# N Channel MOSFET

multicomp PRO

RoHS Compliant

## Features

- $V_{DS}$ (V) = 60V
- ID = 3.7A ($V_{GS}$ = 10V)
- $R_{DS(ON)}$ < 100mΩ ($V_{GS}$ = 10V)
- $R_{DS(ON)}$ < 120mΩ ($V_{GS}$ = 4.5V)

## Absolute Maximum Ratings (TA = 25°C unless otherwise noted)

| Parameter | Symbol | Rating | Unit |
|---|---|---|---|
| Drain-Source Voltage | $V_{DS}$ | 60 | V |
| Gate-Source Voltage | $V_{GS}$ | +20 | |
| Continuous Drain Current | $I_D$ | 3.7 | A |
| Pulsed Drain Current | $I_{DM}$ | 25 | |
| Power Dissipation | $P_D$ | 1.4 | W |
| Thermal Resistance.Junction- to-Ambient | $R_{thJA}$ | 55 | °C/W |
| Junction Temperature | $T_J$ | 150 | °C |
| Storage Temperature Range | $T_{stg}$ | -55 to 150 | |

## Electrical Characteristics ($T_A$ = 25°C

| Parameter | Symbol | Test Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **Off Characteristics** | | | | | | |
| Drain-Source Breakdown Voltage | $V_{DSS}$ | $I_D$=-250μA, $V_{GS}$=0V | -60 | | | V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$=-60V, $V_{GS}$=0V | | | 1 | μA |
| Gate-Body leakage current | $I_{GSS}$ | $V_{DS}$=0V, $V_{GS}$=±20V | | | ±100 | nA |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$=$V_{GS}$ $I_D$=-250μA | 1 | | 3 | V |
| Static Drain-Source On-Resistance | $R_{DS(On)}$ | $V_{GS}$=-10V, $I_D$=-3.9A | | | 100 | mΩ |
| | | $V_{GS}$=-4.5V, $I_D$=-3.7A | | | 120 | |
| Forward Transconductance | $g_{FS}$ | $V_{DS}$=-15V, $I_D$=-10A | 35 | | | S |
| On State Drain Current | $I_{D(ON)}$ | $V_{GS}$=5V, $V_{DS}$=10V | 8 | | | A |
| Forward Transconductance | $g_{FS}$ | $V_{DS}$=5V, $I_D$=3.7A | 3 | 9 | | S |

| Parameter | Symbol | Test Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Input Capacitance | $C_{iss}$ | $V_{GS}$=0V, $V_{DS}$=-25V, f=1MHz | | | 800 | pF |
| Output Capacitance | $C_{oss}$ | | | | 250 | |
| Reverse Transfer Capacitance | $C_{rss}$ | | | | 60 | |
| Total Gate Charge | $Q_g$ | $V_{DS}$=-10V, $V_{DS}$=40V, $I_D$=-3.7A | | 9 | 12 | nC |
| Gate Source Charge | $Q_{gs}$ | | | 2 | | |
| Gate Drain Charge | $Q_{gd}$ | | | 6 | | |
| Turn-On DelayTime | $t_{d(on)}$ | $I_D$=1A, $V_{DS}$=25V, $R_{GEN}$=6Ω | | 15 | 20 | nS |
| Turn-On Rise Time | $t_r$ | | | 18 | 20 | |
| Turn-Off DelayTime | $t_{d(off)}$ | | | 40 | 50 | |
| Turn-Off Fall Time | $t_f$ | | | 16 | 20 | |
| Maximum Body-Diode Continuous Current | $I_S$ | $I_{SD}$=-12A, $V_{GS}$=0V | | | 2.5 | A |
| Diode Forward Current | $V_{SD}$ | $I_S$=1.5A,$V_{GS}$=0V | | | 1.2 | V |

## Typical Characterisitics

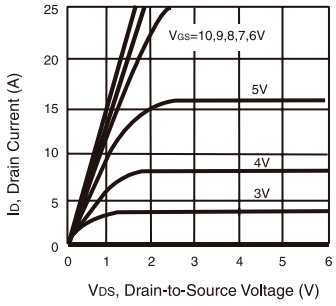



Figure 1. Output Characteristics

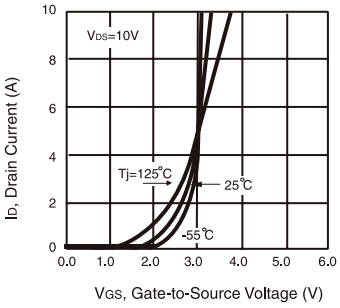



Figure 2. Transfer Characteristics

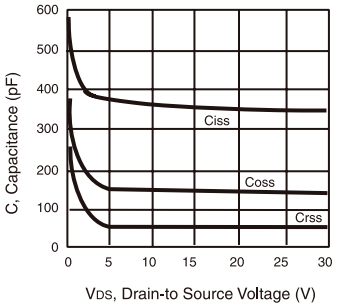



Figure 3. Capacitance

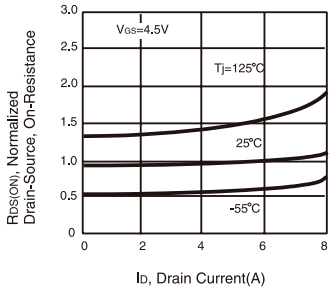



Figure 4. On-Resistance Variation with Drain Current and Temperature

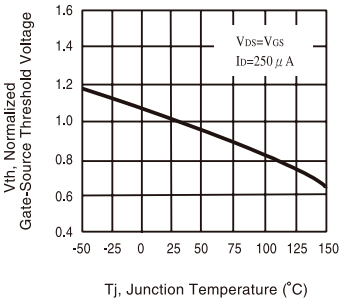



Figure 5. Gate Threshold Variation with Temperature

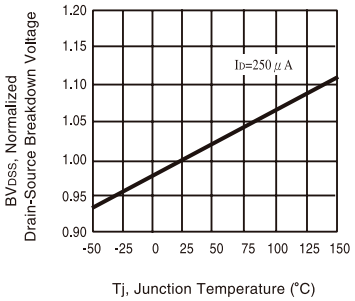



Figure 6. Breakdown Voltage Variation with Temperature

## Typical Characterisitics

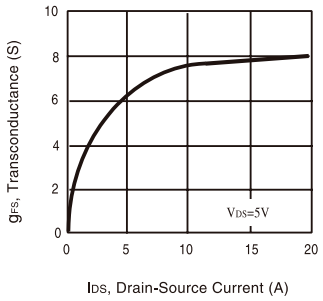



Figure 7. Transconductance Variation with Drain Current

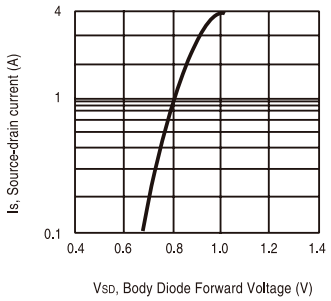



Figure 8. Body Diode Forward Voltage Variation with Source Current

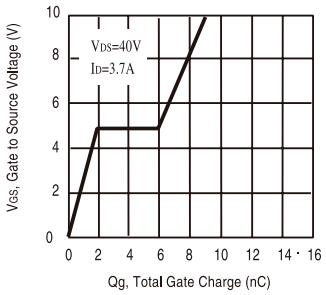



Figure 9. Gate Charge

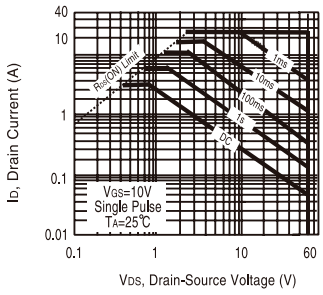



Figure 10. Maximum Safe Operating Area

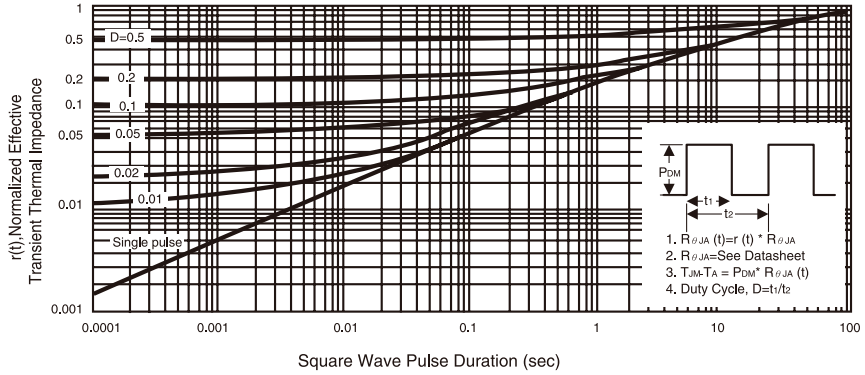
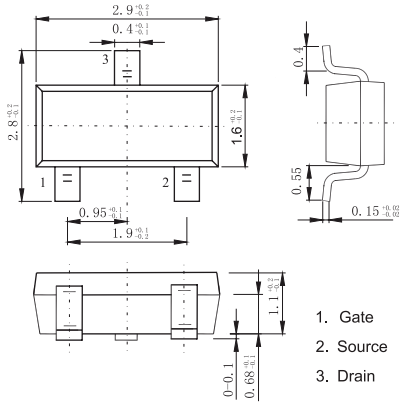
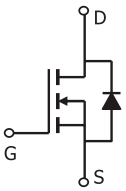



Figure 11. Normalized Thermal Transient Impedance Curve

## Diagram




Dimensions : Millimetres

## Part Number Table

| Description | Part Number |
|---|---|
| N Channel MOSFET, 3.7A, 60V, SOT23-3 | 2KK5013 |