## 1. Description

The KIA-8103A is the highest performance trench N-ch MOSFETs with extreme high cell density,which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.The KIA30N03B meet the RoHS and Green Product requirenment,100%EAS guaranteed with full function reliability approved.

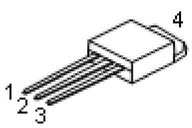
## 2. Features

- $R_{DS(on)}$=15mΩ(typ.) @ $V_{DS}$=30V
- Avanced high cell density Trench technology
- Super Low Gate Charge
- Excellent Cdv/dt effect decline
- 100%EAS Guaranteed
- Green Device Available

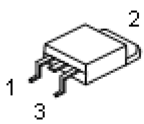
## 3. Applications

- High Frequency Point-of-Load Synchronous Buck Converter for MB/NB/UMPC/VGA
- Networking DC-DC Power System
- Load Switch

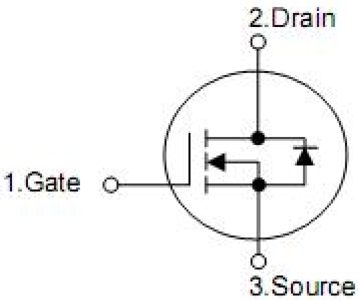
## 4.Symbol



TO-251



TO-252




| Pin | Function |
|---|---|
| 1 | Gate |
| 2 | Drain |
| 3 | Source |

## 5. Ordering Information

| Part Number | Package | Brand |
|---|---|---|
| KND8103A | TO-252 | KIA |
| KNU8103A | TO-251 | KIA |

## 6. Absolute maximum ratings

| Parameter | | Symbol | Rating | Units |
|---|---|---|---|---|
| Drain-source voltage | | $V_{DS}$ | 30 | V |
| Gate-source voltage | | $V_{GS}$ | $\pm$20 | V |
| Continuous drain current, $V_{GS}$ @10V[1] | $T_C$=25ºC | $I_D$ | 30 | A |
| | $T_C$=100ºC | | 18 | A |
| Pulsed drain current [2] | | $I_{DM}$ | 60 | A |
| Single pulse avalanche energy[3] | | $E_{AS}$ | 72 | mJ |
| Avalanche current | | $I_{AS}$ | 21 | A |
| Total power dissipation[4] | $T_C$=25 ºC | $P_D$ | 25 | 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-ambient($t \leq 10s$)[1] | $R_{\theta JA}$ | -- | 25 | ºC/W |
| Thermal resistance,Junction-ambient（Steady State）[1] | $R_{\theta JA}$ | -- | 62 | ºC/W |
| Thermal resistance,Junction-case[1] | $R_{\theta JC}$ | -- | 5 | ºC/W |

## 8. 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,$I_D$=250μA | 30 | - | - | V |
| $BV_{DSS}$ temperature coefficient | $\triangle BV_{DSS}/\triangle T_J$ | Reference to 25 ºC, $I_D$=1mA | | 0.023 | | V/°C |
| Static drain-source on-resistance[2] | $R_{DS(on)}$ | $V_{GS}$=10V,$I_D$=10A | | 15 | 18 | mΩ |
| | | $V_{GS}$=4.5V,$I_D$=5A | | 22 | 30 | |
| Gate threshold voltage | $V_{GS(th)}$ | $V_{DS}$=$V_{GS}$, $I_D$=250μA | 1.0 | 1.5 | 2.5 | V |
| $V_{GS(th)}$ temperature coefficient | $\triangle V_{GS(th)}$ | | | -5.2 | | mV/°C |
| Drain-source leakage current | $I_{DSS}$ | $V_{DS}$=24V, $V_{GS}$=0V $T_J$=25°C | | | 1 | μA |
| | | $V_{DS}$=24V, $V_{GS}$=0V $T_J$=55°C | | | 5 | μA |
| Gate- source leakage current | $I_{GSS}$ | $V_{GS}$=$\pm$20V, $V_{DS}$=0V | | | $\pm$100 | nA |
| Forward transconductance | gfs | $V_{DS}$=15V, $I_D$=10A | | 10 | | S |
| Gate resistance | $R_g$ | $V_{DS}$=24V, $V_{GS}$=0V,f=1MHz | | 2.5 | 5 | Ω |
| Total gate charge(4.5V) | $Q_g$ | $V_{DS}$=20V, $V_{GS}$=4.5V $I_D$ =12A | - | 7.2 | | nC |
| Gate-source charge | $Q_{gs}$ | | | 1.4 | | |
| Gate-drain charge | $Q_{gd}$ | | | 2.2 | | |
| Turn-on delay time | $t_{d(on)}$ | $V_{DD}$=12V,$I_D$=5A, $R_G$=3.3Ω, $V_{GS}$=10V | | 4.1 | | ns |
| Rise time | $t_r$ | | | 9.8 | | |
| Turn-off delay time | $t_{d(off)}$ | | | 15.5 | | |
| Fall time | $t_f$ | | | 6.0 | | |
| Input capacitance | $C_{iss}$ | $V_{DS}$=15V,$V_{GS}$=0V, f=1MHz | | 572 | | pF |
| Output capacitance | $C_{oss}$ | | | 81 | | |
| Reverse transfer capacitance | $C_{rss}$ | | | 65 | | |
| Single pulse avalanche energy[5] | EAS | $V_{DD}$=25V,L=0.1mH, $I_{AS}$=10A | 16 | | | mJ |
| Continuous source current[1,6] | $I_S$ | $V_G$= $V_{D=}$=0V, Force current | | | 30 | A |
| Pulsed source current[2,6] | $I_{SM}$ | | | | 60 | A |
| Diode forward voltage[2] | $V_{SD}$ | $V_{GS}$=0V,$I_S$=15A, $T_J$=25ºC | | | 1.2 | V |

Note:1.The data tested by surface mounted on a 1 inch$^2$ FR-4 board with 20Z copper.

2.The data tested by pulsed, pulse width≤300μs,duty cycle≤2%

3.The EAS data shows Max.rating.The test condition is $V_{DD}$=25V, $V_{GS}$=10V,L=0.1mH,$I_{AS}$=21A

4.The power dissipation is limited by 150°C junction temperature

5.The Min, value is 100% EAS tested guarantee.

6.The data is theoretically the same as $I_D$ and $I_{DM}$,in real applications, should be limited by total power dissipation.

## 9. Test circuits and waveforms

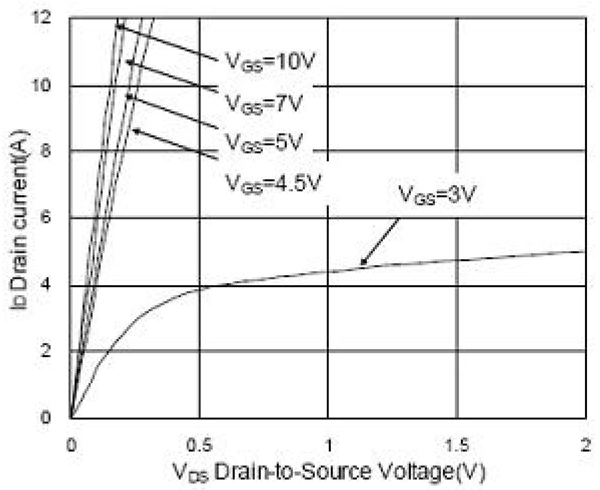



**Fig.1 Typical Output Characteristics**

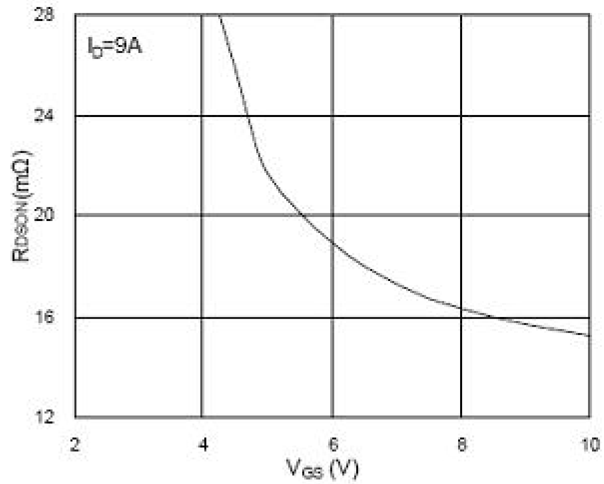



**Fig.2 On-Resistance v.s Gate-Source**

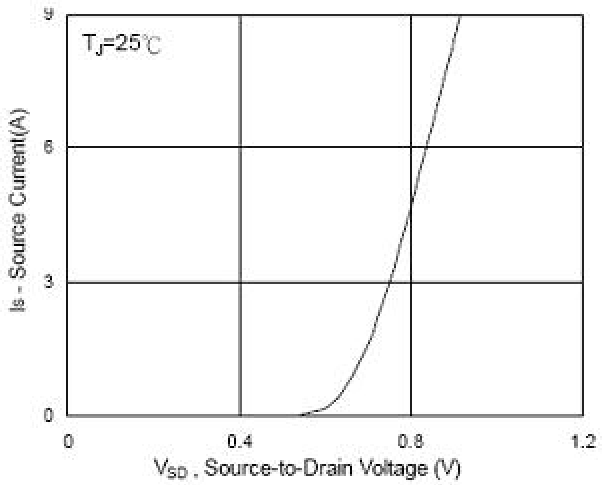



**Fig.3 Forward Characteristics of Reverse**

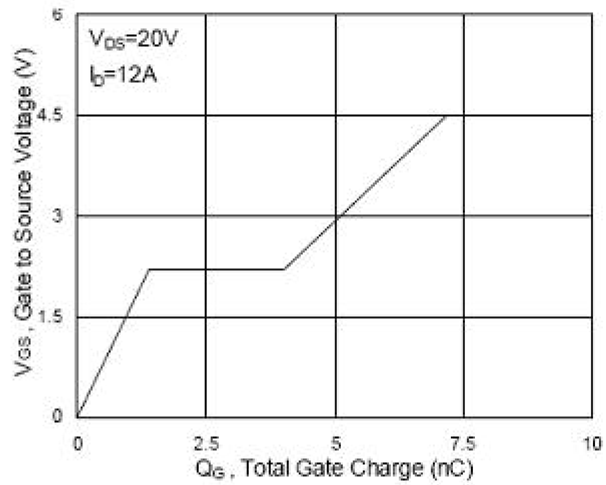



**Fig.4 Gate-Charge characteristics**

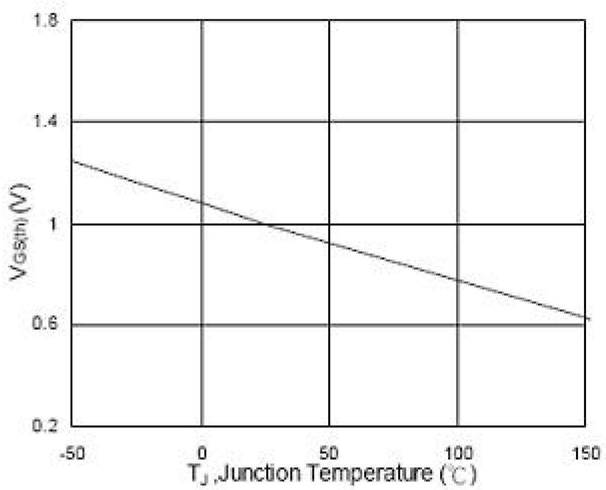



**Fig.5 Normalized $V_{GS(th)}$ v.s $T_J$**

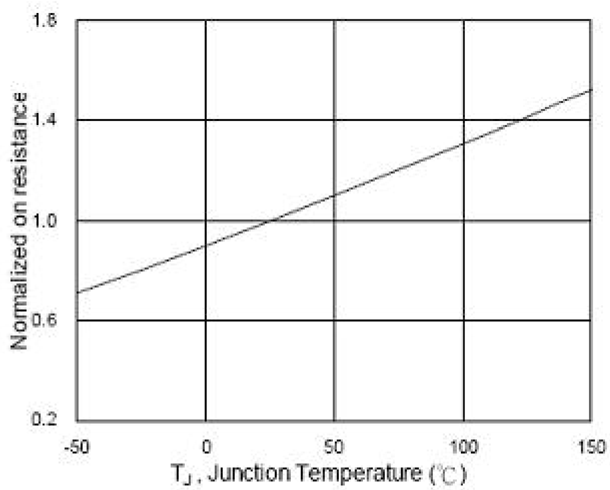



**Fig.6 Normalized $R_{DSON}$ v.s $T_J$**

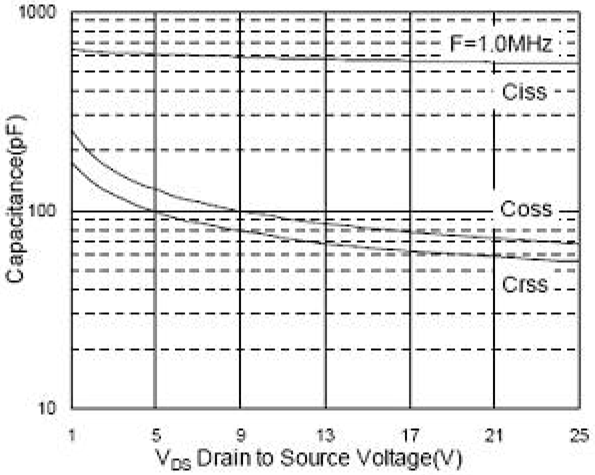



Fig.7 Capacitance

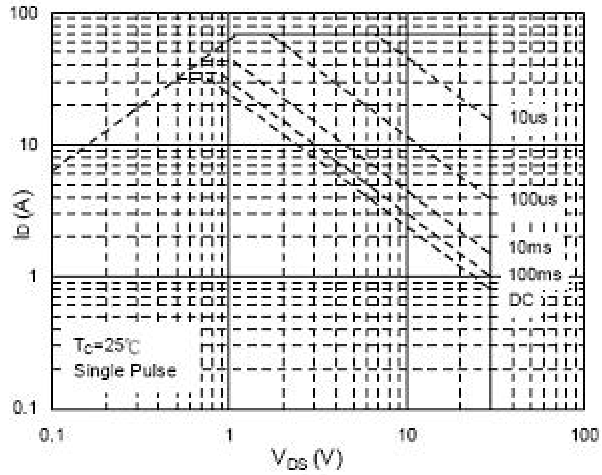



Fig.8 Safe Operating Area

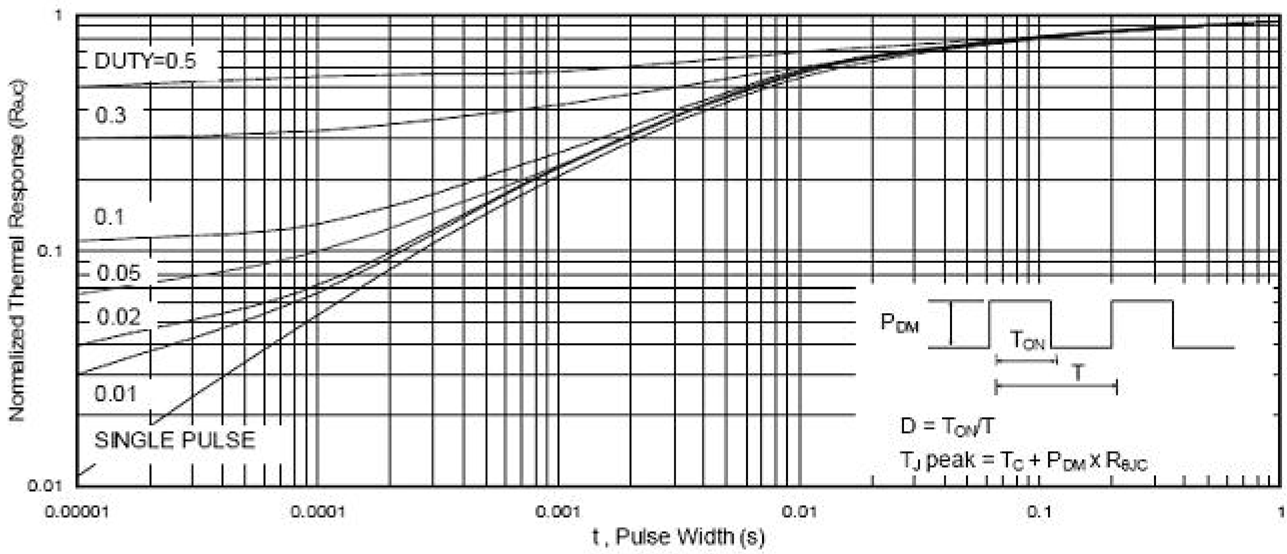



Fig.9 Normalized Maximum Transient Thermal Impedance

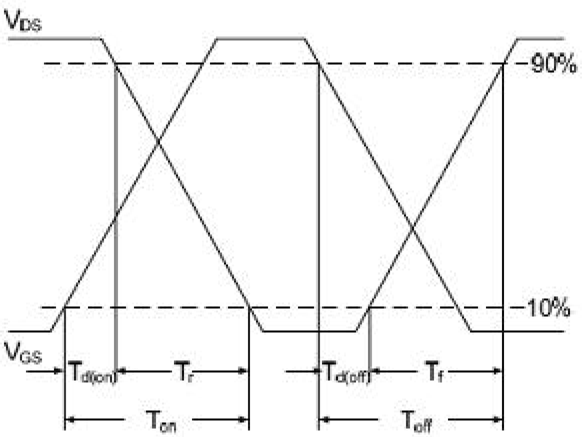



Fig.10 Switching Time Waveform

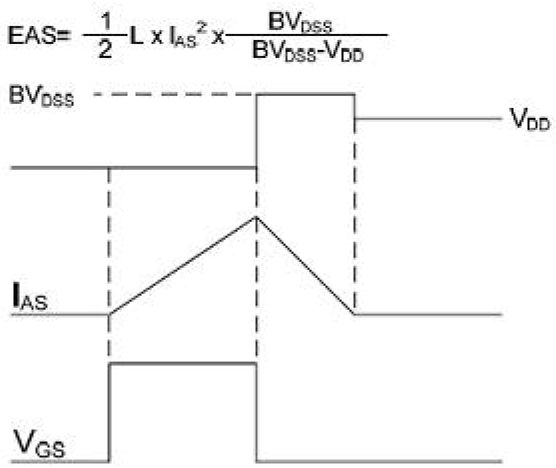



Fig.11 Unclamped Inductive Switching Waveform

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