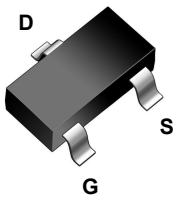
GOOD-ARK
SEMICONDUCTOR

# GSFCR2303

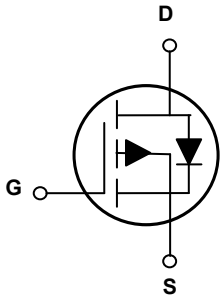
**20V P-Channel MOSFET**

## Main Product Characteristics

| | |
|---|---|
| $V_{(BR)DSS}$ | -20V |
| $R_{DS(ON)}$ | 119mΩ (Max.) |
| $I_D$ | -2.0A |




SOT-323




Schematic Diagram

## Features and Benefits

- Advanced MOSFET process technology
- Ideal for high efficiency switched mode power supplies
- Low on-resistance with low gate charge
- Fast switching and reverse body recovery

## Description

The GSFCR2303 utilizes the latest techniques to achieve high cell density and low on-resistance. These features make this device extremely efficient and reliable for use in high efficiency switch mode power supplies and a wide variety of other applications.

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

| Parameter | Symbol | Max. | Unit |
|---|---|---|---|
| Drain-Source Voltage | $V_{DS}$ | -20 | V |
| Gate-to-Source Voltage | $V_{GS}$ | ±8 | V |
| Continuous Drain Current, @ Steady-State ($T_A$=25°C)[1] | $I_D$ | -2.0 | A |
| Continuous Drain Current, @ Steady-State ($T_A$=70°C) | | -1.6 | A |
| Pulsed Drain Current[2] | $I_{DM}$ | -8 | A |
| Power Dissipation ($T_A$=25°C) | $P_D$ | 0.45 | W |
| Linear Derating Factor ($T_A$=25°C) | | 3.6 | mW/°C |
| Thermal Resistance, Junction-to-Ambient (PCB Mounted, Steady-State)[3] | $R_{\theta JA}$ | 280 | °C/W |
| Operating Junction and Storage Temperature Range | $T_J/T_{STG}$ | -55 to +150 | °C |

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

| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| **On / Off Characteristics** | | | | | | |
| Drain-to-Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS}$=0V, $I_D$=-250μA | -20 | - | - | V |
| Drain-to-Source Leakage Current | $I_{DSS}$ | $V_{DS}$=-20V, $V_{GS}$=0V | - | - | -1 | μA |
| | | $T_J$=125°C | - | - | -50 | |
| Gate-to-Source Forward Leakage | $I_{GSS}$ | $V_{GS}$=8V | - | - | 100 | nA |
| | | $V_{GS}$=-8V | - | - | -100 | |
| Static Drain-to-Source On-Resistance | $R_{DS(ON)}$ | $V_{GS}$=-4.5V, $I_D$=-2.0A | - | 82 | 119 | mΩ |
| | | $V_{GS}$=-2.5V, $I_D$=-1.0A | - | 100 | 119 | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$=$V_{GS}$, $I_D$=-250μA | -0.4 | -0.62 | -1.0 | V |
| Forward Transconductance | gfs | $V_{DS}$=5V, $I_D$=-2.0A | - | 11 | - | S |
| **Dynamic and Switching Characteristics** | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{GS}$=0V, $V_{DS}$=-10V, $f$=1MHz | - | 438 | - | pF |
| Output Capacitance | $C_{oss}$ | | - | 76 | - | |
| Reverse Transfer Capacitance | $C_{rss}$ | | - | 63 | - | |
| Total Gate Charge | $Q_g$ | $I_D$=-2.0A, $V_{DS}$=-10V, $V_{GS}$=-10V | - | 5.4 | - | nC |
| Gate-to-Source Charge | $Q_{gs}$ | | - | 1.2 | - | |
| Gate-to-Drain ("Miller") Charge | $Q_{gd}$ | | - | 1.3 | - | |
| Turn-on Delay Time | $t_{d(on)}$ | $V_{GS}$=-4.5V, $V_{DS}$=-10V, $I_D$=-1A, $R_G$=3.0Ω | - | 6.5 | - | nS |
| Rise Time | $t_r$ | | - | 21 | - | |
| Turn-Off Delay Time | $t_{d(off)}$ | | - | 37 | - | |
| Fall Time | $t_f$ | | - | 34 | - | |
| Gate Resistance | $R_g$ | $f$=1MHz | - | 5.1 | - | Ω |
| **Source-Drain Ratings and Characteristics** | | | | | | |
| Continuous Source Current (Body Diode) | $I_S$ | MOSFET symbol showing the integral reverse p-n junction diode. | - | - | -2.0 | A |
| Pulsed Source Current (Body Diode) | $I_{SM}$ | | - | - | -8 | A |
| Diode Forward Voltage | $V_{SD}$ | $I_S$=-1.0A, $V_{GS}$=0V | - | -0.9 | -1.2 | V |

Notes:

1. Pulse test: Pulse width ≤ 300us, duty cycle ≤ 2%.
2. Repetitive rating; pulse width limited by max. junction temperature.
3. Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch.

## Typical Electrical and Thermal Characteristic Curves

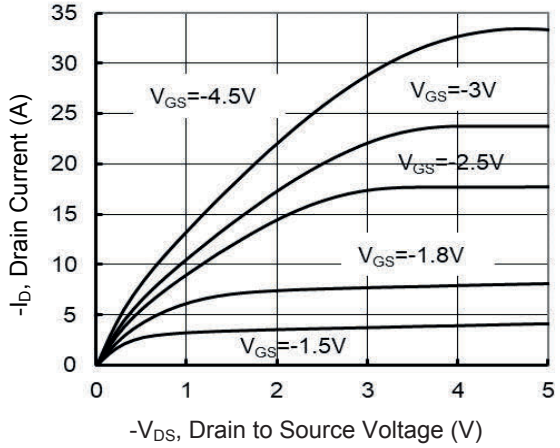



**Figure 1. Typical Output Characteristics**

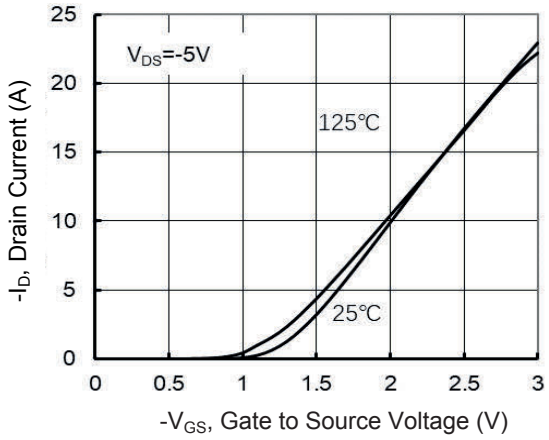



**Figure 2. Typical Transfer Characteristics**

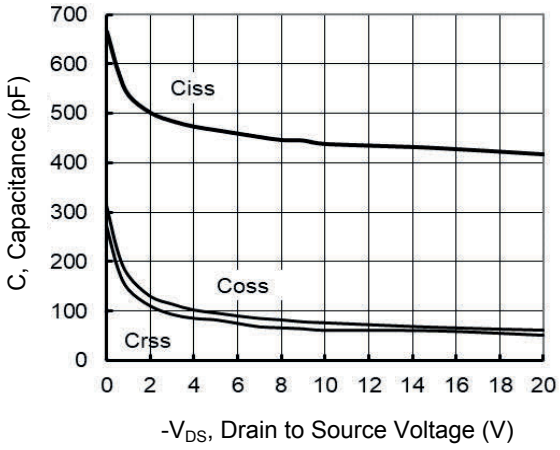



**Figure 3. Capacitance vs. Drain to Source Voltage**

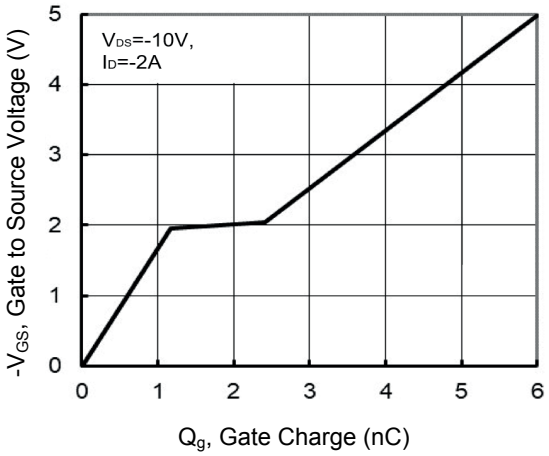



**Figure 4. Gate Charge**

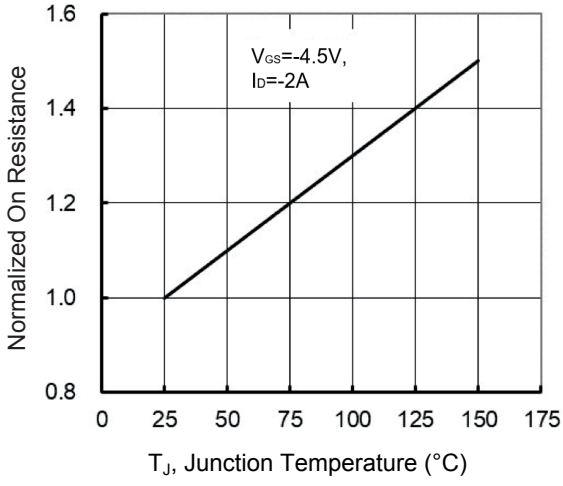



**Figure 5. Normalized $R_{DS(ON)}$ vs. $T_J$**

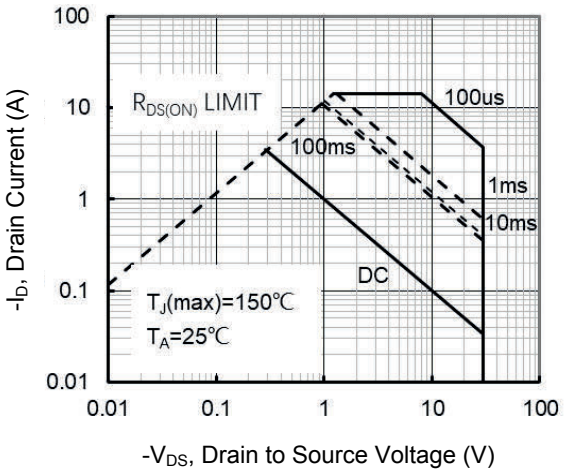
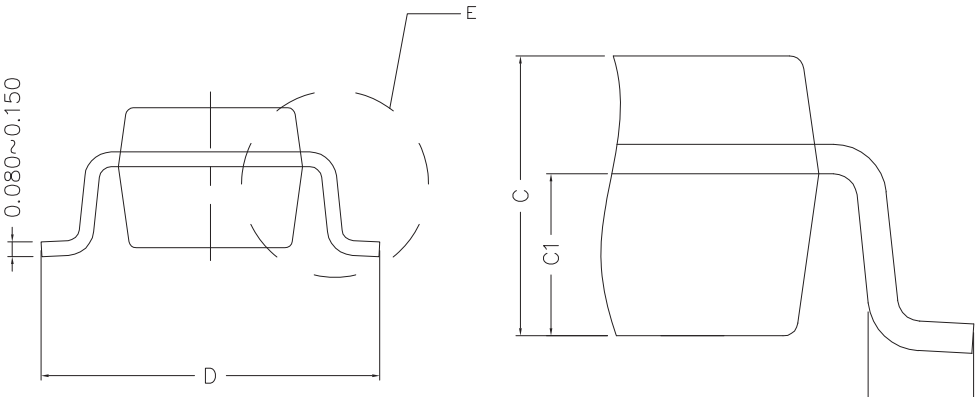


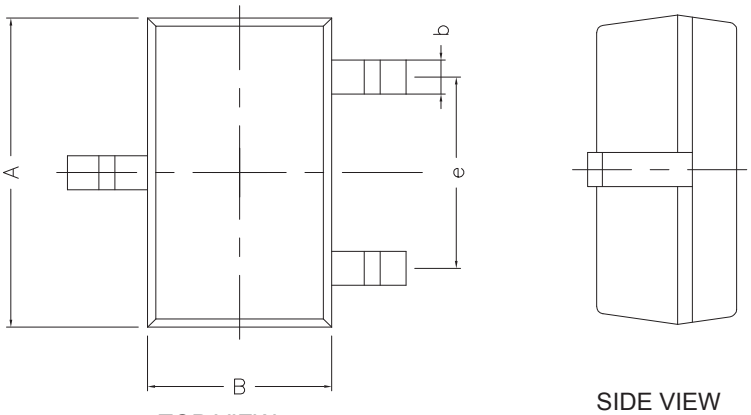

**Figure 6. Safe Operation Area**

## Package Outline Dimensions (SOT-323)




SIDE VIEW

DETAIL E




TOP VIEW



SIDE VIEW

| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|---|---|---|---|---|
| | Min. | Max. | Min. | Max. |
| A | 2.00 | 2.20 | 0.079 | 0.087 |
| B | 1.15 | 1.35 | 0.045 | 0.053 |
| C | 0.90 | 1.00 | 0.035 | 0.039 |
| C1 | 0.50 | 0.60 | 0.020 | 0.024 |
| D | 2.10 | 2.50 | 0.083 | 0.098 |
| L | 0.22 | 0.50 | 0.009 | 0.020 |
| b | 0.20 | 0.40 | 0.008 | 0.016 |
| e | 1.30 TYP | | 0.051 TYP | |

## Order Information

| Device | Package | Marking | Packaging | SPQ |
|---|---|---|---|---|
| GSFCR2303 | SOT-323 | W2303 | Tape & Reel | 3,000pcs / Reel |