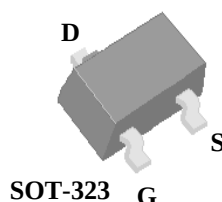
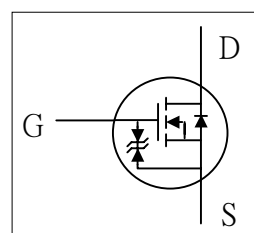


- ▼ Simple Drive Requirement
- ▼ Small Package Outline
- ▼ Surface Mount Device
- ▼ RoHS Compliant & Halogen-Free



|              |           |
|--------------|-----------|
| $BV_{DSS}$   | 60V       |
| $R_{DS(ON)}$ | $2\Omega$ |
| $I_D$        | 270mA     |



## Description

XP2N7002 series are innovated design and silicon process technology to achieve the lowest possible on-resistance and fast switching performance. It provides the designer with an extreme efficient device for use in a wide range of power applications.

The SOT-323 package is widely used for all commercial-industrial applications.

## Absolute Maximum Ratings@ $T_J=25^\circ\text{C}$ (unless otherwise specified)

| Symbol                     | Parameter                                   | Rating     | Units            |
|----------------------------|---------------------------------------------|------------|------------------|
| $V_{DS}$                   | Drain-Source Voltage                        | 60         | V                |
| $V_{GS}$                   | Gate-Source Voltage                         | $\pm 20$   | V                |
| $I_D@T_A=25^\circ\text{C}$ | Drain Current <sup>3</sup> , $V_{GS}$ @ 10V | 270        | mA               |
| $I_D@T_A=70^\circ\text{C}$ | Drain Current <sup>3</sup> , $V_{GS}$ @ 10V | 210        | mA               |
| $I_{DM}$                   | Pulsed Drain Current <sup>1</sup>           | 800        | mA               |
| $P_D@T_A=25^\circ\text{C}$ | Total Power Dissipation <sup>3</sup>        | 0.31       | W                |
| $T_{STG}$                  | Storage Temperature Range                   | -55 to 150 | $^\circ\text{C}$ |
| $T_J$                      | Operating Junction Temperature Range        | -55 to 150 | $^\circ\text{C}$ |

## Thermal Data

| Symbol      | Parameter                                                 | Value | Unit               |
|-------------|-----------------------------------------------------------|-------|--------------------|
| $R_{thj-a}$ | Maximum Thermal Resistance, Junction-ambient <sup>3</sup> | 400   | $^\circ\text{C/W}$ |

**Electrical Characteristics@T<sub>j</sub>=25°C(unless otherwise specified)**

| Symbol              | Parameter                                      | Test Conditions                                          | Min. | Typ. | Max. | Units |
|---------------------|------------------------------------------------|----------------------------------------------------------|------|------|------|-------|
| BV <sub>DSS</sub>   | Drain-Source Breakdown Voltage                 | V <sub>GS</sub> =0V, I <sub>D</sub> =250uA               | 60   | -    | -    | V     |
| R <sub>DS(ON)</sub> | Static Drain-Source On-Resistance <sup>2</sup> | V <sub>GS</sub> =10V, I <sub>D</sub> =450mA              | -    | -    | 2    | Ω     |
|                     |                                                | V <sub>GS</sub> =4.5V, I <sub>D</sub> =200mA             | -    | -    | 4    | Ω     |
| V <sub>GS(th)</sub> | Gate Threshold Voltage                         | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA | 1    | -    | 2.5  | V     |
| g <sub>fs</sub>     | Forward Transconductance                       | V <sub>DS</sub> =10V, I <sub>D</sub> =450mA              | -    | 600  | -    | mS    |
| I <sub>DSS</sub>    | Drain-Source Leakage Current                   | V <sub>DS</sub> =48V, V <sub>GS</sub> =0V                | -    | -    | 25   | uA    |
| I <sub>GSS</sub>    | Gate-Source Leakage                            | V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V               | -    | -    | ±30  | uA    |
| Q <sub>g</sub>      | Total Gate Charge                              | I <sub>D</sub> =200mA                                    | -    | 1.1  | 1.8  | nC    |
| Q <sub>gs</sub>     | Gate-Source Charge                             | V <sub>DS</sub> =48V                                     | -    | 0.3  | -    | nC    |
| Q <sub>gd</sub>     | Gate-Drain ("Miller") Charge                   | V <sub>GS</sub> =4.5V                                    | -    | 0.5  | -    | nC    |
| t <sub>d(on)</sub>  | Turn-on Delay Time                             | V <sub>DS</sub> =30V                                     | -    | 11   | -    | ns    |
| t <sub>r</sub>      | Rise Time                                      | I <sub>D</sub> =450mA                                    | -    | 9    | -    | ns    |
| t <sub>d(off)</sub> | Turn-off Delay Time                            | R <sub>G</sub> =3.3 Ω                                    | -    | 64   | -    | ns    |
| t <sub>f</sub>      | Fall Time                                      | V <sub>GS</sub> =10V                                     | -    | 30   | -    | ns    |
| C <sub>iss</sub>    | Input Capacitance                              | V <sub>GS</sub> =0V                                      | -    | 39   | 62   | pF    |
| C <sub>oss</sub>    | Output Capacitance                             | V <sub>DS</sub> =25V                                     | -    | 12   | -    | pF    |
| C <sub>rss</sub>    | Reverse Transfer Capacitance                   | f=1.0MHz                                                 | -    | 5    | -    | pF    |

**Source-Drain Diode**

| Symbol          | Parameter                       | Test Conditions                            | Min. | Typ. | Max. | Units |
|-----------------|---------------------------------|--------------------------------------------|------|------|------|-------|
| V <sub>SD</sub> | Forward On Voltage <sup>2</sup> | I <sub>S</sub> =450mA, V <sub>GS</sub> =0V | -    | -    | 1.2  | V     |

**Notes:**

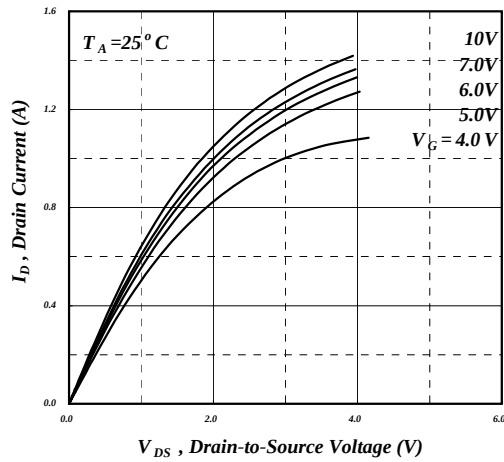
- 1.Pulse width limited by Max. junction temperature.
- 2.Pulse test
- 3.Surface mounted on min. copper pad of FR4 board.

THIS PRODUCT IS SENSITIVE TO ELECTROSTATIC DISCHARGE, PLEASE HANDLE WITH CAUTION.

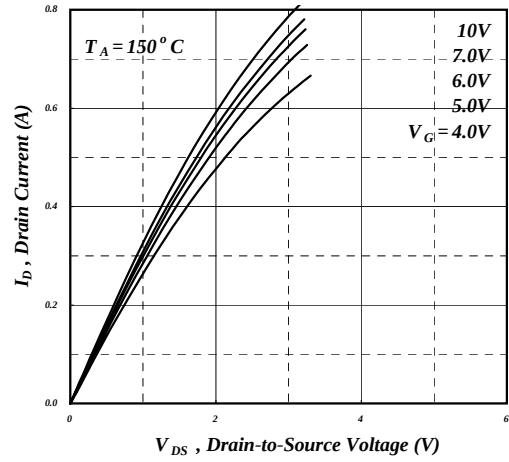
USE OF THIS PRODUCT AS A CRITICAL COMPONENT IN LIFE SUPPORT OR OTHER SIMILAR SYSTEMS IS NOT AUTHORIZED.

XSEMI DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS.

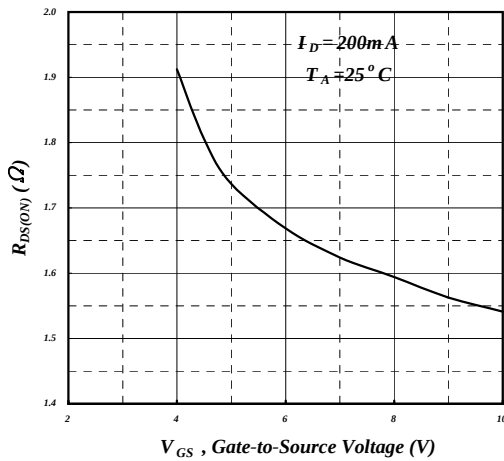
XSEMI RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION OR DESIGN.



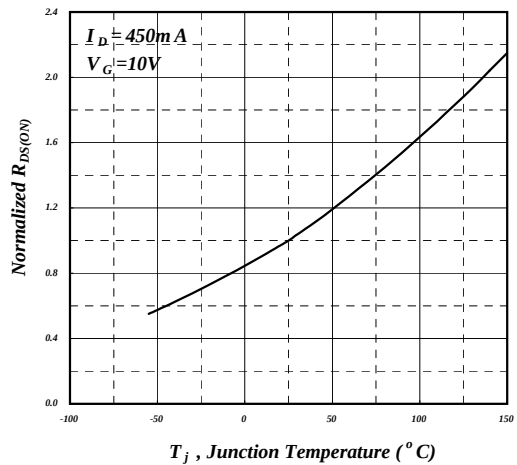
**Fig 1. Typical Output Characteristics**



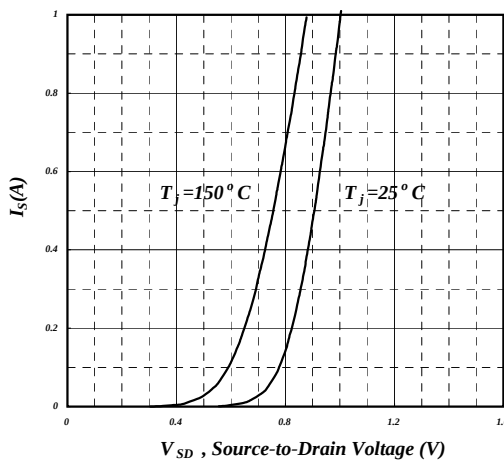
**Fig 2. Typical Output Characteristics**



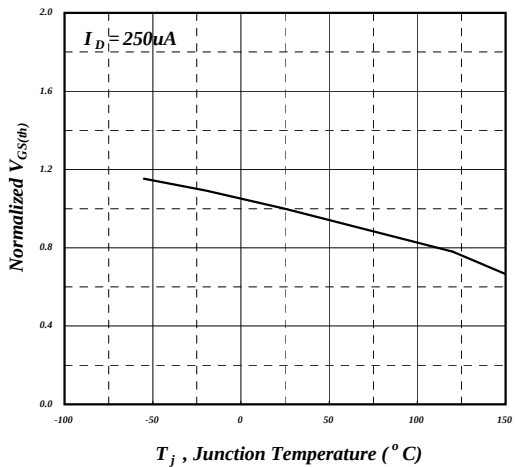
**Fig 3. On-Resistance v.s. Gate Voltage**



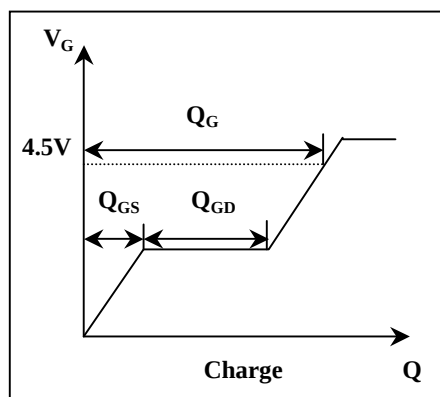
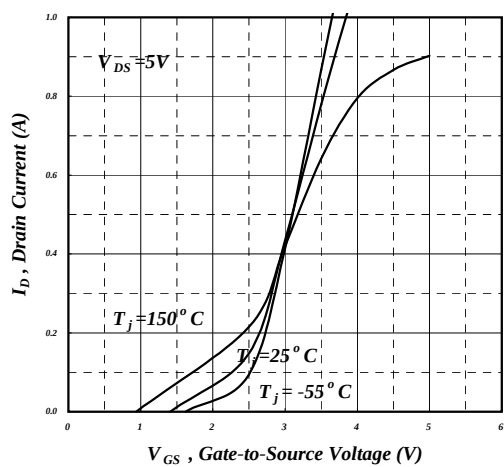
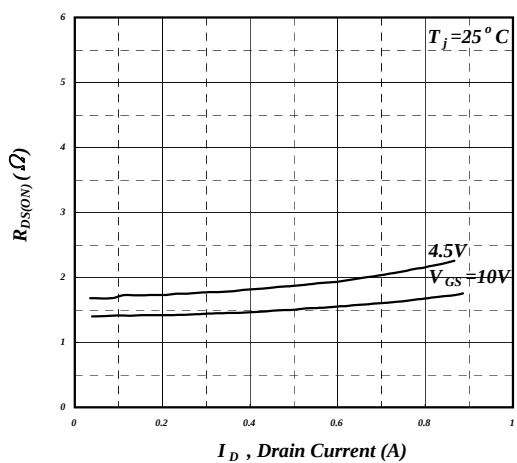
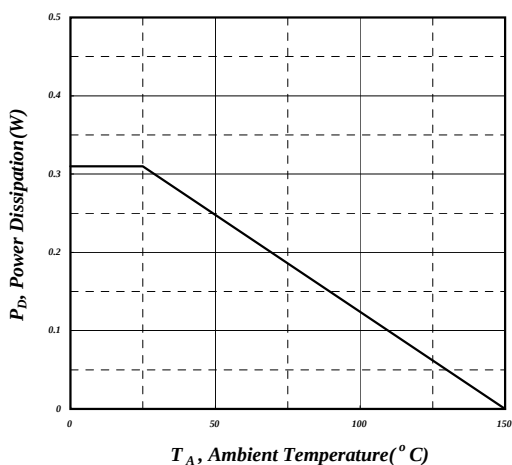
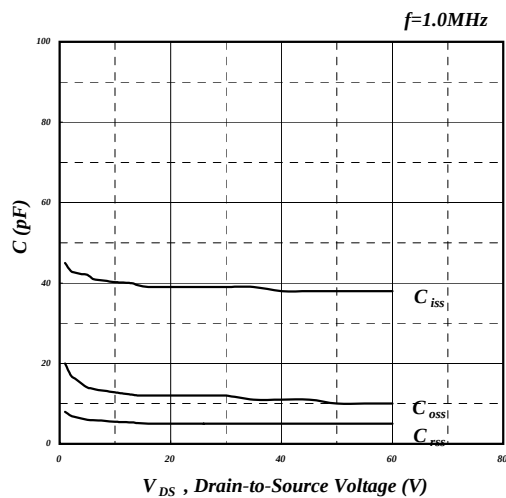
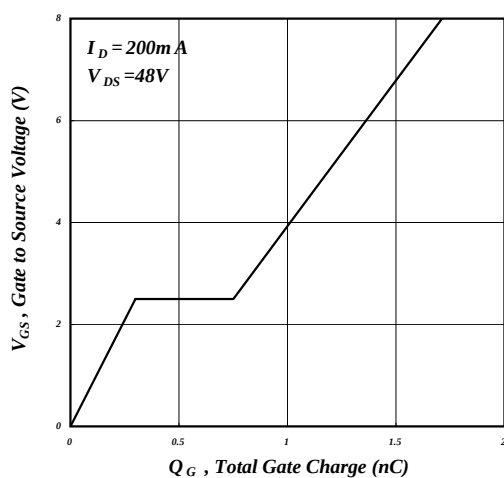
**Fig 4. Normalized On-Resistance  
v.s. Junction Temperature**



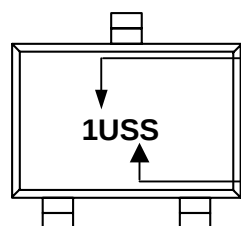
**Fig 5. Forward Characteristic of  
Reverse Diode**



**Fig 6. Gate Threshold Voltage v.s.  
Junction Temperature**



---

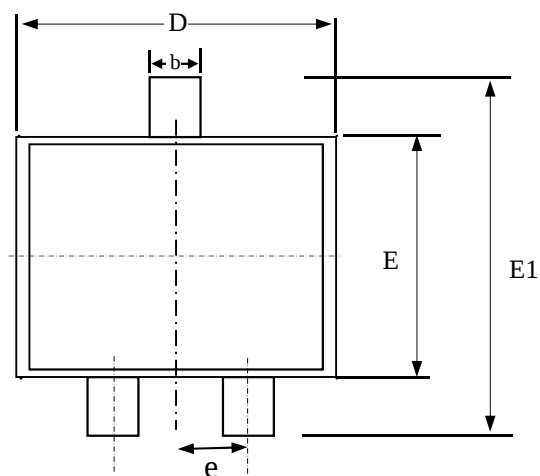
**MARKING INFORMATION**

Part Number : 1U

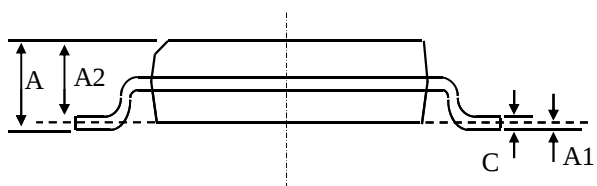
Date Code : SS

SS:2004,2008,2012,2016,2020,2024...SS:2003,2007,2011,2015,2019,2023...SS:2002,2006,2010,2014,2018,2022...SS:2001,2005,2009,2013,2017,2021...

## Package Outline : SOT-323(SC-70-3L)



| SYMBOLS | Millimeters |      |      |
|---------|-------------|------|------|
|         | MIN         | NOM  | MAX  |
| A       | 0.80        | 0.95 | 1.10 |
| A1      | 0.00        | 0.05 | 0.10 |
| A2      | 0.80        | 0.90 | 1.00 |
| b       | 0.00        | 0.20 | 0.40 |
| C       | 0.10        | 0.18 | 0.25 |
| e       | 0.65 REF    |      |      |
| D       | 1.80        | 2.00 | 2.20 |
| E1      | 1.75        | 2.10 | 2.45 |
| E       | 1.15        | 1.25 | 1.35 |



- 1.All Dimension Are In Millimeters.
- 2.Dimension Does Not Include Mold Protrusions.

**SOT-323(SC-70-3L) FOOTPRINT :**

