



**SOT-23 Plastic-Encapsulate MOSFETS**

**MK2301S**

**P-Channel 20-V(D-S) MOSFET**

| V(BR)DSS | RDS(on)MAX  | ID    |
|----------|-------------|-------|
| -20 V    | 230mΩ@-4.5V | -2.3A |
|          | 290mΩ@-2.5V |       |

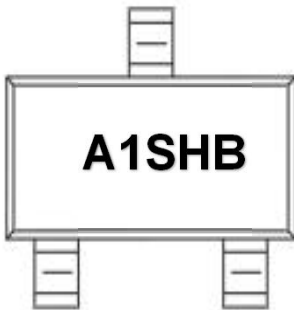
**FEATURE**

※ TrenchFET Power MOSFET

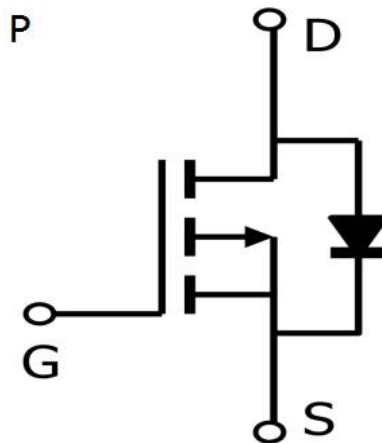
**APPLICATION**

- ※ Load Switch for Portable Devices
- ※ DC/DC Converter

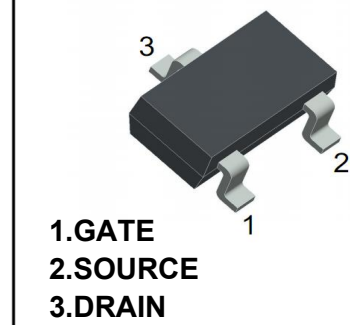
**MARKING**



**Equivalent Circuit**



**SOT-23**



**Maximum ratings ( Ta=25°C unless otherwise noted)**

| Parameter  | Symbol | Value    | Unit |
|--|--------|----------|------|
| Drain-Source Voltage                               | VDS    | -20      | V    |
| Gate-Source Voltage                                | VGS    | ±8       |      |
| Continuous Drain Current                           | ID     | -2.3     | A    |
| Pulsed Diode Current                               | IDM    | -10      |      |
| Continuous Source-Drain Current(Diode Conduction)  | IS     | -1.3     |      |
| Power Dissipation                                  | PD     | 0.35     | W    |
| Thermal Resistance from Junction to Ambient (t≤5s) | RθJA   | 357      | °C/W |
| Operating Junction                                 | TJ     | 150      | °C   |
| Storage Temperature                                | TSTG   | -55~+150 | °C   |



**MOSFET ELECTRICAL CHARACTERISTICS**

**Static Electrical Characteristics (Ta = 25 °C Unless Otherwise Noted)**

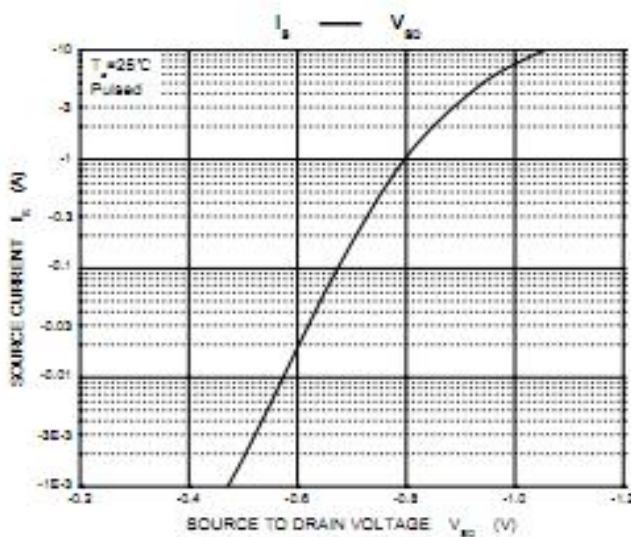
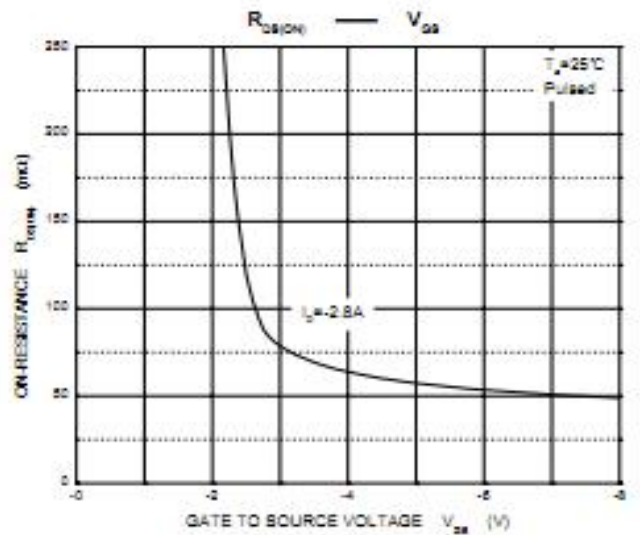
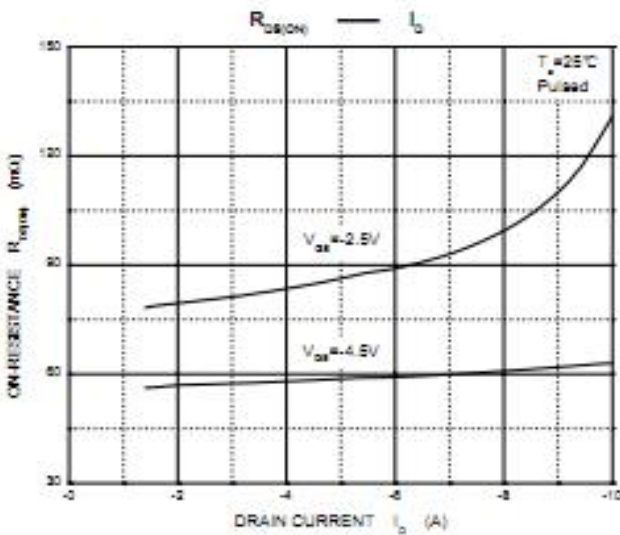
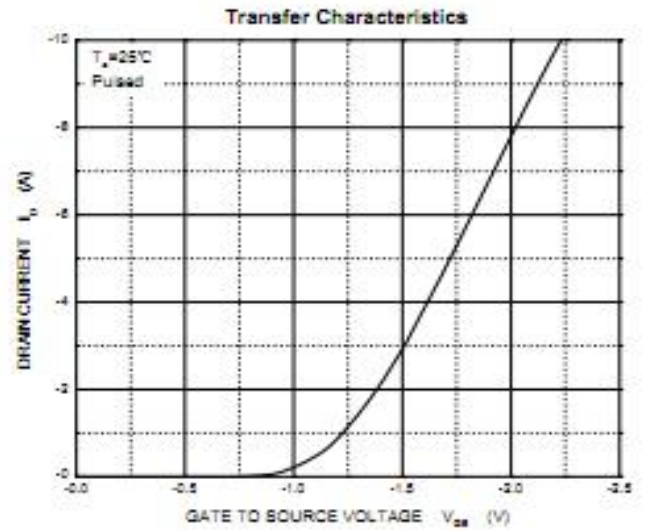
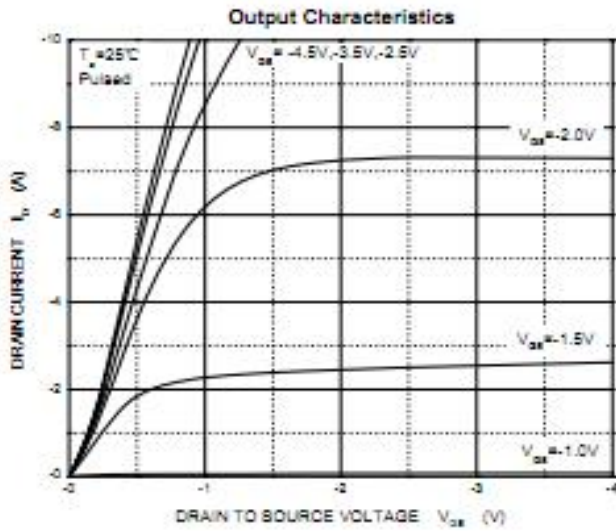
| Parameter                                      | Symbol   | Test Condition  | Min  | Typ  | Max  | Unit |
|--|----------|---|------|------|------|------|
| <b>Static</b>                                  |          |   |      |      |      |      |
| Drain-source breakdown voltage                 | V(BR)DSS | VGS = 0V, ID = -250μA                                     | -20  |      |      | V    |
| Gate-source threshold voltage                  | VGS(th)  | VDS = VGS, ID = -250μA                                    | -0.4 |      | -1   | V    |
| Gate-source leakage                            | IGSS     | VDS = 0V, VGS = ±8V                                       |      |      | ±100 | nA   |
| Zero gate voltage drain current                | IDSS     | VDS = -18V, VGS = 0V                                      |      |      | -1   | μA   |
| Drain-source on-state resistancea              | RDS(on)  | VGS = -4.5V, ID = -2.3A                                   |      | 150  | 230  | mΩ   |
|  |          | VGS = -2.5V, ID = -1A                                     |      | 185  | 290  | mΩ   |
| Forward transconductancea                      | gfs      | VDS = -4.5V, ID = -2.3A                                   |      | 4    |      | S    |
| Diode forward voltage                          | VSD      | IS = -0.8A, VGS = 0V                                      |      | -0.8 | -1.3 | V    |
| <b>Dynamic</b>                                 |          |   |      |      |      |      |
| Input capacitance                              | Ciss     | VDS = -10V, VGS = 0V,<br>f = 1MHz                         |      | 405  |      | pF   |
| Output capacitance                             | Coss     |   |      | 75   |      | pF   |
| Reverse transfer capacitanceb                  | Crss     |   |      | 55   |      | pF   |
| Total gate charge                              | Qg       | VDS = -10V, VGS = -4.5V,<br>ID = -2.3A                    |      | 5.5  | 10   | nC   |
|  |          | VDS = -10V, VGS = -2.5V,<br>ID = -2.3A                    |      | 3.3  | 6    | nC   |
| Gate-source charge                             | Qgs      | VDS = -10V, VGS = -2.5V,<br>ID = -2.3A                    |      | 0.7  |      | nC   |
| Gate-drain charge                              | Qgd      |   |      | 1.3  |      | nC   |
| Gate resistance                                | Rg       | f = 1MHz  |      | 6.0  |      | Ω    |
| <b>Switchingb</b>                              |          |   |      |      |      |      |
| Turn-on delay time                             | td(on)   | VDD = -10V<br>RL = 3Ω, ID ≈ -1A,<br>VGEN = -4.5V, Rg = 1Ω |      | 11   | 20   | ns   |
| Rise time                                      | tr       |   |      | 35   | 60   | ns   |
| Turn-off delay time                            | td(off)  |   |      | 30   | 50   | ns   |
| Fall time                                      | tf       |   |      | 10   | 20   | ns   |
| <b>Drain-source body diode characteristics</b> |          |   |      |      |      |      |
| Continuous Source-Drain Diode Current          | IS       | Tc = 25°C   |      |      | -1.3 | A    |
| Pulsed Diode forward Current                   | ISM      |   |      |      | -10  | A    |

**Note :**

1. Repetitive Rating : Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t < 5 sec.
3. Pulse Test : Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production testing.

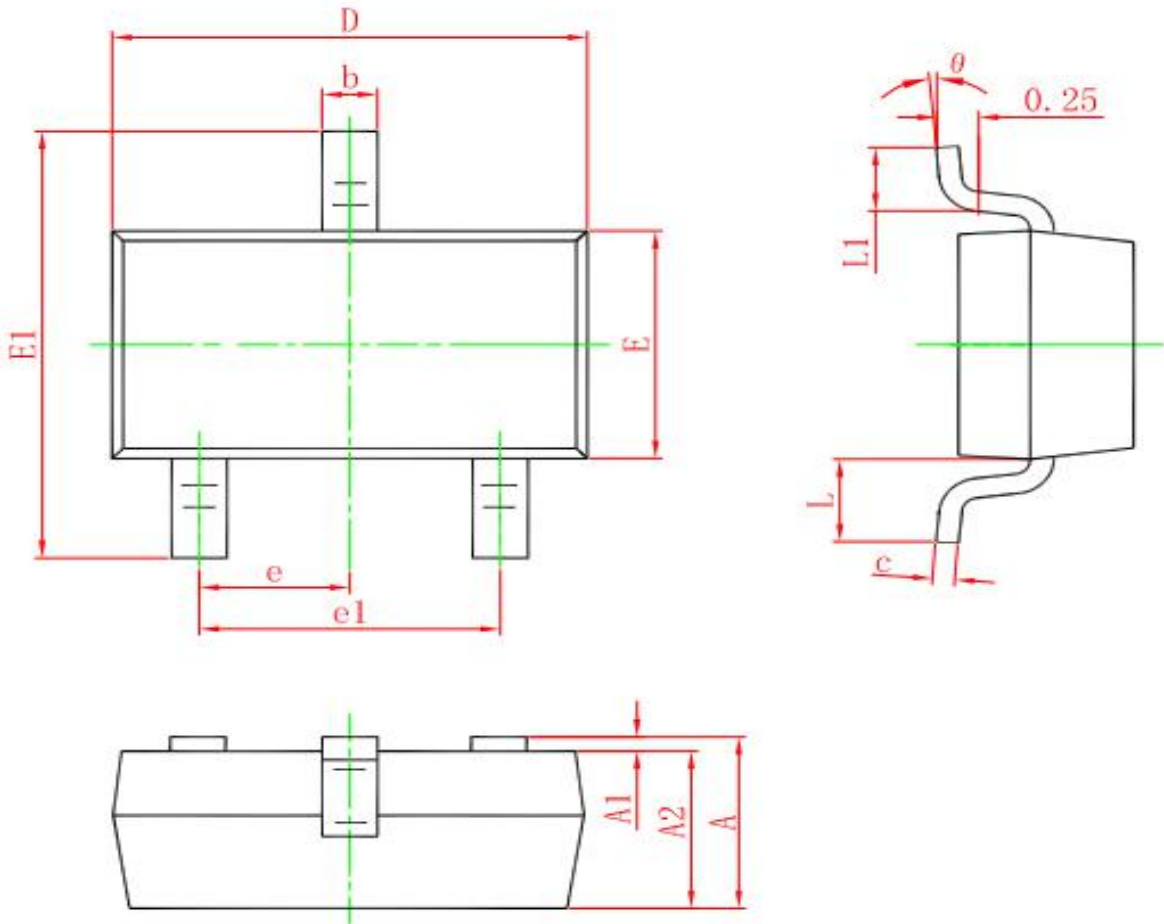


TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS





SOT-23 PACKAGE OUTLINE DIMENSIONS



| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min.                      | Max.  | Min.                 | Max.  |
| A      | 0.900                     | 1.150 | 0.035                | 0.045 |
| A1     | 0.000                     | 0.100 | 0.000                | 0.004 |
| A2     | 0.900                     | 1.050 | 0.035                | 0.041 |
| 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      | 0.950 TYP.                |       | 0.037 TYP.           |       |
| e1     | 1.800                     | 2.000 | 0.071                | 0.079 |
| L      | 0.550 REF.                |       | 0.022 REF.           |       |
| L1     | 0.300                     | 0.500 | 0.012                | 0.020 |
| theta  | 0°                        | 8°    | 0°                   | 8°    |