

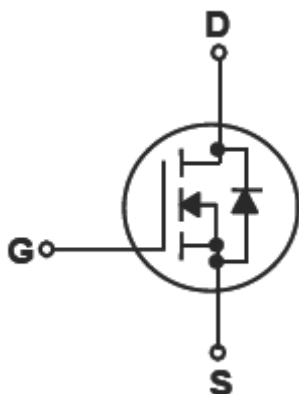
## 1. Features

- $R_{DS(ON)}=2.6m\Omega(\text{typ.})@V_{GS}=10V$ , DFN3\*3/5\*6
- $R_{DS(ON)}=3.2m\Omega(\text{typ.})@V_{GS}=10V$ , TO-252
- Very Low On-resistance  $R_{DS(ON)}$
- Low  $C_{rss}$
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability

## 2. Application

- PWM Application
- Load Switch
- Power Management

## 3. Pin configuration



Pin		Function
DFN3*3/5*6	TO-252	
4	1	Gate
5,6,7,8	2	Drain
1,2,3	3	Source

## 4. Ordering Information

Part Number	Package	Brand
KNG3303C	DFN3*3	KIA
KNY3303C	DFN5*6	KIA
KND3303C	TO-252	KIA

## 5. Absolute maximum ratings

(T<sub>C</sub>=25°C unless otherwise noted)

Parameter	Symbol	Rating		Units
		DFN3*3/5*6	TO-252	
Drain-source voltage	V <sub>DSS</sub>	30		V
Continuous drain current	T <sub>C</sub> =25°C	I <sub>D</sub>	90	A
	T <sub>C</sub> =100°C	I <sub>D</sub>	59	A
Pulsed drain current -Pulsed <sup>1)</sup>	I <sub>DM</sub>	400		A
Gate-source voltage	V <sub>GS</sub>	±20		V
Single pulse avalanche energy <sup>2)</sup>	E <sub>AS</sub>	289		mJ
Power dissipation (T <sub>C</sub> =25°C)	P <sub>D</sub>	66	70	W
Operating junction and storage temperature range	T <sub>J</sub> , T <sub>STG</sub>	-55 to 150		°C
Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds	T <sub>L</sub>	300		°C

\*Drain current limited by maximum junction temperature.

## 6. Thermal Data

Parameter	Symbol	Rating		Unit
		DFN3*3/5*6	TO-252	
Thermal resistance junction-case	R <sub>θJC</sub>	1.9	1.78	°C/W

## 7. Electrical characteristics

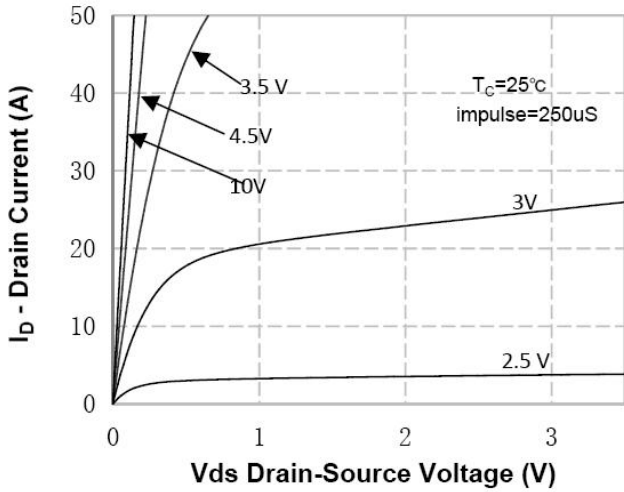
(T<sub>C</sub>=25°C, unless otherwise noted)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units	
Drain-source breakdown voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250uA	30	-	-	V	
Drain-source leakage current	I <sub>DSS</sub>	V <sub>DS</sub> =30V, V <sub>GS</sub> =0V	-	-	1	uA	
Gate-source forward leakage	I <sub>GSS</sub>	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	-	-	±100	nA	
Gate threshold voltage	V <sub>GS(TH)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA	1.0	-	2.2	V	
Drain-source on-resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =20A	DFN3*3/5*6	-	2.6	3.9	mΩ
			TO-252	-	3.2	4.0	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =15A	DFN3*3/5*6	-	3.9	5.6	mΩ
			TO-252	-	4.5	5.6	mΩ
Input capacitance	C <sub>iss</sub>	V <sub>DS</sub> =15V, V <sub>GS</sub> =0V f=1MHz	-	3280	-	pF	
Output capacitance	C <sub>oss</sub>		-	360	-	pF	
Reverse transfer capacitance	C <sub>rss</sub>		-	320	-	pF	
Turn-on delay time	t <sub>d(on)</sub>	V <sub>GS</sub> =10V, V <sub>DS</sub> =10V R <sub>L</sub> =3Ω, I <sub>D</sub> =30A <sup>3)</sup>		10	-	ns	
Rise time	t <sub>r</sub>			100	-	ns	
Turn-off delay time	t <sub>d(off)</sub>			54	-	ns	
Fall time	t <sub>f</sub>			98		ns	
Total gate charge(10V)	Q <sub>g</sub>	V <sub>DS</sub> =10V, I <sub>D</sub> =30A V <sub>GS</sub> =10V <sup>3)</sup>	-	60	-	nC	
Gate-source charge	Q <sub>gs</sub>		-	28	-	nC	
Gate-drain charge	Q <sub>gd</sub>		-	3	-	nC	
Maximum Continuous Drain-Source Diode Forward Current	I <sub>S</sub>	—	-	-	100	A	
Maximum Pulsed Drain-Source Diode Forward Current	I <sub>SM</sub>	—	-	-	400	A	
Diode forward voltage	V <sub>SD</sub>	I <sub>SD</sub> =20A, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C	-	-	1.2	V	
Reverse recovery time	T <sub>rr</sub>	I <sub>F</sub> =20A dI <sub>F</sub> /dt=100A/μs	-	20	-	ns	
Reverse recovery charge	Q <sub>rr</sub>	I <sub>F</sub> =20A dI <sub>F</sub> /dt=100A/μs	-	10	-	nC	

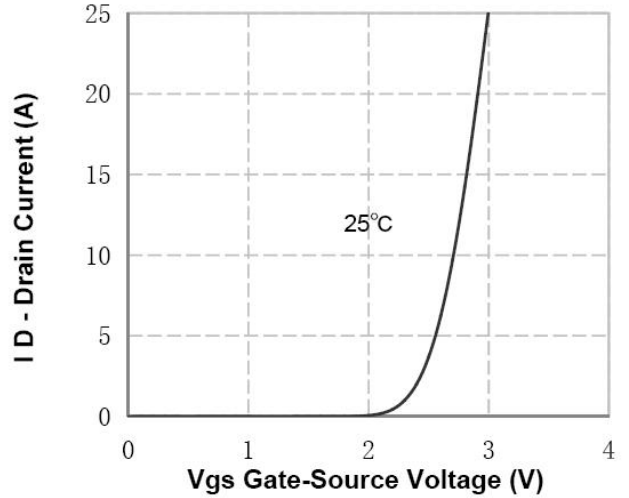
Note:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
2. EAS condition: T<sub>J</sub>=25°C, V<sub>DD</sub>=15V, V<sub>G</sub>=10V, R<sub>G</sub>=25Ω, L=0.5mH.
3. Pulse Test: Pulse Width≤300us, Duty Cycle≤0.5%

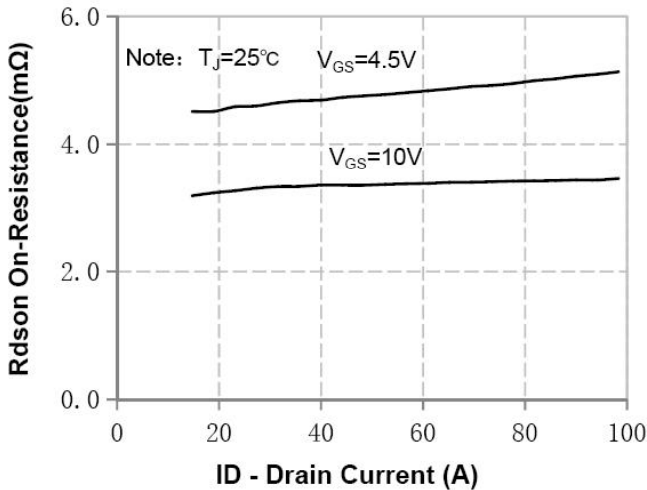
**8. Typical Electrical Characteristics**



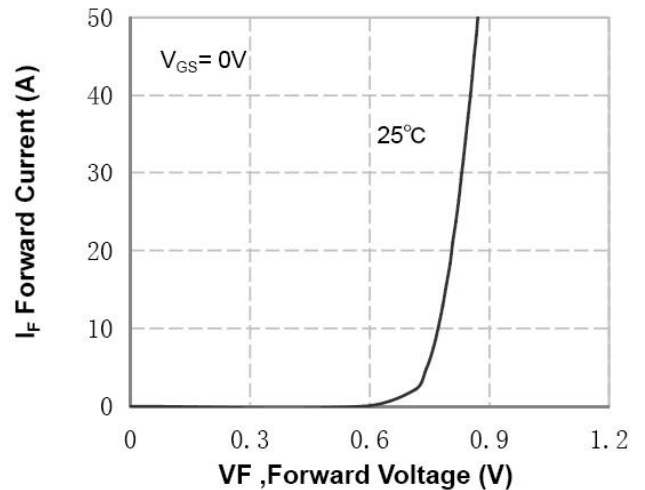
**Figure 1. On-Region Characteristics**



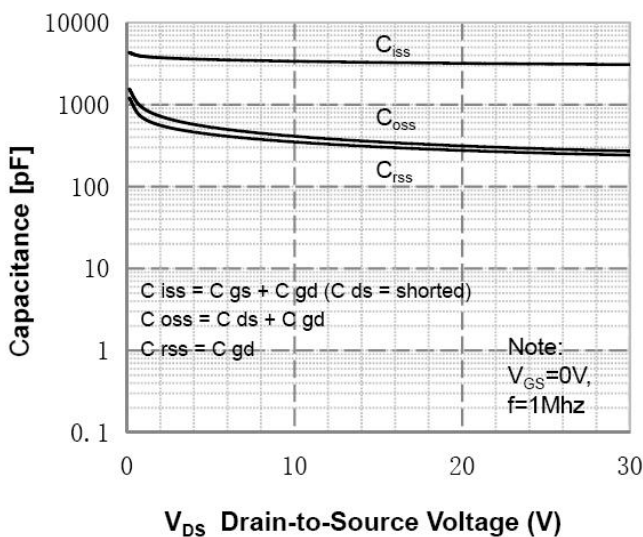
**Figure 2. Transfer Characteristics**



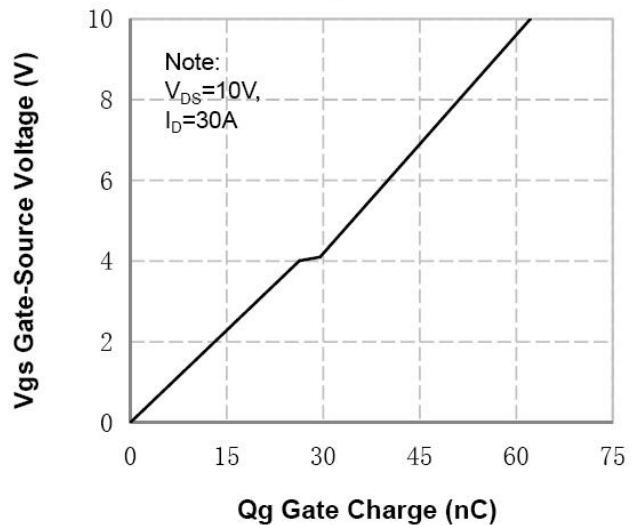
**Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage**



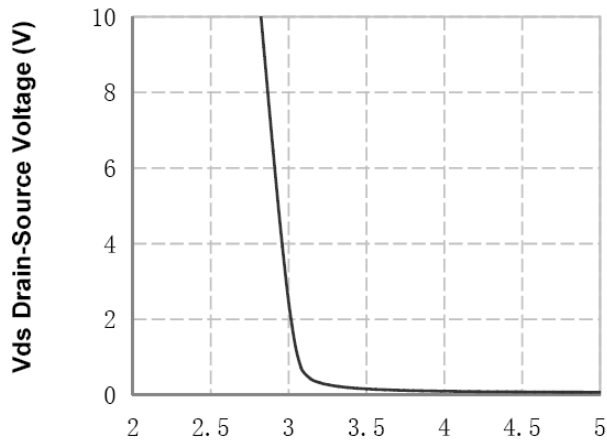
**Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature**



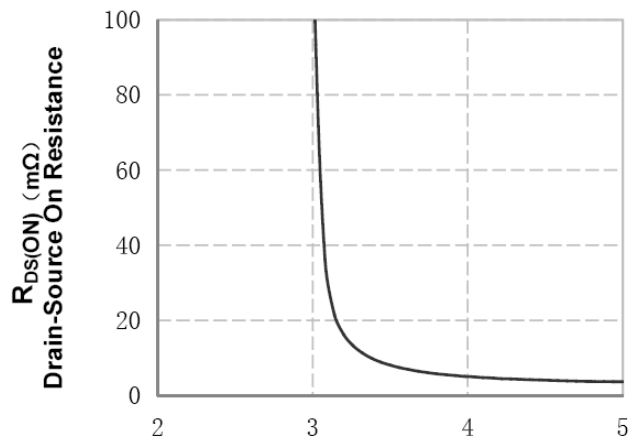
**Figure 5. Capacitance Characteristics**



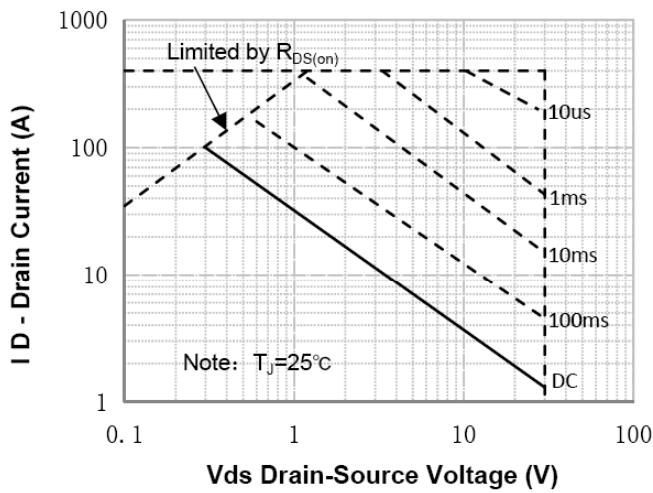
**Figure 6. Gate Charge Characteristics**



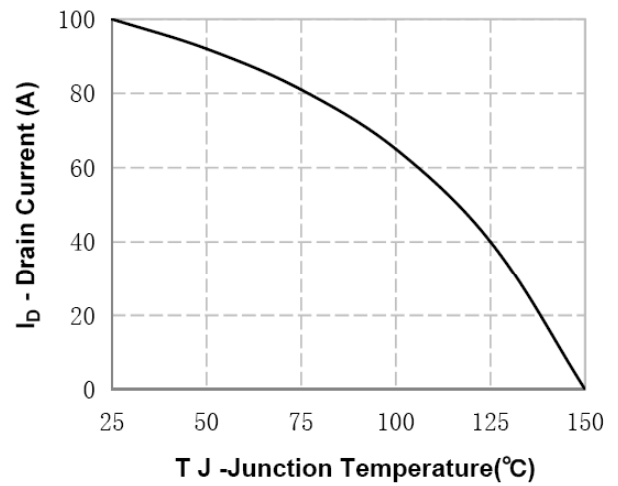
**Figure 7. Vds Drain-Source Voltage vs Gate Voltage**



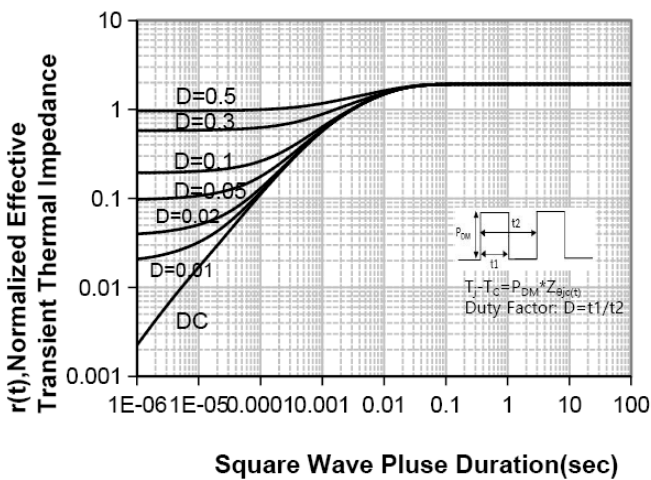
**Figure 8. On-Resistance vs Gate Voltage**



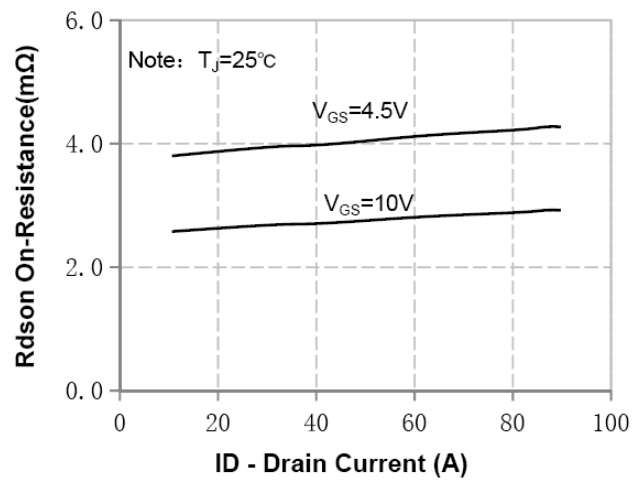
**Figure 9. Maximum Safe Operating Area**



**Figure 10. Maximum Continuous Drain Current vs Temperature**



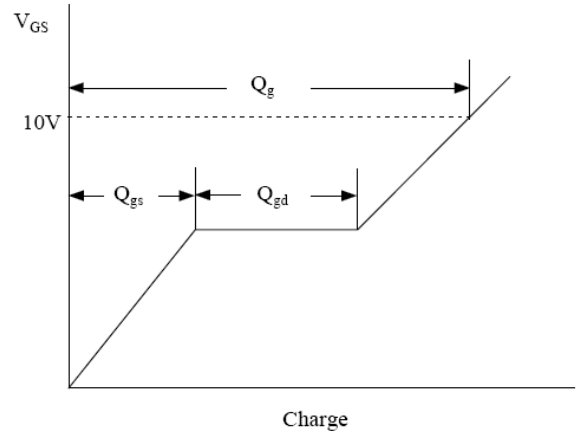
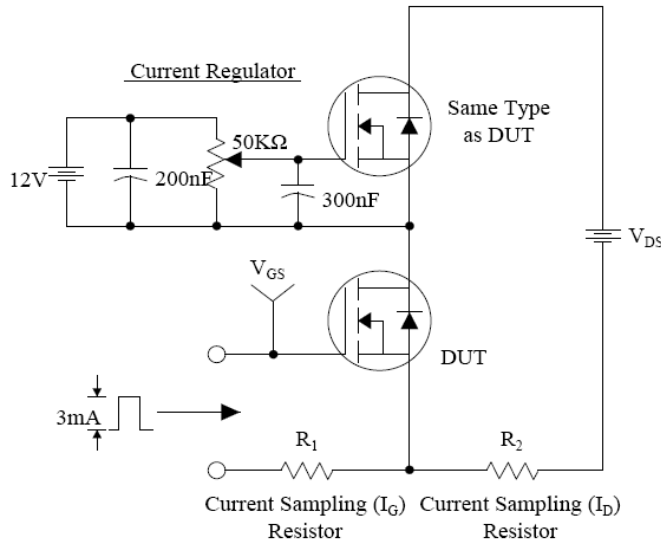
**Figure 11. Transient Thermal Response Curve**



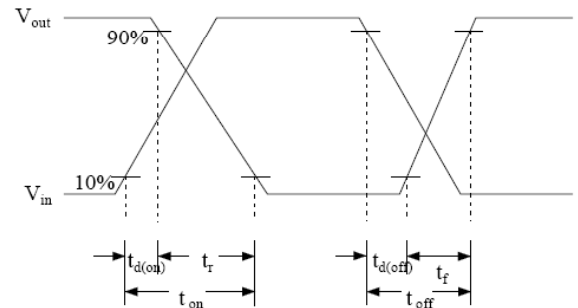
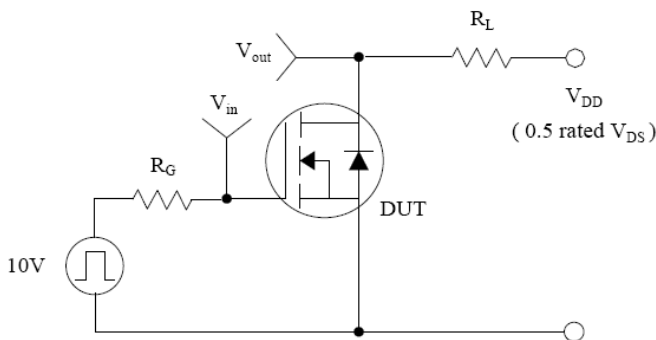
**Figure 12. On-Resistance Variation vs Drain Current and Gate Voltage**

**9. Test Circuits and Waveforms**

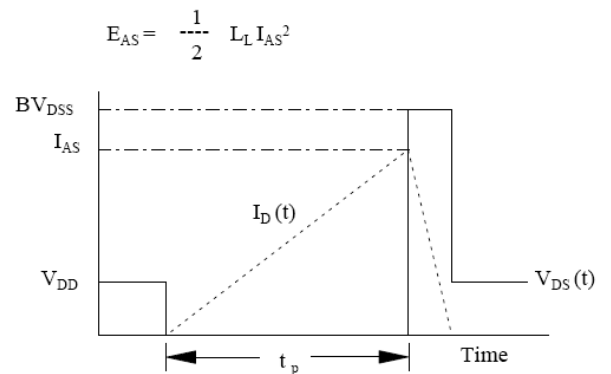
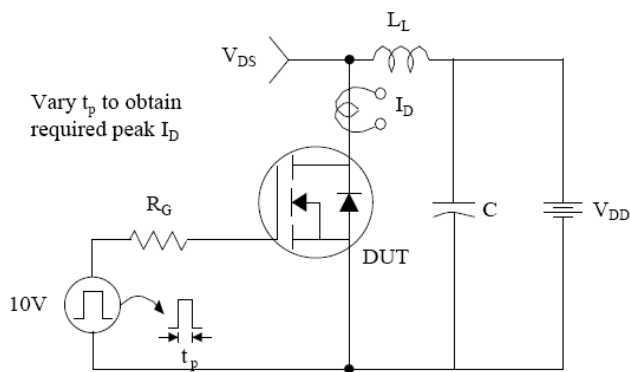
**Gate Charge Test Circuit & Waveform**



**Resistive Switching Test Circuit & Waveforms**



**Unclamped Inductive Switching Test Circuit & Waveforms**



## Peak Diode Recovery $dv/dt$ Test Circuit & Waveforms

