

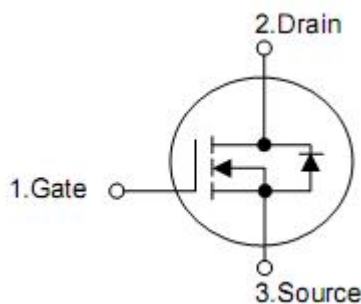
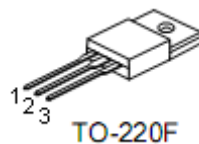
1. Description

This Power MOSFET is produced using KIA semi's advanced super-junction technology. This advanced technology has been especially tailored to minimize conduction loss, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for AC/DC power conversion in switching mode operation for higher efficiency.

2. Features

- $R_{DS(on)}=0.16\Omega @ V_{GS}=10V$
- Low gate charge (typical 70nC)
- High ruggedness
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability

3. Pin configuration



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

4. Absolute maximum ratings

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

| Parameter | Symbol | Rating | Units |
|---|----------------------|---|------------------|
| Drain-source voltage | V_{DSS} | 650 | V |
| Gate-source voltage | V_{GSS} | +30 | V |
| Drain current continuous | I_D | $T_C=25^\circ\text{C}$ | 20* |
| | | $T_C=100^\circ\text{C}$ | 10* |
| Drain current pulsed (note1) | I_{DM} | 62* | A |
| Avalanche energy | Repetitive (note1) | E_{AR} | 1 |
| | Single pulse (note2) | E_{AS} | 485 |
| Avalanche energy(note1) | I_{AR} | 20 | A |
| Peak diode recovery dv/dt (note3) | dv/dt | 4.5 | V/ns |
| Total power dissipation | P_D | $T_C=25\text{ }^\circ\text{C}$ | 35 |
| | | derate above $25\text{ }^\circ\text{C}$ | 0.3 |
| Operating and storage temperature range | T_J, T_{STG} | -55~+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

5. Thermal characteristics

| Parameter | Symbol | Rating | Unit |
|---------------------------------------|------------|--------|--------------------|
| Thermal resistance, Junction-ambient | R_{thJA} | 80 | $^\circ\text{C/W}$ |
| Thermal resistance, case-to-sink typ. | R_{thJS} | - | $^\circ\text{C/W}$ |
| Thermal resistance, Junction-case | R_{thJC} | 3.6 | $^\circ\text{C/W}$ |

6. Electrical characteristics

 (T_C=25°C, unless otherwise noted)

| Parameter | Symbol | Conditions | Min | Typ | Max | Unit | |
|---|-------------------------------------|--|---|------|------|--|----|
| Off characteristics | | | | | | | |
| Drain-source breakdown voltage T _J =25°C | BV _{DSS} | V _{GS} =0V, I _D =250μA | 650 | - | - | V | |
| Zero gate voltage drain current | I _{DSS} | V _{DS} =650V, V _{GS} =0V | - | - | 1 | μA | |
| | | V _{DS} =480V, T _C =125°C | - | - | 10 | μA | |
| Gate-body leakage current | Forward | I _{GSS} | V _{GS} =30V, V _{DS} =0V | - | - | 100 | nA |
| | Reverse | | | | | V _{GS} =-30V, V _{DS} =0V | - |
| Breakdown voltage temperature coefficient | ΔBV _{DSS} /ΔT _J | I _D =250μA, referenced to 25°C | - | 0.6 | - | V/°C | |
| On characteristics | | | | | | | |
| Gate threshold voltage | V _{GS(th)} | V _{DS} =V _{GS} , I _D =250μA | 2.5 | - | 4.5 | V | |
| Static drain-source on-resistance | R _{DS(on)} | V _{GS} =10V, I _D =5A | - | 0.16 | 0.19 | Ω | |
| Forward transconductance | g _{FS} | V _{DS} =40V, I _D =5A (note4) | - | 16 | - | S | |
| Dynamic characteristics | | | | | | | |
| Input capacitance | C _{iss} | V _{DS} =25V, V _{GS} =0V, f=1MHz | - | 1440 | - | pF | |
| Output capacitance | C _{oss} | | - | 300 | - | pF | |
| Reverse transfer capacitance | C _{rss} | | - | 10 | - | pF | |
| Switching characteristics | | | | | | | |
| Turn-on delay time | t _{d(on)} | V _{DD} =400V, I _D =5A, R _G =20Ω (note4,5) | - | 25 | - | ns | |
| Rise time | t _r | | - | 55 | - | ns | |
| Turn-off delay time | t _{d(off)} | | - | 70 | - | ns | |
| Fall time | t _f | | - | 40 | - | ns | |
| Total gate charge | Q _g | V _{DS} =480V, I _D =10A, V _{GS} =10V (note4,5) | - | 70 | - | nC | |
| Gate-source charge | Q _{gs} | | - | 7.8 | - | nC | |
| Gate-drain charge | Q _{gd} | | - | 9 | - | nC | |
| Drain-source diode characteristics and maximum ratings | | | | | | | |
| Drain-source diode forward voltage | V _{SD} | V _{GS} =0V, I _{SD} =4.9A | - | - | 1.5 | V | |
| Continuous drain-source current | I _S | | - | - | 20 | A | |
| Pulsed drain-source current | I _{SM} | | - | - | 60 | A | |
| Reverse recovery time | t _{rr} | V _{GS} =0V, I _{SD} =4.9A di _F /dt=100A/μs (note4) | - | 475 | - | ns | |
| Reverse recovery charge | Q _{rr} | | - | 5.8 | - | μC | |

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

 2. I_{AS}=3.5A, V_{DD}=150V, R_G=25Ω, starting T_J=25°C

 3. I_{SD}≤10A, 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 typical characteristics.

Typical Characteristics

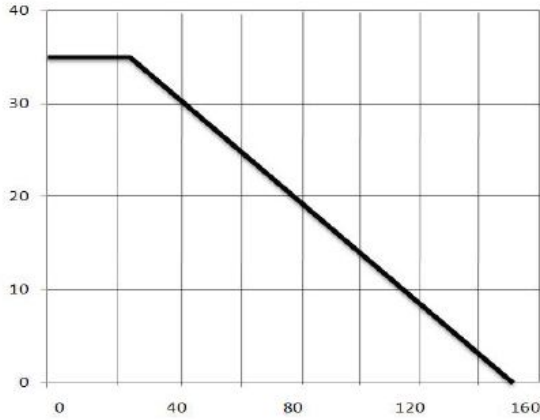


Figure 1. Power Dissipation

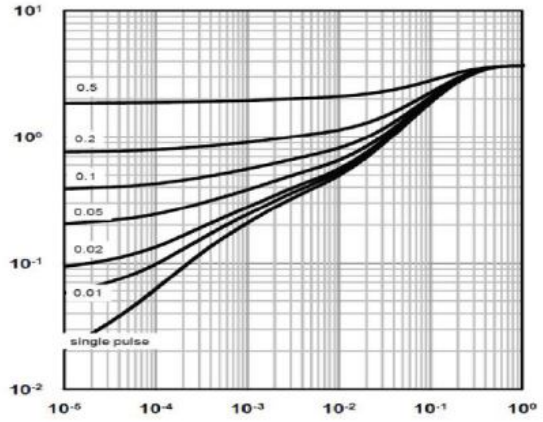


Figure 2. Transient Thermal Response Curve

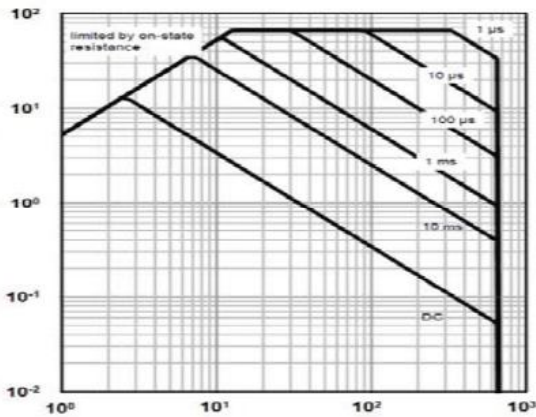


Figure 3. Maximum Safe Operating Area

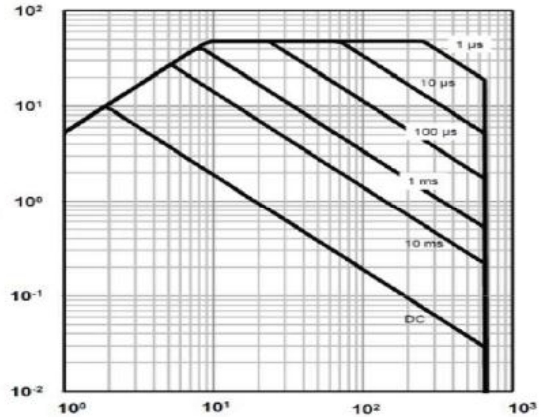


Figure 4. Maximum Safe Operating Area

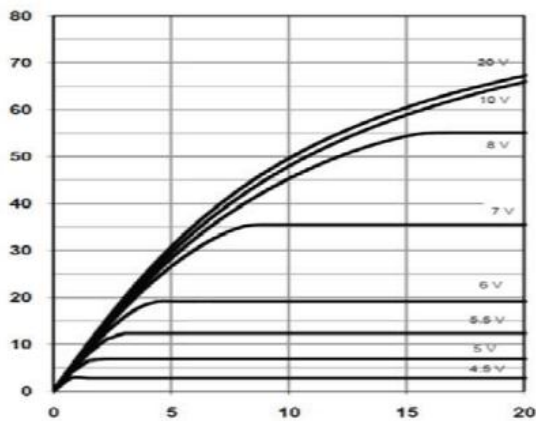


Figure 5. On-Region Characteristics@25°C

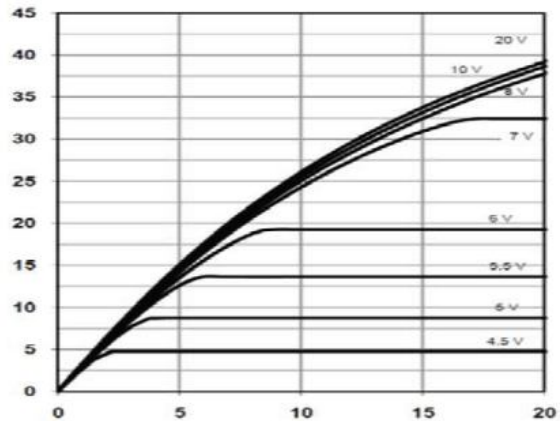


Figure 6. On-Region Characteristics@125°C

Typical Characteristics (Continued)

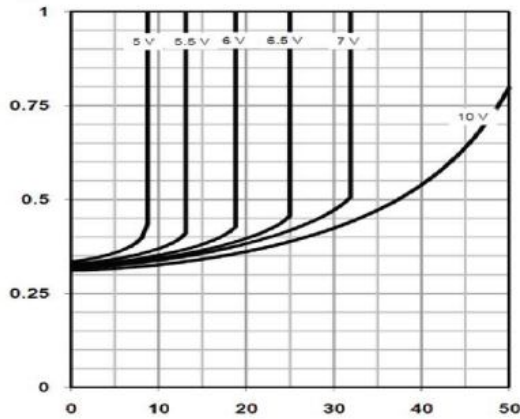


Figure 7. On-Resistance Variation vs Drain Current and Gate Voltage@125°C

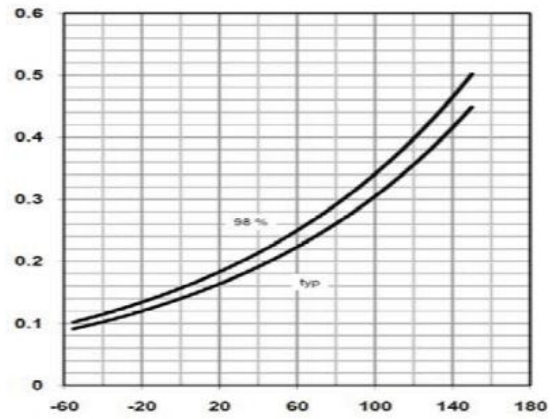


Figure 8. On-Resistance Variation vs Temperature

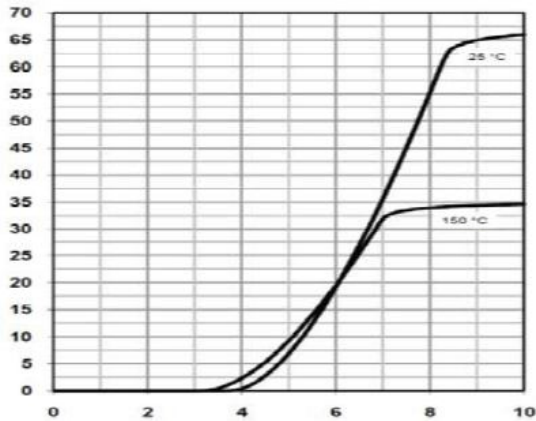


Figure 9. Transfer Characteristics

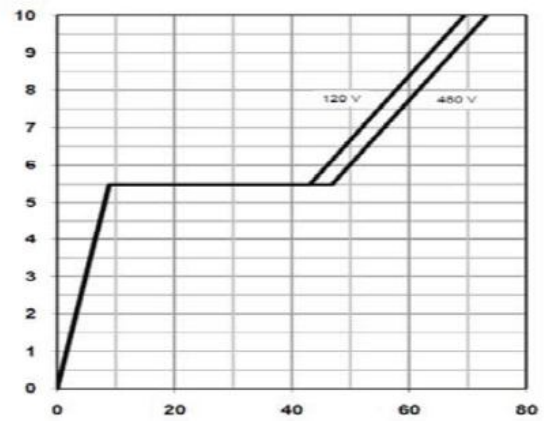


Figure 10. Gate Charge Characteristics

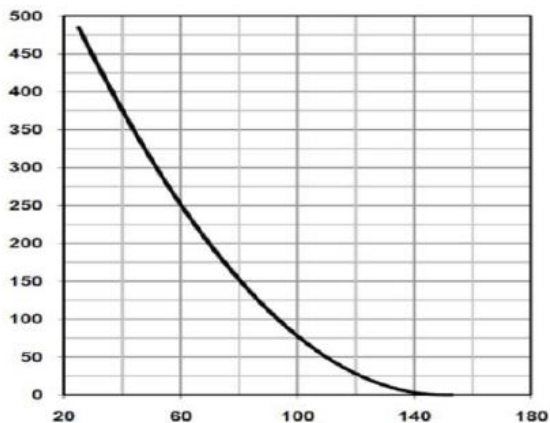


Figure 11. Avalanche Energy Characteristics

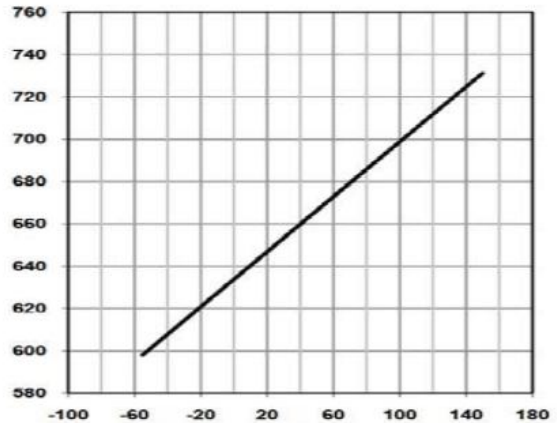


Figure 12. Breakdown Voltage Variation vs Temperature

Typical Characteristics (Continued)

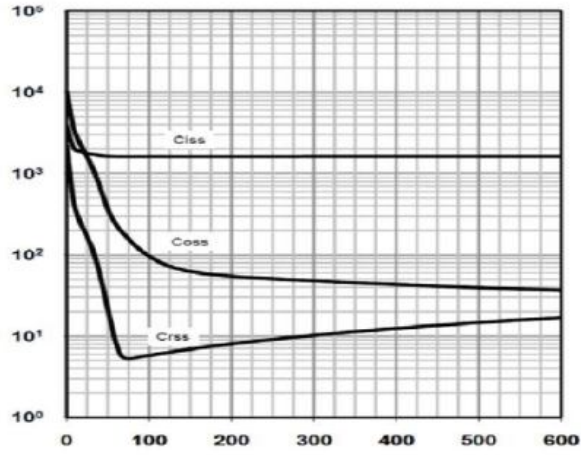


Figure 13. Capacitance Characteristics

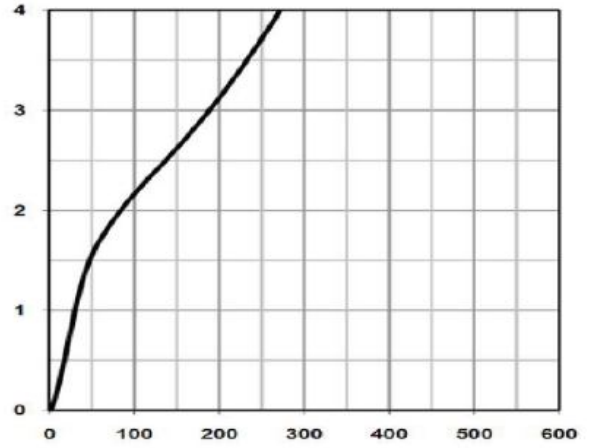


Figure 14. On-Resistance Variation vs Temperature

