KIA

SEMICONDUCTORS

10A，800V
N-CHANNEL MOSFET

10N80H

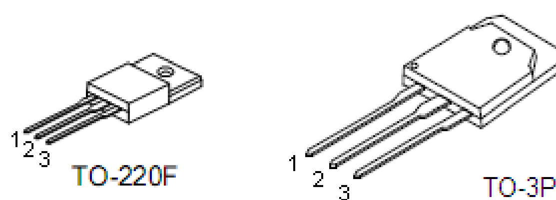
1. Description

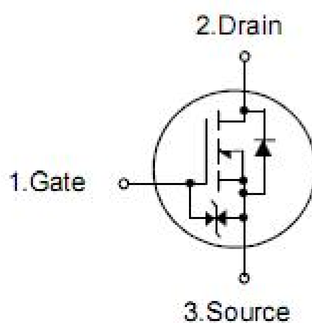
This Power MOSFET is produced using KIA advanced planar stripe DMOS technology. This advanced has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency switched mode power supplies, active power factor correction based on half bridge topology.

2. Features

- $R_{DS(on)}$=0.85Ω @ V_{GS}=10V
- Low gate charge (typical 63nC)
- High ruggedness
- Fast switching capability
- Avalanche energy specified
- Improved dv/dt capability
- ESD improved capability

3. Pin configuration





Pin	Function
1	Gate
2	Drain
3	Source

4. Absolute maximum ratings

(T_C= 25 ºC , unless otherwise specified)

Parameter		Symbol	Ratings TO-220F	Ratings TO-3P	Units
Drain-source voltage		V_{DSS}	800		V
Gate-source voltage		V_{GSS}	±25		V
Drain current continuous	T_C=25ºC	I_D	10*	10	A
	T_C=100ºC		6 *	6	A
Drain current pulsed (note1)		I_{DP}	40		A
Avalanche energy	Repetitive (note1)	E_{AR}	30.5		mJ
	Single pulse (note2)	E_{AS}	350		mJ
Peak diode recovery dv/dt (note 3)		dv/dt	4.5		V/ns
Total power dissipation	T_C=25ºC	P_D	42	305	W
	derate above 25ºC		0.34	2.44	W/ºC
Junction temperature		T_J	+150		ºC
Storage temperature		T_{STG}	-55~+150		ºC

* Drain current limited by maximum junction temperature.

5. Thermal characteristics

Parameter	Symbol	Ratings TO-220F	Ratings TO-3P	Units
Thermal resistance,junction-ambient	R_{thJA}	62.5		ºC/W
Thermal resistance,case-to-sink typ.	R_{thCS}	-		ºC/W
Thermal resistance,Junction-case	R_{thJC}	2.95	0.4	ºC/W

6. Electrical characteristics

(T_J=25°C,unless otherwise specified)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Off characteristics						
Drain-source breakdown voltage	BV_{DSS}	V_{GS}=0V,I_D=250μA	800	-	-	V
Zero gate voltage drain current	I_{DSS}	V_{DS}=800V ,V_{GS}=0V	-	-	1	μA
		V_{DS}=640V ,T_C=125 ºC	-	-	10	μA
Gate-body leakage current — Forward	I_{GSS}	V_{GS}=25V,V_{DS}=0V	-	-	10	uA
Gate-body leakage current — Reverse		V_{GS}=-25V,V_{DS}=0V	-	-	-10	uA
Breakdown voltage temperature coefficient	$\triangle BV_{DSS}/\triangle T_J$	I_D=250μA	-	0.8	-	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_{DS}=10V,I_D=5A	-	0.85	1.1	Ω
Dynamic characteristics						
Input capacitance	C_{iss}	V_{DS}=25V,V_{GS}=0V, f=1MHz	-	2230	-	pF
Output capacitance	C_{oss}		-	135	-	pF
Reverse transfer capacitance	C_{rss}		-	74	-	pF
Switching characteristics						
Turn-on delay time	$t_{d(on)}$	V_{DD}=400V,I_D=10A, R_G=25Ω (note4,5)	-	25	-	ns
Rise time	t_r		-	35	-	ns
Turn-off delay time	$t_{d(off)}$		-	225	-	ns
Fall time	t_f		-	145	-	ns
Total gate charge	Q_g	V_{DS}=640V,I_D=10A , V_{GS}=10V (note4,5)	-	63	-	nC
Gate-source charge	Q_{gs}		-	10	-	nC
Gate-drain charge	Q_{gd}		-	25	-	nC
Drain-source diode characteristics						
Drain-source diode forward voltage	V_{SD}	V_{GS}=0V,I_D=10A	-	-	1.4	V
Continuous drain-source current	I_{SD}		-	-	9	A
Pulsed drain-source current	I_{SM}		-	-	36	A
Reverse recovery time	t_{rr}	I_{SD}=10A dI_{SD}/dt=100A/μs (note4)	-	850	-	ns
Reverse recovery charge	Q_{rr}		-	10	-	μC

Note: 1Repetitive rating: pulse width limited by maximum junction temperature

2. L=6.3mH, I_{AS}=10A,V_{DD}=50V,R_G=25Ω,staring T_J=25ºC
3. I_{SD}≤9A,di/dt≤200A/μs, V_{DD}≤BV_{DSS}, staring T_J=25 ºC
4. Pulse test: pulse width≤300μs,duty cycle≤2%
5. Essentially independent of operating temperature

7.Typical characteristics

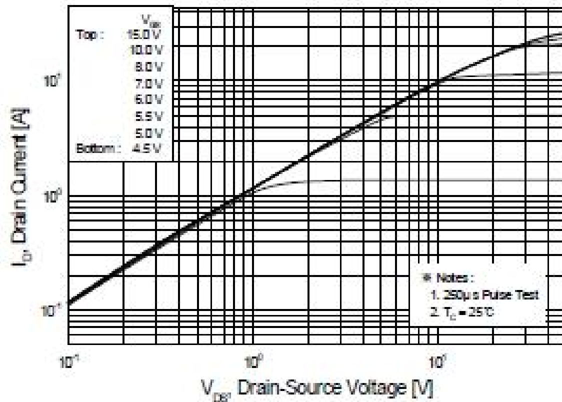


Figure 1. On-Region Characteristics

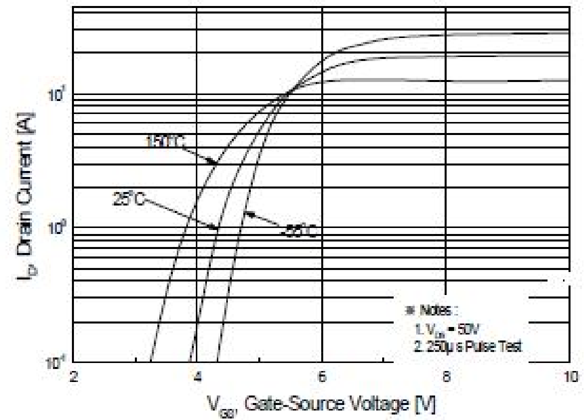


Figure 2. Transfer Characteristics

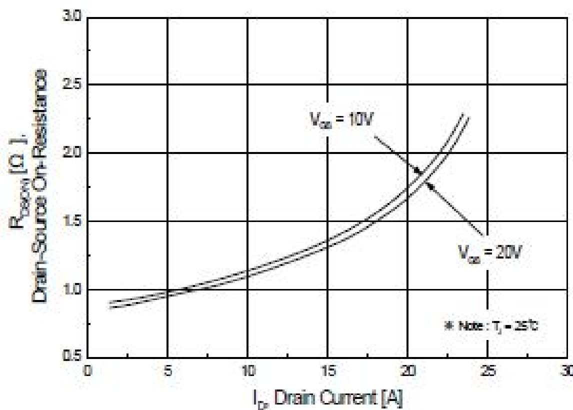


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

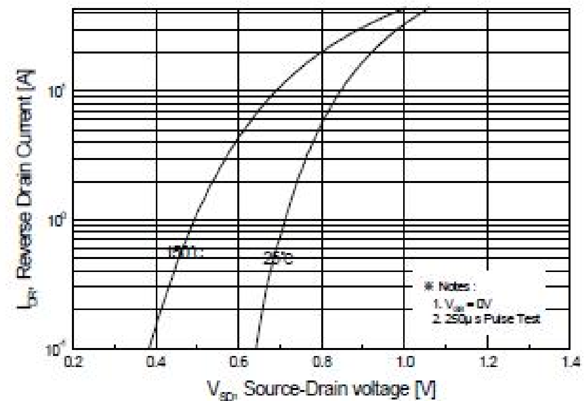


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

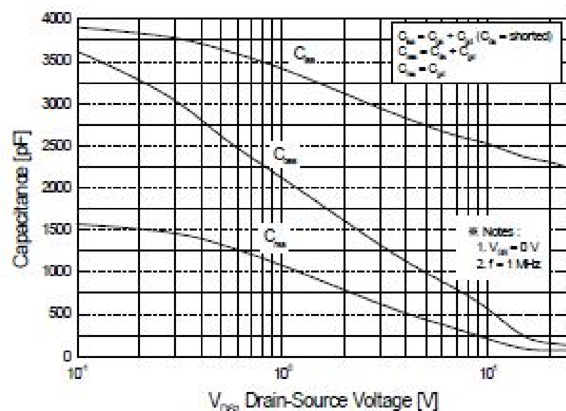


Figure 5. Capacitance Characteristics

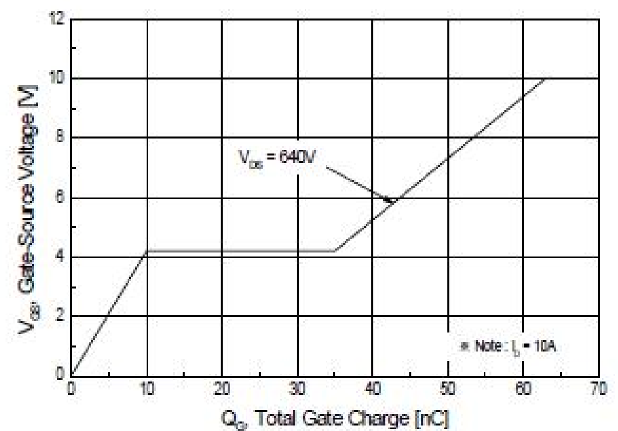


Figure 6. Gate Charge Characteristics

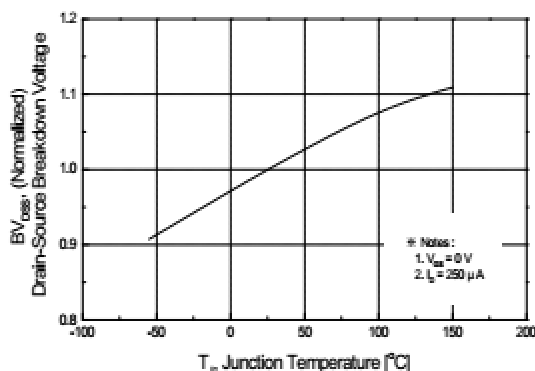


Figure 7. Breakdown Voltage Variation vs Temperature

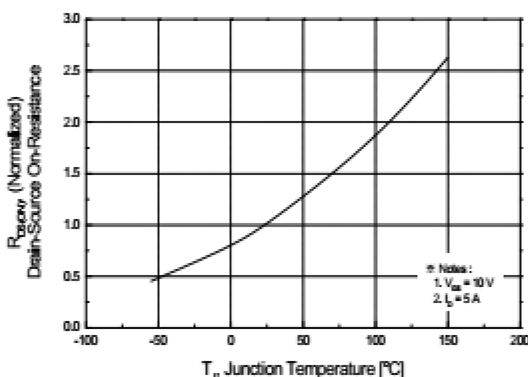


Figure 8. On-Resistance Variation vs Temperature

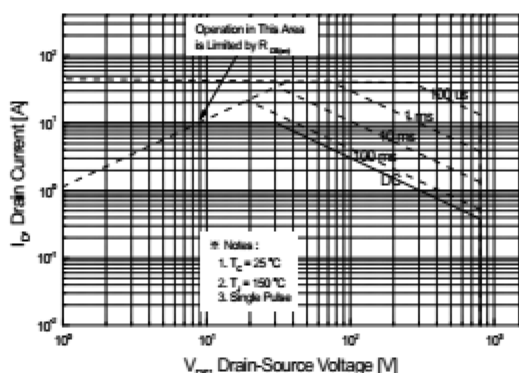


Figure 9. Maximum Safe Operating Area

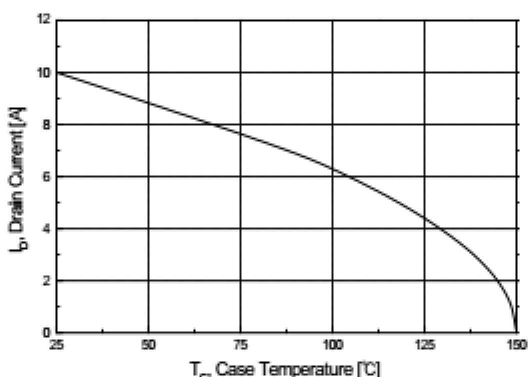


Figure 10. Maximum Drain Current vs Case Temperature

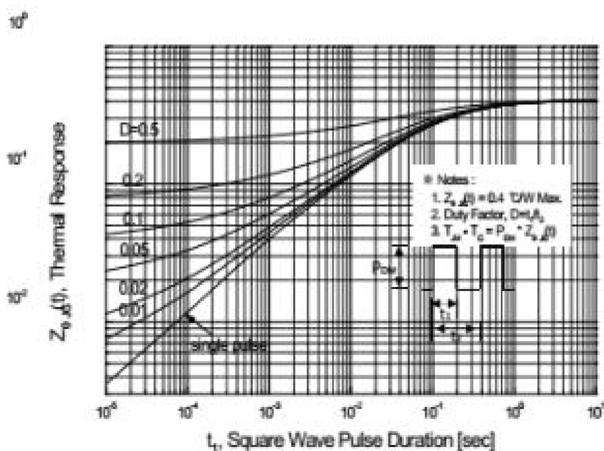


Figure 11-1. Transient Thermal Response Curve for TO-3P

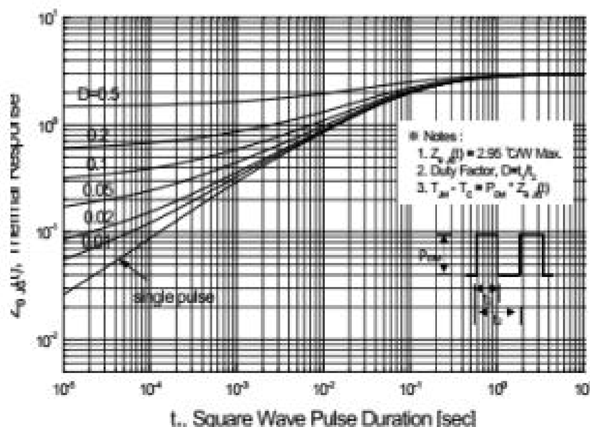


Figure 11-2. Transient Thermal Response Curve for TO-220F