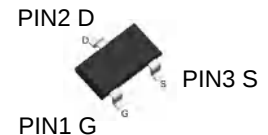
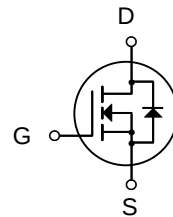




## MT2300 N-Channel Enhancement Mode MOSFET

### Description

The MT2300 uses advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a Battery protection or in other Switching application.



### General Features

$V_{DS} = 20V$   $I_D = 3.0A$

$R_{DS(ON)} < 45m\Omega @ V_{GS}=4.5V$

### Application

Battery protection  
Load switch  
Uninterruptible power supply

**SOT23**

**Marking : 2300**

### Absolute Maximum Ratings ( $T_A=25^{\circ}C$ unless otherwise noted)

| Parameter                                        | Symbol          | Limit      | Unit          |
|--------------------------------------------------|-----------------|------------|---------------|
| Drain-Source Voltage                             | $V_{DS}$        | 20         | V             |
| Gate-Source Voltage                              | $V_{GS}$        | $\pm 8$    | V             |
| Drain Current-Continuous                         | $I_D$           | 3.0        | A             |
| Drain Current-Pulsed (Note 1)                    | $I_{DM}$        | 12         | A             |
| Maximum Power Dissipation                        | $P_D$           | 0.9        | W             |
| Operating Junction and Storage Temperature Range | $T_J, T_{STG}$  | -55 To 150 | $^{\circ}C$   |
| Thermal Resistance, Junction-to-Ambient (Note 2) | $R_{\theta JA}$ | 139        | $^{\circ}C/W$ |



| Parameter                                 | Symbol       | Condition                                                     | Min | Typ  | Max       | Unit       |
|-------------------------------------------|--------------|---------------------------------------------------------------|-----|------|-----------|------------|
| Drain-Source Breakdown Voltage            | $BV_{DSS}$   | $V_{GS}=0V, I_D=250\mu A$                                     | 20  | 22   | -         | V          |
| Zero Gate Voltage Drain Current           | $I_{DSS}$    | $V_{DS}=20V, V_{GS}=0V$                                       | -   | -    | 1         | $\mu A$    |
| Gate-Body Leakage Current                 | $I_{GSS}$    | $V_{GS}=\pm 12V, V_{DS}=0V$                                   | -   | -    | $\pm 100$ | nA         |
| Gate Threshold Voltage                    | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=250\mu A$                                 | 0.5 | 0.75 | 1.2       | V          |
| Drain-Source On-State Resistance          | $R_{DS(ON)}$ | $V_{GS}=2.5V, I_D=2.8A$                                       | -   | 55   | 75        | m $\Omega$ |
|                                           |              | $V_{GS}=4.5V, I_D=3A$                                         | -   | 45   | 60        | m $\Omega$ |
| Forward Transconductance                  | $g_{FS}$     | $V_{DS}=5V, I_D=3A$                                           | -   | 8    | -         | S          |
| Input Capacitance                         | $C_{iss}$    | $V_{DS}=10V, V_{GS}=0V,$<br>$F=1.0MHz$                        | -   | 260  | -         | PF         |
| Output Capacitance                        | $C_{oss}$    |                                                               | -   | 48   | -         | PF         |
| Reverse Transfer Capacitance              | $C_{rss}$    |                                                               | -   | 27   | -         | PF         |
| Turn-on Delay Time                        | $t_{d(on)}$  | $V_{DD}=10V, R_L=3.3\Omega$<br>$V_{GS}=4.5V, R_{GEN}=6\Omega$ | -   | 2.5  | -         | nS         |
| Turn-on Rise Time                         | $t_r$        |                                                               | -   | 3.2  | -         | nS         |
| Turn-Off Delay Time                       | $t_{d(off)}$ |                                                               | -   | 21   | -         | nS         |
| Turn-Off Fall Time                        | $t_f$        |                                                               | -   | 3    | -         | nS         |
| Total Gate Charge                         | $Q_g$        | $V_{DS}=10V, I_D=3A,$<br>$V_{GS}=4.5V$                        | -   | 2.9  | 5         | nC         |
| Gate-Source Charge                        | $Q_{gs}$     |                                                               | -   | 0.4  | -         | nC         |
| Gate-Drain Charge                         | $Q_{gd}$     |                                                               | -   | 0.6  | -         | nC         |
| Diode Forward Voltage <sup>(Note 3)</sup> | $V_{SD}$     | $V_{GS}=0V, I_S=3.3A$                                         | -   | 0.75 | 1.2       | V          |
| Diode Forward Current <sup>(Note 2)</sup> | $I_S$        |                                                               | -   | -    | 3.3       | A          |

## Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board,  $t \leq 10$  sec.
3. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .
4. Guaranteed by design, not subject to production



## Typical Electrical and Thermal Characteristics

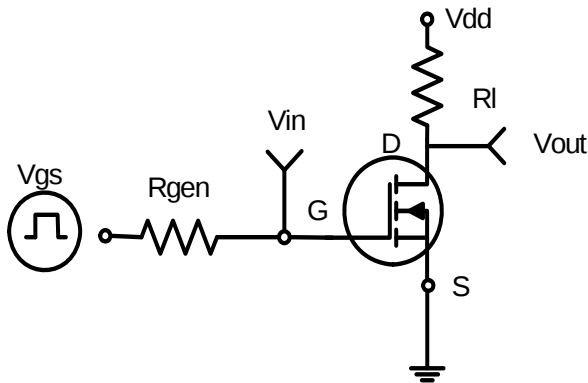


Figure 1: Switching Test Circuit

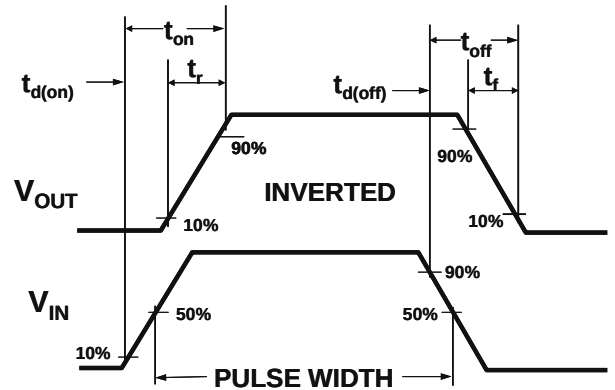


Figure 2: Switching Waveforms

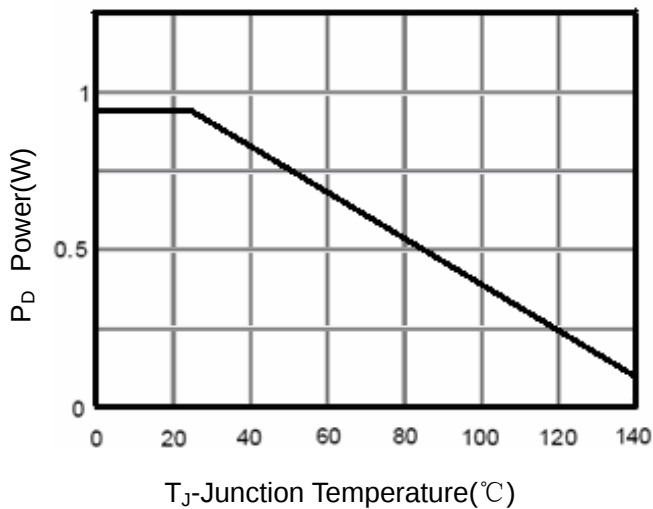


Figure 3 Power Dissipation

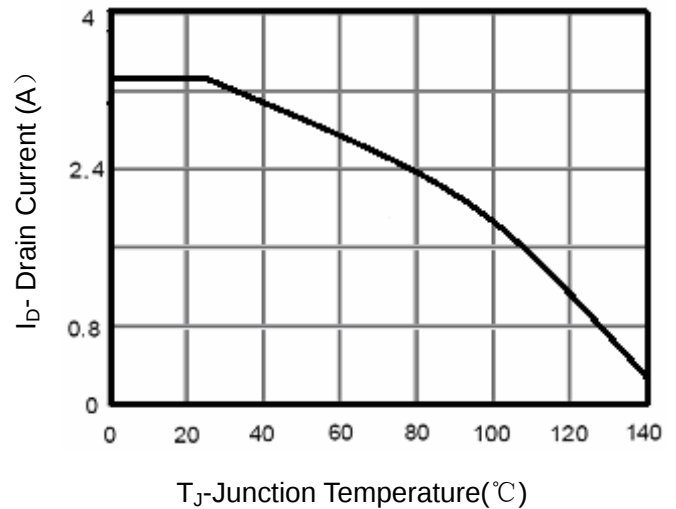


Figure 4 Drain Current

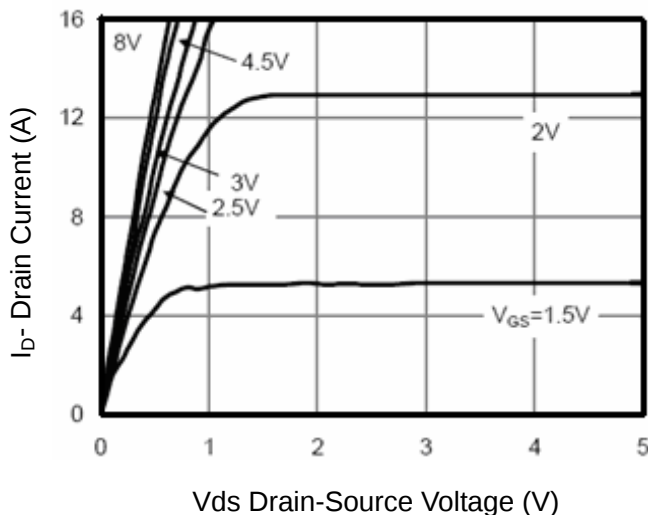


Figure 5 Output Characteristics

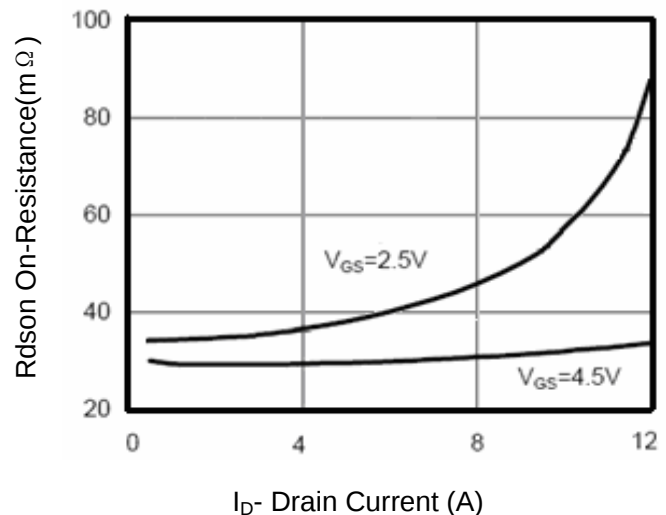


Figure 6 Drain-Source On-Resistance

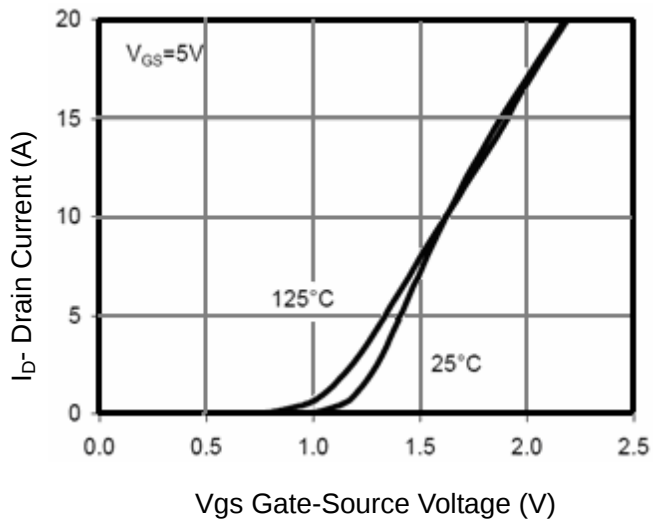


Figure 7 Transfer Characteristics

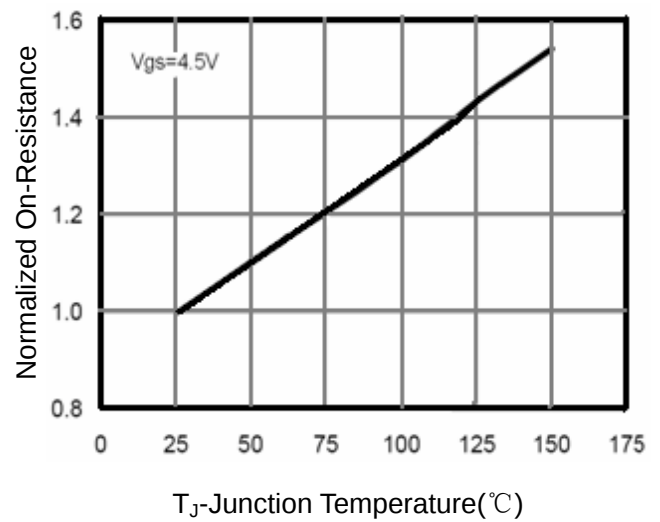


Figure 8 Drain-Source On-Resistance

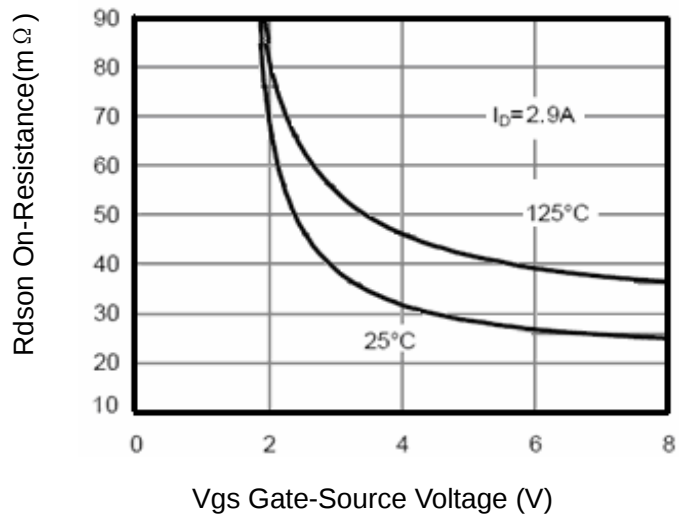


Figure 9 Rdson vs Vgs

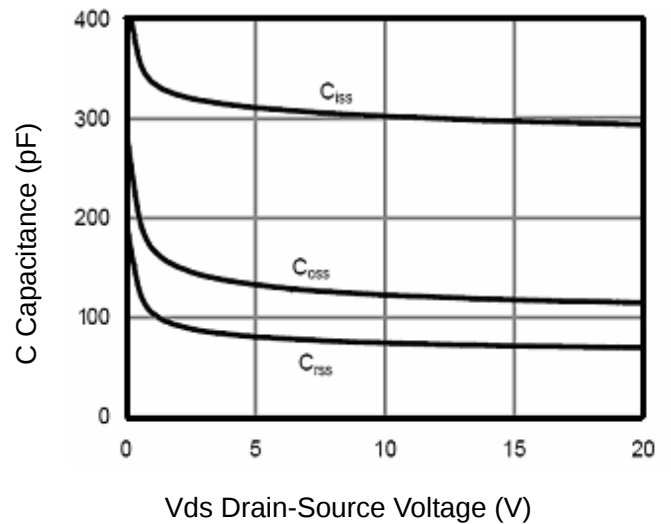


Figure 10 Capacitance vs Vds

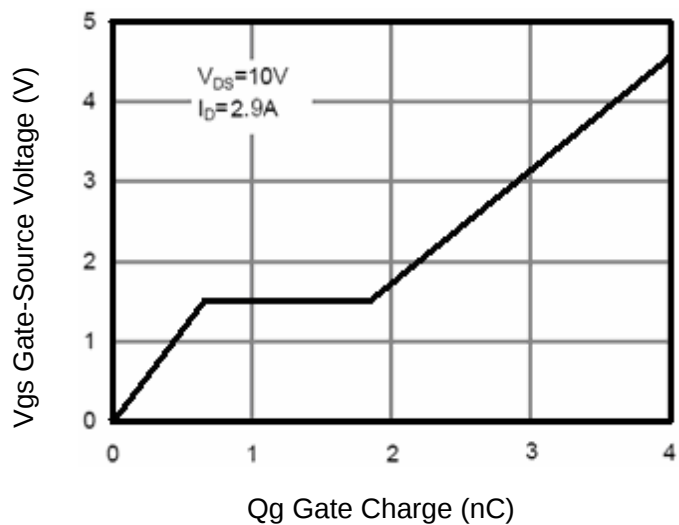


Figure 11 Gate Charge

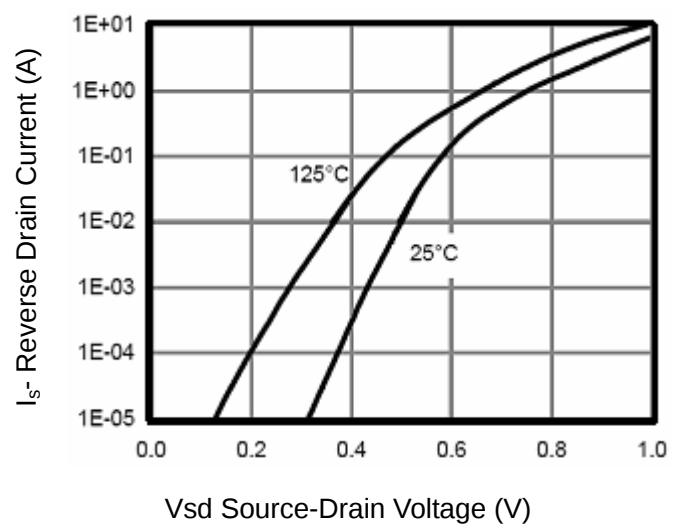


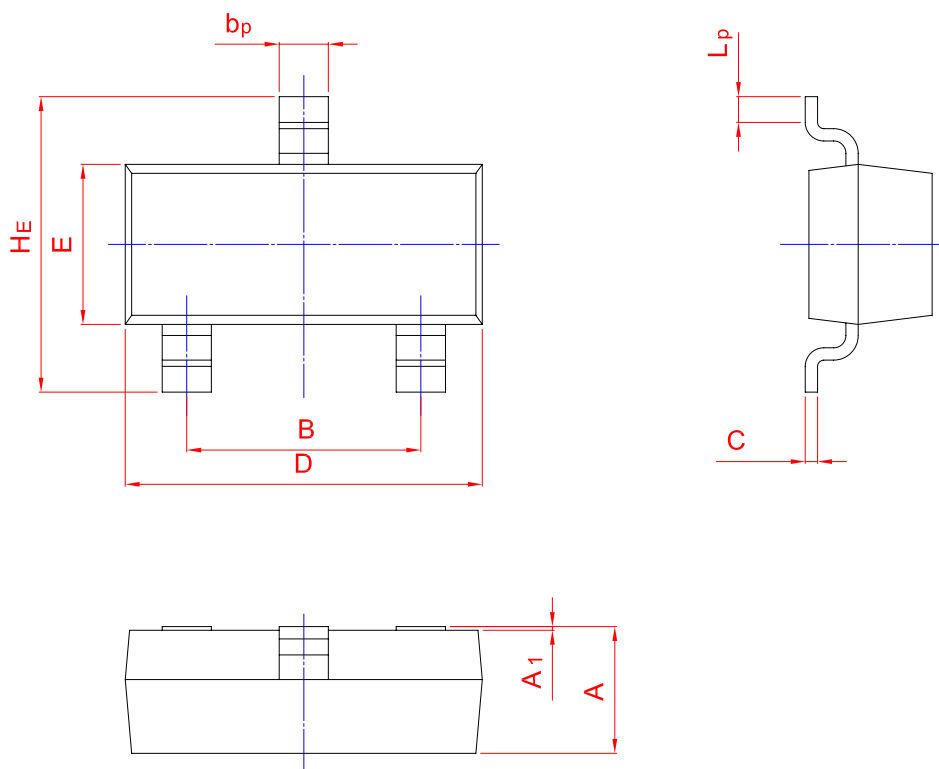
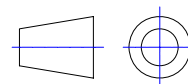
Figure 12 Source- Drain Diode Forward



## PACKAGE OUTLINE

Plastic surface mounted package; 3 leads

SOT-23



| UNIT | A            | B            | b <sub>p</sub> | C            | D            | E            | H <sub>E</sub> | A <sub>1</sub> | L <sub>p</sub> |
|------|--------------|--------------|----------------|--------------|--------------|--------------|----------------|----------------|----------------|
| mm   | 1.40<br>0.95 | 2.04<br>1.78 | 0.50<br>0.35   | 0.19<br>0.08 | 3.10<br>2.70 | 1.65<br>1.20 | 3.00<br>2.20   | 0.100<br>0.013 | 0.50<br>0.20   |