

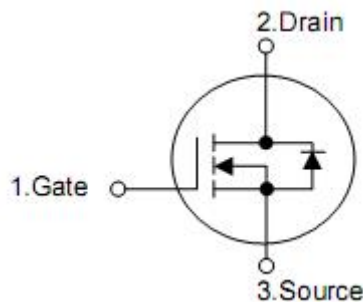
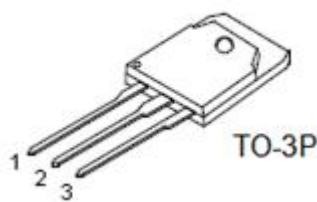
## 1. Description

This Power MOSFET is produced using KIA 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  $R_{DS(on)}=0.17\Omega @ V_{GS}=10V$
- n Low gate charge ( typical 102nC)
- n Fast switching capability
- n Avalanche energy specified
- n Improved dv/dt capability

## 3. Pin configuration



Pin	Function
1	Gate
2	Drain
3	Source

#### 4. Absolute maximum ratings

(T<sub>C</sub>= 25 °C , unless otherwise specified)

Parameter	Symbol	Ratings	Units
Drain-source voltage	V <sub>DSS</sub>	500	V
Gate-source voltage	V <sub>GSS</sub>	+30	V
Drain current continuous	I <sub>D</sub>	T <sub>C</sub> =25°C	28
		T <sub>C</sub> =100°C	16.8
Drain current pulsed (note1)	I <sub>DP</sub>	112	A
Avalanche energy	E <sub>AR</sub>	Repetitive (note1)	43
		Single pulse (note2)	1960
Peak diode recovery dv/dt (note 3)	dv/dt	4.5	V/ns
Total power dissipation	P <sub>D</sub>	T <sub>C</sub> =25°C	479
		derate above 25°C	3.83
Junction temperature	T <sub>J</sub>	+150	°C
Storage temperature	T <sub>STG</sub>	-55~+150	°C

\*Drain current limited by maximum junction temperature.

#### 5. Thermal characteristics

Parameter	Symbol	Ratings	Units
Thermal resistance,junction-ambient	R <sub>thJA</sub>	62.5	°C/W
Thermal resistance,case-to-sink typ.	R <sub>thCS</sub>	0.5	
Thermal resistance,Junction-case	R <sub>thJC</sub>	0.26	

## 6. Electrical characteristics

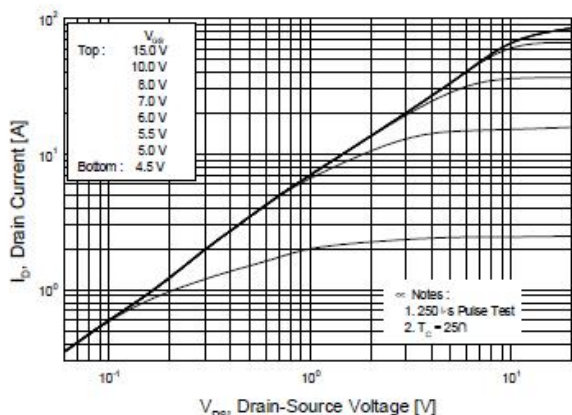
(T<sub>J</sub>=25°C, unless otherwise specified)

Parameter	Symbol	Conditions	Min	Typ	Max	Units	
<b>Off characteristics</b>							
Drain-source breakdown voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	500	-	-	V	
Zero gate voltage drain current	I <sub>DSS</sub>	V <sub>DS</sub> =500V, V <sub>GS</sub> =0V	-	-	1	μA	
		V <sub>DS</sub> =400V, T <sub>C</sub> =125 °C	-	-	10	μA	
Gate-body leakage current	Forward	I <sub>GSS</sub>	V <sub>GS</sub> =30V, V <sub>DS</sub> =0V	-	-	100	nA
	Reverse					-100	nA
Breakdown voltage temperature coefficient	ΔBV <sub>DSS</sub> /ΔT <sub>J</sub>	I <sub>D</sub> =250μA	-	0.6	-	V/°C	
<b>On characteristics</b>							
Gate threshold voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	2.0	-	4.0	V	
Static drain-source on-resistance	R <sub>DS(on)</sub>	V <sub>DS</sub> =10V, I <sub>D</sub> =14A	-	0.16	0.2	Ω	
Forward transconductance	g <sub>FS</sub>	V <sub>DS</sub> =40V, I <sub>D</sub> =14A (note4)	-	26	-	S	
<b>Dynamic characteristics</b>							
Input capacitance	C <sub>iss</sub>	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1MHz	-	4085	-	pF	
Output capacitance	C <sub>oss</sub>		-	474	-	pF	
Reverse transfer capacitance	C <sub>rss</sub>		-	60	-	pF	
<b>Switching characteristics</b>							
Turn-on delay time	t <sub>d(on)</sub>	V <sub>DD</sub> =250V, I <sub>D</sub> =28A, R <sub>G</sub> =25Ω (note4,5)	-	45	-	ns	
Rise time	t <sub>r</sub>		-	87	-	ns	
Turn-off delay time	t <sub>d(off)</sub>		-	355	-	ns	
Fall time	t <sub>f</sub>		-	130	-	ns	
Total gate charge	Q <sub>g</sub>	V <sub>DS</sub> =400V, I <sub>D</sub> =28A, V <sub>GS</sub> =10V (note4,5)	-	102	-	nC	
Gate-source charge	Q <sub>gs</sub>		-	43	-	nC	
Gate-drain charge	Q <sub>gd</sub>		-	20	-	nC	
<b>Drain-source diode characteristics</b>							
Drain-source diode forward voltage	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =28A	-	-	1.4	V	
Continuous drain-source current	I <sub>SD</sub>		-	-	28	A	
Pulsed drain-source current	I <sub>SM</sub>		-	-	112	A	
Reverse recovery time	t <sub>rr</sub>	I <sub>SD</sub> =28A di <sub>SD</sub> /dt=100A/μs (note4)	-	656	-	ns	
Reverse recovery charge	Q <sub>rr</sub>		-	11.5	-	μC	

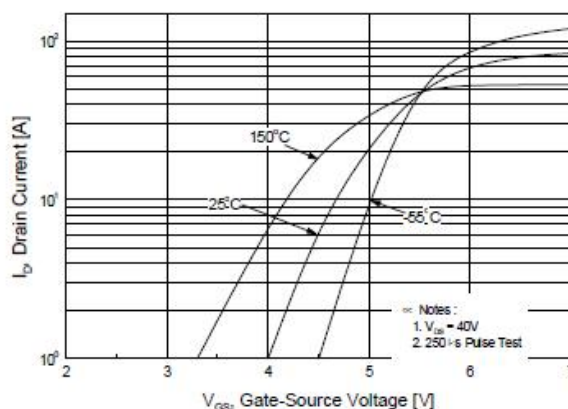
Note:1 Repetitive rating: pulse width limited by maximum junction temperature

2. L=5mH, I<sub>AS</sub>=28A, V<sub>DD</sub>=50V, R<sub>G</sub>=25Ω, starting T<sub>J</sub>=25°C
3. I<sub>SD</sub>≤28A, di/dt≤100A/μs, V<sub>DD</sub>≤BV<sub>DSS</sub>, starting T<sub>J</sub>=25 °C
4. Pulse test: pulse width≤300μs, duty cycle≤2%
5. Essentially independent of operating temperature

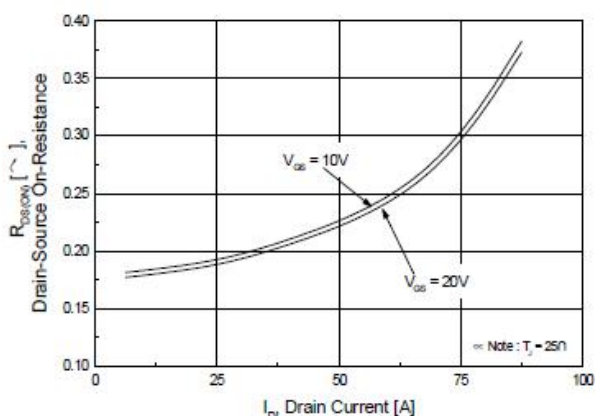
**7. Test circuits and waveforms**



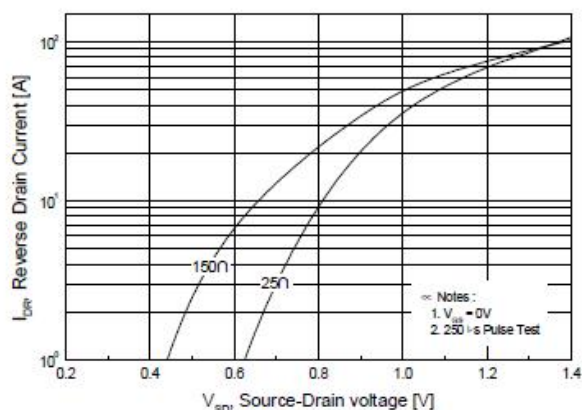
**Figure 1. On-Region Characteristics**



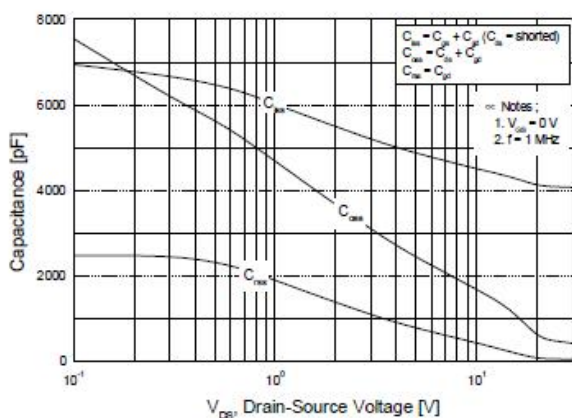
**Figure 2. Transfer Characteristics**



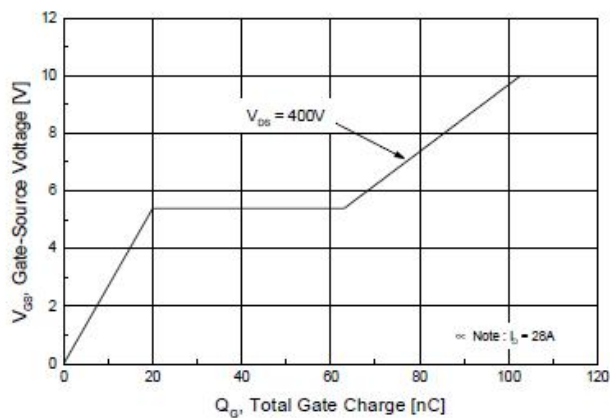
**Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage**



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



**Figure 5. Capacitance Characteristics**



**Figure 6. Gate Charge Characteristics**

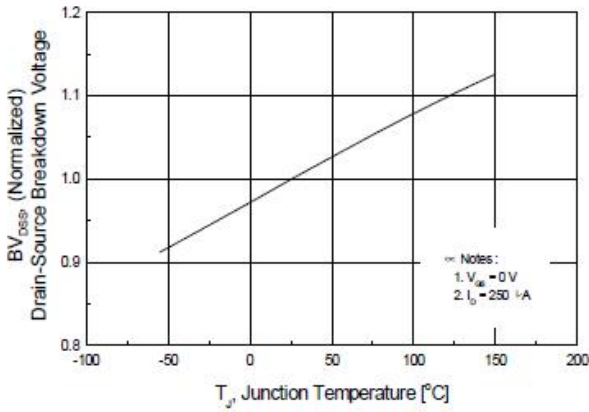


Figure 7. Breakdown Voltage Variation vs Temperature

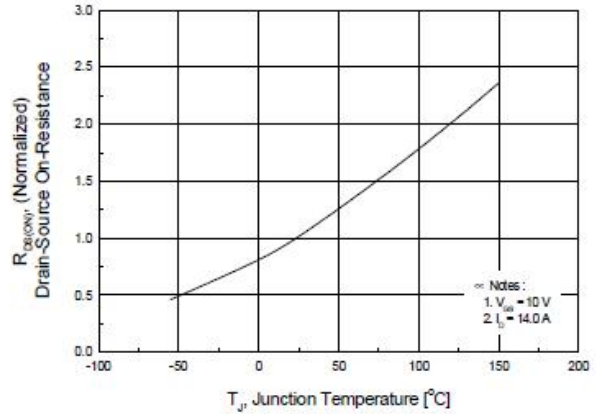


Figure 8. On-Resistance Variation vs Temperature

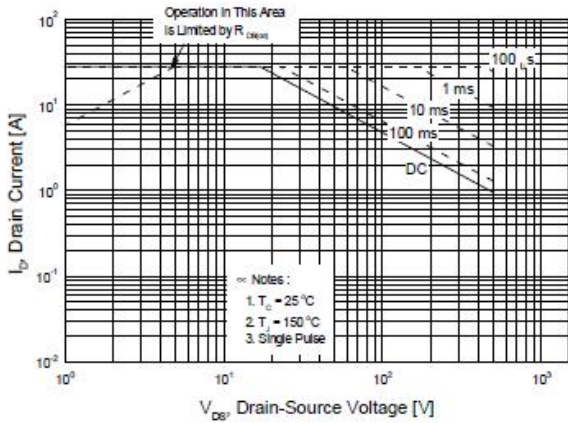


Figure 9. Maximum Safe Operating Area

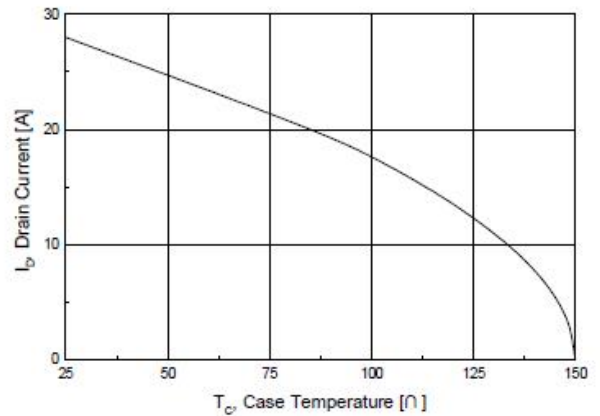


Figure 10. Maximum Drain Current vs Case Temperature

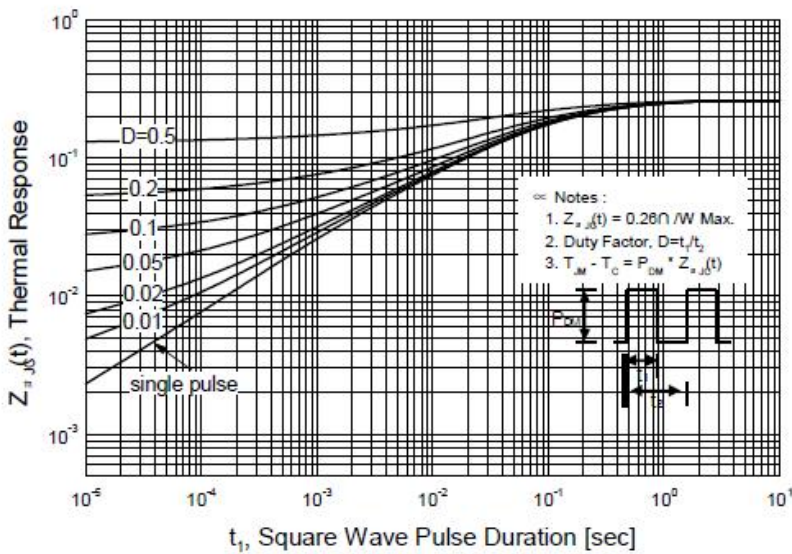


Figure 11. Transient Thermal Response Curve