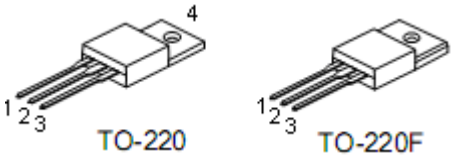
1. Description

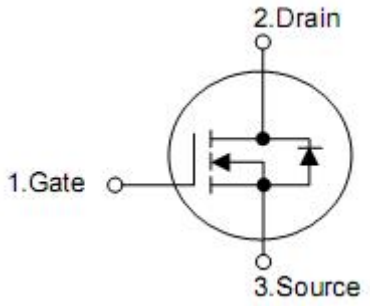
The KIA8N60 is a high voltage MOSFET and is designed to have better characteristics, such as fast switching time, low gate charge, low on-state resistance and have a high rugged avalanche characteristics. This power MOSFET is usually used at high speed switching applications in power supplies, PWM motor controls, high efficient DC to DC converters and bridge circuits.

2. Features

- $R_{DS(on)}$=0.98Ω @ V_{GS}=10V
- Ultra low gate charge (typical 29nC)
- Fast switching capability
- Avalanche energy tested
- Improved dv/dt capability,

3. Pin configuration





Pin	Function
1	Gate
2	Drain
3	Source
4	Drain

4. Absolute maximum ratings

(T_C=25ºC , unless otherwise specified)

Parameter		Symbol	Rating		Units
			TO220	TO220F	
Drain-source voltage		V_{DSS}	600		V
Gate-source voltage		V_{GSS}	±30		V
Drain current continuous	T_C=25ºC	I_D	7.5	7.5*	A
	T_C=100ºC		4.6	4.6*	A
Drain current pulsed (note1)		I_{DP}	30	30*	A
Peak diode recovery dv/dt (note3)		dv/dt	4.5		V/ns
Total power dissipation	T_C=25ºC	P_D	147	48	W
	Derate above 25ºC		1.18	0.38	W/ºC
Junction temperature		T_J	+150		ºC
Storage temperature		T_{STG}	-55~+150		ºC

* Drain current limited by maximum junction temperature

5. Thermal data

Parameter	Symbol	Rating		Unit
		TO220	TO220F	
Thermal resistance junction-ambient	R_{thJA}	62.5		ºC/W
Thermal resistance, case-to-Sink Typ	R_{thCS}	0.5	--	ºC/W
Thermal resistance junction-case	R_{thJC}	0.85	2.6	ºC/W

6. Electrical characteristics

(T_J=25°C,unless otherwise notes)

Parameter		Symbol	Test Conditions	Min	Typ	Max	Units
Off characteristics							
Drain-source breakdown voltage		BV_{DSS}	V_{GS}=0V,I_D=250μA	600	-	-	V
Zero gate voltage drain current		I_{DSS}	V_{DS}=600V,V_{GS}=0V	-	-	1	μA
			V_{DS}=480V,T_C=125ºC	-	-	10	μA
Gate-body leakage current	Forward	I_{GSS}	V_{GS}=30V,V_{DS}=0V	-	-	100	nA
	Reverse		V_{GS}=-30V,V_{DS}=0V	-	-	-100	nA
Breakdown voltage temperature coefficient		△BV_{DSS}/△T_J	I_D=250μA	-	0.6	-	V/ ºC
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=3.75A(Note 4)	-	0.98	1.2	Ω
Dynamic characteristics							
Input capacitance		C_{ISS}	V_{DS}=25V,V_{GS}=0V,f=1MHz	-	1000	-	pF
Output capacitance		C_{OSS}		-	110	-	pF
Reverse transfer capacitance		C_{RSS}		-	12	-	pF
Switching characteristics							
Turn-on delay time		$t_{D(ON)}$	V_{DD}=300V,R_G=25Ω, I_D=7.5A (note4,5)	-	20	-	ns
Rise time		t_R		-	50	-	ns
Turn-off delay time		$t_{D(OFF)}$		-	80	-	ns
Fall time		t_F		-	70	-	ns
Total gate charge		Q_G	V_{DS}=480V,V_{GS}=10V I_D=7.5A (note4,5)	-	29	-	nC
Gate-source charge		Q_{GS}		-	4.7	-	nC
Gate-drain charge		Q_{GD}		-	12.5	-	nC
Drain-source diode characteristics							
Drain-source diode forward voltage		V_{SD}	V_{GS}=0V,I_{SD}=7.5A	-	-	1.4	V
Continuous drain-source current		I_{SD}		-	-	7.5	A
Pulsed drain-source current		I_{SM}		-	-	30	A
Reverse recovery time		t_{RR}	I_{SD}=7.5A, di/dt=100A/μA (note4)	-	350	-	ns
Reverse recovery charge		Q_{RR}		-	3.3	-	μC

Note: 1.Repetitive Rating: Pulse width limited by maximum junction temperature
2. L=7.3mH,I_{AS}=7.5A,V_{DD}=50V,R_G=25Ω,Starting T_J=25ºC
3. I_{SD}≤7.5A,di/dt≤200A/μs, V_{DD}≤ BV_{DSS},Starting T_J=25ºC
4. Pulse test: pulse width ≤300μs, duty cycle≤2%
5. Essentially independent of operating temperature.

7. Typical characteristics

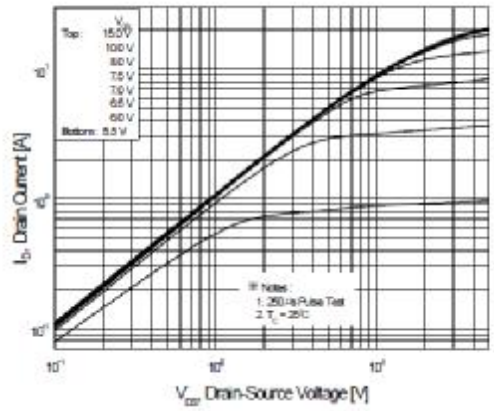


Figure 1. On-Region Characteristics

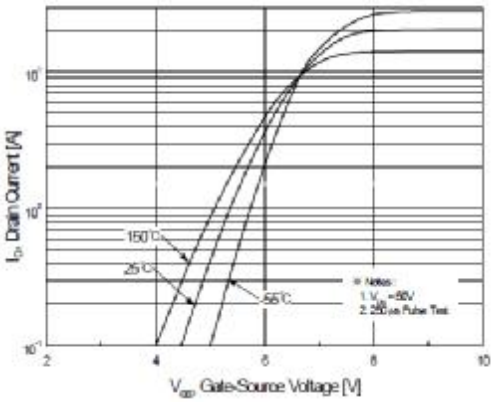


Figure 2. Transfer Characteristics

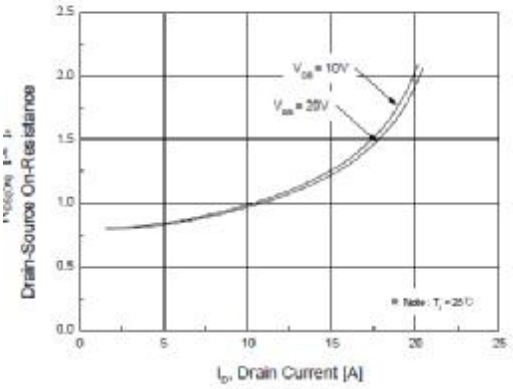


Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage

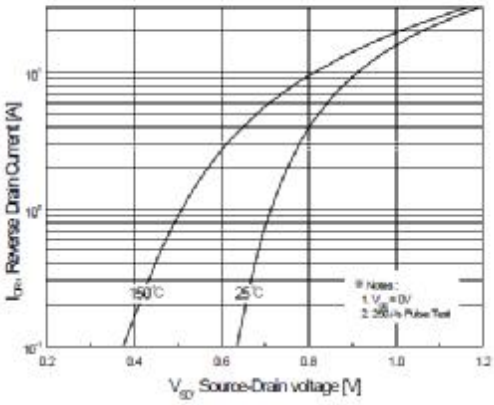


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

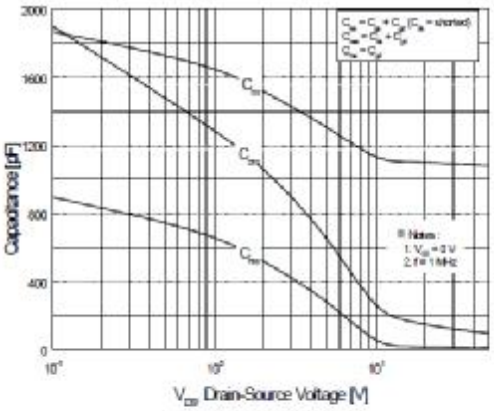


Figure 5. Capacitance Characteristics

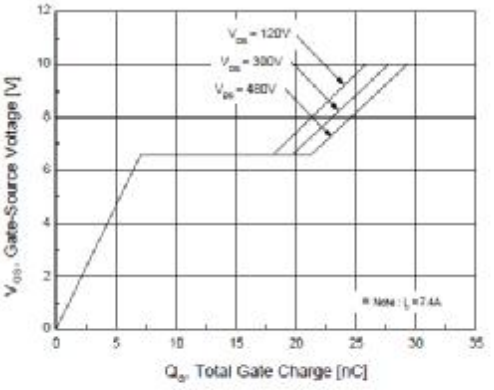


Figure 6. Gate Charge Characteristics

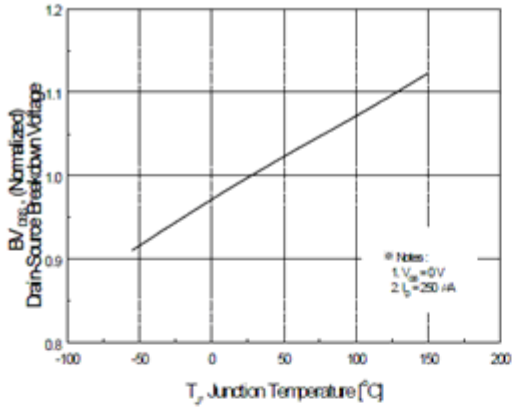


Figure 7. Breakdown Voltage Variation vs. Temperature

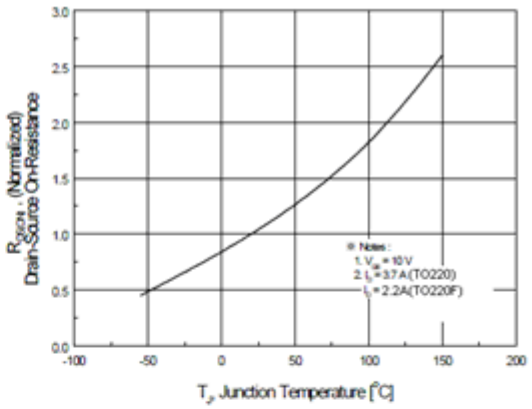


Figure8. On-Resistance Variation vs Temperature.

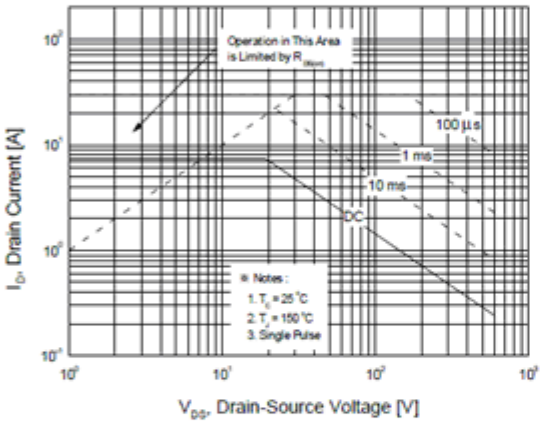


Figure 9. Maximum Safe Operating Area

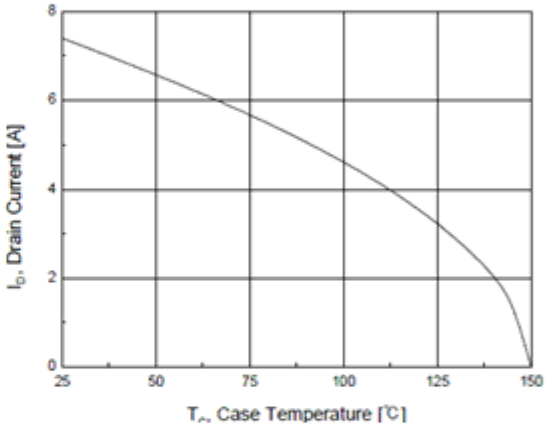


Figure 10. Maximum Drain Current vs Case Temperature

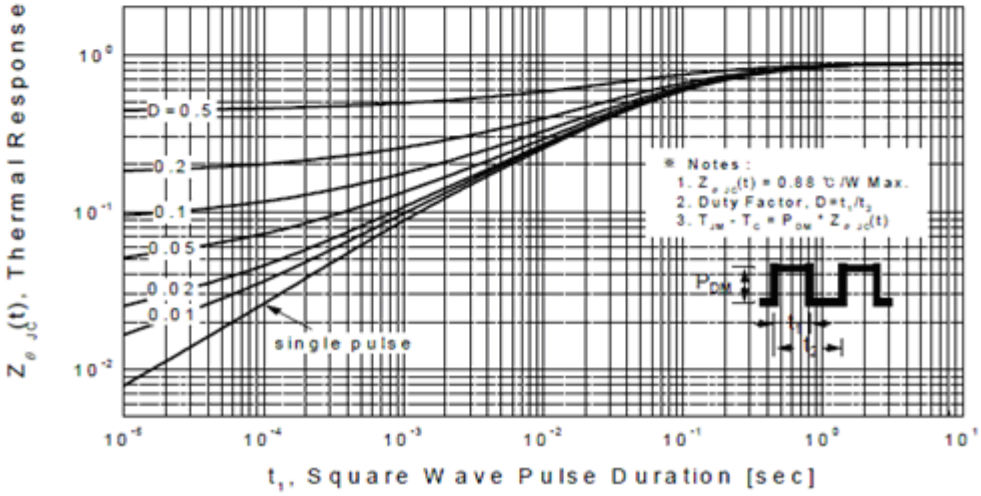


Figure 11-1. Transient Thermal Response Curve for TO220

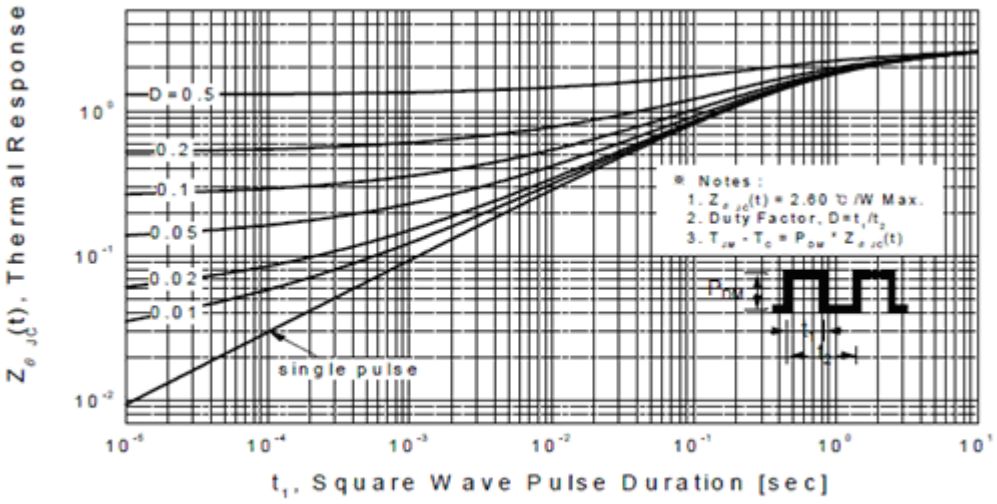


Figure 11-2. Transient Thermal Response Curve for TO220F