

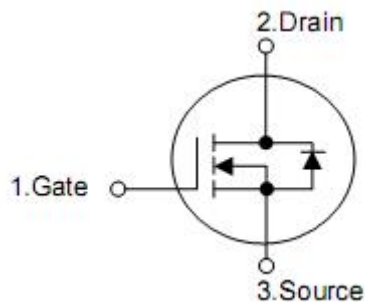
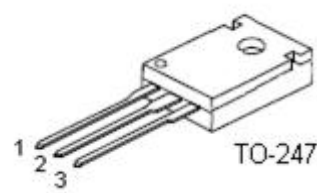
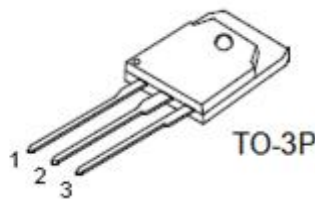
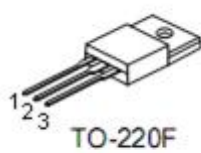
## 1. Description

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  $R_{DS(on)}=0.32\Omega$  @  $V_{GS}=10V$
- n Low gate charge ( typical 45nC)
- 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 notes)

Parameter	Symbol	Ratings			Units	
		TO-220F	TO-3P	TO-247		
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	16*	16	16	A
		T <sub>C</sub> =100°C	9.6*			A
Drain current pulsed (note1)	I <sub>Dm</sub>	64			A	
Avalanche energy	Repetitive (note1)	E <sub>AR</sub>			20	mJ
	Single pulse (note2)	E <sub>AS</sub>			853	mJ
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	38.5	205	205	W
		derate above 25°C	0.3	2.1	2.1	W/°C
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	TO-220F	TO-3P	TO-247	Units
Thermal resistance,junction-ambient	R <sub>thJA</sub>	62.5	42	40	°C/W
Thermal resistance,case-to-sink typ.	R <sub>thCS</sub>	-	0.25	0.24	
Thermal resistance,Junction-case	R <sub>thJC</sub>	3.3	0.62	0.62	

## 6. Electrical characteristics

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

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Off characteristics						
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	I <sub>GSS</sub>	V <sub>GS</sub> =30V, V <sub>DS</sub> =0V	-	-	100	nA
		V <sub>GS</sub> =-30V, V <sub>DS</sub> =0V	-	-	-100	nA
Breakdown voltage temperature coefficient	ΔBV <sub>DSS</sub> /ΔT <sub>J</sub>	I <sub>D</sub> =250μA	-	0.6	-	V/°C
On characteristics						
Gate threshold voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	3.0	4.0	5.0	V
Static drain-source on-resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =8.0A	-	0.32	0.38	Ω
Dynamic characteristics						
Input capacitance	C <sub>iss</sub>	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1MHz	-	2200	-	pF
Output capacitance	C <sub>oss</sub>		-	350	-	pF
Reverse transfer capacitance	C <sub>rss</sub>		-	35	-	pF
Switching characteristics						
Turn-on delay time	t <sub>d(on)</sub>	V <sub>DD</sub> =250V, I <sub>D</sub> =16.0A, R <sub>G</sub> =25Ω (note4,5)	-	50	-	ns
Rise time	t <sub>r</sub>		-	170	-	ns
Turn-off delay time	t <sub>d(off)</sub>		-	90	-	ns
Fall time	t <sub>f</sub>		-	80	-	ns
Total gate charge	Q <sub>g</sub>	V <sub>DS</sub> =400V, I <sub>D</sub> =16.0A, V <sub>GS</sub> =10V (note4,5)	-	45	-	nC
Gate-source charge	Q <sub>gs</sub>		-	12	-	nC
Gate-drain charge	Q <sub>gd</sub>		-	20	-	nC
Drain-source diode characteristics						
Drain-source diode forward voltage	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =16.0A	-	-	1.5	V
Continuous drain-source current	I <sub>SD</sub>		-	-	16	A
Pulsed drain-source current	I <sub>SM</sub>		-	-	64	A
Reverse recovery time	t <sub>rr</sub>	I <sub>SD</sub> =16.0A dI <sub>SD</sub> /dt=100A/μs (note4)	-	500	-	ns
Reverse recovery charge	Q <sub>rr</sub>		-	5.0	-	μC

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

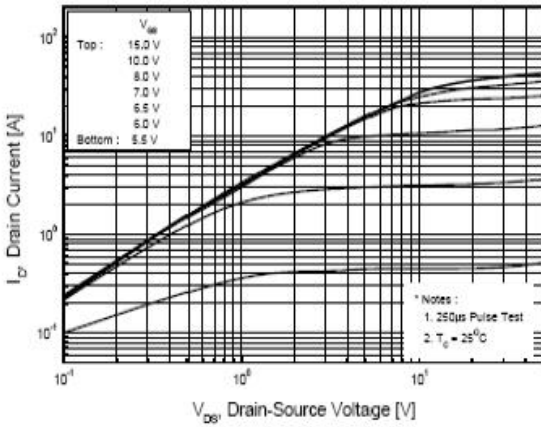
2. L=6.0mH, I<sub>AS</sub>=16.0A, V<sub>DD</sub>=50V, R<sub>G</sub>=25Ω, starting T<sub>J</sub>=25°C

3. I<sub>SD</sub>≤16.0A, di/dt≤200A/μs, V<sub>DD</sub>≤BV<sub>DSS</sub>, starting T<sub>J</sub>=25 °C

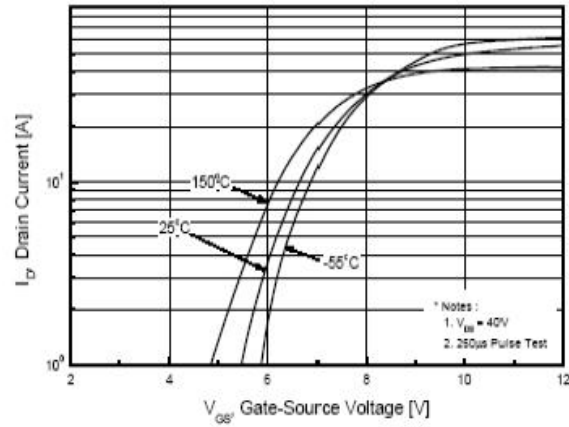
4. Pulse test: pulse width≤300μs, duty cycle≤2%

5. Essentially independent of operating temperature

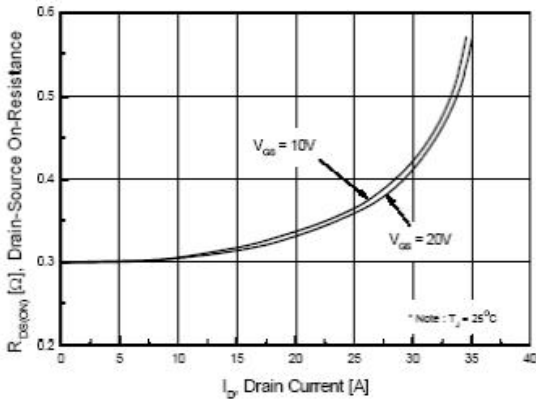
**7. Typical operating characteristics**



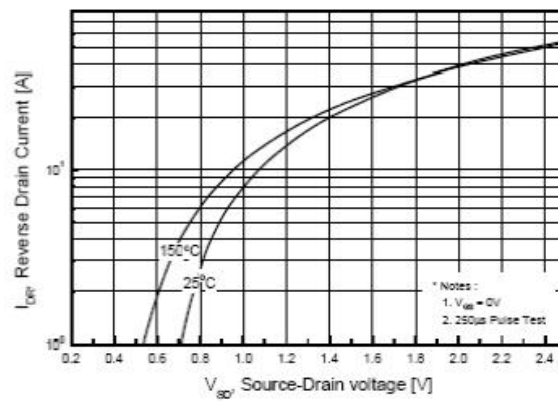
**Figure 1. On-Region Characteristics**



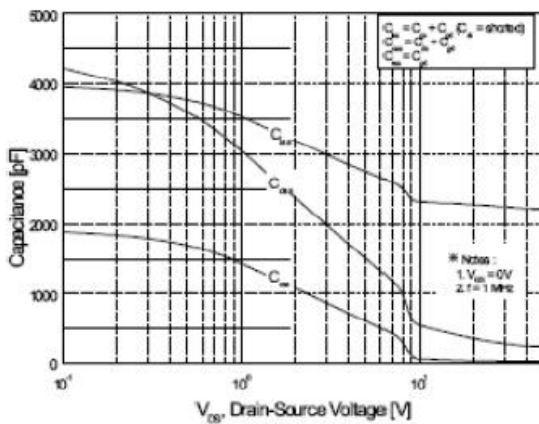
**Figure 2. Transfer Characteristics**



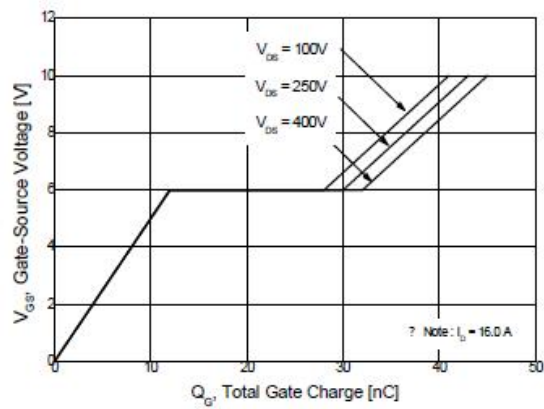
**Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage**



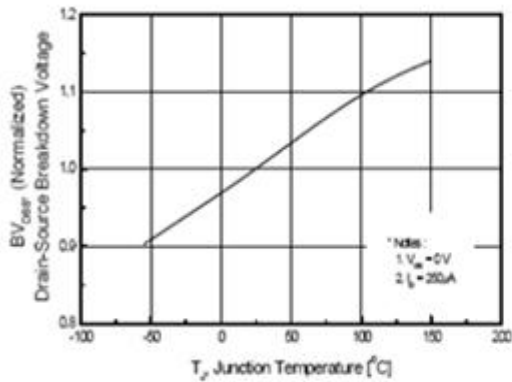
**Figure 4. Body Diode Forward Voltage Variation with Source Current**



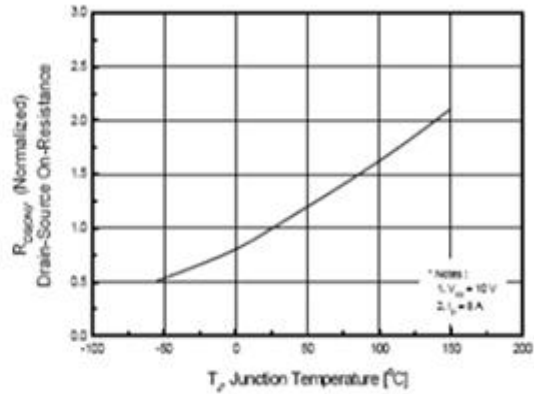
**Figure 5. Capacitance Characteristics**



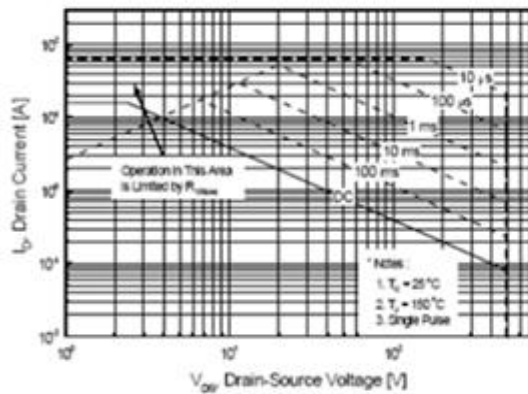
**Figure 6. Gate Charge Characteristics**



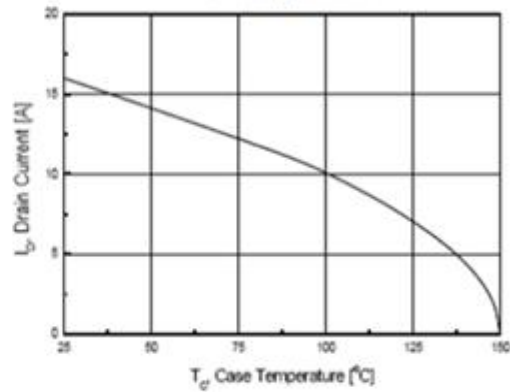
**Figure 7. Breakdown Voltage Variation**



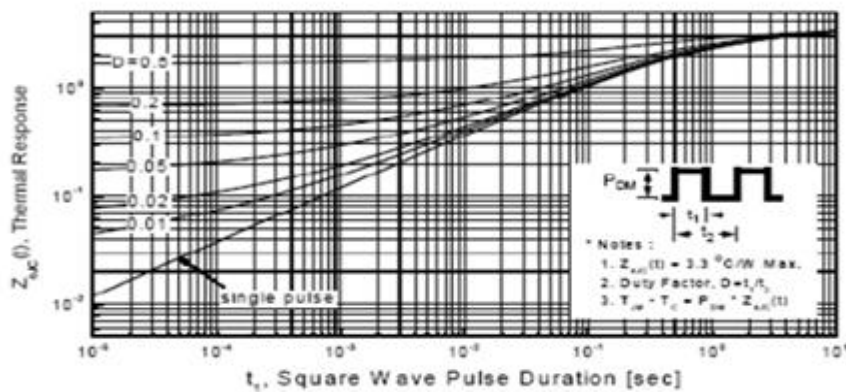
**Figure 8. On-Resistance Variation vs Temperature**



**Figure 9 Maximum Safe Operating Area**



**Figure 10. Maximum Drain Current vs Case Temperature**



**Figure 11 Transient Thermal Response Curve for T0-220F**

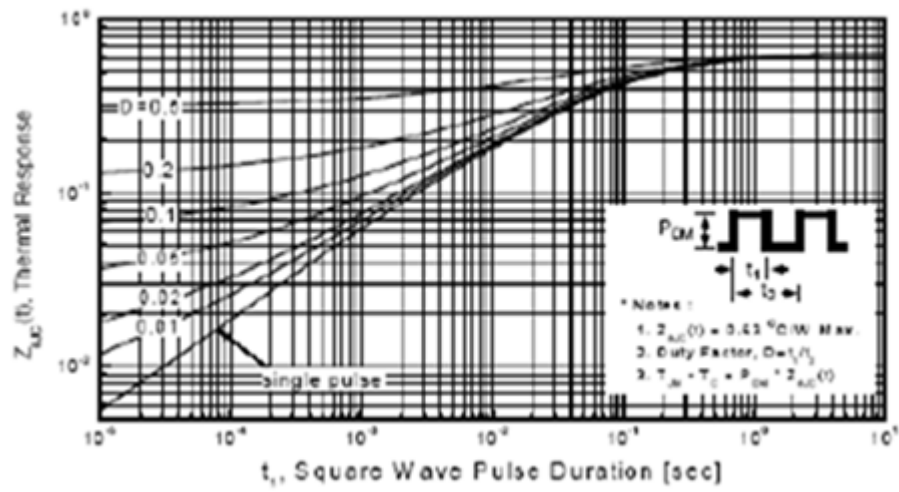


Figure 11-1. Transient Thermal Response Curve for T0-3P, T0-247