

1. Features

- Advanced Planar Process
- $R_{DS(ON)}=0.6\Omega(\text{typ.})@V_{GS}=10V$
- RoHS Compliant
- Low Gate Charge Minimize Switching Loss
- Fast Recovery Body Diode

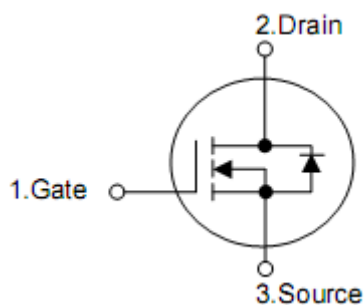
2. Applications

- Adaptor
- Charger
- SMPS Standby Power

3. Pin configuration



TO-220F



Pin	Function
1	Gate
2	Drain
3	Source

4. Ordering Information

Part Number	Package	Brand
KNF12N65	TO-220F	KIA

5. Absolute maximum ratings

(T_c= 25 °C, unless otherwise specified)

Parameter	Symbol	Ratings	Unit
Drain-to-Source Voltage ¹⁾	V _{DSS}	650	V
Gate-to-Source Voltage	V _{GSS}	±30	V
Continuous Drain Current	I _D	12	A
Pulsed Drain Current at V _{GS} =10V	I _{DM}	48	A
Single Pulse Avalanche Energy	EAS	450	mJ
Power Dissipation	P _D	73	W
Derating Factor above 25°C	P _D	0.58	W/°C
Soldering Temperature Distance of 1.6mm from case for 10 seconds	T _L	300	°C
Operating and Storage Temperature Range	T _J &T _{STG}	-55 to 150	°C

Caution: Stresses greater than those in the “Absolute Maximum Ratings” may cause permanent damage to the device.

6. Thermal characteristics

Parameter	Symbol	Ratings	Unit
Thermal Resistance, Junction-to-Case	R _{θJC}	1.71	°C/W
Thermal Resistance, Junction-to-Ambient	R _{θJA}	100	°C/W

7. Electrical characteristics

(T_J=25°C, unless otherwise specified)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Drain-to-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250uA	650	-	-	V
Drain-to-Source Leakage Current	I _{DSS}	V _{DS} =650V, V _{GS} =0V	-	-	1	uA
		V _{DS} =520V, V _{GS} =0V T _J =125°C	-	-	100	uA
Gate-to-Source Leakage Current	I _{GSS}	V _{GS} =±30V, V _{DS} =0V	-	-	±100	nA
Drain-to-Source ON Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =6A	-	0.6	0.75	Ω
Gate Threshold Voltage	V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250uA	2.0	-	4.0	V
Forward Transconductance	g _{fs}	V _{DS} =15V, I _D =6A	-	5.2	-	S
Input Capacitance	C _{iss}	V _{GS} =0V, V _{DS} =25V, f=1.0MHZ	-	1800	-	pF
Reverse Transfer Capacitance	C _{oss}		-	140	-	
Output Capacitance	C _{rss}		-	30	-	
Total Gate Charge	Q _g	V _{DD} =480V, I _D =12A, V _{GS} =0 to 10V	-	50	-	nC
Gate-to-Source Charge	Q _{gs}		-	8	-	
Gate-to-Drain (Miller) Charge	Q _{gd}		-	18	-	
Turn-on Delay Time	t _{d(ON)}	V _{DD} =300V, I _D =12A, R _G =25Ω, V _{GS} =10V	-	23	-	nS
Rise Time	t _{rise}		-	38	-	
Turn-Off Delay Time	t _{d(OFF)}		-	145	-	
Fall Time	t _{fall}		-	58	-	
Continuous Source Current ²⁾	I _{SD}	Integral PN-diode in MOSFET	-	-	12	A
Pulsed Source Current ²⁾	I _{SM}		-	-	48	A
Forward Voltage	V _{SD}	I _S =12A, V _{GS} =0V	-	-	1.4	V
Reverse recovery time	t _{rr}	I _F =I _S , V _{GS} =0V di/dt=100A/us,	-	420	-	ns
Reverse recovery charge	Q _{rr}		-	6.0	-	uC

Note:

1) T_J=+25°C to +150.

2) Pulse width≤380us; duty cycle≤2%.

8. Typical Characteristics

Figure 1. Output Characteristics ($T_J = 25^\circ\text{C}$)

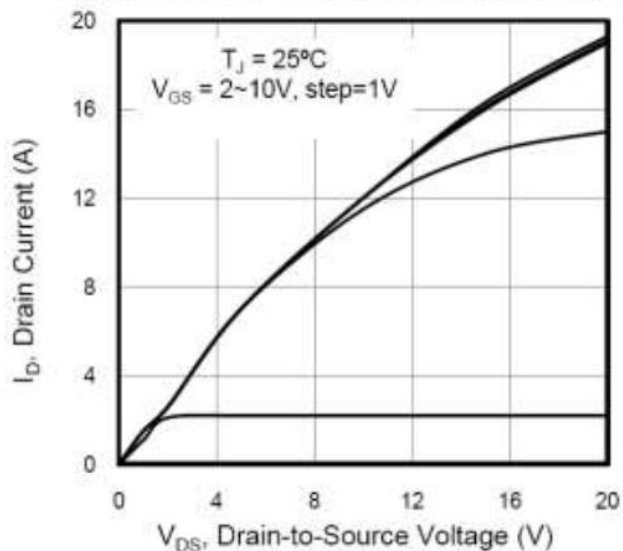


Figure 2. On-Resistance vs. Drain Current

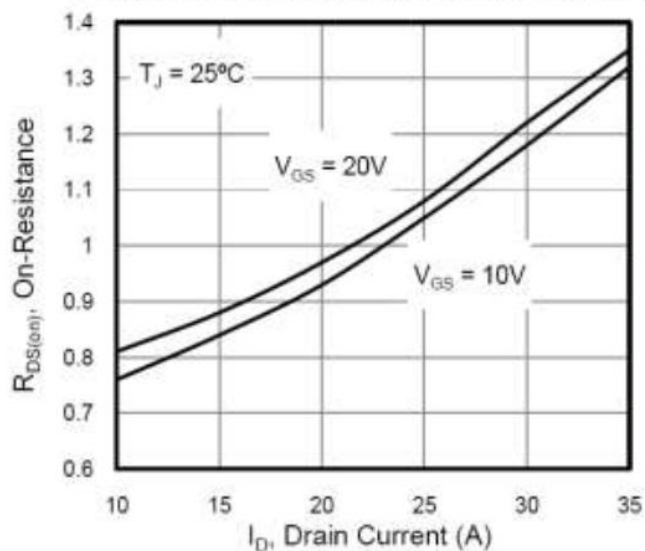


Figure 3. BV_{DSS} vs. Temperature

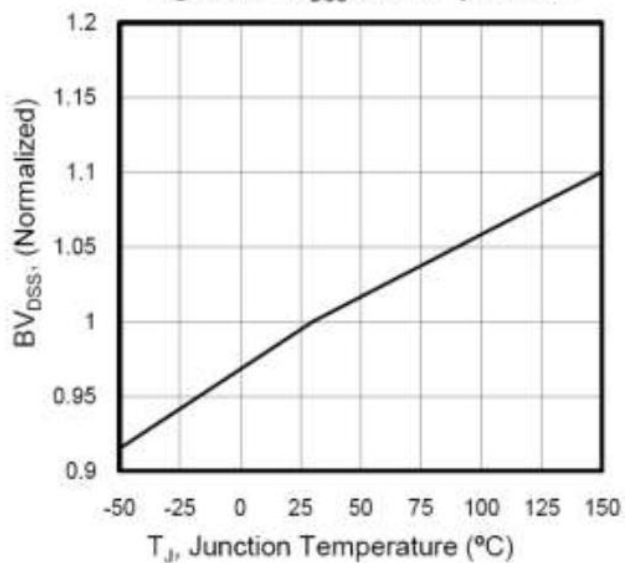


Figure 4. On-Resistance vs. Temperature

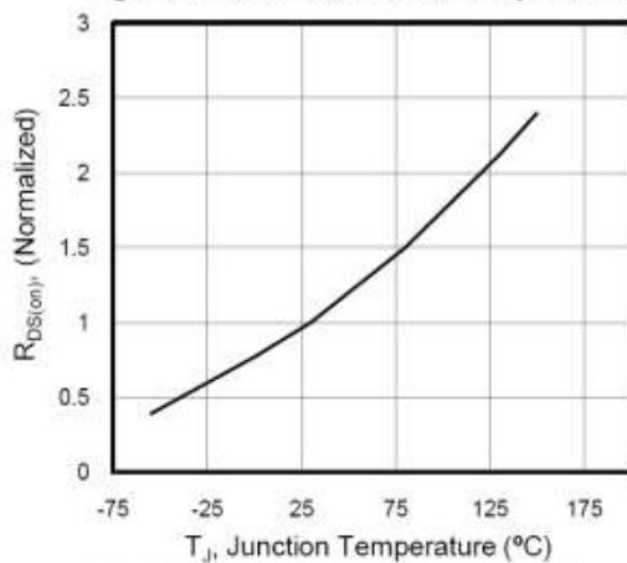


Figure 5. Gate Charge

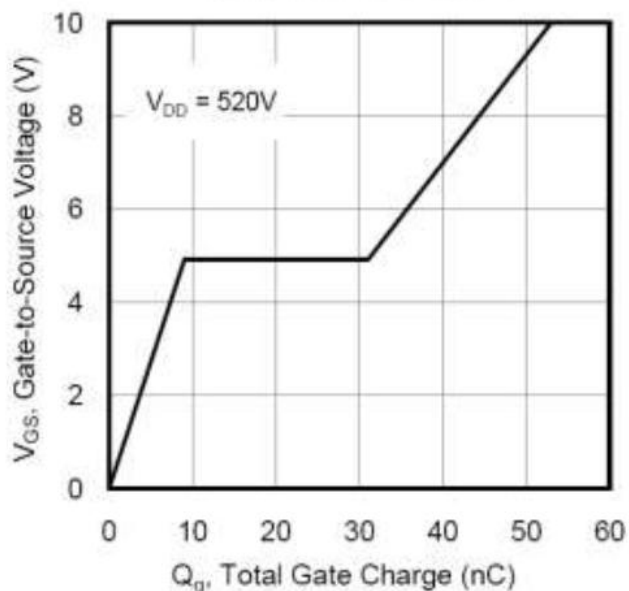


Figure 6. Body Diode Forward Voltage

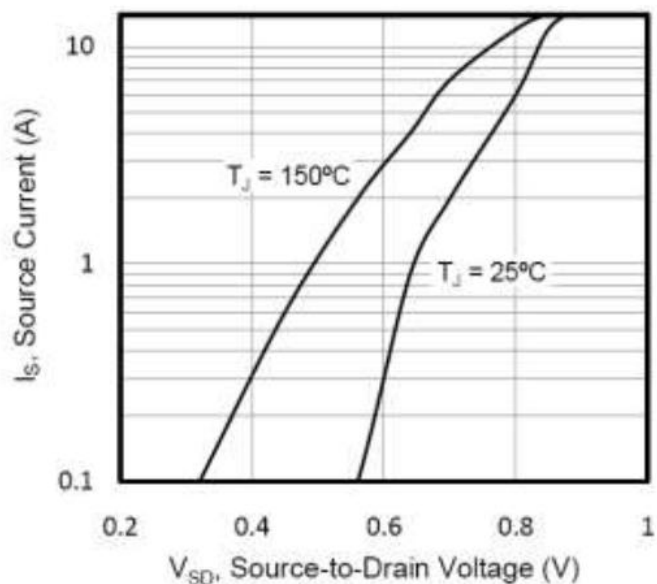


Figure 7. Safe Operating Area

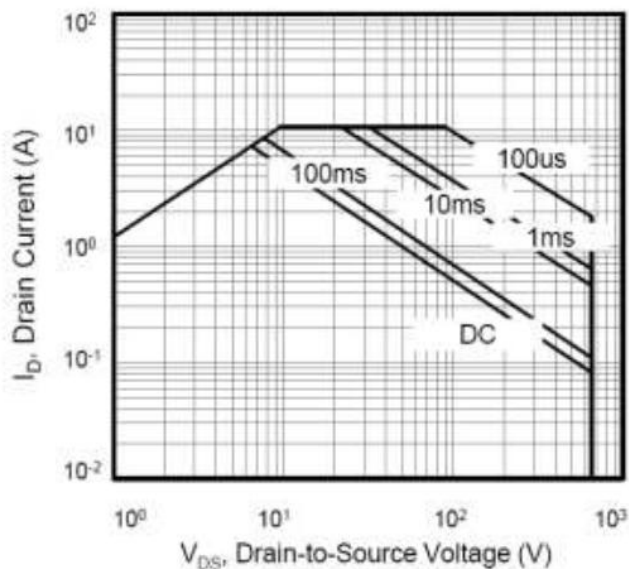
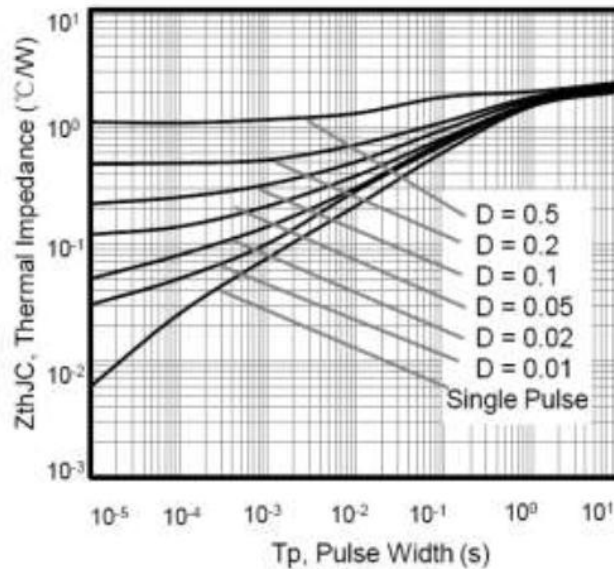
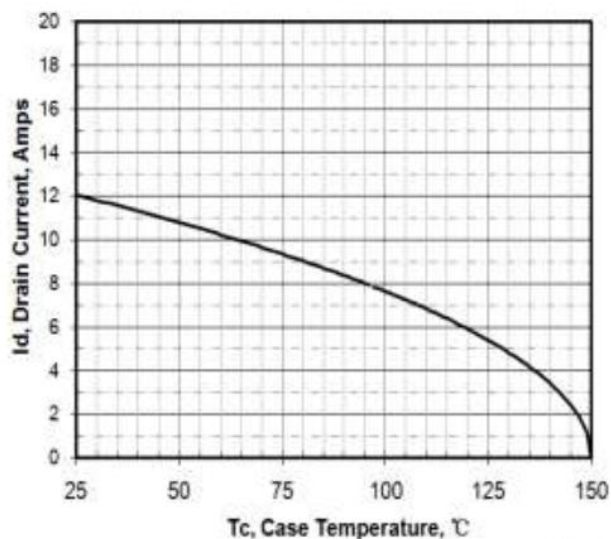


Figure 8. Transient Thermal Impedance



**Figure 9 .Maximum Continuous
Drain Current vs Tc**



**Figure 10 . Max. Power
Dissipation vs Tc**

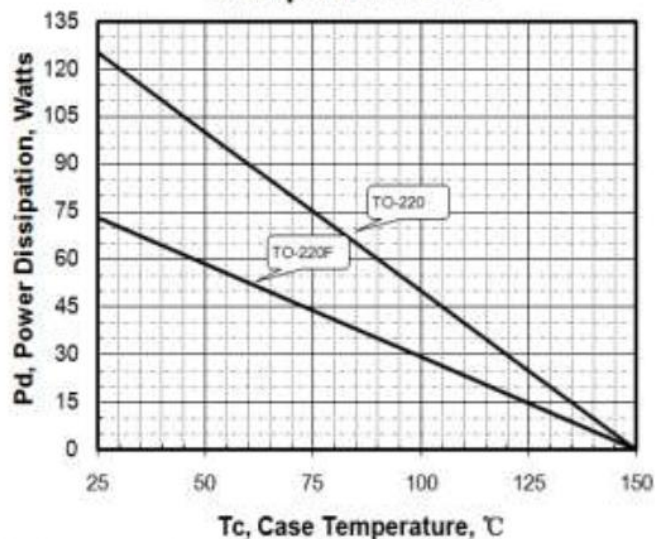
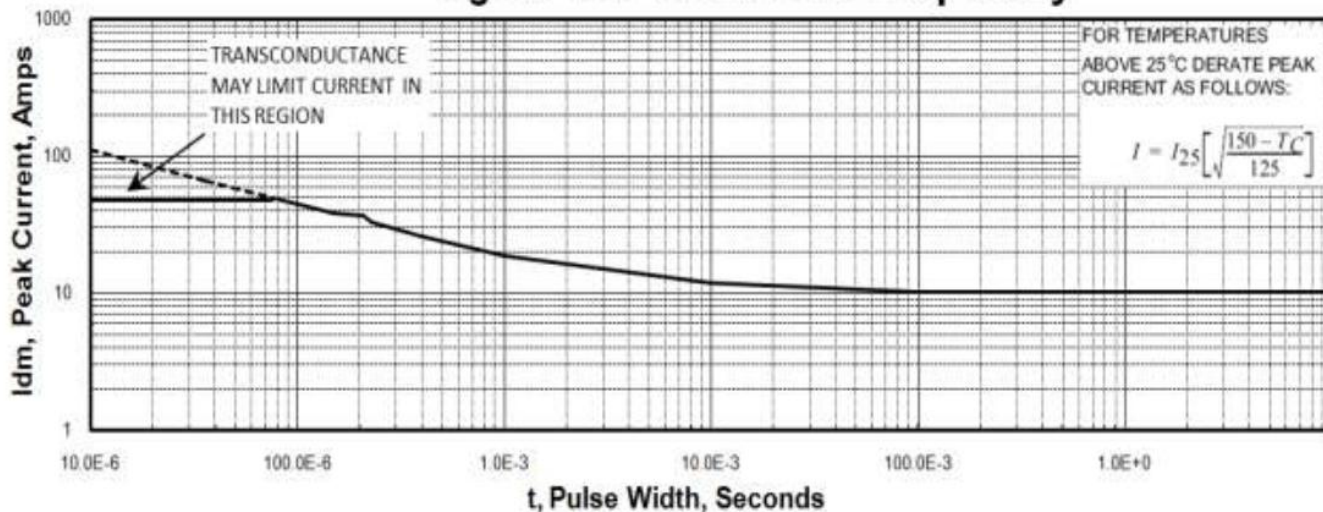


Figure 11. Peak Current Capability



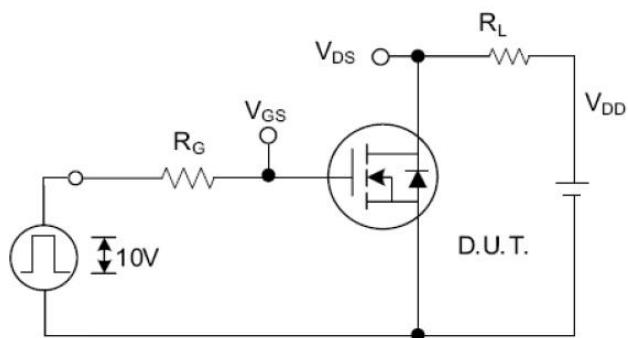


Fig. 2.1 Switching Test Circuit

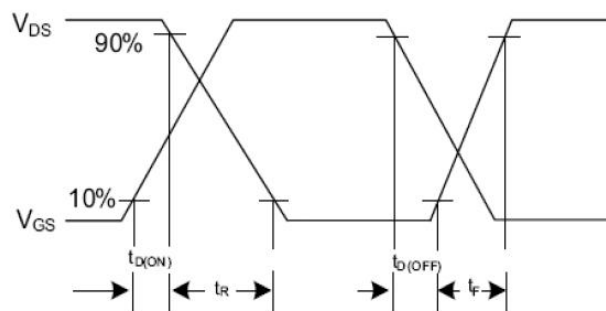


Fig. 2.2 Switching Waveforms

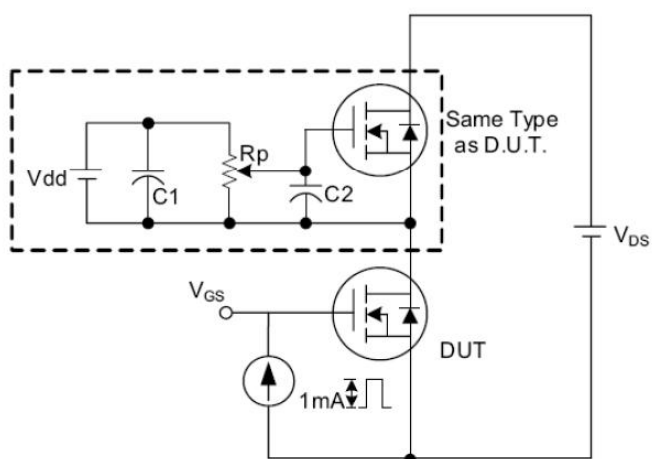


Fig. 3.1 Gate Charge Test Circuit

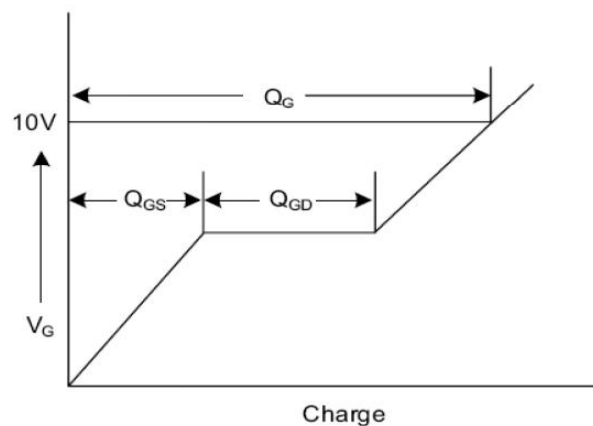


Fig. 3.2 Gate Charge Waveform

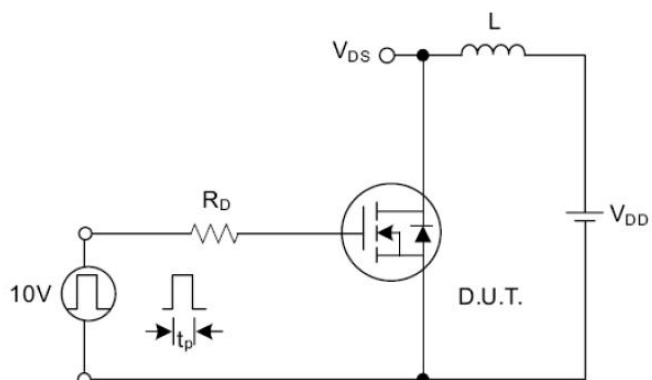


Fig. 4.1 Unclamped Inductive Switching Test Circuit

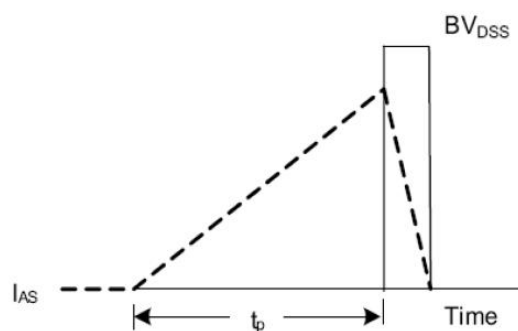


Fig. 4.2 Unclamped Inductive Switching Waveforms

