



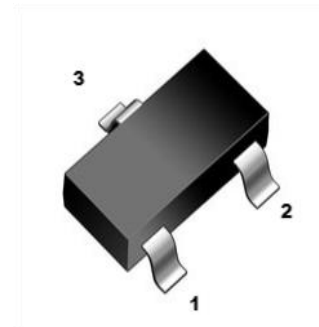
### 1. Features

- Trench Technology Power MOSFET
- Low RDS(ON)
- Low Gate Charge

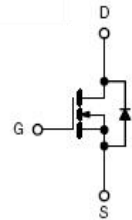
### 2. Mechanical Data

- Case:Molded Plastic,SOT-23 .
- Epoxy:UL 94V-0 rate flame retardant
- Terminals:Plated Leads Solderable perMIL-STD-750,Method-2026.
- Marking: S0
- Mounting Position : Any.

SOT-23



1 Gate  
2 Source  
3 Drain



### 3. Maximum Ratings and Electrical Characteristics

Rating at 25°C ambient temperature unless otherwise specified.

| Parameter                                                | Symbol          | Value     | UNIT |
|----------------------------------------------------------|-----------------|-----------|------|
| Drain-Source Voltage                                     | $V_{DS}$        | 20        | V    |
| Gate-Source Voltage                                      | $V_{GS}$        | ±12       | V    |
| Continuous Drain Current <sup>1,5</sup>                  | $I_D$           | 4.5       | A    |
| Drain Current-Pulsed <sup>2</sup>                        | $I_{DM}$        | 18        | A    |
| Power Dissipation <sup>4,5</sup>                         | $P_D$           | 1.56      | W    |
| Thermal Resistance from Junction to Ambient <sup>5</sup> | $R_{\theta JA}$ | 125       | °C/W |
| Junction and Storage Temperature Range                   | $T_J, T_{STG}$  | -55~ +150 | °C   |

**4. Electrical Characteristics**

Rating at 25°C ambient temperature unless otherwise specified.

| Parameter                                              | Symbol                | Test Condition                                                                       | Min | Typ  | Max  | Units |
|--------------------------------------------------------|-----------------------|--------------------------------------------------------------------------------------|-----|------|------|-------|
| Off Characteristics                                    |                       |                                                                                      |     |      |      |       |
| Drain-source breakdown voltage                         | V <sub>(BR) DSS</sub> | V <sub>GS</sub> = 0V, I <sub>D</sub> =250μA                                          | 20  |      |      | V     |
| Zero gate voltage drain current                        | I <sub>DSS</sub>      | V <sub>DS</sub> =20V, V <sub>GS</sub> = 0V                                           |     |      | 1    | μA    |
| Gate-source leakage current                            | I <sub>GSS</sub>      | V <sub>GS</sub> =±12V, V <sub>DS</sub> = 0V                                          |     |      | ±100 | nA    |
| On characteristics <sup>3</sup>                        |                       |                                                                                      |     |      |      |       |
| Drain-source on-resistance                             | R <sub>DS(on)</sub>   | V <sub>GS</sub> =4.5V, I <sub>D</sub> =3A                                            |     | 19   | 32   | mΩ    |
|                                                        |                       | V <sub>GS</sub> =2.5V, I <sub>D</sub> =2A                                            |     | 25   | 40   | mΩ    |
| Gate threshold voltage                                 | V <sub>GS(th)</sub>   | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA                             | 0.4 | 0.7  | 1    | V     |
| Dynamic Characteristics                                |                       |                                                                                      |     |      |      |       |
| Input capacitance                                      | C <sub>iss</sub>      | V <sub>DS</sub> =10V, V <sub>GS</sub> =0V, f =1MHz                                   |     | 420  |      | pF    |
| Output capacitance                                     | C <sub>oss</sub>      |                                                                                      |     | 60   |      | pF    |
| Reverse transfer capacitance                           | C <sub>rss</sub>      |                                                                                      |     | 34   |      | pF    |
| Switching Characteristics                              |                       |                                                                                      |     |      |      |       |
| Total Gate Charge                                      | Q <sub>g</sub>        | V <sub>DS</sub> =10V, I <sub>D</sub> =4A, V <sub>GS</sub> =4.5V                      |     | 7.7  |      | nC    |
| Gate-Source Charge                                     | Q <sub>gs</sub>       |                                                                                      |     | 0.9  |      | nC    |
| Gate-Drain Charge                                      | Q <sub>gd</sub>       |                                                                                      |     | 2.4  |      | nC    |
| Turn-on delay time                                     | t <sub>d(on)</sub>    | V <sub>GS</sub> =10V, V <sub>DS</sub> =4.5V, I <sub>D</sub> =1A, R <sub>G</sub> =25Ω |     | 4.1  |      | ns    |
| Turn-on rise time                                      | t <sub>r</sub>        |                                                                                      |     | 11.6 |      | ns    |
| Turn-off delay time                                    | t <sub>d(off)</sub>   |                                                                                      |     | 23.9 |      | ns    |
| Turn-off fall time                                     | t <sub>f</sub>        |                                                                                      |     | 7.6  |      | ns    |
| Source-drain diode characteristics and maximum ratings |                       |                                                                                      |     |      |      |       |
| Diode forward voltage <sup>3</sup>                     | V <sub>SD</sub>       | I <sub>S</sub> =1A, V <sub>GS</sub> =0V                                              |     | 0.7  | 1.3  | V     |

Note :

1. The maximum current rating is limited by package.
2. Pulse Test : Pulse Width  $\leq 10\mu s$ , duty cycle  $\leq 1\%$ .
3. Pulse Test : Pulse Width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$ .
4. The power dissipation PD is limited by  $T_{J(MAX)} = 150^\circ C$ .
5. Device mounted on 1in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with  $T_A = 25^\circ C$ .



### 5. Rating And Characteristic Curves

Fig1: Output Characteristics

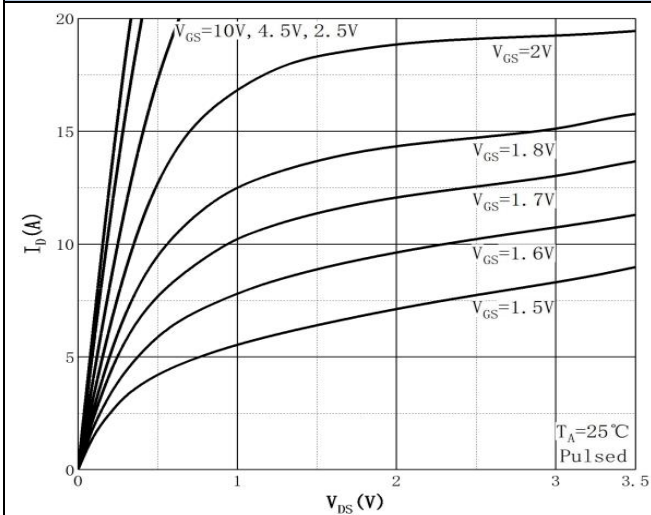


Fig2: Transfer Characteristics

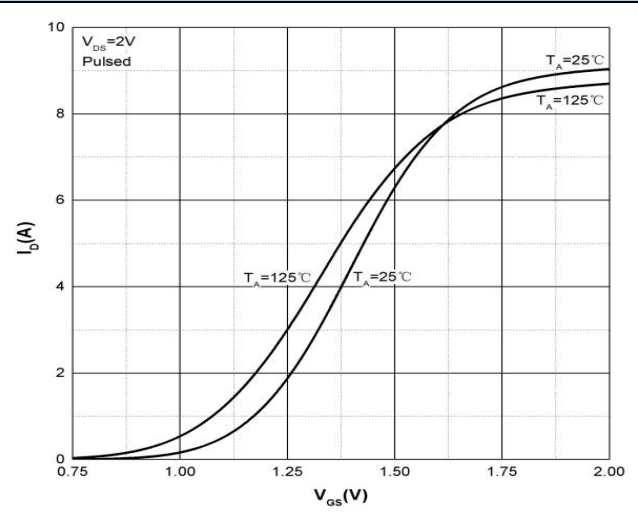


Fig.3  $R_{DS(on)}$  -  $I_D$

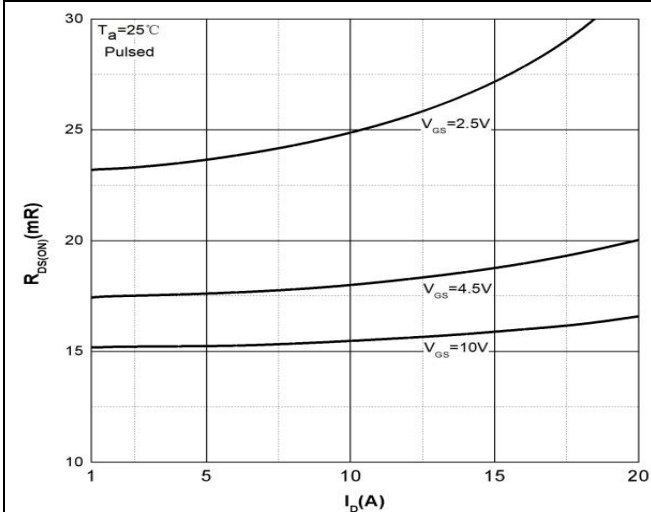


Fig.4  $R_{DS(on)}$  -  $V_{GS}$

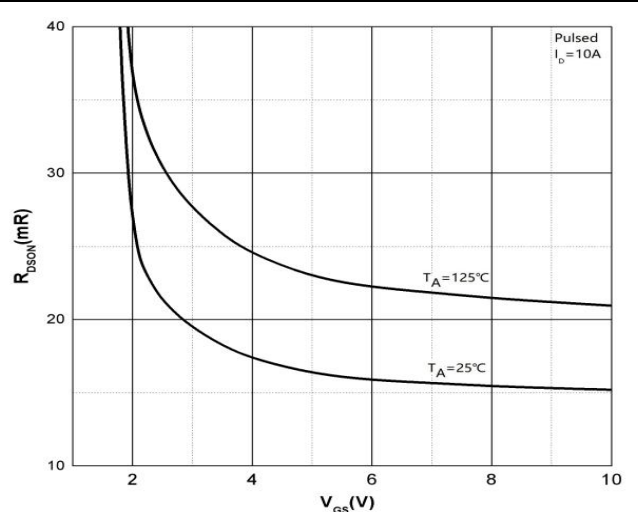


Fig.5 IS - VSD

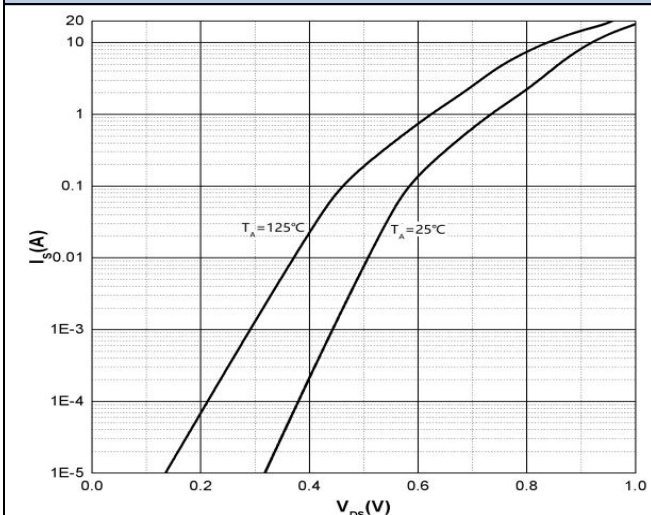
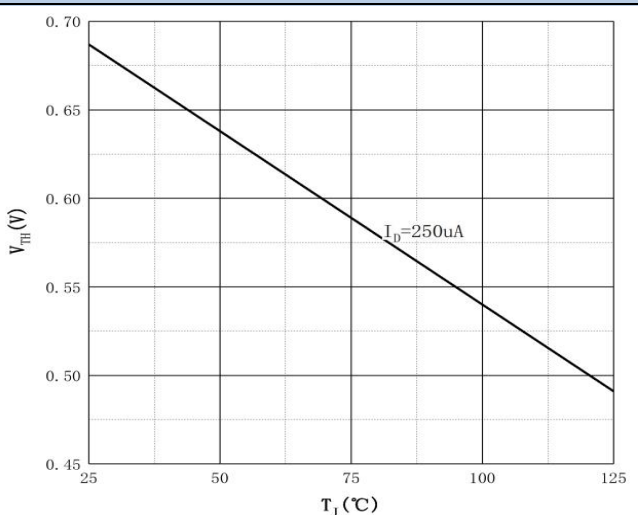
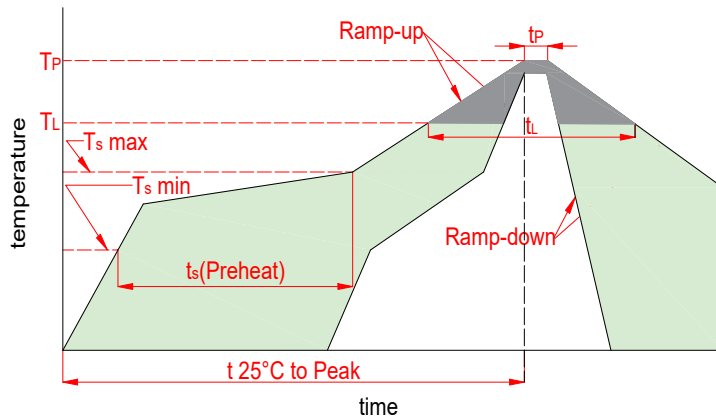


Fig.6 Threshold Voltage



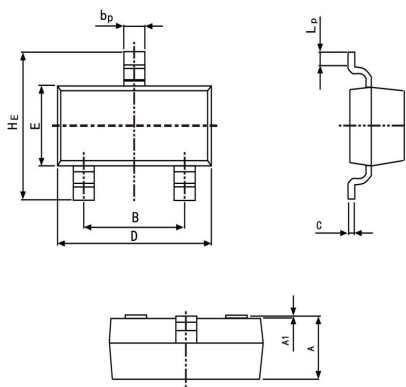


### 6. Soldering Parameters

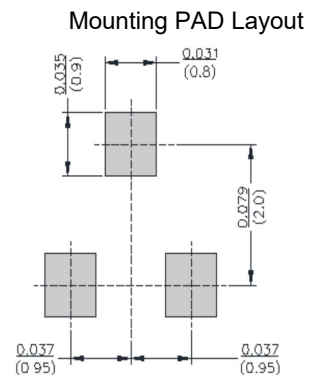


| Reflow Condition                                   |                           | Lead-free              |
|----------------------------------------------------|---------------------------|------------------------|
| Pre Heat                                           | Temp. min( $T_s$ (min))   | 150℃                   |
|                                                    | Temp. max( $T_s$ (min))   | 200℃                   |
|                                                    | Time(min to max)( $t_s$ ) | 60~120s                |
| Aver. ramp up rate(Liquidus Temp.)( $T_L$ )to peak |                           | 3℃/s max               |
| $T_s$ (max) to $T_L$ -Ramp-up Rate                 |                           | 3℃/s max               |
| Reflow                                             | Temp. ( $T_L$ )(Liquidus) | 217℃                   |
|                                                    | Temp. ( $t_L$ )(Liquidus) | 60~150s                |
| Peak Temp. ( $T_p$ )                               |                           | 260 <sup>+0/-5</sup> ℃ |
| Time within actual peak Temp. ( $t_p$ )            |                           | 30s max                |
| Ramp-down Rate                                     |                           | 6℃/s max               |
| Time 25℃ to peak Tempe. ( $T_p$ )                  |                           | 8 minutes max          |
| Do not exceed                                      |                           | 260℃                   |

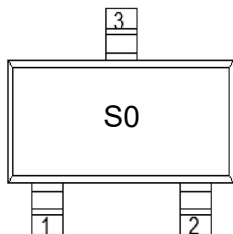
### 7. Dimensions



| Dimensions | Inches |       | Millimeters |      |
|------------|--------|-------|-------------|------|
|            | Min    | Max   | Min         | Max  |
| A          | 0.035  | 0.045 | 0.90        | 1.15 |
| B          | 0.070  | 0.081 | 1.78        | 2.05 |
| bp         | 0.012  | 0.020 | 0.30        | 0.51 |
| C          | 0.003  | 0.007 | 0.08        | 0.18 |
| D          | 0.110  | 0.118 | 2.80        | 3.00 |
| E          | 0.047  | 0.055 | 1.20        | 1.40 |
| HE         | 0.087  | 0.110 | 2.20        | 2.80 |
| A1         | 0.000  | 0.004 | 0.00        | 0.10 |
| LP         | 0.008  | 0.020 | 0.20        | 0.50 |



### 8. Part Marking System



### 9. Package Information

| Package | Part Number | Tape Width(mm) | Quantity(pcs) |
|---------|-------------|----------------|---------------|
| SOT-23  | XN2300      | 8              | 3000          |



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