

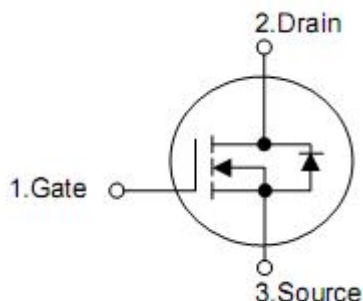
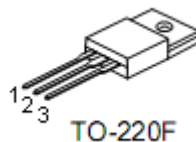
## 1. Description

The KIA3N80H 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

- $R_{DS(on)}=4.8\Omega @ V_{GS}=10V$
- Low gate charge ( typical 13nC)
- High ruggedness
- Fast switching capability
- Avalanche energy specified
- Improved dv/dt capability

## 3. Pin configuration



Pin	Function
1	Gate
2	Drain
3	Source

## 4. Absolute maximum ratings

( $T_C = 25\text{ }^\circ\text{C}$ , unless otherwise specified)

Parameter	Symbol	Rating	Units
Drain-source voltage	$V_{DSS}$	800	V
Gate-source voltage	$V_{GSS}$	+30	V
Drain current continuous	$I_D$	$T_C=25^\circ\text{C}$	3
		$T_C=100^\circ\text{C}$	1.9
Drain current pulsed (note1)	$I_{DP}$	12	A
Avalanche energy	Repetitive (note1)	$E_{AR}$	10.7
	Single pulse (note2)	$E_{AS}$	320
Peak diode recovery dv/dt (note3)	dv/dt	4.5	V/ns
Total power dissipation	$P_D$	$T_C=25\text{ }^\circ\text{C}$	39
		derate above $25\text{ }^\circ\text{C}$	0.31
Junction temperature	$T_J$	+150	$^\circ\text{C}$
Storage temperature	$T_{STG}$	-55~+150	$^\circ\text{C}$

## 5. Thermal characteristics

Parameter	Symbol	Rating	Unit
Thermal resistance,Junction-ambient	$R_{thJA}$	62.5	$^\circ\text{C/W}$
Thermal resistance,case-to-sink typ.	$R_{thCS}$	-	$^\circ\text{C/W}$
Thermal resistance,Junction-case	$R_{thJC}$	3.2	$^\circ\text{C/W}$

## 6. Electrical characteristics

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

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Off characteristics						
Drain-source breakdown voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	800	-	-	V
Zero gate voltage drain current	I <sub>DSS</sub>	V <sub>DS</sub> =800V, V <sub>GS</sub> =0V	-	-	1	μA
		V <sub>DS</sub> =640V, 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	-	1	-	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	-	5.0	V
Static drain-source on-resistance	R <sub>DS(on)</sub>	V <sub>DS</sub> =10V, I <sub>D</sub> =1.5A	-	4.0	4.8	Ω
Dynamic characteristics						
Input capacitance	C <sub>iss</sub>	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1MHz	-	543	705	pF
Output capacitance	C <sub>oss</sub>		-	54	70	pF
Reverse transfer capacitance	C <sub>rss</sub>		-	5.5	7.5	pF
Switching characteristics						
Turn-on delay time	t <sub>d(on)</sub>	V <sub>DD</sub> =400V, I <sub>D</sub> =3.0A, R <sub>G</sub> =25Ω (note4,5)	-	15	40	ns
Rise time	t <sub>r</sub>		-	43.5	95	ns
Turn-off delay time	t <sub>d(off)</sub>		-	22.5	55	ns
Fall time	t <sub>f</sub>		-	32	75	ns
Total gate charge	Q <sub>g</sub>	V <sub>DS</sub> =640V, I <sub>D</sub> =3.0A, V <sub>GS</sub> =10V (note4,5)	-	13	16.5	nC
Gate-source charge	Q <sub>gs</sub>		-	3.4	-	nC
Gate-drain charge	Q <sub>gd</sub>		-	5.8	-	nC
Drain-source diode characteristics						
Drain-source diode forward voltage	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>SD</sub> =3.0A	-	-	1.4	V
Continuous drain-source current	I <sub>SD</sub>		-	-	3.0	A
Pulsed drain-source current	I <sub>SM</sub>		-	-	12.0	A
Reverse recovery time	t <sub>rr</sub>	V <sub>GS</sub> =0V, I <sub>SD</sub> =3.0A di <sub>SD</sub> /dt=100A/μs (note4)	-	642	-	ns
Reverse recovery charge	Q <sub>rr</sub>		-	4.0	-	μC

Note: 1. repetitive rating: pulse width limited by maximum junction temperature

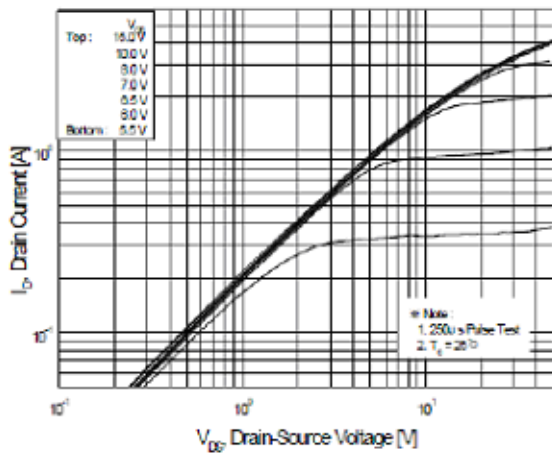
2. L=67mH, I<sub>AS</sub>=3.0A, V<sub>DD</sub>=50V, R<sub>G</sub>=25Ω, starting T<sub>J</sub>=25°C

3. I<sub>SD</sub>≤3.0A, di/dt≤200A/μs, V<sub>DD</sub>≤BV<sub>DSS</sub>, starting T<sub>J</sub>=25 °C

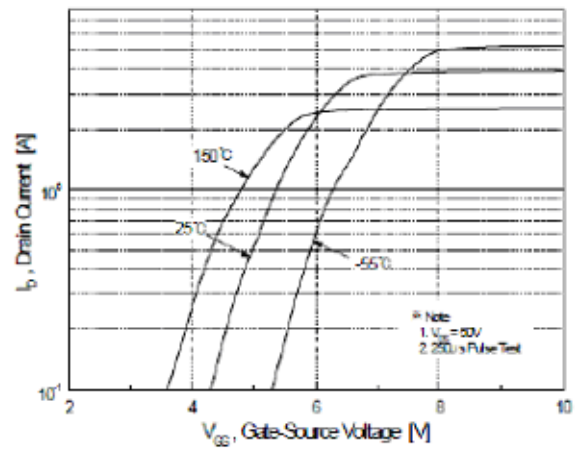
4. Pulse test: pulse width≤300μs, duty cycle≤2%

5. Essentially independent of operating temperature

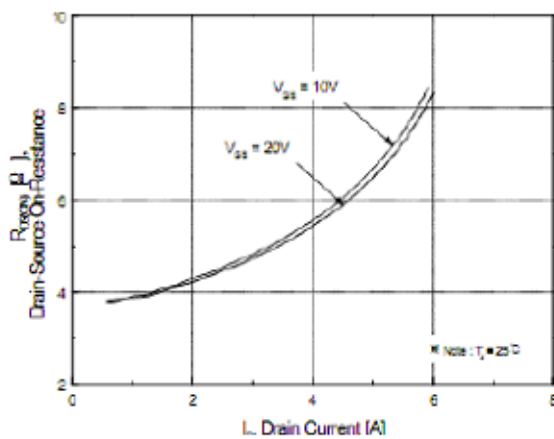
**7. Test circuits and waveforms**



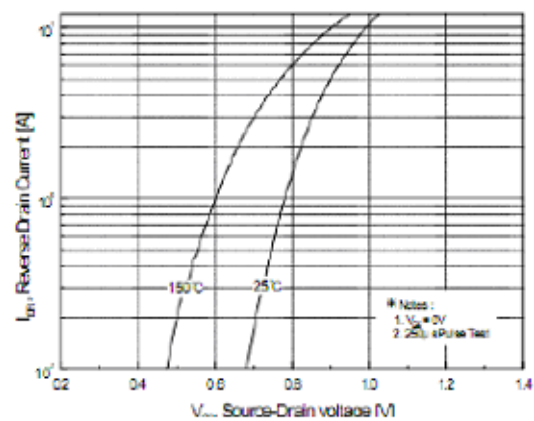
**Figure 1. On-Region Characteristics**



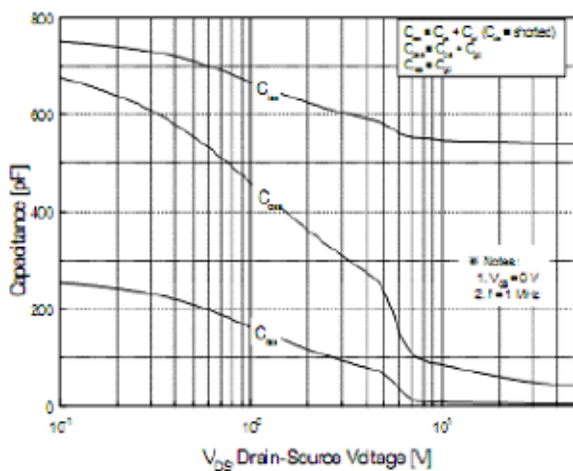
**Figure 2. Transfer Characteristics**



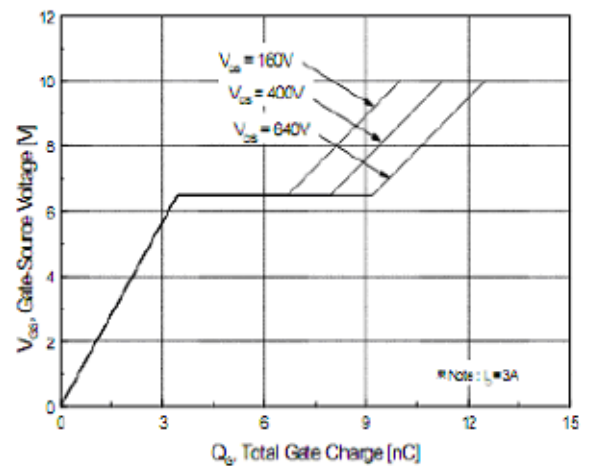
**Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage**



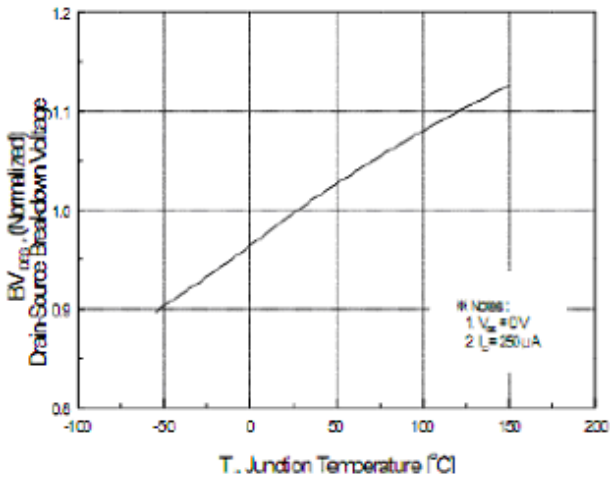
**Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature**



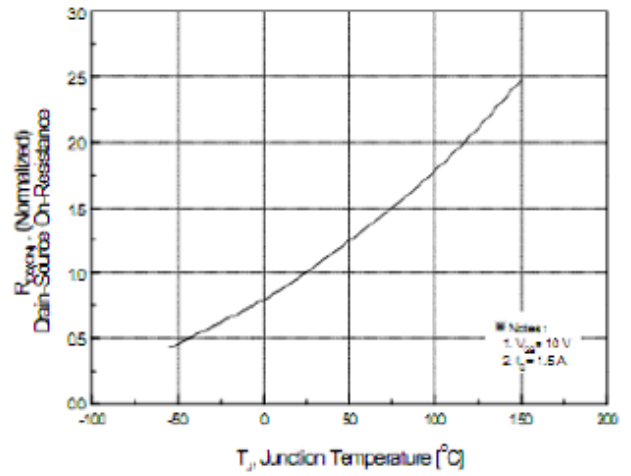
**Figure 5. Capacitance Characteristics**



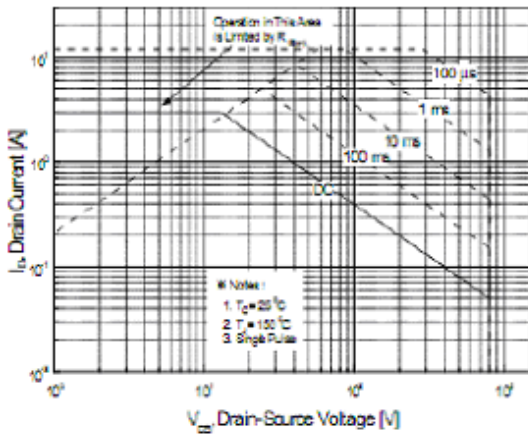
**Figure 6. Gate Charge Characteristics**



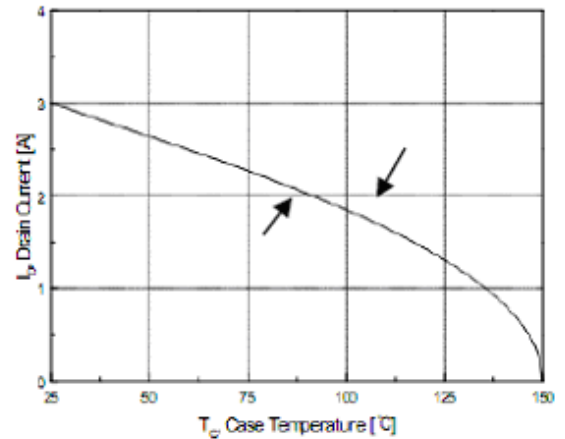
**Figure 7. Breakdown Voltage Variation**



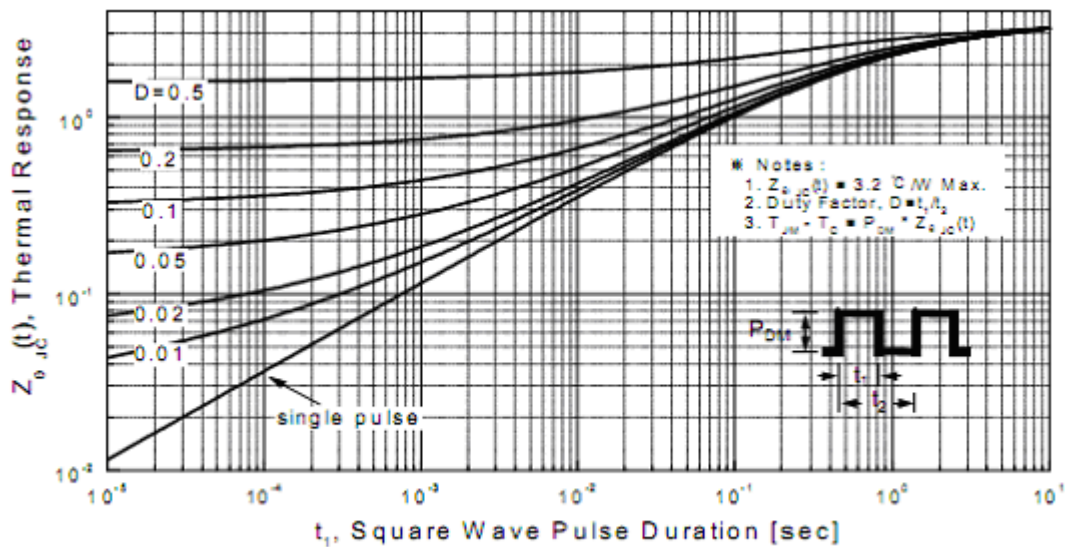
**Figure 8. On-Resistance Variation vs Temperature**



**Figure 9 . Maximum Safe Operating Area**



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



**Figure 11. Transient Thermal Response Curve**