

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.

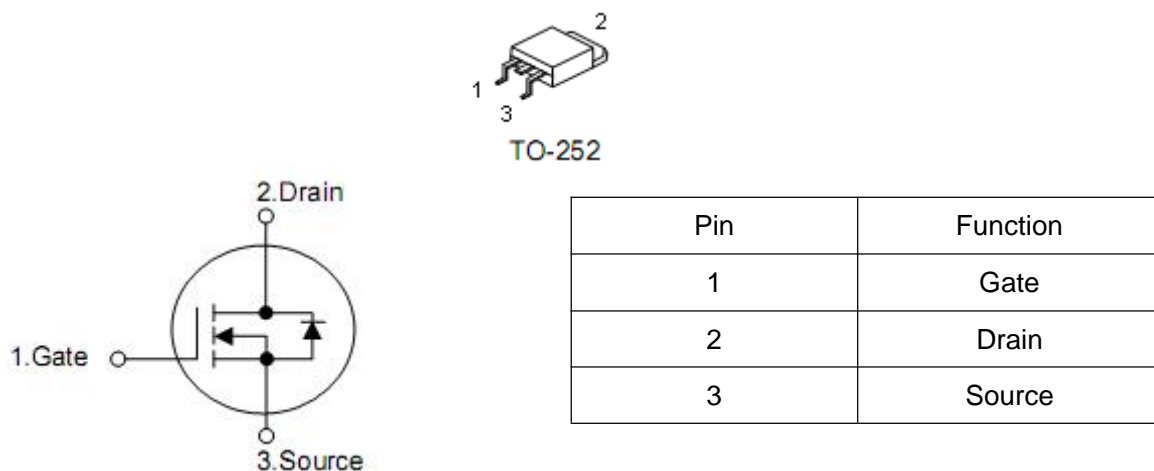
2. Features

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

3. Applications

- n Battery protection
- n Load switch
- n Power management

4. Symbol



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	I_D	$T_C=25^\circ\text{C}^1$	A
		$T_C=100^\circ\text{C}$	A
Pulsed drain current ²	I_{DM}	240	A
Single pulse avalanche energy ³	E_{AS}	340	mJ
Total power dissipation $T_C=25^\circ\text{C}$	P_D	50	W
Operation junction temperature range	T_J	-55 to 150	$^\circ\text{C}$
Storage temperature range	T_{STG}	-55 to 150	$^\circ\text{C}$

7. Thermal characteristics

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

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			-	2.7	-	
Gate-drain charge			-	7.2	-	
Turn-on delay time	t _{d(on)}	V _{DS} =10V, I _D =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

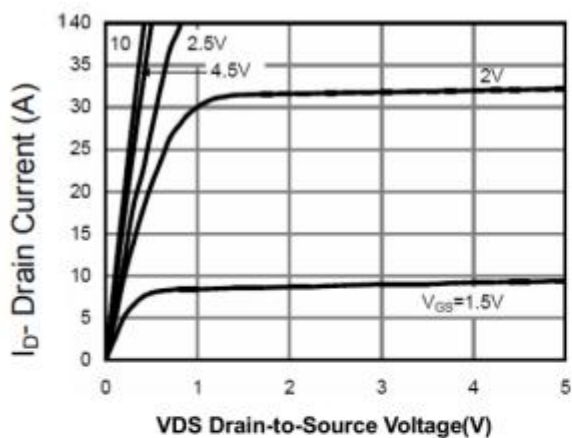


Figure 2. Transfer Characteristics

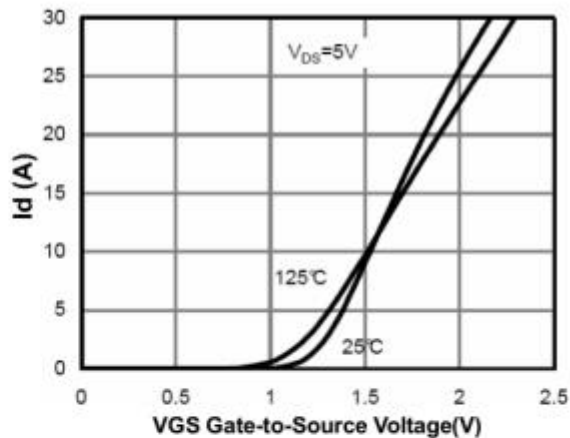


Figure 3. Drain-Source On-Resistance

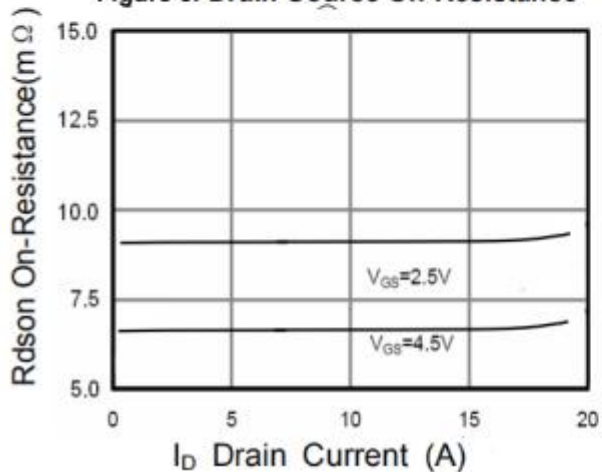


Figure 4. Drain Current

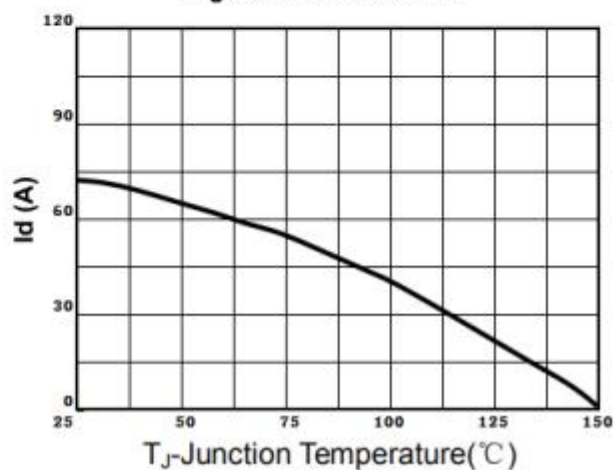


Figure 5. Power De-rating

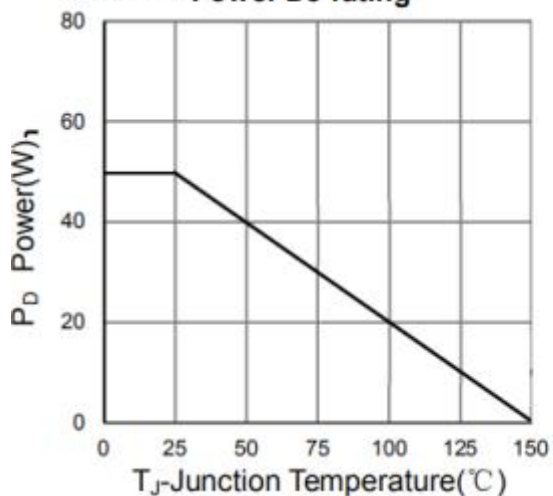


Figure 6. $R_{DS(ON)}$ vs Junction Temperature

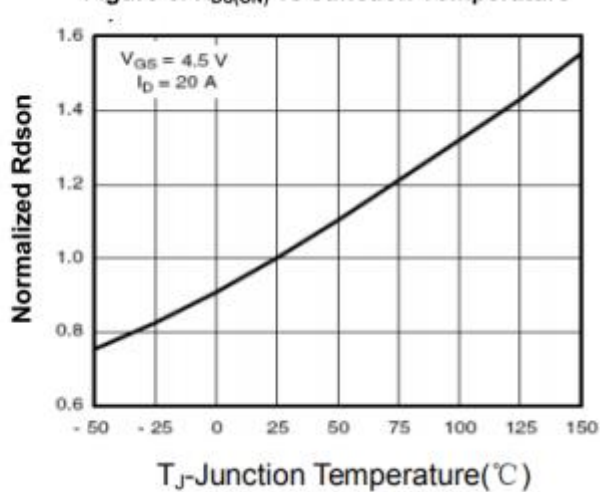


Figure 7. Gate Charge Waveforms

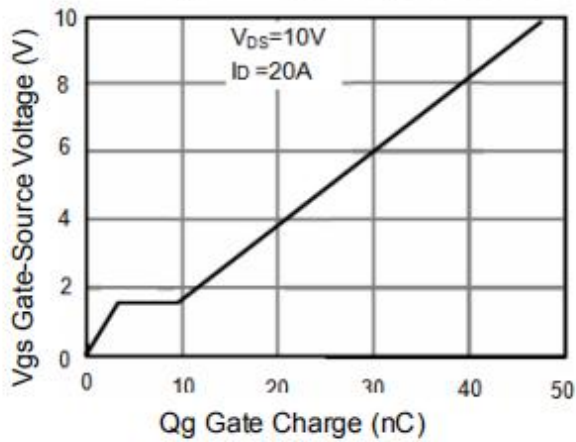


Figure 8. Capacitance

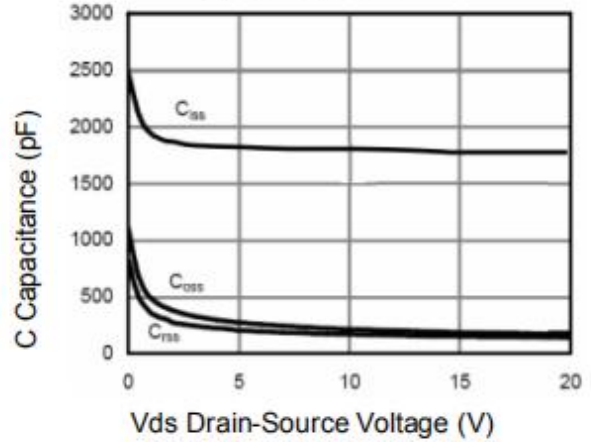


Figure 9. VGS(th) vs Junction Temperature

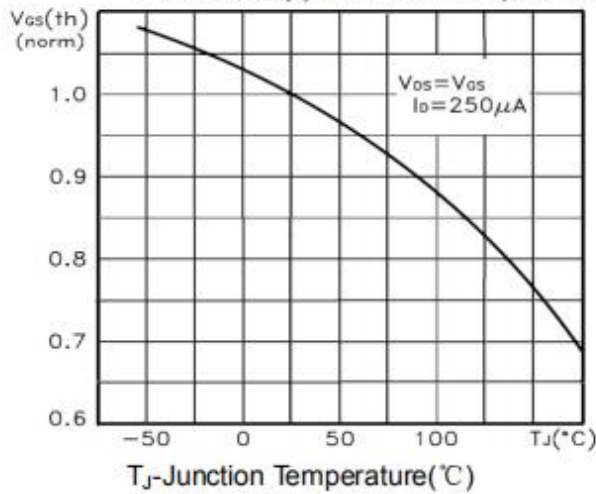


Figure 10. Maximum Safe Operating Area

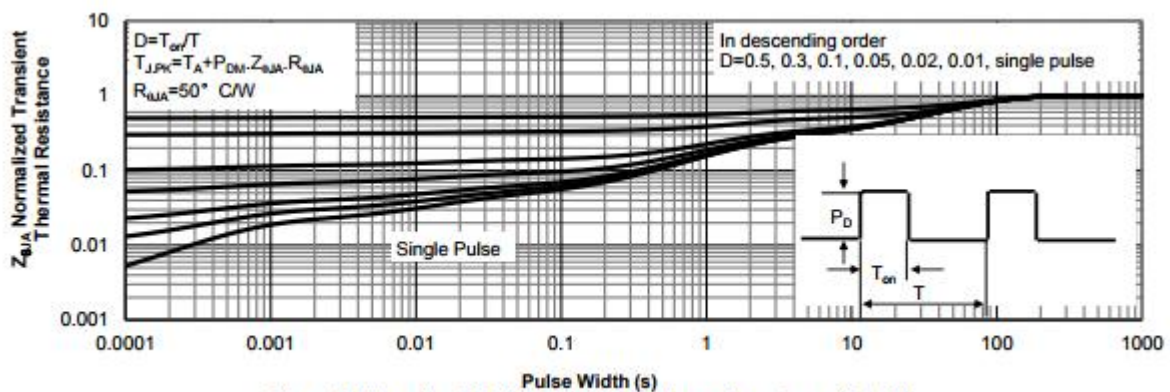
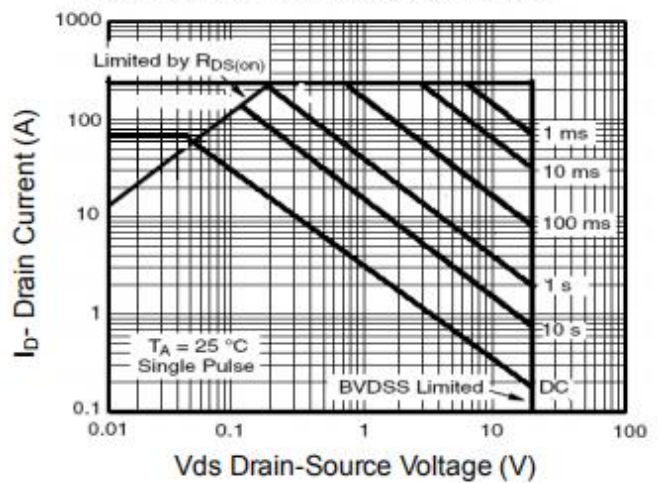


Figure 16: Normalized Maximum Transient Thermal Impedance (Note H)