# P-Channel -20V (D-S) Power MOSFET

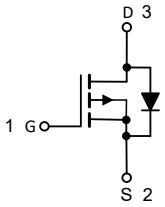
## Features

- 100% Avalanche Tested
- Halogen Free, Pb-Free
- RoHS Compliant


SOT-23

## Applications

- Relay driver
- Switching circuits
- High-side load switch
- High-speed line driver




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

| Parameter | | Symbol | Value | Unit |
|---|---|---|---|---|
| Drain Source Voltage | | $V_{DS}$ | -20 | V |
| Gate Source Voltage | | $V_{GS}$ | ±12 | V |
| Drain Current, Continuous $V_{GS}$=-10V | $T_C$=25°C | $I_D$ | -2.6 | A |
| Drain Current, Pulsed *(Note 1)* | | $I_{DM}$ | -10 | A |
| Power Dissipation | $T_C$=25°C | $P_D$ | 1.25 | W |
| Operating Junction/ Storage Temperature Range | | $T_J$/ $T_{STG}$ | -55 to +150 | °C |

*Note 1: Single pulse; $t_p \leq 1us$.*

## Thermal Characteristics

| Parameter | Symbol | Max | Unit |
|---|---|---|---|
| Thermal Resistance Junction to Case(*Note 2*) | $R_{thJC}$ | 100 | °C/W |

*Note 2: Device mounted on 1 square inch FR4 PCB board, with 2oz single-sided copper, in a 25°C still air environment.*

## Electrical Characteristics ($T_A$ =25°C unless otherwise noted)

| Parameter | Symbol | Test Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Drain Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS}$=0V, $I_D$=-250μA | 20 | -- | -- | V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$=-20V, $V_{GS}$=0V | -- | -- | -1 | uA |
| Gate Threshold Voltage | $V_{GS(TH)}$ | $V_{DS}$=$V_{GS}$, $I_{DS}$=-250uA | -0.4 | -- | -1 | V |
| Gate Leakage Current | $I_{GSS}$ | $V_{GS}$=±12V, $V_{DS}$=0V | -- | -- | ±100 | nA |
| Drain-Source On-state Resistance *(Note 3)* | $R_{DS(on)}$ | $V_{GS}$=-4.5V, $I_D$=-2A | -- | 59 | 75 | mΩ |
| | | $V_{GS}$=-2.5V, $I_D$=-1.8A | -- | 76 | 95 | |
| Total Gate Charge | $Q_g$ | $V_{DS}$=-6V, $V_{GS}$=-4.5V, $I_D$=-2.3A | -- | 5.8 | -- | nC |
| Gate-Source Charge | $Q_{gs}$ | | -- | 0.84 | -- | |
| Gate-Drain Charge | $Q_{gd}$ | | -- | 1.6 | -- | |
| Turn-on Delay Time | $t_{d(on)}$ | $V_{GS}$=-4.5V, $V_{DD}$=-20V, $R_G$=3Ω, $R_L$=10Ω | -- | 7 | -- | ns |
| Turn-on Rise Time | $t_r$ | | -- | 14 | -- | |
| Turn-off Delay Time | $t_{d(off)}$ | | -- | 20 | -- | |
| Turn-off Fall Time | $t_f$ | | -- | 7 | -- | |
| Input Capacitance | $C_{iss}$ | $V_{GS}$=0V, $V_{DS}$=-20V, f=1MHz | -- | 394 | -- | pF |
| Output Capacitance | $C_{oss}$ | | -- | 48 | -- | |
| Reverse Transfer Capacitance | $C_{rss}$ | | -- | 41 | -- | |

## Reverse Diode Characteristics ($T_A$ =25°C unless otherwise noted)

| Parameter | Symbol | Test Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Forward Current, Continuous | $I_{SD}$ | $T_C$=25°C | -- | -- | -2.6 | A |
| Diode Forward Voltage *(Note 3)* | $V_{SD}$ | $I_F$=-1A, $V_{GS}$=0V | -- | -0.8 | -1.2 | V |

*Note 3: Pulse test; pulse width ≤ 380μs, duty cycle ≤ 1%.*

## Typical Characteristics Curves ($T_A$ = 25℃ unless otherwise noted)

Fig.1 - Typical Output Characteristics

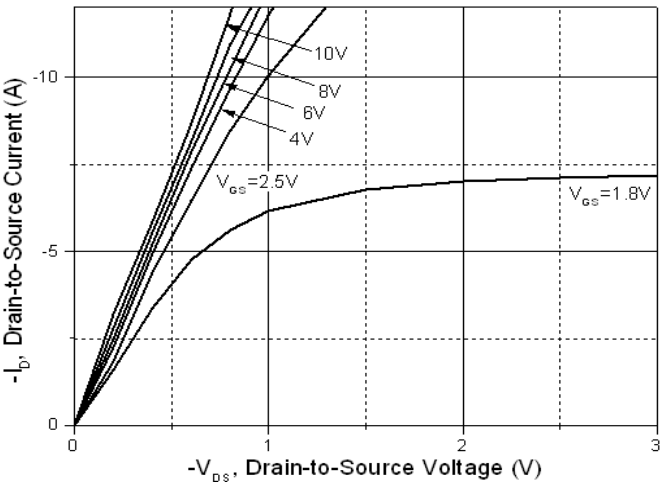



Fig.2 - $V_{GS(th)}$ vs. Junction Temperature

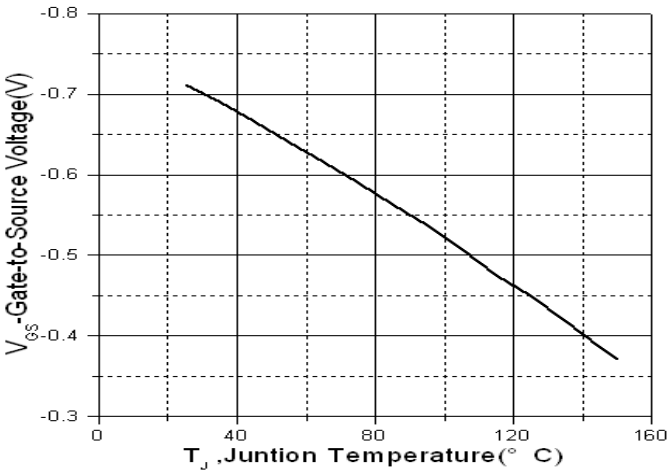



Fig.3 - Drain-to-Source Breakdown Voltage vs. Junction Temperature

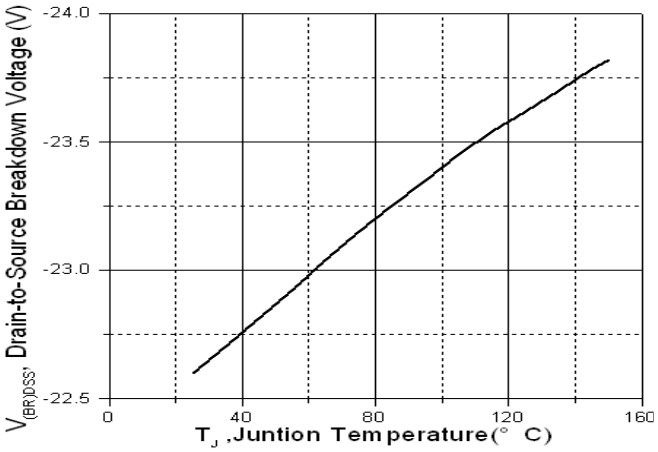



Fig.4 - $R_{DS(on)}$ vs. Junction Temperature

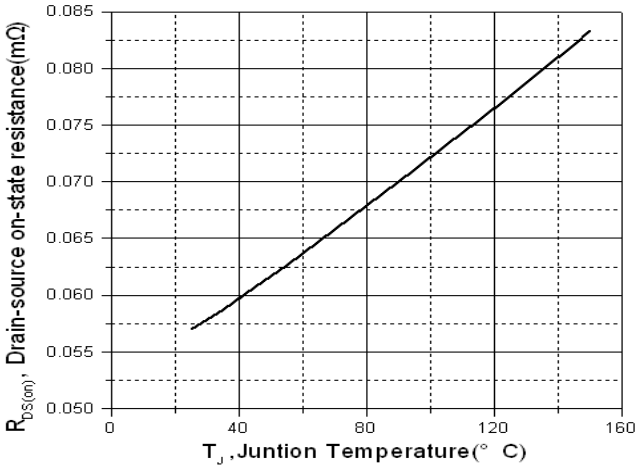



Fig.5 - Drain Current vs. Case Temperature

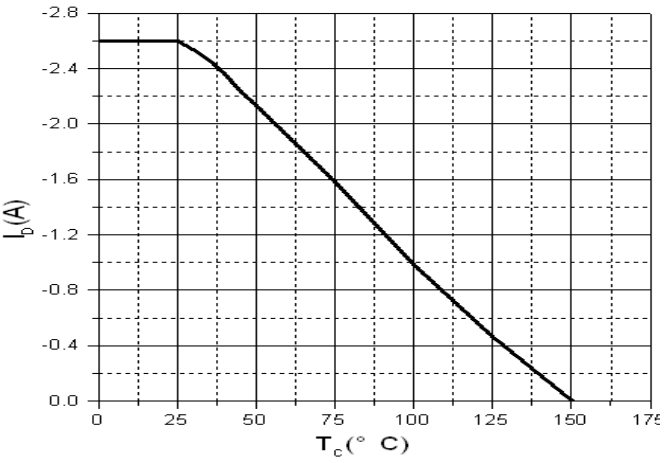
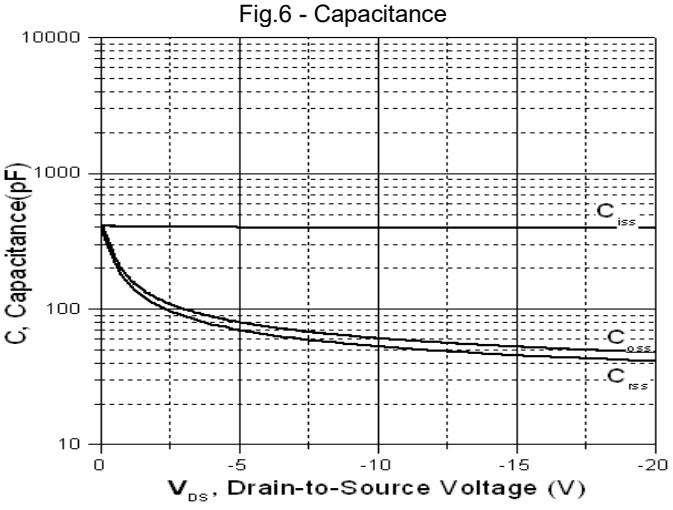
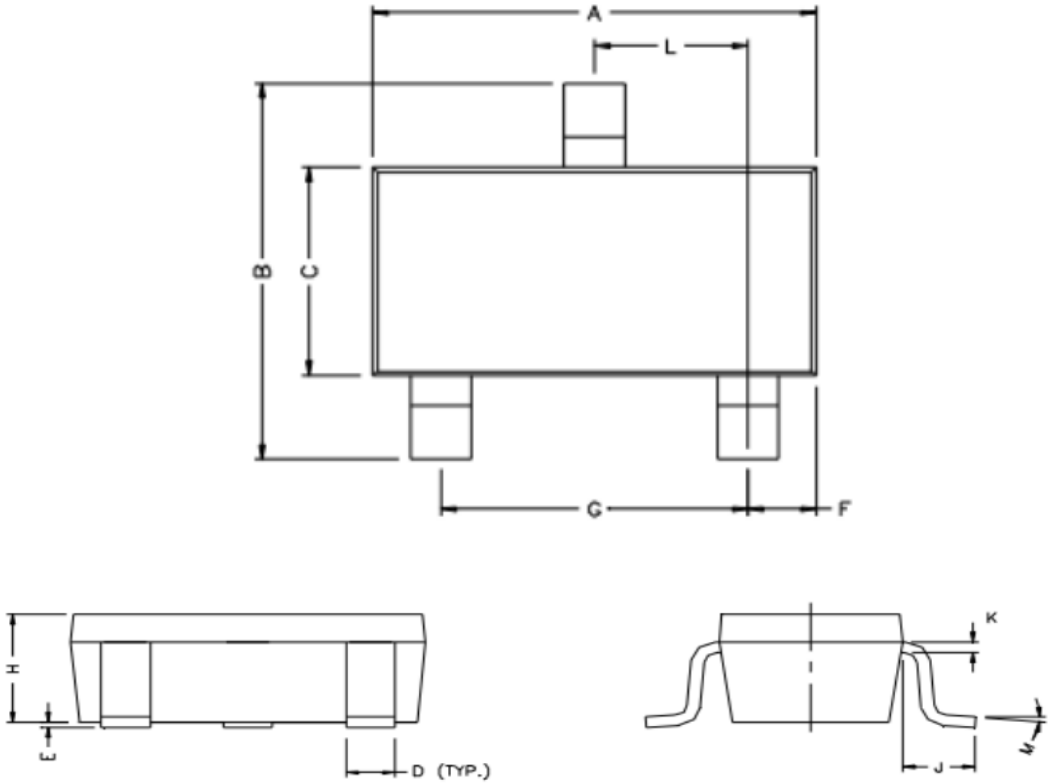



Fig.6 - Capacitance



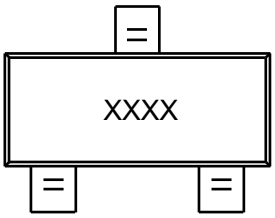
## Package Outline Dimensions (Unit: millimeters)

### SOT-23




| REF. | Millimeter | | REF. | Millimete | |
|---|---|---|---|---|---|
| | Min. | Max. | | Min. | Max. |
| A | 2.80 | 3.00 | G | 1.80 | 2.00 |
| B | 2.30 | 2.50 | H | 0.90 | 1.1 |
| C | 1.20 | 1.40 | K | 0.10 | 0.20 |
| D | 0.30 | 0.50 | J | 0.35 | 0.70 |
| E | 0 | 0.10 | L | 0.92 | 0.98 |
| F | 0.45 | 0.55 | M | 0° | 10° |

## Marking Outline




Part Name: GMP2301UP

1. P/N Mark: 2301

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