

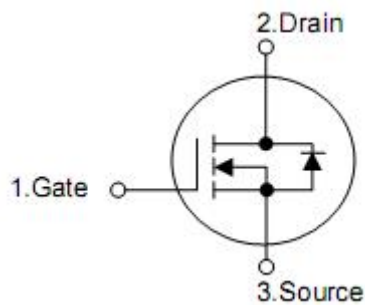
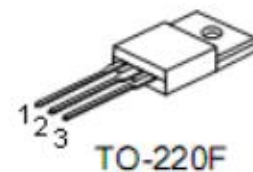
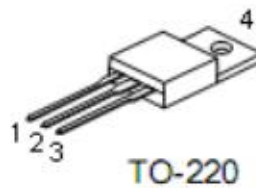
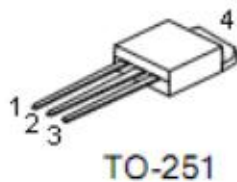
1. Description

The KIA730H N-Channel enhancement mode silicon gate power MOSFET is designed for high voltage, high speed power switching applications such as switching regulators, switching converters, solenoid, motor drivers, relay drivers.

2. Features

- n $R_{DS(on)}=0.83\Omega$ (Typ) @ $V_{GS}=10\text{ V}$
- n Low gate charge (typical 20nC)
- n Avalanche energy specified
- n Fast switching capability
- n Improved dv/dt capability

3. Pin configuration



Pin	Function
1	Gate
2	Drain
3	Source
4	Drain

4. Absolute maximum ratings

(T_C=25 °C , unless otherwise specified)

Parameter	Symbol	Ratings			Units	
		T0251	T0220	T0220F		
Drain-source voltage	V _{DSS}	400			V	
Gate-source voltage	V _{GSS}	±30			V	
Drain current continuous	I _D	T _C =25°C	6.0*	6.0	6.0*	A
		T _C =100°C	3.6*	3.6	3.6*	A
Drain current pulsed (note1)	I _{DP}	24*	24	24*	A	
Avalanche energy	Repetitive (note1)	E _{AR}			7.3	mJ
	Single pulse (note2)	E _{AS}			270	mJ
Peak diode recovery dv/dt (note 3)	dv/dt	4.5			V/ns	
Total power dissipation	P _D	T _C =25°C	42	73	38	W
		Derate above 25°C	0.35	0.58	0.30	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	Rating			Unit
		T0251	T0220	T0220F	
Thermal resistance,Junction-to-case	R _{thJC}	2.11	1.71	3.31	°C/W
Thermal resistance,Junction-to-ambient	R _{thJA}	62.5	62.5	62.5	°C/W
Thermal resistance, Case-to-sink typ.	R _{thCS}	0.5	0.5	--	°C/W

6. Electrical characteristics

(T_J=25°C, unless otherwise notes)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Off Characteristics						
Drain-source breakdown voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA	400	-	-	V
Zero gate voltage drain current	I _{DSS}	V _{DS} =400V, V _{GS} =0V	-	-	1	μA
		V _{DS} =320V, T _C =125 °C	-	-	10	μA
Gate-body leakage current	I _{GSS}	V _{GS} =30V, V _{DS} =0V	-	-	100	nA
		V _{GS} =-30V, V _{DS} =0V	-	-	-100	nA
Breakdown voltage temperature	ΔBV _{DSS} /ΔT _J	I _D =250μA,	-	0.54	-	V/°C
On characteristics						
Gate threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	2.0	-	4.0	V
Static drain-source on-resistance	R _{DS(on)}	V _{GS} =10V, I _D =3.0A	-	0.83	1.0	Ω
Dynamic characteristics						
Input capacitance	C _{iss}	V _{DS} =25V, V _{GS} =0V, f=1MHz	-	520	-	pF
Output capacitance	C _{oss}		-	80	-	pF
Reverse transfer capacitance	C _{rss}		-	15	-	pF
Switching characteristics						
Turn-on delay time	t _{d(on)}	V _{DD} =200V, I _D =6.0A, R _G =25Ω (note4,5)	-	10	-	ns
Rise time	t _r		-	60	-	ns
Turn-off delay time	t _{d(off)}		-	20	-	ns
Fall time	t _f		-	40	-	ns
Total gate charge	Q _g	V _{DS} =320V, I _D =6.0A, V _{GS} =10V (note4,5)	-	18	-	nC
Gate-source charge	Q _{gs}		-	2.5	-	nC
Gate-drain charge	Q _{gd}		-	8.5	-	nC
Drain-source diode characteristics						
Drain-source diode forward voltage	V _{SD}	V _{GS} =0V, I _{SD} =6.0A	-	-	1.4	V
Continuous Drain-source current	I _{SD}		-	-	6.0	A
Pulsed Drain-source current	I _{SM}		-	-	24.0	A
Reverse recovery time	t _{rr}	I _{SD} =6.0A,	-	250	-	ns
Reverse recovery charge	Q _{rr}	dI _{SD} /dt=100A/μs (note 4)	-	2.0	-	μC

Note: 1.Repetitive Rating:Pulse width limited by maximum junction temperature

2.L=14mH, I_{AS}=6.0A, V_{DD}=50V, R_G=25Ω, Starting T_J=25 °C

3.I_{SD}≤6.0A, di/dt≤200A/μs, V_{DD}≤ BV_{DSS}, Starting T_J=25 °C

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

5.Essentially independent of operating temperature

7. Test circuits and waveforms

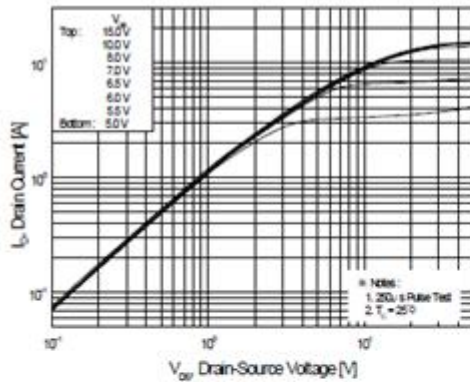


Figure 1. On-Region Characteristics

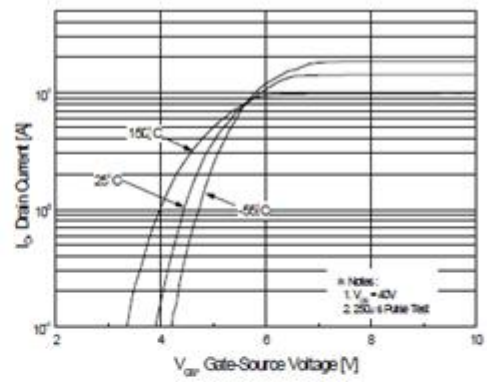


Figure 2. Transfer Characteristics

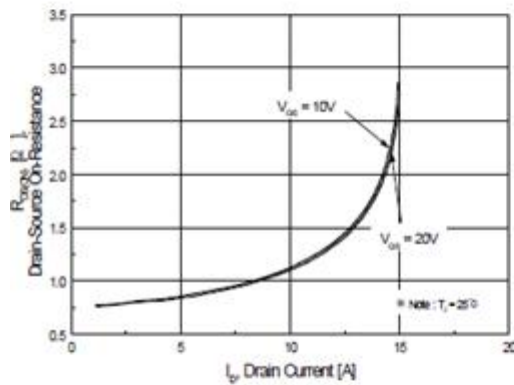


Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage

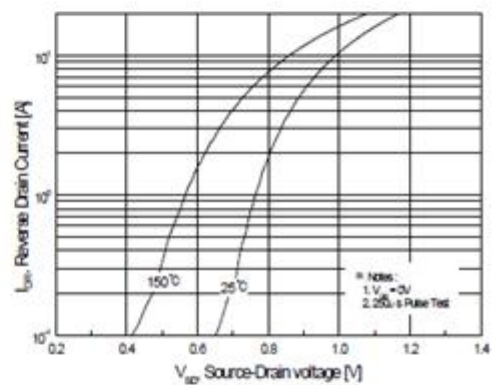


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

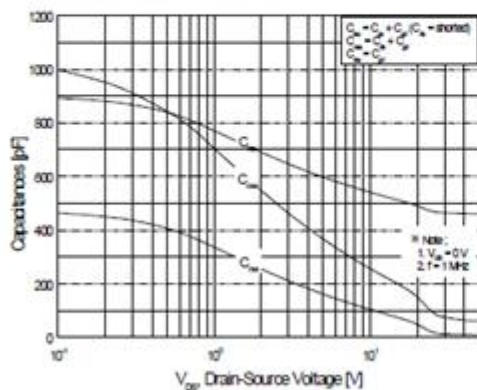


Figure 5. Capacitance Characteristics

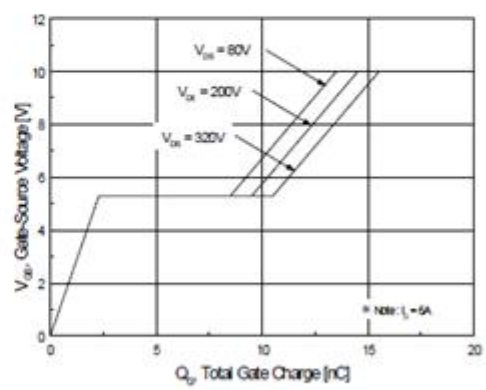


Figure 6. Gate Charge Characteristics

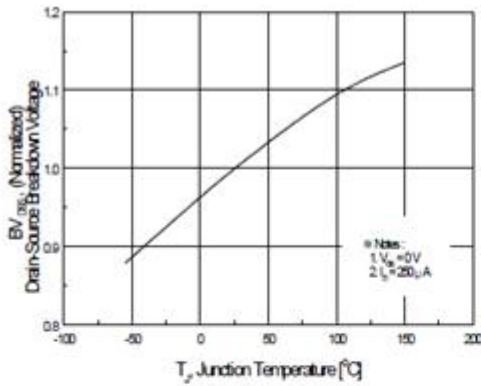


Figure 7. Breakdown Voltage Variation vs Temperature

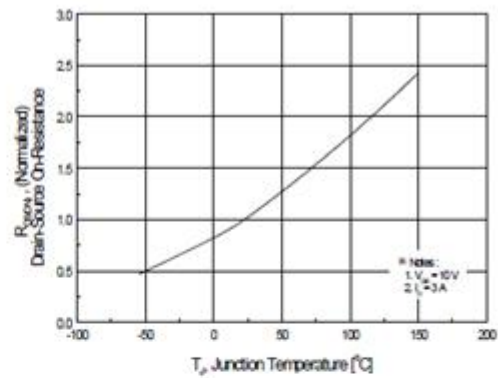


Figure 8. On-Resistance Variation vs Temperature

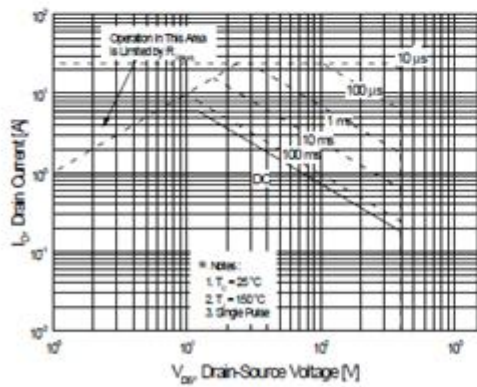


Figure 9-1. Maximum Safe Operating Area for T0220

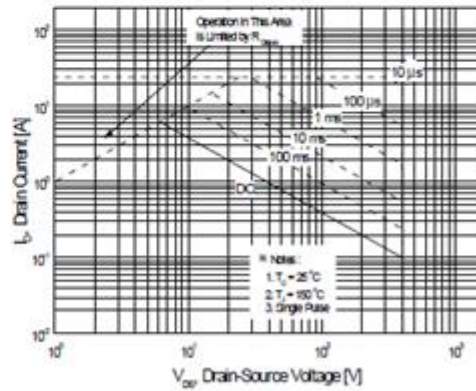


Figure 9-2. Maximum Safe Operating Area for T0220F or TO-251

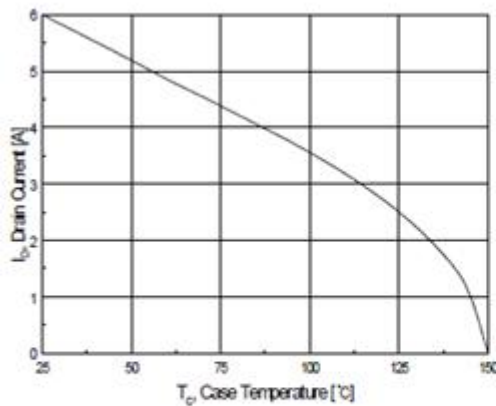


Figure 10. Maximum Drain Current vs Case Temperature

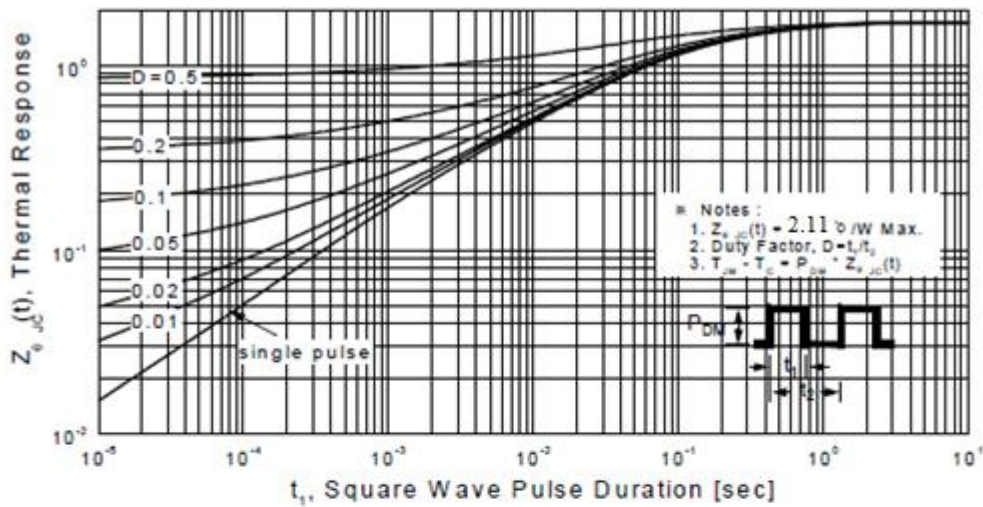


Figure 11-1. Transient Thermal Response Curve for TO-251

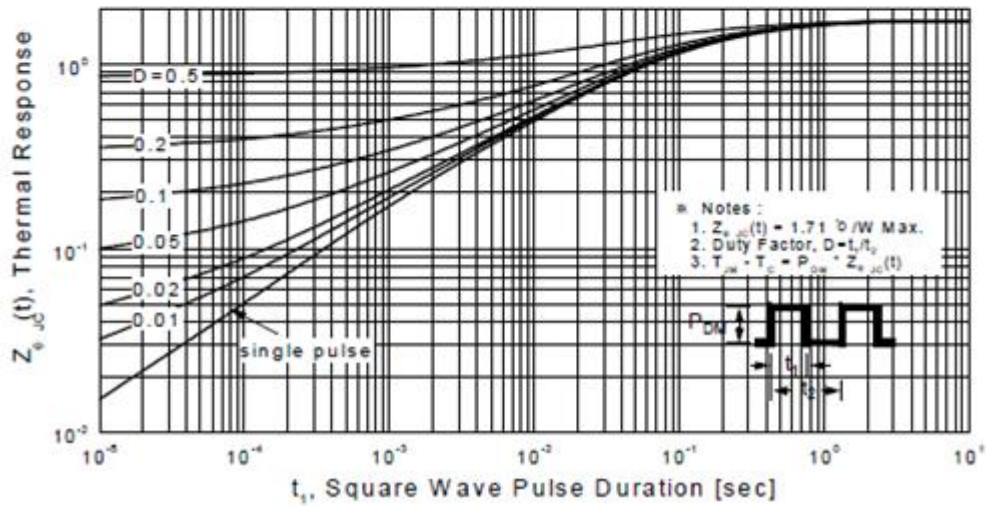


Figure 11-2. Transient Thermal Response Curve for TO220

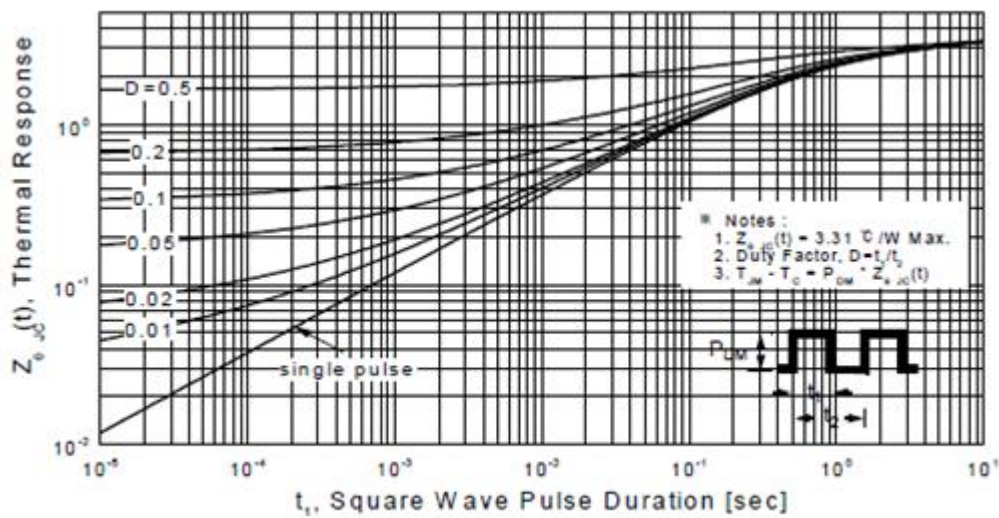


Figure 11-3. Transient Thermal Response Curve for TO220F