

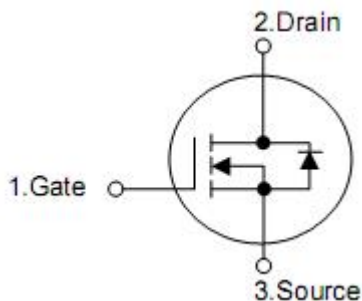
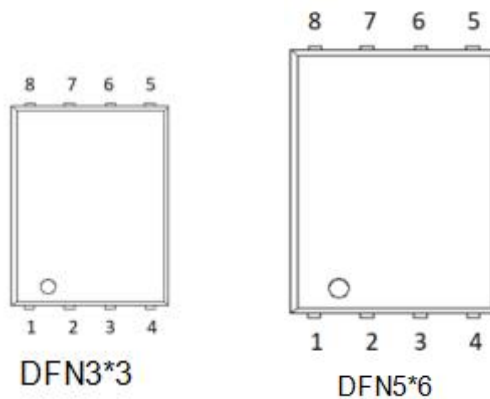
## 1.Features

- n  $R_{DS(on)}(typ.)=7.5m\Omega, V_{GS}=10V$
- n Advanced trench process technology
- n High density cell design for ultra low on-resistance
- n Fully characterized avalanche voltage and current

## 2.Applications

- n High Frequency Point-of-Load Synchronous Buck Converter for MB/NB/UMPC/VGA
- n Networking DC-DC Power System
- n Load Switch

## 3. Pin configuration



Pin	Function
4	Gate
5,6,7,8	Drain
1,2,3	Source

## 4. Ordering information

Part Number	Package	Brand
KNG3703A	DFN3*3	KIA
KNY3703A	DFN5*6	KIA

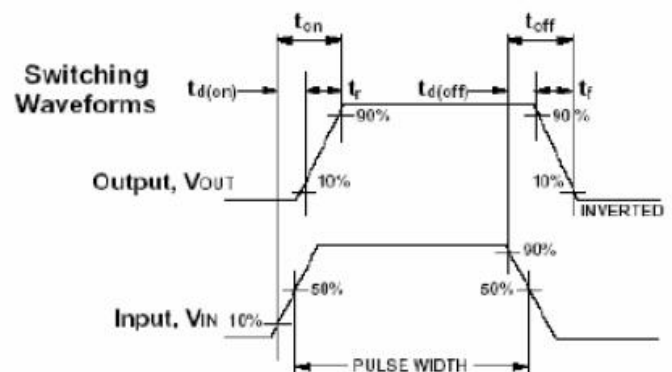
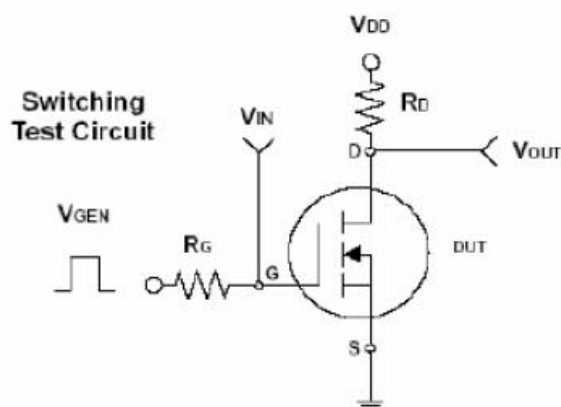
## 5. Maximum ratings and thermal characteristics

( $T_a=25^\circ\text{C}$ , unless otherwise notes)

Rating	Symbol	Value		Unit	
		DNF5*6	DNF3*3		
Drain-source voltage	$V_{DS}$	30		V	
Gate-source voltage	$V_{GS}$	$\pm 20$		V	
Continuous drain current <sup>4)</sup>	$I_D$	50	50	A	
Pulsed drain current <sup>1,4)</sup>	$I_{DM}$	200	200	A	
Maximum power dissipation	$T_A=25^\circ\text{C}$	$P_D$	46	28	W
	$T_A=75^\circ\text{C}$	$P_D$	17.9	11.1	W
Operating junction and storage temperature range	$T_J/T_{STG}$	-55 to 150		$^\circ\text{C}$	
Junction-to-case thermal resistance	$R_{\theta JC}$	2.71	4.46	$^\circ\text{C/W}$	
Junction-to ambient thermal resistance (PCB mount) <sup>2)</sup>	$R_{\theta JA}$	47	72	$^\circ\text{C/W}$	

- Note: 1. Repetitive rating; pulse width limited by the maximum junction temperature  
 2. 1-in<sup>2</sup> 2oz Cu PCB board  
 3. Guaranteed by design; not subject to production testing  
 4. Drain current limited by maximum junction temperature.

## 6. Typical application circuit



## 7. Electrical characteristics

(Ta=25°C, unless otherwise notes)

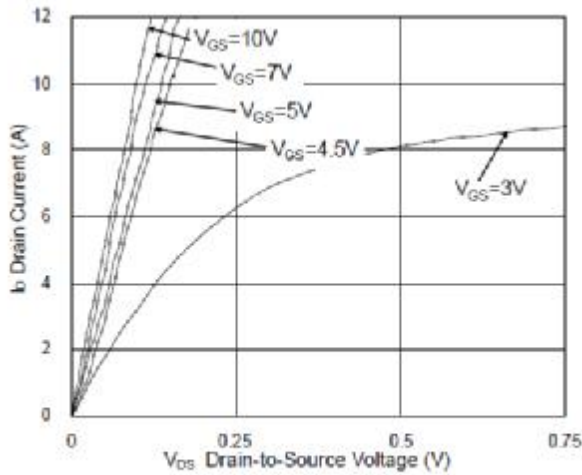
Parameter	Symbol	Test conditions	Min.	Typ.	Max.	Units	
<b>Static</b>							
Drain-source breakdown voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	30	-	-	V	
Drain-source on-state resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =4.5V, I <sub>D</sub> =25A	-	11.5	14	mΩ	
		V <sub>GS</sub> =10V, I <sub>D</sub> =25A	-	7.5	9.0	mΩ	
Gate threshold voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250μA	1	1.5	3	V	
Forward transconductance	g <sub>fs</sub>	V <sub>DS</sub> =15V, I <sub>D</sub> =15A	-	12	-	S	
Zero gate voltage drain current	I <sub>DSS</sub>	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V	-	-	1	μA	
Gate-source forward leakage	I <sub>GSS</sub>	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	-	-	±100	nA	
<b>Dynamic<sup>3)</sup></b>							
Total gate charge	Q <sub>g</sub>	I <sub>D</sub> =35A V <sub>DS</sub> =15V V <sub>GS</sub> =10V	-	10		nC	
Gate-source charge	Q <sub>gs</sub>				3.5		nC
Gate-drain ("miller") charge	Q <sub>gd</sub>			-	3		nC
Turn-on delay time	t <sub>d(off)</sub>	V <sub>DD</sub> =15V I <sub>D</sub> =1A R <sub>G</sub> =6Ω R <sub>L</sub> =15Ω V <sub>GEN</sub> =10V	-	12	-	ns	
Rise time	t <sub>r</sub>		-	4	-	ns	
Turn-off delay time	t <sub>d(off)</sub>		-	32	-	ns	
Fall time	t <sub>f</sub>		-	6	-	ns	
Input capacitance	C <sub>iss</sub>	V <sub>GS</sub> =0V V <sub>DS</sub> =15V f=1.0MHz	-	1300	-	pF	
Output capacitance	C <sub>oss</sub>		-	270	-	pF	
Reverse transfer capacitance	C <sub>rss</sub>		-	145	-	pF	

### Source-drain diode

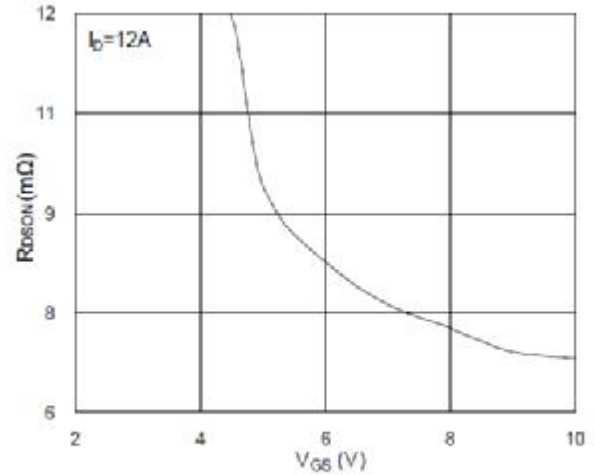
Parameter	Symbol	Test condition	Min.	Typ.	Max.	Units
Diode forward voltage	V <sub>SD</sub>	I <sub>S</sub> =20A, V <sub>GS</sub> =0V	-	0.87	1.5	V
Max. diode forward current	I <sub>S</sub>		-	-	20	A

Notes: Pulse width ≤ 300μs, duty cycle ≤ 2%

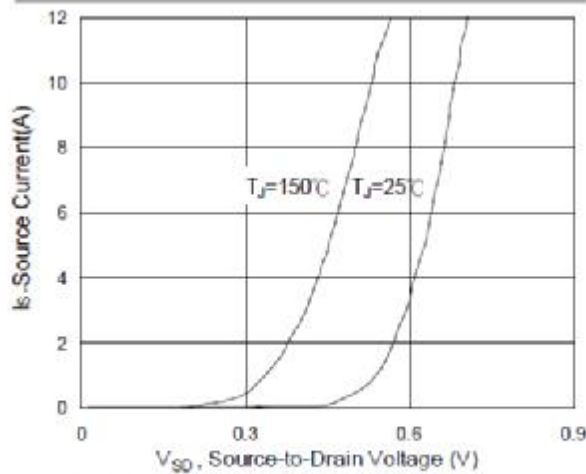
**8. Test circuits and waveforms**



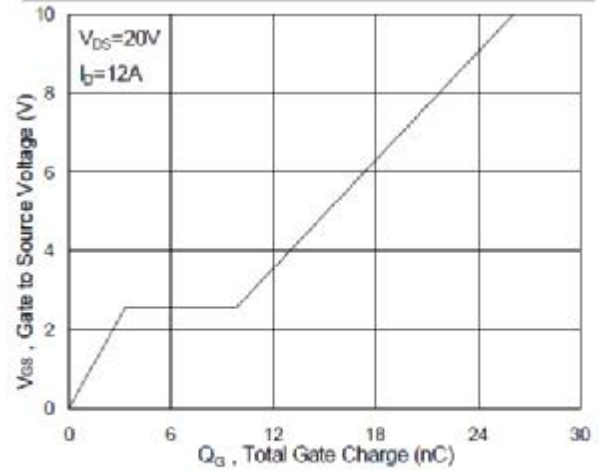
**Fig.1 Typical Output Characteristics**



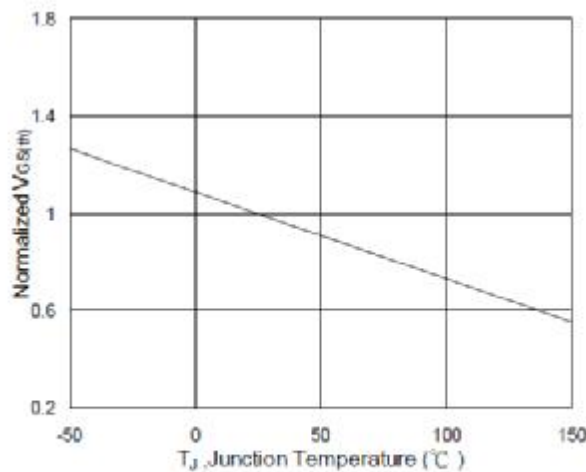
**Fig.2 On-Resistance vs. G-S Voltage**



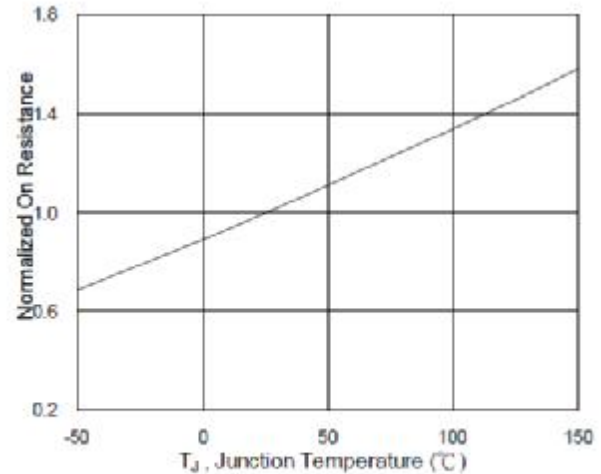
**Fig.3 Forward Characteristics of Reverse**



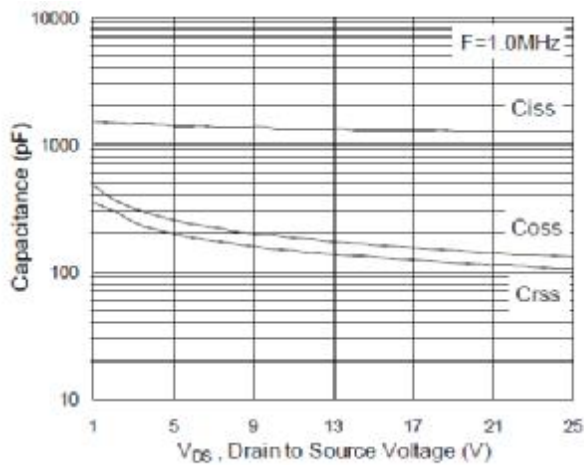
**Fig.4 Gate-Charge Characteristics**



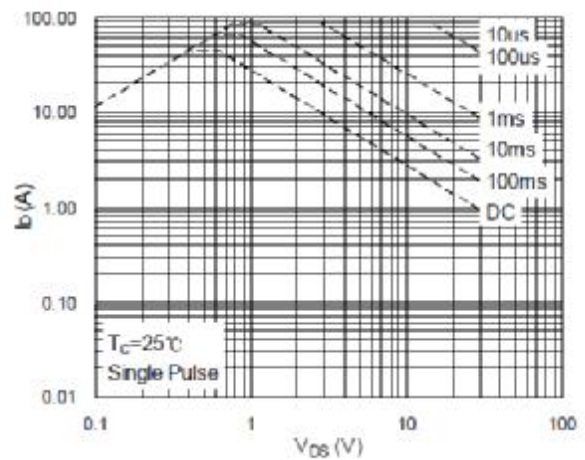
**Fig.5 Normalized  $V_{GS(th)}$  vs.  $T_J$**



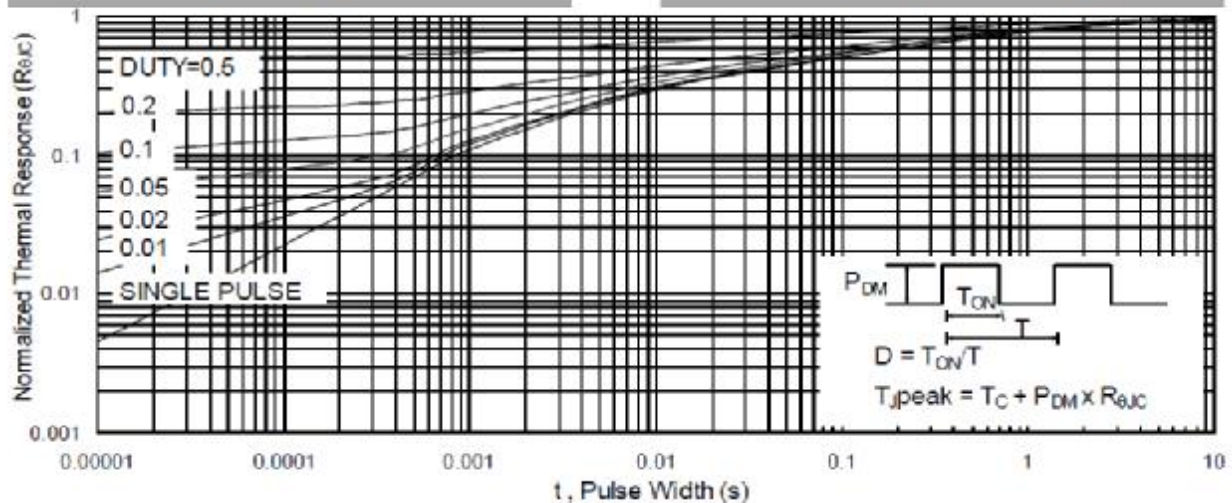
**Fig.6 Normalized  $R_{DS(on)}$  vs.  $T_J$**



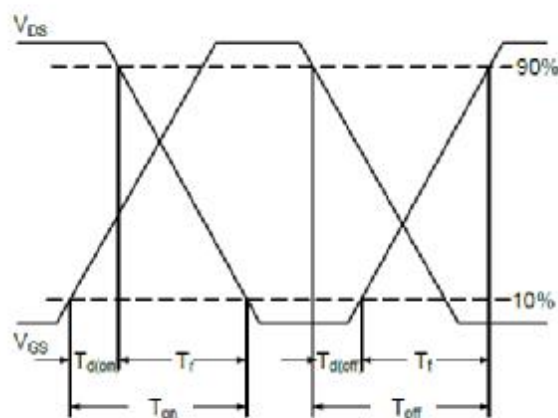
**Fig.7 Capacitance**



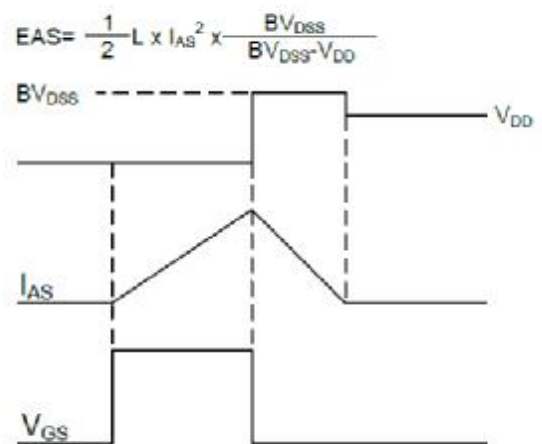
**Fig.8 Safe Operating Area**



**Fig.9 Normalized Maximum Transient Thermal Impedance**



**Fig.10 Switching Time Waveform**



**Fig.11 Unclamped Inductive Switching Waveform**