

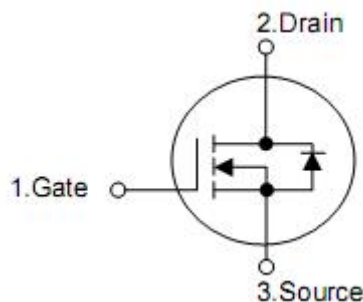
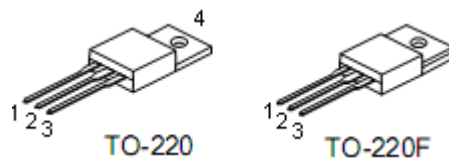
1. Description

The KIA8N60 is a high voltage MOSFET and is designed to have better characteristics, such as fast switching time, low gate charge, low on-state resistance and have a high rugged avalanche characteristics. This power MOSFET is usually used at high speed switching applications in power supplies, PWM motor controls, high efficient DC to DC converters and bridge circuits.

2. Features

- n $R_{DS(on)}=0.98\Omega$ @ $V_{GS}=10V$
- n Ultra low gate charge (typical 29nC)
- n Fast switching capability
- n Avalanche energy tested
- n Improved dv/dt capability,

3. Pin configuration



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

4. Absolute maximum ratings

(T_C=25°C , unless otherwise specified)

| Parameter | Symbol | Rating | | Units | |
|-----------------------------------|------------------|-----------------------|--------|-------|------|
| | | TO220 | TO220F | | |
| Drain-source voltage | V _{DSS} | 600 | | V | |
| Gate-source voltage | V _{GSS} | ±30 | | V | |
| Drain current continuous | I _D | T _C =25°C | 7.5 | 7.5* | A |
| | | T _C =100°C | 4.6 | 4.6* | A |
| Drain current pulsed (note1) | I _{DP} | 30 | 30* | A | |
| Peak diode recovery dv/dt (note3) | dv/dt | 4.5 | | V/ns | |
| Total power dissipation | P _D | T _C =25°C | 147 | 48 | W |
| | | Derate above 25°C | 1.18 | 0.38 | W/°C |
| Junction temperature | T _J | +150 | | °C | |
| Storage temperature | T _{STG} | -55~+150 | | °C | |

* Drain current limited by maximum junction temperature

5. Thermal data

| Parameter | Symbol | Rating | | Unit |
|--------------------------------------|-------------------|--------|--------|------|
| | | TO220 | TO220F | |
| Thermal resistance junction-ambient | R _{thJA} | 62.5 | | °C/W |
| Thermal resistance, case-to-Sink Typ | R _{thCS} | 0.5 | -- | °C/W |
| Thermal resistance junction-case | R _{thJC} | 0.85 | 2.6 | °C/W |

6. Electrical characteristics

(T_J=25°C, unless otherwise notes)

| Parameter | Symbol | Test Conditions | Min | Typ | Max | Units |
|---|--------------------------------------|---|-----|------|------|-------|
| Off characteristics | | | | | | |
| Drain-source breakdown voltage | BV _{DSS} | V _{GS} =0V, I _D =250μA | 600 | - | - | V |
| Zero gate voltage drain current | I _{DSS} | V _{DS} =600V, V _{GS} =0V | - | - | 1 | μA |
| | | V _{DS} =480V, T _C =125°C | - | - | 10 | μA |
| Gate-body leakage current | Forward | I _{GSS} | - | - | 100 | nA |
| | Reverse | | | | -100 | nA |
| Breakdown voltage temperature coefficient | $\frac{\Delta BV_{DSS}}{\Delta T_J}$ | I _D =250μA | - | 0.6 | - | V/°C |
| 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 _{GS} =10V, I _D =3.75A (Note 4) | - | 0.98 | 1.2 | Ω |
| Dynamic characteristics | | | | | | |
| Input capacitance | C _{ISS} | V _{DS} =25V, V _{GS} =0V, f=1MHz | - | 100 | - | pF |
| Output capacitance | C _{OSS} | | - | 110 | - | pF |
| Reverse transfer capacitance | C _{RSS} | | - | 12 | - | pF |
| Switching characteristics | | | | | | |
| Turn-on delay time | t _{D(ON)} | V _{DD} =300V, R _G =25Ω, I _D =7.5A (note 4,5) | - | 20 | - | ns |
| Rise time | t _R | | - | 50 | - | ns |
| Turn-off delay time | t _{D(OFF)} | | - | 80 | - | ns |
| Fall time | t _F | | - | 70 | - | ns |
| Total gate charge | Q _G | V _{DS} =480V, V _{GS} =10V I _D =7.5A (note 4,5) | - | 29 | - | nC |
| Gate-source charge | Q _{GS} | | - | 4.7 | - | nC |
| Gate-drain charge | Q _{GD} | | - | 12.5 | - | nC |
| Drain-source diode characteristics | | | | | | |
| Drain-source diode forward voltage | V _{SD} | V _{GS} =0V, I _{SD} =7.5A | - | - | 1.4 | V |
| Continuous drain-source current | I _{SD} | | - | - | 7.5 | A |
| Pulsed drain-source current | I _{SM} | | - | - | 30 | A |
| Reverse recovery time | t _{RR} | I _{SD} =7.5A, di/dt=100A/μA (note 4) | - | 350 | - | ns |
| Reverse recovery charge | Q _{RR} | | - | 3.3 | - | μC |

- Note: 1. Repetitive Rating: Pulse width limited by maximum junction temperature
 2. L=7.3mH, I_{AS}=7.5A, V_{DD}=50V, R_G=25Ω, Starting T_J=25°C
 3. I_{SD}≤7.5A, di/dt≤200A/μs, V_{DD}≤BV_{DSS}, Starting T_J=25°C
 4. Pulse test: pulse width ≤300μs, duty cycle ≤2%
 5. Essentially independent of operating temperature.

7. Typical characteristics

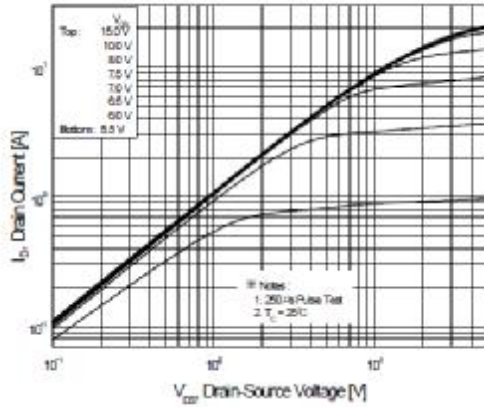


Figure 1. On-Region Characteristics

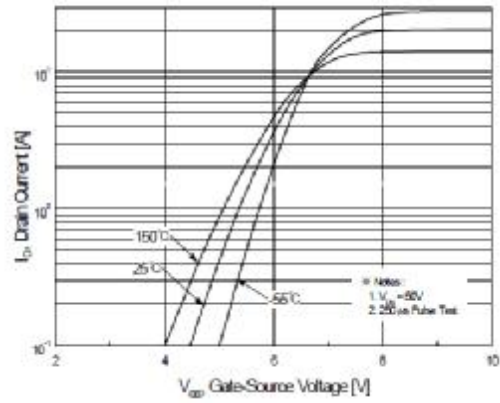


Figure 2. Transfer Characteristics

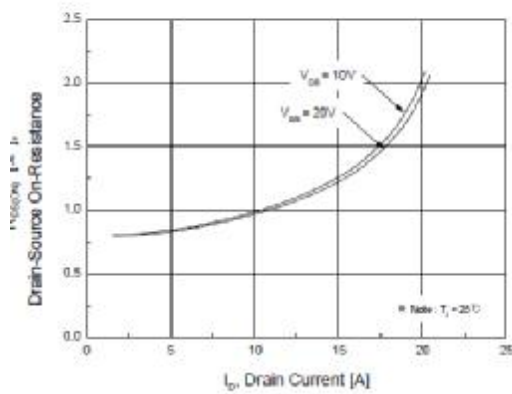


Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage

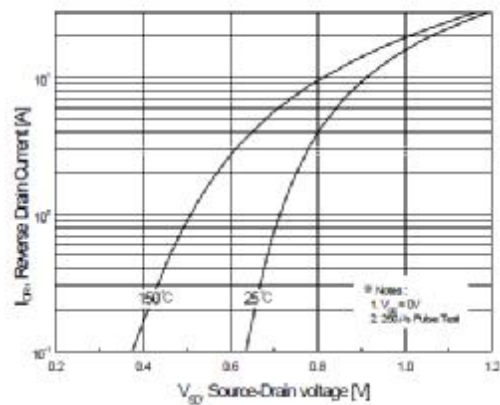


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

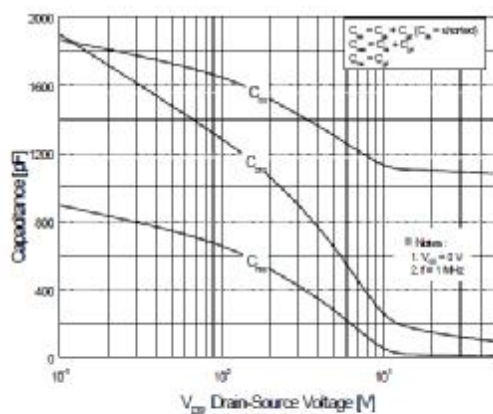


Figure 5. Capacitance Characteristics

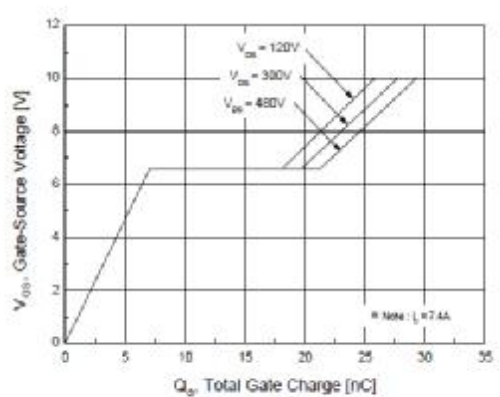


Figure 6. Gate Charge Characteristics

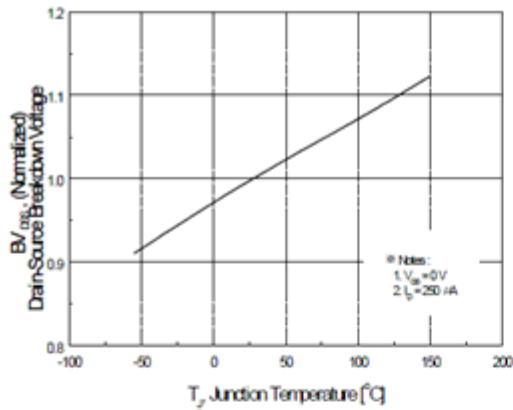


Figure 7. Breakdown Voltage Variation vs. Temperature

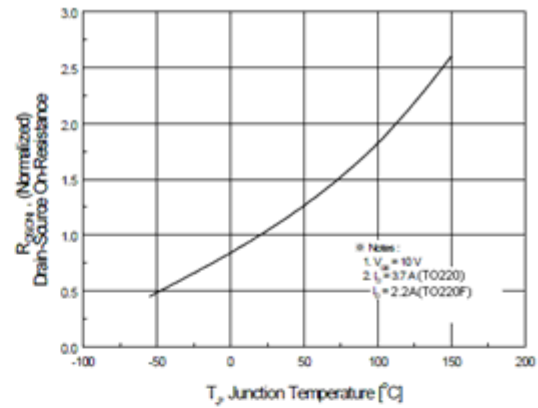


Figure 8. On-Resistance Variation vs. Temperature.

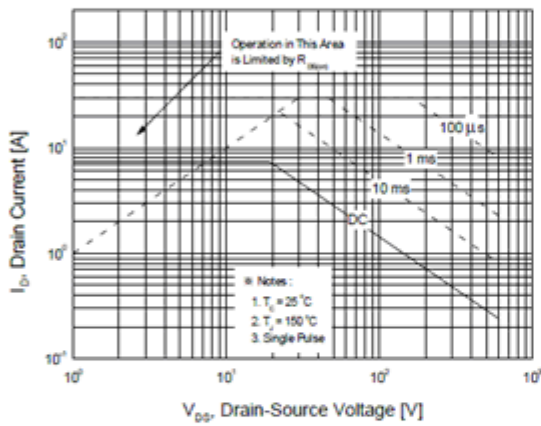


Figure 9. Maximum Safe Operating Area

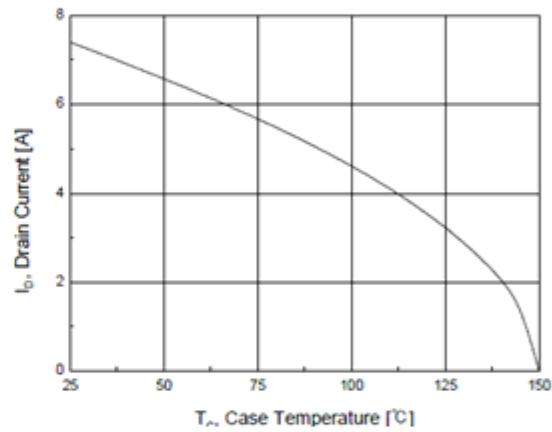


Figure 10. Maximum Drain Current vs Case Temperature

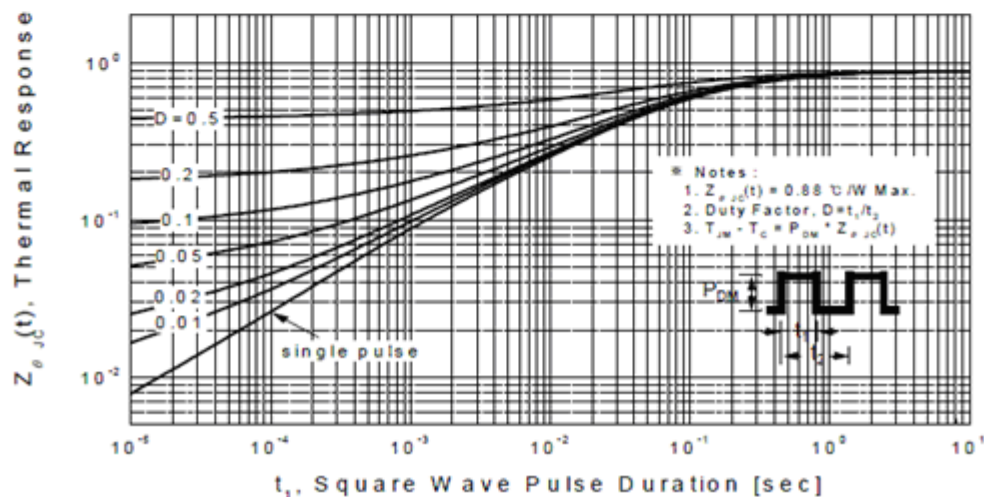


Figure 11-1. Transient Thermal Response Curve for TO220

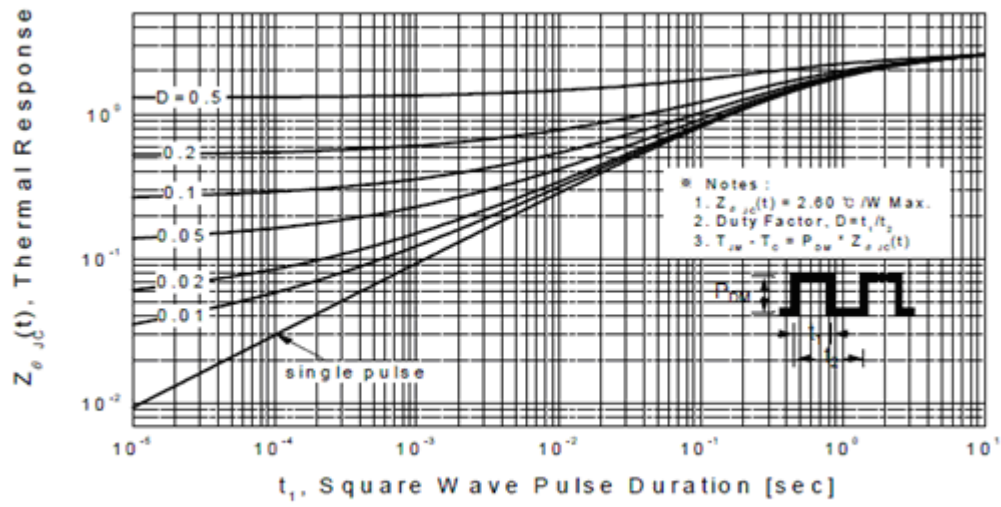


Figure 11-2. Transient Thermal Response Curve for TO220F