# N-Channel MOSFET MEM2310X

## General Description

MEM2310XG Series N-channel enhancement mode field-effect transistor ,produced with high cell density DMOS trench technology, which is especially used to minimize on-state resistance. This device particularly suits low voltage applications, and low power dissipation in a very small outline surface mount package.

## Features

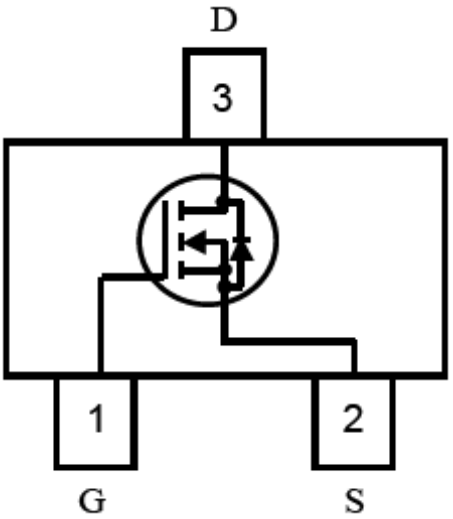
- 30V/5.8A

  $R_{DS(ON)}$ =25mΩ@ $V_{GS}$=10V, $I_D$=5.8A

  $R_{DS(ON)}$ =28mΩ@ $V_{GS}$=4.5V, $I_D$=5A

  $R_{DS(ON)}$ =37mΩ@ $V_{GS}$=2.5V, $I_D$=4A
- High Density Cell Design For Ultra Low On-Resistance
- Subminiature surface mount package:SOT23

## Pin Configuration




## Typical Application

- Battery management
- High speed switch
- Low power DC to DC converter

## Absolute Maximum Ratings

| Parameter | | Symbol | Ratings | Unit |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DSS}$ | 30V | V |
| Gate-Source Voltage | | $V_{GSS}$ | ±12 | V |
| Drain Current | $T_A$=25℃ | $I_D$ | 5.8 | A |
| | $T_A$=70℃ | | 4.9 | |
| Pulsed Drain Current[1,2] | | $I_{DM}$ | 30 | A |
| Total Power Dissipation | $T_A$=25℃ | Pd | 1.4 | W |
| | $T_A$=70℃ | | 1 | |
| operating junction temperature | | $T_j$ | 150 | ℃ |
| Storage Temperature Range | | $T_{stg}$ | -65/150 | ℃ |

## Thermal Characteristics

| Parameter | | Symbol | TYP. | MAX. | Unit |
|---|---|---|---|---|---|
| Thermal Resistance,Junction-to-Ambient | t≤10s | RθJA | 65 | 90 | ℃/W |
| Thermal Resistance, Junction-to-Ambient | Steady-State | RθJA | 85 | 125 | ℃/W |
| Thermal Resistance,Junction-to-Lead | Steady-State | RθJL | 43 | 60 | ℃/W |

## Electrical Characteristics

MEM2310X

| Parameter | Symbol | Test Condition | Min | Type | Max | Unit |
|---|---|---|---|---|---|---|
| **Static Characteristics** | | | | | | |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS}$=0V, $I_D$=250uA | 30 | 35 | | V |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$= $V_{GS}$, $I_D$=250uA | 0.7 | 0.88 | 1.4 | V |
| Gate-Body Leakage | $I_{GSS}$ | $V_{DS}$=0V，$V_{GS}$=12V | | 0.5 | 100 | nA |
| | | $V_{DS}$=0V，$V_{GS}$=-12V | | -0.2 | -100 | nA |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$=24V $V_{GS}$=0V | | | 1000 | nA |
| Static Drain-Source On-Resistance | $R_{DS(ON)}$ | $V_{GS}$=10V, $I_D$=5.8A | | 25 | 30 | mΩ |
| | | $V_{GS}$=4.5V, $I_D$=5A | | 28 | 33 | mΩ |
| | | $V_{GS}$=2.5V, $I_D$=4A | | 37 | 50 | mΩ |
| Forward Transconductance | $g_{FS}$ | $V_{DS}$ = 5 V, $I_D$ = 5A | 10 | 15 | | S |
| Maximum Body-Diode Continuous Current | Is | | | | 2.5 | A |
| Source-drain (diode forward) voltage | $V_{SD}$ | $V_{GS}$=0V,$I_S$=1A | | 0.72 | 1.0 | V |
| **Dynamic Characteristics** | | | | | | |
| Input Capacitance | Ciss | $V_{DS}$ = 15 V, $V_{GS}$ = 0 V, f = 1 MHz | | 823 | 1030 | pF |
| Output Capacitance | Coss | | | 99 | | |
| Reverse Transfer Capacitance | Crss | | | 77 | | |
| Gate resistance | Rg | $V_{GS}$=0V, $V_{DS}$=0V, f=1MHz | | 1.2 | 3.6 | Ω |
| **Switching Characteristics** | | | | | | |
| Turn-On Delay Time | td(on) | $V_{DD}$ = 15 V, $R_L$ = 2.7Ω $V_{GEN}$ = 10V, Rg = 3 Ω | | 7 | 14 | ns |
| Rise Time | tr | | | 15 | 30 | |
| Turn-Off Delay Time | td(off) | | | 38 | 76 | |
| Fall-Time | tf | | | 3 | 6 | |
| Total Gate Charge | Qg | $V_{DS}$ = 15 V, $V_{GS}$ = 4.5 V, $I_D$ = 5.8A | | 11 | 14.3 | nc |
| Gate-Source Charge | Qgs | | | 1.6 | 2.08 | |
| Gate-Drain Charge | Qgd | | | 2.8 | 3.64 | |

1、Repetitive rating, pulse width limited by junction temperature.

2、Pulse width <300us , duty cycle <0.5%.

## Typical Performance Characteristics

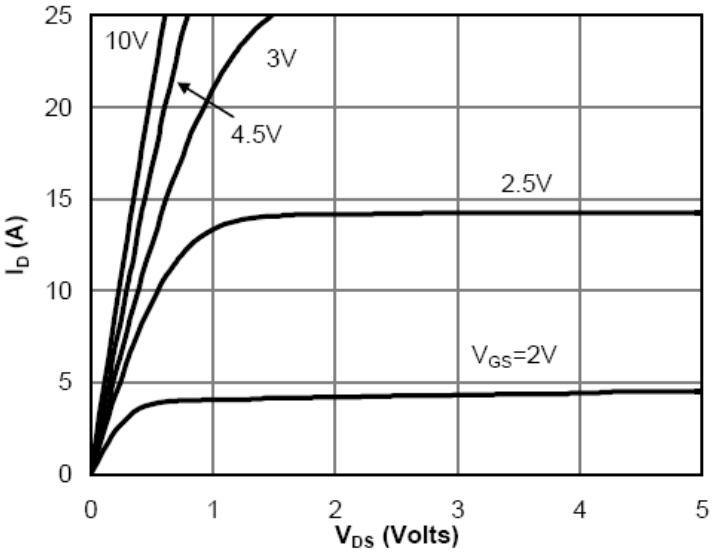



Fig 1: On-Region Characteristics

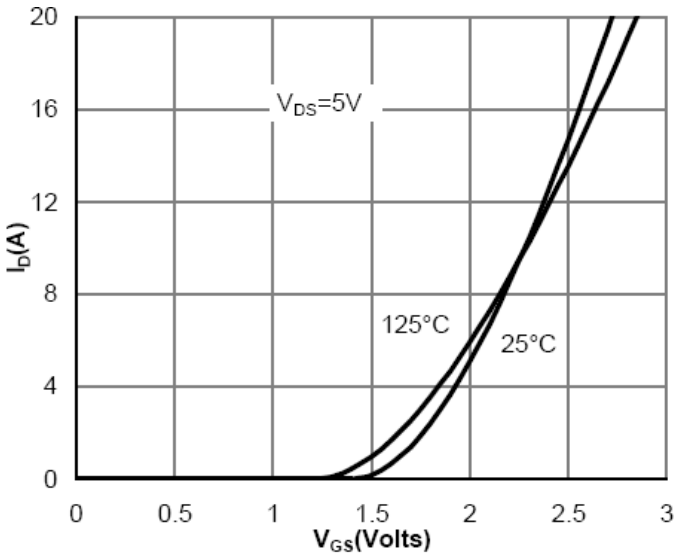



Figure 2: Transfer Characteristics

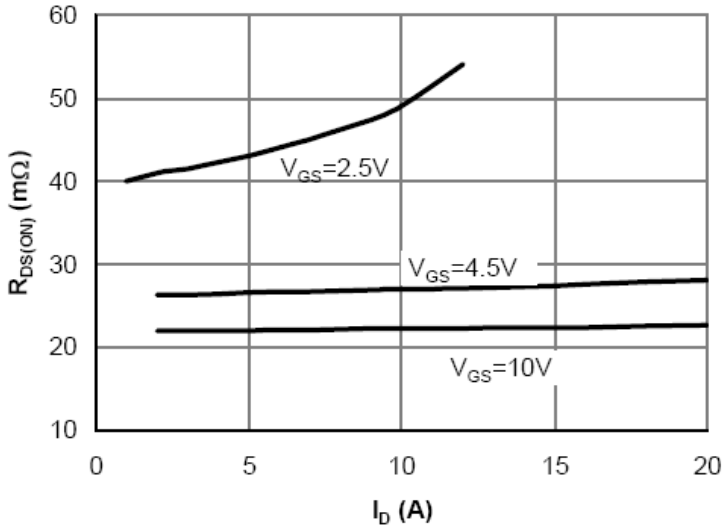



Figure 3: On-Resistance vs. Drain Current and Gate Voltage

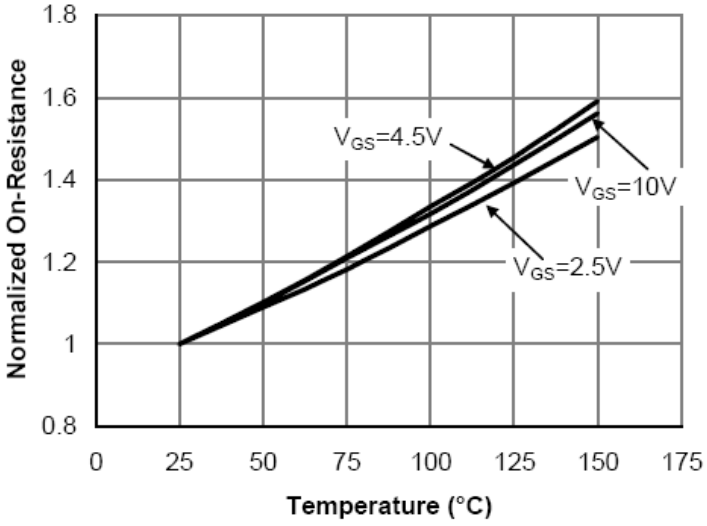



Figure 4: On-Resistance vs. Junction Temperature

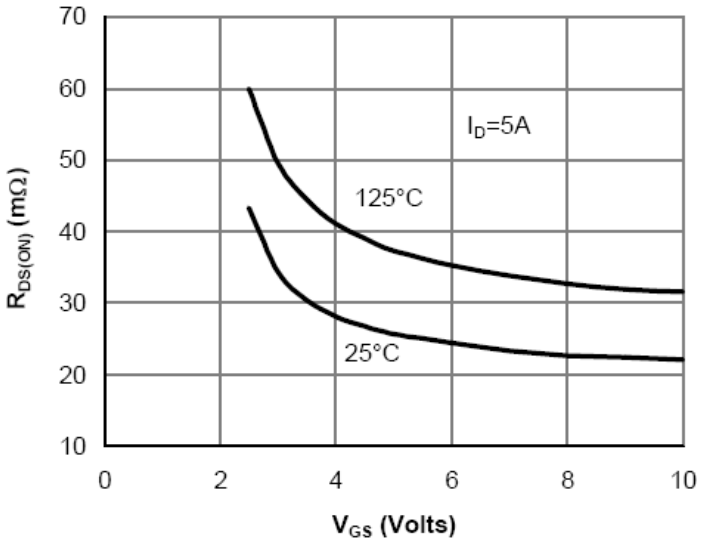



Figure 5: On-Resistance vs. Gate-Source Voltage

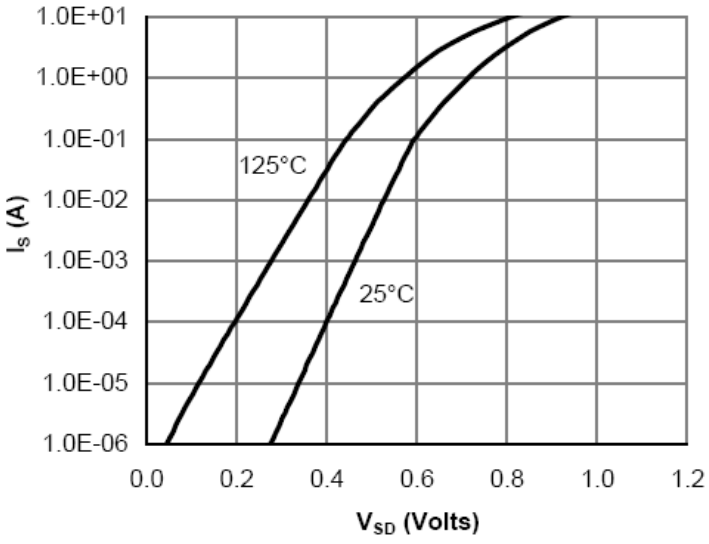



Figure 6: Body-Diode Characteristics

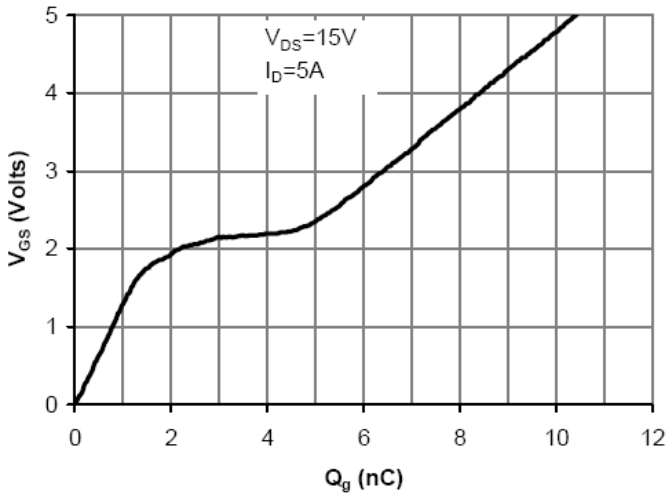



Figure 7: Gate-Charge Characteristics

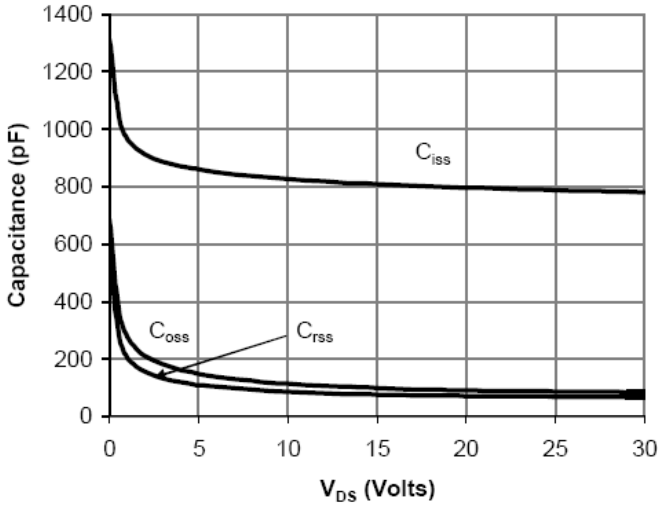



Figure 8: Capacitance Characteristics

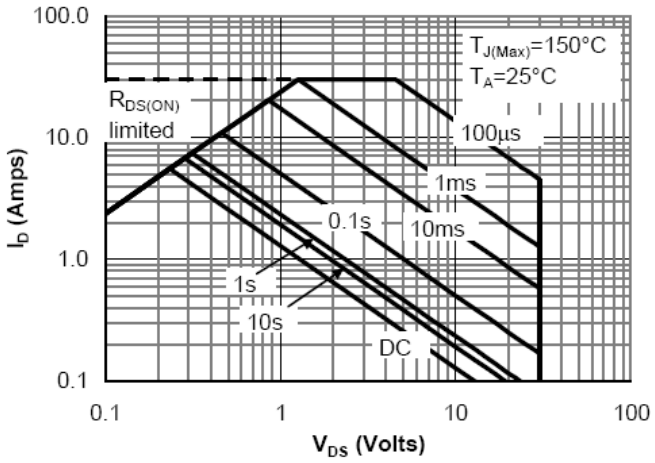



Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

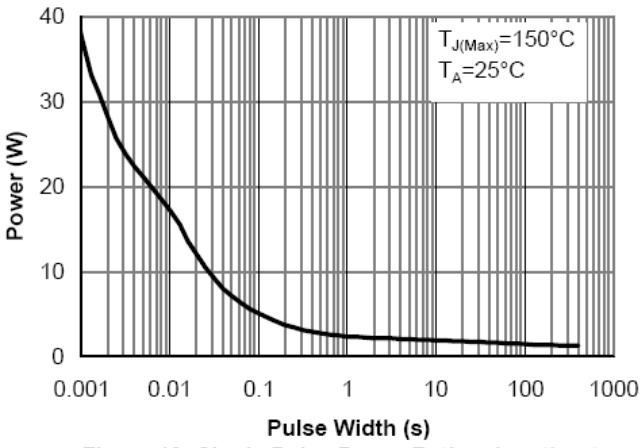



Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

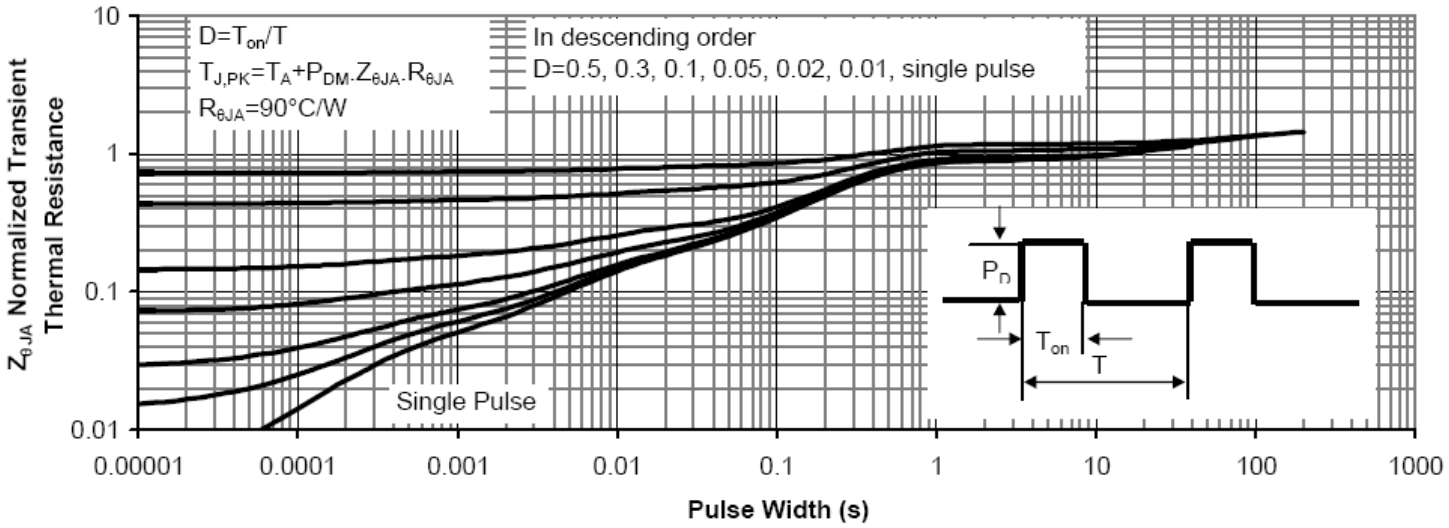
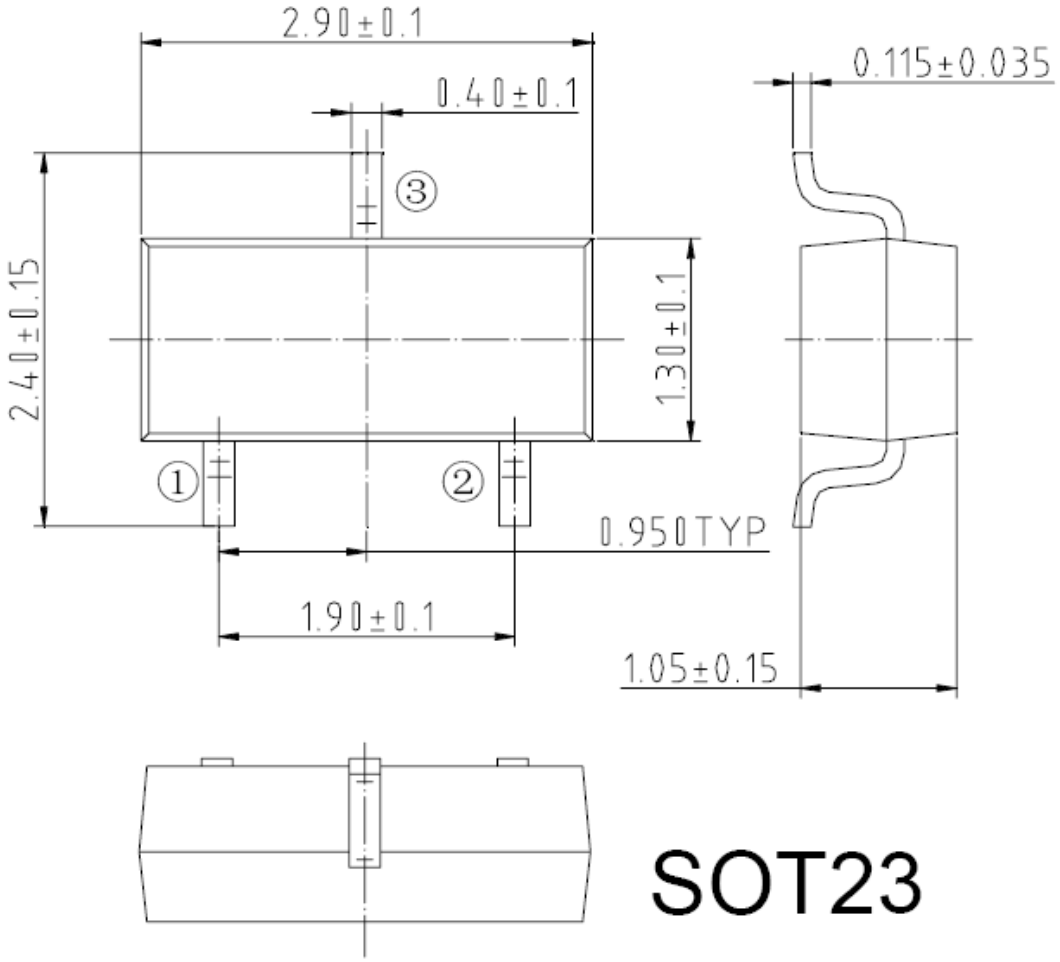



**Figure 11: Normalized Maximum Transient Thermal Impedance**

**Package Information**

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