

# GSM9102

## 20V N-Channel Enhancement Mode MOSFET

JAN. 2010

### Product Description

The GSM9102 is the P-Channel logic enhancement mode power field effect transistors are produced using high cell density, DMOS trench technology.

This high density process is especially tailored to minimize on-state resistance.

These devices are particularly suited for low voltage application such as cellular phone and notebook computer power management and other battery powered circuits, and low in-line power loss are needed in a very small outline surface mount package.

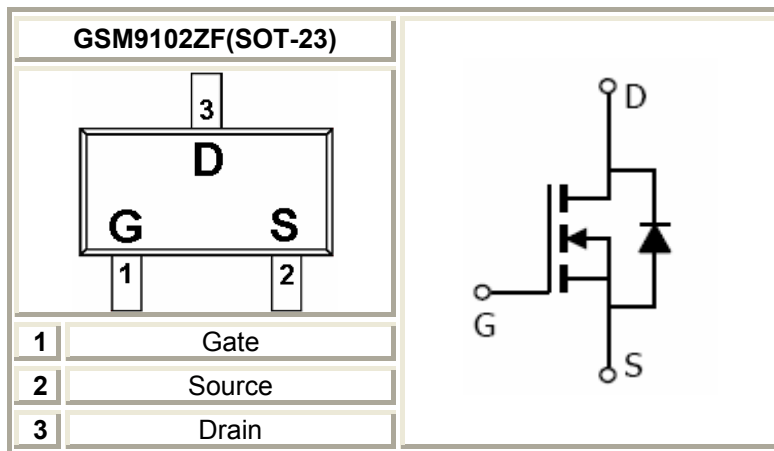
### Features

- 20V/3.6A,  $R_{DS(ON)} = 80m\Omega @ V_{GS} = 4.5V$
- 20V/3.1A,  $R_{DS(ON)} = 95m\Omega @ V_{GS} = 2.5V$
- Super high density cell design for extremely Low  $R_{DS(ON)}$
- Exceptional on-resistance and maximum DC current capability
- SOT-23-3L package design

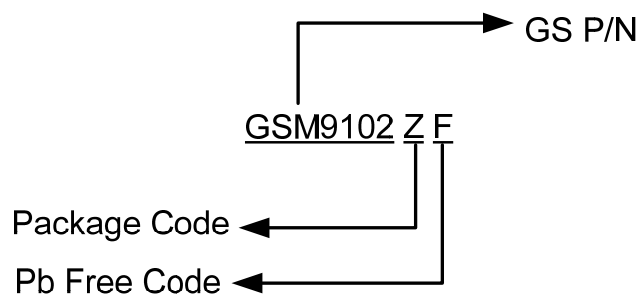
### Applications

- Power Management in Note book
- Portable Equipment
- Battery Powered System
- DC/DC Converter
- Load Switch
- DSC
- LCD Display inverter

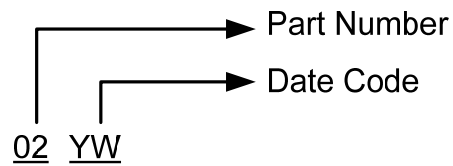
### Packages & Pin Assignments



### Ordering Information



## Marking Information



| Part Number | Package   | Part Marking |
|-------------|-----------|--------------|
| GSM9102ZF   | SOT-23-3L | 02YW         |

## Absolute Maximum Ratings

TA=25°C Unless otherwise noted

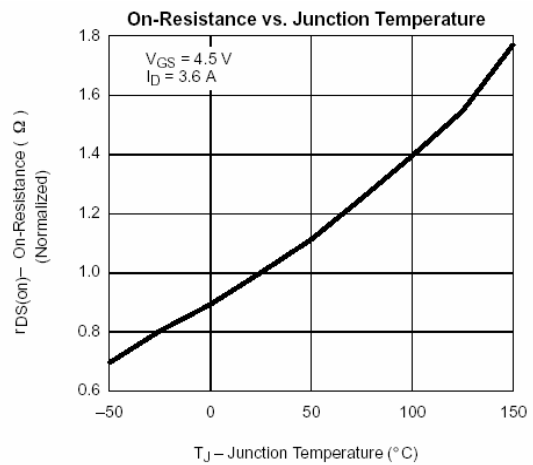
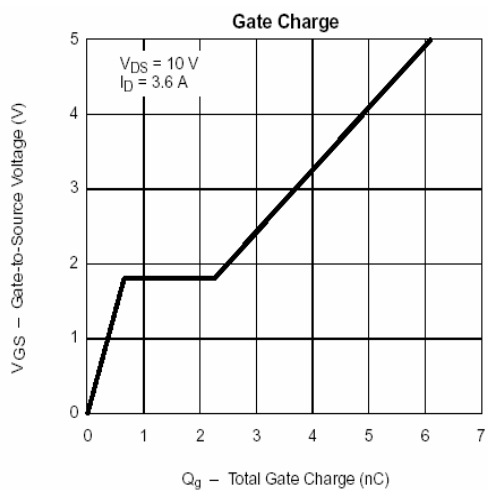
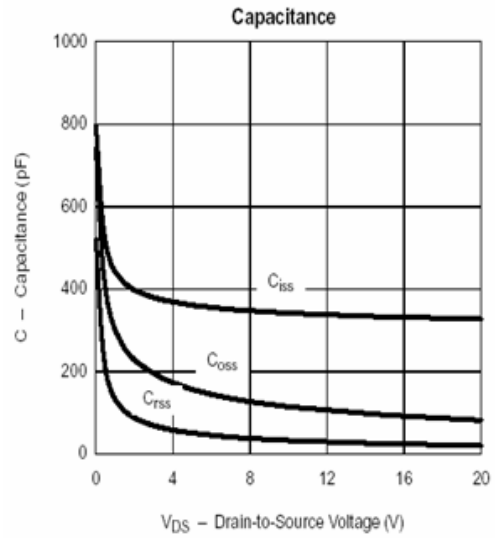
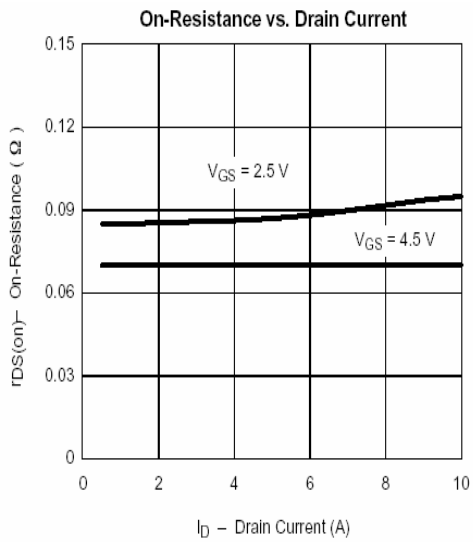
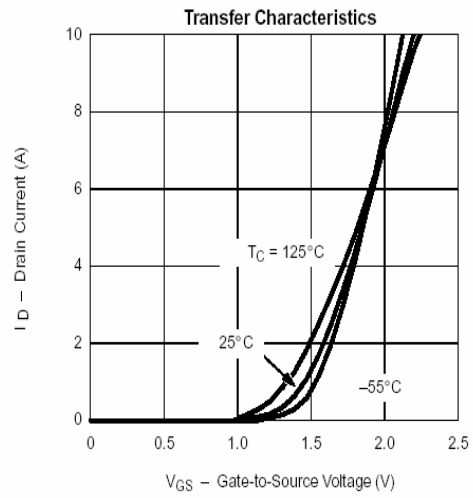
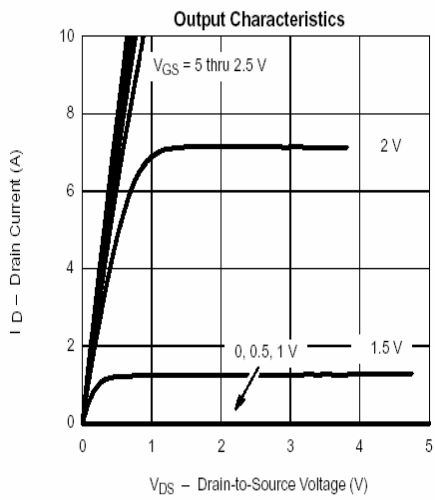
| Symbol           | Parameter                                       | Typical  | Unit |   |
|------------------|---|----------|------|---|
| V <sub>DSS</sub> | Drain-Source Voltage                            | 20       | V    |   |
| V <sub>GSS</sub> | Gate –Source Voltage                            | ±12      | V    |   |
| I <sub>D</sub>   | Continuous Drain Current(T <sub>J</sub> =150°C) | TA =25°C | 3.2  | A |
|                  |   | TA =70°C | 2.6  |   |
| I <sub>DM</sub>  | Pulsed Drain Current                            | 1.0      | A    |   |
| I <sub>S</sub>   | Continuous Source Current(Diode Conduction)     | 1.6      | A    |   |
| PD               | Power Dissipation                               | TA =25°C | 1.25 | W |
|                  |   | TA =70°C | 0.8  |   |
| T <sub>J</sub>   | Operating Junction Temperature                  | 150      | °C   |   |
| T <sub>STG</sub> | Storage Temperature Range                       | -55/150  | °C   |   |
| R <sub>θJA</sub> | Thermal Resistance-Junction to Ambient          | 100      | °C/W |   |

## Electrical Characteristics

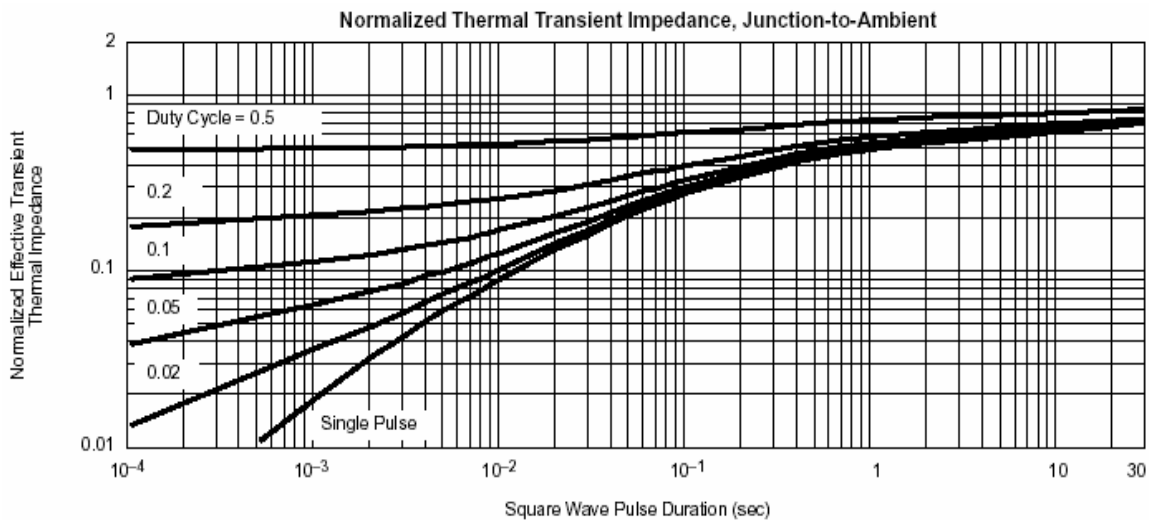
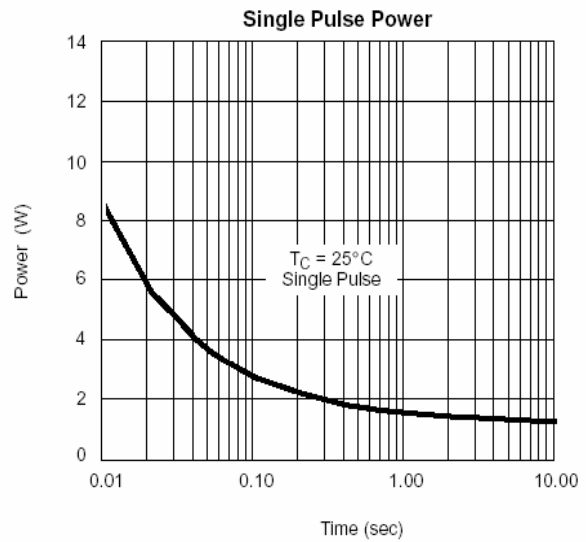
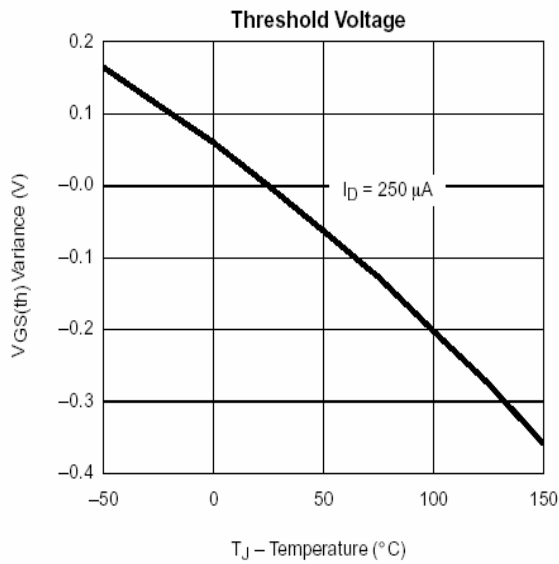
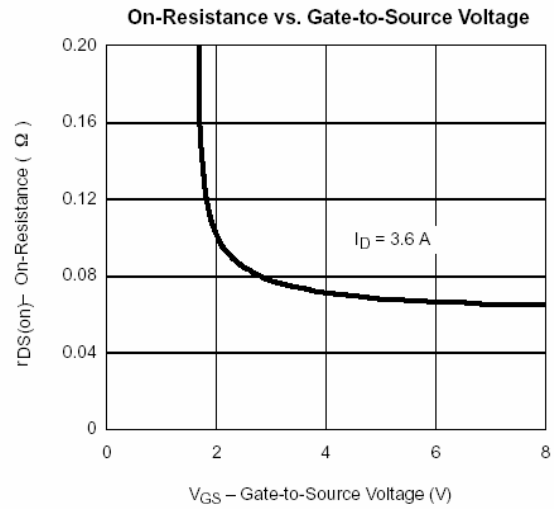
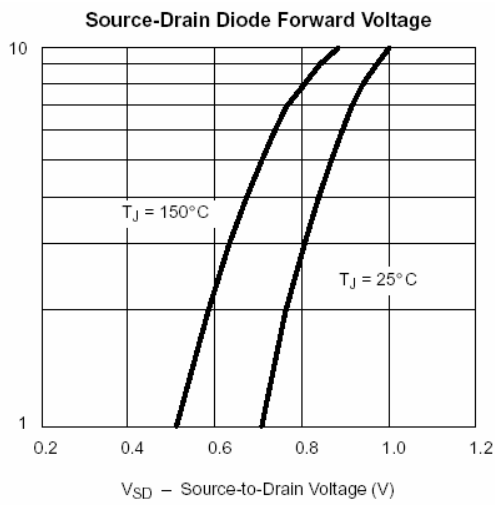
TA=25°C Unless otherwise noted

| Symbol               | Parameter                       | Conditions   | Min  | Typ   | Max   | Unit |
|----------------------|---------------------------------|--|------|-------|-------|------|
| <b>Static</b>        |                                 |  |      |       |       |      |
| V <sub>(BR)DSS</sub> | Drain-Source Breakdown Voltage  | V <sub>GS</sub> =0V, I <sub>D</sub> =250uA   | 20   |       |       | V    |
| V <sub>GS(th)</sub>  | Gate Threshold Voltage          | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA   | 0.45 |       | 1.2   |      |
| I <sub>GSS</sub>     | Gate Leakage Current            | V <sub>DS</sub> =0V, V <sub>GS</sub> =±12V   |      |       | ±100  | nA   |
| I <sub>DSS</sub>     | Zero Gate Voltage Drain Current | V <sub>DS</sub> =20V, V <sub>GS</sub> =0V  |      |       | 1     | uA   |
|                      |                                 | V <sub>DS</sub> =20V, V <sub>GS</sub> =0V<br>T <sub>J</sub> =55°C  |      |       | 10    |      |
| I <sub>D(on)</sub>   | On-State Drain Current          | V <sub>DS</sub> ≥5V, V <sub>GS</sub> =4.5V   | 6    |       |       | A    |
|                      |                                 | V <sub>DS</sub> ≥5V, V <sub>GS</sub> =2.5V   | 4    |       |       |      |
| R <sub>DS(on)</sub>  | Drain-Source On-Resistance      | V <sub>GS</sub> =4.5V, I <sub>D</sub> =3.6A  |      | 0.050 | 0.080 | Ω    |
|                      |                                 | V <sub>GS</sub> =2.5V, I <sub>D</sub> =3.1A  |      | 0.070 | 0.095 |      |
| g <sub>fs</sub>      | Forward Transconductance        | V <sub>DS</sub> =5V, I <sub>D</sub> =3.6A  |      | 10    |       | S    |
| V <sub>SD</sub>      | Diode Forward Voltage           | I <sub>S</sub> =1.6A, V <sub>GS</sub> =0V  |      | 0.85  | 1.2   | V    |
| <b>Dynamic</b>       |                                 |  |      |       |       |      |
| Q <sub>g</sub>       | Total Gate Charge               | V <sub>DS</sub> =10V, V <sub>GS</sub> =4.5V<br>I <sub>D</sub> ≅3.6A  |      | 5.4   | 10    | nC   |
| Q <sub>gs</sub>      | Gate-Source Charge              |  |      | 0.65  |       |      |
| Q <sub>gd</sub>      | Gate-Drain Charge               |  |      | 1.4   |       |      |
| C <sub>iss</sub>     | Input Capacitance               | V <sub>DS</sub> =10V, V <sub>GS</sub> =0V<br>f=1MHz  |      | 340   |       | pF   |
| C <sub>oss</sub>     | Output Capacitance              |  |      | 115   |       |      |
| C <sub>rss</sub>     | Reverse Transfer Capacitance    |  |      | 33    |       |      |
| t <sub>d(on)</sub>   | Turn-On Time                    | V <sub>DD</sub> =10V, R <sub>L</sub> =5.5Ω<br>I <sub>D</sub> ≅3.6A, V <sub>GEN</sub> =4.5V<br>R <sub>G</sub> =6Ω |      | 12    | 25    | ns   |
| t <sub>r</sub>       |                                 |  |      | 36    | 60    |      |
| t <sub>d(off)</sub>  | Turn-Off Time                   |  |      | 34    | 60    |      |
| t <sub>f</sub>       |                                 |  |      | 10    | 25    |      |

## Typical Performance Characteristics

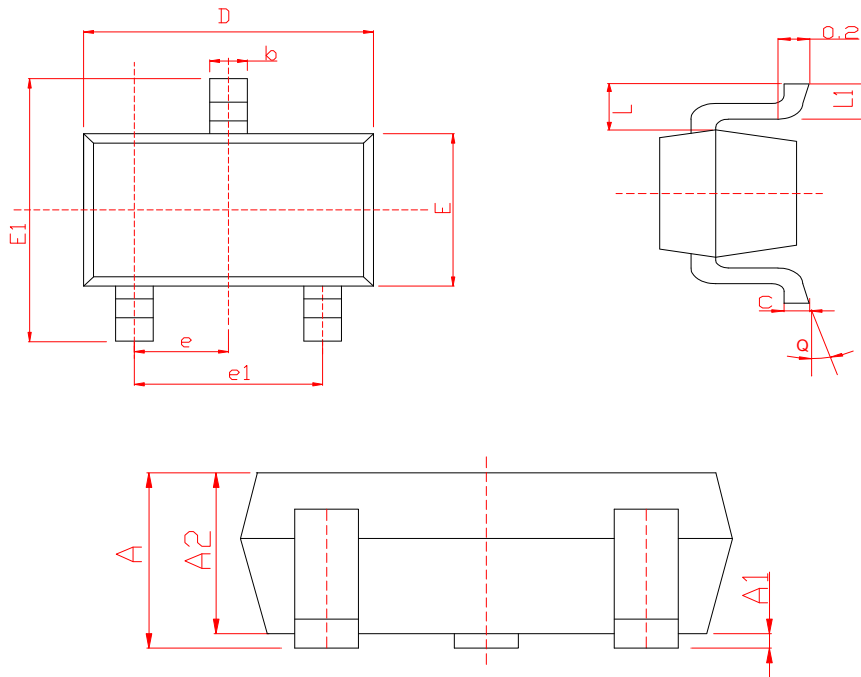


## Typical Performance Characteristics



## Package Dimension

### SOT-23-3L







| Dimensions |             |      |             |       |
|------------|-------------|------|-------------|-------|
| Symbol     | Millimeters |      | Inches      |       |
|            | Min         | Max  | Min         | Max   |
| <b>A</b>   | 1.05        | 1.25 | 0.041       | 0.049 |
| <b>A1</b>  | 0           | 0.1  | 0           | 0.004 |
| <b>A2</b>  | 1.05        | 1.15 | 0.041       | 0.045 |
| <b>b</b>   | 0.3         | 0.4  | 0.012       | 0.016 |
| <b>c</b>   | 0.1         | 0.2  | 0.004       | 0.008 |
| <b>D</b>   | 2.82        | 3.02 | 0.111       | 0.119 |
| <b>E</b>   | 1.5         | 1.7  | 0.059       | 0.067 |
| <b>E1</b>  | 2.65        | 2.95 | 0.104       | 0.116 |
| <b>e</b>   | 0.950 (TYP) |      | 0.037 (TYP) |       |
| <b>e1</b>  | 1.8         | 2    | 0.071       | 0.079 |
| <b>L</b>   | 0.700 (REF) |      | 0.028 (REF) |       |
| <b>L1</b>  | 0.3         | 0.6  | 0.012       | 0.024 |
| <b>θ</b>   | 0°          | 8°   | 0°          | 8°    |



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