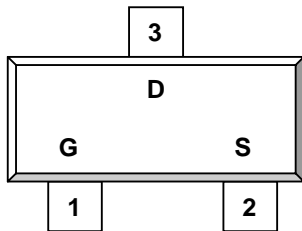
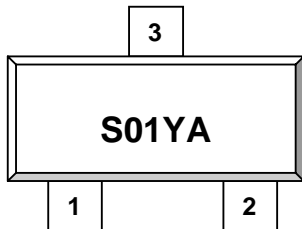


**DESCRIPTION**

The ST2301M is the P-Channel logic enhancement mode power field effect transistor is 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 batter powered circuits, and low in-line power loss are needed in a very small outline surface mount package.

**PIN CONFIGURATION**  
**SOT-23**


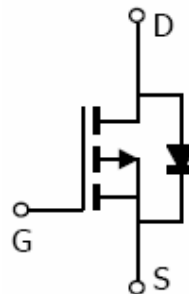
1.Gate 2.Source 3.Drain

**PART MARKING**  
**SOT-23**


Y: Year Code A: Process Code

**FEATURE**

- -20V/-2.8A,  $R_{DS(ON)} = 130\text{m-ohm}$  (Typ.)  
@ $V_{GS} = -4.5\text{V}$
- -20V/-2.0A,  $R_{DS(ON)} = 220\text{m-ohm}$   
@ $V_{GS} = -2.5\text{V}$
- Super high density cell design for extremely low  $R_{DS(ON)}$
- Exceptional on-resistance and maximum DC current capability
- SOT-23 package design


**ORDERING INFORMATION**

| Part Number | Package | Part Marking |
|-------------|---------|--------------|
| ST2301MSRG  | SOT-23  | S01YA        |

※ Process Code : A ~ Z ; a ~ z

※ ST2301MSRG S : SOT-23 ; R : Tape Reel ; G : Pb – Free

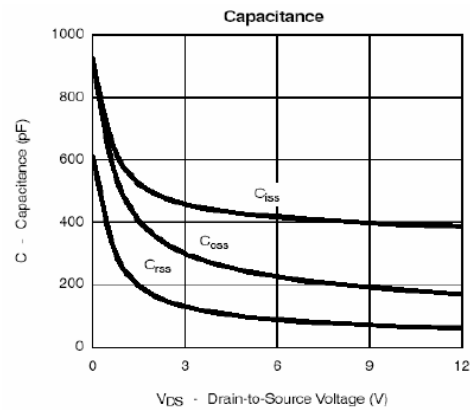
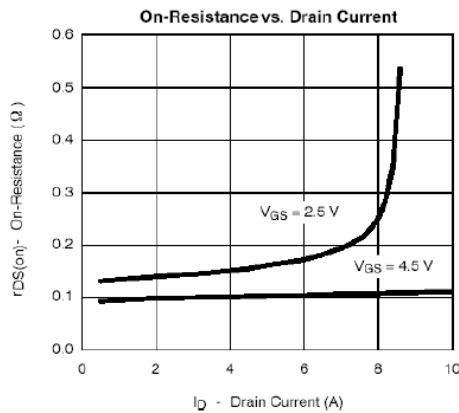
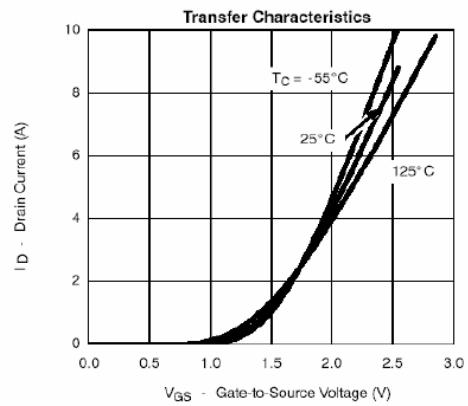
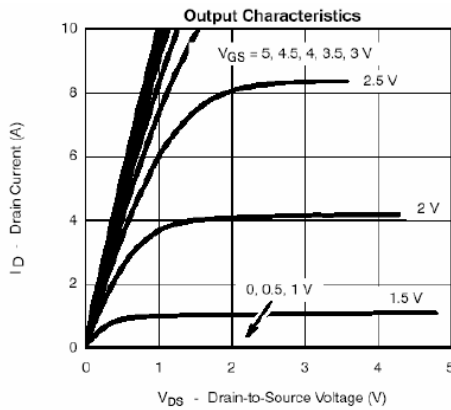
**ABSOLUTE MAXIMUM RATINGS** (Ta = 25°C Unless otherwise noted )

| Parameter  | Symbol           | Typical                      | Unit |
|--|------------------|------------------------------|------|
| Drain-Source Voltage                             | V <sub>DSS</sub> | -20                          | V    |
| Gate-Source Voltage                              | V <sub>GSS</sub> | ±12                          | V    |
| Continuous Drain Current (T <sub>J</sub> =150°C) | I <sub>D</sub>   | T <sub>A</sub> =25°C<br>-2.5 | A    |
|  |                  | T <sub>A</sub> =70°C<br>-1.5 |      |
| Pulsed Drain Current                             | I <sub>DM</sub>  | -10                          | A    |
| Continuous Source Current (Diode Conduction)     | I <sub>S</sub>   | -1.6                         | A    |
| Power Dissipation                                | P <sub>D</sub>   | T <sub>A</sub> =25°C<br>1.25 | W    |
|  |                  | T <sub>A</sub> =70°C<br>0.8  |      |
| Operation Junction Temperature                   | T <sub>J</sub>   | 150                          | °C   |
| Storage Temperature Range                        | T <sub>STG</sub> | -55/150                      | °C   |
| Thermal Resistance-Junction to Ambient           | R <sub>θJA</sub> | 120                          | °C/W |

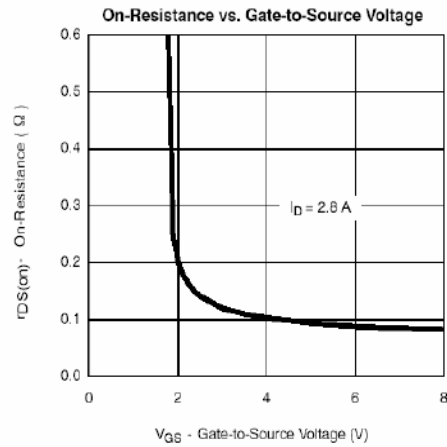
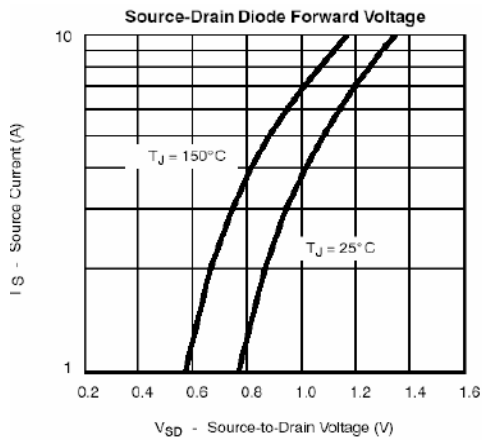
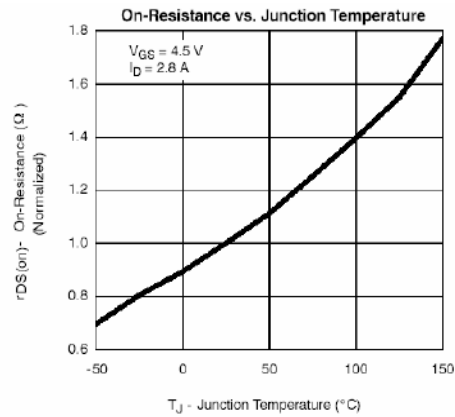
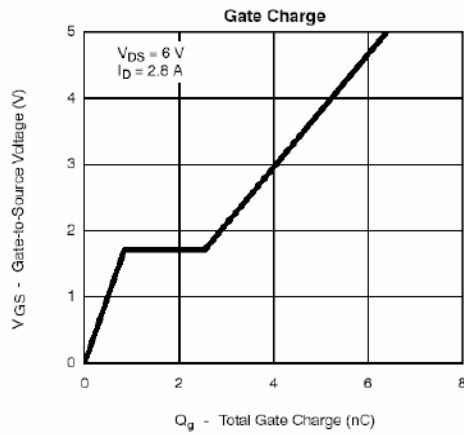
**ELECTRICAL CHARACTERISTICS** ( Ta = 25°C Unless otherwise noted )

| Parameter                       | Symbol                | Condition  | Min                              | Typ            | Max       | Unit     |
|---------------------------------|-----------------------|--|----------------------------------|----------------|-----------|----------|
| <b>Static</b>                   |                       |  |                                  |                |           |          |
| Drain-Source Breakdown Voltage  | $V_{(BR)DSS}$         | $V_{GS}=0V, I_D=-250\mu A$                                       | -20                              |                |           | V        |
| Gate Threshold Voltage          | $V_{GS(th)}$          | $V_{DS}=V_{GS}, I_D=-250\mu A$                                   | -0.48                            |                | -1.5      | V        |
| Gate Leakage Current            | $I_{GSS}$             | $V_{DS}=0V, V_{GS}=\pm 12V$                                      |                                  |                | $\pm 100$ | nA       |
| Zero Gate Voltage Drain Current | $I_{DSS}$             | $V_{DS}=-20V, V_{GS}=0V$   |                                  |                | -1        | uA       |
|                                 |                       | $V_{DS}=-20V, V_{GS}=0V$<br>$T_J=55^\circ C$                     |                                  |                | -10       |          |
| On-State Drain Current          | $I_{D(on)}$           | $V_{DS}\leq -5V, V_{GS}=-4.5V$<br>$V_{DS}\leq -5V, V_{GS}=-2.5V$ | -6<br>-3                         |                |           | A        |
| Drain-source On-Resistance      | $R_{DS(on)}$          | $V_{GS}=-4.5V, I_D=-2.8A$<br>$V_{GS}=-2.5V, I_D=-2.0A$           |                                  | 0.135<br>0.220 |           | $\Omega$ |
| Forward Transconductance        | $g_{fs}$              | $V_{DS}=-5V, I_D=-2.8V$  |                                  | 6.5            |           | S        |
| Diode Forward Voltage           | $V_{SD}$              | $I_S=-1.6A, V_{GS}=0V$   |                                  | -0.8           | -1.2      | V        |
| <b>Dynamic</b>                  |                       |  |                                  |                |           |          |
| Total Gate Charge               | $Q_g$                 | $V_{DS}=-6V$<br>$V_{GS}=-4.5V$<br>$I_D=-2.8A$                    |                                  | 4.8            | 8         | nC       |
| Gate-Source Charge              | $Q_{gs}$              |  |                                  | 0.75           |           |          |
| Gate-Drain Charge               | $Q_{gd}$              |  |                                  | 1.4            |           |          |
| Input Capacitance               | $C_{iss}$             | $V_{DS}=-6V$<br>$V_{GS}=0V$<br>$F=1MHz$                          |                                  | 35             |           | pF       |
| Output Capacitance              | $C_{oss}$             |  |                                  | 150            |           |          |
| Reverse Transfer Capacitance    | $C_{rss}$             |  |                                  | 60             |           |          |
| Turn-On Time                    | $t_{d(on)}$<br>$t_r$  | $V_{DD}=-6V$<br>$R_L=6\Omega$<br>$I_D=-1A$                       |                                  | 10             | 20        | nS       |
| Turn-Off Time                   | $t_{d(off)}$<br>$t_f$ |  | $V_{GEN}=-4.5V$<br>$R_G=6\Omega$ |                | 32        |          |
|                                 |                       |  |                                  | 38             | 55        |          |
|                                 |                       |  |                                  | 30             | 50        |          |

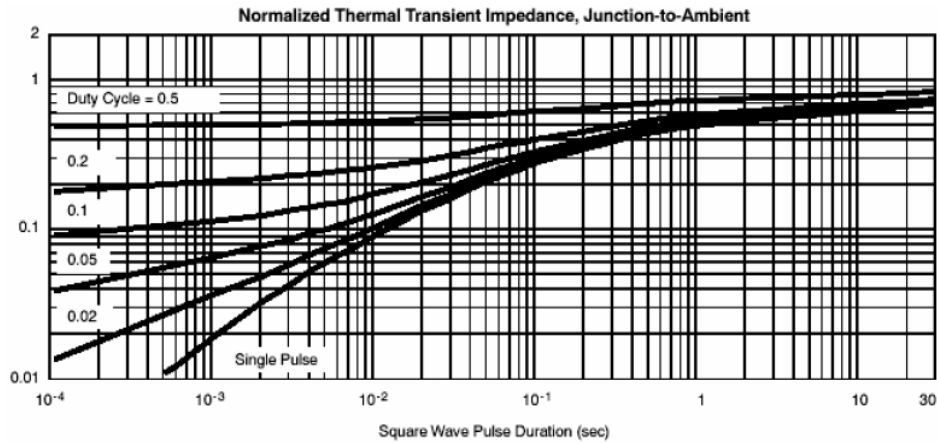
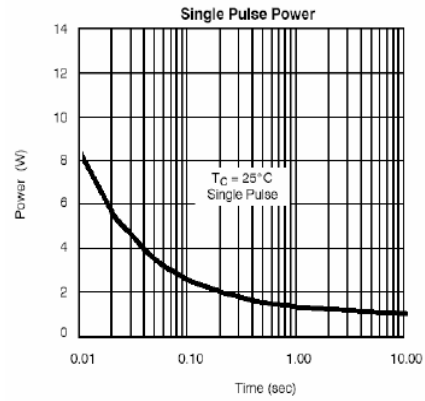
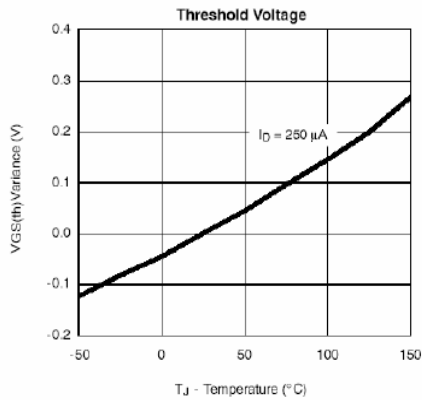
**TYPICAL CHARACTERISTICS (25°C Unless noted)**

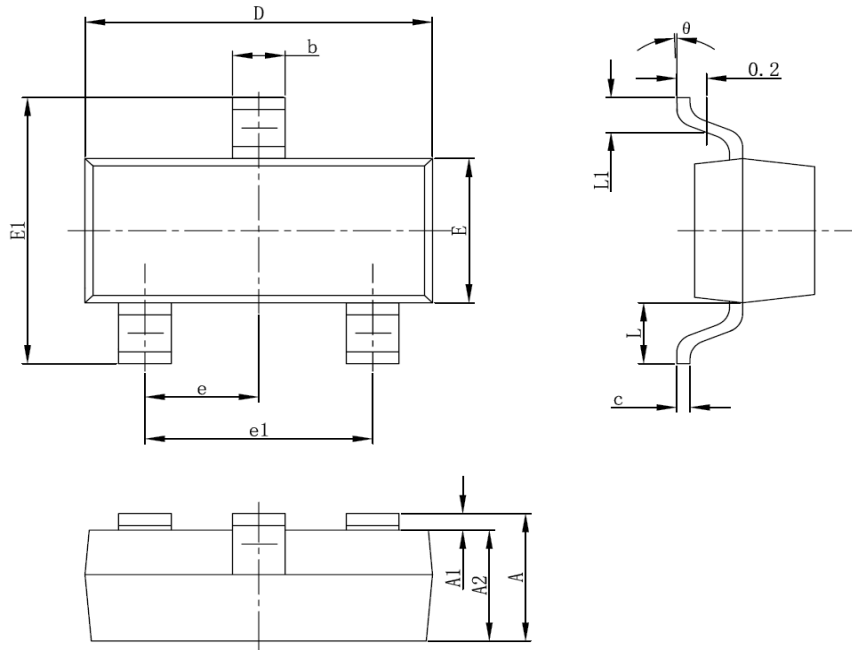


**TYPICAL CHARACTERISTICS** (25°C Unless noted)



**TYPICAL CHARACTERISTICS (25°C Unless noted)**



**SOT-23 PACKAGE OUTLINE**


| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min                       | Max   | Min                  | Max   |
| A      | 0.900                     | 1.100 | 0.035                | 0.043 |
| A1     | 0.000                     | 0.100 | 0.000                | 0.004 |
| A2     | 0.900                     | 1.000 | 0.035                | 0.039 |
| 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      | 1.200                     | 1.400 | 0.047                | 0.055 |
| E1     | 2.250                     | 2.550 | 0.089                | 0.100 |
| e      | 0.950TYP                  |       | 0.037TYP             |       |
| e1     | 1.800                     | 2.000 | 0.071                | 0.079 |
| L      | 0.550REF                  |       | 0.022REF             |       |
| L1     | 0.300                     | 0.500 | 0.012                | 0.020 |
| theta  | 0°                        | 8°    | 0°                   | 8°    |