

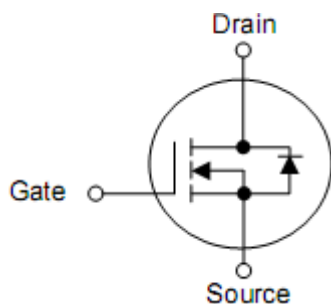
1. Features

- $R_{DS(ON)}=7m\Omega(typ.)@V_{GS}=10V$
- Proprietary New Planar Technology
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability

2. Applications

- Switch Mode Power Supply (SMPS)
- Uninterruptible Power Supply (UPS)
- Power Factor Correction (PFC)

3. Symbol



Pin	Function
1	Gate
2	Drain
3	Source

4. Ordering Information

Part Number	Package	Brand
KNP3106N	TO-220	KIA

5. Absolute maximum ratings

$T_C=25^{\circ}\text{C}$ unless otherwise noted

Parameter	Symbol	Rating	Units
Drain-source voltage ($V_{GS}=0V$)	V_{DSS}	60	V
Gate-to-Source Voltage	V_{GSS}	± 20	V
Continuous drain current	I_D	110	A
Pulsed Drain Current ¹⁾	I_{DM}	440	A
Single pulse avalanche energy ²⁾	E_{AS}	653	mJ
Avalanche Current ¹⁾	I_{AS}	40	A
Repetitive Avalanche Energy ¹⁾	E_{AR}	391.8	mJ
Power dissipation ($T_C=25^{\circ}\text{C}$)	P_D	108	W
Operating junction and storage temperature range	T_J, T_{STG}	-55 to 150	$^{\circ}\text{C}$

6. Thermal characteristics

Parameter	Symbol	Rating	Unit
Thermal resistance junction-case	$R_{\theta JC}$	0.65	$^{\circ}\text{C/W}$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	62	$^{\circ}\text{C/W}$

7. Electrical characteristics

(T_J=25°C unless otherwise noted)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Drain-source breakdown voltage	BV _{DSS}	V _{GS} =0V, I _D =250uA	60	-	-	V
Drain-source leakage current	I _{DSS}	V _{DS} =60V, V _{GS} =0V	-	-	1	uA
Gate-source forward leakage	I _{GSS}	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
Drain-source on-resistance ³⁾	R _{DS(on)}	V _{GS} =10V, I _D =60A	-	7	8	mΩ
Gate threshold voltage	V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250uA	2.0	-	4.0	V
Forward Transconductance	g _{fs}	V _{DS} =25V, I _D =60A	-	17	-	S
Input capacitance	C _{iss}	V _{DS} =25V, V _{GS} =0V f=1MHz	-	2600	-	pF
Reverse transfer capacitance	C _{oss}		-	1000	-	pF
Output capacitance	C _{rss}		-	480	-	pF
Total gate charge	Q _g	V _{DS} =28V, I _D =42A V _{GS} =15V	-	110	-	nC
Gate-source charge	Q _{gs}		-	11	-	nC
Gate-drain charge	Q _{gd}		-	50	-	nC
Turn-on delay time	t _{d(on)}	V _{DD} =28V, V _{GS} =15V, R _G =25Ω, I _D =42A	-	50	-	ns
Rise time	t _r		-	140	-	ns
Turn-off delay time	t _{d(off)}		-	345	-	ns
Fall time	t _f		-	210	-	ns
Continuous Source Current	I _{SD}	T _J =25°C, I _{SD} =60A, V _{GS} =0V	-	-	110	A
Pulsed Source Current	I _{SM}		-	-	440	A
Diode forward voltage	V _{SD}	I _S =40A, V _{GS} =0V,	-	-	1.2	V
Reverse Recovery Time	t _{rr}	V _{GS} =0V, I _F =180A, dI _F /dt=100A/μs	-	100	-	nS
Reverse Recovery Charge	Q _{rr}		-	0.33	-	uC

Note:

1) Repetitive Rating: Pulse width limited by maximum junction temperature.

2) L=1mH, V_{DD}=50V, R_G=25Ω, Starting T=25°C.

3) Pulse Test: Pulse width≤300μs, Duty Cycle≤1%.

8. Typical operating characteristics

Figure 1. Output Characteristics ($T_J = 25^\circ\text{C}$)

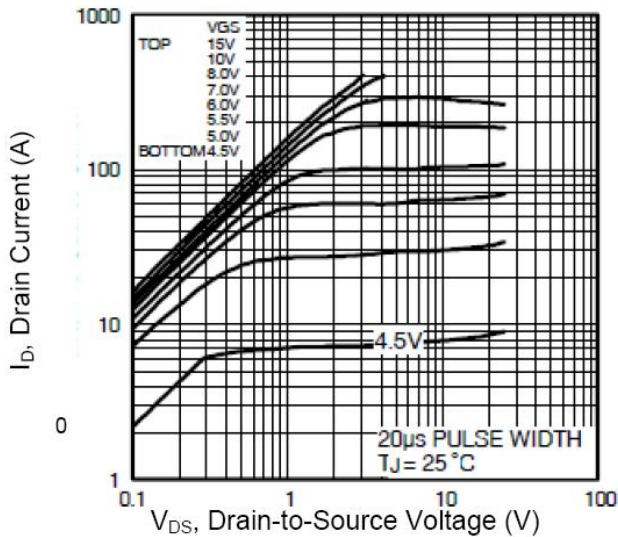


Figure 2. Body Diode Forward Voltage

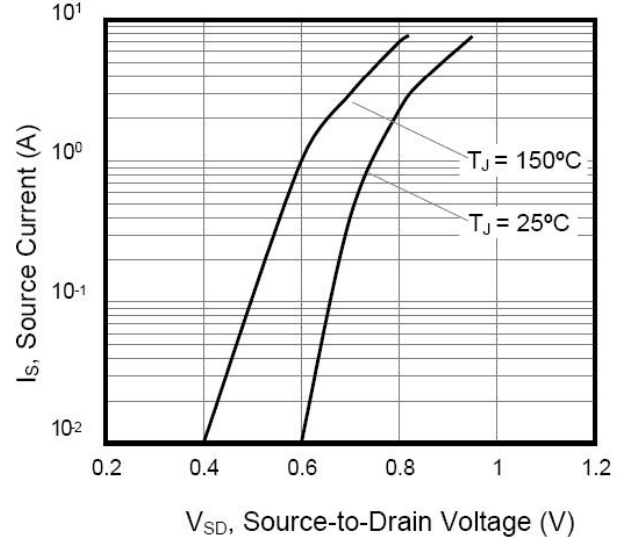


Figure 3. Drain Current vs. Temperature

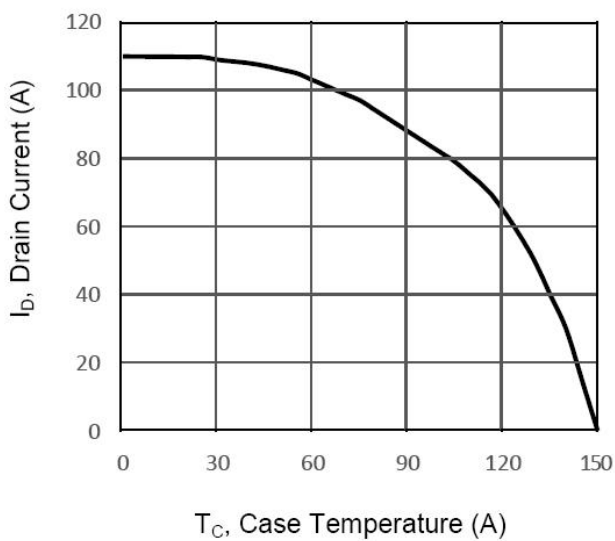


Figure 4. BV_{DSS} Variation vs. Temperature

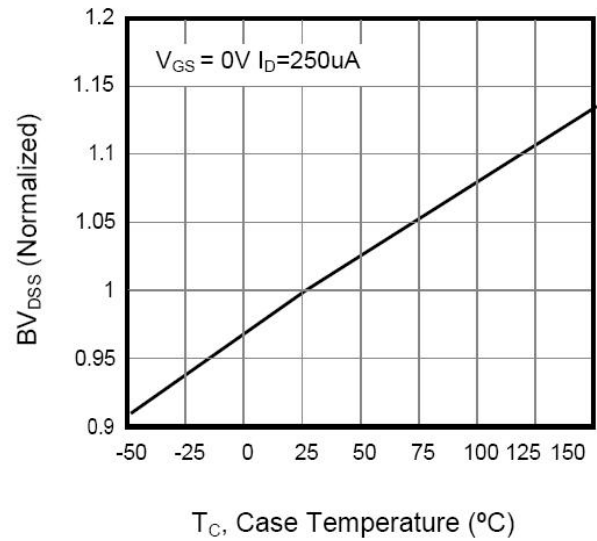


Figure 5. Transfer Characteristics

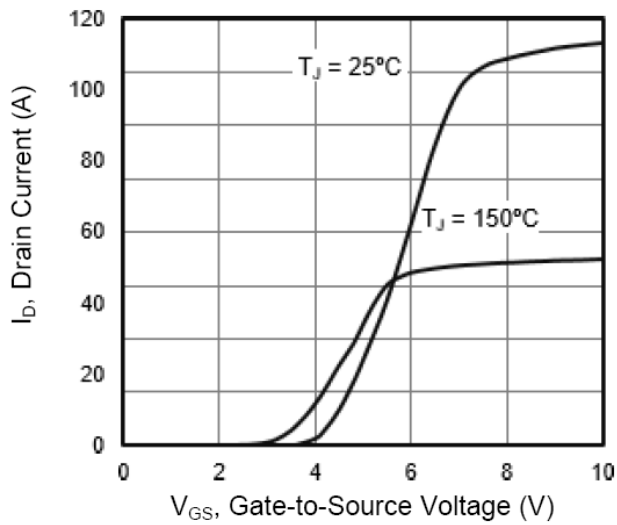


Figure 6. On-Resistance vs. Temperature

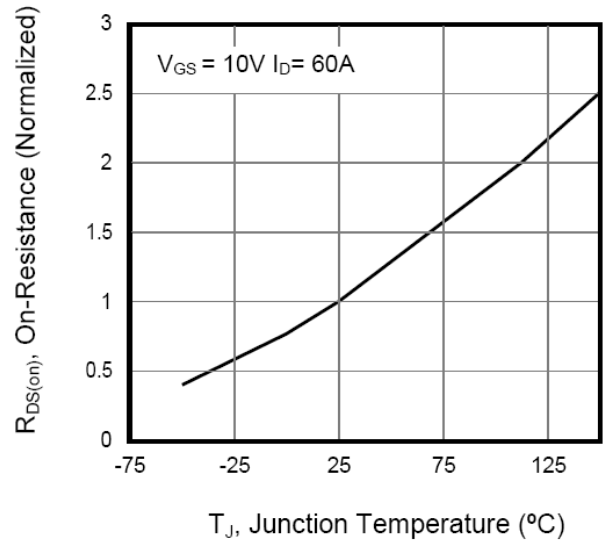


Figure 7. Capacitance

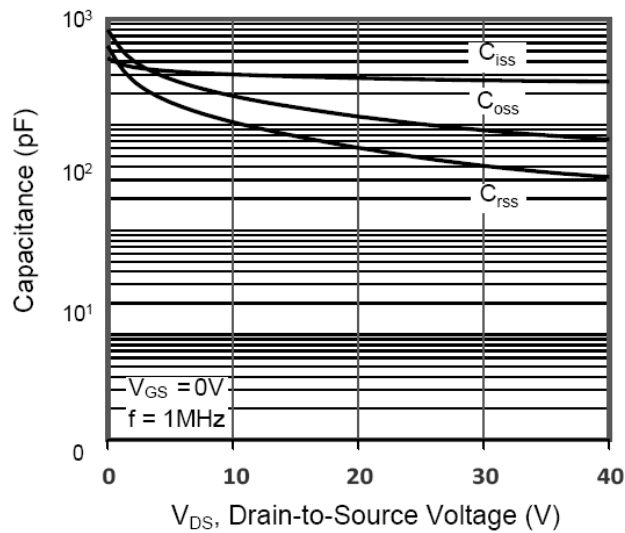


Figure 8. Gate Charge

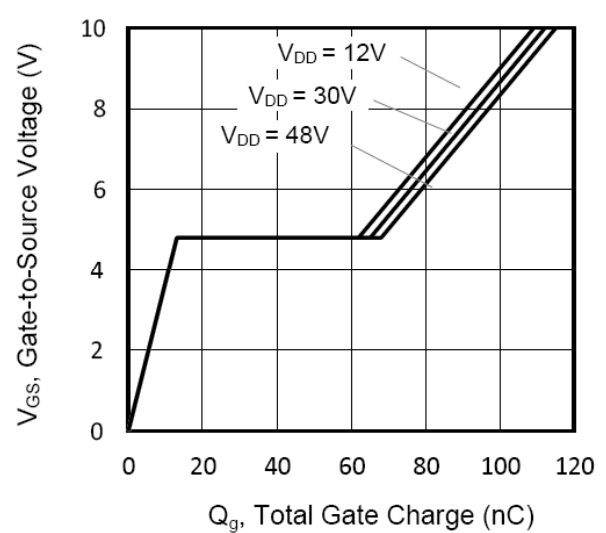
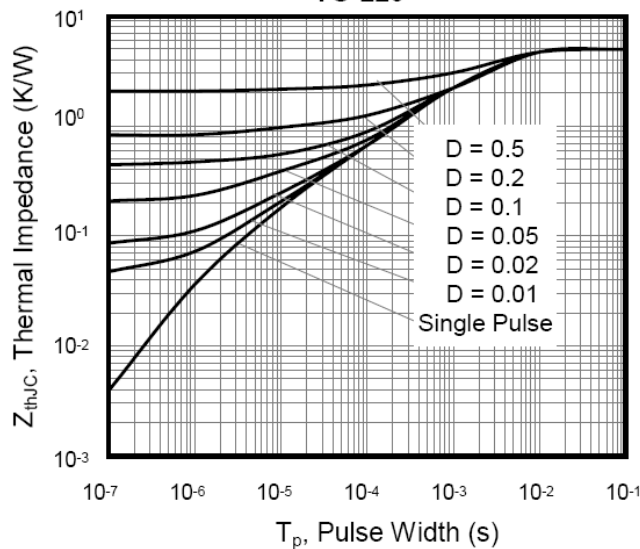


Figure 9. Transient Thermal Impedance
TO-220



9. Test Circuits and Waveforms

Figure A: Gate Charge Test Circuit and Waveform

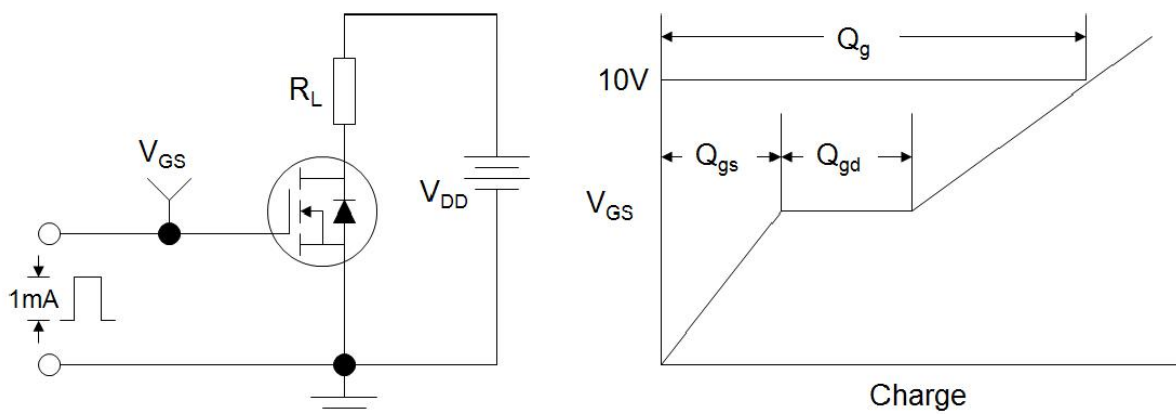


Figure B: Resistive Switching Test Circuit and Waveform

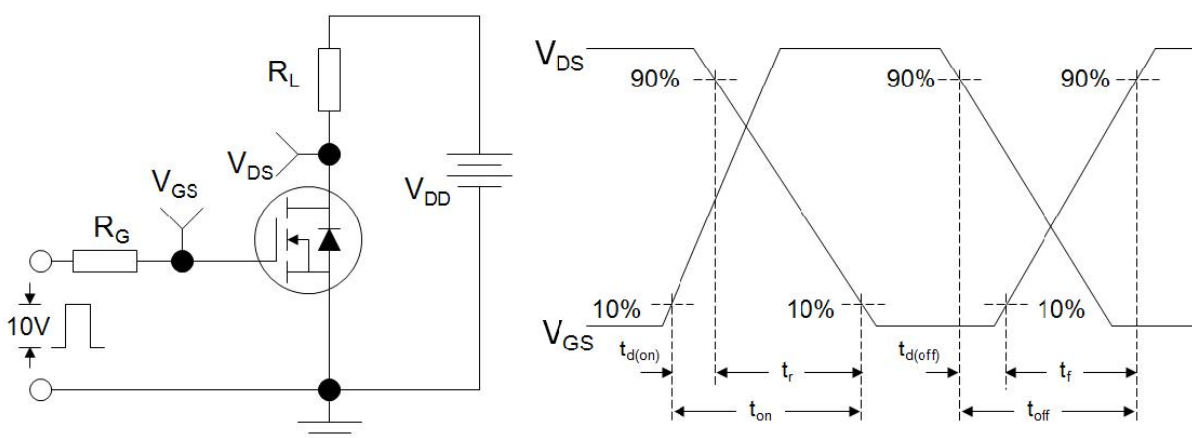


Figure C: Unclamped Inductive Switching Test Circuit and Waveform

