

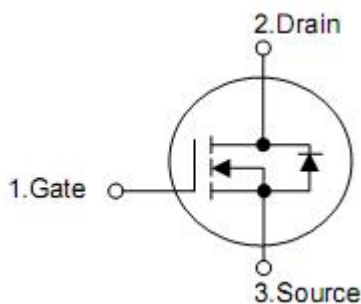
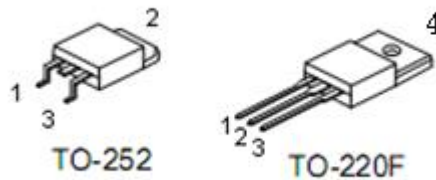
1. Features

- n $R_{DS(ON),typ.}=2.0\Omega$ @ $V_{GS}=10V, I_D=2A$
- n Fast Switching
- n 100% avalanche tested
- n Improved dv/dt capability

2. Application

- n High frequency switching mode power supply
- n Uninterruptible Power Supply(UPS)
- n Electronic ballast

3. Pin configuration



Pin	Function
1	Gate
2	Drain
3	Source
4	Drain

4. Ordering Information

Part Number	Package	Brand
KND4365A	TO-252	KIA
KNF4365A	TO-220F	KIA

5. Absolute maximum ratings

(T_C= 25°C , unless otherwise specified)

Parameter	Symbol	Rating		Units
		TO252	TO220F	
Drain-source voltage	V _{DSS}	650		V
Gate-source voltage	V _{GSS}	±30		V
Continuous Drain Current	T _C =25 °C	4*	4*	A
	T _C =100 °C	2.78*	2.78*	A
Pulsed Drain Current ^{note1}	I _{DM}	16*	16*	A
Single Pulse Avalanche Energy ^{note2}	E _{AS}	180		mJ
Peak Diode Recovery Energy ^{note3}	dv/dt	4.8		V/ns
Power Dissipation	T _C =25 °C	55	44.6	W
Linear Derating Factor	T _C > 25 °C	0.46	0.357	W/°C
Thermal Resistance, Junction to Case	R _{θJC}	2.16	3.75	°C/W
Operating and Storage Temperature Range	T _L , T _{STG}	-55~+150		°C

*Drain current limited by maximum junction temperature

6. Electrical characteristics

(T_J=25°C, unless otherwise specified)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Off characteristics						
Drain-source breakdown Voltage	V _{(BR)DSS}	V _{GS} =0V, I _D =250μA	650	-	-	V
Breakdown voltage temperature coefficient	$\frac{\Delta V_{(BR)DS}}{\Delta T_J}$	I _D =250μA, referenced to 25°C	-	0.65	-	V/°C
Zero Gage Voltage Drain Source	I _{DSS}	V _{DS} =640V, V _{GS} =0V	-	-	1	μA
		V _{DS} =512V, T _C =125°C	-	-	10	μA
Gate to Body Leakage Current	I _{GSS}	V _{GS} =+30V, V _{DS} =0V	-	-	100	nA
		V _{GS} =-30V, V _{DS} =0V	-	-	-100	nA
On characteristics						
Gate threshold voltage ^{note4}	V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250μA	2	-	4	V
Static drain-source on-resistance	R _{DS(ON)}	V _{GS} =10V, I _D =2A	-	2.0	2.5	Ω
Forward Transconductance	G _{FS}	V _{DS} =30V, I _D =2A	-	6	-	S
Dynamic characteristics						
Input capacitance	C _{ISS}	V _{DS} =25V, V _{GS} =0V,	-	523	-	pF
Output capacitance	C _{OSS}	f=1.0 MHz	-	58.7	-	pF
Reverse transfer capacitance	C _{RSS}		-	9.85	-	pF
Total gate charge	Q _G	V _{DD} =512V,	-	15.7	-	nC
Gate-source charge	Q _{GS}	I _D =4.0A	-	2.43	-	nC
Gate-drain charge	Q _{GD}	V _{GS} =10V	-	6.72	-	nC
Switching characteristics						
Turn-on delay time	t _{D(ON)}	V _{DD} =320V, I _D =4.0A,	-	12.1	-	ns
Rise time	t _R	R _G =10Ω, V _{GS} =10V	-	14.9	-	ns
Turn-off delay time	t _{D(OFF)}		-	36.8	-	ns
Fall time	t _F		-	11.3	-	ns
Switching characteristics						
Drain-source diode forward voltage	V _{SD}	V _{GS} =0V, I _S =4.0A	-	-	1.4	V
Continuous drain-source current	I _S		-	-	4	A
Pulsed drain-source current	I _{SM}		-	-	16	A
Reverse recovery time	t _{RR}	V _{GS} =0V, I _F =4A	-	312	-	ns
Reverse recovery charge	Q _{RR}	di/dt=100A/μs	-	1.81	-	μC

Note: 1. Repetitive Rating: Pulse width limited by maximum junction temperature.

2. L=10mH, I_{AS}=6A, V_{DD}=50V, R_G=25Ω, Starting T_J=25°C.

3. I_{SD}≤4A, di/dt≤200A/μs, V_{DD}≤B_VDSS, Starting T_J=25°C.

4. Pulse width≤300μs; duty cycle≤2%

7. Typical Characteristics

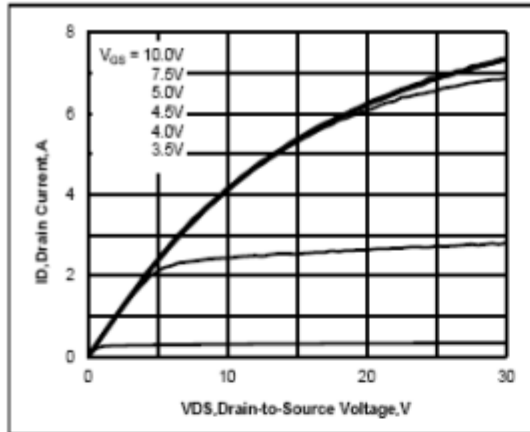


Figure 1. Output Characteristics

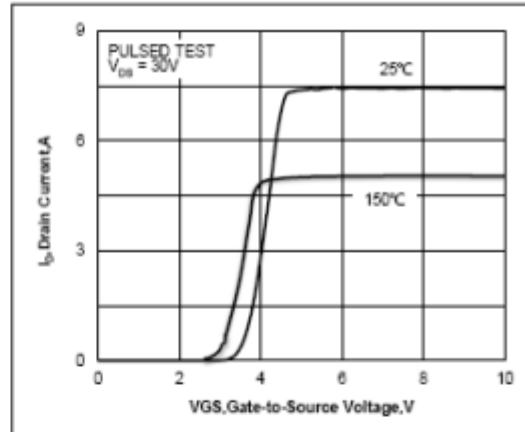


Figure 2. Transfer Characteristics

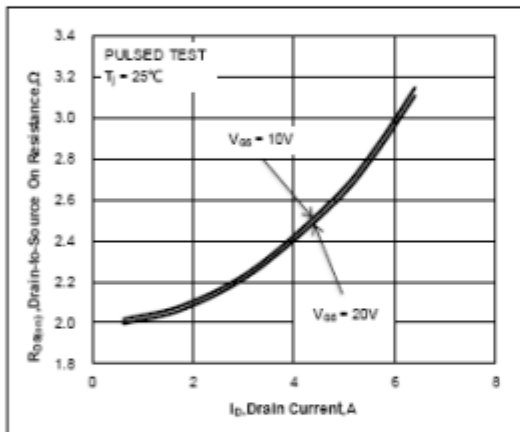


Figure 3. Drain-to-Source On Resistance vs. Drain Current and Gate Voltage

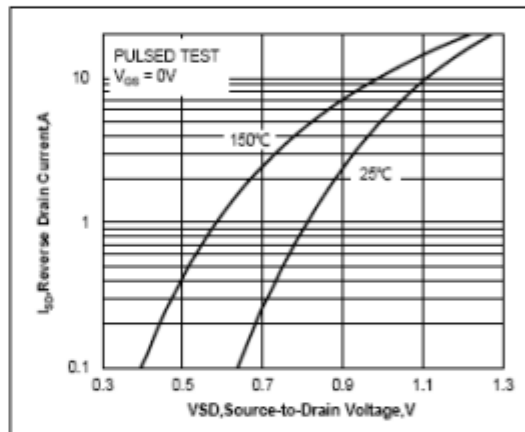


Figure 4. Body Diode Forward Voltage vs. Source Current and Temperature

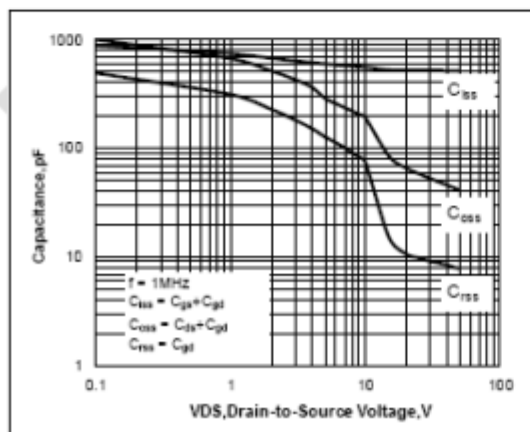


Figure 5. Capacitance Characteristics

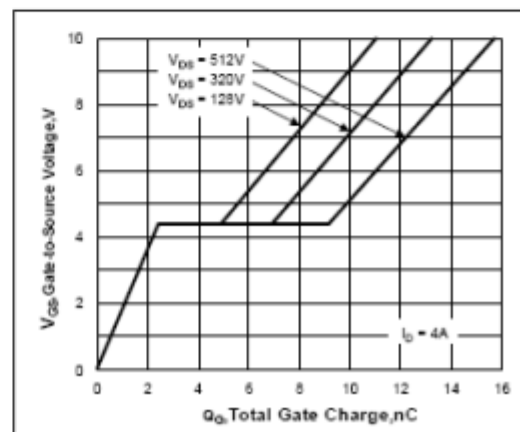


Figure 6. Gate Charge Characteristics

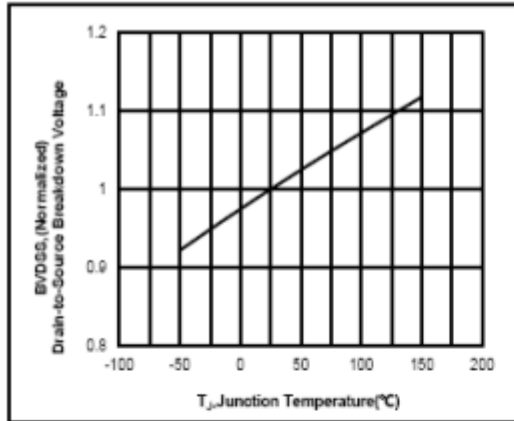


Figure 7. Normalized Breakdown Voltage vs. Junction Temperature

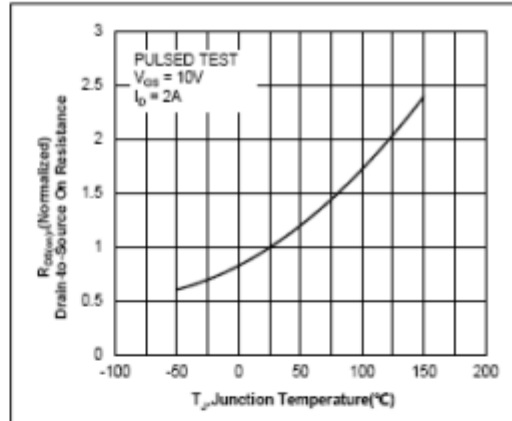


Figure 8. Normalized On Resistance vs. Junction Temperature

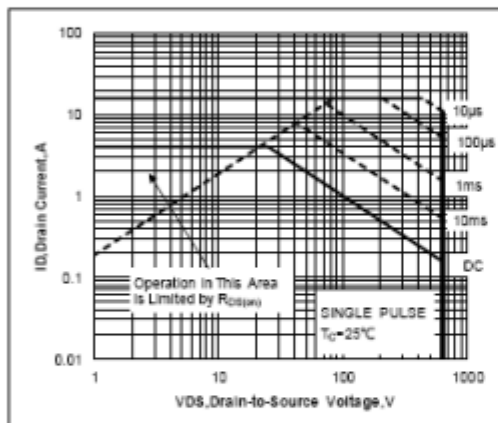


Figure 9. Maximum Safe Operating Area

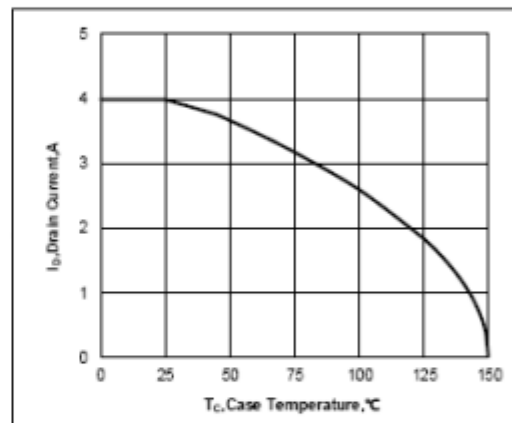
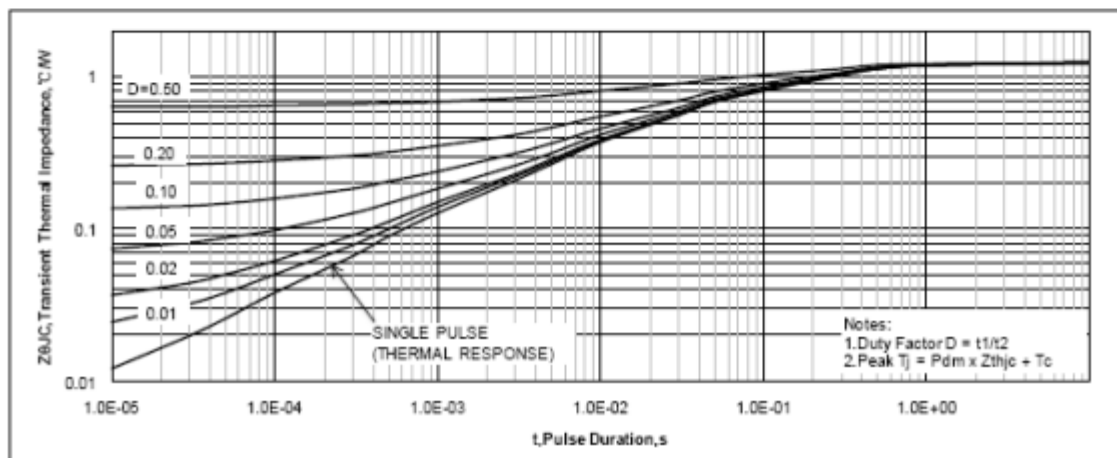


Figure 10. Maximum Continuous Drain Current vs. Case Temperature



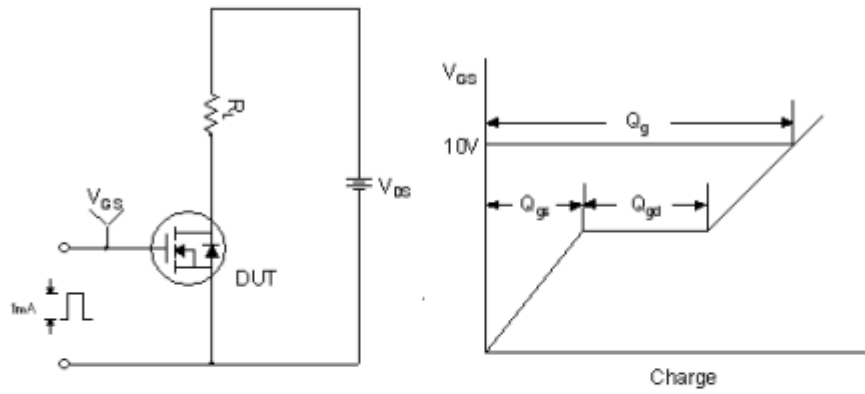


Figure 12. Gate Charge Test Circuit & Waveform

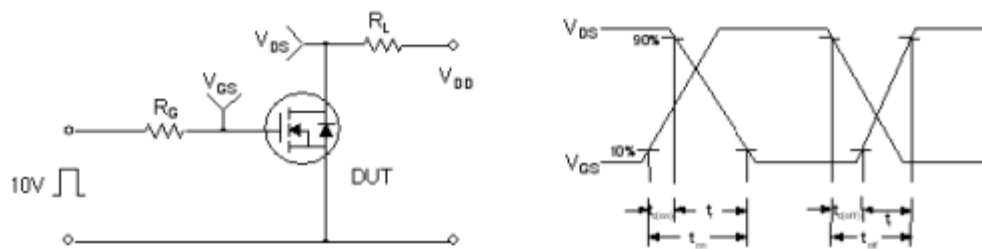


Figure 13. Resistive Switching Test Circuit & Waveforms

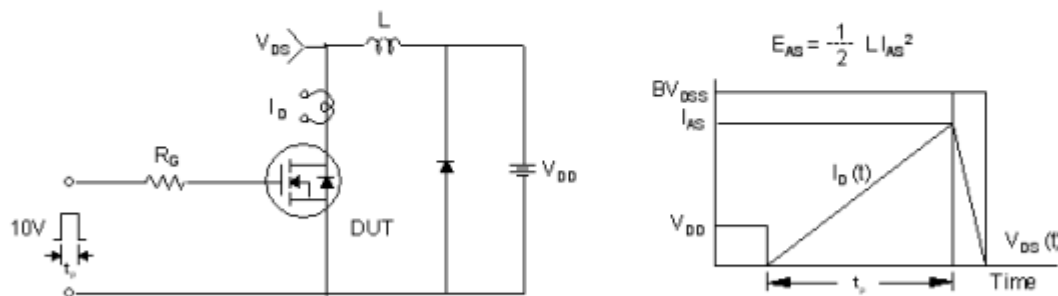


Figure 14. Unclamped Inductive Switching Test Circuit & Waveforms

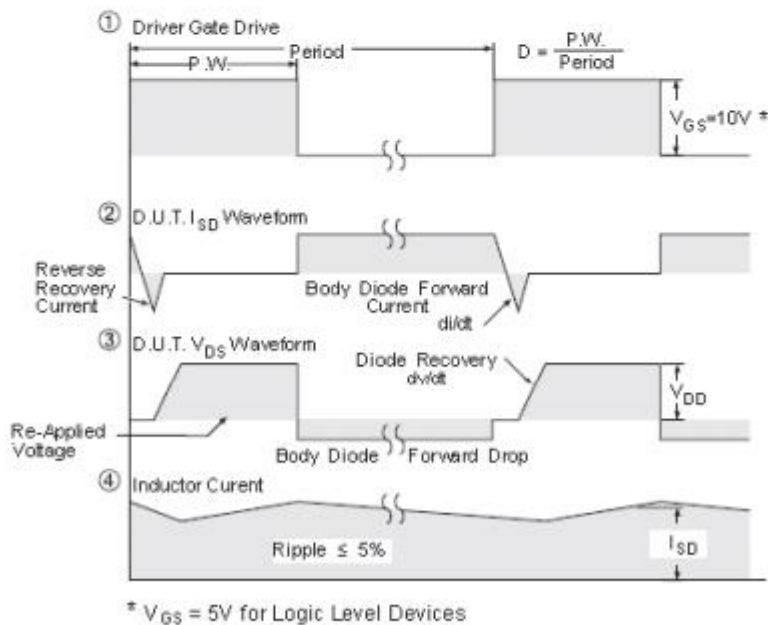
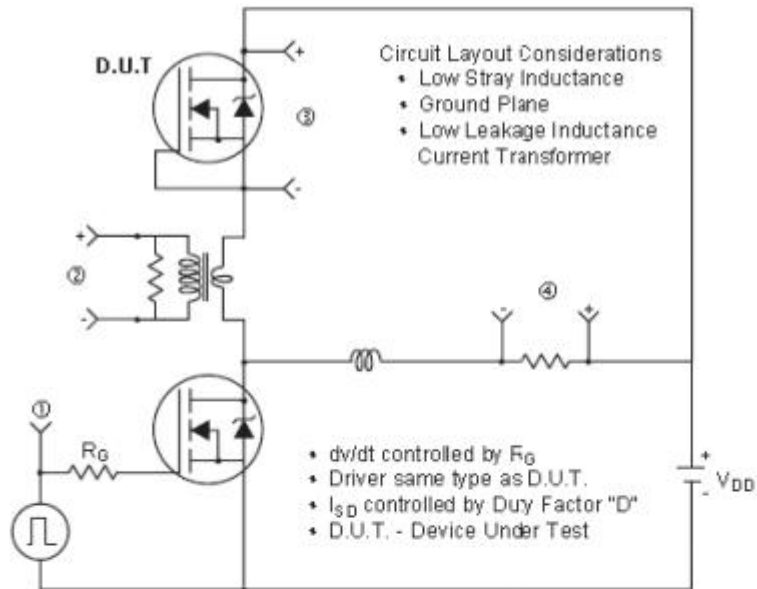


Figure 15. Peak Diode Recovery dv/dt Test Circuit & Waveforms (For N-channel)