



## 2N7002DW

Power MOSFET

300mA, 60V DUAL  
N-CHANNEL POWER MOSFET

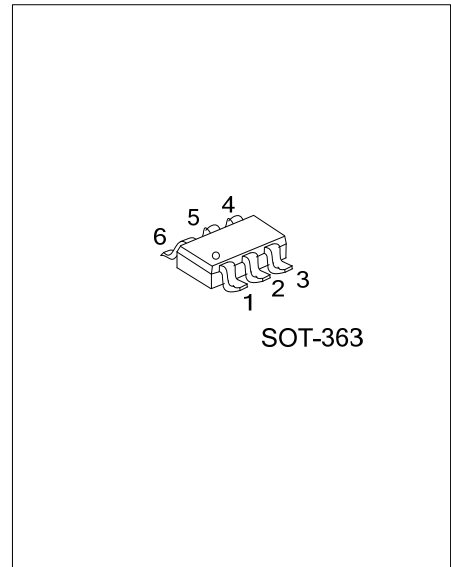
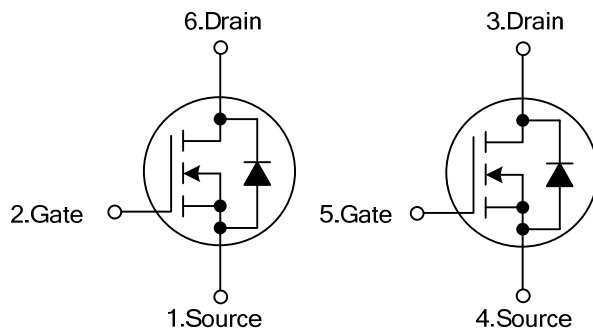
### DESCRIPTION

The UTC **2N7002DW** uses advanced technology to provide excellent  $R_{DS(ON)}$ , low gate charge and operation with low gate voltages. This device is suitable for use as a load switch or in PWM applications.

### FEATURES

- \* High Density Cell Design for Low  $R_{DS(ON)}$ .
- \* Voltage Controlled Small Signal Switch
- \* Rugged and Reliable
- \* High Saturation Current Capability

### SYMBOL



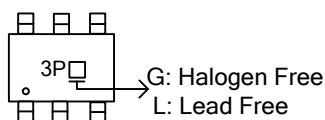
SOT-363

### ORDERING INFORMATION

| Ordering Number |                 | Package | Pin Assignment |    |    |    |    |    | Packing   |
|-----------------|-----------------|---------|----------------|----|----|----|----|----|-----------|
| Lead Free       | Halogen Free    |         | 1              | 2  | 3  | 4  | 5  | 6  |           |
| 2N7002DWL-AL6-R | 2N7002DWG-AL6-R | SOT-363 | S1             | G1 | D2 | S2 | G2 | D1 | Tape Reel |

|                 |                 |                                   |
|-----------------|-----------------|-----------------------------------|
| 2N7002DWG-AL6-R | (1)Packing Type | (1) R: Tape Reel                  |
|                 | (2)Package Type | (2) AL6: SOT-363                  |
|                 | (3)Halogen Free | (3) G: Halogen Free, L: Lead Free |

### MARKING



■ ABSOLUTE MAXIMUM RATINGS ( $T_A=25^{\circ}\text{C}$ , unless otherwise noted.)

| PARAMETER                                            | SYMBOL                                  | RATINGS    | UNIT                         |
|------------------------------------------------------|-----------------------------------------|------------|------------------------------|
| Drain-Source Voltage                                 | $V_{DS}$                                | 60         | V                            |
| Drain-Gate Voltage ( $R_{GS} \leq 1\text{M}\Omega$ ) | $V_{DGR}$                               | 60         | V                            |
| Gate Source Voltage                                  | Continuous                              | $\pm 20$   | V                            |
|                                                      | Non Repetitive( $t_P < 50\mu\text{s}$ ) | $\pm 40$   |                              |
| Drain Current                                        | Continuous                              | 300        | mA                           |
|                                                      | Pulsed                                  | 800        |                              |
| Power Dissipation                                    | $P_D$                                   | 200        | mW                           |
| Derated Above $25^{\circ}\text{C}$                   |                                         | 1.6        | $\text{mW}/^{\circ}\text{C}$ |
| Junction Temperature                                 | $T_J$                                   | + 150      | $^{\circ}\text{C}$           |
| Storage Temperature                                  | $T_{STG}$                               | -55 ~ +150 | $^{\circ}\text{C}$           |

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■ THERMAL DATA

| PARAMETER           | SYMBOL        | RATINGS     | UNIT                        |
|---------------------|---------------|-------------|-----------------------------|
| Junction to Ambient | $\theta_{JA}$ | 625 (Note1) | $^{\circ}\text{C}/\text{W}$ |

■ ELECTRICAL CHARACTERISTICS ( $T_A=25^{\circ}\text{C}$ , unless otherwise specified)

| PARAMETER                                              | SYMBOL               | TEST CONDITIONS                                                                                                    | MIN | TYP  | MAX  | UNIT |
|--------------------------------------------------------|----------------------|--------------------------------------------------------------------------------------------------------------------|-----|------|------|------|
| OFF CHARACTERISTICS                                    |                      |                                                                                                                    |     |      |      |      |
| Drain-Source Breakdown Voltage                         | BV <sub>DSS</sub>    | V <sub>GS</sub> =0V, I <sub>D</sub> =10μA                                                                          | 60  |      |      | V    |
| Drain-Source Leakage Current                           | I <sub>DSS</sub>     | V <sub>DS</sub> =60V, V <sub>GS</sub> =0V                                                                          |     |      | 1    | μA   |
| Gate-Source Leakage Current                            | I <sub>GSSF</sub>    | V <sub>GS</sub> =20V, V <sub>DS</sub> =0V                                                                          |     |      | 100  | nA   |
|                                                        | I <sub>GSSR</sub>    | V <sub>GS</sub> =-20V, V <sub>DS</sub> =0V                                                                         |     |      | -100 | nA   |
| ON CHARACTERISTICS (Note 2)                            |                      |                                                                                                                    |     |      |      |      |
| Gate Threshold Voltage                                 | V <sub>GS(TH)</sub>  | V <sub>GS</sub> = V <sub>DS</sub> , I <sub>D</sub> =250μA                                                          | 1   | 2.1  | 2.5  | V    |
| Drain-Source On-Voltage                                | V <sub>DS (ON)</sub> | V <sub>GS</sub> = 10V, I <sub>D</sub> =300mA                                                                       |     | 0.6  | 3.75 | V    |
|                                                        |                      | V <sub>GS</sub> = 5.0V, I <sub>D</sub> =50mA                                                                       |     | 0.09 | 1.5  |      |
| Static Drain-Source On-Resistance                      | R <sub>DS (ON)</sub> | V <sub>GS</sub> =10V, I <sub>D</sub> =300mA, T <sub>J</sub> =125°C                                                 |     |      | 13.5 | Ω    |
|                                                        |                      | V <sub>GS</sub> =5.0V, I <sub>D</sub> =50mA                                                                        |     |      | 7.5  | Ω    |
| DYNAMIC CHARACTERISTICS                                |                      |                                                                                                                    |     |      |      |      |
| Input Capacitance                                      | C <sub>ISS</sub>     | V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1.0MHz                                                                |     | 20   | 50   | pF   |
| Output Capacitance                                     | C <sub>OSS</sub>     |                                                                                                                    |     | 11   | 25   | pF   |
| Reverse Transfer Capacitance                           | C <sub>RSS</sub>     |                                                                                                                    |     | 4    | 5    | pF   |
| Turn-On Time                                           | t <sub>ON</sub>      | V <sub>DD</sub> =30V, R <sub>L</sub> =150Ω<br>I <sub>D</sub> =200mA, V <sub>GS</sub> =10V<br>R <sub>GEN</sub> =25Ω |     |      | 20   | nS   |
| Turn-Off Time                                          | t <sub>OFF</sub>     | V <sub>DD</sub> =30V, R <sub>L</sub> =25Ω<br>I <sub>D</sub> =200mA, V <sub>GS</sub> =10V<br>R <sub>GEN</sub> =25Ω  |     |      | 20   | nS   |
| DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS |                      |                                                                                                                    |     |      |      |      |
| Drain-Source Diode Forward Voltage                     | V <sub>SD</sub>      | V <sub>GS</sub> =0V, I <sub>S</sub> =300mA (Note )                                                                 |     | 0.88 | 1.5  | V    |
| Maximum Pulsed Drain-Source Diode Forward Current      | I <sub>SM</sub>      |                                                                                                                    |     |      | 0.8  | A    |
| Maximum Continuous Drain-Source Diode Forward Current  | I <sub>S</sub>       |                                                                                                                    |     |      | 300  | mA   |

Note: 1. Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch. Minimum land pad size.

2. Pulse Test: Pulse Width  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 2.0\%$

# ■ TEST CIRCUIT AND WAVEFORM

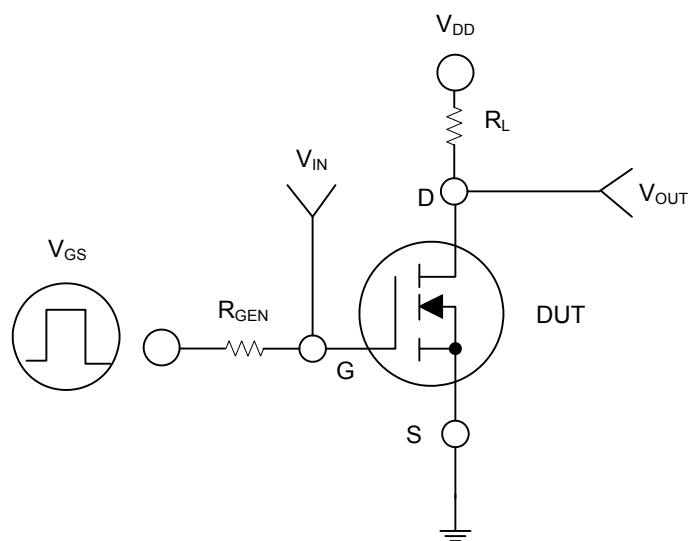


Fig. 1

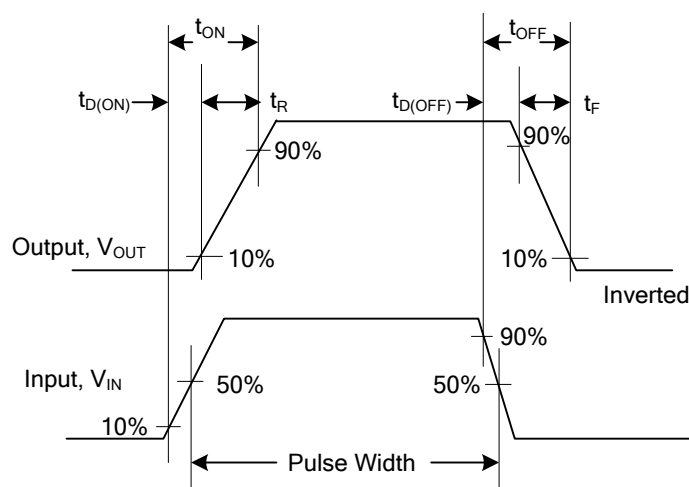
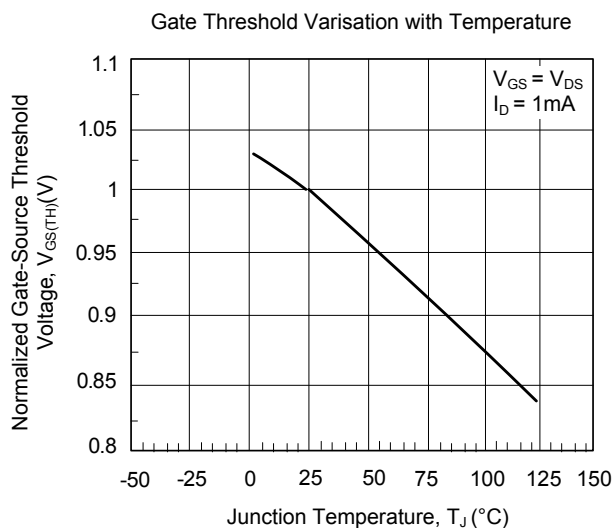
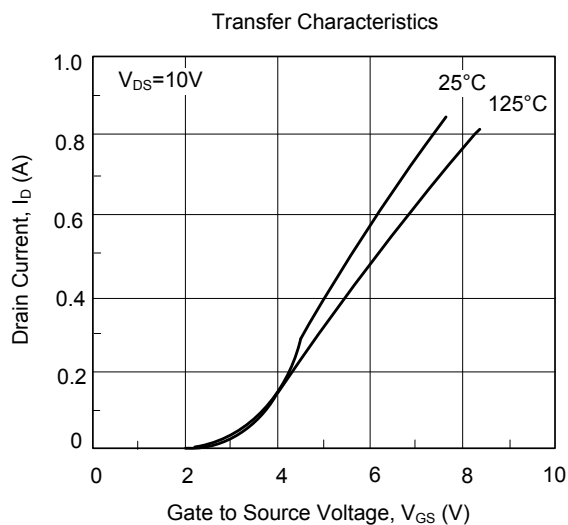
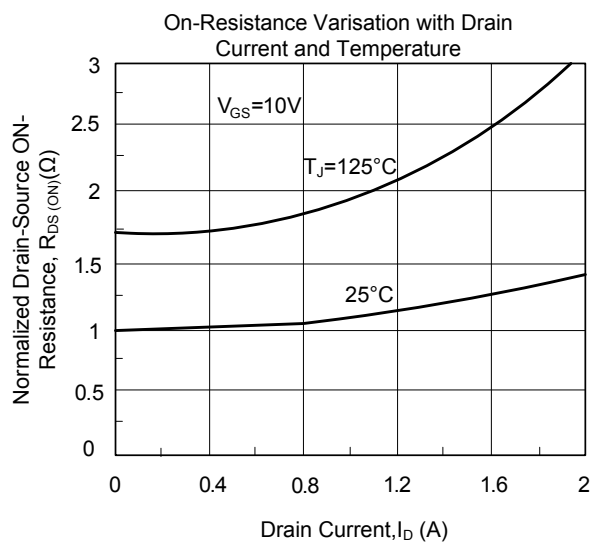
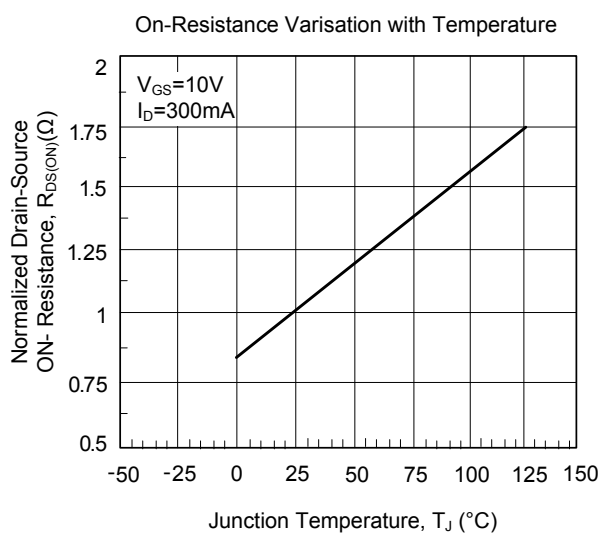
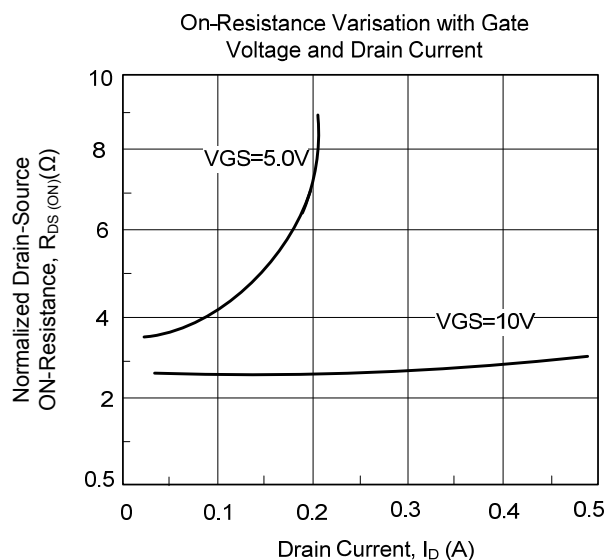
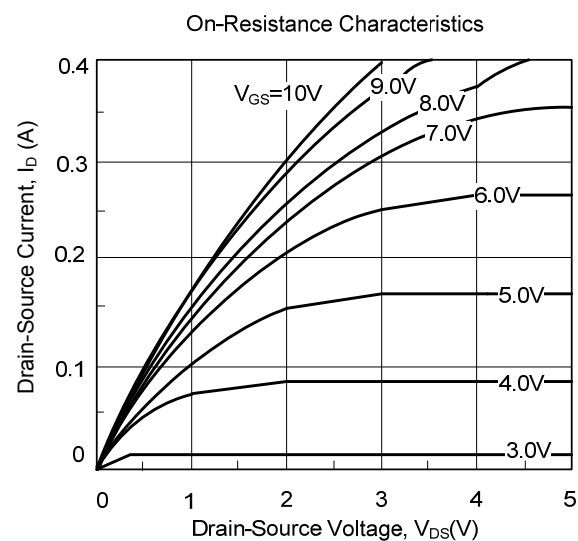


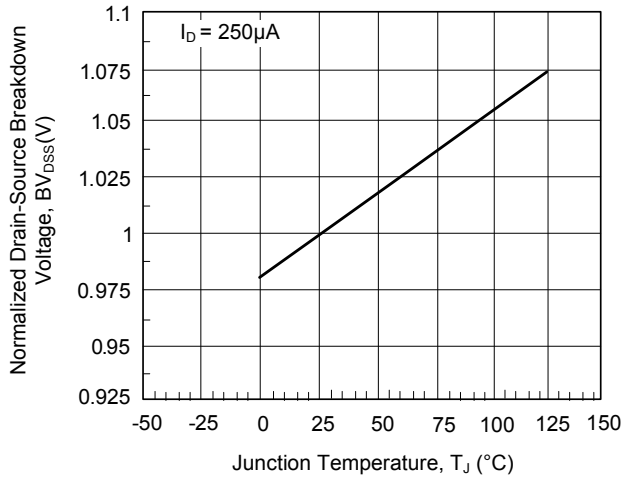
Fig. 2 Switching Waveforms

## TYPICAL CHARACTERISTICS

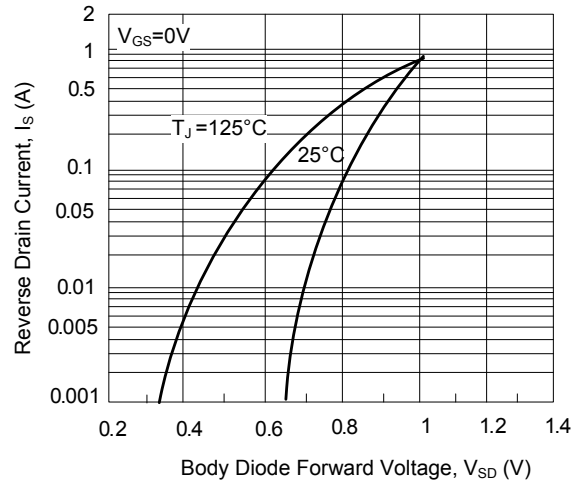


## ■ TYPICAL CHARACTERISTICS (Cont.)

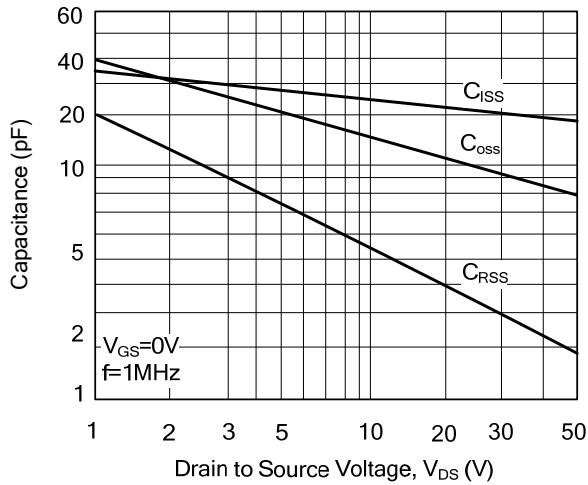
Breakdown Voltage Variation with Temperature



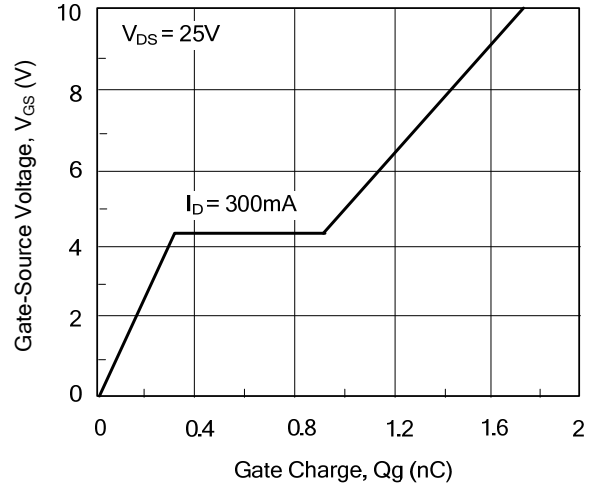
Body Diode Forward Voltage Variation with Temperature



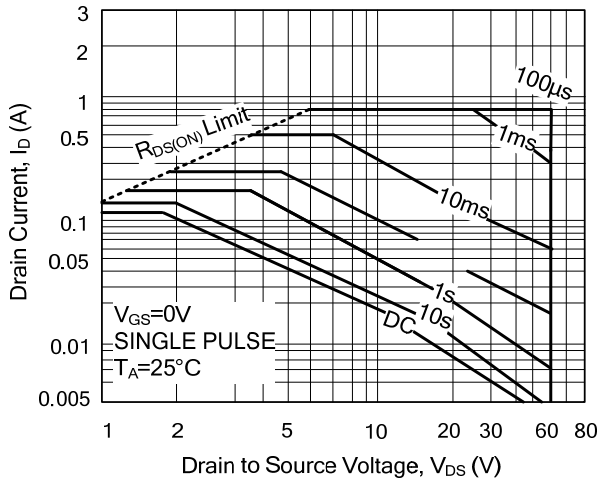
Capacitance Characteristics



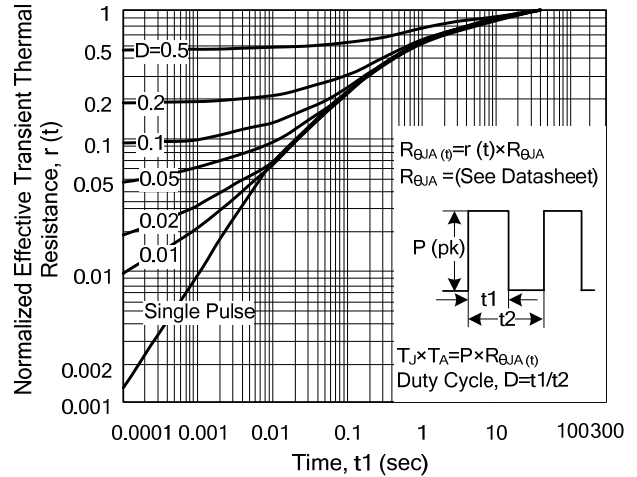
Gate Charge Characteristics



Maximum Safe Operating Area



Transient Thermal Response Curve



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- Консультации по применению компонента;
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#### Как с нами связаться

**Телефон:** 8 (812) 309 58 32 (многоканальный)

**Факс:** 8 (812) 320-02-42

**Электронная почта:** [org@eplast1.ru](mailto:org@eplast1.ru)

**Адрес:** 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.