

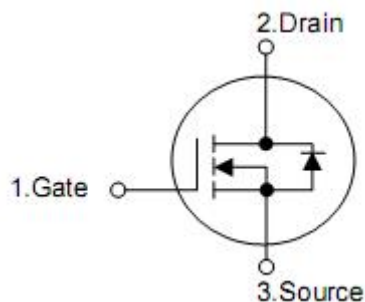
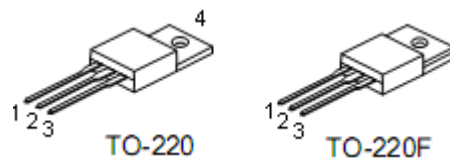
## 1. Description

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

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

## 3. Pin configuration



Pin	Function
1	Gate
2	Drain
3	Source
4	Drain

#### 4. Absolute maximum ratings

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

Parameter	Symbol	Rating		Units	
		TO220	TO220F		
Drain-source voltage	V <sub>DSS</sub>	600		V	
Gate-source voltage	V <sub>GSS</sub>	±30		V	
Drain current continuous	I <sub>D</sub>	T <sub>C</sub> =25°C	7.5	7.5*	A
		T <sub>C</sub> =100°C	4.6	4.6*	A
Drain current pulsed (note1)	I <sub>DP</sub>	30	30*	A	
Peak diode recovery dv/dt (note3)	dv/dt	4.5		V/ns	
Total power dissipation	P <sub>D</sub>	T <sub>C</sub> =25°C	147	48	W
		Derate above 25°C	1.18	0.38	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 data

Parameter	Symbol	Rating		Unit
		TO220	TO220F	
Thermal resistance junction-ambient	R <sub>thJA</sub>	62.5		°C/W
Thermal resistance, case-to-Sink Typ	R <sub>thCS</sub>	0.5	--	°C/W
Thermal resistance junction-case	R <sub>thJC</sub>	0.85	2.6	°C/W

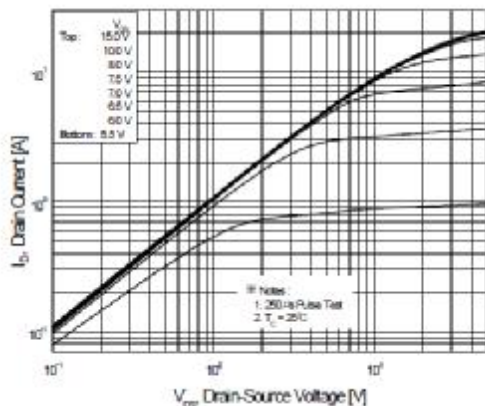
## 6. Electrical characteristics

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

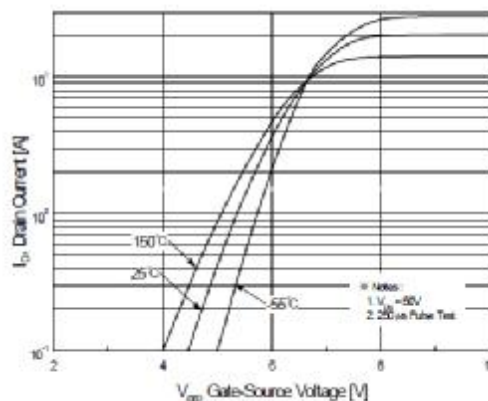
Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Off characteristics						
Drain-source breakdown voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	600	-	-	V
Zero gate voltage drain current	I <sub>DSS</sub>	V <sub>DS</sub> =600V, V <sub>GS</sub> =0V	-	-	1	μA
		V <sub>DS</sub> =480V, T <sub>C</sub> =125°C	-	-	10	μA
Gate-body leakage current	Forward	I <sub>GSS</sub>	-	-	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
On characteristics						
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> =3.75A (Note 4)	-	0.98	1.2	Ω
Dynamic characteristics						
Input capacitance	C <sub>ISS</sub>	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1MHz	-	100	-	pF
Output capacitance	C <sub>OSS</sub>		0	110	-	pF
Reverse transfer capacitance	C <sub>RSS</sub>		-	12	-	pF
Switching characteristics						
Turn-on delay time	t <sub>D(ON)</sub>	V <sub>DD</sub> =300V, R <sub>G</sub> =25Ω, I <sub>D</sub> =7.5A (note4,5)	-	20	-	ns
Rise time	t <sub>R</sub>		-	50	-	ns
Turn-off delay time	t <sub>D(OFF)</sub>		-	80	-	ns
Fall time	t <sub>F</sub>		-	70	-	ns
Total gate charge	Q <sub>G</sub>	V <sub>DS</sub> =480V, V <sub>GS</sub> =10V I <sub>D</sub> =7.5A (note4,5)	-	29	-	nC
Gate-source charge	Q <sub>GS</sub>		-	4.7	-	nC
Gate-drain charge	Q <sub>GD</sub>		-	12.5	-	nC
Drain-source diode characteristics						
Drain-source diode forward voltage	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>SD</sub> =7.5A	-	-	1.4	V
Continuous drain-source current	I <sub>SD</sub>		-	-	7.5	A
Pulsed drain-source current	I <sub>SM</sub>		-	-	30	A
Reverse recovery time	t <sub>RR</sub>	I <sub>SD</sub> =7.5A, di/dt=100A/μA (note4)	-	350	-	ns
Reverse recovery charge	Q <sub>RR</sub>		-	3.3	-	μC

- Note: 1. Repetitive Rating: Pulse width limited by maximum junction temperature  
 2. L=7.3mH, I<sub>AS</sub>=7.5A, V<sub>DD</sub>=50V, R<sub>G</sub>=25Ω, Starting T<sub>J</sub>=25°C  
 3. I<sub>SD</sub>≤7.5A, 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.

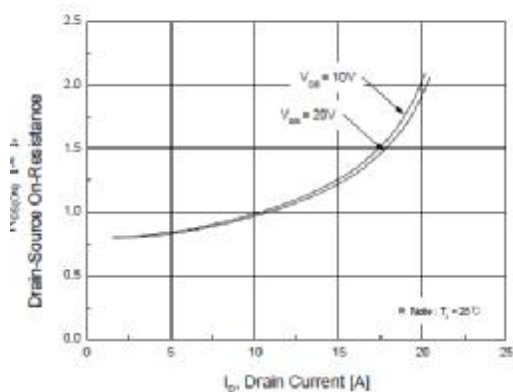
**7. Typical characteristics**



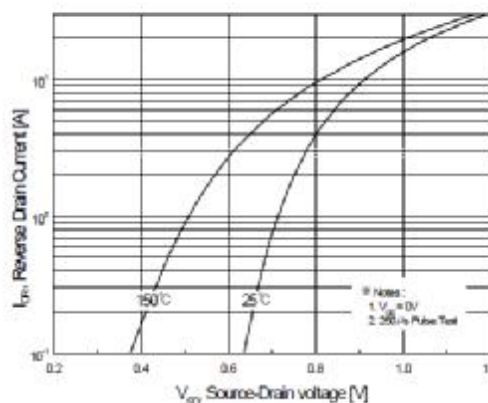
**Figure 1. On-Region Characteristics**



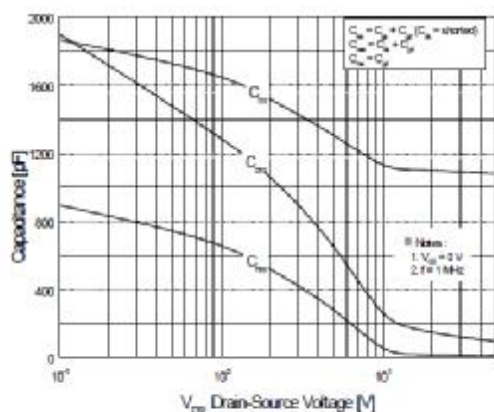
**Figure 2. Transfer Characteristics**



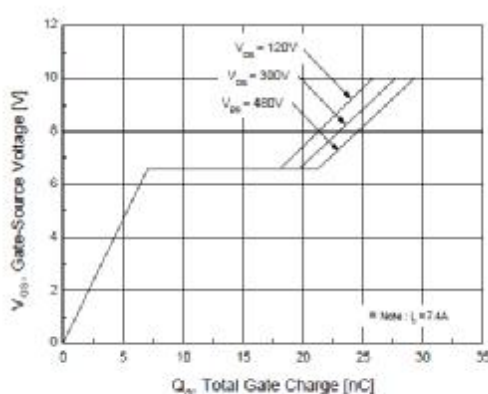
**Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage**



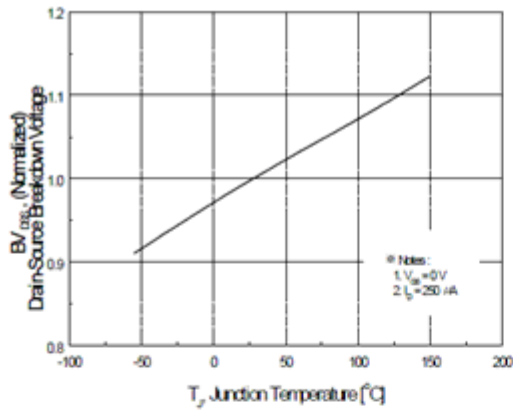
**Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature**



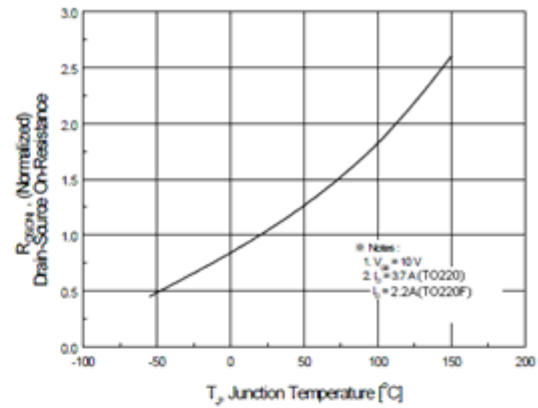
**Figure 5. Capacitance Characteristics**



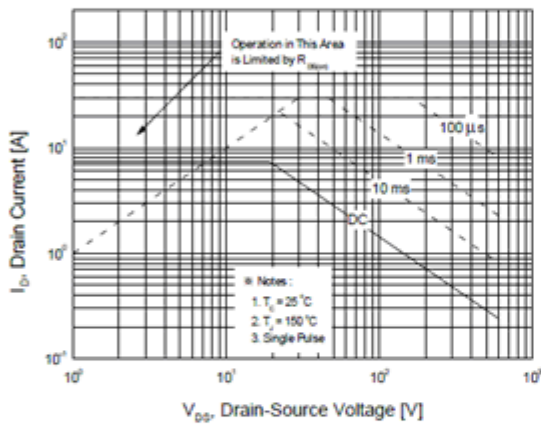
**Figure 6. Gate Charge Characteristics**



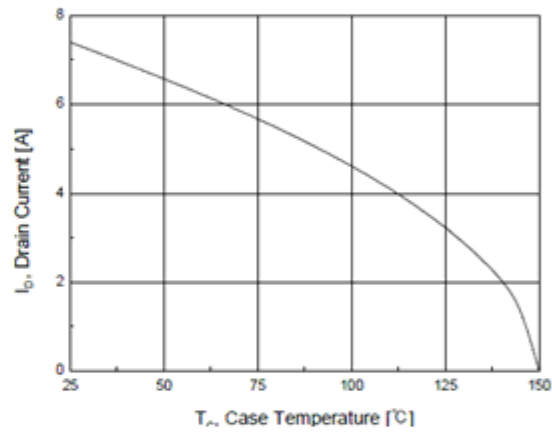
**Figure 7. Breakdown Voltage Variation vs. Temperature**



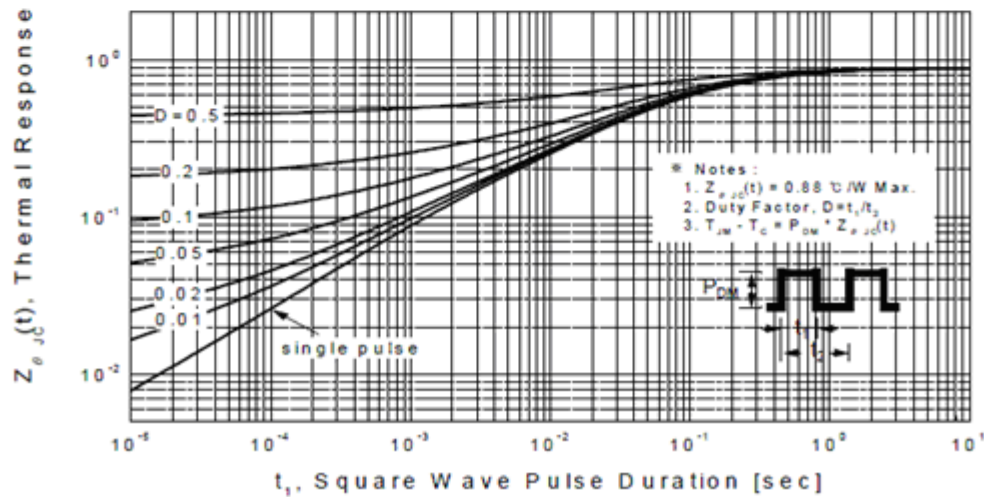
**Figure 8. On-Resistance Variation vs. Temperature.**



**Figure 9. Maximum Safe Operating Area**



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



**Figure 11-1. Transient Thermal Response Curve for TO220**

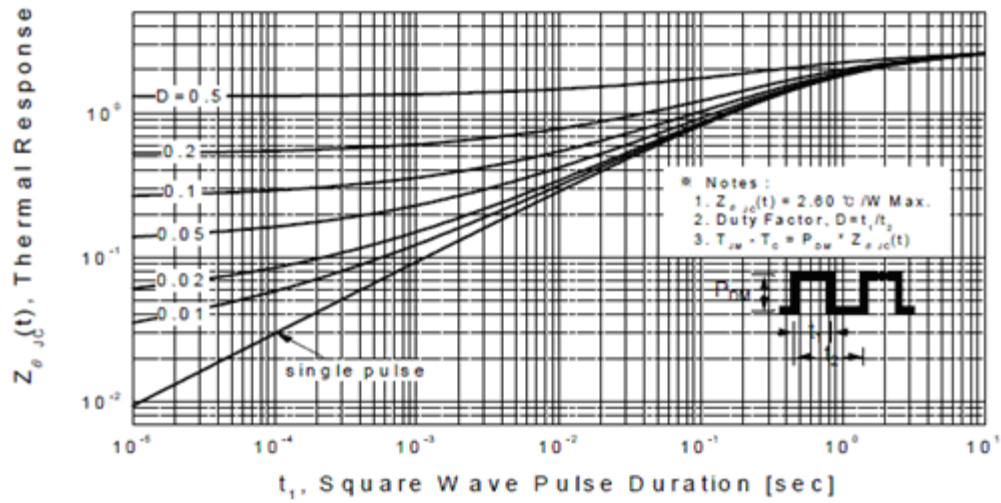


Figure 11-2. Transient Thermal Response Curve for TO220F