

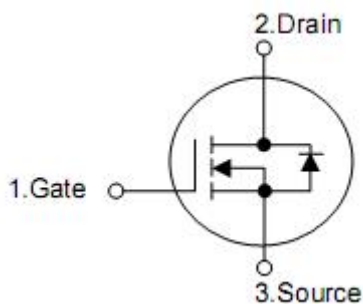
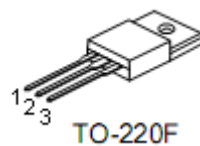
## 1. Description

The KIA10N65H N-Channel enhancement mode silicon gate power MOSFET is designed for high voltage, high speed power switching applications such as high efficiency switched mode power supplies, active power factor correction, electronic lamp ballasts based on half bridge to pology.

## 2. Features

- n  $R_{DS(on)}=0.65\Omega$  @  $V_{GS}=10V$
- n Low gate charge ( typical 48nC)
- 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

(TC= 25 °C , unless otherwise specified)

Parameter	Symbol	Rating	Units
Drain-source voltage	$V_{DSS}$	650	V
Gate-source voltage	$V_{GSS}$	$\pm 30$	V
Drain current continuous	$I_D$	$T_C=25^\circ\text{C}$	10.0*
		$T_C=100^\circ\text{C}$	6.0*
Drain current pulsed (note1)	$I_{DP}$	40.0*	A
Avalanche energy	Repetitive (note1)	$E_{AR}$	16.2
	Single pulse (note2)	$E_{AS}$	709
Peak diode recovery dv/dt (note3)	dv/dt	4.5	V/ns
Total power dissipation	$P_D$	$T_C=25^\circ\text{C}$	52
		derate above 25 °C	0.42
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
Thermal resistance,Junction-ambient	$R_{thJA}$	62.5	°C/W
Thermal resistance,case-to-sink typ.	$R_{thCS}$	-	°C/W
Thermal resistance,Junction-case	$R_{thJC}$	2.4	°C/W

## 6. Electrical characteristics

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

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
<b>Off characteristics</b>						
Drain-source breakdown voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	650	-	-	V
Zero gate voltage drain current	I <sub>DSS</sub>	V <sub>DS</sub> =650V, 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	-	0.7	-	V/°C
<b>On characteristics</b>						
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> =5.0A	-	0.65	0.75	Ω
<b>Dynamic characteristics</b>						
Input capacitance	C <sub>iss</sub>	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1MHz	-	1650	-	pF
Output capacitance	C <sub>oss</sub>		-	1665	-	pF
Reverse transfer capacitance	C <sub>rss</sub>		-	18	-	pF
<b>Switching characteristics</b>						
Turn-on delay time	t <sub>d(on)</sub>	V <sub>DD</sub> =325V, I <sub>D</sub> =10.0A, R <sub>G</sub> =25Ω (note4,5)	-	25	-	ns
Rise time	t <sub>r</sub>		-	70	-	ns
Turn-off delay time	t <sub>d(off)</sub>		-	140	-	ns
Fall time	t <sub>f</sub>		-	80	-	ns
Total gate charge	Q <sub>g</sub>	V <sub>DS</sub> =520V, I <sub>D</sub> =10.0A , V <sub>GS</sub> =10V (note4,5)	-	48	-	nC
Gate-source charge	Q <sub>gs</sub>		-	7.0	-	nC
Gate-drain charge	Q <sub>gd</sub>		-	18.0	-	nC
<b>Drain-source diode characteristics</b>						
Drain-source diode forward voltage	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>SD</sub> =10.0A	-	-	1.4	V
Continuous drain-source current	I <sub>SD</sub>		-	-	10.0	A
Pulsed drain-source current	I <sub>SM</sub>		-	-	40.0	A
Reverse recovery time	t <sub>rr</sub>	I <sub>SD</sub> =10.0A dI <sub>SD</sub> /dt=100A/μs (note4)	-	430	-	ns
Reverse recovery charge	Q <sub>rr</sub>		-	4.3	-	μC

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

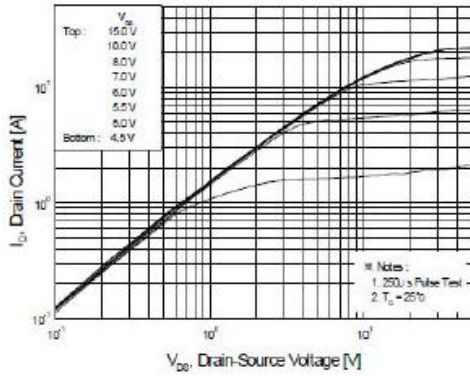
2. L=13mH, I<sub>AS</sub>=10.0A, V<sub>DD</sub>=50V, R<sub>G</sub>=25Ω, starting T<sub>J</sub>=25°C

3. I<sub>SD</sub>≤10.0, di/dt≤200A/μs, V<sub>DD</sub>≤BV<sub>DSS</sub>, starting T<sub>J</sub>=25 °C

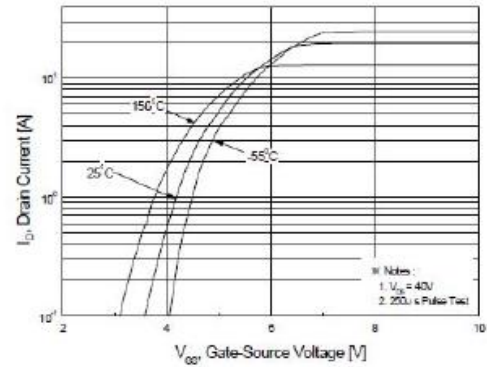
4. Pulse test: pulse width≤300μs, duty cycle≤2%

5. Essentially independent of operating temperature

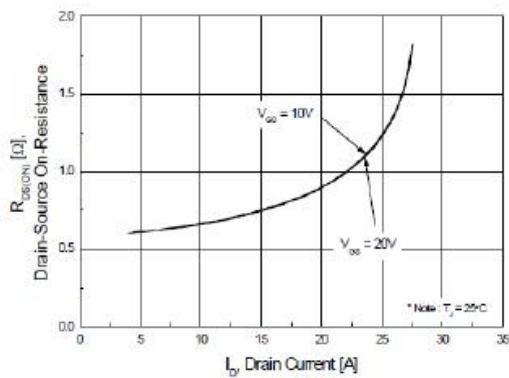
**7. Test circuits and waveforms**



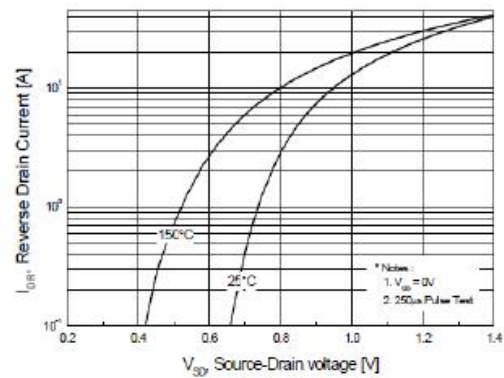
**Figure 1. On-Region Characteristics**



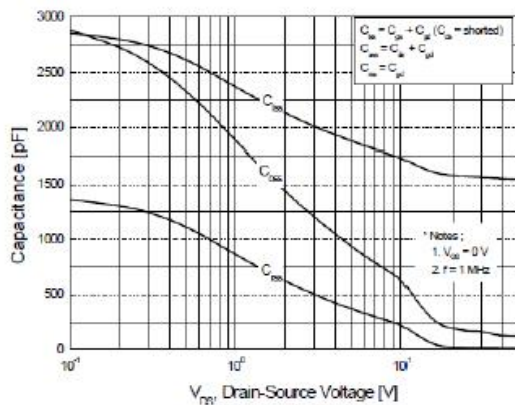
**Figure 2. Transfer Characteristics**



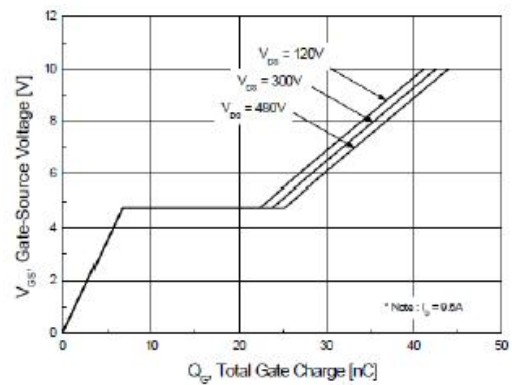
**Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage**



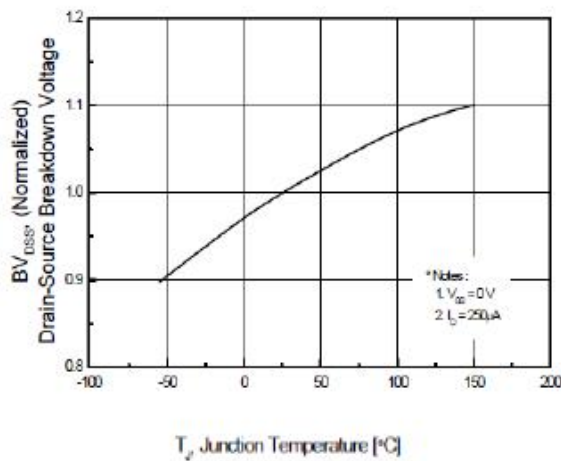
**Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature**



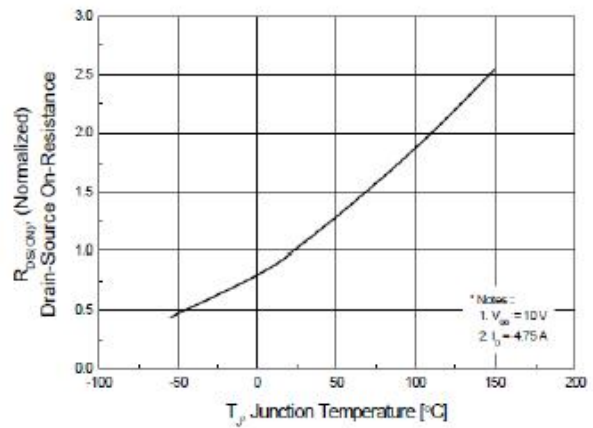
**Figure 5. Capacitance Characteristics**



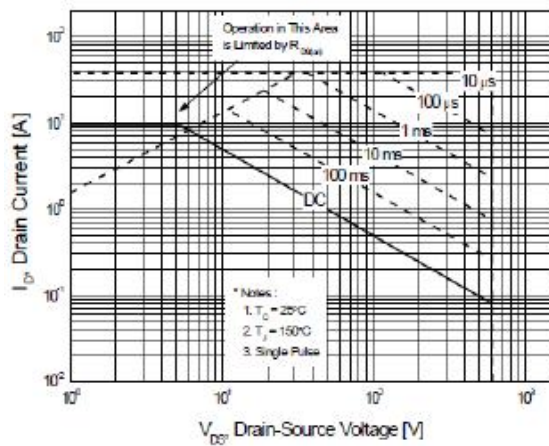
**Figure 6. Gate Charge Characteristics**



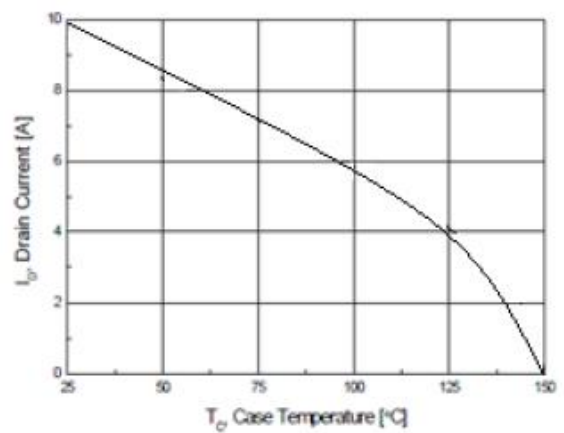
**Figure 7. Breakdown Voltage Variation vs Temperature**



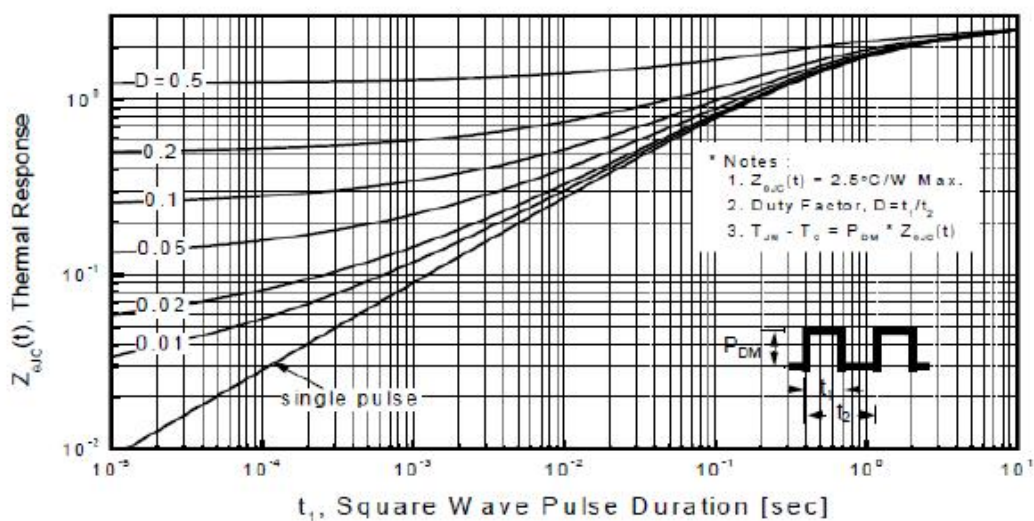
**Figure 8. On-Resistance Variation vs Temperature**



**Figure 9. Maximum Safe Operating Area**



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



**Figure 11. Transient Thermal Response Curve for TO220F**