1. Features

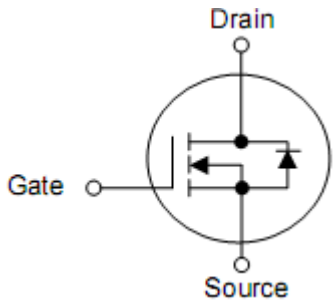
- $R_{DS(ON)}$=4.4mΩ(typ.)@V_{GS}=10V
- Very Low On-resistance $R_{DS(ON)}$
- Low Crss
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability

2. Applications

- PWM Application
- Power Management
- Load switch

3. Symbol

TO-252



Pin	Function
1	Gate
2	Drain
3	Source

4. Ordering Information

Part Number	Package	Brand
KND3404D	TO-252	KIA

5. Absolute maximum ratings

T_C=25°C unless otherwise noted

Parameter		Symbol	Rating	Units
Drain-source voltage		V_{DSS}	40	V
Continuous drain current	T_C=25°C	I_D	80	A
	T_C=100°C	I_D	52	A
Pulsed drain current -Pulsed [1]		I_{DM}	320	A
Gate-source voltage		V_{GS}	±20	V
Single pulse avalanche energy [2]		E_{AS}	104	mJ
Power dissipation (T_C=25°C)		P_D	77	W
Operating junction and storage temperature range		T_J ,T_{STG}	-55 to150	ºC
Maximum lead temperature for soldering purposes,1/8" from case for 5 seconds		T_L	300	ºC

*Drain current limited by maximum junction temperature.

6. Thermal characteristics

Parameter	Symbol	Rating	Unit
Thermal resistance junction-case	$R_{\theta JC}$	1.95	ºC/W

7. Electrical characteristics

(T_C=25°C unless otherwise noted)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Drain-source breakdown voltage	BV_{DSS}	V_{GS}=0V,I_D=250uA	40	-	-	V
Drain-source leakage current	I_{DSS}	V_{DS}=40V, V_{GS}=0V	-	-	1	uA
		V_{DS}=32V,T_C=125°C	-	-	10	uA
Gate-source forward leakage	I_{GSS}	V_{GS}=±20V, V_{DS}=0V	-	-	±100	nA
Gate threshold voltage	$V_{GS(TH)}$	V_{DS}= V_{GS},I_D=250uA	1.0	1.5	2.5	V
Drain-source on-resistance	$R_{DS(on)}$	V_{GS}=10V,I_D=30A	-	4.4	5.5	mΩ
		V_{GS}=4.5V,I_D=20A	-	6.5	10	mΩ
Input capacitance	C_{iss}	V_{DS}=20V,V_{GS}=0V f=1MHz	-	3045	-	pF
Output capacitance	C_{oss}		-	388	-	pF
Reverse transfer capacitance	C_{rss}		-	234	-	pF
Turn-on delay time	$t_{d(on)}$	V_{GS}=10V,V_{DS}=20V, R_G=3Ω, I_D=30A	-	6	-	ns
Rise time	t_r		-	17	-	ns
Turn-off delay time	$t_{d(off)}$		-	23	-	ns
Fall time	t_f		-	12	-	ns
Total gate charge(10V)	Q_g	V_{DS}=20V, I_D=30A V_{GS}=10V	-	58	-	nC
Gate-source charge	Q_{gs}		-	10	-	nC
Gate-drain charge	Q_{gd}		-	9	-	nC
Maximum Continuous Drain-Source Diode Forward Current	I_S	—	-	-	80	A
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}	—	-	-	320	A
Diode forward voltage	V_{SD}	I_{SD}=30A,V_{GS}=0V,T_J=25°C	-	-	1.2	V
Reverse Recovery Time	t_{rr}	I_F=20A,di/dt=100A/μs T_J=25°C	-	22	-	nS
Reverse Recovery Charge	Q_{rr}		-	11	-	nC

Note:
1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
2. EAS condition: T_J=25°C, V_{DD}=20V, V_G=10V, L=0.5mH, Rg=25Ω, I_{AS}=20A
3. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%

8. Typical operating characteristics

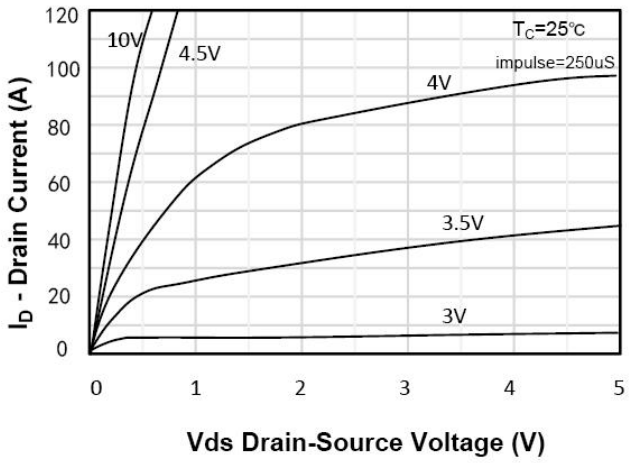


Figure 1. On-Region Characteristics

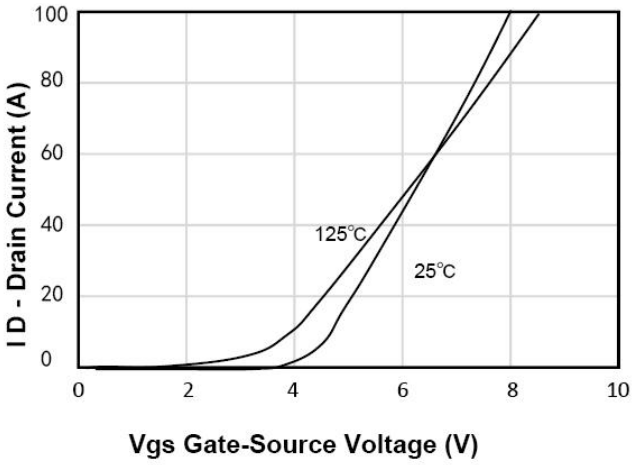


Figure 2. Transfer Characteristics

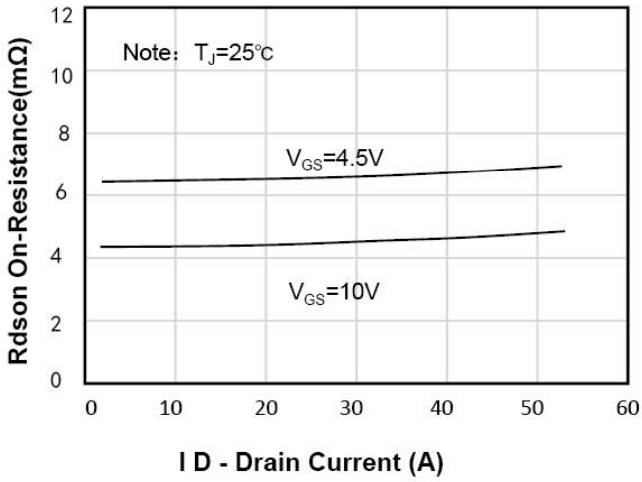


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

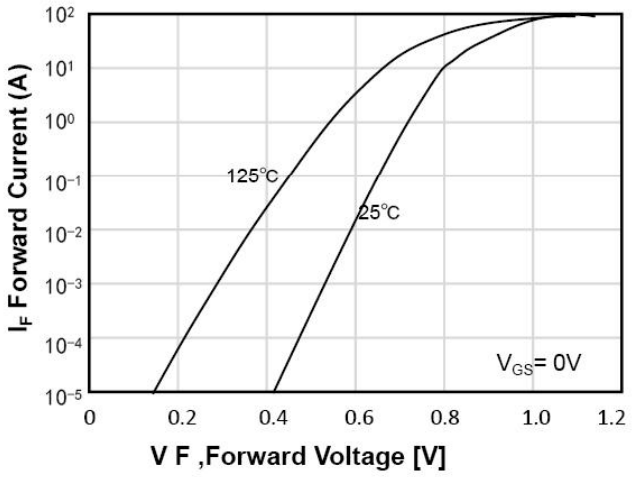


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

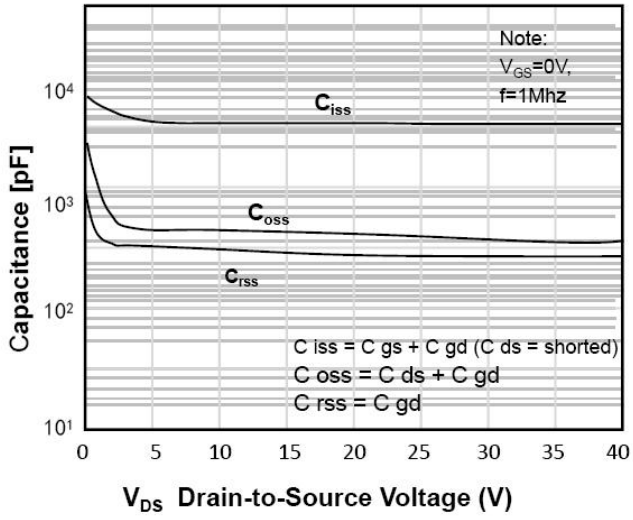


Figure 5. Capacitance Characteristics

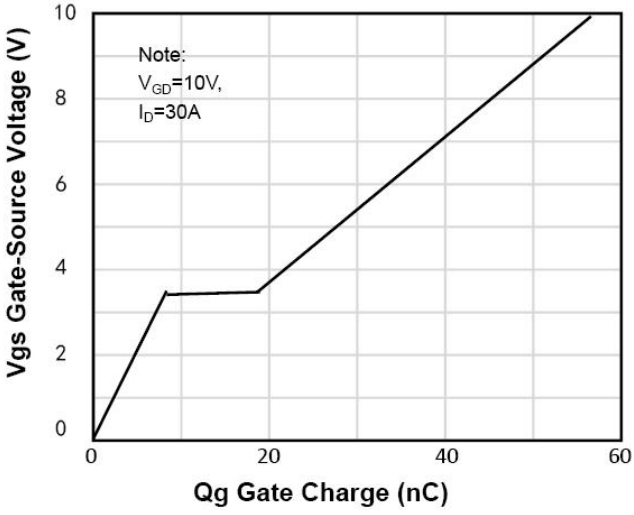


Figure 6. Gate Charge Characteristics

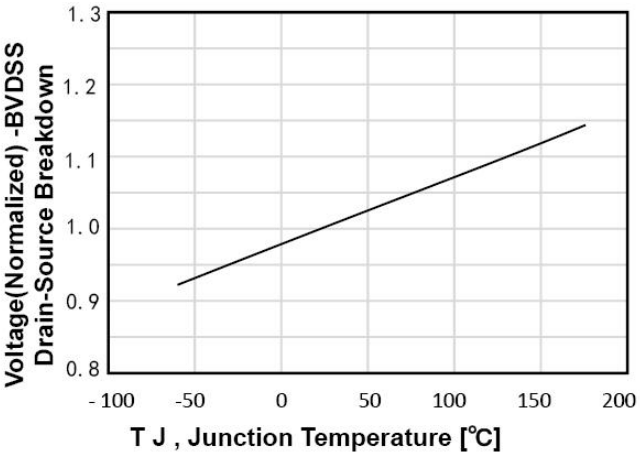


Figure 7. Breakdown Voltage Variation vs Temperature

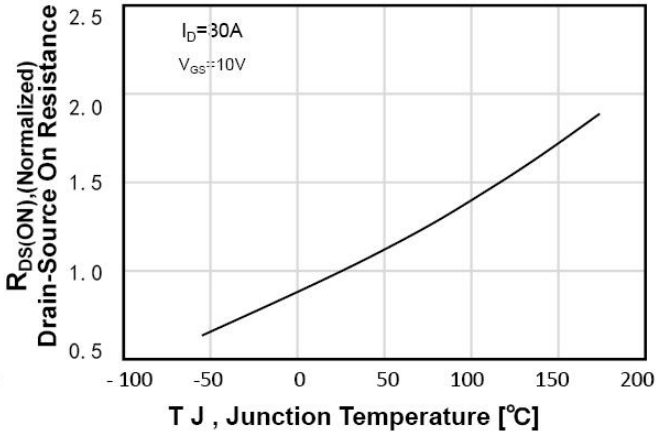


Figure 8. On-Resistance Variation vs Temperature

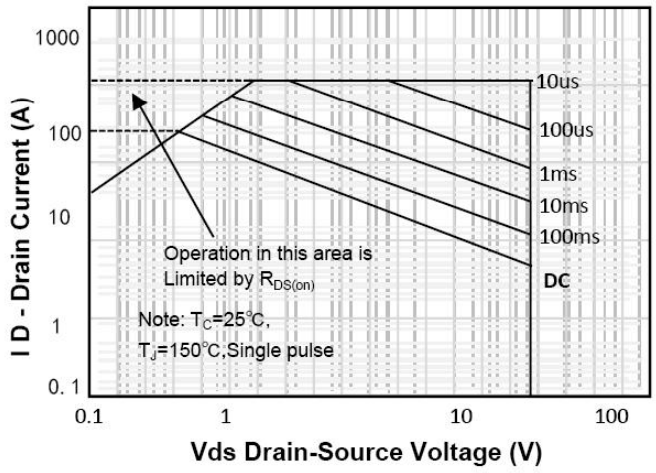


Figure 9. Maximum Safe Operating Area

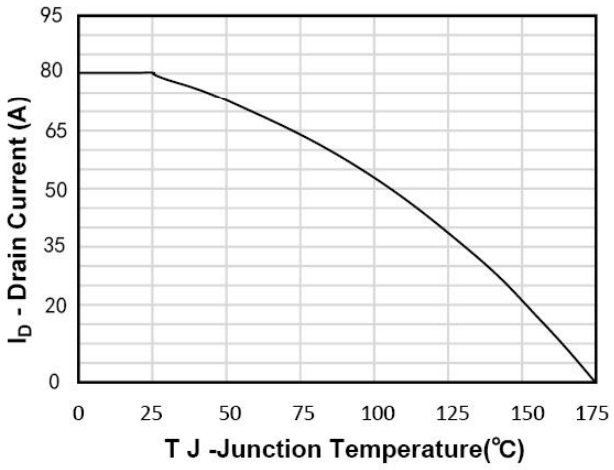


Figure 10. Vds Drain VS Junction Temperature

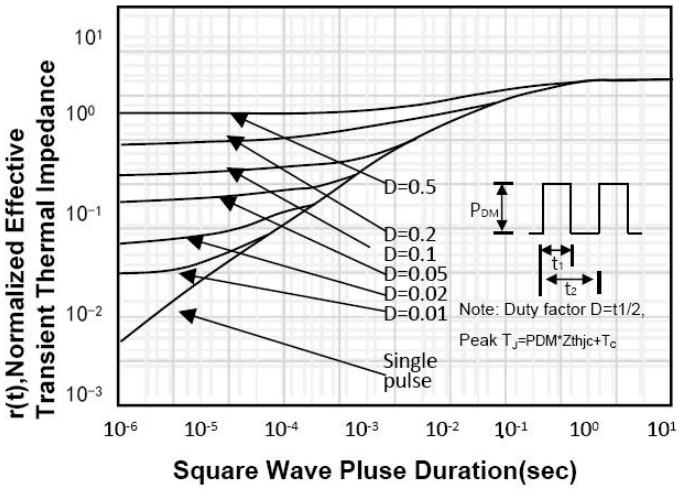
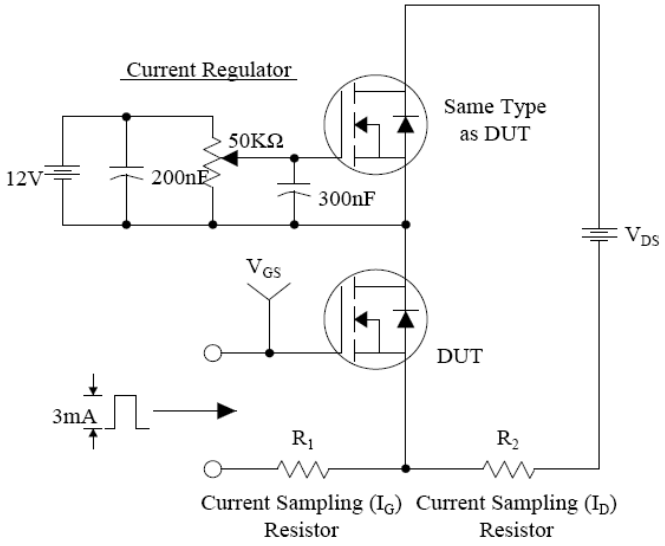
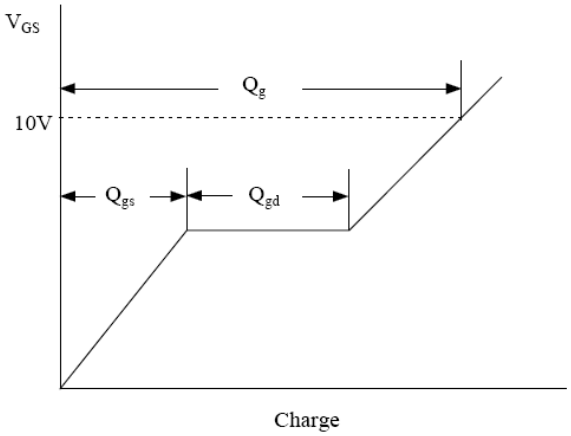


Figure 11. Transient Thermal Response Curve

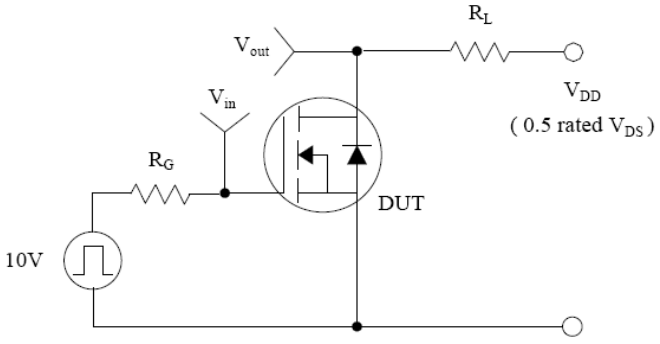
9. Test Circuits and Waveforms

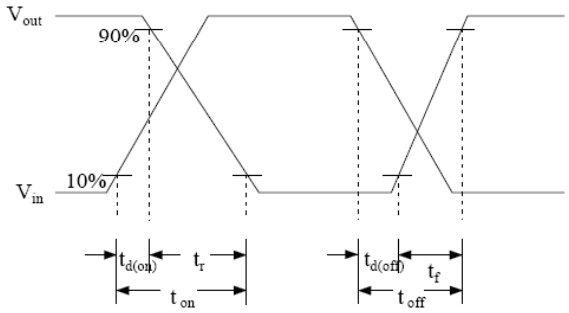
Gate Charge Test Circuit & Waveform



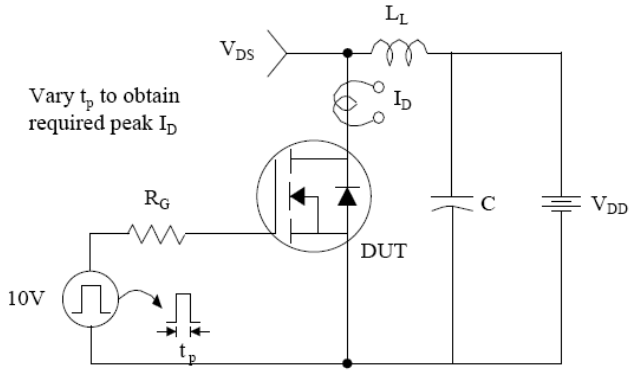


Resistive Switching Test Circuit & Waveforms

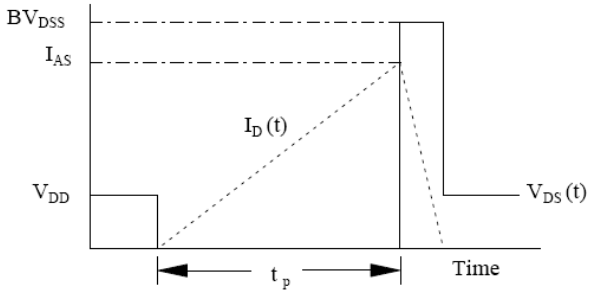




Unclamped Inductive Switching Test Circuit & Waveforms



$$E_{AS} = \frac{1}{2} L_L I_{AS}^2$$



Peak Diode Recovery dv/dt Test Circuit & Waveforms