# GSM2302

## 20V N-Channel Enhancement Mode MOSFET

### Product Description

The GSM2302 uses advanced trench technology to provide excellent RDS(ON), low gate charge and high density cell Design for ultra low on-resistance. This device is suitable for use as a load switch or in PWM applications.

### Features

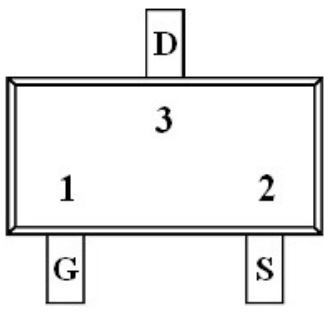
- 20V/2.5A, $R_{DS(ON)}$=46mΩ@$V_{GS}$=4.5V
- $R_{DS(ON)}$=61mΩ@$V_{GS}$=2.5V
- High power and current handing capability
- SOT-23 package design

### Applications

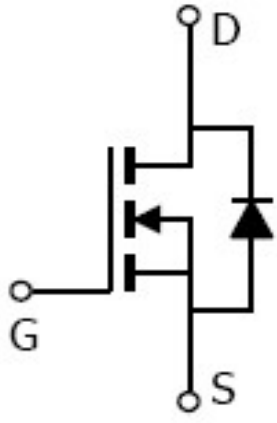
- PWM Applications
- Load Switch

### Packages & Pin Assignments

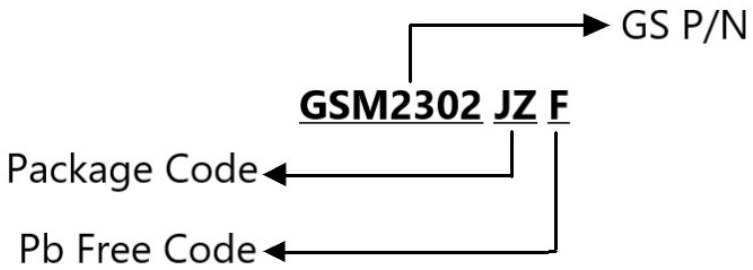
**GSM2302JZF(SOT-23)**



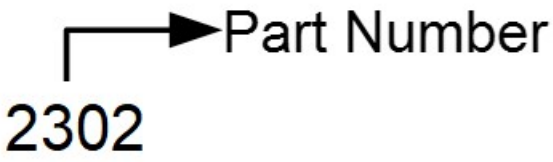

| | |
|---|---|
| **1** | Gate |
| **2** | Source |
| **3** | Drain |



## Ordering Information




## Marking Information




| Part Number | Package | Part Marking |
|---|---|---|
| GSM2302JZF | SOT-23 | 2302 |

## Absolute Maximum Ratings

$T_A$=25ºC unless otherwise noted

| Symbol | Parameter | | Limit | Unit |
|---|---|---|---|---|
| $V_{DSS}$ | Drain-Source Voltage | | 20 | V |
| $V_{GSS}$ | Gate –Source Voltage | | ±12 | V |
| $I_D$ | Continuous Drain Current($T_J$=150℃) [1] | $T_A$=25℃ | 2.5 | A |
| | | $T_A$=70℃ | 2.0 | |
| $I_{DM}$ | Pulsed Drain Curren[2] | | 10 | A |
| $I_S$ | Continuous source current (diode conduction)[1] | | 0.6 | A |
| $P_D$ | Power Dissipation[1] | $T_A$=25℃ | 0.71 | W |
| | | $T_A$=70℃ | 0.46 | W/ |
| $T_J$ | Operating Junction Temperature Range | | -55 to 150 | ºC |
| $T_{STG}$ | Storage Temperature Range | | -55 to 150 | ºC |
| $R_{\theta JA}$ | Thermal Resistance - Junction to Ambient[1] | | 175 | ºC/W |

Notes
1. Surface mounted on 1" x 1" FR4 board
2. Pulse width limited by maximum junction temperature

## Electrical Characteristics

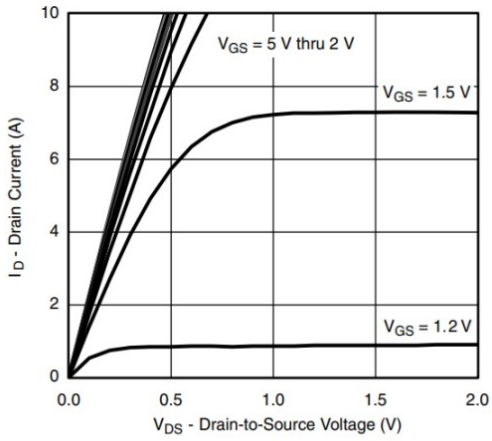
$T_A$=25°C unless otherwise noted

| Symbol | Parameter | Conditions | Min. | Typ | Max. | Unit |
|---|---|---|---|---|---|---|
| **Static** | | | | | | |
| $V_{(BR)DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}$=0V, $I_D$=250uA | 20 | | | V |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}$=$V_{GS}$, $I_D$=250uA | 0.5 | 0.65 | 1.0 | |
| $I_{GSS}$ | Gate Leakage Current | $V_{DS}$=0V, $V_{GS}$=±12V | | | ±100 | nA |
| $I_{DSS}$ | Drain-Source Leakage Current | $V_{DS}$=20V, $V_{GS}$=0V | | | 1 | uA |
| $R_{DS(on)}$ | Drain-Source On-Resistance | $V_{GS}$=4.5V, $I_D$=2.5A | | 46 | 60 | mΩ |
| | | $V_{GS}$=2.5V, $I_D$=1A | | 61 | 85 | |
| $g_{FS}$ | Forward Transconductance | $V_{DS}$=5V, $I_S$=2A | | 5 | | S |
| $V_{SD}$ | Diode Forward Voltage | $I_S$=2.5A, $V_{GS}$=0V | | 0.76 | 1.16 | V |
| **Dynamic** | | | | | | |
| $Q_g$ | Total Gate Charge[2,3] | $V_{DS}$=10V, $V_{GS}$=4.5V $I_D$=2.5A | | 3.5 | | nC |
| $Q_{gs}$ | Gate-Source Charge[2,3] | | | 0.6 | | |
| $Q_{gd}$ | Gate-Drain Charge[2,3] | | | 0.45 | | |
| $C_{iss}$ | Input Capacitance | $V_{DS}$=10V, $V_{GS}$=0V f=1MHz | | 308 | | pF |
| $C_{oss}$ | Output Capacitance | | | 52 | | |
| $C_{rss}$ | Reverse Transfer Capacitance | | | 27 | | |
| $t_{d(on)}$ | Turn-On Time[2,3] | $V_{DD}$=10V, $R_L$=4Ω, $V_{GS}$=4.5V, $R_G$=6Ω | | 8 | | ns |
| $t_r$ | | | | 27 | | |
| $t_{d(off)}$ | Turn-Off Time[2,3] | | | 20 | | |
| $t_f$ | | | | 17 | | |

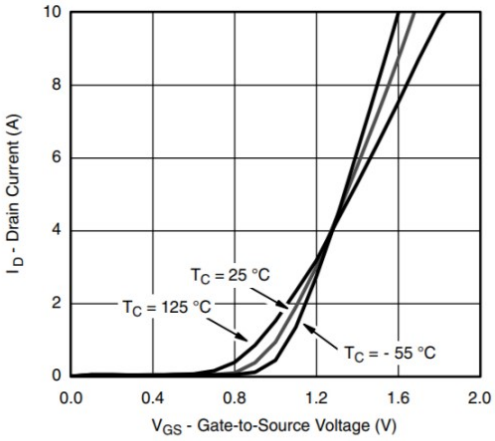
Note :

1. Pulse test: Pulse width ≦ 300 μs, duty cycle ≦ 2 %
2. Guaranteed by design, not subject to production testing

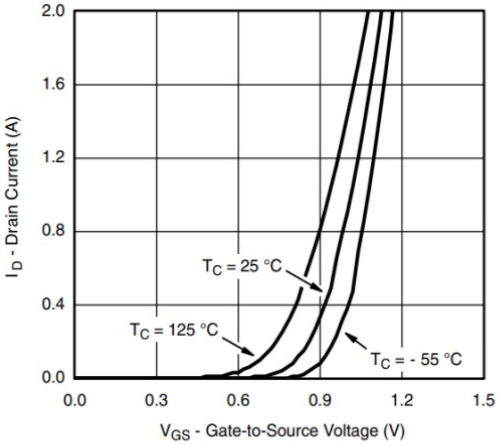
## Typical Performance Characteristics



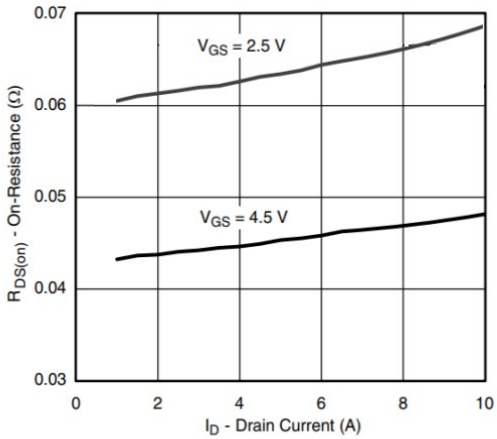

**Output Characteristics**



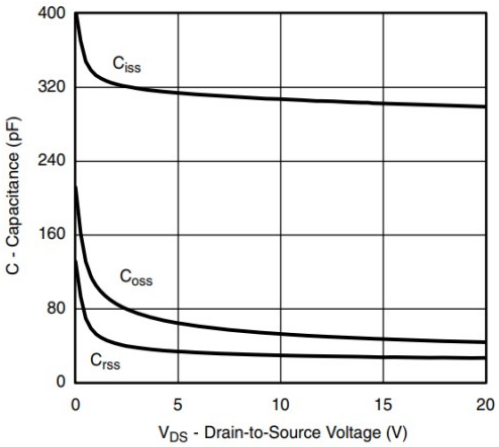

**Transfer Characteristics**



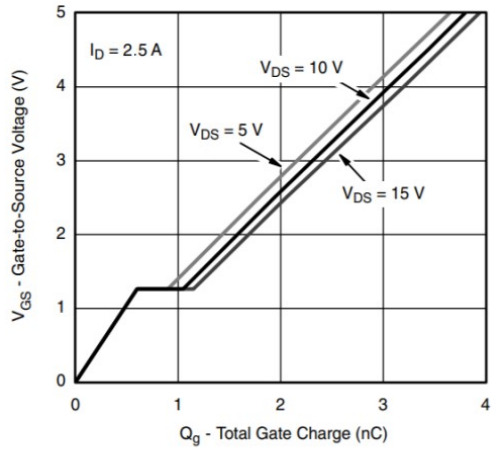

**Transfer Characteristics**




**On-Resistance vs. Drain Current**

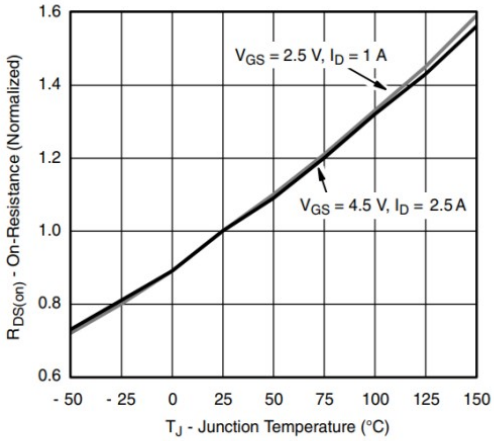



**Capacitance**

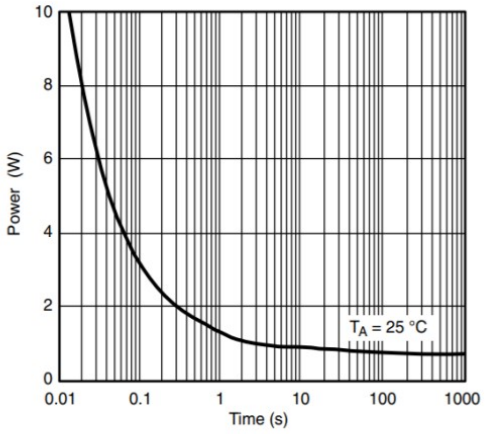



**Gate Charge**

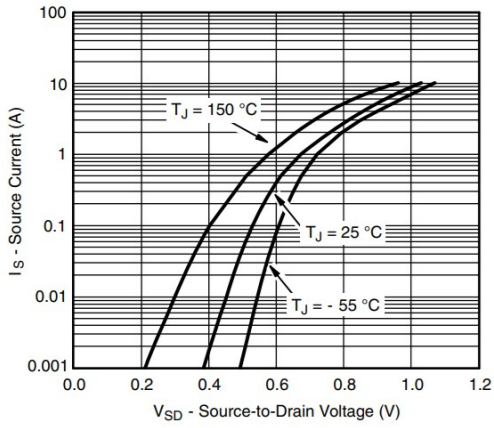
## Typical Performance Characteristics (continue)



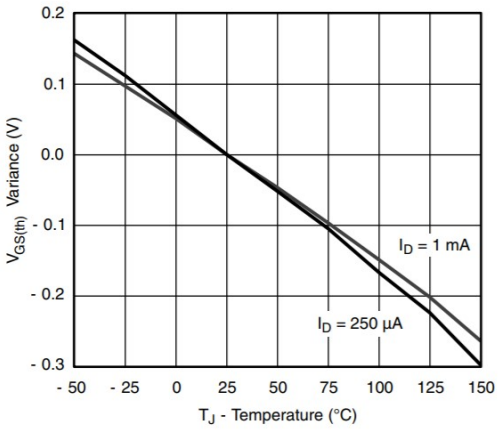

**On-Resistance vs. Junction Temperature**



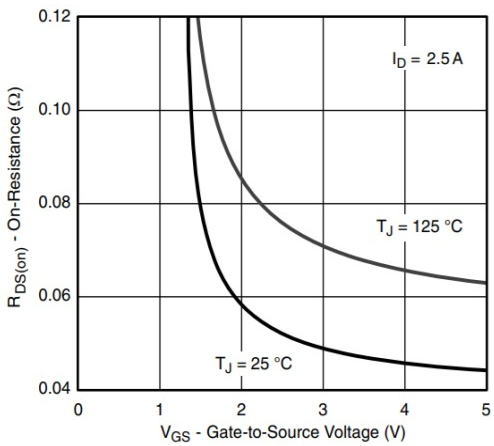

**Single Pulse Power**



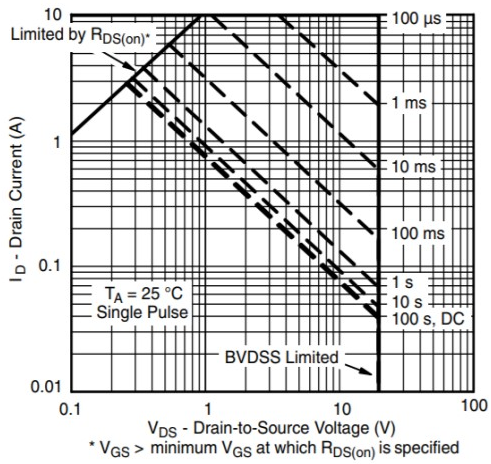

**Source-Drain Diode Forward Voltage**




**Threshold Voltage**



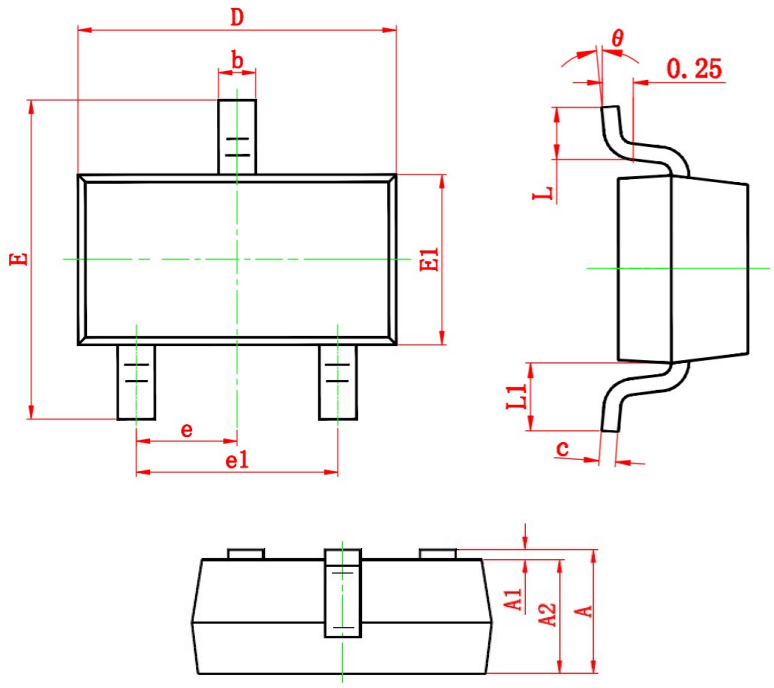

**On-Resistance vs. Gate-to-Source Voltage**




**Safe Operating Area, Junction-to-Ambient**

## Package Dimension

# SOT-23




| Dimensions | | | | |
|---|---|---|---|---|
| Symbol | Millimeters | | Inches | |
| | Min | Max | Min | Max |
| A | 0.900 | 1.500 | 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 | 2.250 | 2.550 | 0.047 | 0.055 |
| E1 | 1.200 | 1.400 | 0.089 | 0.100 |
| e | 0.950 TYP | | 0.037 TYP | |
| e1 | 1.800 | 2.000 | 0.071 | 0.079 |
| L | 0.300 | 0.500 | 0.012 | 0.020 |
| L1 | 0.550 REF | | 0.022 REF | |
| θ | 0° | 8° | 0° | 6° |

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