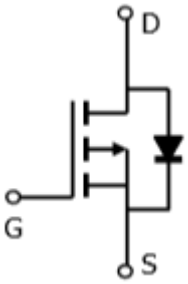
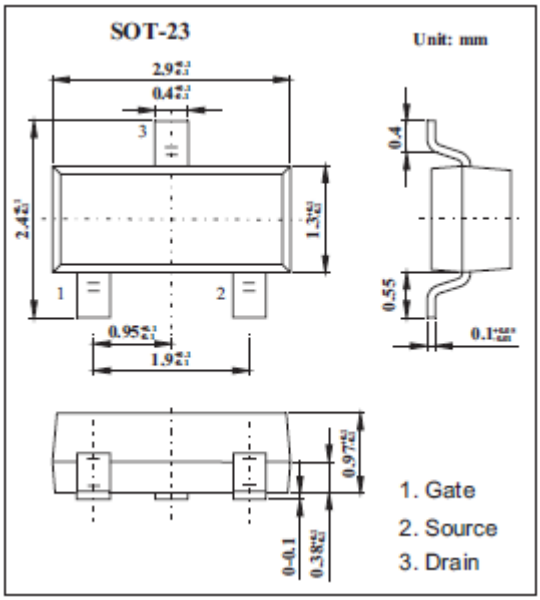
# P-Channel 60-V(D-S) MOSFET

# SI2309

## Features

- TrenchFET Power MOSFET
- RoHS Compliant




## Absolute Maximum Ratings Ta=25℃

| Parameter | Symbol | Rating | Unit |
|---|---|---|---|
| Drain-Source Voltage | $V_{DS}$ | -60 | V |
| Gate-Source Voltage | $V_{GS}$ | ±20 | V |
| Continuous Drain Current(TJ=150℃) *1,2 TA=25℃<br>TA=100℃ | $I_D$ | -1.25<br>-0.85 | A |
| Pulsed Drain Current | $I_{DM}$ | -8 | A |
| Avalanche Current L = 0.1 mH | IAS | -5 | A |
| Power Dissipation*1,2 TA=25℃<br>TA=70℃ | $P_D$ | 1.25<br>0.8 | W |
| Operating Junction and Storage Temperature Range | $T_j$.$T_{stg}$ | -55 to 150 | ℃ |
| Maximum Junction-to-Ambient*2 | $R_{thJA}$ | 145 | ℃/W |
| Maximum Junction-to-Ambient*3 | | 175 | |

*1. Pulse Width limited by maximum junction temperature.

*2. Surface Mounted on FR4 Board, t≤5sec.

*3. Surface Mounted on FR4 Board.

## ■ Electrical Characteristics Ta=25℃

| Parameter | Symbol | Test conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS}$=0V,$I_D$=-250uA | -60 | | | V |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$=VGS,ID=-250uA | -1.0 | | | |
| Gate-Body Leakage | $I_{GSS}$ | $V_{DS=0V,VGS}$=±20V | | | ±100 | nA |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$=-48V,VGS=0V | | | -1 | uA |
| | | $V_{DS}$=-48V,VGS=0V, Tj=125℃ | | | -50 | |
| On-State Drain Current | $I_{D(on)}$ | $V_{DS}$≥-4.5V, $V_{GS}$=-10V | -6 | . | . | A |
| Drain-Source On-State Resistance* | $R_{DS(on)}$ | $V_{GS}$=-10V,$I_D$=-1.25A | | 0.275 | 0.340 | Ω |
| | | $V_{GS}$=-4.5V,$I_D$=-1A | | 0.406 | 0.550 | |
| Forward Transconductance* | gFS | $V_{DS}$=-4.5V,$I_D$=-1A | | 1.9 | | S |
| Diode Forward Voltage* | $V_{SD}$ | Is=-1.25A,$V_{GS}$=0V | | -0.82 | -1.2 | V |
| Total Gate Charge* | Qg | $V_{DS}$=-30V,$V_{GS}$=-10V, $I_D$=-1.25A | | 5.4 | 12 | nC |
| Gate-Source Charge* | Qgs | | | 1.15 | | |
| Gate-Drain Charge* | Qgd | | | 0.92 | | |
| Input Capacitance | Ciss | $V_{DS}$=-15V,$V_{GS}$=0V, f=1MHz | | 380 | | pF |
| Output Capacitance | Coss | | | 100 | | |
| Reverse Transfer Capacitance | Crss | | | 75 | | |
| Turn-On Time | td(on) | $V_{DS}$=-30V,$R_L$=30Ω, $I_D$=-1A,$V_{GEN}$=-4.5V, $R_G$=6Ω | | 10.5 | 20 | ns |
| | tr | | | 11.5 | 20 | |
| Turn-Off Time | Td(off) | | | 15.5 | 30 | |
| | Tf | | | 7.5 | 15 | |

*Pulse Test: Pulse Width ≤300μ, Duty Cycle≤2%.