

## DESCRIPTION

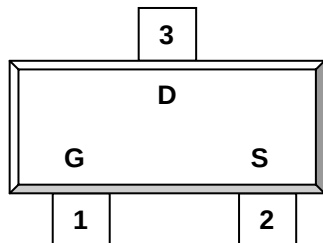
The ST2302M is the N-Channel logic enhancement mode power field effect transistor are produced using high cell density, DMOS trench technology.

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 batter powered circuits, and low in-line power loss are needed in a very small outline surface mount package.

## PIN CONFIGURATION

### SOT-23



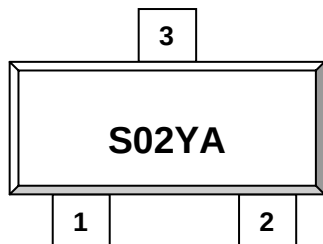
1.Gate 2.Source 3.Drain

## FEATURE

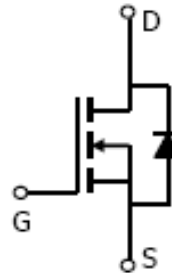
- 20V/3.6A,  $R_{DS(ON)} = 90\text{m-ohm}$  (Typ.) @VGS = 4.5V
- 20V/3.1A,  $R_{DS(ON)} = 130\text{m-ohm}$  @VGS = 2.5V
- Super high density cell design for extremely low  $R_{DS(ON)}$
- Exceptional on-resistance and maximum DC current capability
- SOT-23 package design

## PART MARKING

### SOT-23



Y: Year Code A: Process Code



## ORDERING INFORMATION

| Part Number | Package | Part Marking |
|-------------|---------|--------------|
| ST2302MSRG  | SOT-23  | S02YA        |

※ Process Code : A ~ Z ; a ~ z

※ ST2302MSRG S : SOT-23 ; R : Tape Reel ; G : Pb – Free



**ST2302M**



N Channel Enhancement Mode MOSFET

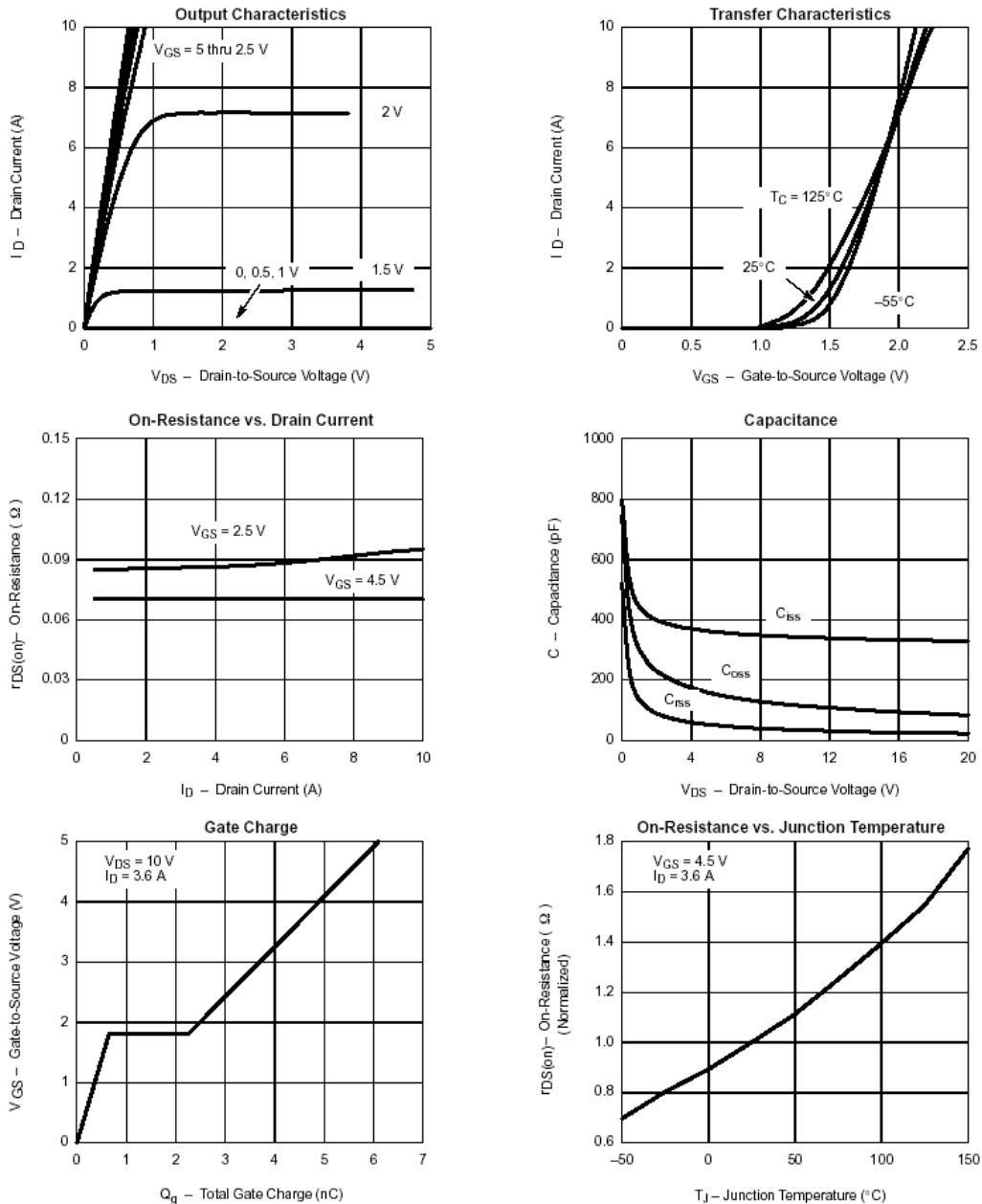
**3.6A**

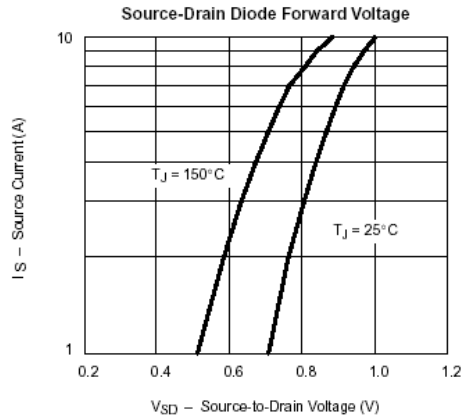
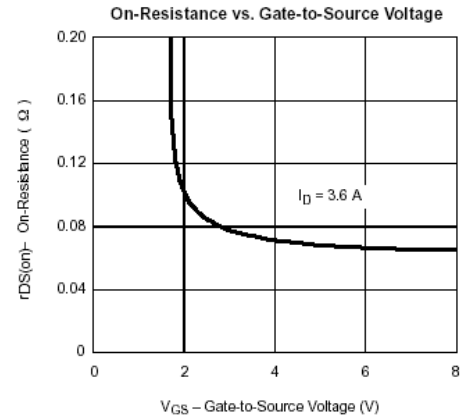
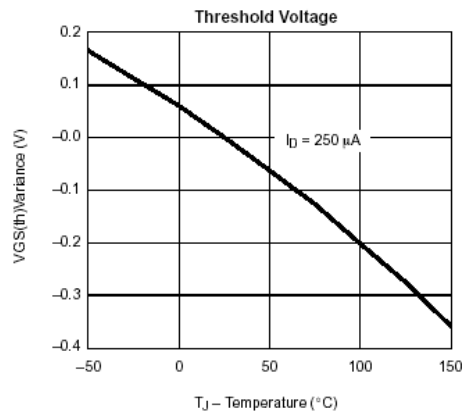
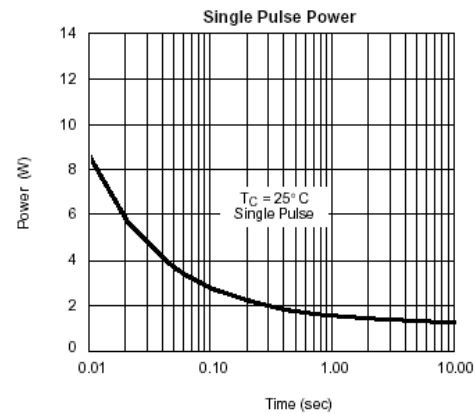
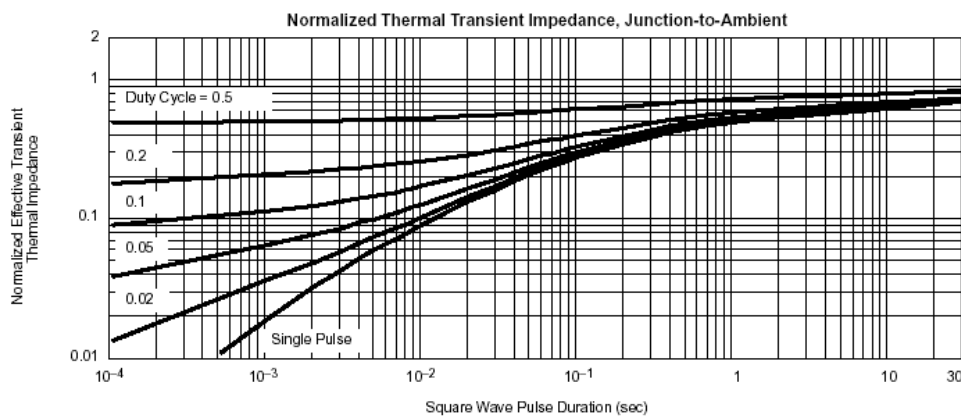
**ABSOLUTE MAXIMUM RATINGS** (Ta = 25°C Unless otherwise noted )

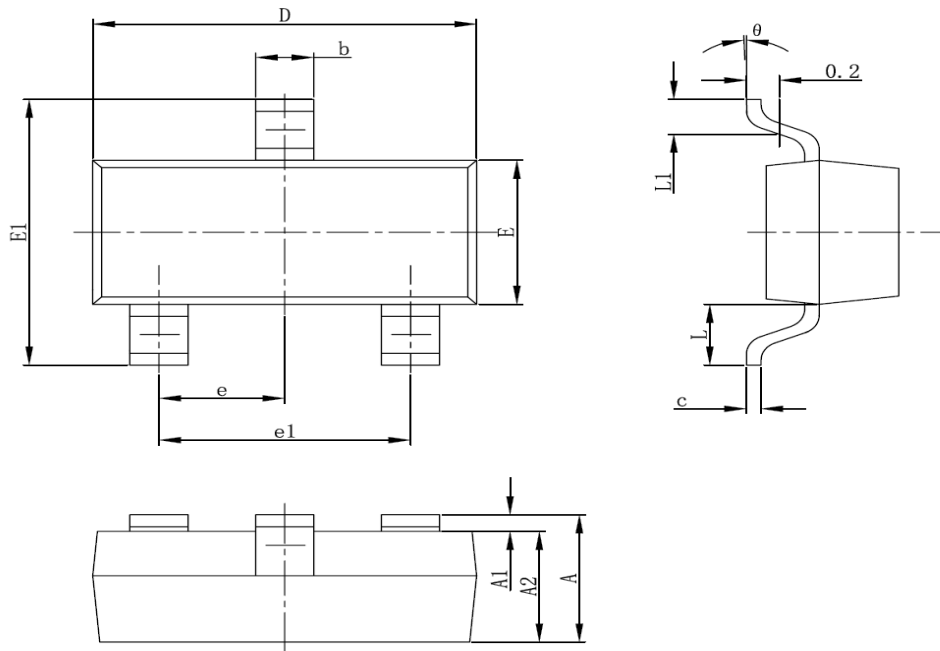
| Parameter                                         |                                                | Symbol           | Typical     | Unit |
|---------------------------------------------------|------------------------------------------------|------------------|-------------|------|
| Drain-Source 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) | T <sub>A</sub> = 25°C<br>T <sub>A</sub> = 70°C | I <sub>D</sub>   | 3.2<br>2.6  | A    |
| Pulsed Drain Current                              |                                                | I <sub>DM</sub>  | 10          | A    |
| Continuous Source Current (Diode Conduction)      |                                                | I <sub>S</sub>   | 1.6         | A    |
| Power Dissipation                                 | T <sub>A</sub> = 25°C<br>T <sub>A</sub> = 70°C | P <sub>D</sub>   | 1.25<br>0.8 | W    |
| 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> | 100         | °C/W |

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

| Parameter                       | Symbol                    | Condition                                                                                                            | Min    | Typ          | Max  | Unit |
|---------------------------------|---------------------------|----------------------------------------------------------------------------------------------------------------------|--------|--------------|------|------|
| Static                          |                           |                                                                                                                      |        |              |      |      |
| Drain-Source Breakdown Voltage  | V <sub>(BR)DSS</sub>      | V <sub>GS</sub> =0V, I <sub>D</sub> =250uA                                                                           | 20     |              |      | V    |
| Gate Threshold Voltage          | V <sub>GS(th)</sub>       | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA                                                             | 0.5    |              | 1.2  | V    |
| Gate Leakage Current            | I <sub>GSS</sub>          | V <sub>DS</sub> =0V, V <sub>GS</sub> =±12V                                                                           |        |              | ±100 | nA   |
| Zero Gate Voltage Drain Current | I <sub>DSS</sub>          | 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℃                                                     |        |              | 10   |      |
| On-State Drain Current          | I <sub>D(on)</sub>        | V <sub>DS</sub> ≥5V, V <sub>GS</sub> =4.5V<br>V <sub>DS</sub> ≥5V, V <sub>GS</sub> =2.5V                             | 6<br>4 |              |      | A    |
| Drain-source On-Resistance      | R <sub>DS(on)</sub>       | V <sub>GS</sub> =4.5V, I <sub>D</sub> =3.6A<br>V <sub>GS</sub> =2.5V, I <sub>D</sub> =3.1A                           |        | 0.09<br>0.13 |      | Ω    |
| Forward Transconductance        | g <sub>fs</sub>           | V <sub>DS</sub> =5V, I <sub>D</sub> =3.6V                                                                            |        | 10           |      | S    |
| Diode Forward Voltage           | V <sub>SD</sub>           | I <sub>S</sub> =1.6A, V <sub>GS</sub> =0V                                                                            |        | 0.85         | 1.2  | V    |
| Dynamic                         |                           |                                                                                                                      |        |              |      |      |
| Total Gate Charge               | Q <sub>g</sub>            | V <sub>DS</sub> =10V<br>V <sub>GS</sub> =4.5V<br>I <sub>D</sub> ≡3.6A                                                |        | 5.4          | 10   | nC   |
| Gate-Source Charge              | Q <sub>gs</sub>           |                                                                                                                      |        | 0.65         |      |      |
| Gate-Drain Charge               | Q <sub>gd</sub>           |                                                                                                                      |        | 1.4          |      |      |
| Input Capacitance               | C <sub>iss</sub>          | V <sub>DS</sub> =10V<br>V <sub>GS</sub> =0V<br>F=1MHz                                                                |        | 340          |      | pF   |
| Output Capacitance              | C <sub>oss</sub>          |                                                                                                                      |        | 115          |      |      |
| Reverse Transfer Capacitance    | C <sub>rss</sub>          |                                                                                                                      |        | 33           |      |      |
| Turn-On Time                    | t <sub>d(on)</sub><br>tr  | V <sub>DD</sub> =10V<br>R <sub>L</sub> =5.5Ω<br>I <sub>D</sub> =3.6A<br>V <sub>GEN</sub> =4.5V<br>R <sub>G</sub> =6Ω |        | 12           | 25   | nS   |
| Turn-Off Time                   | t <sub>d(off)</sub><br>tf |                                                                                                                      |        | 36           | 60   |      |
|                                 |                           |                                                                                                                      |        | 34           | 60   |      |
|                                 |                           |                                                                                                                      |        | 10           | 25   |      |

**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°    |