

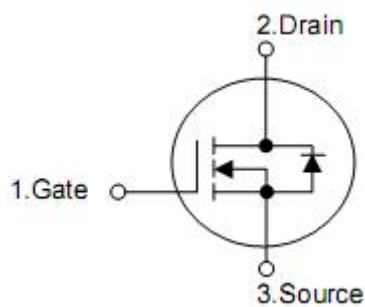
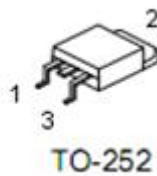
## 1. Features

- n  $R_{DS(ON),typ.}=8.5m\Omega@V_{GS}=10V$
- n Extremely low on-resistance  $R_{DS(on)}$
- n Excellent  $Q_g \times R_{DS(on)}$  product(FOM)
- n Qualified according to JEDEC criteria

## 2. Applications

- n Motor control and drive
- n Battery management
- n UPS (Uninterruptible Power Supplies)

## 3. Pin configuration



Pin	Function
1	Gate
2	Drain
3	Source

#### 4. Ordering Information

Part Number	Package	Brand
KND3406C	TO-252	KIA

#### 5. Absolute maximum ratings

Parameter		Symbol	Ratings	Unit
Drain-to-Source Voltage		$V_{DSS}$	60	V
Continuous Drain Current	$T_C=25\text{ }^\circ\text{C}$ (Silicon limit)	$I_D$	64	A
	$T_C=25\text{ }^\circ\text{C}$ (Package limit)		80	
	$T_C=100\text{ }^\circ\text{C}$ (Silicon limited)		41	
Pulsed Drain Current	( $T_C = 25^\circ\text{C}$ , $t_p$ limited by $T_{jmax}$ )	$I_{DP}$	256	
Avalanche Energy single pulse ( $L=0.5\text{mH}$ , $R_g=25\Omega$ )		$E_{AS}$	60	mJ
Gate-Source voltage		$V_{GS}$	$\pm 20$	V
Power dissipation ( $T_C = 25^\circ\text{C}$ )		$P_{tot}$	87	W
Junction & Storage Temperature Range		$T_J, T_{STG}$	-55 to 150	$^\circ\text{C}$

#### 6. Thermal characteristics

Parameter	Symbol	Ratings	Units
Thermal resistance, junction-ambient	$R_{\theta JA}$	99	$^\circ\text{C}/\text{W}$
Thermal resistance, Junction-case	$R_{\theta JC}$	1.43	

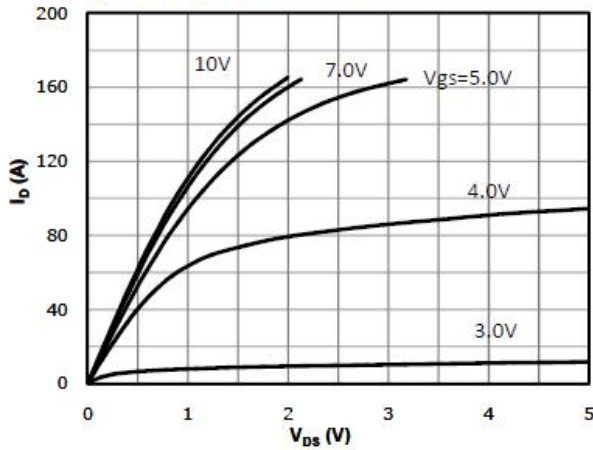
## 7. Electrical characteristics

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

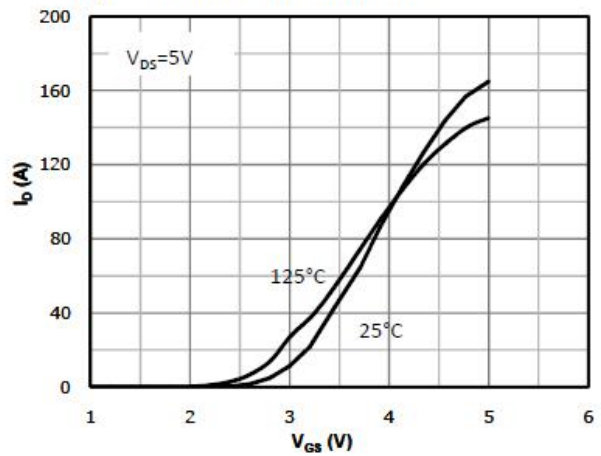
Parameter	Symbol	Conditions	Min	Typ	Max	Units	
Static characteristics							
Drain-source breakdown voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	60	-	-	V	
Gate threshold voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA	1.3	1.8	2.3	V	
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =60V, V <sub>GS</sub> =0V	T <sub>J</sub> =25°C	-	-	1	μA
			T <sub>J</sub> =125°C	-	-	10	
Gate leakage current	I <sub>GSS</sub>	V <sub>GS</sub> =20V, V <sub>DS</sub> =0V	-	10	100	nA	
Drain-source on-resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =20A	T <sub>J</sub> =25 °C	-	8.5	10.5	mΩ
			T <sub>J</sub> =150 °C	-	16.7	20.5	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =20A	-	10.5	12.5	mΩ	
Forward Transconductance	g <sub>fs</sub>	V <sub>DS</sub> =5V, I <sub>D</sub> =20A	-	50	-	S	
Dynamic characteristics							
Gate Resistance	R <sub>G</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, f=1MHz	-	1.2	-	Ω	
Input capacitance	C <sub>iSS</sub>	V <sub>DS</sub> =30V, V <sub>GS</sub> =0V, F=1MHz	-	1940	-	pF	
Output capacitance	C <sub>oss</sub>		-	200	-	pF	
Reverse transfer capacitance	C <sub>rSS</sub>		-	140	-	pF	
Turn-on delay time	t <sub>d(on)</sub>	V <sub>GS</sub> =10V, V <sub>DD</sub> =30V, R <sub>G</sub> =24Ω, I <sub>D</sub> =20A,	-	22	-	ns	
Rise time	t <sub>r</sub>		-	90	-	ns	
Turn-off delay time	t <sub>d(off)</sub>		-	155	-	ns	
Fall time	t <sub>f</sub>		-	145	-	ns	
Gate Charge Characteristics							
Total gate charge	Q <sub>g</sub>	V <sub>GS</sub> =10V, V <sub>DS</sub> =30V, I <sub>D</sub> =20A, F=1MHz	-	45	-	nC	
Gate-source charge	Q <sub>gs</sub>		-	8	-	nC	
Gate-drain charge	Q <sub>gd</sub>		-	12	-	nC	
Diode characteristics							
Diode forward voltage	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>SD</sub> =20A	-	0.8	1.3	V	
Reverse recovery time	t <sub>rr</sub>	I <sub>F</sub> =20A di/dt=100A/μs	-	20	-	ns	
Reverse recovery charge	Q <sub>rr</sub>		-	16	-	nC	

**8. Typical Characteristics**

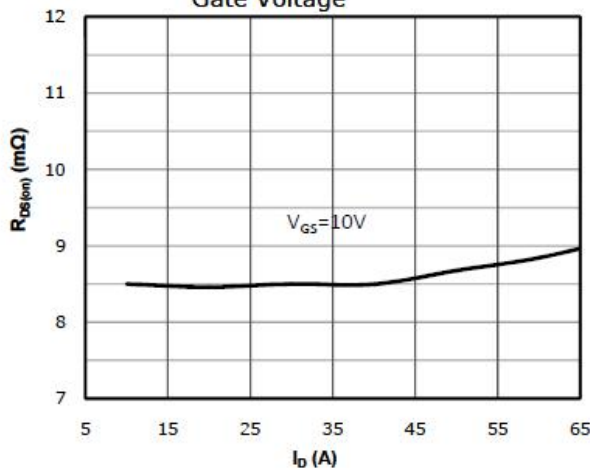
**Fig 1: Output Characteristics**



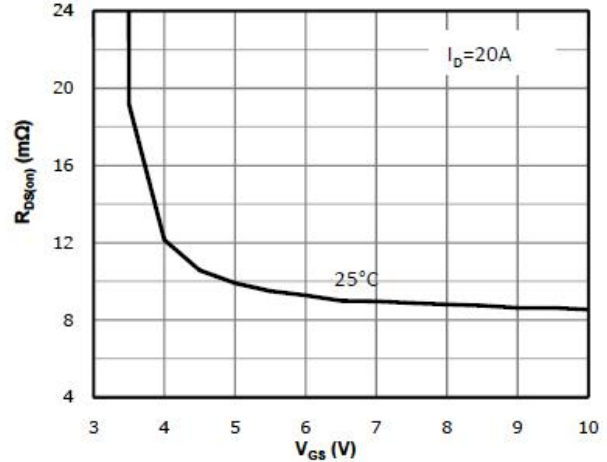
**Fig 2: Transfer Characteristics**



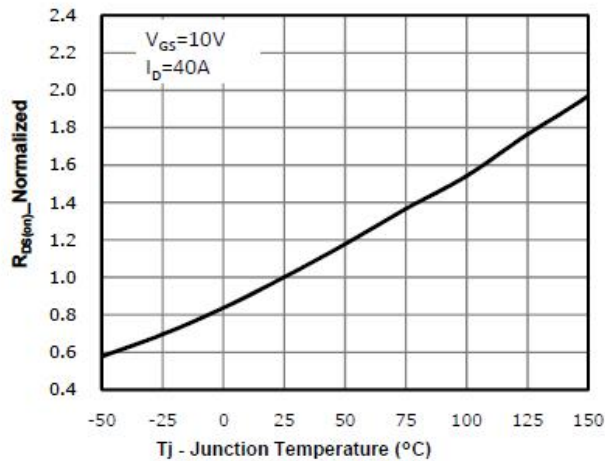
**Fig 3: Rds(on) vs Drain Current and Gate Voltage**



**Fig 4: Rds(on) vs Gate Voltage**



**Fig 5: Rds(on) vs. Temperature**



**Fig 6: Capacitance Characteristics**

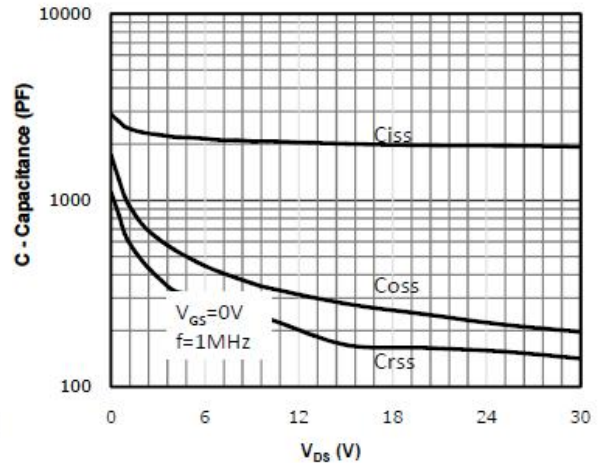


Fig 7: Gate Charge Characteristics

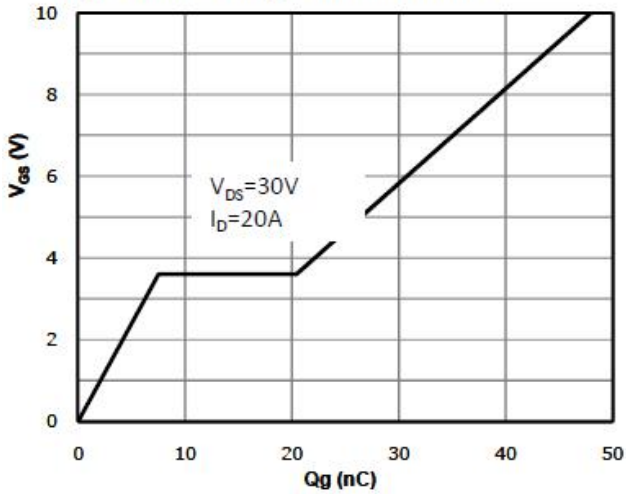


Fig 8: Body-diode Forward Characteristics

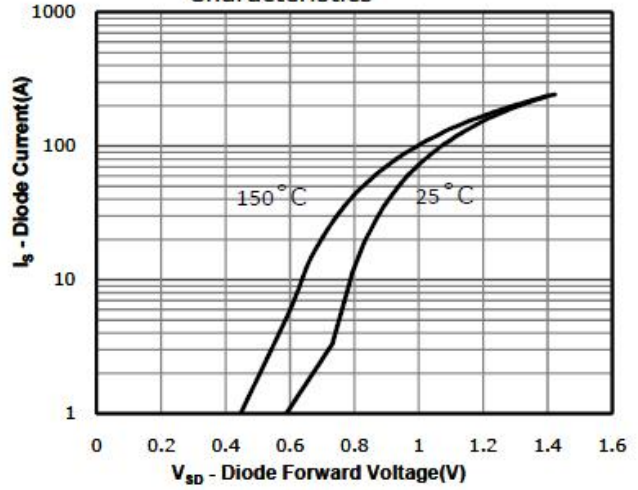


Fig 9: Power Dissipation

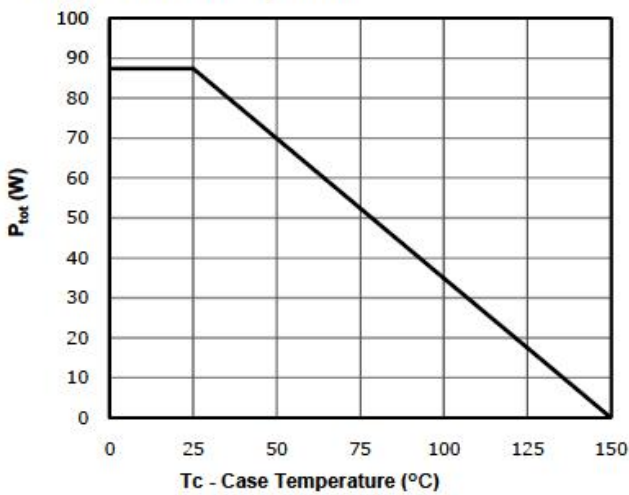


Fig 10: Drain Current Derating

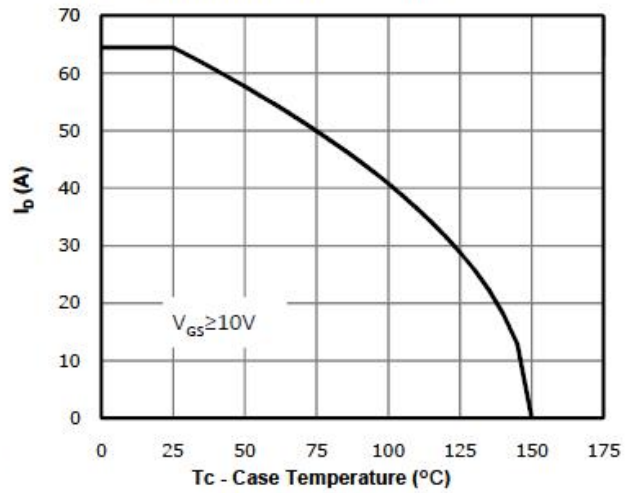


Fig 11: Safe Operating Area

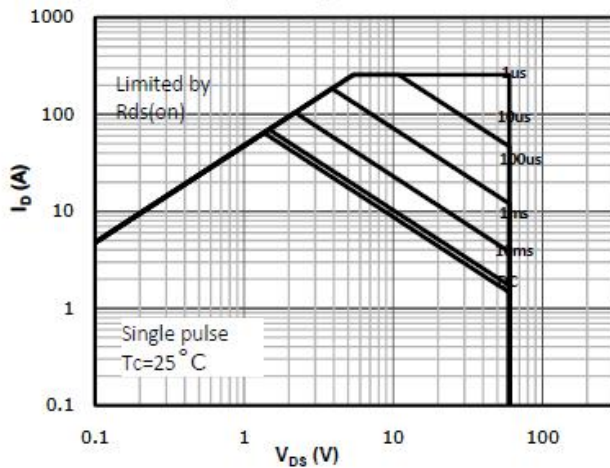
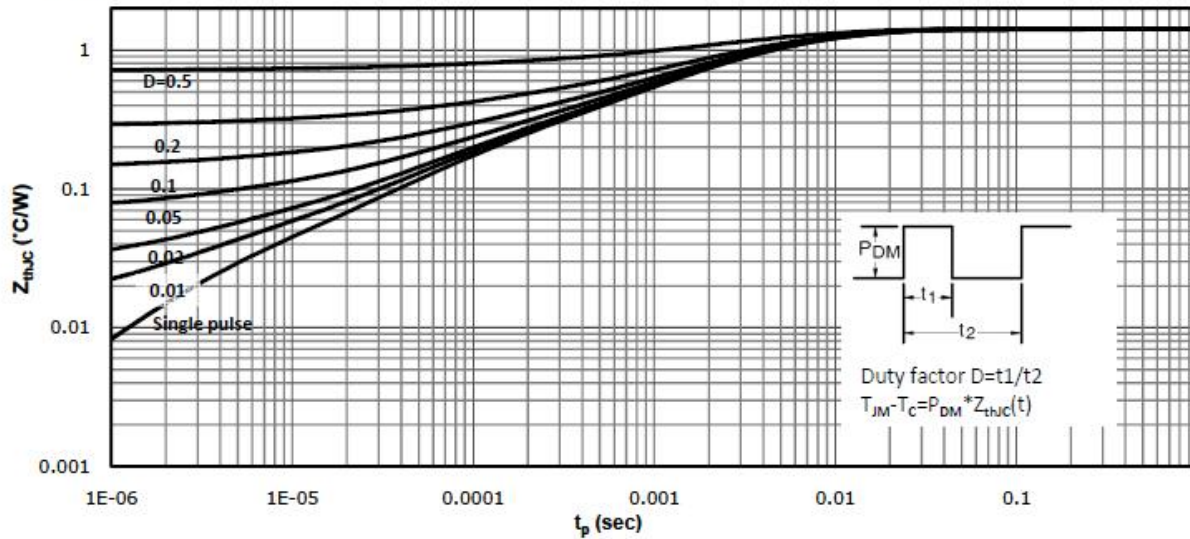
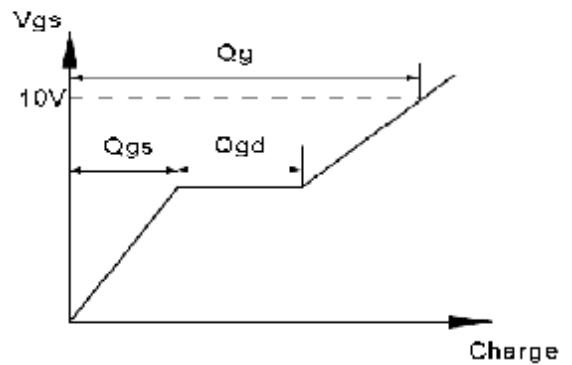
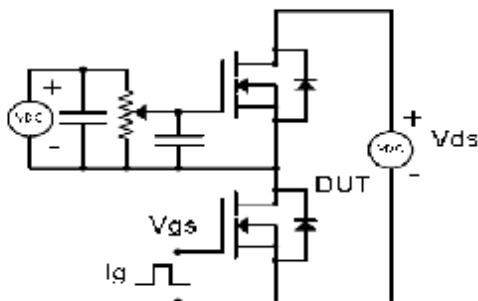


Fig 12: Max. Transient Thermal Impedance

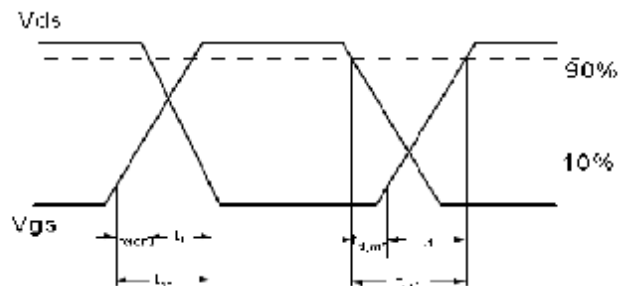
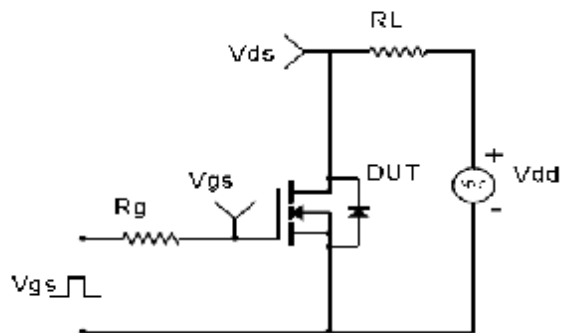


## 9. Typical Characteristics

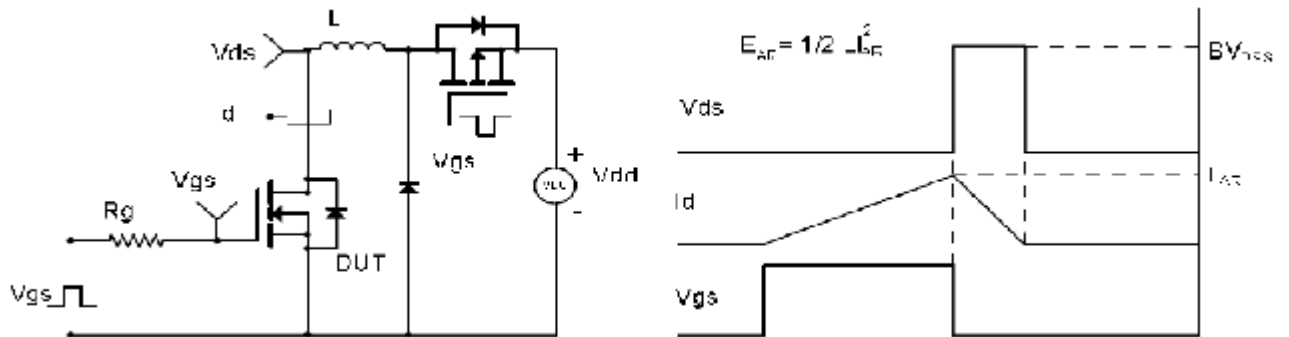
Gate Charge Test Circuit & Waveform



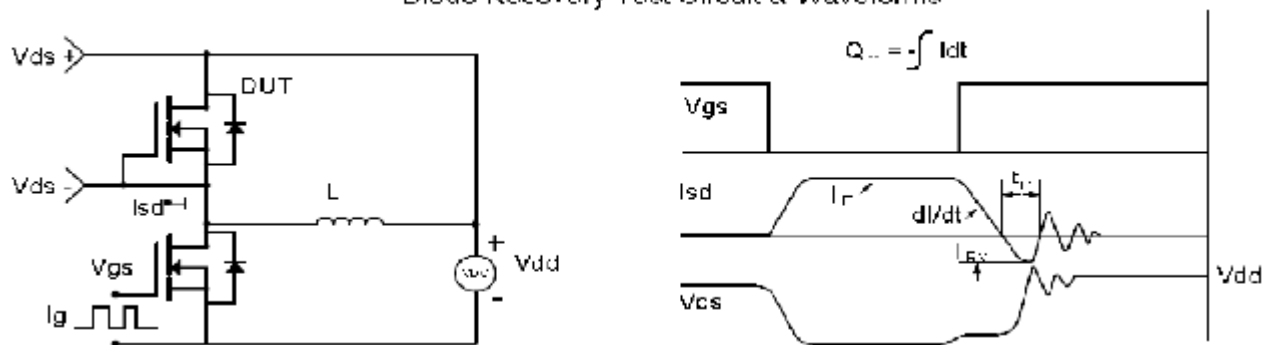
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



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