

1. Features

- $R_{DS(ON)}=12m\Omega(typ.)@V_{GS}=10V$
- Very Low On-resistance $R_{DS(ON)}$
- Low Cr_{ss}
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability

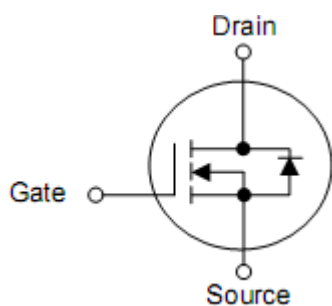
2. Applications

- PWM Application
- Power Management
- Load switch

3. Symbol



SOT-89



Pin	Function
1	Gate
2	Drain
3	Source

4. Ordering Information

Part Number	Package	Brand
KNS8104A	SOT-89	KIA

5. Absolute maximum ratings

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

Parameter		Symbol	Rating	Units
Drain-source voltage		V_{DSS}	40	V
Continuous drain current	$T_C=25^{\circ}\text{C}$	I_D	30	A
	$T_C=100^{\circ}\text{C}$	I_D	19	A
Pulsed drain current	-Pulsed ¹⁾	I_{DM}	120	A
Gate-source voltage		V_{GS}	± 20	V
Single pulse avalanche energy ²⁾		E_{AS}	25	mJ
Power dissipation ($T_C=25^{\circ}\text{C}$)		P_D	48	W
Operating junction and storage temperature range		T_J, T_{STG}	-55 to 150	$^{\circ}\text{C}$
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. 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 =250μA	40	-	-	V
Drain-source leakage current	I _{DSS}	V _{DS} =40V, V _{GS} =0V	-	-	1	μA
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 =250μA	1.0	1.5	2.5	V
Drain-source on-resistance	R _{DS(on)}	V _{GS} =10V, I _D =20A	-	12	16	mΩ
		V _{GS} =4.5V, I _D =10A	-	16.5	24	mΩ
Gate Resistance	R _G	f=1MHz	-	4	-	Ω
Input capacitance	C _{iss}	V _{DS} =20V, V _{GS} =0V f=1MHz	-	850	-	pF
Output capacitance	C _{oss}		-	70	-	pF
Reverse transfer capacitance	C _{rss}		-	62	-	pF
Turn-on delay time	t _{d(on)}	V _{GS} =10V, V _{DS} =30V, R _G =4.7Ω, I _D =30A ³⁾	-	4	-	ns
Rise time	t _r		-	8	-	ns
Turn-off delay time	t _{d(off)}		-	30	-	ns
Fall time	t _f		-	10	-	ns
Total gate charge(10V)	Q _g	V _{DS} =20V, I _D =30A V _{GS} =10V ³⁾	-	18	-	nC
Gate-source charge	Q _{gs}		-	2.5	-	nC
Gate-drain charge	Q _{gd}		-	5	-	nC
Maximum Continuous Drain-Source Diode Forward Current	I _S	—	-	-	30	A
Maximum Pulsed Drain-Source Diode Forward Current	I _{SM}	—	-	-	120	A
Diode forward voltage	V _{SD}	I _{SD} =20A, V _{GS} =0V, T _J =25°C	-	-	1.2	V

Note:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
2. EAS condition: T_J=25°C, V_{DD}=30V, V_G=10V, L=0.5mH, R_G=25Ω
3. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%

7. Typical operating characteristics

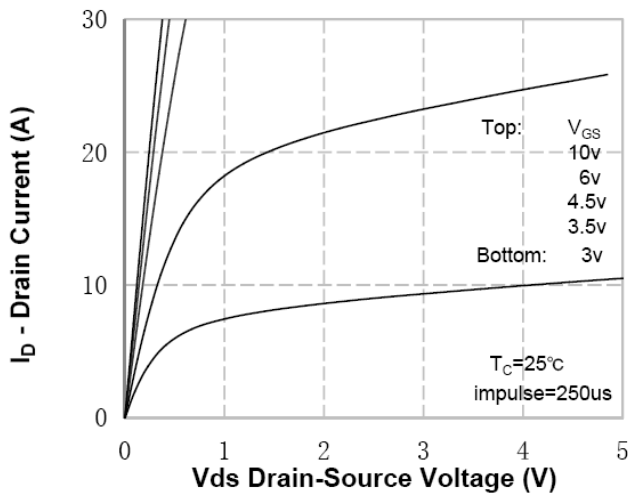


Figure 1. On-Region Characteristics

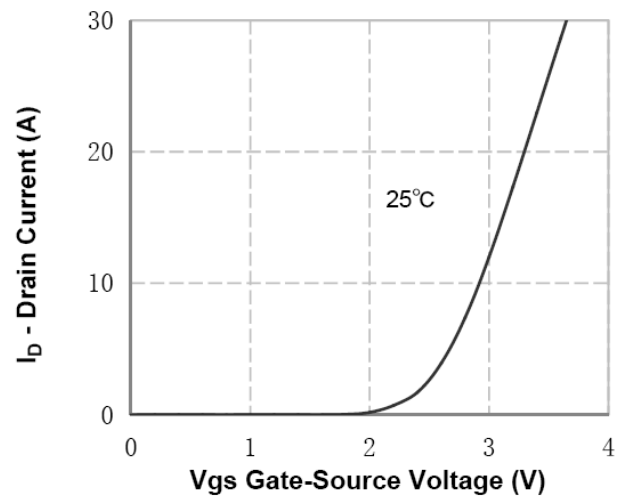


Figure 2. Transfer Characteristics

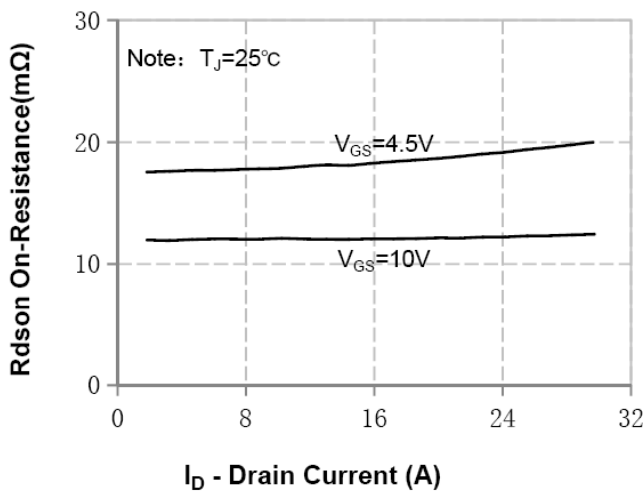


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

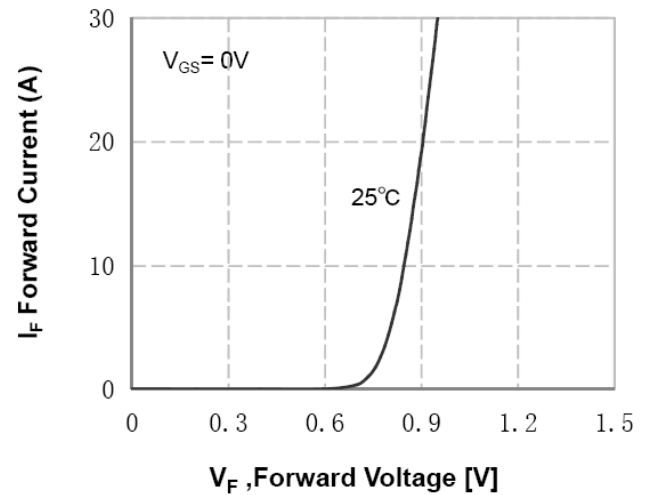


Figure 4. Body Diode Forward Voltage Variation with Source Current

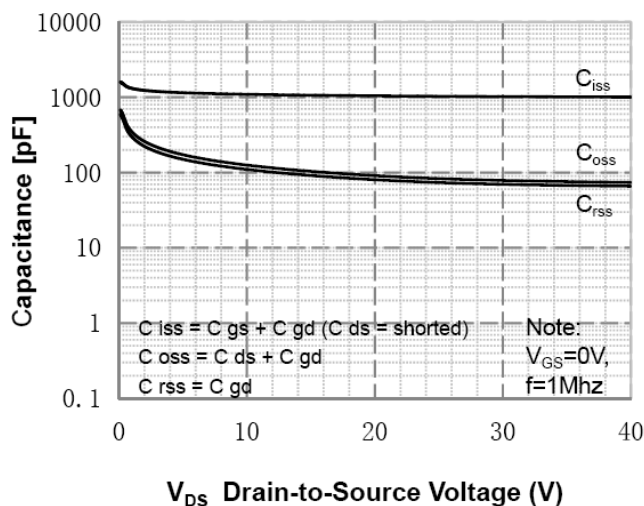


Figure 5. Capacitance Characteristics

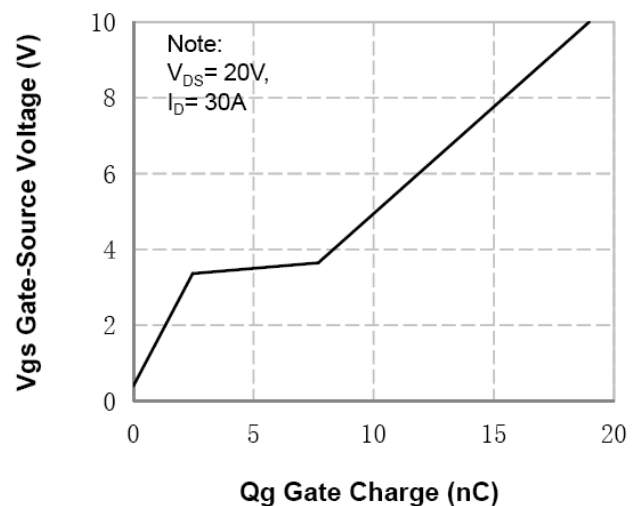


Figure 6. Gate Charge Characteristics

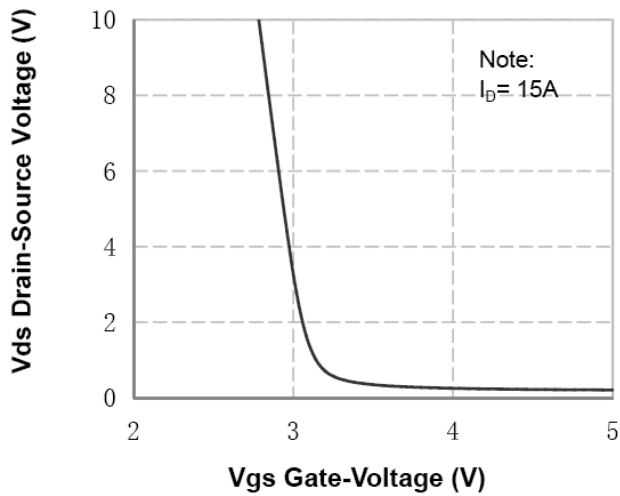


Figure 7. V_{DS} Drain-Source Voltage vs Gate Voltage

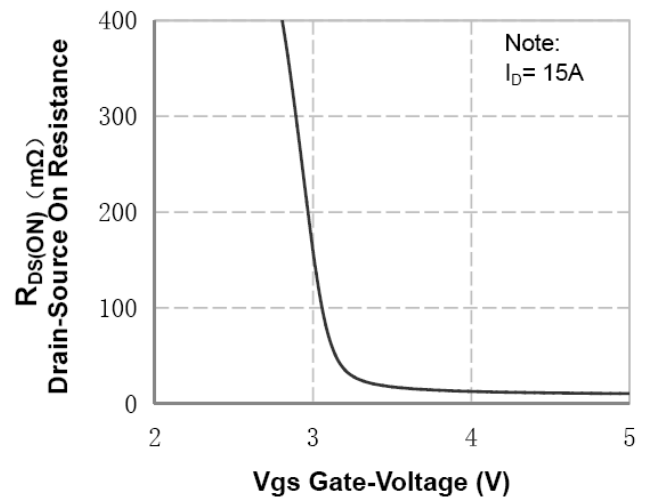


Figure 8. On-Resistance vs Gate Voltage

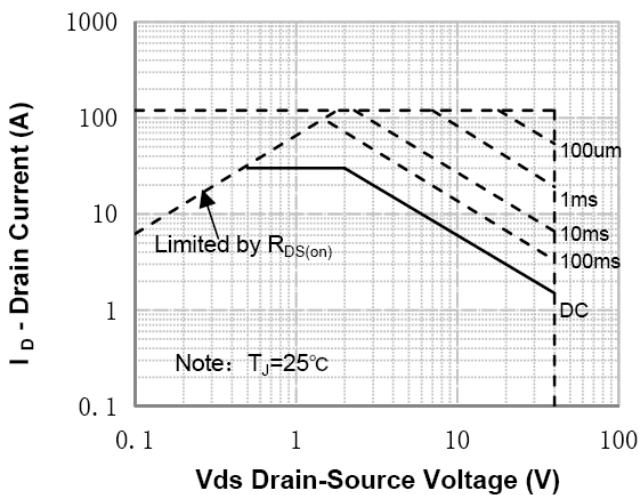


Figure 9. Maximum Safe Operating Area

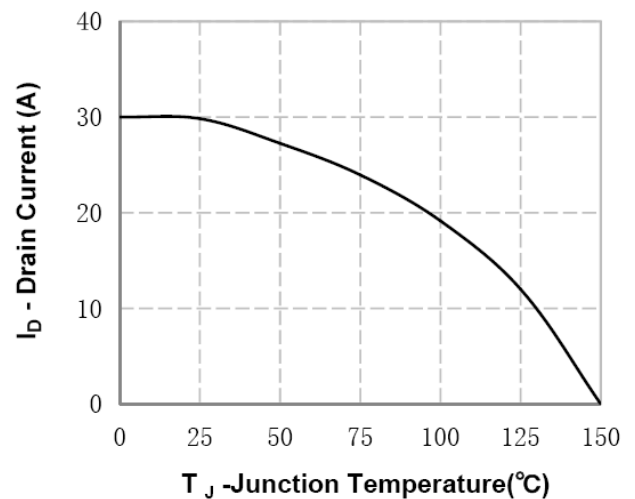
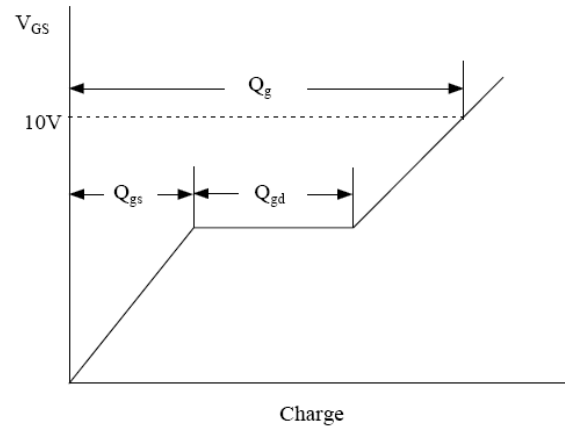
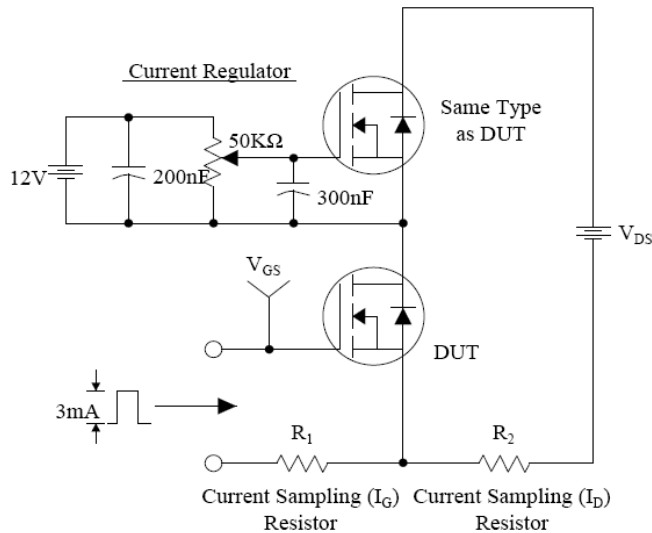


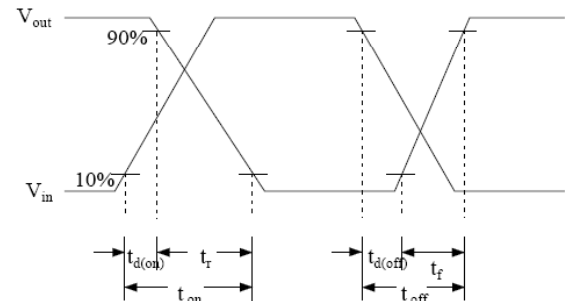
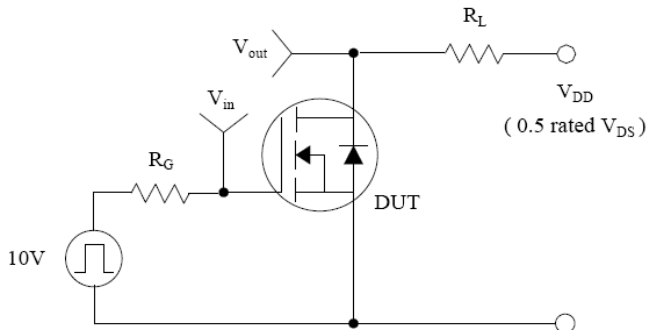
Figure 10. Maximum Continuous Drain Current vs Temperature

8. Test Circuits and Waveforms

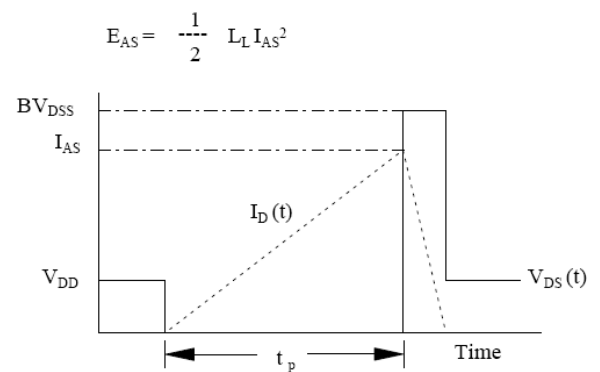
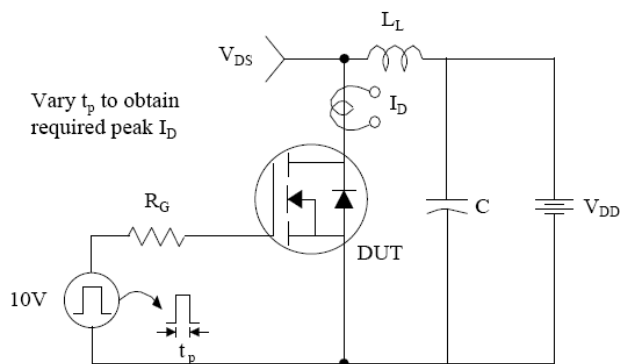
Gate Charge Test Circuit & Waveform



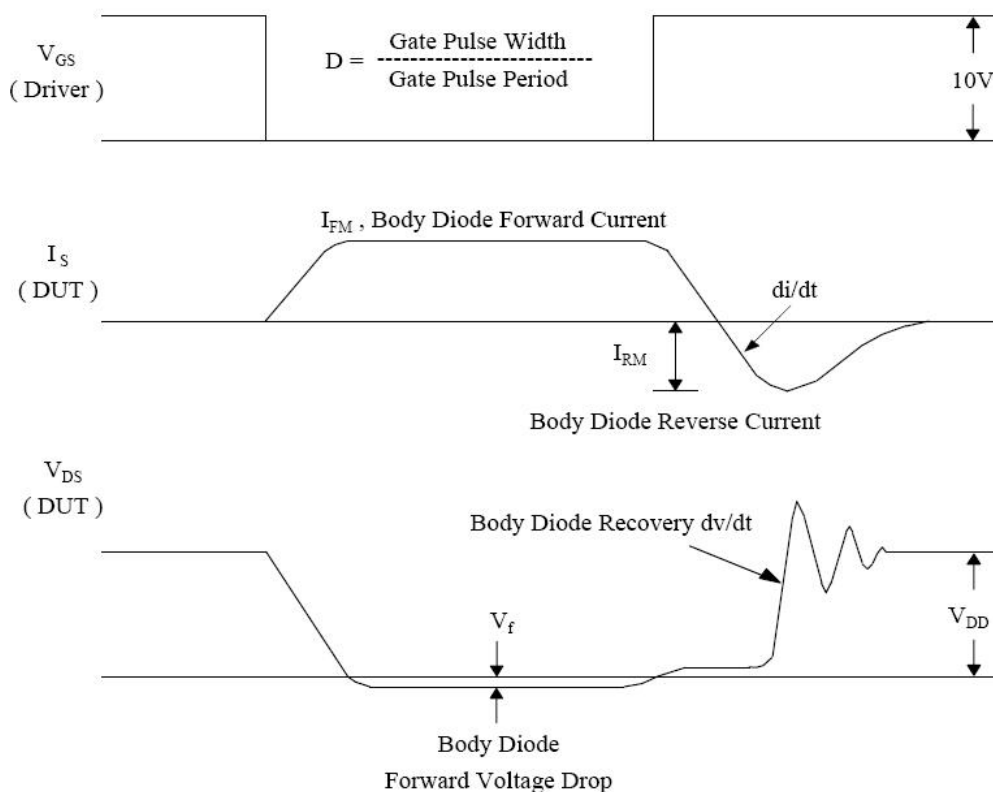
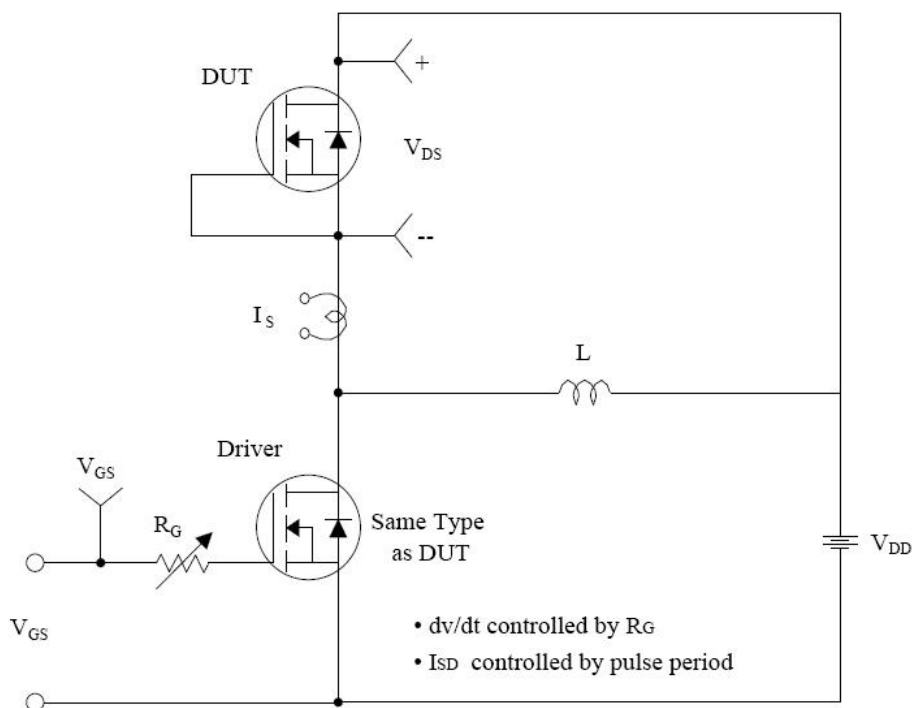
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms



Peak Diode Recovery dv/dt Test Circuit & Waveforms



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