优尚

YOUSHANG SEMICONDUCTOR

# 设计研发新型功率器件

## 各类小信号开关

## 中低压及高压大电流等场效应管

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## Product Summary

| $BV_{DSS}$ | $R_{DS(on)}$ | $I_D$ $T_A$ = +25°C |
|---|---|---|
| 100V | 1.5Ω @ $V_{GS}$= 10V | 800mA |

## Description and Applications

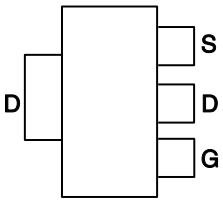
This MOSFET is designed to minimize the on-state resistance and yet maintain superior switching performance, making it ideal for high efficiency power management applications

## Mechanical Data

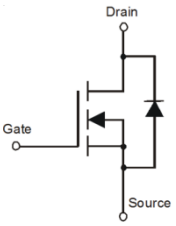
- Package: SOT223 (Type DN)
- Package Material: Molded Plastic, UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.112 grams (Approximate)

SOT223(Type DN)

Top View




Pin Out - Top View




Equivalent Circuit

## Maximum Ratings (@ $T_A$ = +25°C, unless otherwise specified.)

| Characteristic | | Symbol | Value | Unit |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DSS}$ | 100 | V |
| Gate-Source Voltage | | $V_{GSS}$ | ±20 | V |
| Continuous Drain Current $V_{GS}$ = 10V | $T_A$ = +25°C | $I_D$ | 800 | mA |
| Pulsed Drain Current | | $I_{DM}$ | 6 | A |

## Thermal Characteristics (@ $T_A$ = +25°C, unless otherwise specified.)

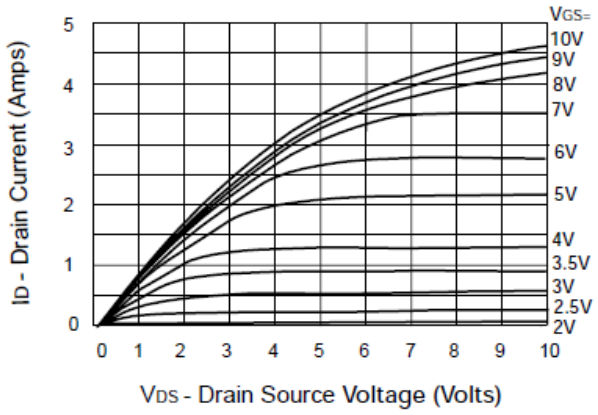
| Characteristic | | Symbol | Value | Unit |
|---|---|---|---|---|
| Total Power Dissipation | $T_A$ = +25°C | $P_D$ | 2 | W |
| Operating and Storage Temperature Range | | $T_J$, $T_{STG}$ | -55 to +150 | °C |

## Electrical Characteristics (@ $T_A$ = +25°C, unless otherwise specified.)

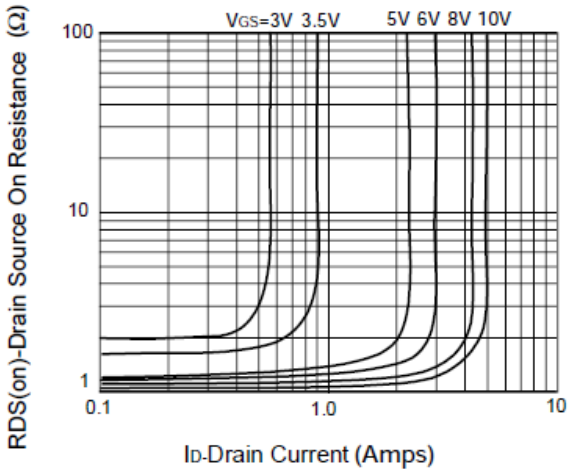
| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|---|---|---|---|---|---|
| **OFF CHARACTERISTICS** | | | | | | |
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | 100 | – | – | V | $V_{GS}$ = 0V, $I_D$ =1mA |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | –<br>– | –<br>– | 10<br>100 | μA<br>μA | $V_{DS}$ = 100V, $V_{GS}$ = 0V<br>$V_{DS}$=80V, $V_{GS}$=0V, T=125°C (Note 6) |
| Gate-Source Leakage | $I_{GSS}$ | – | – | ±100 | nA | $V_{GS}$ = ±20V, $V_{DS}$ = 0V |
| **ON CHARACTERISTICS** | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | 0.8 | – | 2.4 | V | $V_{DS}$ = $V_{GS}$, $I_D$ = 1mA |
| Static Drain-Source On-Resistance | $R_{DS(on)}$ | – | – | 1.5 | Ω | $V_{GS}$ = 10V, $I_D$ = 1.5A |
| | | – | – | 1.8 | Ω | $V_{GS}$ = 5V, $I_D$ = 0.5A |
| Diode Forward Voltage (Note 5) | $V_{SD}$ | –<br>– | 0.79<br>0.89 | –<br>– | V | $I_S$ =0.32A, $V_{GS}$ =0V<br>$I_S$ =1.0A, $V_{GS}$ =0V |
| On-State Drain Current (Note 5) | $I_{D(on)}$ | 2.5 | – | – | A | $V_{DS}$ =25V, $V_{GS}$ =10V |
| Forward Transconductance (Notes 5, 6) | $g_{fs}$ | 250 | – | – | mS | $V_{DS}$ =25V,$I_D$ =1.5A |
| Reverse Recovery Time (to $I_R$ =10%) | $t_{RR}$ | – | 135 | – | ns | $I_F$ =0.45A, $V_{GS}$ =0V, $I_R$ =100mA, $V_R$ =10V |
| **DYNAMIC CHARACTERISTICS** (Note 6) | | | | | | |
| Input Capacitance | $C_{iss}$ | – | – | 100 | pF | $V_{DS}$ = 25V, $V_{GS}$ = 0V, f = 1MHz |
| Output Capacitance | $C_{oss}$ | – | – | 40 | pF | |
| Reverse Transfer Capacitance | $C_{rss}$ | – | – | 12 | pF | |
| Turn-On Delay Time (Note 7) | $t_{D(on)}$ | – | – | 4 | ns | $V_{DD}$ = 25V, $I_D$=1.5A |
| Turn-On Rise Time (Note 7) | $t_R$ | – | – | 8 | ns | |
| Turn-Off Delay Time (Note 7) | $t_{D(off)}$ | – | – | 20 | ns | |
| Turn-Off Fall Time (Note 7) | $t_F$ | – | – | 30 | ns | |

Notes:
5. Measured under pulsed conditions. Width=300μs. Duty cycle ≤ 2%.
6. Sample test.
7. Switching times measured with 50Ω source impedance and <5ns rise time on a pulse generator. Spice parameter data is available upon request for this device

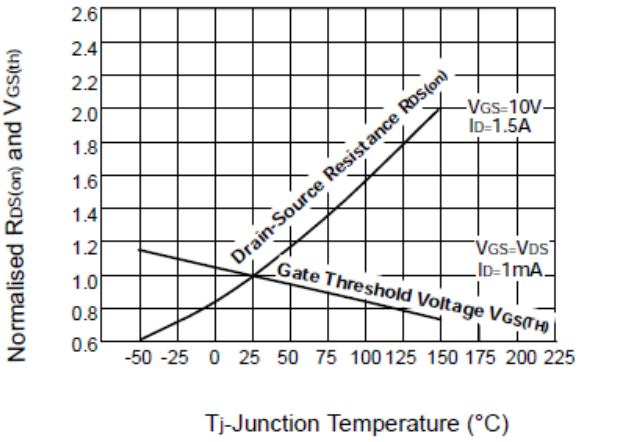
## Electrical Characteristics



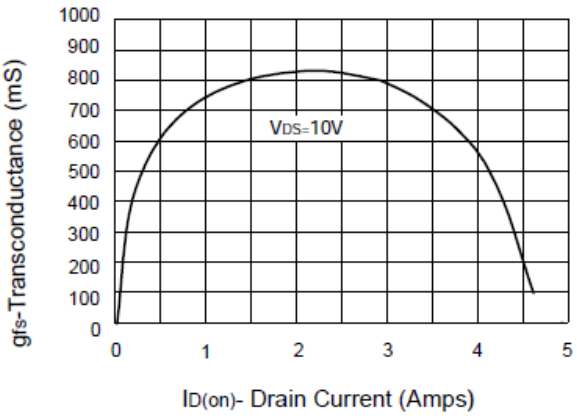

**Saturation Characteristics**



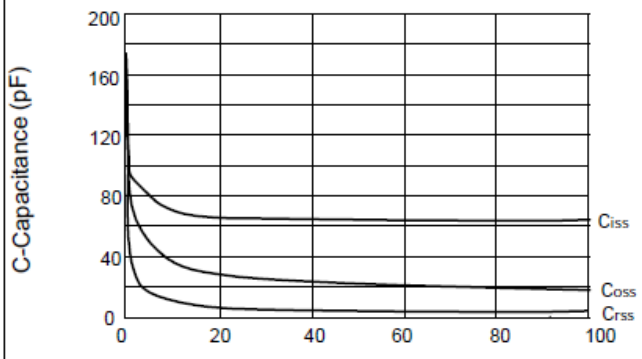

**On-resistance v drain current**



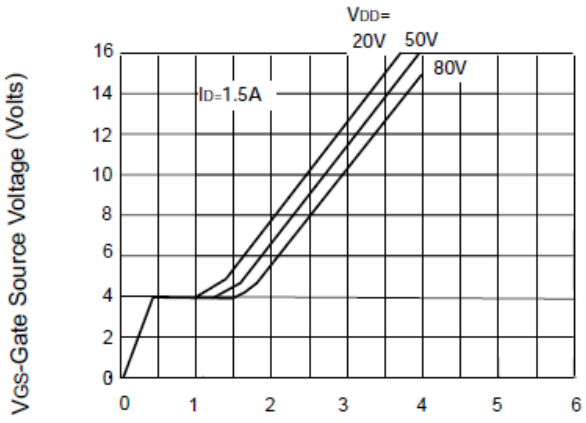

**Normalised $R_{DS(on)}$ and $V_{GS(th)}$ v Temperature**




**Transconductance v drain current**

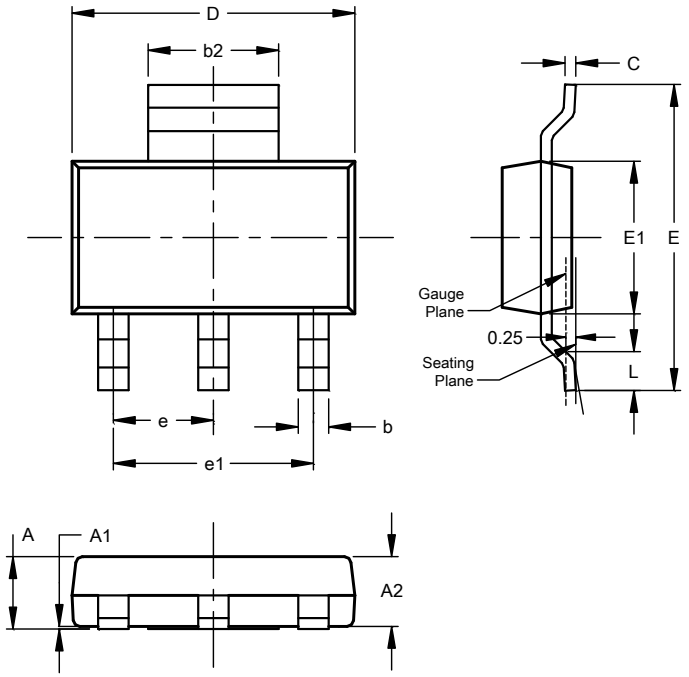



**Capacitance v drain-source voltage**



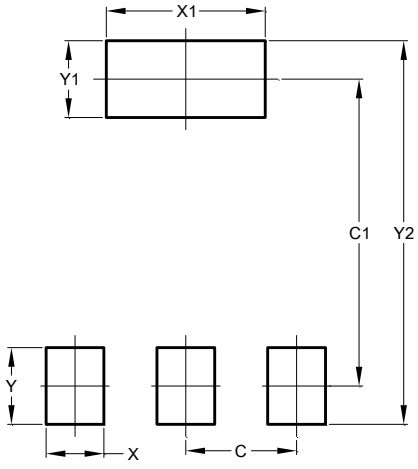

**Gate charge v gate-source voltage**

## Package Outline Dimensions




| SOT223 (Type DN) | | | |
|---|---|---|---|
| **Dim** | **Min** | **Max** | **Typ** |
| **A** | -- | 1.70 | -- |
| **A1** | 0.01 | 0.15 | -- |
| **A2** | 1.50 | 1.68 | 1.60 |
| **b** | 0.60 | 0.80 | 0.70 |
| **b2** | 2.90 | 3.10 | -- |
| **c** | 0.20 | 0.32 | -- |
| **D** | 6.30 | 6.70 | -- |
| **E** | 6.70 | 7.30 | -- |
| **E1** | 3.30 | 3.70 | -- |
| **e** | -- | -- | 2.30 |
| **e1** | -- | -- | 4.60 |
| **L** | 0.85 | -- | -- |
| **All Dimensions in mm** | | | |

## Suggested Pad Layout




| Dimensions | Value (in mm) |
|---|---|
| **C** | 2.30 |
| **C1** | 6.40 |
| **X** | 1.20 |
| **X1** | 3.30 |
| **Y** | 1.60 |
| **Y1** | 1.60 |
| **Y2** | 8.00 |