

RoHS Compliant Product  
A suffix of "-C" specifies halogen and lead-free

## DESCRIPTION

The SGM2310B utilized advanced processing techniques to achieve the lowest possible on-resistance, extremely efficient and cost-effectiveness device. The SGM2310B is universally used for all commercial-industrial applications.

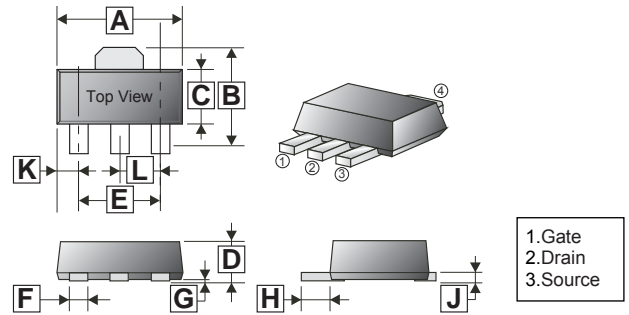
## FEATURES

- Simple Drive Requirement
- Small Package Outline

## MARKING



## SOT-89

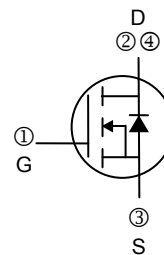


| REF. | Millimeter |      | REF. | Millimeter |      |
|------|------------|------|------|------------|------|
|      | Min.       | Max. |      | Min.       | Max. |
| A    | 4.40       | 4.60 | G    | -          | -    |
| B    | 4.05       | 4.25 | H    | 0.89       | 1.20 |
| C    | 2.40       | 2.60 | J    | 0.35       | 0.41 |
| D    | 1.40       | 1.60 | K    | 0.70       | 0.80 |
| E    | 3.00 REF.  |      | L    | 1.50 REF.  |      |
| F    | 0.40       | 0.52 |      |            |      |

## PACKAGE INFORMATION

| Package | MPQ | Leader Size |
|---------|-----|-------------|
| SOT-89  | 3K  | 7 inch      |

## TOP VIEW



## ABSOLUTE MAXIMUM RATINGS ( $T_A=25^\circ\text{C}$ unless otherwise specified)

| Parameter  | Symbol          | Ratings                | Unit                        |
|--|-----------------|------------------------|-----------------------------|
| Drain-Source Voltage                                 | $V_{DS}$        | 60                     | V                           |
| Gate-Source Voltage                                  | $V_{GS}$        | $\pm 20$               | V                           |
| Continuous Drain Current <sup>1</sup> , $V_{GS}@10V$ | $I_D$           | $T_A=25^\circ\text{C}$ | 2.7                         |
|  |                 | $T_A=70^\circ\text{C}$ | 2.2                         |
| Pulsed Drain Current <sup>2</sup>                    | $I_{DM}$        | 10                     | A                           |
| Power Dissipation <sup>3</sup>                       | $P_D$           | 1.25                   | W                           |
| Linear Derating Factor                               |                 | 0.01                   | $^\circ\text{C} / \text{W}$ |
| Operating Junction and Storage Temperature Range     | $T_j, T_{stg}$  | -55~150                | $^\circ\text{C}$            |
| <b>Thermal Resistance Rating</b>                     |                 |                        |                             |
| Maximum Junction to Ambient <sup>1</sup>             | $R_{\theta JA}$ | 100                    | $^\circ\text{C} / \text{W}$ |

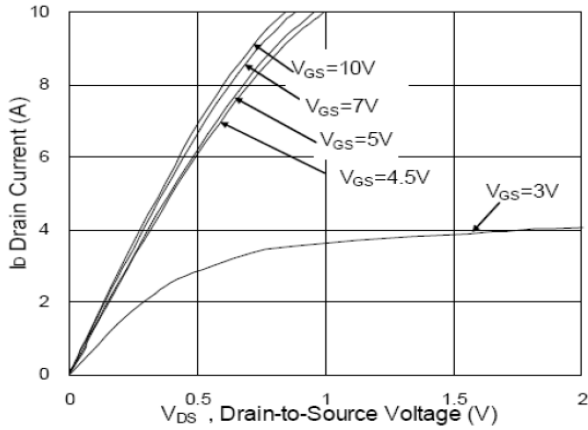
**ELECTRICAL CHARACTERISTICS** ( $T_A=25^\circ\text{C}$  unless otherwise specified)

| Parameter                                | Symbol       | Min.                   | Typ. | Max.      | Unit       | Test Conditions   |                               |
|--|--------------|------------------------|------|-----------|------------|---|-------------------------------|
| <b>Static</b>                            |              |                        |      |           |            |   |                               |
| Drain-Source Breakdown Voltage           | $BV_{DSS}$   | 60                     | -    | -         | V          | $V_{GS}=0, I_D=250\mu\text{A}$  |                               |
| Gate-Threshold Voltage                   | $V_{GS(th)}$ | 1                      | -    | 2.5       | V          | $V_{DS}=V_{GS}, I_D=250\mu\text{A}$   |                               |
| Forward Transconductance                 | $g_{fs}$     | -                      | 13   | -         | S          | $V_{DS}=5\text{V}, I_D=2\text{A}$   |                               |
| Gate-Body Leakage Current                | $I_{GSS}$    | -                      | -    | $\pm 100$ | nA         | $V_{GS}=\pm 20\text{V}$   |                               |
| Drain-Source Leakage Current             | $I_{DSS}$    | $T_J=25^\circ\text{C}$ | -    | -         | 1          | $\mu\text{A}$   | $V_{DS}=48\text{V}, V_{GS}=0$ |
|  |              | $T_J=55^\circ\text{C}$ | -    | -         | 5          |   | $V_{DS}=48\text{V}, V_{GS}=0$ |
| Drain-Source On-Resistance <sup>2</sup>  | $R_{DS(ON)}$ | -                      | -    | 100       | m $\Omega$ | $V_{GS}=10\text{V}, I_D=2.5\text{A}$  |                               |
|  |              | -                      | -    | 110       |            | $V_{GS}=4.5\text{V}, I_D=1.5\text{A}$   |                               |
| Total Gate Charge                        | $Q_g$        | -                      | 5    | -         | nC         | $V_{DS}=48\text{V},$<br>$V_{GS}=4.5\text{V},$<br>$I_D=2\text{A}$                    |                               |
| Gate-Source Charge                       | $Q_{gs}$     | -                      | 1.68 | -         |            |   |                               |
| Gate-Drain ("Miller") Charge             | $Q_{gd}$     | -                      | 1.9  | -         |            |   |                               |
| Turn-on Delay Time <sup>2</sup>          | $T_{d(on)}$  | -                      | 1.6  | -         | nS         | $V_{DD}=30\text{V},$<br>$V_{GS}=10\text{V},$<br>$R_G=3.3\Omega,$<br>$I_D=2\text{A}$ |                               |
| Rise Time                                | $T_r$        | -                      | 7.2  | -         |            |   |                               |
| Turn-off Delay Time                      | $T_{d(off)}$ | -                      | 25   | -         |            |   |                               |
| Fall Time                                | $T_f$        | -                      | 14.4 | -         |            |   |                               |
| Input Capacitance                        | $C_{iss}$    | -                      | 511  | -         | pF         | $V_{GS}=0,$<br>$V_{DS}=15\text{V},$<br>$f=1.0\text{MHz}$                            |                               |
| Output Capacitance                       | $C_{oss}$    | -                      | 38   | -         |            |   |                               |
| Reverse Transfer Capacitance             | $C_{rss}$    | -                      | 25   | -         |            |   |                               |
| <b>Source-Drain Diode</b>                |              |                        |      |           |            |   |                               |
| Diode Forward Voltage <sup>2</sup>       | $V_{SD}$     | -                      | -    | 1.2       | V          | $I_S=1\text{A}, V_{GS}=0$   |                               |
| Continuous Source Current <sup>1,4</sup> | $I_S$        | -                      | -    | 2.7       | A          | $V_G=V_D=0, \text{Force Current}$   |                               |
| Pulsed Source Current <sup>2,4</sup>     | $I_{SM}$     | -                      | -    | 10        |            |   |                               |
| Reverse Recovery Time                    | $T_{RR}$     | -                      | 9.7  | -         | nS         | $I_S=2\text{A}, di/dt=100\text{A}/\mu\text{s}$                                      |                               |
| Reverse Recovery Charge                  | $Q_{RR}$     | -                      | 5.8  | -         | nC         | $V_{GS}=0$  |                               |

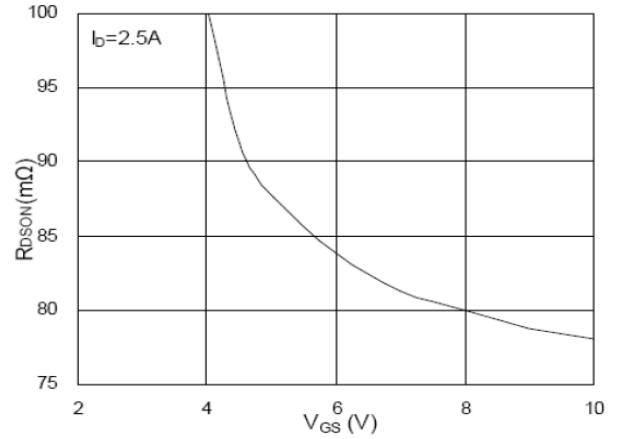
Notes:

- Surface mounted on FR4 board ,  $t \leq 10\text{sec}$ .
- The data tested by pulsed , pulse width  $\leq 300\mu\text{s}$ , duty cycle  $\leq 2\%$
- The power dissipation is limited by 150 °C junction temperature
- The data is theoretically the same as  $I_D$  and  $I_{DM}$  , in real applications , should be limited by total power dissipation

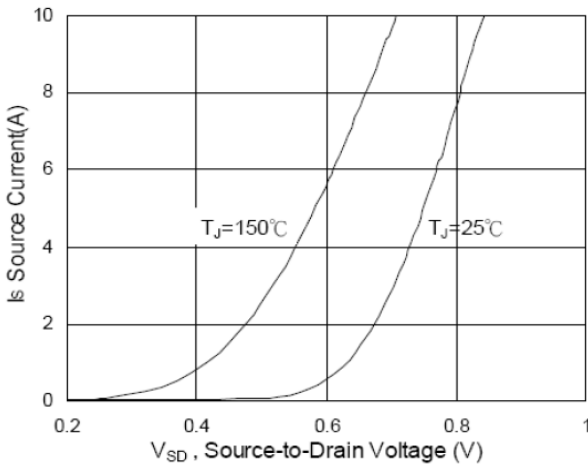
**CHARACTERISTIC CURVES**



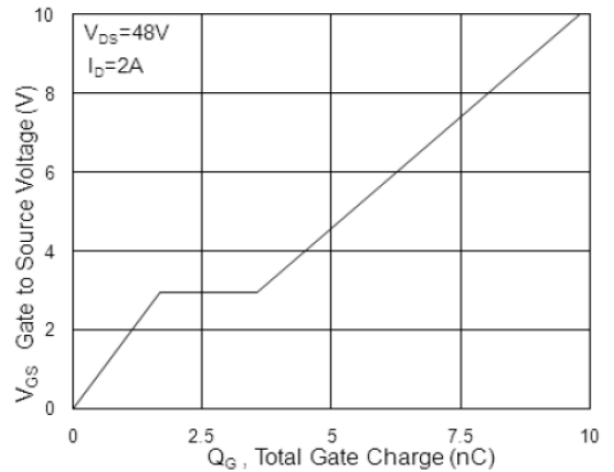
**Fig.1 Typical Output Characteristics**



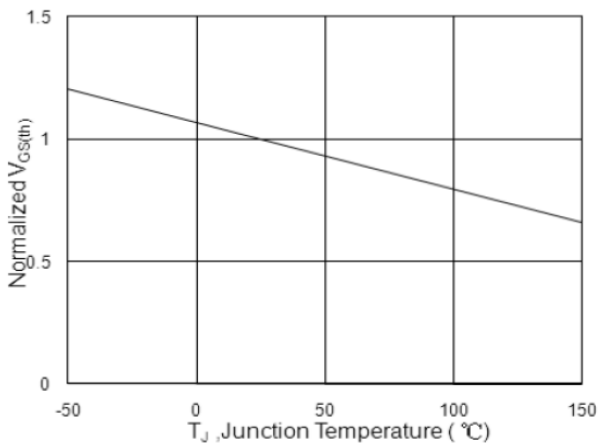
**Fig.2 On-Resistance v.s Gate-Source**



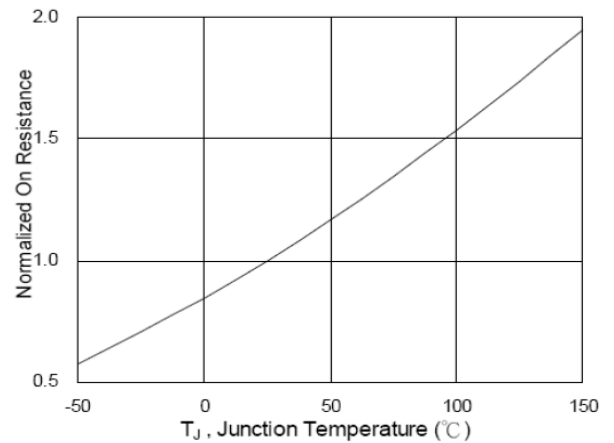
**Fig.3 Forward Characteristics of Reverse**



**Fig.4 Gate-Charge Characteristics**

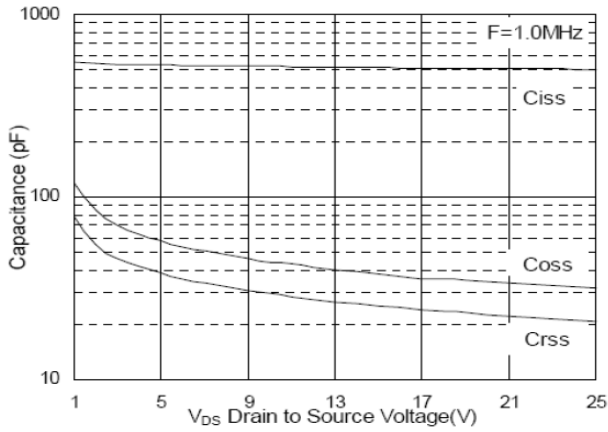


**Fig.5 Normalized  $V_{GS(th)}$  v.s  $T_J$**

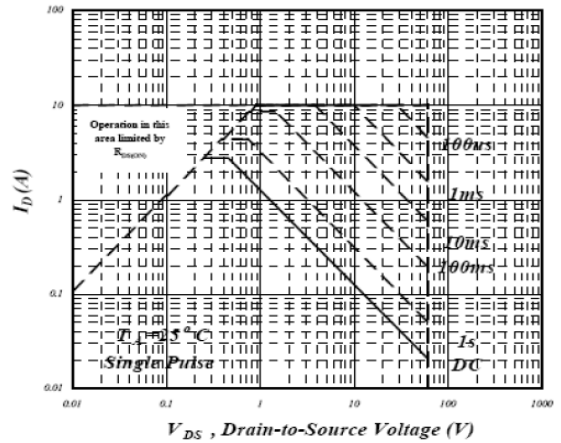


**Fig.6 Normalized  $R_{DS(ON)}$  v.s  $T_J$**

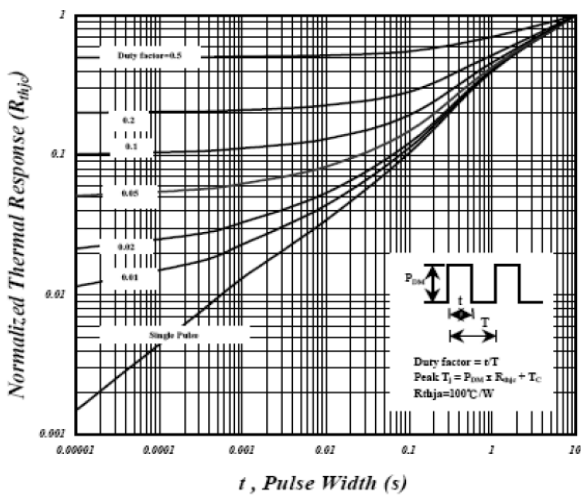
**CHARACTERISTIC CURVES**



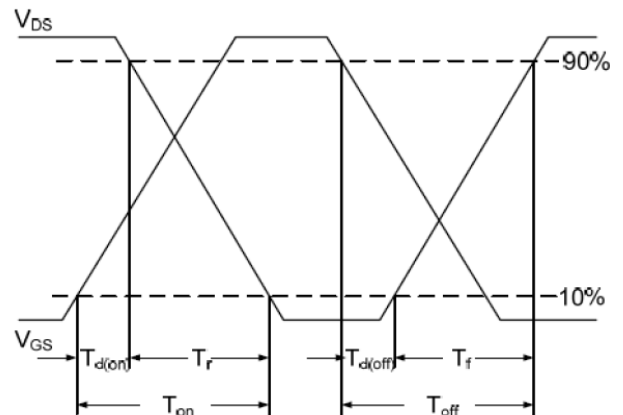
**Fig.7 Capacitance**



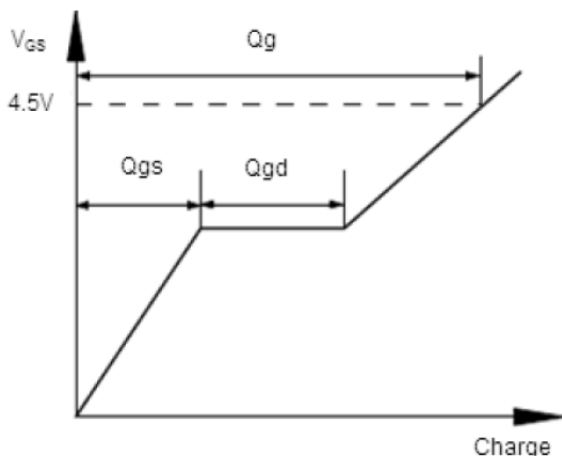
**Fig.8 Safe Operating Area**



**Fig.9 Normalized Maximum Transient Thermal Impedance**



**Fig.10 Switching Time Waveform**



**Fig.11 Gate Charge Waveform**