

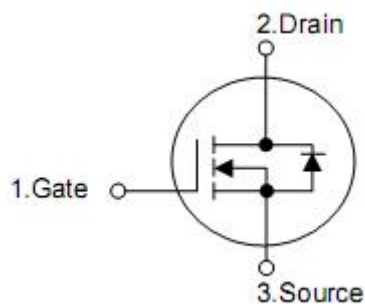
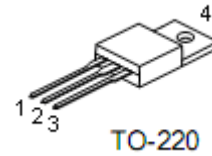
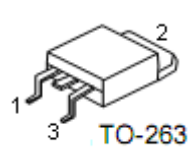
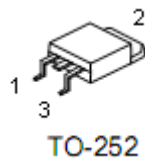
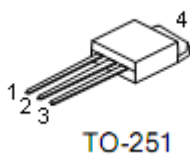
1. Description

This Power MOSFET is produced using KIA's advanced planar stripe DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency switched mode power supplies, active power factor correction based on half bridge topology.

2. Features

- n $R_{DS(on)}=3.1m\Omega @ V_{GS}=10V$
- n Improved dv/dt capability
- n Fast switching
- n Green device available

3. Symbol



Pin	Function
1	Gate
2	Drain
3	Source

4. Absolute maximum ratings

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

Parameter	Symbol	Rating		Units
		To-251/252	To-220/263	
Drain-source voltage	V_{DSS}	30		V
Gate-source voltage	V_{GSS}	± 20		V
Continuous drain current	I_D	$T_C=25^\circ\text{C}$		A
		$T_C=100^\circ\text{C}$		A
Pulse drain current (note 1)	I_{DP}	$T_C=25^\circ\text{C}$		A
Avalanche current (note 2)	I_{AS}	50		A
Avalanche energy, (note 2)	E_{AS}	125		mJ
Maximum power dissipation	P_D	$T_C=25^\circ\text{C}$		W
		Derate above 25 $^\circ\text{C}$		$W/^\circ\text{C}$
Junction & storage temperature range	T_J, T_{STG}	-55-150		$^\circ\text{C}$

5. Thermal characteristics

Parameter	Symbol	Rating	Unit
Thermal resistance, Junction-ambient	$R_{\theta JA}$	62	$^\circ\text{C/W}$
Thermal resistance, Junction-case	$R_{\theta JC}$	1.7	$^\circ\text{C/W}$

6. 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} =250μA	30	-	-	V
BV _{DSS} temperature coefficient	$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Reference to 25°C, I _D =1mA	-	0.03	-	V/°C
Zero gate voltage drain current	I _{DSS}	V _{DS} =30V, V _{GS} =0V, T _J =25°C	-	-	1	μA
		V _{DS} =24V, V _{GS} =0V, T _J =125°C	-	-	10	
Gate threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	1.2	1.6	2.5	V
V _{GS(th)} temperature coefficient	$\Delta V_{GS(th)}$	V _{DS} =V _{GS} , I _D =250μA	-	-5	-	mV/°C
Gate leakage current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
Drain-source on-resistance(note3)	R _{DS(on)}	V _{GS} =10V, I _D =24A (T _O -251/252)	-	3.1	4	mΩ
		V _{GS} =10V, I _D =24A(T _O -220,263)	-	4.0	5.0	
		V _{GS} =4.5V, I _D =12A	-	4.5	6	
Forward transconductance	g _{fs}	V _{DS} =10V, I _D =10A	-	15.5	-	S
Gate resistance	R _g	V _{DS} =0V, V _{GS} =0V, f=1MHz	-	2	-	Ω
Input capacitance	C _{iss}	V _{DS} =25V, V _{GS} =0V, f=1MHz	-	2200	-	pF
Output capacitance	C _{oss}		-	280	-	
Reverse transfer capacitance	C _{rss}		-	177	-	
Turn-on delay time(note 3,4)	t _{d(on)}	V _{DD} =15V, I _D =15A, R _G =3.3Ω, V _{GS} =10V	-	12.6	-	nS
Rise time(note 3,4)	t _r		-	19.5	-	
Turn-off delay time(note 3,4)	t _{d(off)}		-	42.8	-	
Fall time(note 3,4)	t _f		-	13.2	-	
Total gate charge(note 3,4)	Q _g	V _{DS} =15V, V _{GS} =4.5V I _{DS} =24A	-	24	-	nC
Gate-source charge(note 3,4)	Q _{gs}		-	4.2	-	
Gate-drain charge(note 3,4)	Q _{gd}		-	13	-	
Single pulse avalanche energy	EAS	V _{DD} =25V, L=0.1mH, I _{AS} =24A	31	-	-	mJ
Continuous source current	I _S	V _{GS} =V _{DS} =0V, force current	-	-	90	A
Pulsed source current (note 3)	I _{SM}		-	-	360	A
Diode forward voltage(note 3)	V _{SD}	V _{GS} =0V, I _S =1A, T _J =25°C	-	-	1	V
Reverse recovery time	t _{rr}	V _{DS} =30V, I _S =1A, di/dt=100A/μs	-	-	-	nS
Reverse recovery charge	Q _{rr}		-	-	-	nC

Note:1: Repetitive rating, pulse width limited by max junction temperature.

 2: V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=50A, R_G=25Ω, starting T_J=25°C

3: The data tested by pulsed, pulse width ≦ 300us, duty cycle ≦ 2%

4: Essentially independent of operating temperature.

7. Test circuits and waveforms

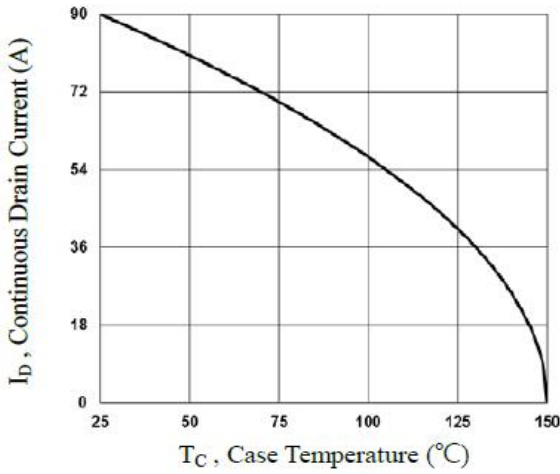


Fig.1 Continuous drain current vs. T_C

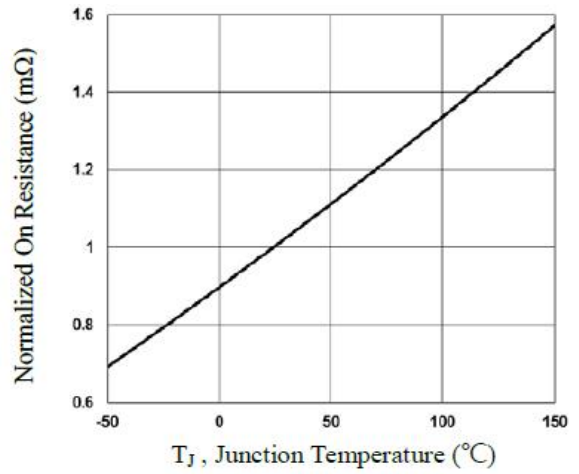


Fig.2 Normalized R_{DSON} vs. T_J

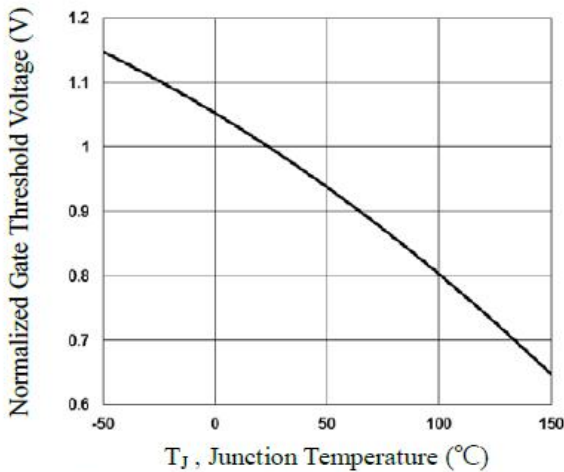


Fig.3 Normalized V_{th} vs. T_J

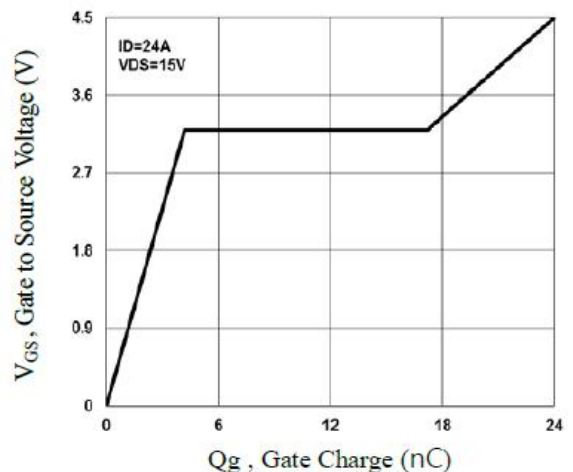


Fig.4 Gate charge waveform

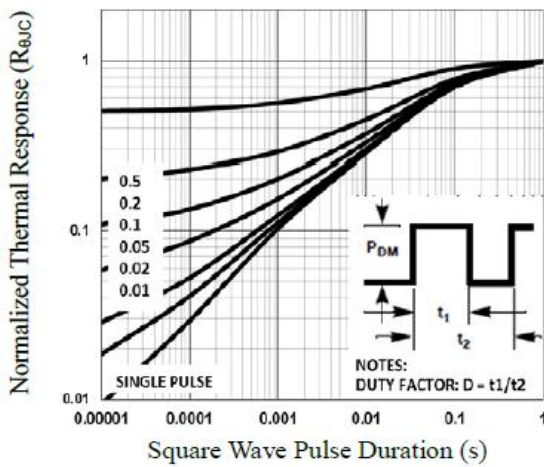


Fig.5 Normalized transient impedance

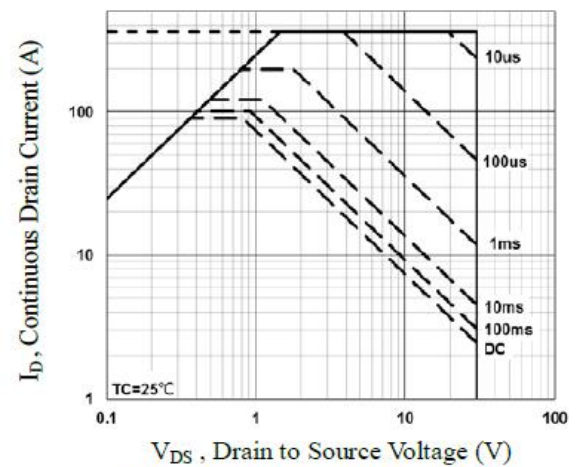


Fig.6 Maximum safe operation area

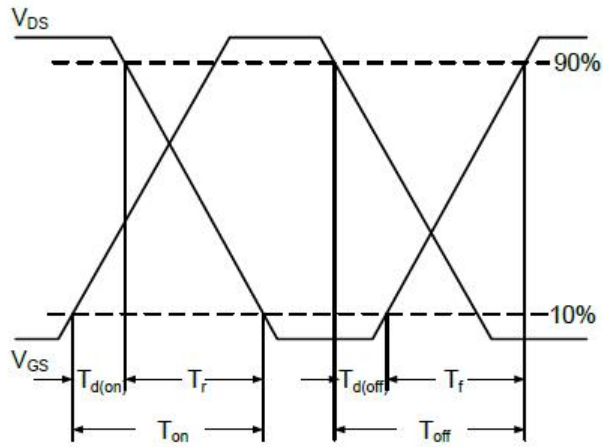


Fig.7 Switching time waveform

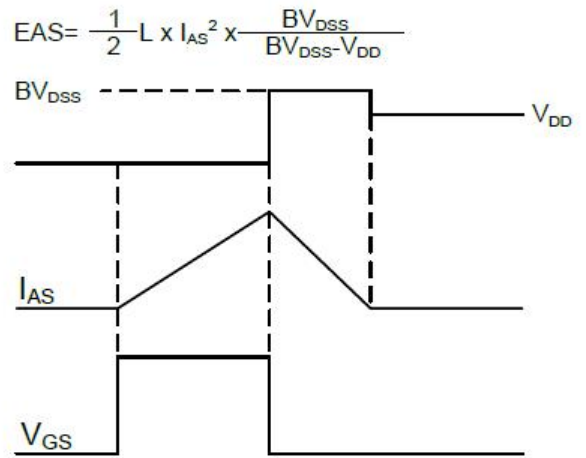


Fig.8 EAS waveform