1. Features

- Fast Switching
- $R_{DS(ON)}$=0.35Ω(typ.) @ V_{GS}=10V
- Low Gate Charge
- Low Reverse transfer capacitances
- 100% Single Pulse avalanche energy Test

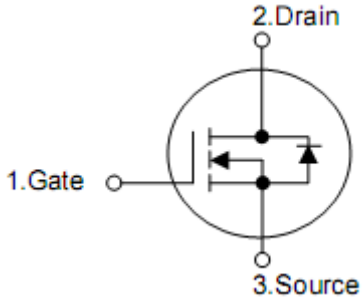
2. Applications

- Power switch circuit of adaptor and charger

3. Pin configuration

TO-220

TO-220F



Pin	Function
1	Gate
2	Drain
3	Source

4. Ordering Information

Part Number	Package	Brand
KNP6450B	TO-220	KIA
KNF6450B	TO-220F	KIA

5. Absolute maximum ratings

(T_C= 25 ºC , unless otherwise specified)

Parameter	Symbol	Ratings		Unit
		TO-220	TO-220F	
Drain-to-Source Voltage	V_{DSS}	500		V
Gate-to-Source Voltage	V_{GSS}	±30		V
Continuous Drain Current	I_D	13		A
Pulsed Drain Current [1]	I_{DM}	52		A
Single Pulse Avalanche Energy [2]	EAS	900		mJ
Power Dissipation	P_D	150	48	W
Derating Factor above 25°C	P_D	1.2	0.38	W/°C
Maximum Temperature for Soldering	T_L	300		ºC
Operating and Storage Temperature Range	T_J&T_{STG}	-55 to 150		ºC

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

6. Thermal characteristics

Parameter	Symbol	Ratings		Unit
		TO-220	TO-220F	
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.83	2.6	ºC/W
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	62.5	100	º C/W

7. Electrical characteristics

(T_C=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	500	-	-	V
BVDSS Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	I_D=250uA, Reference 25°C	-	0.55	-	V/°C
Drain-to-Source Leakage Current	I_{DSS}	V_{DS}=500V, V_{GS}=0V	-	-	1	uA
		V_{DS}=400V,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=6.5A	-	0.35	0.5	Ω
Gate Threshold Voltage	$V_{GS(TH)}$	V_{DS}=V_{GS},I_D=250uA	2.0	-	4.0	V
Forward Transconductance [3]	gfs	V_{DS}=30V,I_D=13A	-	15	-	S
Input Capacitance	C_{iss}	V_{GS}=0V,V_{DS}=25V, f=1.0MHZ	-	2155	-	pF
Reverse Transfer Capacitance	C_{oss}		-	215	-	
Output Capacitance	C_{rss}		-	25	-	
Total Gate Charge	Q_g	V_{DD}=250V,I_D=13A, V_{GS}=10V	-	46	-	nC
Gate-to-Source Charge	Q_{gs}		-	12	-	
Gate-to-Drain (Miller) Charge	Q_{gd}		-	20	-	
Turn-on Delay Time	$t_{d(ON)}$	V_{DD}=200V, I_D=10A, R_G=6.1Ω,V_{GS}=13V	-	16	-	nS
Rise Time	t_{rise}		-	26	-	
Turn-Off Delay Time	$t_{d(OFF)}$		-	46	-	
Fall Time	t_{fall}		-	36	-	
Continuous Source Current	I_{SD}	-	-	-	13	A
Pulsed Source Current	I_{SM}	-	-	-	52	A
Forward Voltage	V_{SD}	I_S=13A, V_{GS}=0V	-	-	1.5	V
Reverse recovery time	t_{rr}	I_F=13A, T_J=25°C diF/dt=100A/μs, V_{GS}=10V	-	500	-	ns
Reverse recovery charge	Q_{rr}		-	4	-	uC

Note:
1) Repetitive rating; pulse width limited by maximum junction temperature.
2) L=10mH, I_D=13A, Start T_J=25°C.
3) Pulse width≤380μs; duty cycle≤2%.

8. Test circuits and waveforms

Figure 1. Maximum Effective Thermal Impedance, Junction-to-Case

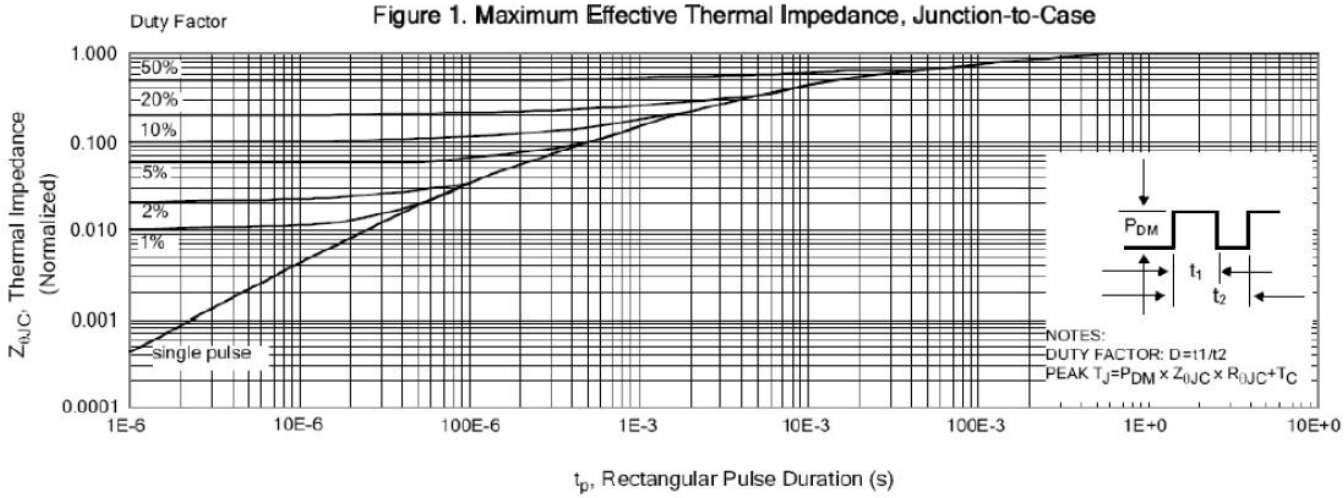


Figure 2. Maximum Power Dissipation vs Case Temperature

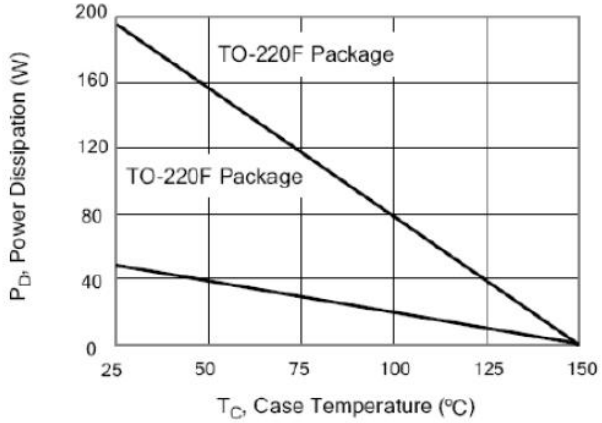


Figure 3. Maximum Continuous Drain Current vs Case Temperature

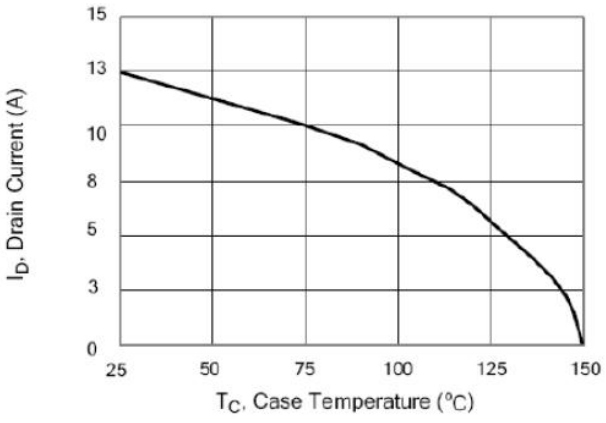


Figure 4. Typical Output Characteristics

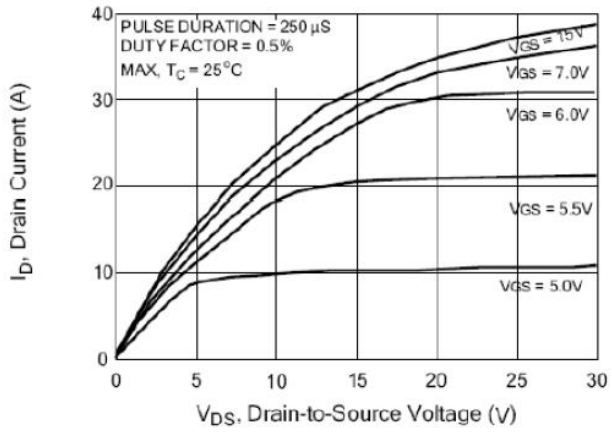


Figure 5. Typical Drain-to-Source ON Resistance vs Gate Voltage and Drain Current

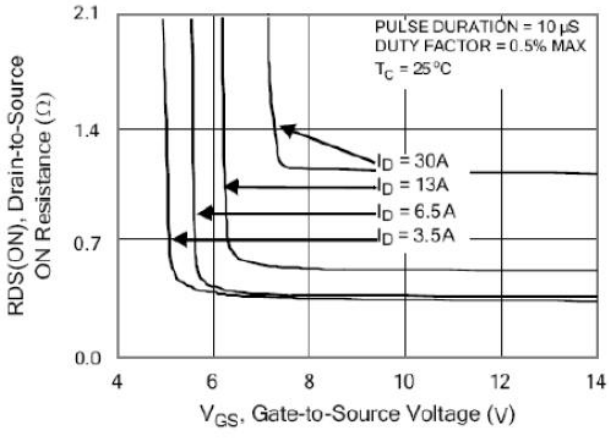


Figure 6. Maximum Peak Current Capability

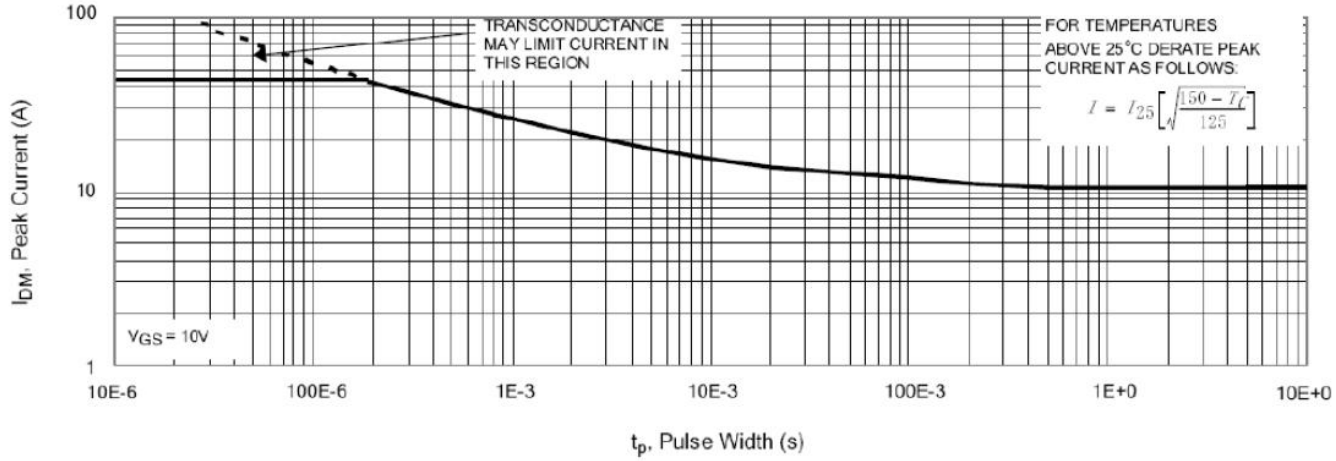


Figure 7. Typical Transfer Characteristics

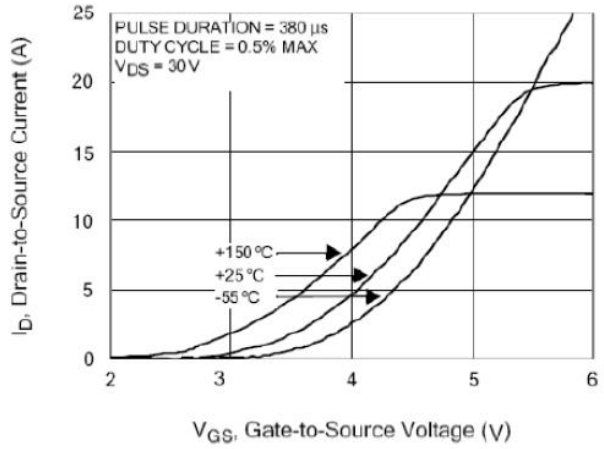


Figure 8. Unclamped Inductive Switching Capability

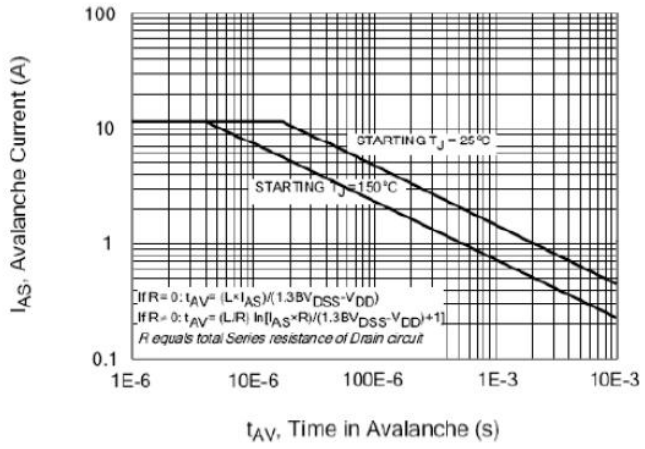


Figure 9. Typical Drain-to-Source ON Resistance vs Drain Current

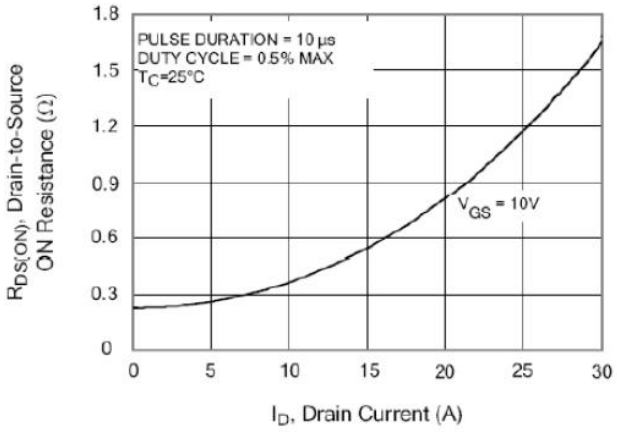


Figure 10. Typical Drain-to-Source ON Resistance vs Junction Temperature

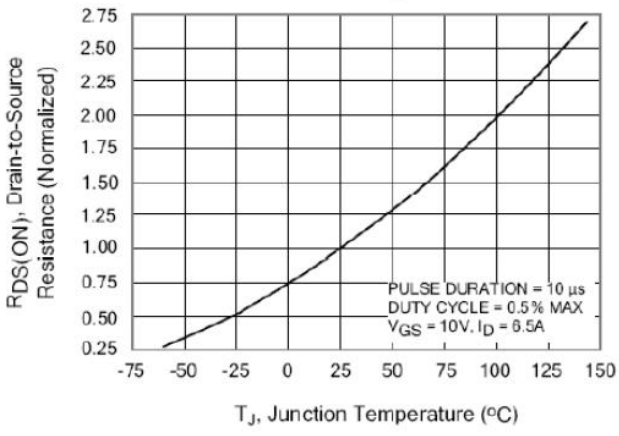


Figure 11. Typical Breakdown Voltage vs Junction Temperature

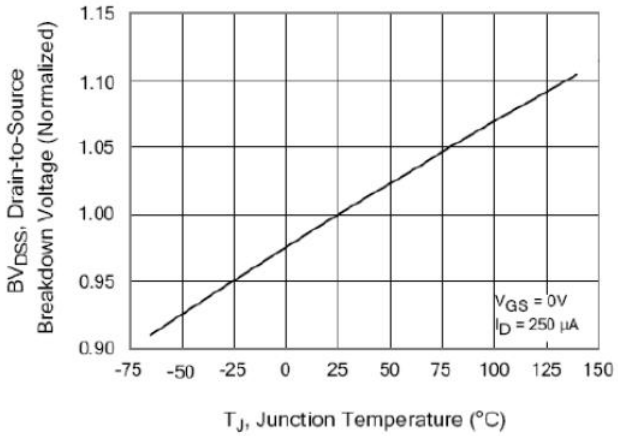


Figure 12. Typical Threshold Voltage vs Junction Temperature

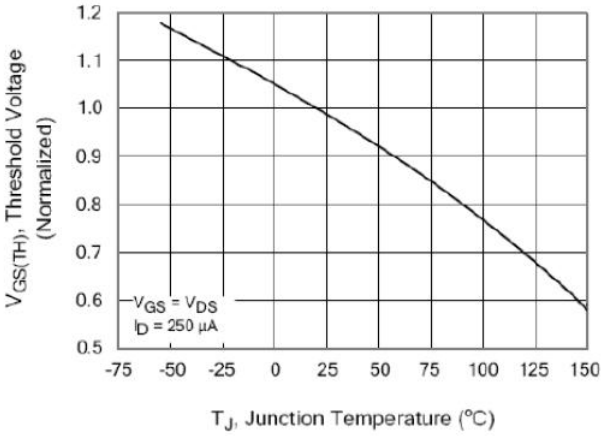


Figure 13. Maximum Forward Bias Safe Operating Area

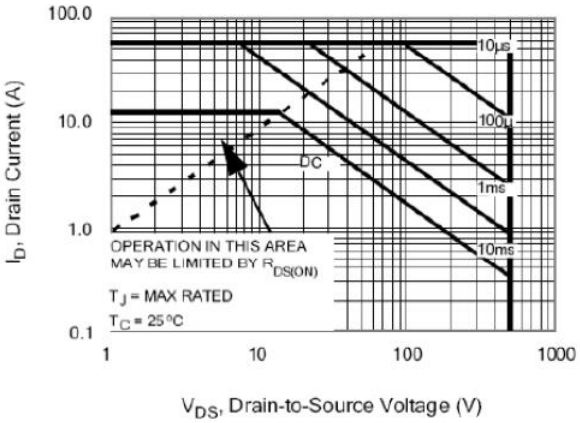


Figure 14. Typical Capacitance vs Drain-to-Source Voltage

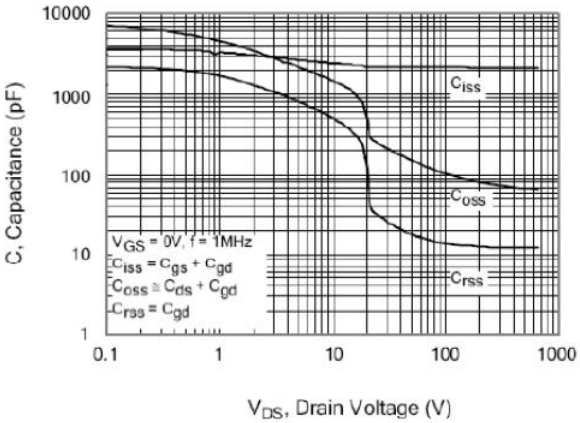


Figure 15. Typical Gate Charge vs Gate-to-Source Voltage

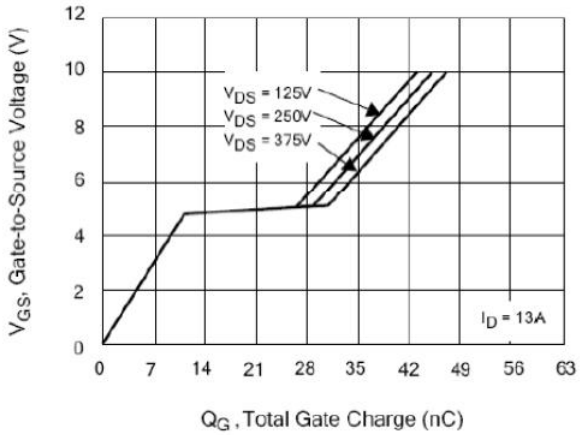


Figure 16. Typical Body Diode Transfer Characteristics