



## Description

The 2N7002DW uses advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.

## General Features

$V_{DS} = 60V$   $I_D = 0.115A$

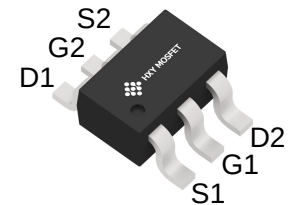
$R_{DS(ON)} < 3\Omega @ V_{GS}=10V$

## Application

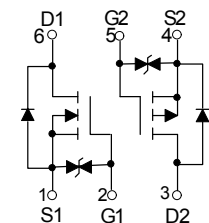
Wireless charging

Boost driver

Brushless motor



SOT-363  
(SC-70-6)



Dual N-Channel MOSFET

## Ordering Information

| Product ID | Pack             | Marking | Qty(PCS) |
|------------|------------------|---------|----------|
| 2N7002DW   | SOT-363(SC-70-6) | 72K     | 3000     |

## Absolute Maximum Ratings ( $T_C=25^{\circ}C$ unless otherwise noted)

| Symbol          | Parameter                                        | Limit      | Unit          |
|-----------------|--------------------------------------------------|------------|---------------|
| $V_{DS}$        | Drain-Source Voltage                             | 60         | V             |
| $V_{GS}$        | Gate-Source Voltage                              | $\pm 20$   | V             |
| $I_D$           | CDrain Current-Continuous                        | 0.115      | A             |
| $P_D$           | Maximum Power Dissipation                        | 0.15       | W             |
| $T_J, T_{STG}$  | Operating Junction and Storage Temperature Range | -55 To 150 | $^{\circ}C$   |
| $R_{\theta JA}$ | Thermal Resistance, Junction-to-Ambient (Note 2) | 833        | $^{\circ}C/W$ |



**Electrical Characteristics ( $T_A=25^{\circ}\text{C}$  unless otherwise noted)**

| Parameter                       | Symbol        | Test conditions                                               | Min        | Typ | Max      | Unit     |
|---------------------------------|---------------|---------------------------------------------------------------|------------|-----|----------|----------|
| Drain-source breakdown voltage  | $V_{(BR)DSS}$ | $V_{GS}=0\text{ V}$ , $I_D=250\text{ }\mu\text{A}$            | 60         |     |          | V        |
| Gate-threshold voltage *        | $V_{th(GS)}$  | $V_{DS}=V_{GS}$ , $I_D=250\text{ }\mu\text{A}$                | 1          | 1.6 | 2.5      |          |
| Gate-body leakage               | $I_{GSS}$     | $V_{DS}=0\text{ V}$ , $V_{GS}=\pm 20\text{ V}$                |            |     | $\pm 80$ | nA       |
| Zero gate voltage drain current | $I_{DSS}$     | $V_{DS}=60\text{ V}$ , $V_{GS}=0\text{ V}$                    |            |     | 80       | nA       |
| Drain-source on-resistance *    | $R_{DS(on)}$  | $V_{GS}=10\text{ V}$ , $I_D=115\text{ mA}$                    |            | 1.3 | 3        | $\Omega$ |
|                                 |               | $V_{GS}=4.5\text{ V}$ , $I_D=50\text{ mA}$                    |            | 2   | 5        |          |
| Forward transconductance *      | $g_{fs}$      | $V_{DS}=10\text{ V}$ , $I_D=200\text{ mA}$                    | 80         |     |          | ms       |
| Drain-source on-voltage *       | $V_{DS(on)}$  | $V_{GS}=10\text{ V}$ , $I_D=500\text{ mA}$                    |            |     | 3.75     | V        |
|                                 |               | $V_{GS}=5\text{ V}$ , $I_D=50\text{ mA}$                      |            |     | 0.375    | V        |
| Diode forward voltage           | $V_{SD}$      | $I_S=115\text{ mA}$ , $V_{GS}=0\text{ V}$                     | 0.55       |     | 1.2      | V        |
| Input capacitance **            | $C_{iss}$     | $V_{DS}=25\text{ V}$ , $V_{GS}=0\text{ V}$ , $f=1\text{ MHz}$ |            |     | 50       | pF       |
| Output capacitance **           | $C_{oss}$     |                                                               |            |     | 25       |          |
| Reverse transfer capacitance ** | $C_{rss}$     |                                                               |            |     | 5        |          |
| Gate-Source Breakdown Voltage   | $V_{GSO}$     | $I_{GS}=\pm 1\text{ mA}$ (Open Drain)                         | $\pm 21.5$ |     | $\pm 30$ | V        |

**Switching Time**

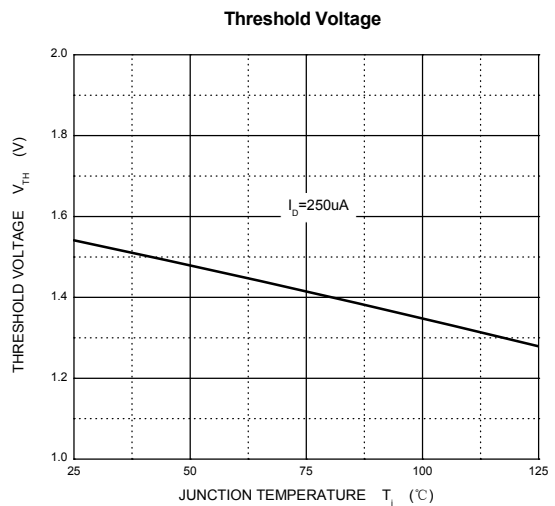
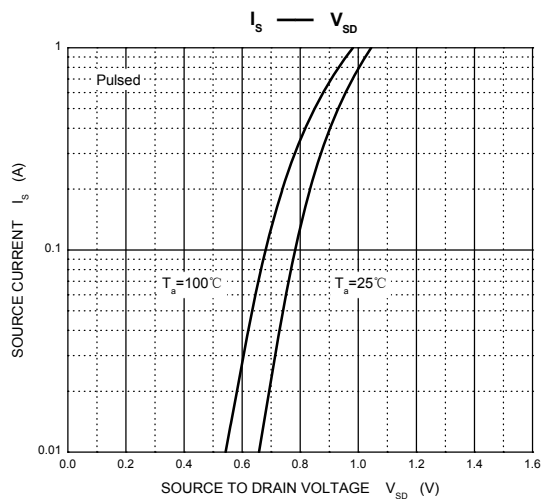
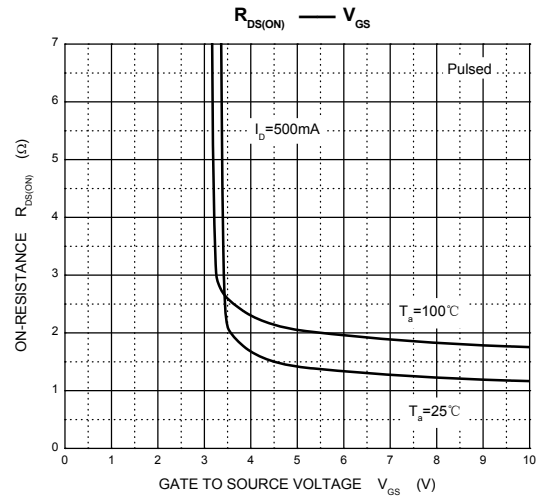
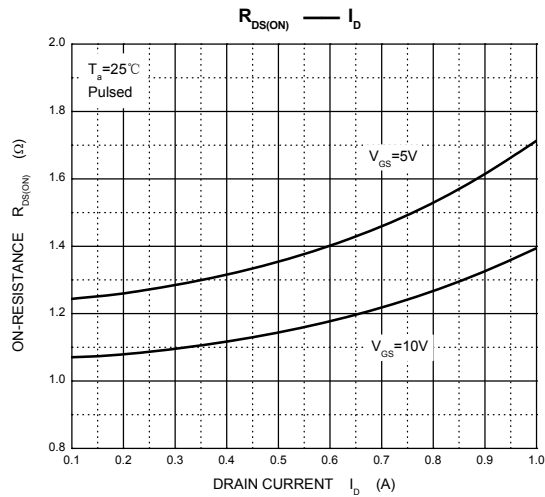
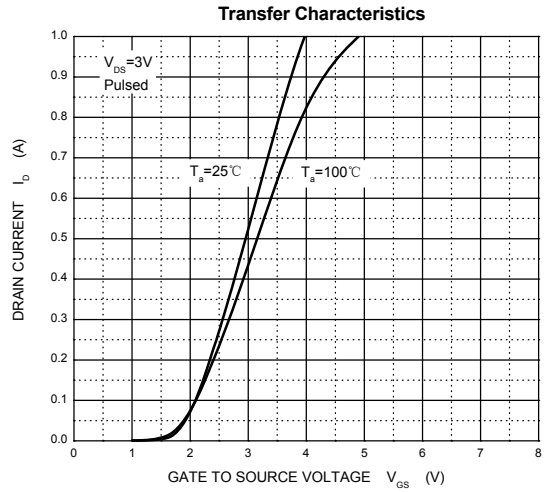
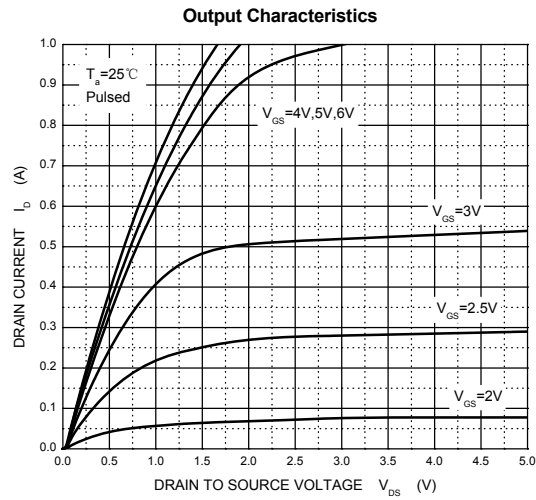
|                  |              |                                                                      |  |  |    |    |
|------------------|--------------|----------------------------------------------------------------------|--|--|----|----|
| Turn-on time **  | $t_{d(on)}$  | $V_{DD}=25\text{ V}$ , $R_L=50\Omega$                                |  |  | 20 | ns |
| Turn-off time ** | $t_{d(off)}$ | $I_D=500\text{ mA}$ , $V_{GEN}=10\text{ V}$ , $V_G=25\text{ }\Omega$ |  |  | 40 |    |

\* Pulse Test: Pulse width  $\leq 300\mu\text{s}$ , duty cycle  $\leq 2\%$ .

\*\* These parameters have no way to verify.

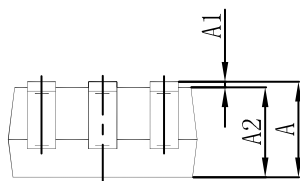
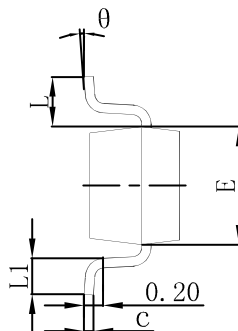
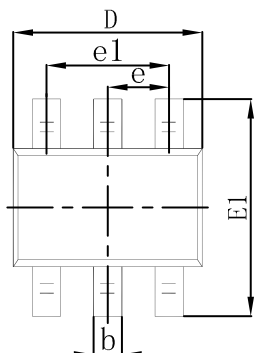


## Typical Characteristics



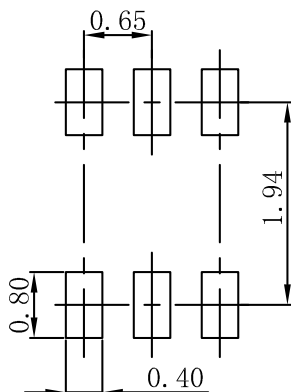


## SOT-363(SC-70-6) Package Outline Dimensions



| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min                       | Max   | Min                  | Max   |
| A      | 0.900                     | 1.100 | 0.035                | 0.043 |
| A1     | 0.000                     | 0.100 | 0.000                | 0.004 |
| A2     | 0.900                     | 1.000 | 0.035                | 0.039 |
| b      | 0.150                     | 0.350 | 0.006                | 0.014 |
| c      | 0.100                     | 0.150 | 0.004                | 0.006 |
| D      | 2.000                     | 2.200 | 0.079                | 0.087 |
| E      | 1.150                     | 1.350 | 0.045                | 0.053 |
| E1     | 2.150                     | 2.400 | 0.085                | 0.094 |
| e      | 0.650 TYP                 |       | 0.026 TYP            |       |
| e1     | 1.200                     | 1.400 | 0.047                | 0.055 |
| L      | 0.525 REF                 |       | 0.021 REF            |       |
| L1     | 0.260                     | 0.460 | 0.010                | 0.018 |
| θ      | 0°                        | 8°    | 0°                   | 8°    |

## SOT-363(SC-70-6) Suggested Pad Layout



### Note:

1. Controlling dimension: in millimeters.
2. General tolerance:  $\pm 0.05\text{mm}$ .
3. The pad layout is for reference purposes only.



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