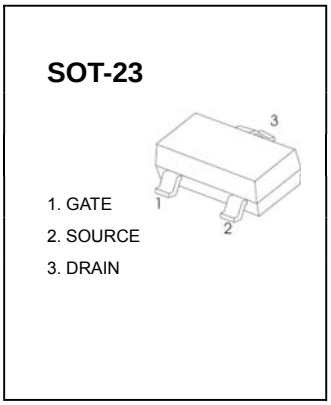
## P-Channel MOSFET

# SOT-23 Plastic-Encapsulate MOSFETS

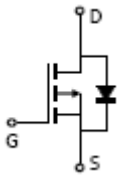



**FEATURE**

TrenchFET Power MOSFET

**APPLICATIONS**

- Load Switch for Portable Devices
- DC/DC Converter




**Maximum ratings ($T_a$=25℃ unless otherwise noted)**

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Drain-Source Voltage | $V_{DS}$ | -20 | V |
| Gate-Source Voltage | $V_{GS}$ | ±12 | |
| Continuous Drain Current | $I_D$ | -4.1 | A |
| Continuous Source-Drain Diode Current | $I_S$ | -0.8 | |
| Maximum Power Dissipation | $P_D$ | 0.35 | W |
| Thermal Resistance from Junction to Ambient(t≤10s) | $R_{\theta JA}$ | 357 | ℃/W |
| Junction Temperature | $T_J$ | 150 | ℃ |
| Storage Temperature | $T_{STG}$ | -50 ~+150 | |

## P-Channel MOSFET

**Electrical characteristics ($T_a$=25℃ unless otherwise noted)**

| Parameter | Symbol | Test Condition | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|
| **Static** | | | | | | |
| Drain-source breakdown voltage | $V_{(BR)DSS}$ | $V_{GS}$ = 0V, $I_D$ =-250μA | -20 | | | V |
| Gate-source threshold voltage | $V_{GS(th)}$ | $V_{DS}$ =$V_{GS}$, $I_D$ =-250μA | -0.5 | | -0.9 | |
| Gate-source leakage | $I_{GSS}$ | $V_{DS}$ =0V, $V_{GS}$ =±8V | | | ±100 | nA |
| Zero gate voltage drain current | $I_{DSS}$ | $V_{DS}$ =-8V, $V_{GS}$ =0V | | | -1 | μA |
| Drain-source on-state resistance[a] | $R_{DS(on)}$ | $V_{GS}$ =-4.5V, $I_D$ =-3.5A | | 30 | 45 | mΩ |
| | | $V_{GS}$ =-2.5V, $I_D$ =-3A | | 40 | 55 | |
| | | $V_{GS}$ =-1.8V,$I_D$=-2.0A | | 60 | 90 | |
| Forward transconductance[a] | $g_{fs}$ | $V_{DS}$ =-5V, $I_D$ =-4.1A | 6 | | | S |
| **Dynamic** | | | | | | |
| Input capacitance[b,c] | $C_{iss}$ | $V_{DS}$ =-4V,$V_{GS}$ =0V,f =1MHz | | 740 | | pF |
| Output capacitance[b,c] | $C_{oss}$ | | | 290 | | |
| Reverse transfer capacitance[b,c] | $C_{rss}$ | | | 190 | | |
| Total gate charge[b] | $Q_g$ | $V_{DS}$ =-4V,$V_{GS}$ =-4.5V, $I_D$ =-4.1A | | 7.8 | 15 | nC |
| | | $V_{DS}$ =-4V,$V_{GS}$ =-2.5V, $I_D$ =-4.1A | | 4.5 | 9 | |
| Gate-source charge[b] | $Q_{gs}$ | | | 1.2 | | |
| Gate-drain charge[b] | $Q_{gd}$ | | | 1.6 | | |
| Gate resistance[b,c] | $R_g$ | f =1MHz | 1.4 | 7 | 14 | Ω |
| Turn-on delay time[b,c] | $t_{d(on)}$ | $V_{DD}$=-4V, $R_L$=1.2Ω, $I_D$ ≈-3.3A, $V_{GEN}$=-4.5V,Rg=1Ω | | 13 | 20 | ns |
| Rise time[b,c] | $t_r$ | | | 35 | 53 | |
| Turn-off Delay time[b,c] | $t_{d(off)}$ | | | 32 | 48 | |
| Fall time[b,c] | $t_f$ | | | 10 | 20 | |
| Turn-on delay time[b,c] | $t_{d(on)}$ | $V_{DD}$=-4V, $R_L$=1.2Ω, $I_D$ ≈-3.3A, $V_{GEN}$=-8V,Rg=1Ω | | 5 | 10 | |
| Rise time[b,c] | $t_r$ | | | 11 | 17 | |
| Turn-off delay time[b,c] | $t_{d(off)}$ | | | 22 | 33 | |
| Fall time[b,c] | $t_f$ | | | 16 | 24 | |
| **Drain-source body diode characteristics** | | | | | | |
| Continuous source-drain diode current | $I_S$ | $T_C$=25℃ | | | -1.4 | A |
| Pulse diode forward current[a] | $I_{SM}$ | | | | -10 | |
| Body ciode voltage | $V_{SD}$ | $I_F$=-3.3A | | | -1.2 | V |

**Note :**

a. Pulse Test ; Pulse Width ≤300μs, Duty Cycle ≤2%.

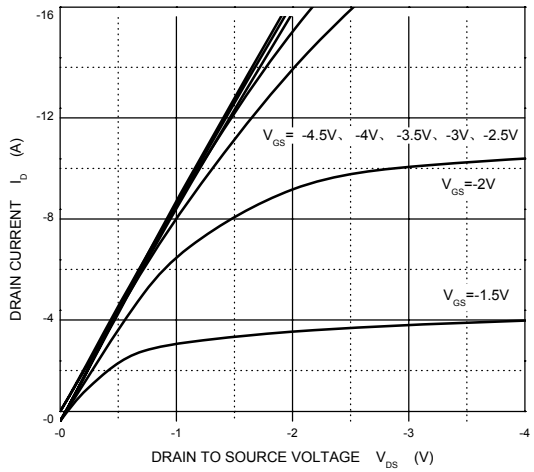
b. Guaranteed by design, not subject to production testing.

c. These parameters have no way to verify.

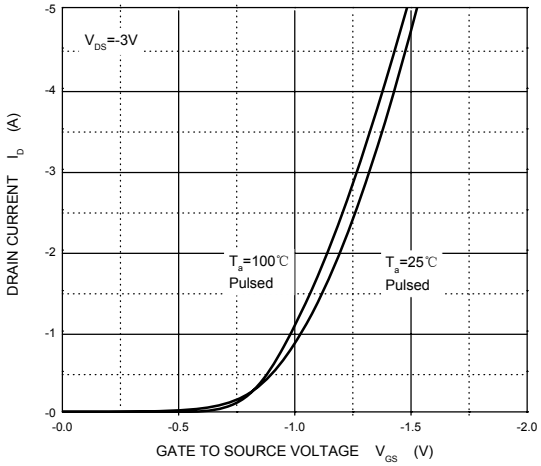
P-Channel MOSFET

# Typical Characteristics

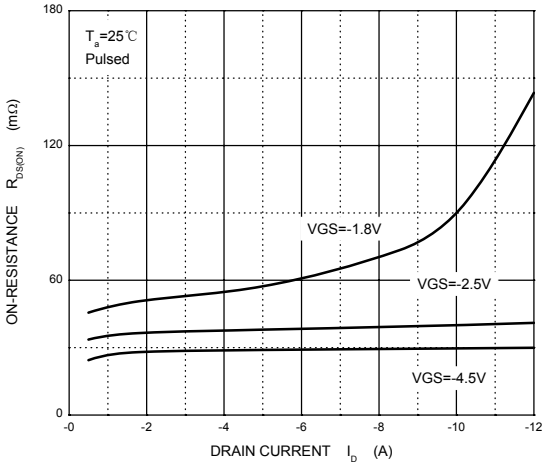
**Output Characteristics**



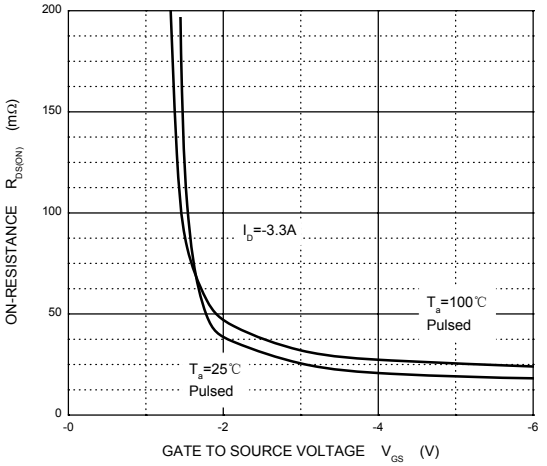

**Transfer Characteristics**



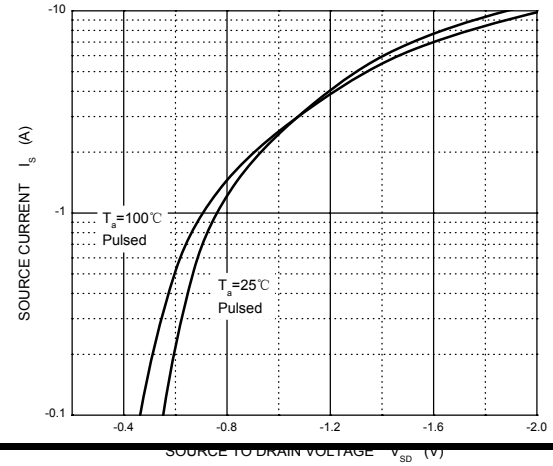

**$R_{DS(ON)}$ —— $I_D$**



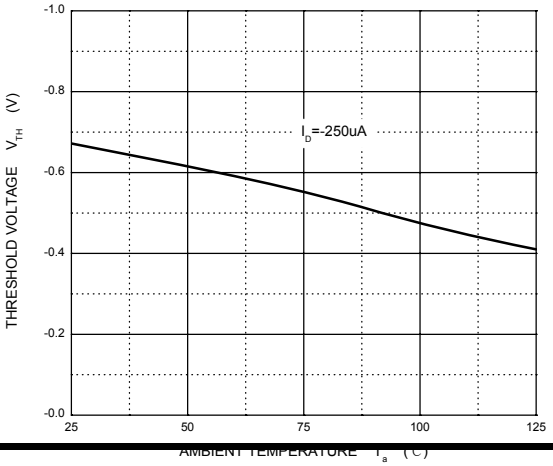

**$R_{DS(ON)}$ —— $V_{GS}$**




**$I_S$ —— $V_{SD}$**

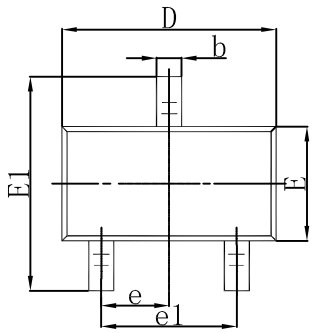


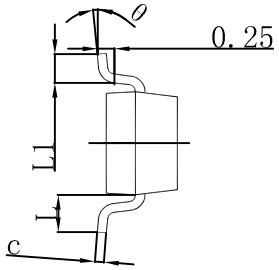

**Threshold Voltage**

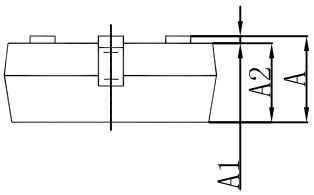


## P-Channel MOSFET

**SOT-23** Package Outline Dimensions

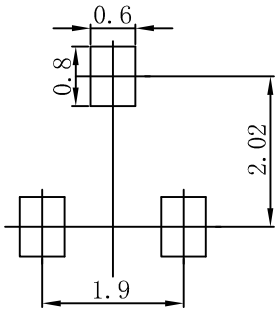



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|---|---|---|---|---|
| | Min | Max | Min | Max |
| A | 0.900 | 1.150 | 0.035 | 0.045 |
| A1 | 0.000 | 0.100 | 0.000 | 0.004 |
| A2 | 0.900 | 1.050 | 0.035 | 0.041 |
| b | 0.300 | 0.500 | 0.012 | 0.020 |
| c | 0.080 | 0.150 | 0.003 | 0.006 |
| D | 2.800 | 3.000 | 0.110 | 0.118 |
| E | 1.200 | 1.400 | 0.047 | 0.055 |
| E1 | 2.250 | 2.550 | 0.089 | 0.100 |
| e | 0.950 TYP | | 0.037 TYP | |
| e1 | 1.800 | 2.000 | 0.071 | 0.079 |
| L | 0.550 REF | | 0.022 REF | |
| L1 | 0.300 | 0.500 | 0.012 | 0.020 |
| θ | 0° | 8° | 0° | 6° |

**SOT-23** Suggested Pad Layout




Note:
1.Controlling dimension:in millimeters.
2.General tolerance:± 0.05mm.
3.The pad layout is for reference purposes only.