

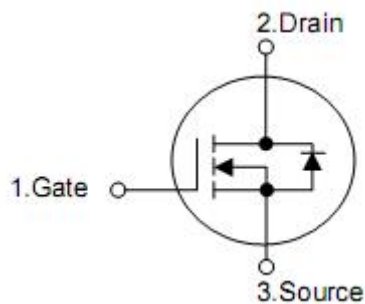
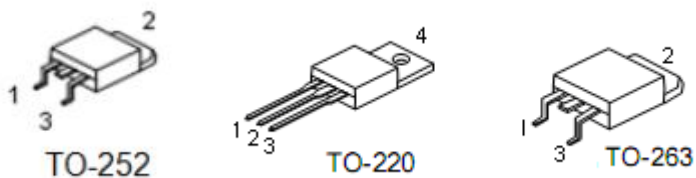
1. Features

- n** $R_{DS(on)}=2.2m\Omega$ (typ.) @ $V_{GS}=10V$
- n** Low On-Resistance
- n** Fast Switching
- n** 100% Avalanche Tested
- n** Repetitive Avalanche Allowed up to T_{jmax}
- n** Lead-Free, RoHS Compliant

2. Features

KNX2803A designed by the trench processing techniques to achieve extremely low on-resistance. Additional features of this design are a 175°C junction operating temperature, fast switching speed and improved repetitive avalanche rating. These features combine to make this design an extremely efficient and reliable device for use in Motor applications and a wide variety of other applications.

3. Pin configuration



Pin	Function
1	Gate
2	Drain
3	Source
4	Drain

4. Ordering Information

Part Number	Package	Brand
KNP2803A	TO-220	KIA
KNB2803A	TO-263	KIA
KND2803A	TO-252	KIA

5. Absolute maximum ratings

($T_C=25\text{ }^{\circ}\text{C}$, unless otherwise specified)

Parameter	Symbol	Ratings		Units
		TO-252	TO-263/220	
Drain-source voltage	V_{DSS}	30		V
Gate-source voltage	V_{GSS}	± 20		V
Continuous drain current @ $V_{GS}=10\text{V}$, $T_C=25\text{ }^{\circ}\text{C}$, (See Fig2)	I_D	150		A
Pulsed drain current tested $T_C=25\text{ }^{\circ}\text{C}$ (Silicon Limit)	I_{DM}	600		A
Avalanche energy single pulse ²	E_{AS}	625		mJ
Maximum Power dissipation $T_C=25\text{ }^{\circ}\text{C}$	P_D	50	160	W
Maximum junction temperature	T_J	175		$^{\circ}\text{C}$
Storage temperature range	T_{STG}	$-55\sim+175$		$^{\circ}\text{C}$
Diode continuous forward current $T_C=25\text{ }^{\circ}\text{C}$ ¹	I_S	150		A

6. Thermal characteristics

Parameter	Symbol	Rating		Unit
		TO-252	TO-263/220	
Thermal resistance, Junction-to-case	θ_{JC}	3.0	0.93	$^{\circ}\text{C/W}$

7. Electrical characteristics

(T_C=25°C, unless otherwise notes)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Off Characteristics						
Drain-source breakdown voltage	BV _{DSS}	V _{GS} =0V,I _D =250μA	30	-	-	V
Drain-to-source leakage current	I _{DSS}	V _{DS} =24V ,V _{GS} =0V	-	-	1	μA
		T _C =125 °C	-	-	100	μA
Gate-to-source leakage current	I _{GSS}	V _{GS} =20V,V _{DS} =0V	-	-	100	nA
		V _{GS} =-20V,V _{DS} =0V	-	-	-100	nA
On characteristics						
Gate threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	0.8	1.3	2.0	V
Static drain-source on-resistance ¹	R _{DS(on)}	V _{GS} =10V,I _D =40A	-	2.2	3.0	mΩ
Static drain-source on-resistance ¹	R _{DS(on)}	V _{GS} =4.5V,I _D =40A	-	2.8	4.0	mΩ
Dynamic characteristics						
Input capacitance	C _{iss}	V _{DS} =15V,V _{GS} =0V,f=1.0MHz	-	4050	-	pF
Output capacitance	C _{oss}		-	680	-	
Reverse transfer capacitance	C _{rss}		-	355	-	
Total gate charge	Q _g	V _{DS} =15V,I _D =20A,V _{GS} =4.5V	-	110	-	nC
Gate-source charge	Q _{gs}		-	35	-	
Gate-drain (Miller)charge	Q _{gd}		-	14	-	
Resistive switching characteristics						
Turn-on delay time	T _{d(ON)}	V _{DD} =15V,I _D =10A,V _{GS} =4.5V, R _G =6.8Ω	-	19	-	nS
Rise time	t _{rise}		-	50	-	
Turn-off delay time	T _{d(OFF)}		-	20	-	
Fall time	t _{fall}		-	26	-	
Source-drain body diode characteristics T _J =25°C,unless otherwise notes						
Diode forward voltage ¹	V _{SD}	V _{GS} =0V,I _{SD} =20A	-	-	1.3	V
Reverse recovery time	t _{rr}	I _{SD} =30A,di _F /dt=100A/μs, T _J =25°C, V _{GS} =0V	-	32	-	ns
Reverse recovery charge	Q _{rr}		-	33	-	nC

Note: 1. Pulse width ≤300μs; duty cycle ≤2%.

2. Limited by T_{Jmax}, Starting T_J=25°C. L=0.5mH R_G=25Ω, I_{AS}=50A, V_{GS}=10V,

Part not recommended for use above this value.

3. Repetitive rating; pulse width limited by max, junction temperature.

8. Typical characteristics

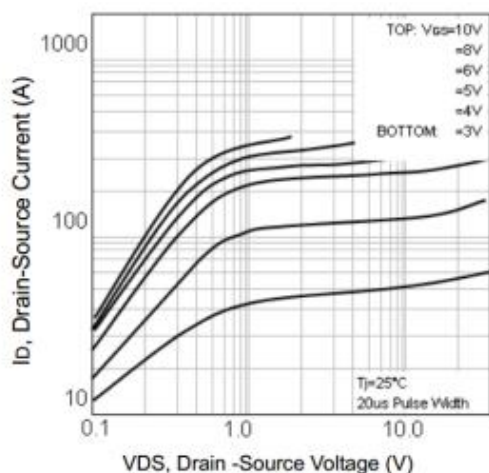


Fig1. Typical Output Characteristics

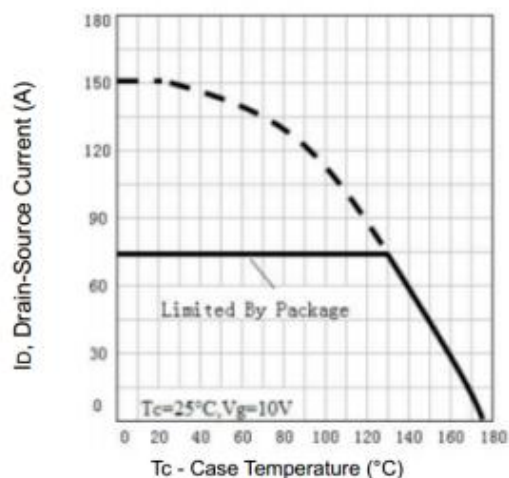


Fig2. Maximum Drain Current Vs. Case Temperature

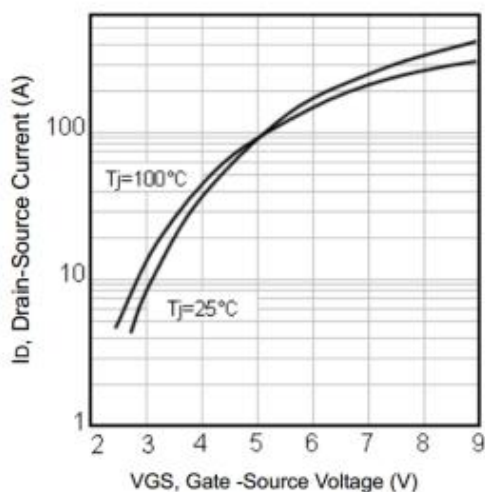


Fig3. Typical Transfer Characteristics

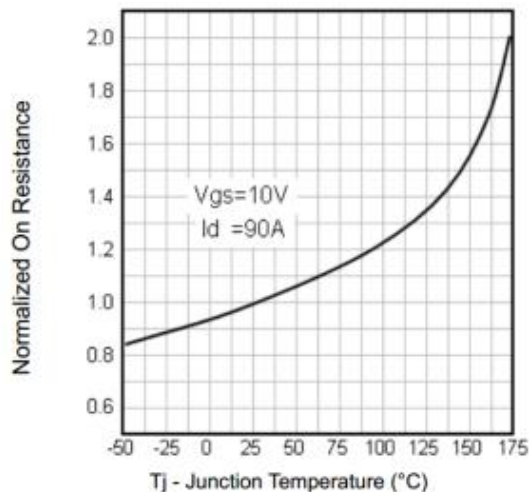


Fig4. Normalized On-Resistance Vs. Temperature

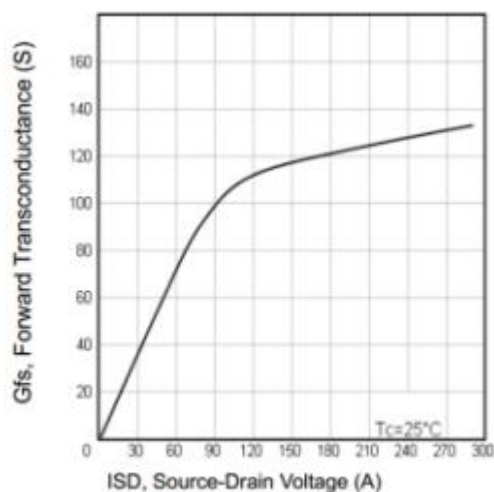


Fig5. Typical Forward Transconductance Vs. Drain Current

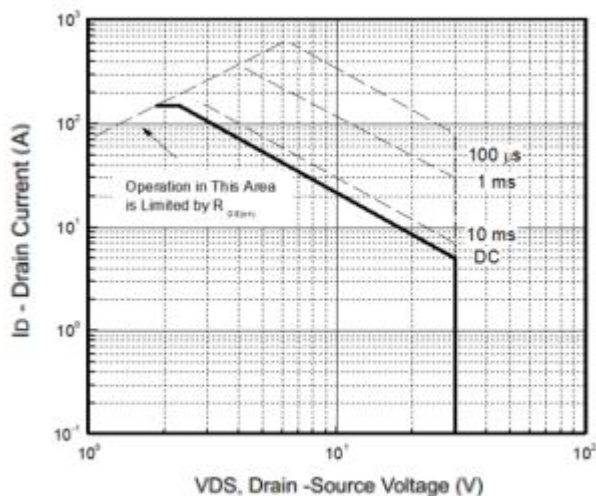


Fig6. Maximum Safe Operating Area

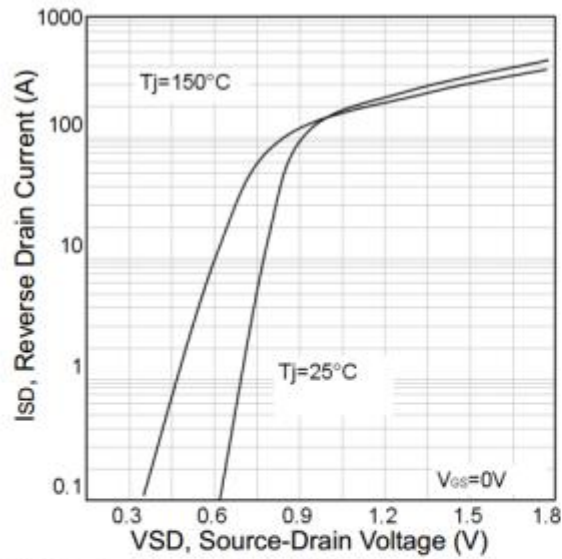


Fig7. Typical Source-Drain Diode Forward Voltage

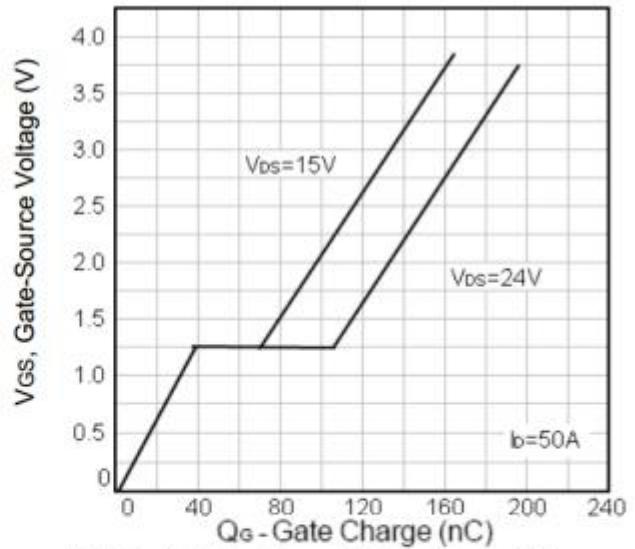


Fig8. Typical Gate Charge Vs. Gate-Source Voltage

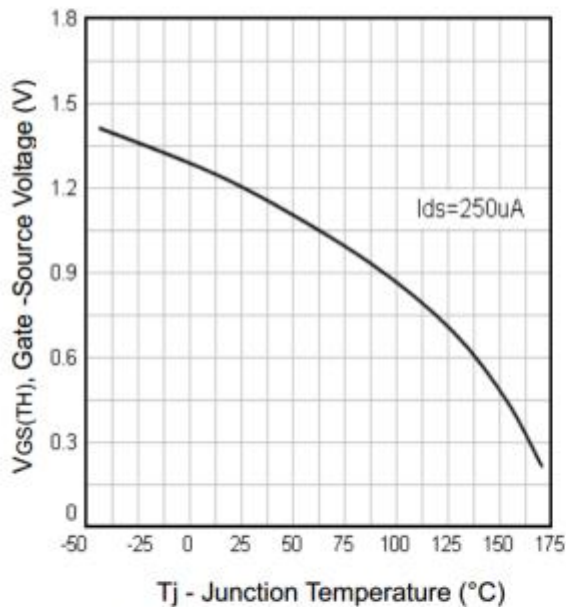


Fig9. Threshold Voltage Vs. Temperature

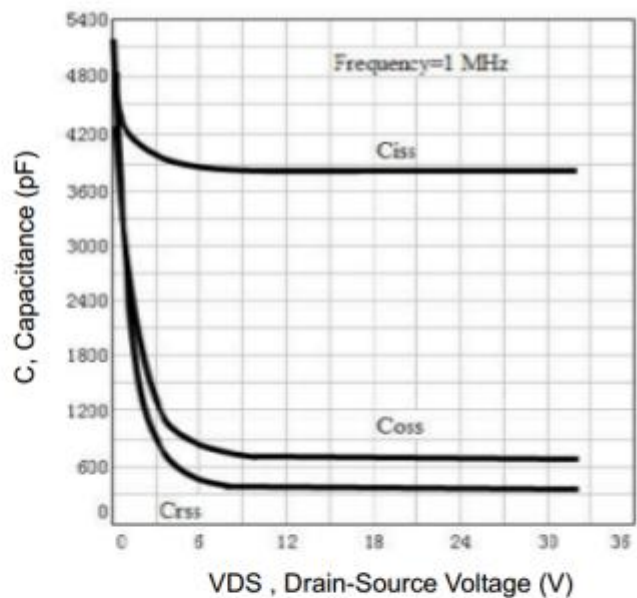


Fig10. Typical Capacitance Vs. Drain-Source Voltage

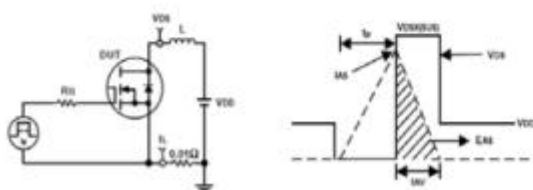


Fig11. Unclamped Inductive Test Circuit and waveforms

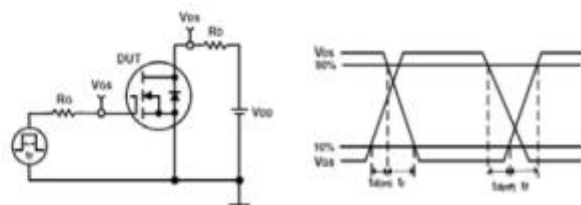


Fig12. Switching Time Test Circuit and waveforms