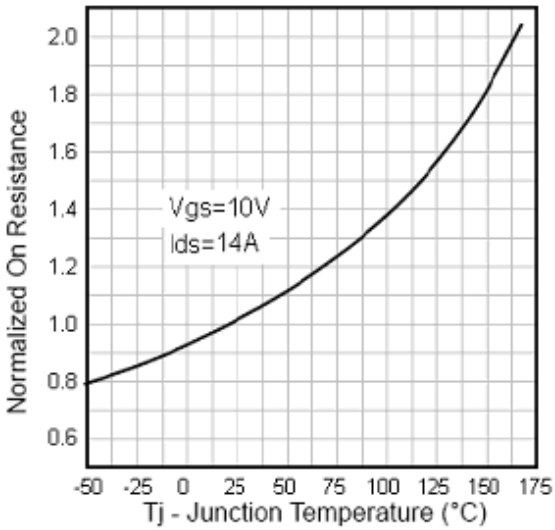

Fig4. Normalized On-Resistance Vs. Temperature

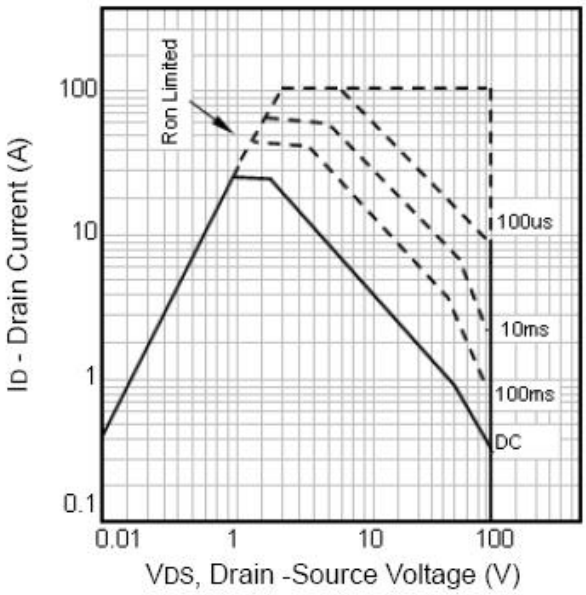

Fig5. Maximum Safe Operating Area

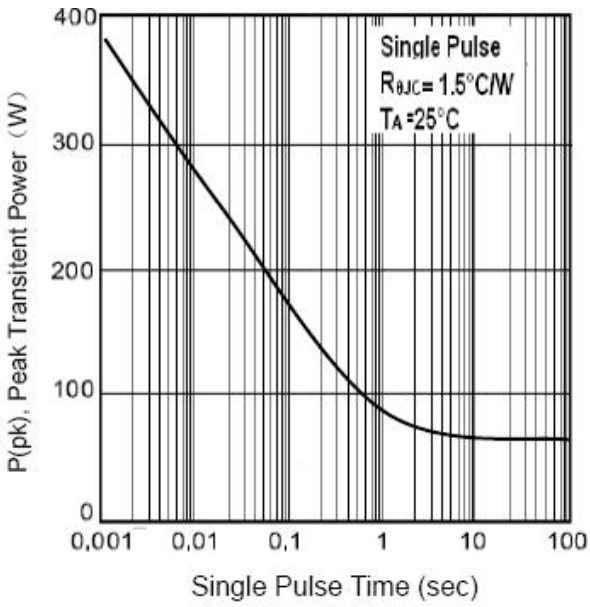

Fig6. Typical Transitent Power

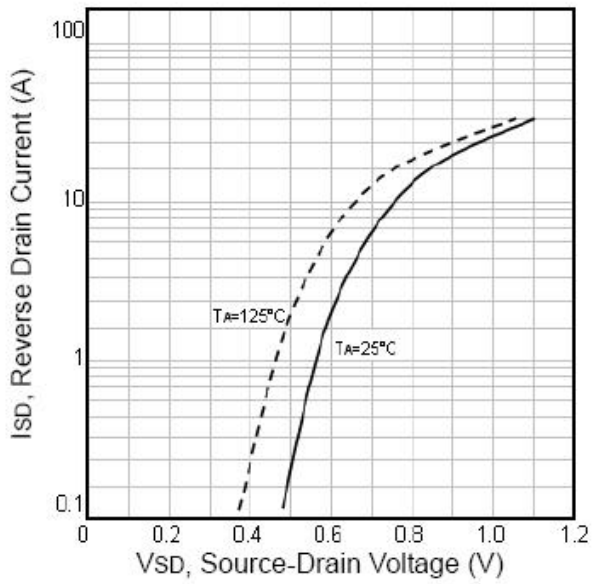

Fig7. Typical Source-Drain Diode Forward Voltage

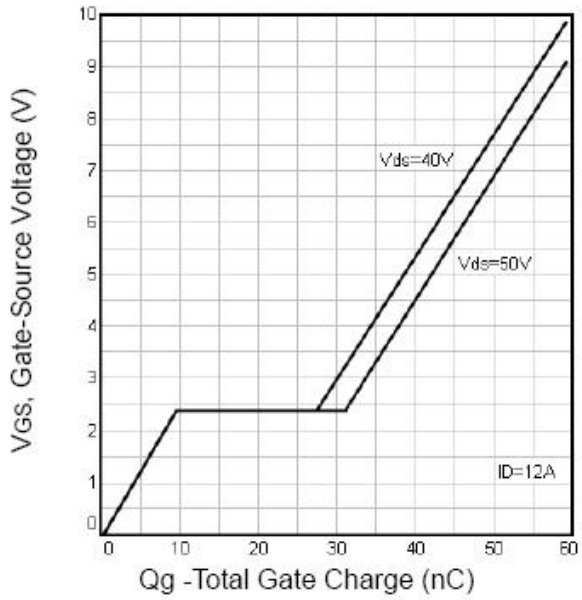

Fig8. Typical Gate Charge Vs.Gate-Source Voltage

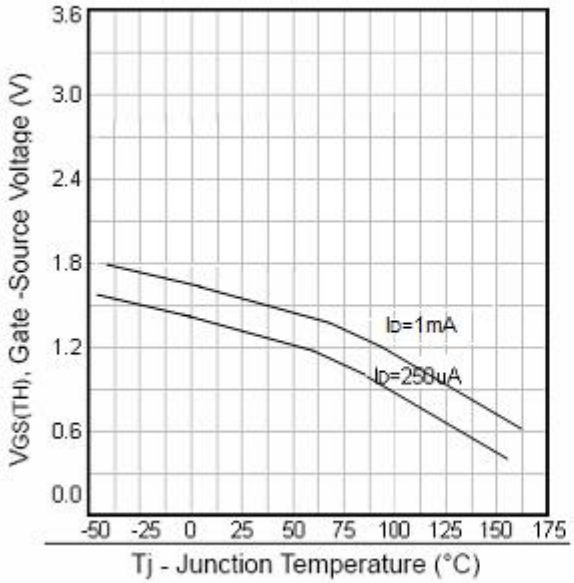

Fig9. Threshold Voltage Vs. Temperature

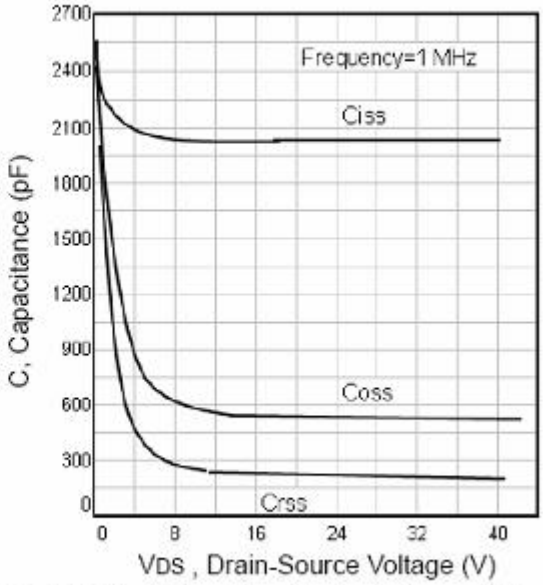

Fig10. Typical Capacitance Vs.Drain-Source Voltage

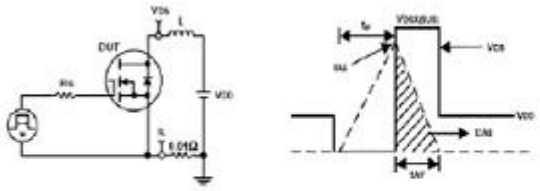

Fig11. Unclamped Inductive Test Circuit and waveforms

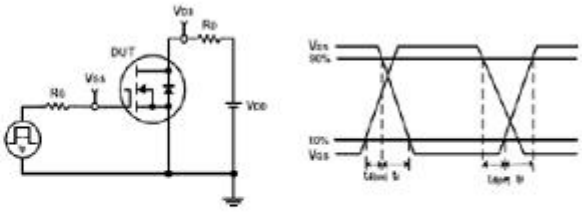

Fig12. Switching Time Test Circuit and waveforms