

1. Features

- $R_{DS(ON)}=2.0m\Omega(\text{typ.})@V_{GS}=10V$
- Very Low On-resistance $R_{DS(ON)}$
- Low C_{rss}
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability

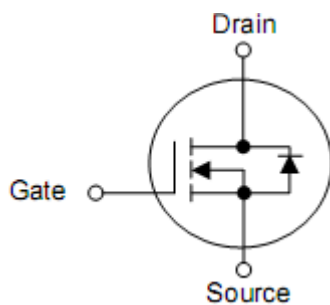
2. Applications

- PWM Application
- Power Management
- Load switch

3. Symbol



TO-220



Pin	Function
1	Gate
2	Drain
3	Source

4. Ordering Information

Part Number	Package	Brand
KNP2803S	TO-220S	KIA

5. Absolute maximum ratings

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

Parameter	Symbol	Rating	Units	
Drain-source voltage	V_{DSS}	30	V	
Continuous drain current	$T_C=25^{\circ}\text{C}$	I_D	150	A
	$T_C=100^{\circ}\text{C}$	I_D	90	A
Pulsed drain current -Pulsed ¹⁾	I_{DM}	560	A	
Gate-source voltage	V_{GS}	± 20	V	
Single pulse avalanche energy ²⁾	E_{AS}	552	mJ	
Power dissipation($T_C=25^{\circ}\text{C}$)	P_D	107	W	
Operating junction and storage temperature range	T_J, T_{STG}	-55 to 175	$^{\circ}\text{C}$	
Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds	T_L	300	$^{\circ}\text{C}$	

*Drain current limited by maximum junction temperature.

6. Thermal characteristics

Parameter	Symbol	Rating	Unit
Thermal resistance junction-case	$R_{\theta JC}$	1.4	$^{\circ}\text{C/W}$

7. Electrical characteristics

(T_C=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	30	-	-	V
Drain-source leakage current	I _{DSS}	V _{DS} =30V, V _{GS} =0V	-	-	1	uA
		V _{DS} =24V, T _C =125°C	-	-	10	uA
Gate-source forward leakage	I _{GSS}	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
Gate threshold voltage	V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250uA	1.0	1.5	2.5	V
Drain-source on-resistance	R _{DS(on)}	V _{GS} =10V, I _D =30A	-	2.0	3.0	mΩ
		V _{GS} =4.5V, I _D =20A	-	3.3	5.5	mΩ
Input capacitance	C _{iss}	V _{DS} =20V, V _{GS} =0V f=1MHz	-	4555	-	pF
Output capacitance	C _{oss}		-	476	-	pF
Reverse transfer capacitance	C _{rss}		-	451	-	pF
Turn-on delay time	t _{d(on)}	V _{GS} =10V, V _{DS} =15V, R _G =3Ω, I _D =30A ³⁾	-	25	-	ns
Rise time	t _r		-	23	-	ns
Turn-off delay time	t _{d(off)}		-	90	-	ns
Fall time	t _f		-	38	-	ns
Total gate charge(10V)	Q _g	V _{DS} =15V, I _D =40A V _{GS} =10V ³⁾	-	92	-	nC
Gate-source charge	Q _{gs}		-	30	-	nC
Gate-drain charge	Q _{gd}		-	38	-	nC
Maximum Continuous Drain-Source Diode Forward Current	I _S	—	-	-	150	A
Maximum Pulsed Drain-Source Diode Forward Current	I _{SM}	—	-	-	560	A
Drain to Source Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _{SD} =30A, T _J =25°C	-	-	1.2	VS
Body Diode Reverse Recovery Time	t _{rr}	I _F =20A, di/dt=100A/μs	-	42	-	nS
Body Diode Reverse Recovery Charge	Q _{rr}		-	39	-	nC

Note:

1) Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

2) EAS condition: T_J=25°C, V_{DD}=15V, V_G=10V, R_G=25Ω, L=0.5mH.

3) Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%

8. Typical operating characteristics

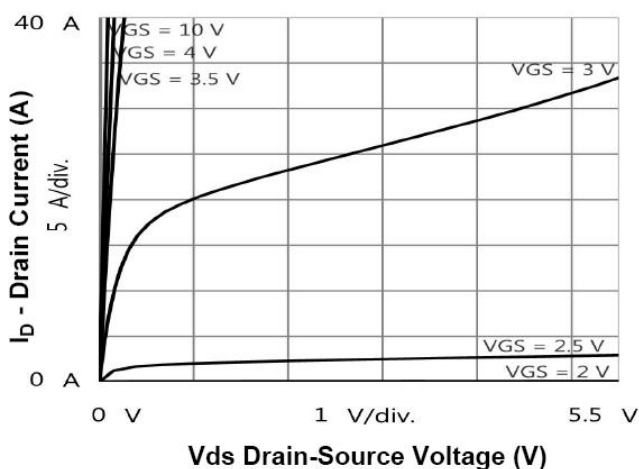


Figure 1. On-Region Characteristics

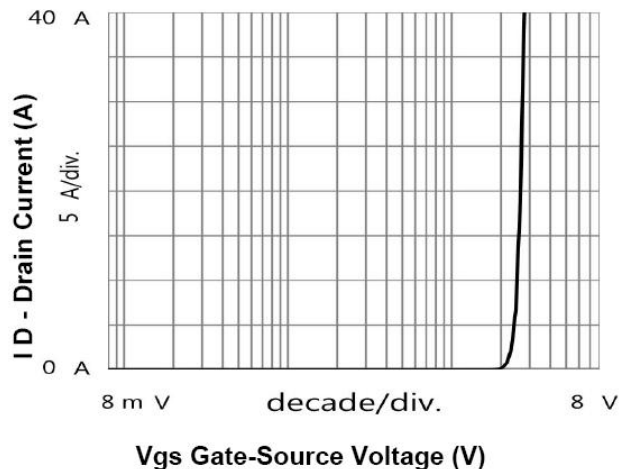


Figure 2. Transfer Characteristics

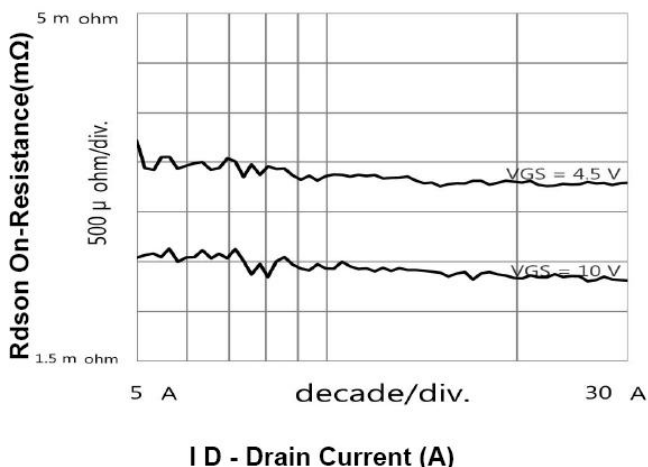


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

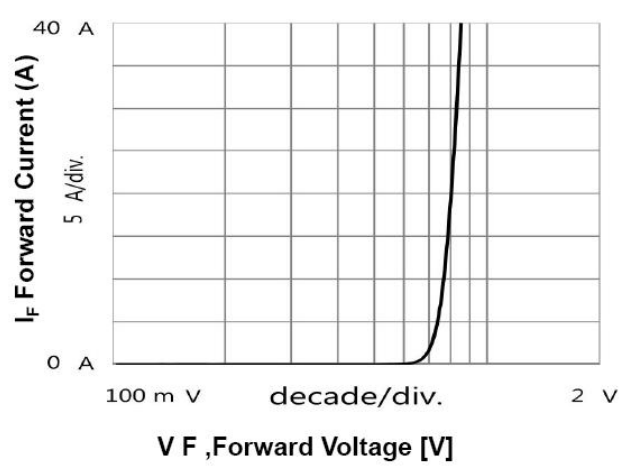


Figure 4. Body Diode Forward Voltage Variation with Source Current

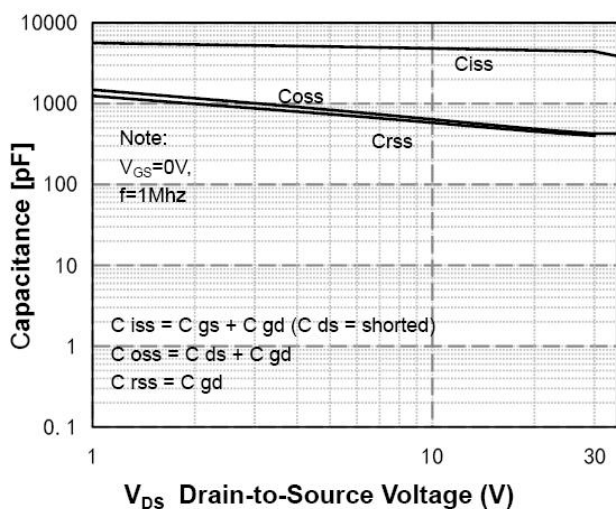


Figure 5. Capacitance Characteristics

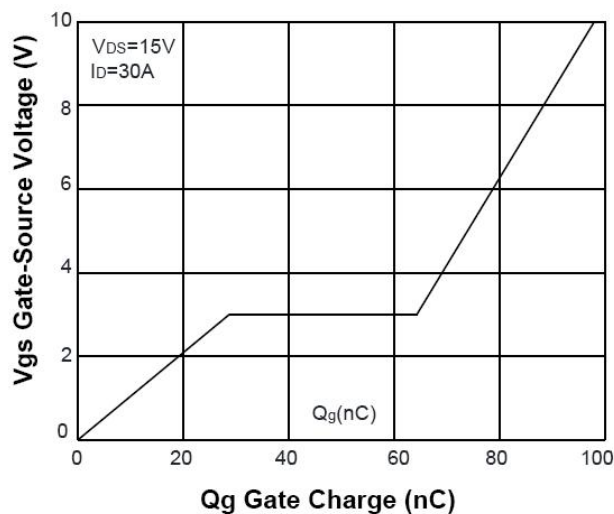


Figure 6. Gate Charge Characteristics

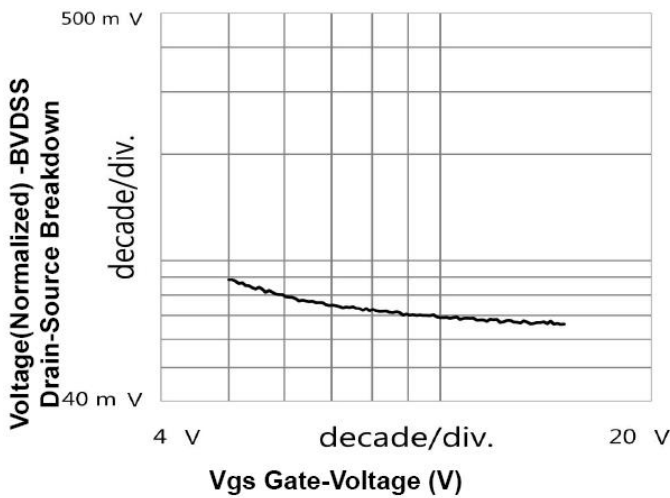


Figure 7. Breakdown Voltage Variation vs Gate-Voltage

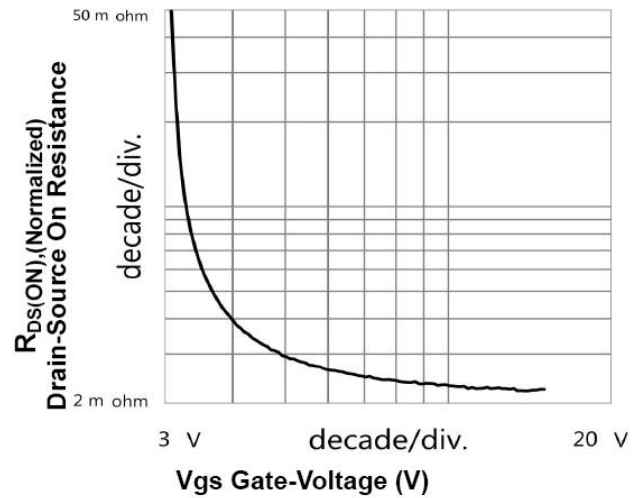


Figure 8. On-Resistance Variation vs Gate Voltage

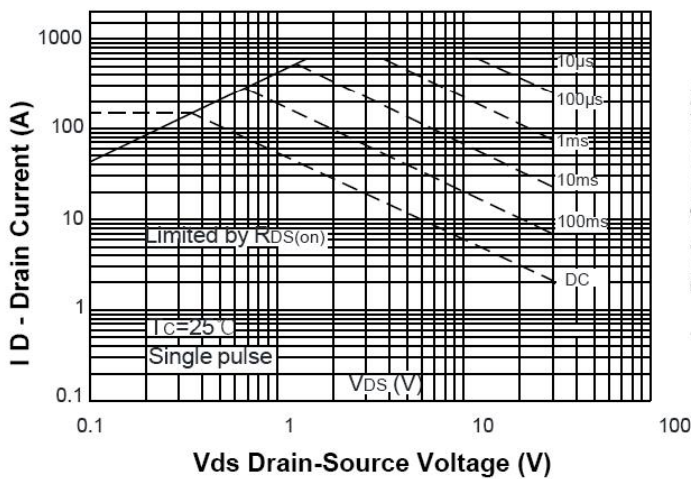


Figure 9. Maximum Safe Operating Area

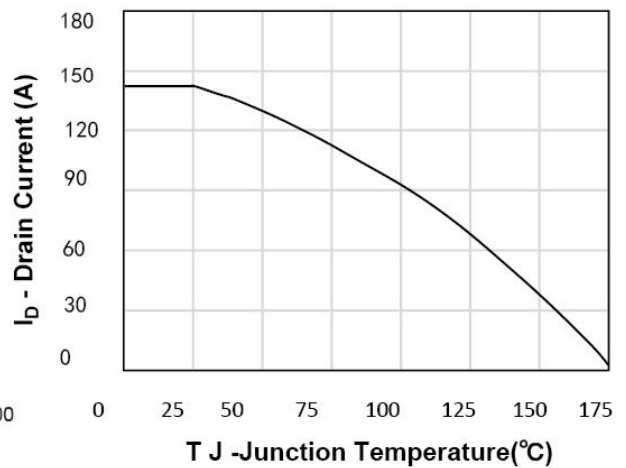


Figure 10. Maximum Continuous Drain Current vs Temperature

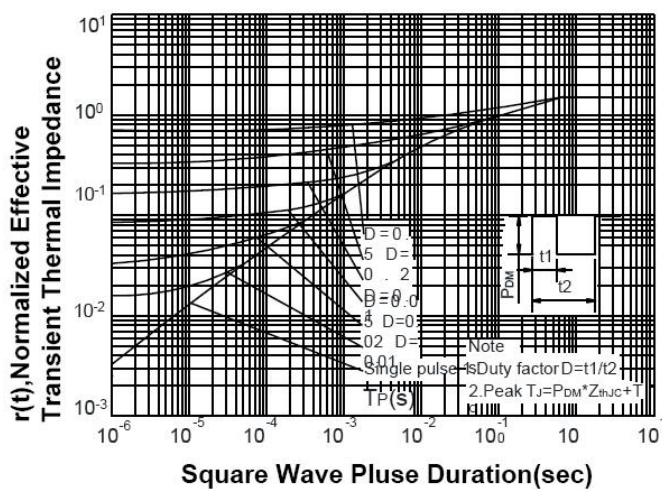
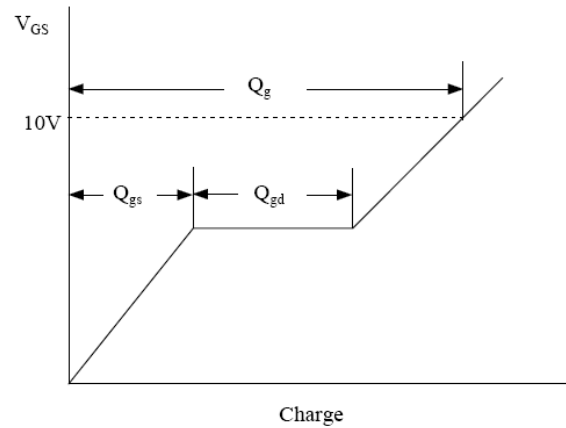
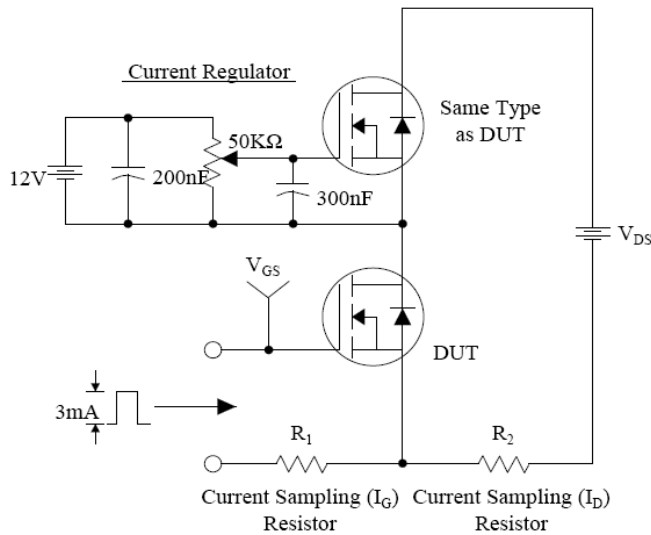


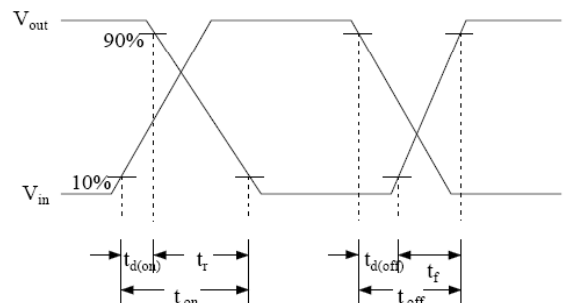
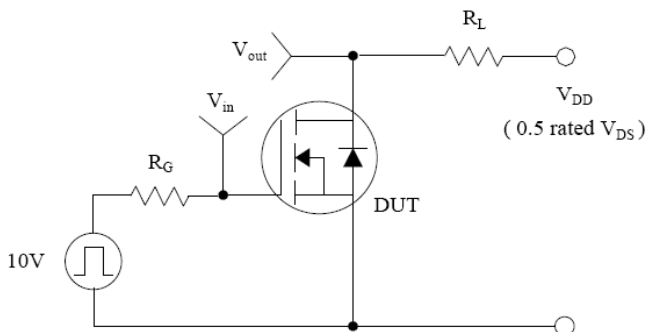
Figure 11. Transient Thermal Response Curve

9. Test Circuits and Waveforms

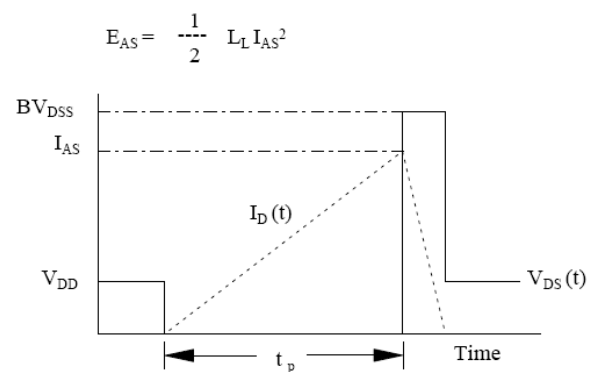
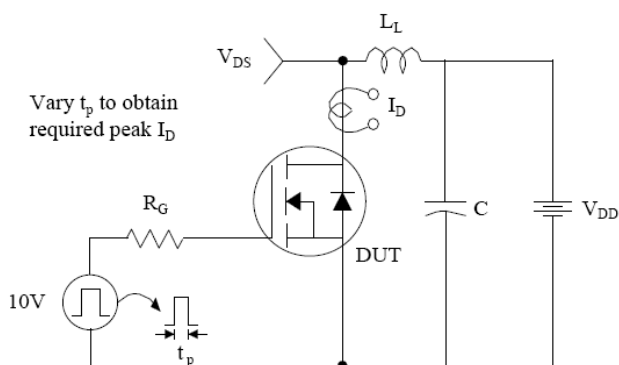
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms



Peak Diode Recovery dv/dt Test Circuit & Waveforms

