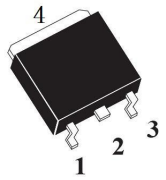
# Si4080

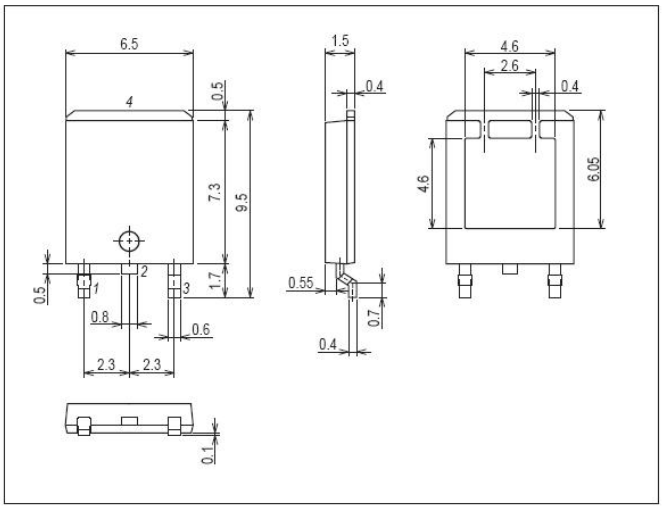
## Features

- Low On resistance.
- 4.5V drive.
- RoHS compliant.




## Package Dimensions

TO-252




## Specifications

### Absolute Maximum Ratings at $T_a$=25$^0$C

| Parameter | Symbol | Conditions | Ratings | Unit |
|---|---|---|---|---|
| Drain-to-Source Voltage | $V_{DSS}$ | | 40 | V |
| Gate-to-Source Voltage | $V_{GSS}$ | | ±20 | V |
| Drain Current (DC) | $I_D$ | | 80 | A |
| Drain Current (Pulse) | $I_{DP}$ | PW≤10uS, duty cycle≤1% | 240 | A |
| Power Dissipation | $P_D$ | | 47 | W |
| Channel Temperature | $T_{ch}$ | | 150 | $^0$C |
| Storage Temperature | $T_{stg}$ | | -55~+175 | $^0$C |

### Electrical Characteristics at $T_a$=25$^0$C

| Parameter | Symbol | Conditions | Ratings | | | Unit |
|---|---|---|---|---|---|---|
| | | | min | typ | max | |
| Drain-to-Source Breakdown Voltage | $V_{(BR)DSS}$ | $I_D$=250uA, $V_{GS}$=0V | 40 | - | - | V |
| Zero-Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$=40V, $V_{GS}$=0V | - | - | 1 | uA |
| Gate-to-Source Leakage Current | $I_{GSS}$ | $V_{GS}$=±20V, $V_{DS}$=0V | - | - | ±100 | nA |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$= $V_{GS}$, $I_D$=250uA | 1 | 1.7 | 2.5 | V |
| Static Drain-to-Source On-State Resistance | $R_{DS(ON)}$ | $I_D$=30A, $V_{GS}$=10V | - | 5.5 | 7 | mΩ |
| | $R_{DS(ON)}$ | $I_D$=20A, $V_{GS}$=4.5V | - | 9 | 12 | mΩ |
| Input Capacitance | $C_{iss}$ | $V_{DS}$=200V, $V_{GS}$=0V, f=1MHz | - | 2400 | - | pF |
| Output Capacitance | $C_{oss}$ | $V_{DS}$=20V, $V_{GS}$=0V, f=1MHz | - | 192 | - | pF |
| Reverse Transfer Capacitance | $C_{rss}$ | $V_{DS}$=20V, $V_{GS}$=0V, f=1MHz | - | 165 | - | pF |

### Electrical Characteristics at $T_a$=25$^0$C (Continued)

| Parameter | Symbol | Conditions | Ratings | | | Unit |
|---|---|---|---|---|---|---|
| | | | min | Typ | max | |
| Turn-on Delay Time | $t_{d(on)}$ | V DD=20V, ID =30A, RL=1Ω, RGEN=3Ω, VGS =10V | - | 12 | - | nS |
| Rise Time | $t_r$ | | - | 12 | - | nS |
| Turn-off Delay Time | $t_{d(off)}$ | | - | 38 | - | nS |
| Fall Time | $t_f$ | | - | 9 | - | nS |
| Total Gate Charge | $Q_g$ | $V_{DS}$=20V, $V_{GS}$=10V, $I_D$=30A | - | 37 | - | nC |
| Gate-to-Source Charge | $Q_{gs}$ | | - | 6 | - | nC |
| Gate-to-Drain “Miller” Charge | $Q_{gd}$ | | - | 7 | - | nC |
| Diode Forward Voltage | $V_{SD}$ | $I_S$=30A, $V_{GS}$=0V | - | - | 1.2 | V |

## Test Circuit

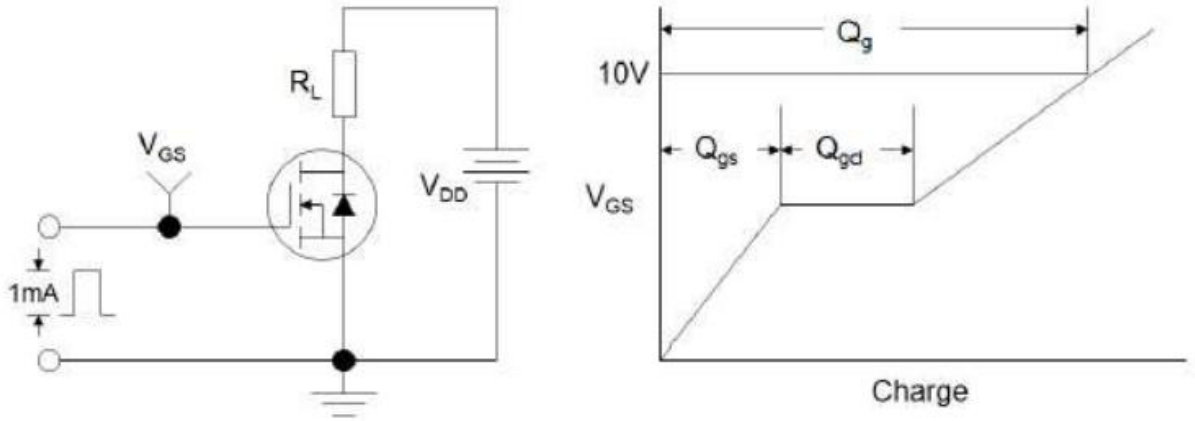



**Figure1:Gate Charge Test Circuit & Waveform**

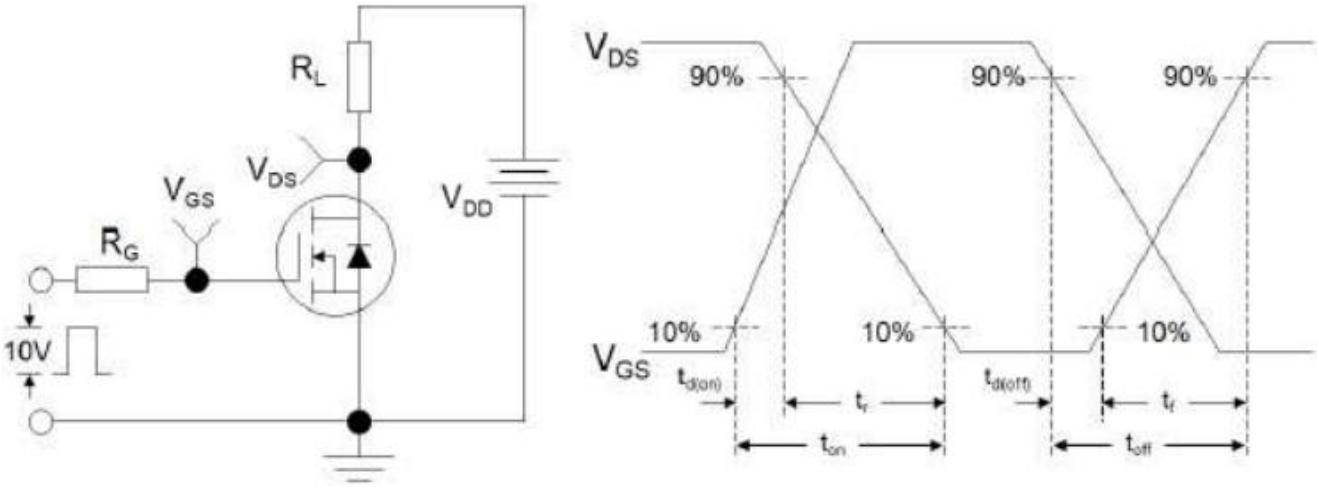



**Figure 2: Resistive Switching Test Circuit & Waveforms**

**Typical Characteristics** at $T_a=25^0C$

**Figure1:** Output Characteristics

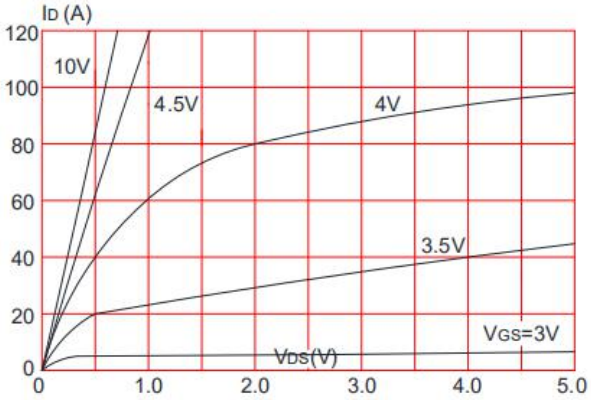



**Figure 2:** Typical Transfer Characteristics

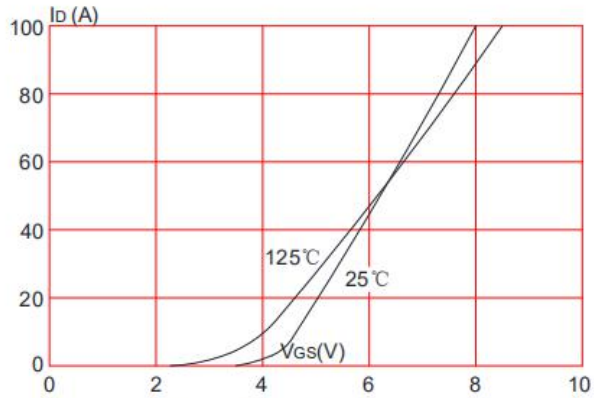



**Figure 3:**On-resistance vs. Drain Current

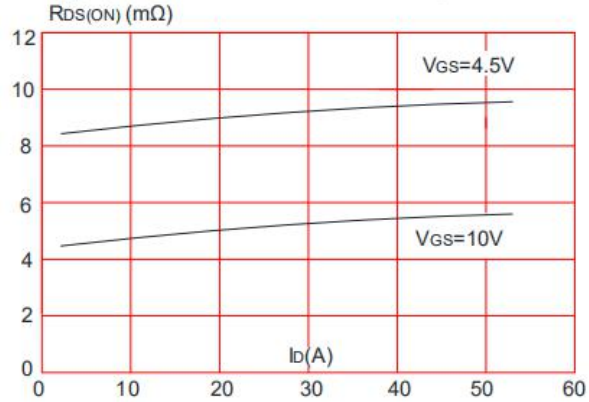



**Figure 4**: Body Diode Characteristics

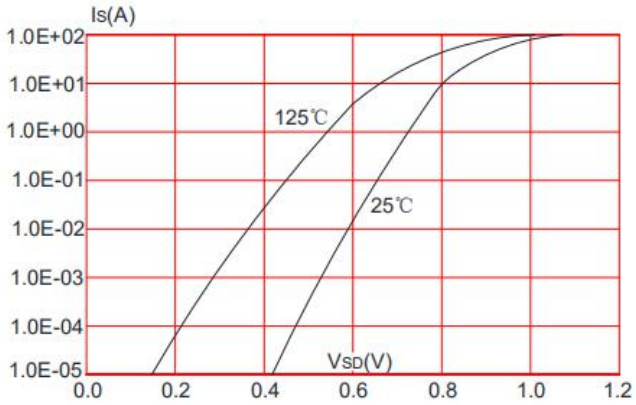



**Figure 5:** Gate Charge Characteristics

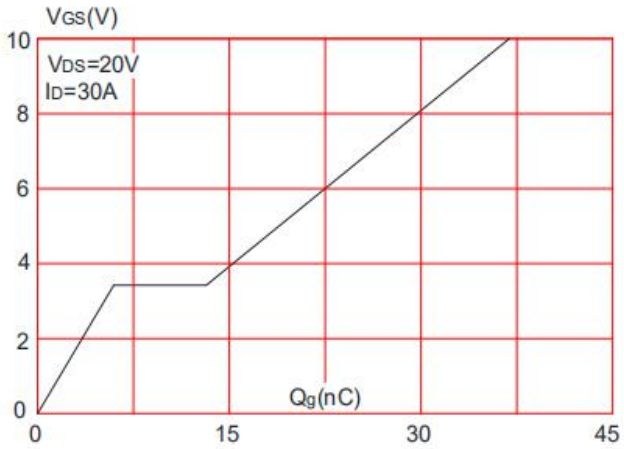



**Figure 6:** Capacitance Characteristics

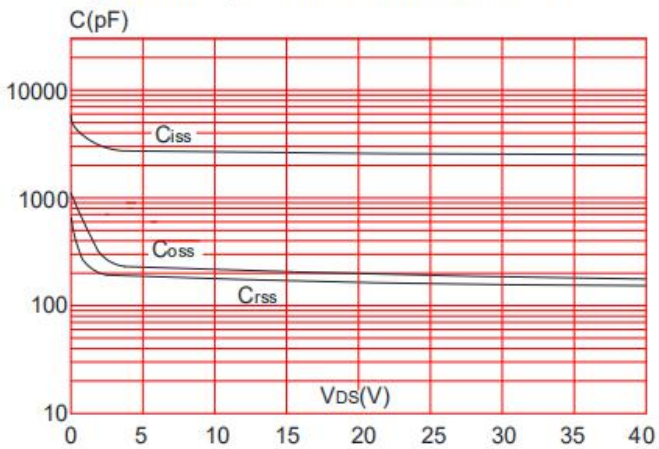


**Figure 7:** Normalized Breakdown Voltage vs. Junction Temperature

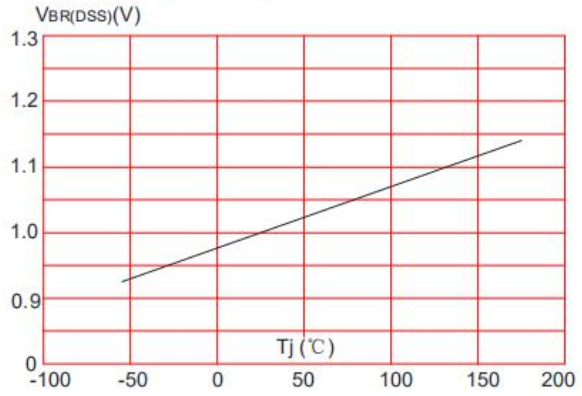



**Figure 8:** Normalized on Resistance vs. Junction Temperature

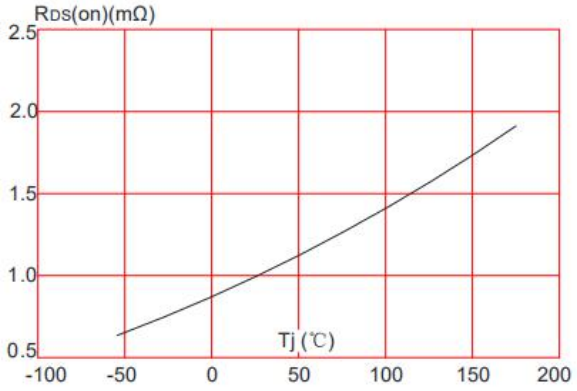



**Figure 9:** Maximum Safe Operating Area

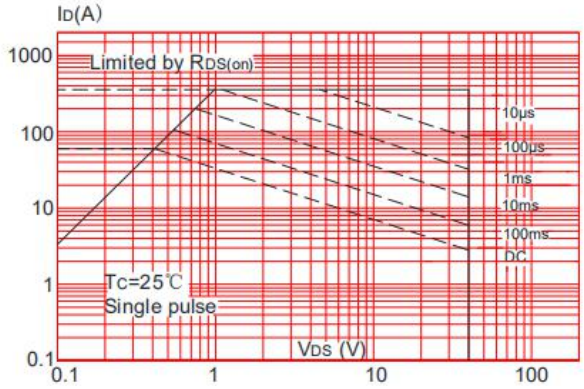



**Figure 10:** Maximum Continuous Drain Current vs. Case Temperature

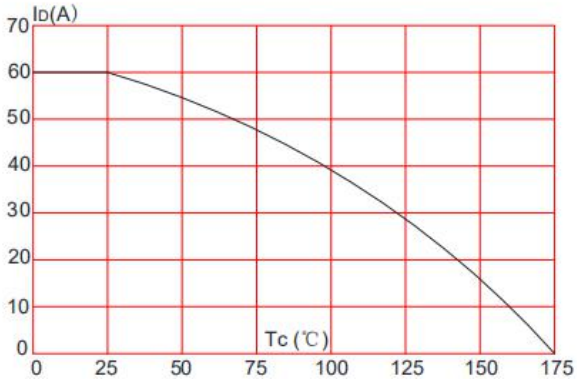



**Figure.11:** Maximum Effective Transient Thermal Impedance, Junction-to-Case