

# GSMDL0910

## 100V N-Channel MOSFETs

### Product Description

These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode.

These devices are well suited for high efficiency fast switching applications.

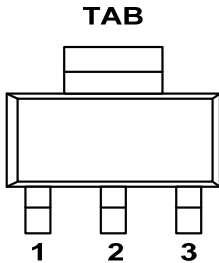
### Features

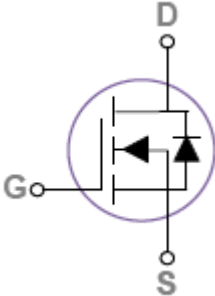
- 100V, 3A,  $R_{DS(ON)}=185m\Omega@V_{GS}=10V$
- Improved dv/dt capability
- Fast switching
- 100% EAS guaranteed
- Green Device Available
- SOT-223 package design

### Applications

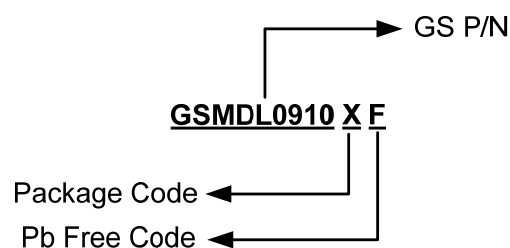
- Notebook
- Load Switch
- LED applications

### Packages & Pin Assignments

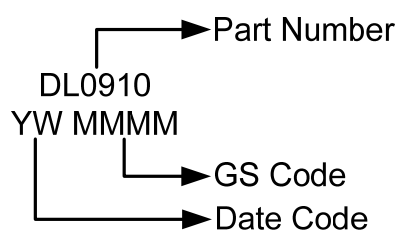
| GSMDL0910XF (SOT-223)                                                               |             |
|-------------------------------------------------------------------------------------|-------------|
|  |             |
| Pin                                                                                 | Description |
| 1                                                                                   | Gate        |
| 2                                                                                   | Drain       |
| 3                                                                                   | Source      |



### Ordering Information



## Marking Information



| Part Number | Package | Quantity |
|-------------|---------|----------|
| GSMDL0910XF | SOT-223 | 2500pcs  |

## Absolute Maximum Ratings

T<sub>A</sub>=25°C Unless otherwise noted

T<sub>A</sub>=25 °C Unless otherwise noted

| Symbol           | Parameter                                |                       | Typical     | Unit |
|------------------|------------------------------------------|-----------------------|-------------|------|
| V <sub>DS</sub>  | Drain-Source Voltage                     |                       | 100         | V    |
| V <sub>GS</sub>  | Gate-Source Voltage                      |                       | ±20         | V    |
| I <sub>D</sub>   | Continuous Drain Current                 | T <sub>A</sub> =25°C  | 3           | A    |
|                  |                                          | T <sub>A</sub> =100°C | 1.8         |      |
| I <sub>DM</sub>  | Pulsed Drain Current                     |                       | 12          | A    |
| P <sub>D</sub>   | Power Dissipation (T <sub>A</sub> =25°C) |                       | 1.78        | W    |
|                  | Power Dissipation (Derate above 25°C)    |                       | 0.014       | W/°C |
| T <sub>J</sub>   | Operating Junction Temperature Range     |                       | -50 to +150 | °C   |
| T <sub>STG</sub> | Storage Temperature Range                |                       | -50 to +150 | °C   |
| R <sub>θJA</sub> | Thermal Resistance-Junction to Ambient   |                       | 70          | °C/W |
| R <sub>θJC</sub> | Thermal Resistance-Junction to Case      |                       | 30          | °C/W |

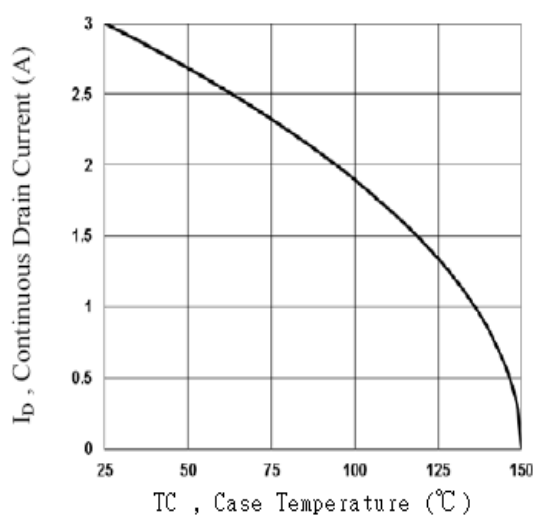
## Electrical Characteristics

T<sub>A</sub>=25°C Unless otherwise noted

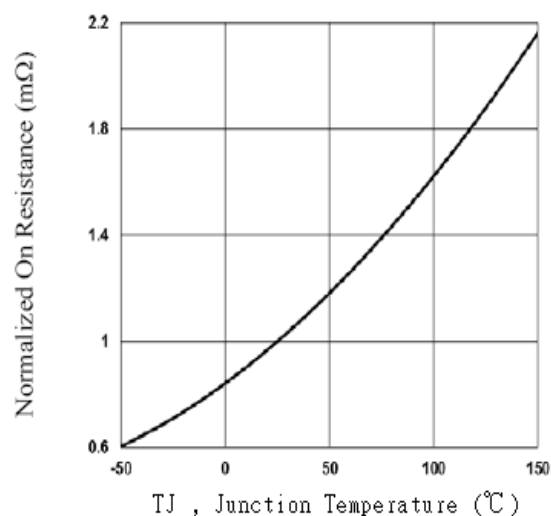
25 °C Unless Otherwise Noted

| Symbol                              | Parameter                                   | Conditions                                                                            | Min | Typ  | Max  | Unit  |
|-------------------------------------|---------------------------------------------|---------------------------------------------------------------------------------------|-----|------|------|-------|
| Static                              |                                             |                                                                                       |     |      |      |       |
| V <sub>(BR)DSS</sub>                | Drain-Source Breakdown Voltage              | V <sub>GS</sub> =0V,I <sub>D</sub> =250uA                                             | 100 |      |      | V     |
| ΔBV <sub>DSS</sub> /ΔT <sub>J</sub> | BV <sub>DSS</sub> Temperature Coefficient   | Reference to 25°C ,<br>I <sub>D</sub> =1mA                                            |     | 0.10 |      | V/°C  |
| V <sub>GS(th)</sub>                 | Gate Threshold Voltage                      | V <sub>DS</sub> =V <sub>GS</sub> ,I <sub>D</sub> =250uA                               | 1.2 | 1.8  | 2.5  | V     |
| ΔV <sub>GS(th)</sub>                | V <sub>GS(th)</sub> Temperature Coefficient |                                                                                       |     | -4   |      | mV/°C |
| I <sub>GSS</sub>                    | Gate Leakage Current                        | V <sub>DS</sub> =0V,V <sub>GS</sub> =±20V                                             |     |      | ±100 | nA    |
| I <sub>DSS</sub>                    | Zero Gate Voltage Drain Current             | V <sub>DS</sub> =100V,V <sub>GS</sub> =0V                                             |     |      | 1    | uA    |
|                                     |                                             | V <sub>DS</sub> =80V,V <sub>GS</sub> =0V,<br>T <sub>J</sub> =125°C                    |     |      | 10   |       |
| I <sub>S</sub>                      | Continuous Source Current                   | V <sub>G</sub> =V <sub>D</sub> =0V,<br>Force Current                                  |     |      | 3    | A     |
| I <sub>SM</sub>                     | Pulsed Source Current                       |                                                                                       |     |      | 6    |       |
| R <sub>DS(on)</sub>                 | Drain-Source On-Resistance                  | V <sub>GS</sub> =10V,I <sub>D</sub> =2A                                               |     | 160  | 185  | mΩ    |
|                                     |                                             | V <sub>GS</sub> =4.5V,I <sub>D</sub> =1A                                              |     | 170  | 195  |       |
| g <sub>FS</sub>                     | Forward Transconductance                    | V <sub>DS</sub> =10V,I <sub>D</sub> =1A                                               |     | 5    |      | S     |
| V <sub>SD</sub>                     | Diode Forward Voltage                       | V <sub>GS</sub> =0V,I <sub>S</sub> =1A                                                |     |      | 1    | V     |
| Dynamic                             |                                             |                                                                                       |     |      |      |       |
| Q <sub>g</sub>                      | Total Gate Charge                           | V <sub>DS</sub> =50V,V <sub>GS</sub> =10V,<br>I <sub>D</sub> =2A                      |     | 13.4 | 21   | nC    |
| Q <sub>gs</sub>                     | Gate-Source Charge                          |                                                                                       |     | 2.9  | 6    |       |
| Q <sub>gd</sub>                     | Gate-Drain Charge                           |                                                                                       |     | 1.7  | 4    |       |
| C <sub>iSS</sub>                    | Input Capacitance                           | V <sub>DS</sub> =50V,V <sub>GS</sub> =0V,<br>f=1MHz                                   |     | 820  | 1190 | pF    |
| C <sub>oSS</sub>                    | Output Capacitance                          |                                                                                       |     | 35   | 55   |       |
| C <sub>rSS</sub>                    | Reverse Transfer Capacitance                |                                                                                       |     | 20   | 30   |       |
| t <sub>d(on)</sub>                  | Turn-On Time                                | V <sub>DD</sub> =30V,I <sub>D</sub> =1A,<br>V <sub>GS</sub> =10V,R <sub>G</sub> =3.3Ω |     | 1.6  | 3    | ns    |
| t <sub>r</sub>                      |                                             |                                                                                       |     | 6.6  | 13   |       |
| t <sub>d(off)</sub>                 | Turn-Off Time                               |                                                                                       |     | 11.5 | 22   |       |
| t <sub>f</sub>                      |                                             |                                                                                       |     | 3.6  | 7    |       |
| R <sub>g</sub>                      | Gate Resistance                             | V <sub>DS</sub> =0V,V <sub>GS</sub> =0V,<br>f=1MHz                                    |     | 1.3  | 2.6  | Ω     |

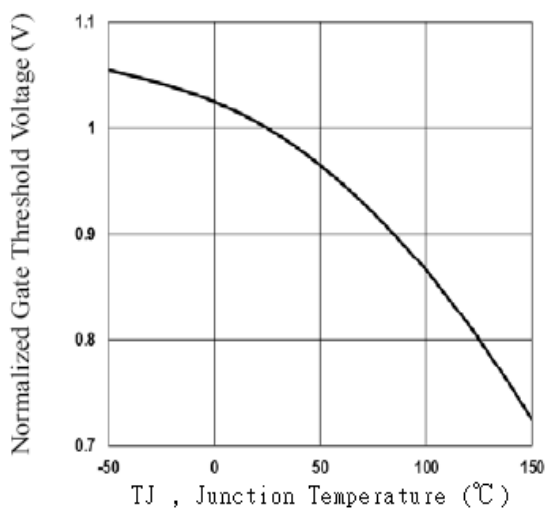
## Typical Performance Characteristics



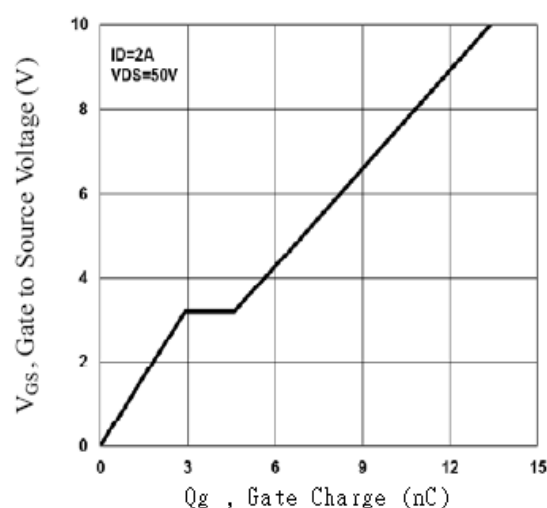
**Fig.1 Continuous Drain Current vs.  $T_C$**



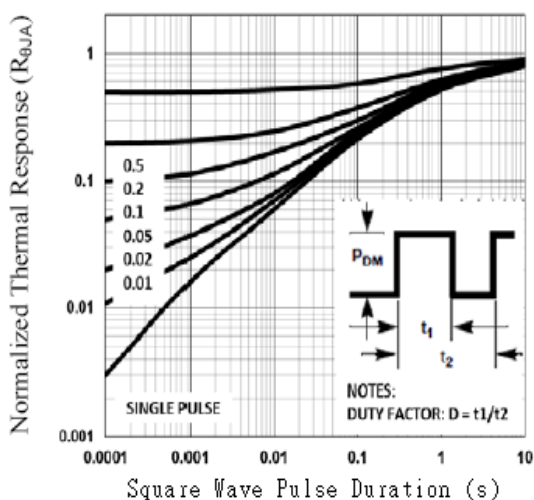
**Fig.2 Continuous Drain Current vs.  $T_C$**



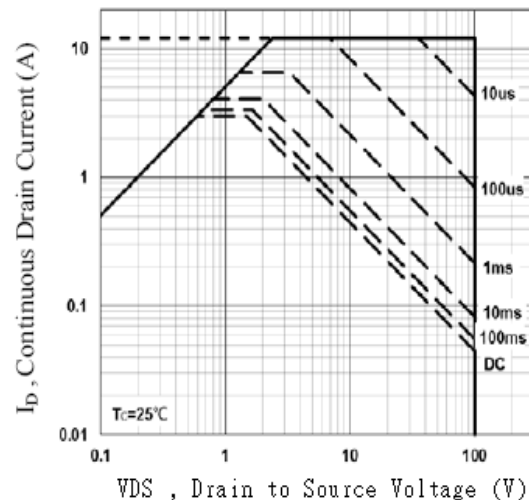
**Fig.3 Normalized  $V_{th}$  vs.  $T_J$**



**Fig.4 Gate Charge Waveform**



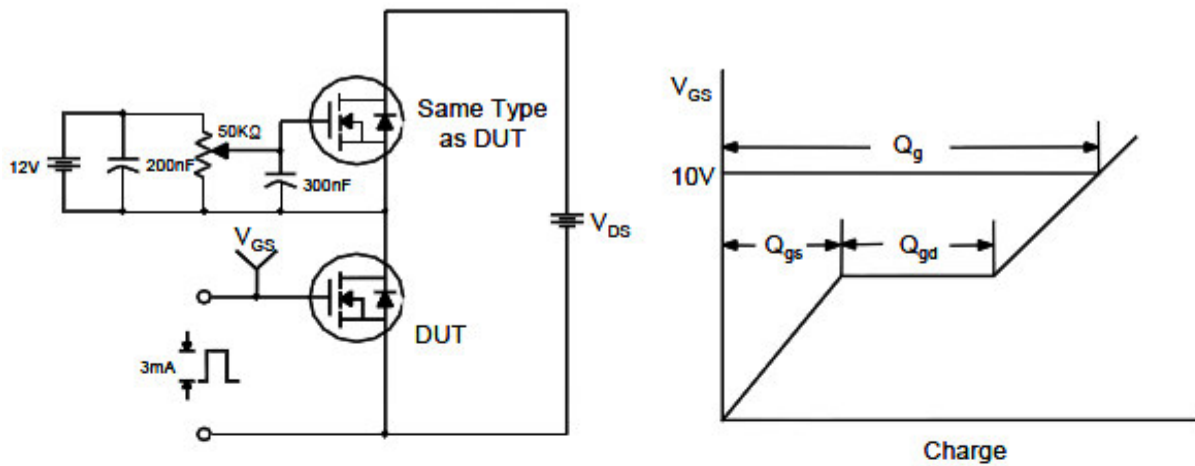
**Fig.5 Normalized Transient Impedance**



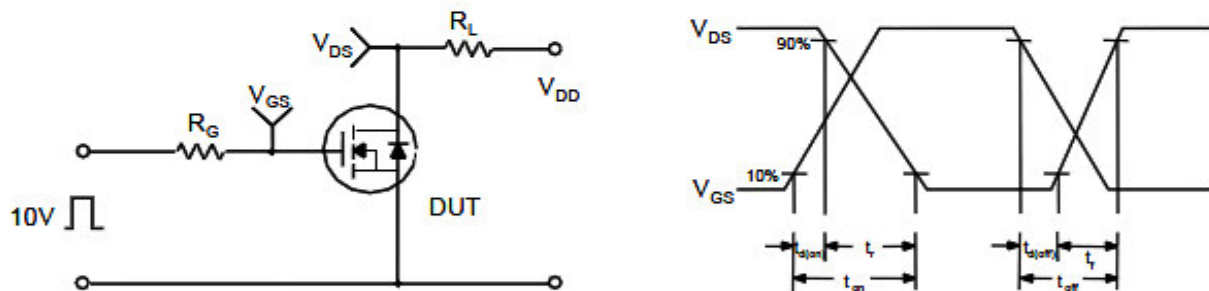
**Fig.6 Maximum Safe Operation Area**

## Typical Performance Characteristics (Continue)

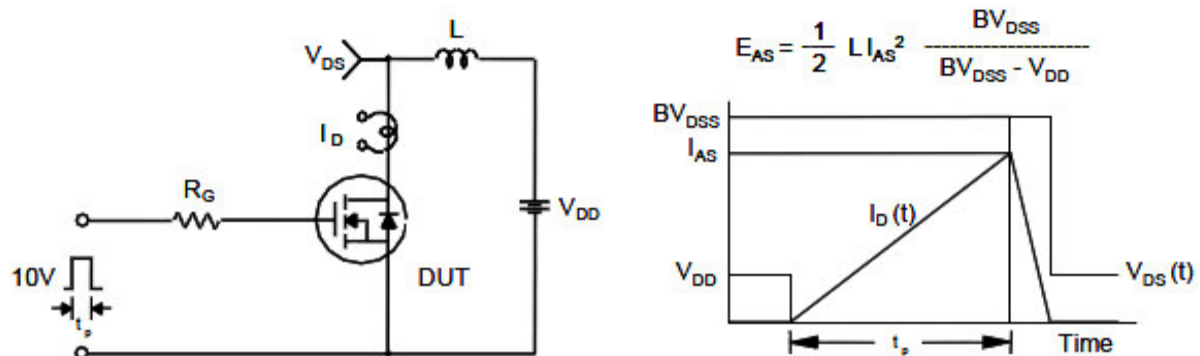
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms

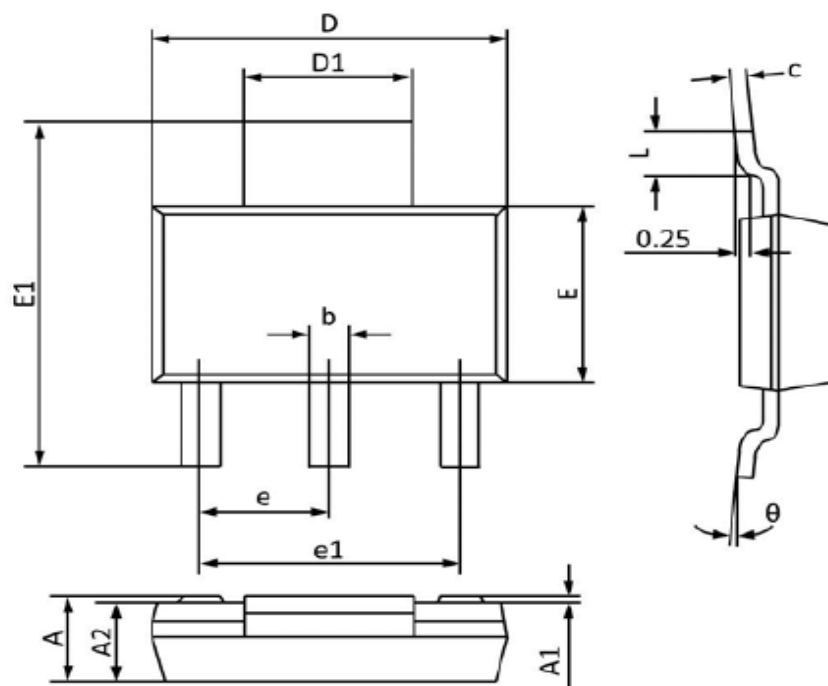


Unclamped Inductive Switching Test Circuit & Waveforms



## Package Dimension

### SOT-223



| Dimensions |             |       |             |       |
|------------|-------------|-------|-------------|-------|
| Symbol     | Millimeters |       | Inches      |       |
|            | Min         | Max   | Min         | Max   |
| A          | 1.520       | 1.800 | 0.060       | 0.071 |
| A1         | 0.000       | 0.100 | 0.000       | 0.004 |
| A2         | 1.500       | 1.700 | 0.059       | 0.067 |
| b          | 0.660       | 0.820 | 0.026       | 0.032 |
| c          | 0.250       | 0.350 | 0.010       | 0.014 |
| D          | 6.200       | 6.400 | 0.244       | 0.252 |
| D1         | 2.900       | 3.100 | 0.114       | 0.122 |
| E          | 3.300       | 3.700 | 0.130       | 0.146 |
| E1         | 6.830       | 7.070 | 0.269       | 0.278 |
| e          | 2.300 (BSC) |       | 0.091 (BSC) |       |
| e1         | 4.500       | 4.700 | 0.177       | 0.185 |
| L          | 0.900       | 1.150 | 0.035       | 0.045 |
| θ          | 0°          | 10°   | 0°          | 10°   |

## NOTICE

Information furnished is believed to be accurate and reliable. However Globaltech Semiconductor assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties, which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of Globaltech Semiconductor. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information without express written approval of Globaltech Semiconductor.

## CONTACT US

| GS Headquarter                                                                      |                                                                                      |
|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
|  | 4F.,No.43-1,Lane11,Sec.6,Minquan E.Rd NeiHu District Taipei City 114, Taiwan (R.O.C) |
|  | 886-2-2657-9980                                                                      |
|  | 886-2-2657-3630                                                                      |
|  | sales_twn@gs-power.com                                                               |

| Shenzhen Branch(China)                                                              |                                                                                             |
|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
|  | 1113 B Building, Happiness Washington, Baoan Nan Road, Luohu District, Shenzhen City, China |
|  | 0755-22208941                                                                               |
|  | sales_cn@gs-power.com                                                                       |

| RD Division                                                                         |                                      |
|-------------------------------------------------------------------------------------|--------------------------------------|
|  | 824 Bolton Drive Milpitas. CA. 95035 |
|  | 1-408-457-0587                       |