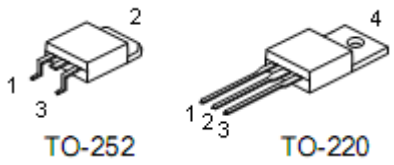
## 1. Description

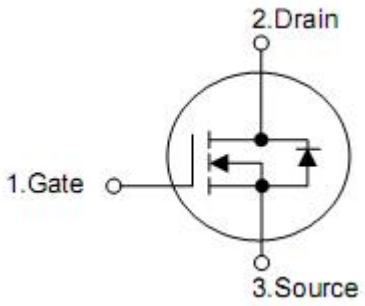
This Power MOSFET is produced using KIA`s advanced planar stripe DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency switched mode power supplies, active power factor correction based on half bridge topology.

## 2. Features

- $R_{DS(ON)}$=0.38Ω(typ.)@$V_{GS}$=10V.
- Low gate charge (typical 15nC)
- High ruggedness
- Fast switching capability
- Avalanche energy specified
- Improved dv/dt capability

## 3. Pin configuration




| Pin | Function |
|---|---|
| 1 | Gate |
| 2 | Drain |
| 3 | Source |
| 4 | Drain |

## 4. Absolute maximum ratings

($T_C$= 25ºC, unless otherwise noted)

| Parameter | | Symbol | Rating | | Units |
|---|---|---|---|---|---|
| | | | TO-220 | TO-252 | |
| Drain-source voltage | | $V_{DSS}$ | 350 | | V |
| Gate-source voltage | | $V_{GSS}$ | ±20 | | V |
| Drain current continuous | $T_C$=25ºC | $I_D$ | 11 | 11* | A |
| | $T_C$=100ºC | | 6.6 | 6.6* | A |
| Drain current pulsed (note1) | | $I_{DM}$ | 36 | | A |
| Avalanche Enlsed | Repetitive (note1) | $E_{AR}$ | 9.91 | | mJ |
| | Single pulse (note2) | $E_{AS}$ | 423 | | mJ |
| Avalanche current (note 1) | | $I_{AR}$ | 9.0 | | A |
| Peak diode recovery dv/dt (note3) | | dv/dt | 4.5 | | V/ns |
| Total power dissipation | $T_C$=25ºC | $P_D$ | 99 | | W |
| | Derate above 25ºC | | 0.79 | | W/ ºC |
| Operating and storage temperature range | | $T_J$, $T_{STG}$ | -55~+150 | | ºC |
| Maximum lead temperature for soldering Purposes,1/8`` form case for 5 seconds | | $T_L$ | 300 | | ºC |

*Drain current limited by maximum junction temperature.

## 5. Thermal characteristics

| Parameter | Symbol | Rating | Unit |
|---|---|---|---|
| Thermal resistance,Junction-amient | $R_{thJA}$ | 62.5 | ºC/W |
| Thermal resistance,case-to-sink typ. | $R_{thJS}$ | 0.5 | ºC/W |
| Thermal resistance,Junction-case | $R_{thJC}$ | 1.26 | ºC/W |

## 6. Electrical characteristics

($T_C$= 25 ºC, unless otherwise noted)

| Parameter | | Symbol | Test conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| Off characteristics | | | | | | | |
| Drain-source breakdown voltage | | $BV_{DSS}$ | $V_{GS}$=0V,$I_D$=250μA | 350 | - | - | V |
| Zero gate voltage drain current | | $I_{DSS}$ | $V_{DS}$=350V, $V_{GS}$=0V | - | - | 1 | μA |
| | | | $V_{DS}$=280V, $T_C$=125ºC | - | - | 10 | μA |
| Gate-body leakage current | Forward | $I_{GSS}$ | $V_{GS}$=20V, $V_{DS}$=0V | - | - | 10 | uA |
| | Reverse | | $V_{GS}$=-20V,$V_{DS}$=0V | - | - | -10 | uA |
| Breakdown voltage temperature coefficient | | $\triangle BV_{DSS}/\triangle T_J$ | $I_D$=250μA | - | 0.35 | - | V/ ºC |
| On characteristics | | | | | | | |
| Gate threshold voltage | | $V_{GS(TH)}$ | $V_{DS}$= $V_{GS}$ $I_D$=250μA | 2.0 | - | 4.0 | V |
| Static drain-source on- resistance | | $R_{DS(ON)}$ | $V_{DS}$=10V,$I_D$=4.5A | - | 0.38 | 0.52 | Ω |
| Forward transconductance | | $g_{FS}$ | $V_{DS}$=40V,$I_D$=4.5A(note4) | - | 7.8 | - | S |
| Dynamic characteristics | | | | | | | |
| Input capacitance | | $C_{ISS}$ | $V_{DS}$=25V,$V_{GS}$=0V, f=1MHz | - | 844 | - | pF |
| Output capacitance | | $C_{OSS}$ | | - | 162 | - | pF |
| Reverse transfer capacitance | | $C_{RSS}$ | | - | 4 | - | pF |
| Switching characteristics | | | | | | | |
| Turn-on delay time | | $t_{D(ON)}$ | $V_{DD}$=175V,$I_D$=9.0A, $R_G$=25Ω (note4,5) | - | 25 | - | ns |
| Rise time | | $t_R$ | | - | 23.5 | - | ns |
| Turn-off delay time | | $t_{D(OFF)}$ | | - | 77 | - | ns |
| Fall time | | $t_F$ | | - | 47.5 | - | ns |
| Total gate charge | | $Q_G$ | $V_{DS}$=280V,$I_D$=9.0A $V_{GS}$=10V (note4,5) | - | 15 | - | nC |
| Gate-source charge | | $Q_{GS}$ | | - | 4 | - | nC |
| Gate-drain charge | | $Q_{GD}$ | | - | 5 | - | nC |
| Drain-source diode characteristics | | | | | | | |
| drain-source diode forward voltage | | $V_{SD}$ | $V_{GS}$=0V,$I_{SD}$=11A | - | - | 1.4 | V |
| Continuous drain-source current | | $I_S$ | | - | - | 11 | A |
| Pulsed drain-source current | | $I_{SM*}$ | | | | 36 | A |
| Reverse recovery time | | $t_{RR}$ | $I_S$=9.0A dI$_{SD}$/dt=100A/μs (note4) | | 317 | - | ns |
| Reverse recovery charge | | $Q_{RR}$ | | | 2.5 | - | μC |

Notes:1.repetitive rating:pulse width limited by maximum junction temperature

2.L=6.3mH,$I_{AS}$=9.0A,$V_{DD}$=50V,$R_G$=25Ω,starting $T_J$=25ºC

3.$I_{SD}$≤11A,di/dt≤100A/μs,$V_{DD}$≤$BV_{DSS}$,starting $T_J$=25ºC

4.Pulse test:pulse width≤300μs,duty cycle≤2%

5.Essentially independent of operating temperature

## 7. Typical characteristics

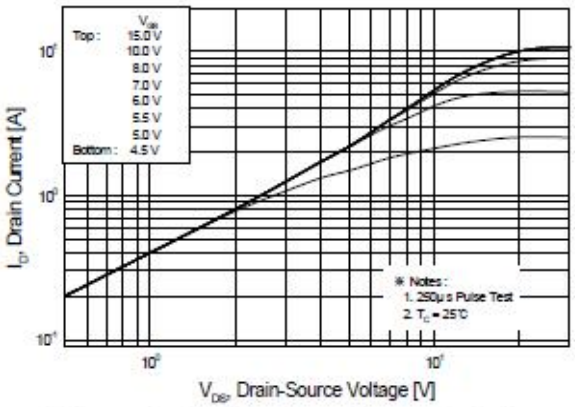



**Figure 1. On-Region Characteristics**

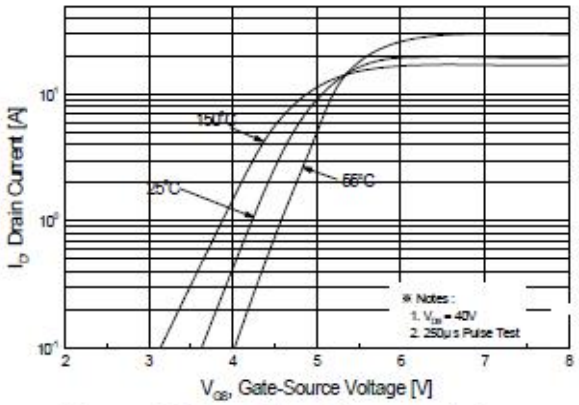



**Figure 2. Transfer Characteristics**

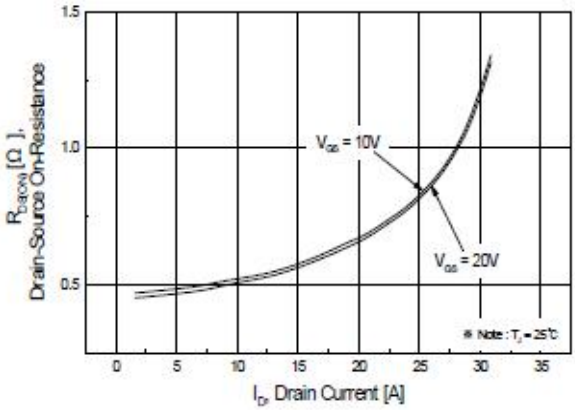



**Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage**

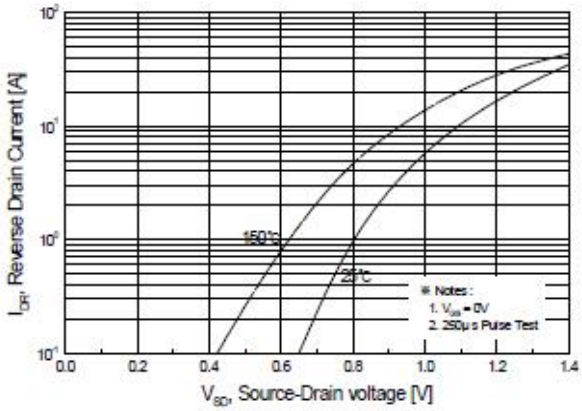



**Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature**

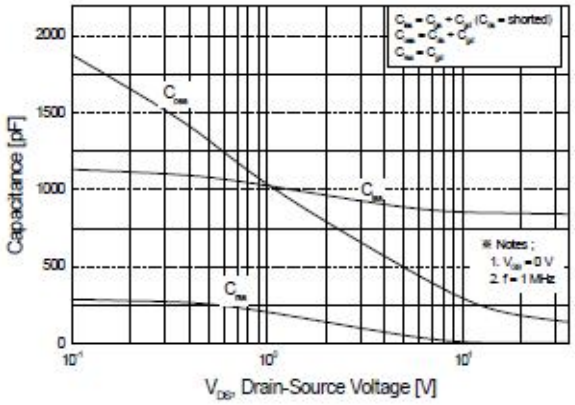



**Figure 5. Capacitance Characteristics**

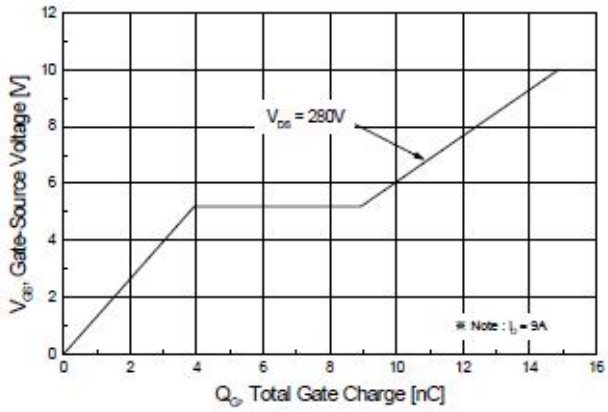



**Figure 6. Gate Charge Characteristics**

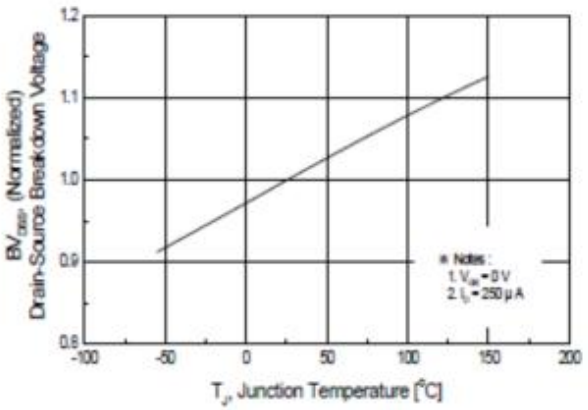



**Figure 7. Breakdown Voltage Variation vs Temperature**

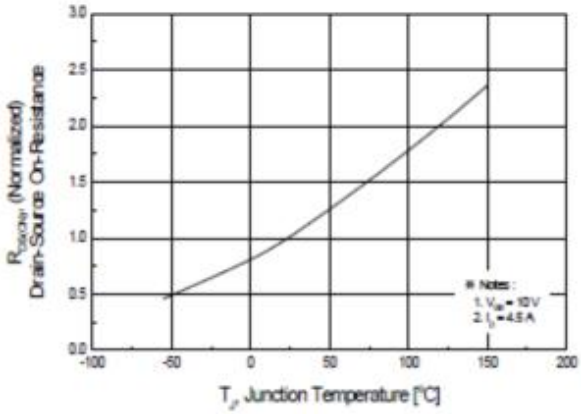



**Figure 8. On-Resistance Variation vs Temperature**

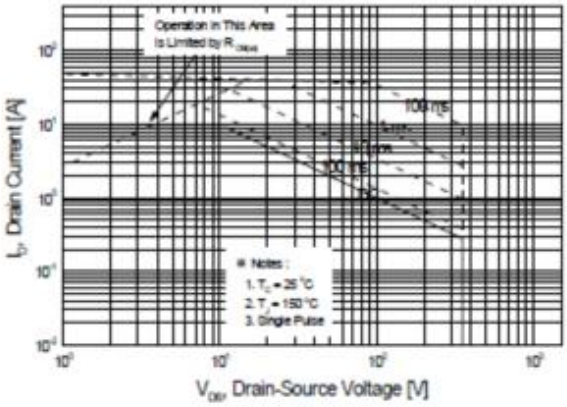



**Figure 9. Maximum Safe Operating Area**

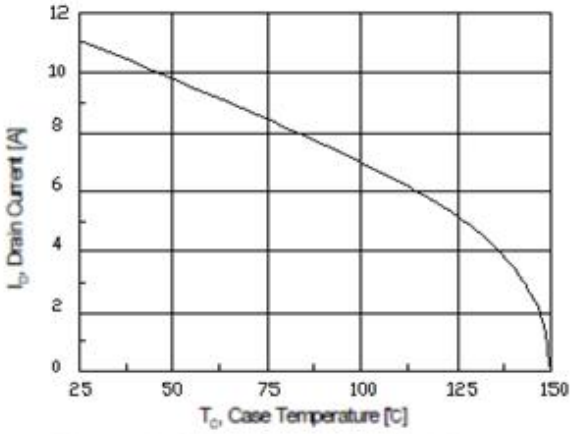



**Figure 10. Maximum Drain Current vs Case Temperature**

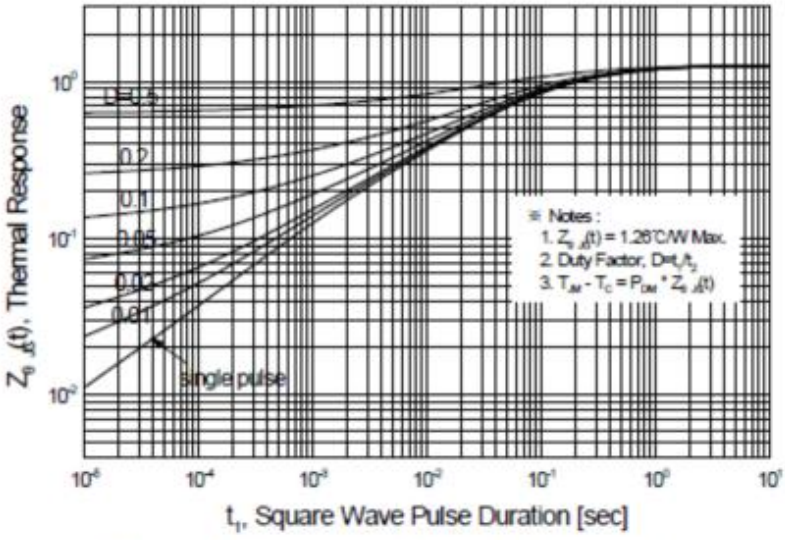



**Figure 11. Transient Thermal Response Curve**