

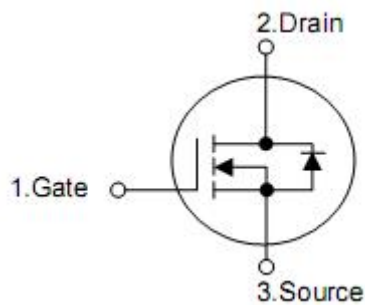
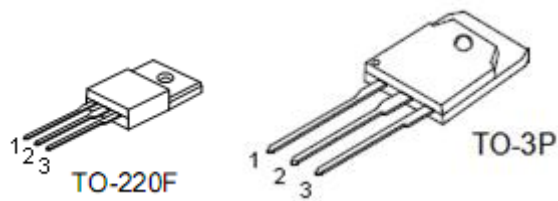
1. Features

- n Proprietary New Planar Technology
- n $R_{DS(ON),typ.}=45m\Omega@V_{GS}=10V$
- n Low Gate Charge Minimize Switching Loss
- n Fast Recovery Body Diode

2. Features

- n DC-DC Converters
- n DC-AC Inverters for UPS
- n SMPS and Motor controls

3. Pin configuration



Pin	Function
1	Gate
2	Drain
3	Source

4. Ordering Information

Part Number	Package	Brand
KNF3725A	TO-220F	KIA
KNH3725A	TO-3P	KIA

5. Absolute maximum ratings

TC=25 °C unless otherwise specified

Parameter	Symbol	Ratings		Unit
		TO-220F	TO-3P	
Drain-to-Source Voltage	V_{DSS}	250		V
Gate-to-Source Voltage	V_{GSS}	±20		
Continuous Drain Current	I_D	50		A
Continuous Drain Current @ $T_C=100\text{ °C}$		25		
Pulsed Drain Current at $V_{GS}=10V$ [2]	I_{DM}	200		
Single Pulse Avalanche Energy	E_{AS}	1250		mJ
Peak Diode Recovery dv/dt [3]	dv/dt	5.0		V/ns
Power Dissipation	P_D	125	260	W
Derating Factor above 25 °C		1.0	2.08	
Maximum Temperature for Soldering Leads at 0.063in (1.6mm) from Case for 10 seconds, Package Body for 10 seconds	T_L T_{PAK}	300 260		°C
Operating and Storage Temperature Range	T_J & T_{STG}	-55 to 150		

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

6. Thermal characteristics

Parameter	Symbol	Ratings		Units
		TO-220F	TO-3P	
Thermal resistance, junction-ambient	$R_{\theta JA}$	90	-	°C/W
Thermal resistance, Junction-case	$R_{\theta JC}$	1.0	0.48	

7. Electrical characteristics

(T_J=25°C, unless otherwise notes)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Off characteristics						
Drain-source breakdown voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA	250	-	-	V
Drain-to-source Leakage Current	I _{DSS}	V _{DS} =250V, V _{GS} =0V	-	-	1	μA
		V _{DS} =200V, V _{GS} =0V T _J =125°C,	-	-	100	μA
Gate-body leakage current	I _{GSS}	V _{GS} =20V, V _{DS} =0V	-	-	+100	nA
		V _{GS} =-20V, V _{DS} =0V	-	-	-100	nA
On characteristics						
Static drain-source on-resistance	R _{DS(on)}	V _{GS} =10V, I _D =25A	-	45	60	mΩ
Gate threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	2.0	-	4.0	V
Forward Transconductance ^[4]	g _{fs}	V _{DS} =15V, I _D =20A	-	65	-	S
Dynamic characteristics						
Input capacitance	C _{iss}	V _{DS} =25V, V _{GS} =0V, f=1MHz	-	4000	-	pF
Output capacitance	C _{oss}		-	510	-	pF
Reverse transfer capacitance	C _{rss}		-	255	-	pF
Total gate charge						
Turn-on delay time	t _{d(on)}	V _{DD} =100V, I _D =20A, V _{GS} =10V, R _G =3.9Ω	-	21	-	ns
Rise time	t _r		-	29	-	ns
Turn-off delay time	t _{d(off)}		-	66	-	ns
Fall time	t _f		-	24	-	ns
Total gate charge	Q _g	V _{DD} =100V, I _D =20A, V _{GS} =0 to 10V	-	75	-	nC
Gate-source charge	Q _{gs}		-	25	-	nC
Gate-drain charge	Q _{gd}		-	20	-	nC
Drain-source diode characteristics						
Drain-source diode forward voltage	V _{SD}	V _{GS} =0V, I _S =30A	-	-	1.5	V
Continuous drain-source current ^[4]	I _{SD}	Integral pn-diode In MOSFET	-	-	50	A
Pulsed drain-source current ^[4]	I _{SM}		-	-	200	A
Reverse recovery time	t _{rr}	V _{GS} =0V, I _F =20A	-	185	-	ns
Reverse recovery charge	Q _{rr}	di _F /dt=100A/μs	-	400	-	μC

Note: 1. T_J=+25°C to +150°C

2. Repetitive rating; pulse width limited by maximum junction temperature.

3. I_{SD}= 20A di/dt < 100 A/μs, V_{DD} < BVDSS, T_J=+150 °C.

4. Pulse width ≤ 380μs; duty cycle ≤ 2%.

8. Typical Characteristics

Figure 1. Maximum Transient Thermal Impedance

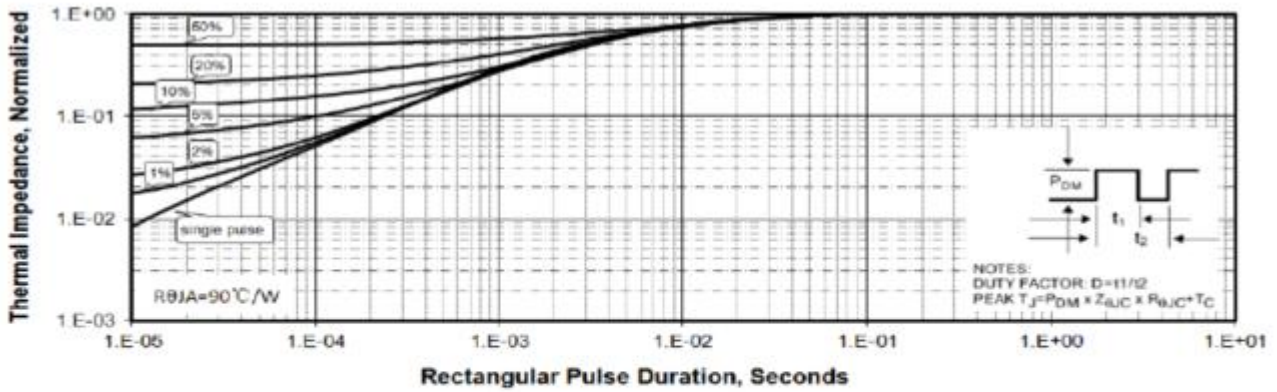


Figure 2. Max. Power Dissipation vs Case Temperature

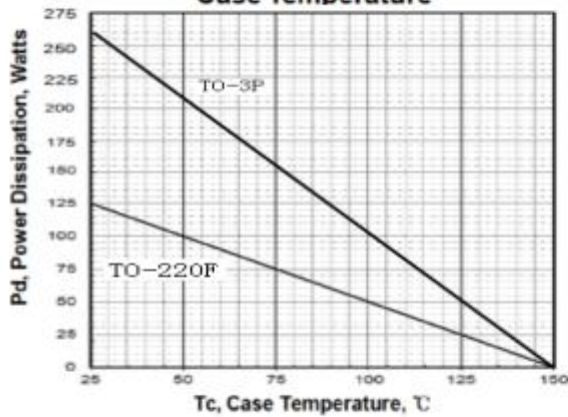


Figure 3. Maximum Continuous Drain Current vs Tc

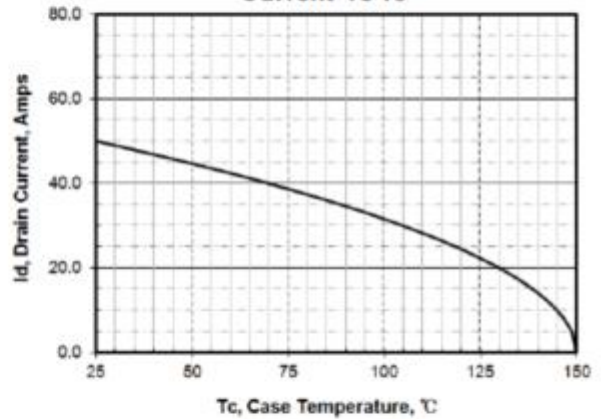


Figure 4. Output Characteristics

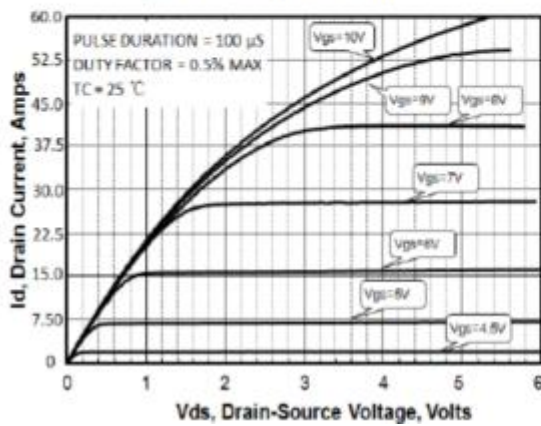


Figure 5. Rds(on) vs Gate Voltage

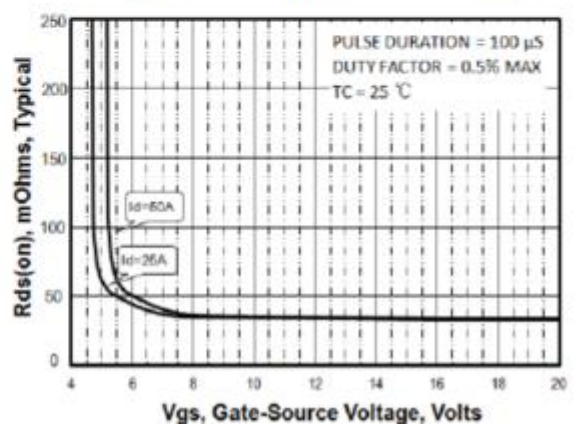


Figure 6. Peak Current Capability

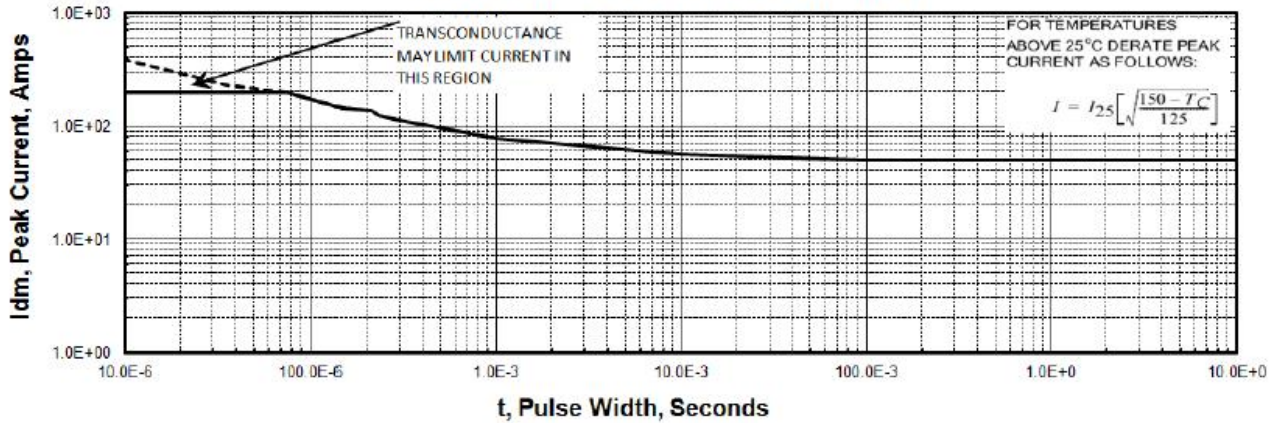


Figure 7. Transfer Characteristics

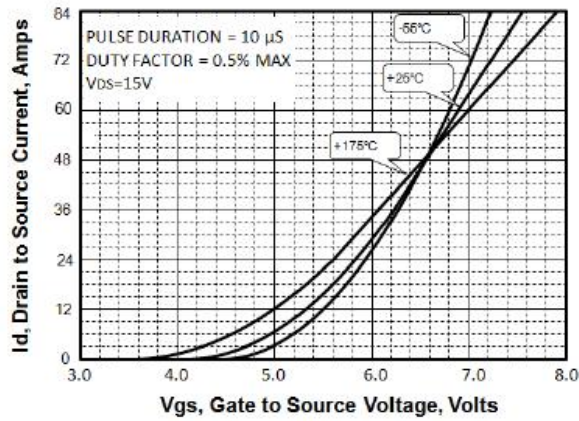


Figure 8. Unclamped Inductive Switching Capability

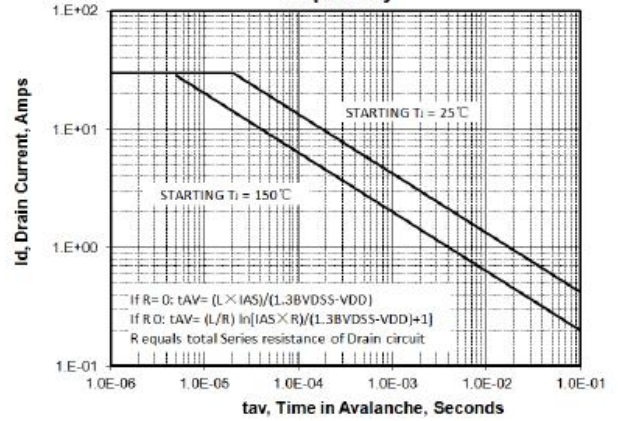


Figure 9. Drain to Source ON Resistance vs Drain Current

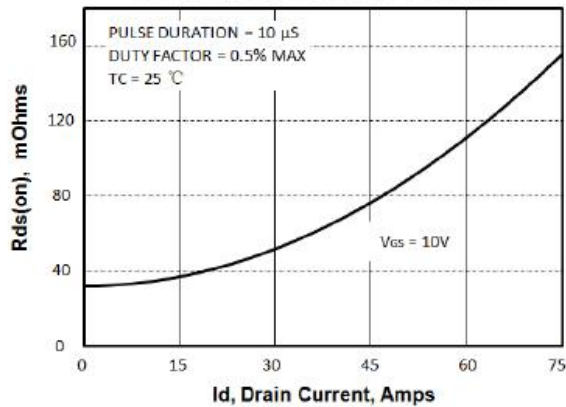


Figure 10. Rds(on) vs Junction Temperature

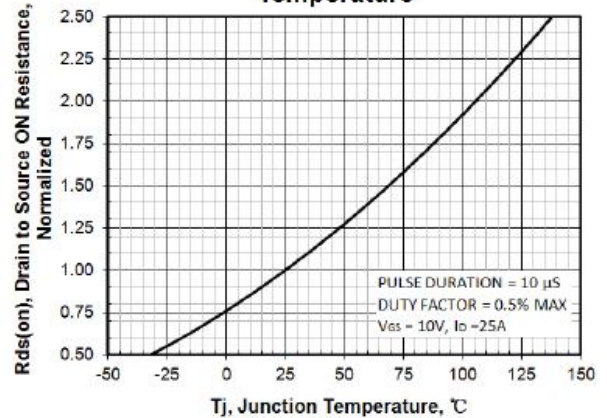


Figure 11. Typical Breakdown Voltage vs Junction Temperature

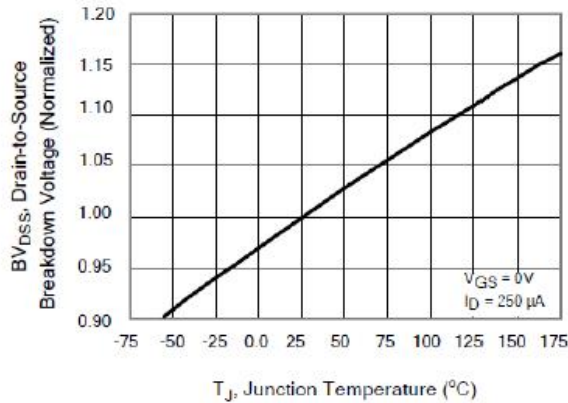


Figure 12. Typical Threshold Voltage vs Junction Temperature

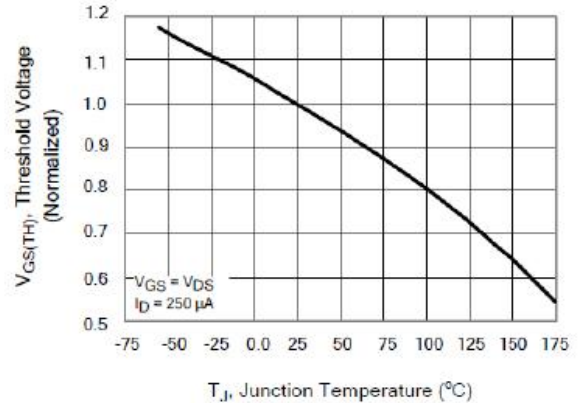


Figure 13. Maximum Safe Operating Area (TO-220F)

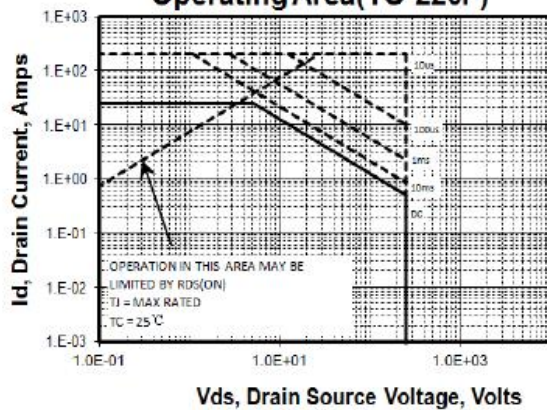


Figure 14. Capacitance vs Vds

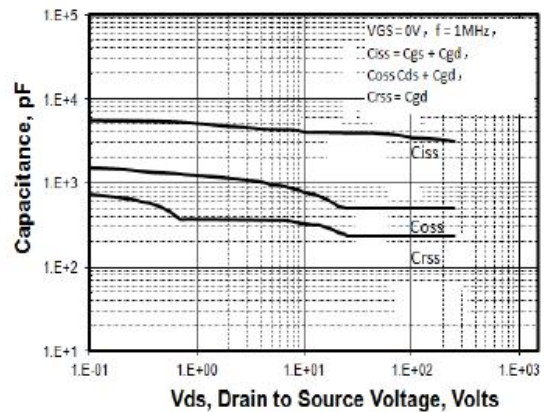


Figure 15. Typical Gate Charge

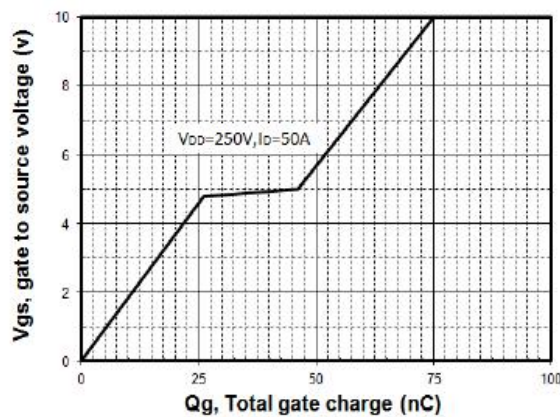


Figure 16. Body Diode Transfer Characteristics

