

## Plastic-Encapsulate MOSFETS

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

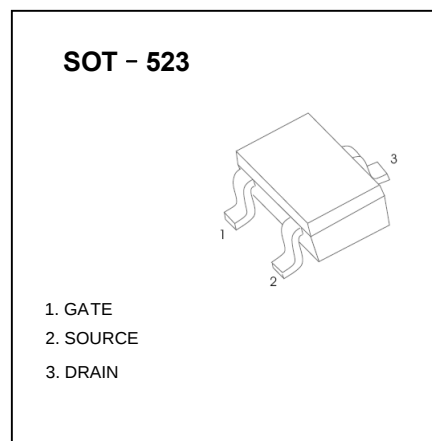
### FEATURE

TrenchFET Power MOSFET

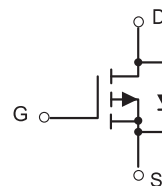
### APPLICATIONS

- Load Switch for Portable Devices
- DC/DC Converter

MARKING: 2301



### Equivalent Circuit



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

| Parameter                                                  | Symbol          | Value     | Unit               |
|------------------------------------------------------------|-----------------|-----------|--------------------|
| Drain-Source Voltage                                       | $V_{DS}$        | -20       | V                  |
| Gate-Source Voltage                                        | $V_{GS}$        | $\pm 8$   |                    |
| Continuous Drain Current                                   | $I_D$           | -2.8      | A                  |
| Pulsed Drain Current                                       | $I_{DM}$        | -4.8      |                    |
| Continuous Source-Drain Diode Current                      | $I_S$           | -0.72     |                    |
| Maximum Power Dissipation                                  | $P_D$           | 0.35      | W                  |
| Thermal Resistance from Junction to Ambient( $t \leq 5s$ ) | $R_{\theta JA}$ | 357       | $^\circ\text{C/W}$ |
| Junction Temperature                                       | $T_J$           | 150       | $^\circ\text{C}$   |
| Storage Temperature                                        | $T_{stg}$       | -55 ~+150 |                    |

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

| Parameter                                     | Symbol               | Test Condition                                                                                                    | Min  | Typ   | Max   | Units |
|-----------------------------------------------|----------------------|-------------------------------------------------------------------------------------------------------------------|------|-------|-------|-------|
| Static                                        |                      |                                                                                                                   |      |       |       |       |
| Drain-source breakdown voltage                | V <sub>(BR)DSS</sub> | V <sub>GS</sub> = 0V, I <sub>D</sub> = -250μA                                                                     | -20  |       |       | V     |
| Gate-source threshold voltage                 | V <sub>GS(th)</sub>  | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250μA                                                         | -0.4 |       | -1    |       |
| Gate-source leakage                           | I <sub>GSS</sub>     | V <sub>DS</sub> =0V, V <sub>GS</sub> =±8V                                                                         |      |       | ±100  | nA    |
| Zero gate voltage drain current               | I <sub>DSS</sub>     | V <sub>DS</sub> =-20V, V <sub>GS</sub> =0V                                                                        |      |       | -1    | μA    |
| Drain-source on-state resistance <sup>a</sup> | R <sub>DS(on)</sub>  | V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-2.8A                                                                     |      | 0.090 | 0.120 | Ω     |
|                                               |                      | V <sub>GS</sub> =-2.5V, I <sub>D</sub> =-2.0A                                                                     |      | 0.110 | 0.170 |       |
| Forward transconductance <sup>a</sup>         | g <sub>fs</sub>      | V <sub>DS</sub> =-5V, I <sub>D</sub> =-1.8A                                                                       |      | 6.5   |       | S     |
| Dynamic <sup>b</sup>                          |                      |                                                                                                                   |      |       |       |       |
| Input capacitance                             | C <sub>iss</sub>     | V <sub>DS</sub> =-10V,V <sub>GS</sub> =0V,f =1MHz                                                                 |      | 405   |       | pF    |
| Output capacitance                            | C <sub>oss</sub>     |                                                                                                                   |      | 75    |       |       |
| Reverse transfer capacitance                  | C <sub>rss</sub>     |                                                                                                                   |      | 55    |       |       |
| Total gate charge                             | Q <sub>g</sub>       | V <sub>DS</sub> =-10V,V <sub>GS</sub> =-4.5V,I <sub>D</sub> =-3A                                                  |      | 5.5   | 10    | nC    |
|                                               |                      | V <sub>DS</sub> =-10V,V <sub>GS</sub> =-2.5V,I <sub>D</sub> =-3A                                                  |      | 3.3   | 6     |       |
| Gate-source charge                            | Q <sub>gs</sub>      |                                                                                                                   |      | 0.7   |       |       |
| Gate-drain charge                             | Q <sub>gd</sub>      |                                                                                                                   |      | 1.3   |       |       |
| Gate resistance                               | R <sub>g</sub>       | f =1MHz                                                                                                           |      | 6.0   |       | Ω     |
| Turn-on delay time                            | t <sub>d(on)</sub>   | V <sub>DD</sub> =-10V,<br>R <sub>L</sub> =10Ω, I <sub>D</sub> =-1A,<br>V <sub>GEN</sub> =-4.5V,R <sub>g</sub> =1Ω |      | 11    | 20    | ns    |
| Rise time                                     | t <sub>r</sub>       |                                                                                                                   |      | 35    | 60    |       |
| Turn-off delay time                           | t <sub>d(off)</sub>  |                                                                                                                   |      | 30    | 50    |       |
| Fall time                                     | t <sub>f</sub>       |                                                                                                                   |      | 10    | 20    |       |
| Drain-source body diode characteristics       |                      |                                                                                                                   |      |       |       |       |
| Continuous source-drain diode current         | I <sub>S</sub>       | T <sub>C</sub> =25°C                                                                                              |      |       | -1.3  | A     |
| Pulse diode forward current <sup>a</sup>      | I <sub>SM</sub>      |                                                                                                                   |      |       | -10   |       |
| Body diode voltage                            | V <sub>SD</sub>      | I <sub>S</sub> =-0.7A                                                                                             |      | -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

