1. Description

The KNX3502A uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a wide variety of applications.

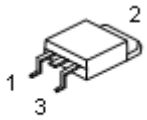
2. Features

- $R_{DS(on)}$=7mΩ(typ.) @ V_{DS}=4.5V
- High power and current handing capability
- Lead free product is acquired
- Surface mount package

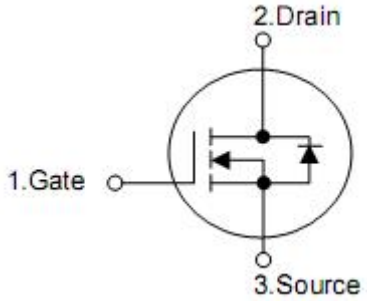
3. Applications

- Battery protection
- Load switch
- Power management

4.Symbol



TO-252



Pin	Function
1	Gate
2	Drain
3	Source

5. Ordering Information

Part Number	Package	Brand
KND3502A	TO-252	KIA

6. Absolute maximum ratings

Parameter		Symbol	Rating	Units	
Drain-source voltage		V_{DS}	20	V	
Gate-source voltage		V_{GS}	±12	V	
Continuous drain current	T_C=25ºC[1]	I_D	70	A	
	T_C=100ºC		42	A	
Pulsed drain current [2]		I_{DM}	240	A	
Single pulse avalanche energy[3]		E_{AS}	340	mJ	
Total power dissipation	T_C=25 ºC	P_D	50	W	
Operation junction temperature range		T_J	-55 to150	ºC	
Storage temperature range		T_{STG}	-55 to150	ºC	

7. Thermal characteristics

Parameter	Symbol	Typ	Max	Unit
Thermal resistance,Junction-case	$R_{\theta JC}$	--	2.5	ºC/W
Thermal resistance-junction to ambient	$R_{\theta JA}$	--	50	ºC/W

8. Electrical characteristics

(T_A=25°C,unless otherwise noted

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Drain-source breakdown voltage	BV_{DSS}	V_{GS}=0V,I_D=250μA	20	-	-	V
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	0.4	0.65	1.1	V
Drain-source leakage current	I_{DSS}	V_{DS}=16V, V_{GS}=0V	-	-	1	μA
Gate- source leakage current	I_{GSS}	V_{GS}=±12V, V_{DS}=0V	-	-	±100	nA
Static drain-source on-resistance	$R_{DS(on)}$	V_{GS}=4.5V,I_D=8A T_C=25°C	-	7	9	mΩ
		V_{GS}=2.5V,I_D=6A T_C=25°C	-	8.5	11	mΩ
Gate resistance	R_g	V_{DS}=0V, V_{GS}=0V,f=1MHz	-	2.8	-	Ω
Total gate charge(10V)	Q_g	V_{DS}=10V, V_{GS}=10V I_D =20A	-	48.5	-	nC
Total gate charge(4.5V)				23.4		
Gate-source charge	Q_{gs}		-	2.7	-	
Gate-drain charge	Q_{gd}		-	7.2	-	
Turn-on delay time	$t_{d(on)}$	V_{DS}=10V,ID=20A R_G=3Ω, V_{GS}=10V	-	5.3	-	ns
Rise time	t_r		-	75.4	-	
Turn-off delay time	$t_{d(off)}$		-	64	-	
Fall time	t_f		-	62	-	
Input capacitance	C_{iss}	V_{DS}=15V,V_{GS}=0V, f=1MHz	-	1800	-	pF
Output capacitance	C_{oss}		-	200	-	
Reverse transfer capacitance	C_{rss}		-	185	-	
Source-drain current(Body diode)	I_{SD}		-	-	70	A
Diode forward voltage	V_{SD}	V_{GS}=0V,I_S=15A	-	-	1.4	V
Body diode reverse recovery time	t_{rr}	I_f=15A. dI/dt=100A/us	-	26.5	-	ns
Body diode reverse recovery charge	Q_{rr}		-	11.5	-	nC

Note:1.The maximum current rating is package limited

2.Repetitive rating: pulse width limited by maximum junction temperature.

3.EAS condition: T_J=25°C, V_{DD}=10V, V_G=4.5V, R_G=25Ω.

9. Test circuits

Figure 1. Output Characteristics

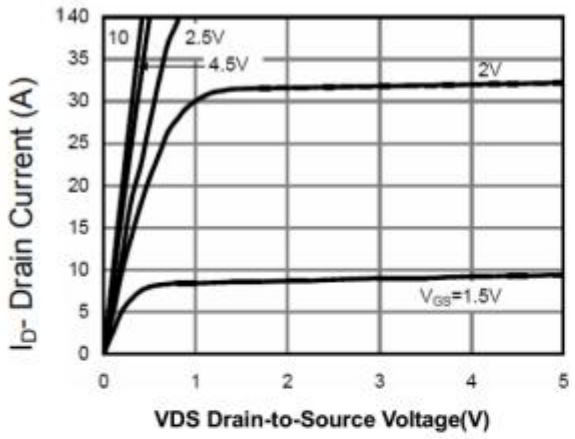


Figure 2. Transfer Characteristics

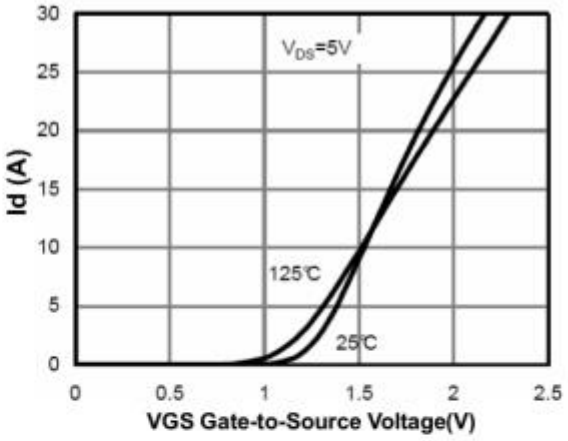


Figure 3. Drain-Source On-Resistance

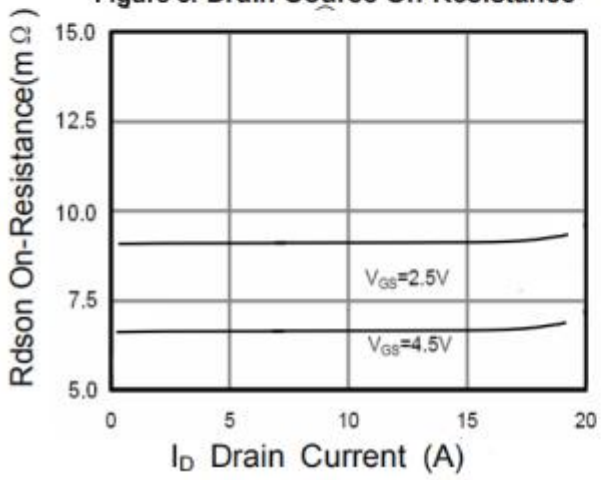


Figure 4. Drain Current

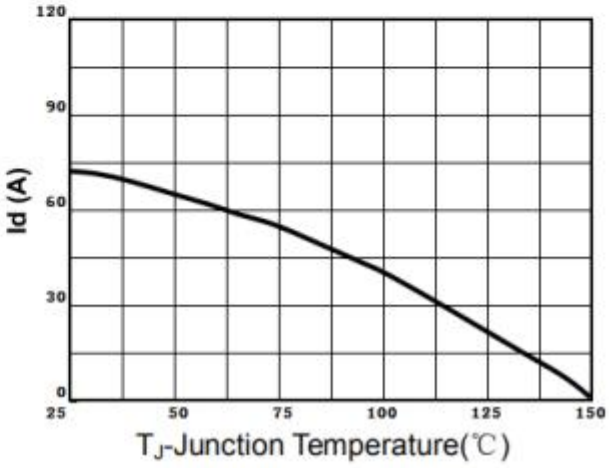


Figure 5. Power De-rating

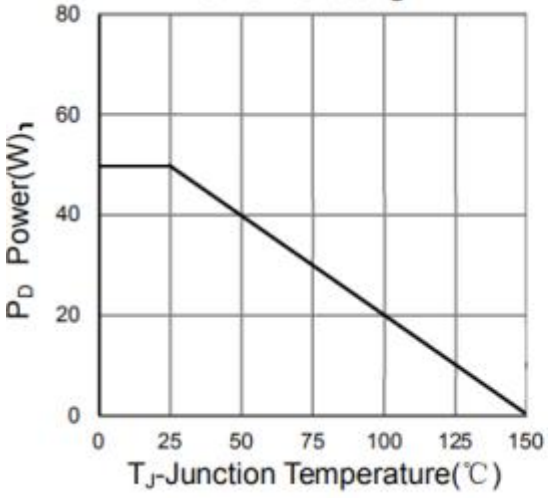


Figure 6. $R_{DS(ON)}$ vs Junction Temperature

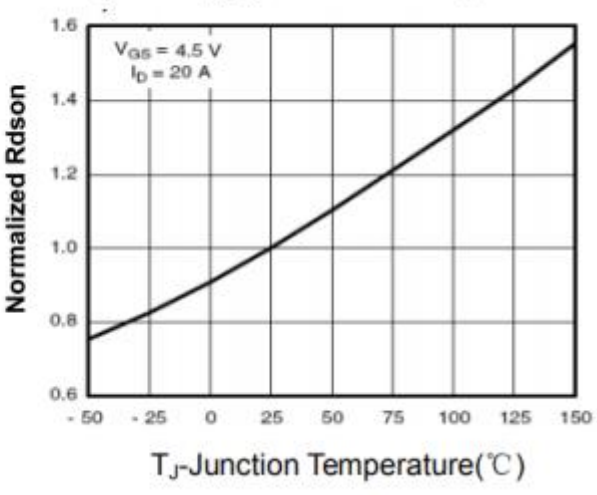


Figure 7. Gate Charge Waveforms

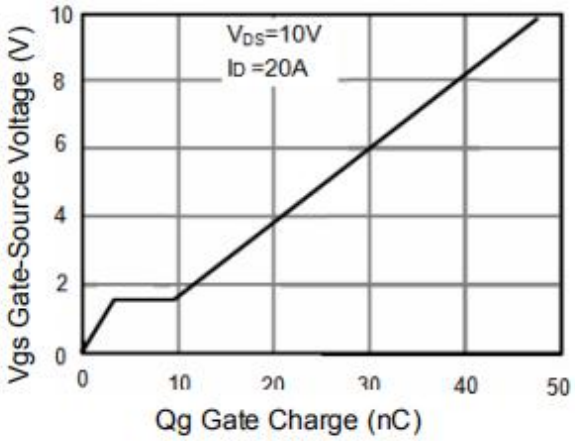


Figure 8. Capacitance

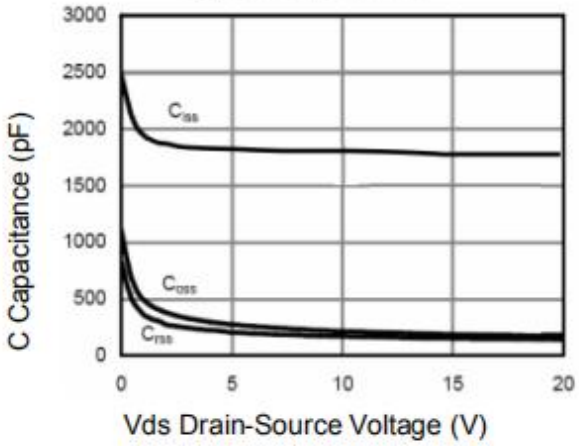


Figure 9. $V_{GS(th)}$ vs Junction Temperature

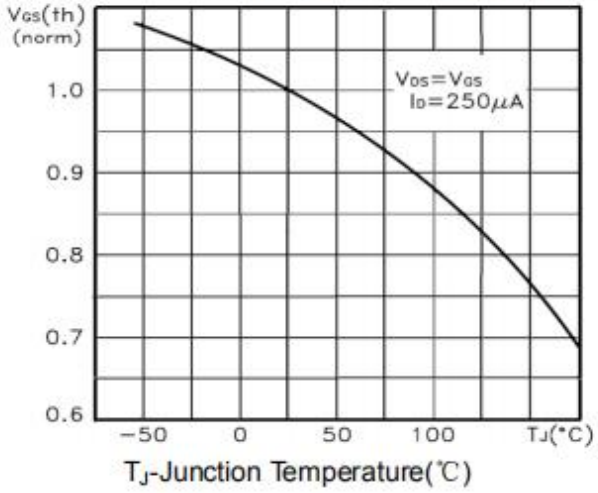
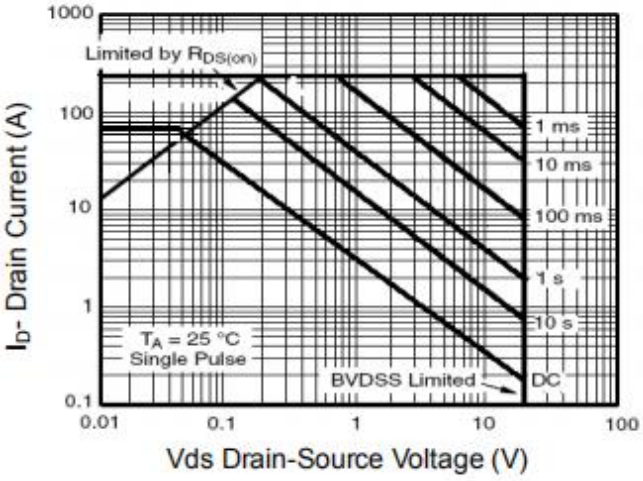


Figure 10. Maximum Safe Operating Area



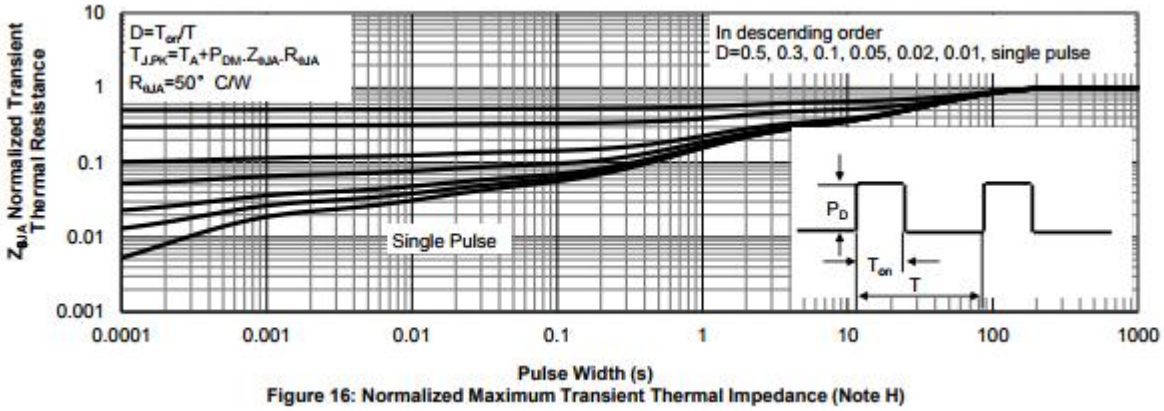


Figure 16: Normalized Maximum Transient Thermal Impedance (Note H)