



## MT2304 Plastic-Encapsulate MOSFETS

N-Channel 30-V(D-S) MOSFET

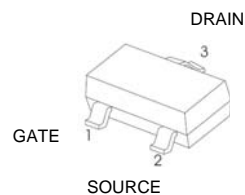
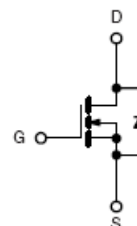
### FEATURE

TrenchFET Power MOSFET

### APPLICATIONS

- Load Switch for Portable Devices
- DC/DC Converter

**MARKING: 2304**



**SOT-23**

Maximum ratings ( $T_a=25^{\circ}\text{C}$  unless otherwise noted)

| Parameter   | Symbol          | Value      | Unit                        |
|---|-----------------|------------|-----------------------------|
| Drain-Source Voltage  | $V_{DS}$        | 30         | V                           |
| Gate-Source Voltage   | $V_{GS}$        | $\pm 20$   |                             |
| Continuous Drain Current                                    | $I_D$           | 3.3        | A                           |
| Pulsed Drain Current  | $I_{DM}$        | 15         |                             |
| Continuous Source-Drain Diode Current                       | $I_S$           | 0.9        |                             |
| Maximum Power Dissipation                                   | $P_D$           | 0.35       | W                           |
| Thermal Resistance from Junction to Ambient ( $t \leq 5s$ ) | $R_{\theta JA}$ | 357        | $^{\circ}\text{C}/\text{W}$ |
| Storage Temperature   | $T_J$           | 150        | $^{\circ}\text{C}$          |
| Junction Temperature  | $T_{STG}$       | -55 ~ +150 |                             |



### Electrical characteristics (T<sub>a</sub>=25°C unless otherwise noted)

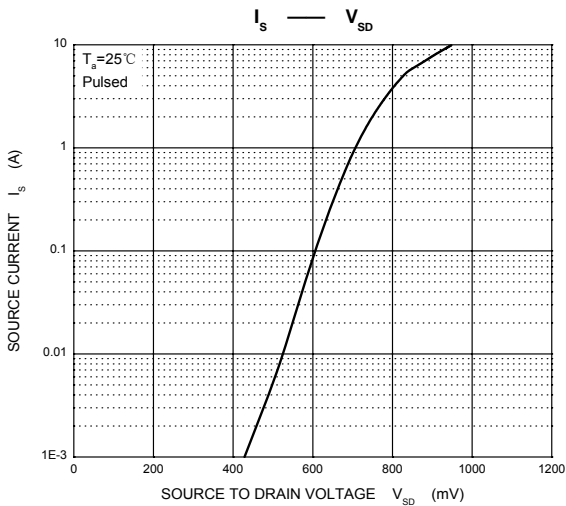
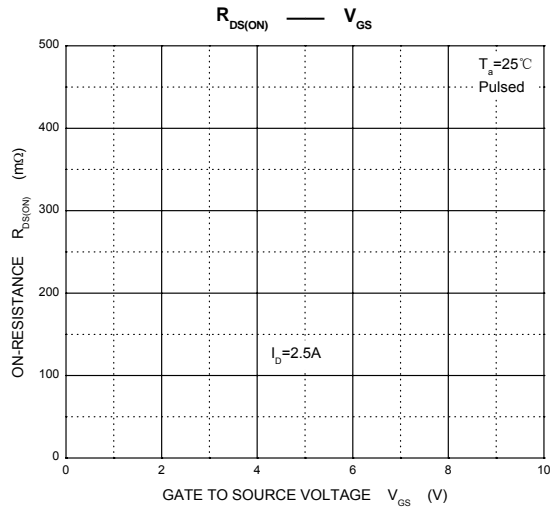
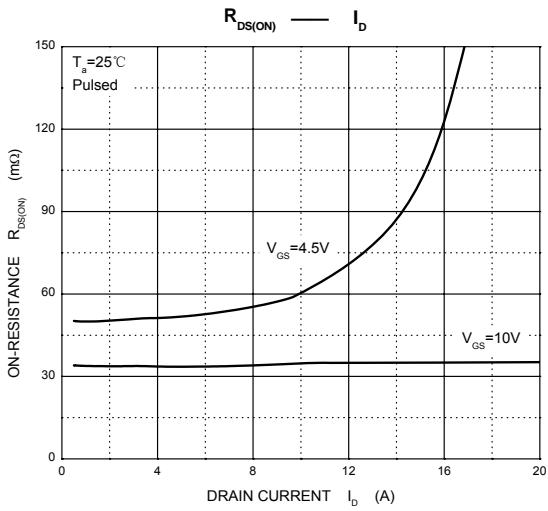
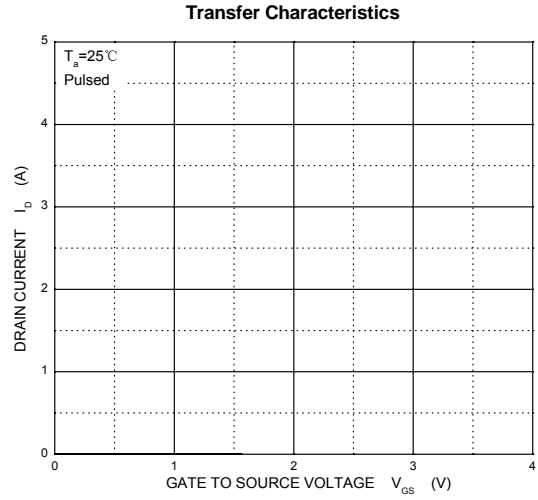
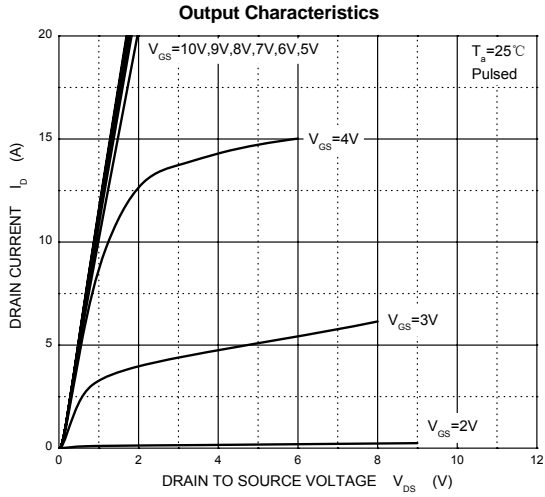
| Parameter                                      | Symbol               | Test condition  | Min | Typ   | Max   | Units |
|--|----------------------|---|-----|-------|-------|-------|
| <b>Static</b>                                  |                      |   |     |       |       |       |
| Drain-source breakdown voltage                 | V <sub>(BR)DSS</sub> | V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA  | 30  |       |       | V     |
| Gate-source threshold voltage                  | V <sub>GS(th)</sub>  | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA  | 1.2 |       | 2.2   |       |
| Gate-body leakage                              | I <sub>GSS</sub>     | V <sub>DS</sub> = 0V, V <sub>GS</sub> = ±20V  |     |       | ±100  | nA    |
| Zero gate voltage drain current                | I <sub>DSS</sub>     | V <sub>DS</sub> = 30V, V <sub>GS</sub> = 0V   |     |       | 1     | μA    |
| Drain-source on-state resistance <sup>a</sup>  | R <sub>DS(on)</sub>  | V <sub>GS</sub> = 10V, I <sub>D</sub> = 3.2A  |     | 0.049 | 0.060 | Ω     |
|  |                      | V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 2.8A   |     | 0.061 | 0.075 |       |
| Forward transconductance <sup>a</sup>          | g <sub>fs</sub>      | V <sub>DS</sub> = 4.5V, I <sub>D</sub> = 2.5A   | 2.5 |       |       | S     |
| <b>Dynamic<sup>b</sup></b>                     |                      |   |     |       |       |       |
| Total gate charge                              | Q <sub>g</sub>       | V <sub>DS</sub> = 15V, V <sub>GS</sub> = 10V, I <sub>D</sub> = 3.4A   |     | 4.5   | 6.7   | nC    |
|  |                      |   |     | 2.1   | 3.2   |       |
|  |                      |   |     | 0.85  |       |       |
| Gate-source charge                             | Q <sub>gs</sub>      | V <sub>DS</sub> = 15V, V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 3.4A  |     | 0.65  |       |       |
| Gate-drain charge                              | Q <sub>gd</sub>      |   |     | 0.85  |       |       |
| Gate resistance                                | R <sub>g</sub>       | f = 1.0MHz  | 0.8 | 4.4   | 8.8   | Ω     |
| Input capacitance                              | C <sub>iss</sub>     | V <sub>DS</sub> = 15V, V <sub>GS</sub> = 0V, f = 1MHz   |     | 235   |       | pF    |
| Output capacitance                             | C <sub>oss</sub>     |   |     | 45    |       |       |
| Reverse transfer capacitance                   | C <sub>rss</sub>     |   |     | 17    |       |       |
| Turn-on delay Time                             | t <sub>d(on)</sub>   | V <sub>DD</sub> = 15V,<br>R <sub>L</sub> = 5.6Ω, I <sub>D</sub> ≈ 2.7A,<br>V <sub>GEN</sub> = 4.5V, R <sub>g</sub> = 1Ω |     | 12    | 20    | ns    |
| Rise time                                      | t <sub>r</sub>       |   |     | 50    | 75    |       |
| Turn-off delay time                            | t <sub>d(off)</sub>  |   |     | 12    | 20    |       |
| Fall time                                      | t <sub>f</sub>       |   |     | 22    | 35    |       |
| Turn-on delay time                             | t <sub>d(on)</sub>   | V <sub>DD</sub> = 15V,<br>R <sub>L</sub> = 5.6Ω, I <sub>D</sub> ≈ 2.7A,<br>V <sub>GEN</sub> = 10V, R <sub>g</sub> = 1Ω  |     | 5     | 10    | ns    |
| Rise time                                      | t <sub>r</sub>       |   |     | 12    | 20    |       |
| Turn-off delay time                            | t <sub>d(off)</sub>  |   |     | 10    | 15    |       |
| Fall time                                      | t <sub>f</sub>       |   |     | 5     | 10    |       |
| <b>Drain-source body diode characteristics</b> |                      |   |     |       |       |       |
| Continuous source-drain diode current          | I <sub>S</sub>       | T <sub>C</sub> = 25°C   |     |       | 1.4   | A     |
| Pulse diode forward current                    | I <sub>SM</sub>      |   |     |       | 15    | A     |
| Body diode voltage                             | V <sub>SD</sub>      | I <sub>S</sub> = -2.7A, V <sub>GS</sub> = 0V  |     | 0.8   | 1.2   | V     |

#### Notes :

- a. Pulse Test : Pulse width ≤ 300μs, duty cycle ≤ 2%.
- b. Guaranteed by design, not subject to production testing.



## Typical Characteristics

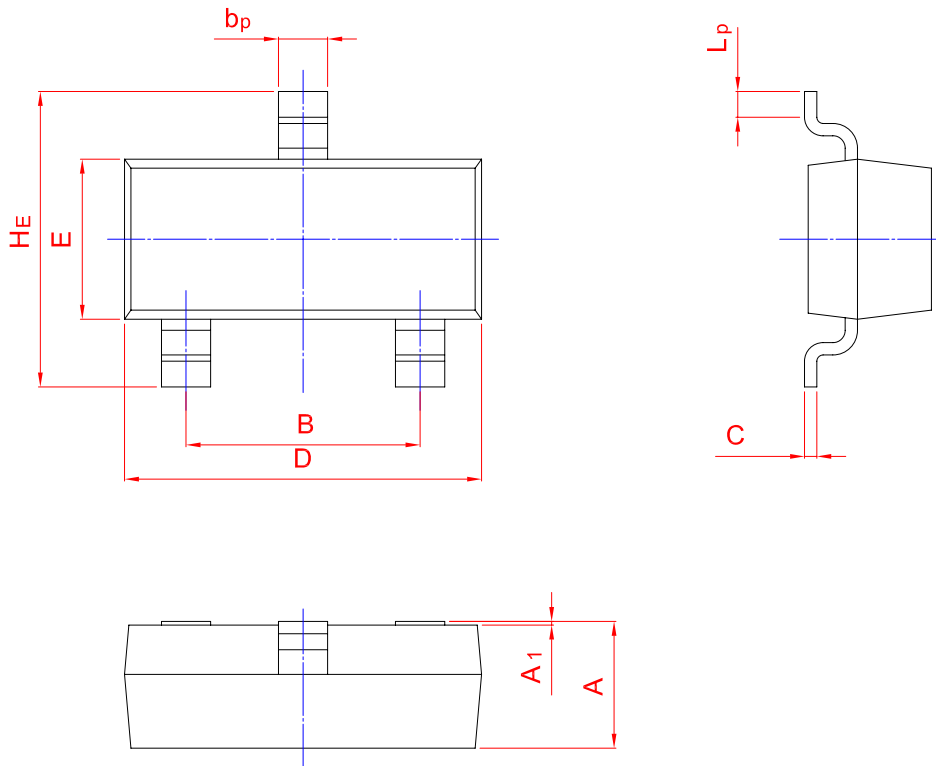
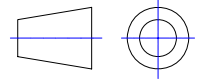




## PACKAGE OUTLINE

Plastic surface mounted package; 3 leads

SOT-23



| UNIT | A    | B    | bp   | C    | D    | E    | HE   | A1    | Lp   |
|------|------|------|------|------|------|------|------|-------|------|
| mm   | 1.40 | 2.04 | 0.50 | 0.19 | 3.10 | 1.65 | 3.00 | 0.100 | 0.50 |
|      | 0.95 | 1.78 | 0.35 | 0.08 | 2.70 | 1.20 | 2.20 | 0.013 | 0.20 |