

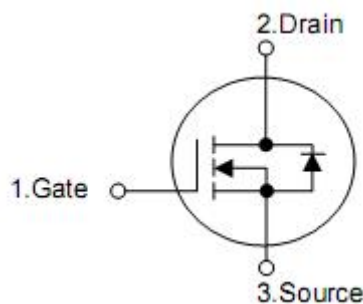
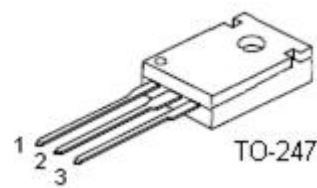
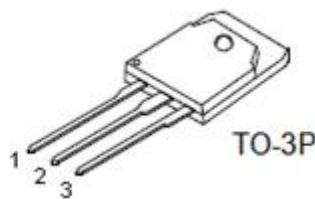
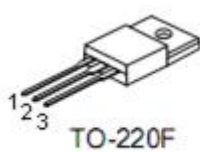
1. Description

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_C= 25 °C , unless otherwise notes)

Parameter	Symbol	Ratings			Units	
		TO-220F	TO-3P	TO-247		
Drain-source voltage	V _{DSS}	500			V	
Gate-source voltage	V _{GSS}	±30			V	
Drain current continuous	I _D	T _C =25°C	16*	16	16	A
		T _C =100°C	9.6			A
Drain current pulsed (note1)	I _{Dm}	64			A	
Avalanche energy	Repetitive (note1)	E _{AR}			20	mJ
	Single pulse (note2)	E _{AS}			853	mJ
Peak diode recovery dv/dt (note 3)	dv/dt	4.5			V/ns	
Total power dissipation	P _D	T _C =25°C	38.5	205	205	W
		derate above 25°C	0.3	2.1	2.1	W/°C
Junction temperature	T _J	+150			°C	
Storage temperature	T _{STG}	-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 _{thJA}	62.5	42	40	°C/W
Thermal resistance,case-to-sink typ.	R _{thCS}	-	0.25	0.24	
Thermal resistance,Junction-case	R _{thJC}	3.3	0.62	0.62	

6. Electrical characteristics

($T_J=25^\circ\text{C}$, unless otherwise notes)

Parameter	Symbol	Conditions	Min	Typ	Max	Units	
Off characteristics							
Zero gate voltage drain current	I_{DSS}	$V_{DS}=500V, V_{GS}=0V$	-	-	1	μA	
		$V_{DS}=400V, T_C=125^\circ\text{C}$	-	-	10	μA	
Gate-body leakage current	Forward Reverse	I_{GSS}	$V_{GS}=30V, V_{DS}=0V$	-	-	100	nA
			$V_{GS}=-30V, V_{DS}=0V$	-	-	-100	nA
Breakdown voltage temperature coefficient	$\Delta BV_{DSS}/\Delta T_J$	$I_D=250\mu\text{A}$	-	0.6	-	$\text{V}/^\circ\text{C}$	
On characteristics							
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	3.0	4.0	5.0	V	
Static drain-source on-resistance	$R_{DS(on)}$	$V_{DS}=10V, I_D=8.0A$	-	0.32	0.38	Ω	
Dynamic characteristics							
Input capacitance	C_{iss}	$V_{DS}=25V, V_{GS}=0V,$ $f=1\text{MHz}$	-	2200	-	pF	
Output capacitance	C_{oss}		-	350	-	pF	
Reverse transfer capacitance	C_{rss}		-	35	-	pF	
Switching characteristics							
Turn-on delay time	$t_{d(on)}$	$V_{DD}=250V, I_D=16.0A,$ $R_G=25\Omega$ (note4,5)	-	50	-	ns	
Rise time	t_r		-	170	-	ns	
Turn-off delay time	$t_{d(off)}$		-	90	-	ns	
Fall time	t_f		-	80	-	ns	
Total gate charge	Q_g	$V_{DS}=400V, I_D=16.0A,$ $V_{GS}=10V$ (note4,5)	-	45	-	nC	
Gate-source charge	Q_{gs}		-	12	-	nC	
Gate-drain charge	Q_{gd}		-	20	-	nC	
Drain-source diode characteristics							
Drain-source diode forward voltage	V_{SD}	$V_{GS}=0V, I_D=16.0A$	-	-	1.5	V	
Continuous drain-source current	I_{SD}		-	-	16	A	
Pulsed drain-source current	I_{SM}		-	-	64	A	
Reverse recovery time	t_{rr}	$I_{SD}=16.0A$ $di_{SD}/dt=100A/\mu\text{s}$ (note4)	-	500	-	ns	
Reverse recovery charge	Q_{rr}		-	5.0	-	μC	

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

2. $L=6.0\text{mH}, I_{AS}=16.0A, V_{DD}=50V, R_G=25\Omega$, starting $T_J=25^\circ\text{C}$

3. $I_{SD}\leq 16.0A, di/dt\leq 200A/\mu\text{s}, V_{DD}\leq BV_{DSS}$, starting $T_J=25^\circ\text{C}$

4. Pulse test:pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$

5. Essentially independent of operating temperature

7. Typical operating characteristics

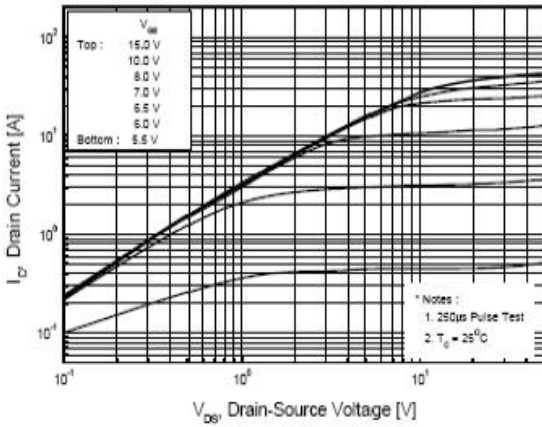


Figure 1. On-Region Characteristics

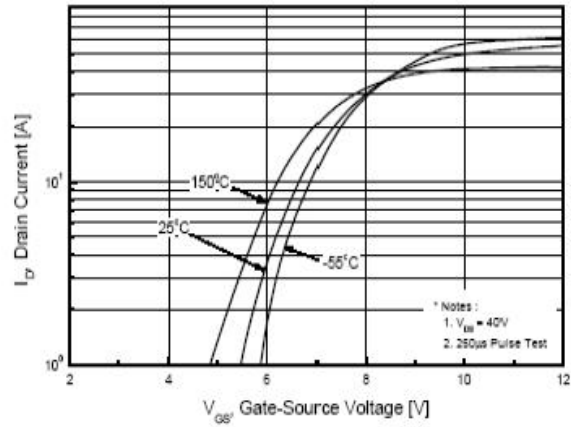


Figure 2. Transfer Characteristics

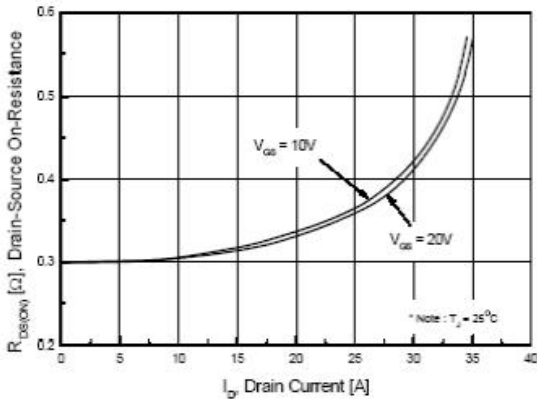


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

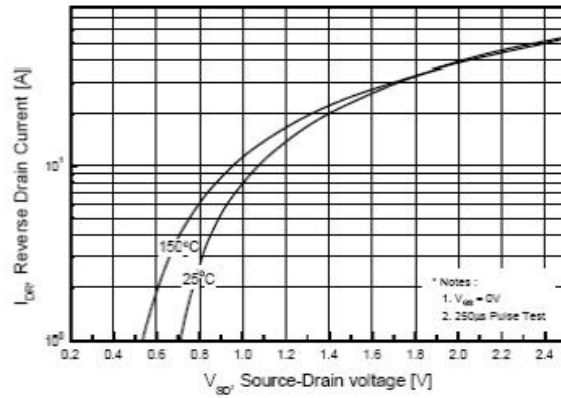


Figure 4. Body Diode Forward Voltage Variation with Source Current

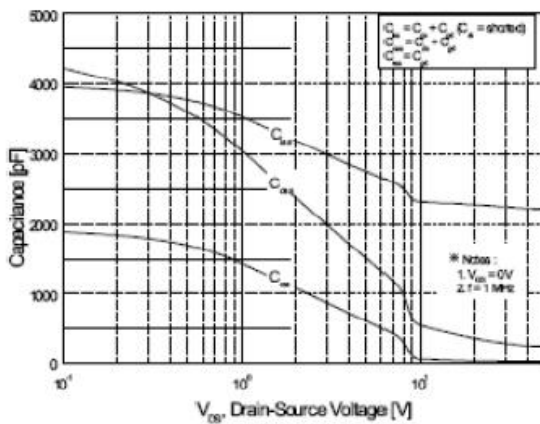


Figure 5. Capacitance Characteristics

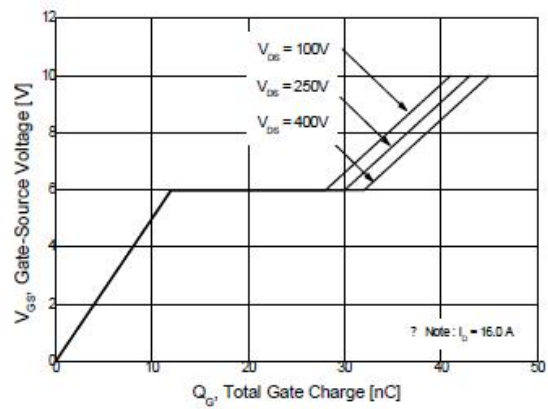


Figure 6. Gate Charge Characteristics

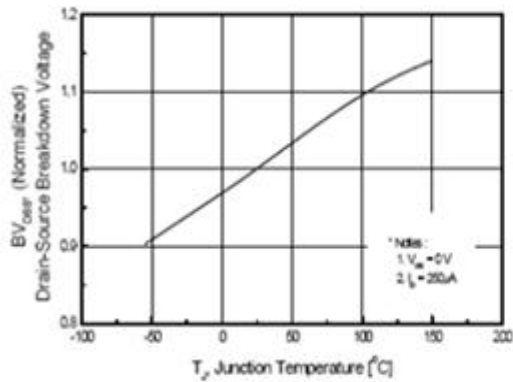


Figure 7. Breakdown Voltage Variation

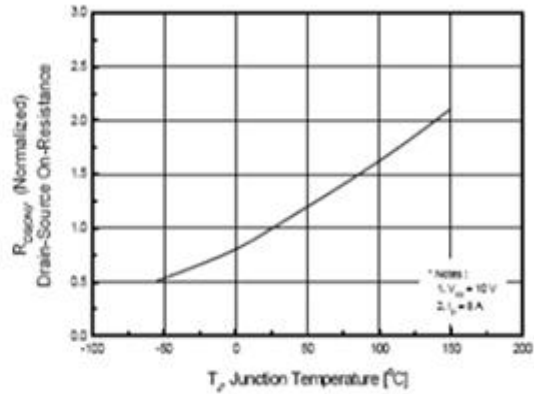


Figure 8. On-Resistance Variation vs Temperature

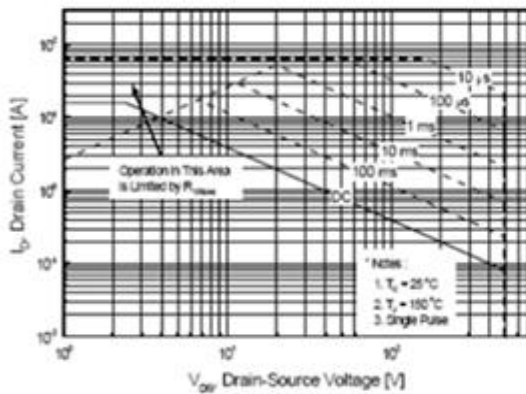


Figure 9 Maximum Safe Operating Area

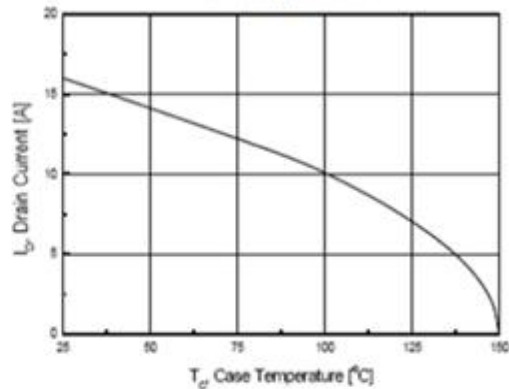


Figure 10. Maximum Drain Current vs Case Temperature

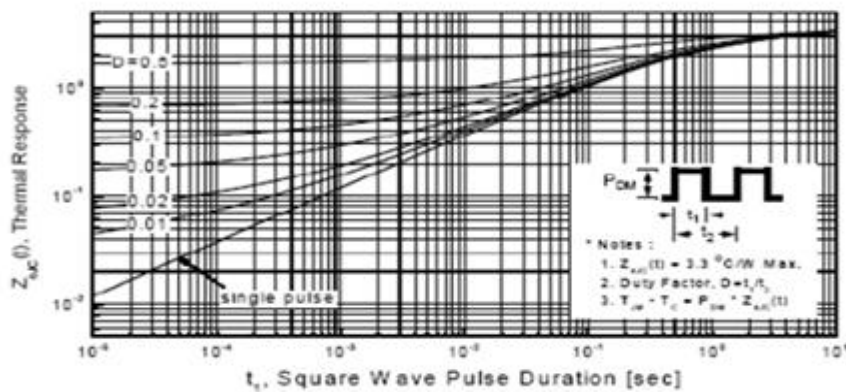


Figure 11 Transient Thermal Response Curve for T0-220F

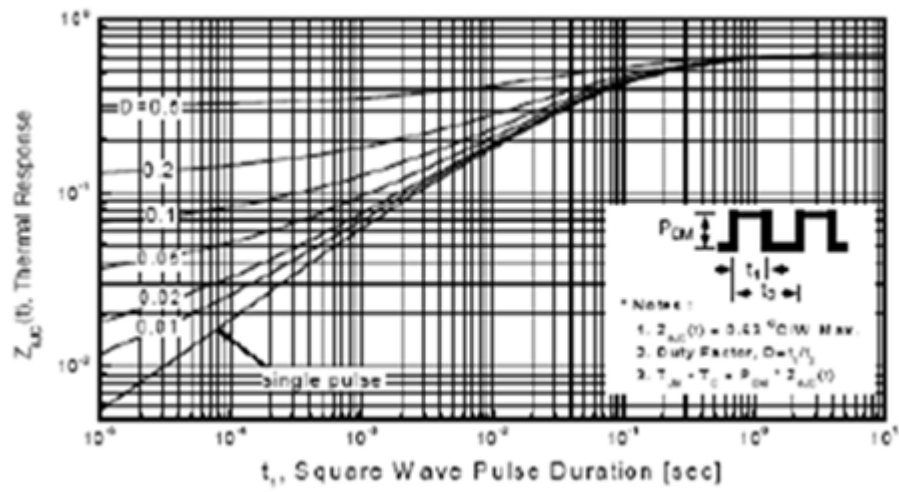


Figure 11-1. Transient Thermal Response Curve for T0-3P, T0-247