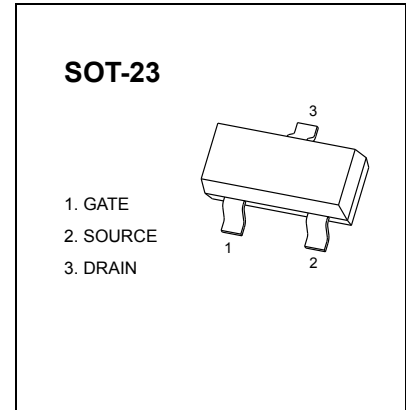


# SOT-23 Plastic-Encapsulate MOSFETS

## 2N7002 MOSFET (N-Channel)

| $V_{(BR)DSS}$ | $R_{DS(on)MAX}$ | $I_D$ |
|---------------|-----------------|-------|
| 60 V          | 2.5Ω@10V        | 115mA |
|               | 3Ω@5V           |       |



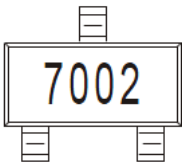
### FEATURE

- High density cell design for low  $R_{DS(ON)}$
- Voltage controlled small signal switch
- Rugged and reliable
- High saturation current capability

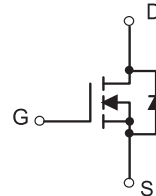
### APPLICATION

- Load Switch for Portable Devices
- DC/DC Converter

### MARKING



### Equivalent Circuit



### MAXIMUM RATINGS ( $T_a=25^\circ\text{C}$ unless otherwise noted)

| Parameter                                   | Symbol          | Value     | Unit |
|---------------------------------------------|-----------------|-----------|------|
| Drain-Source Voltage                        | $V_{DS}$        | 60        | V    |
| Gate-Source Voltage                         | $V_{GS}$        | ±20       | V    |
| Continuous Drain Current                    | $I_D$           | 0.115     | A    |
| Power Dissipation                           | $P_D$           | 0.225     | W    |
| Thermal Resistance from Junction to Ambient | $R_{\theta JA}$ | 556       | °C/W |
| Junction Temperature                        | $T_J$           | 150       | °C   |
| Storage Temperature                         | $T_{stg}$       | -50 ~+150 |      |

## MOSFET ELECTRICAL CHARACTERISTICS

$T_a=25\text{ }^{\circ}\text{C}$  unless otherwise specified

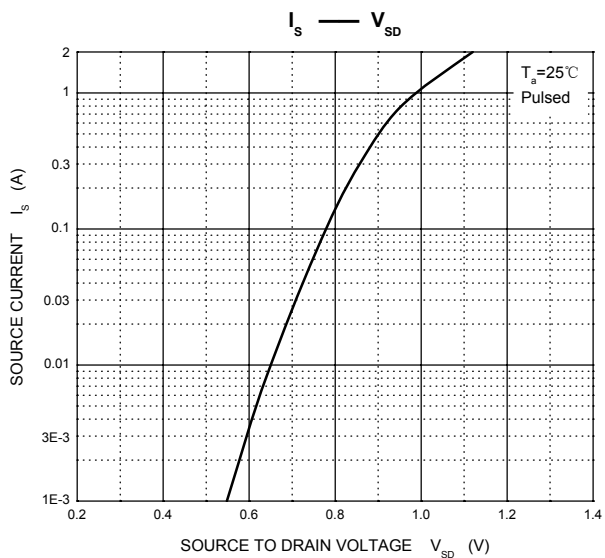
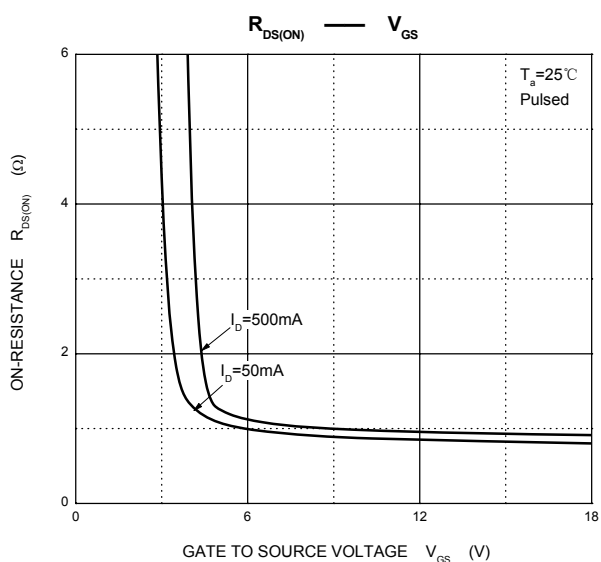
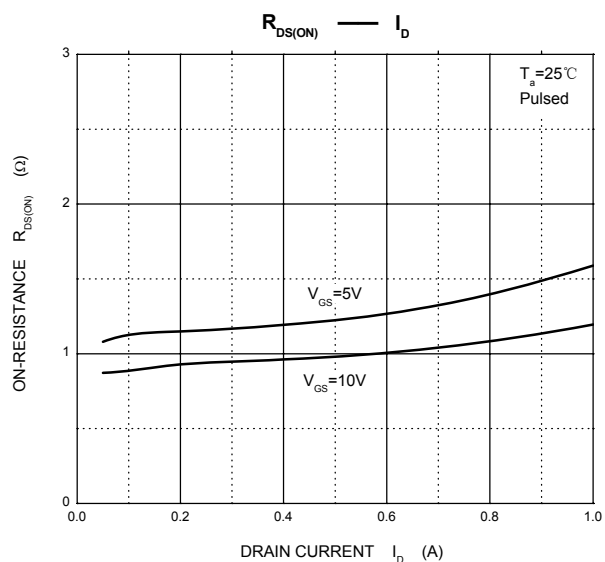
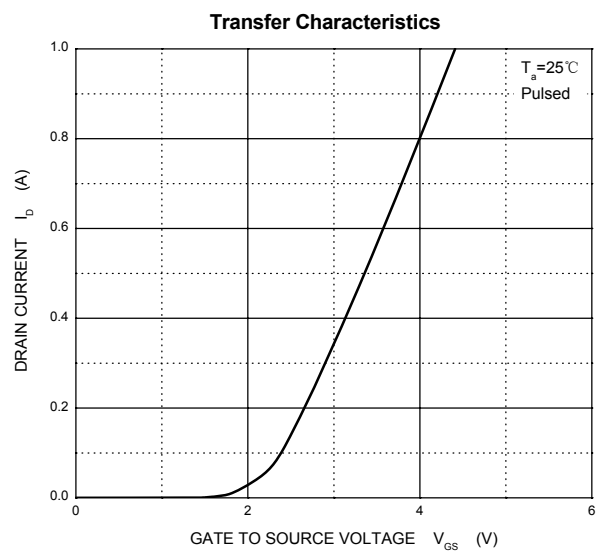
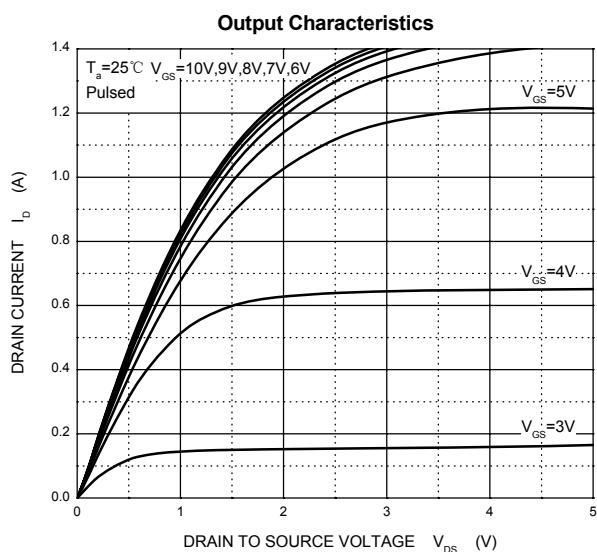
| Parameter                       | Symbol        | Test conditions                                               | Min  | Typ | Max      | Unit     |
|---------------------------------|---------------|---------------------------------------------------------------|------|-----|----------|----------|
| 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       |
| On-state Drain Current          | $I_{D(ON)}$   | $V_{GS}=10\text{ V}$ , $V_{DS}=7\text{ V}$                    | 500  |     |          | mA       |
| Drain-Source On-Resistance      | $R_{DS(on)}$  | $V_{GS}=10\text{ V}$ , $I_D=500\text{ mA}$                    |      | 0.9 | 2.5      | $\Omega$ |
|                                 |               | $V_{GS}=5\text{ V}$ , $I_D=50\text{ mA}$                      |      | 1.1 | 3        |          |
| Forward Trans conductance       | $g_{fs}$      | $V_{DS}=10\text{ V}$ , $I_D=200\text{ mA}$                    | 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        |          |

### SWITCHING TIME

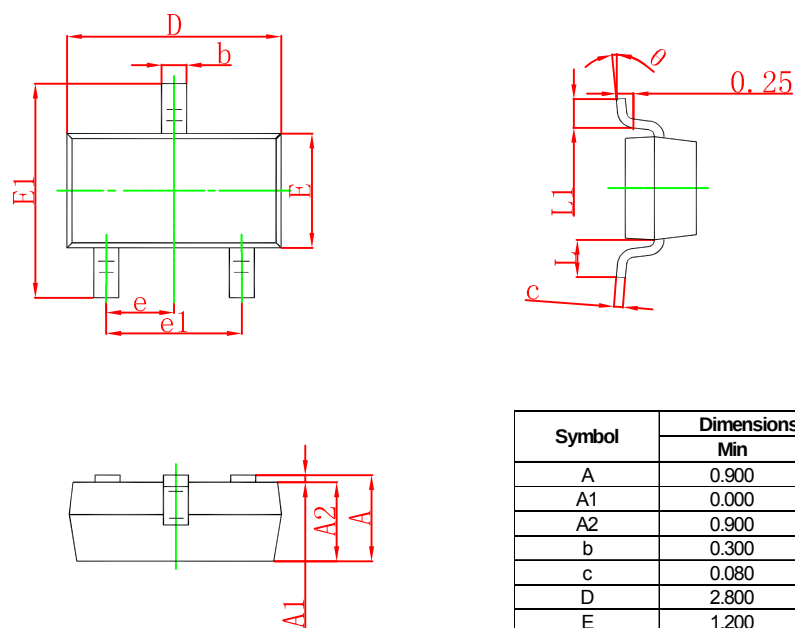
|                 |              |                                                                                                          |  |  |    |    |
|-----------------|--------------|----------------------------------------------------------------------------------------------------------|--|--|----|----|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

\*These parameters have no way to verify.

## Typical Characteristics

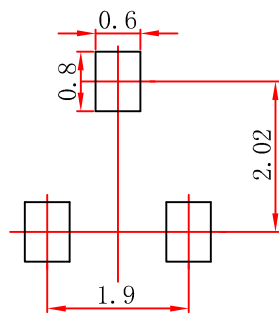


# SOT-23 Package Outline Dimensions



| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min                       | Max   | Min                  | Max   |
| A      | 0.900                     | 1.150 | 0.035                | 0.045 |
| A1     | 0.000                     | 0.100 | 0.000                | 0.004 |
| A2     | 0.900                     | 1.050 | 0.035                | 0.041 |
| b      | 0.300                     | 0.500 | 0.012                | 0.020 |
| c      | 0.080                     | 0.150 | 0.003                | 0.006 |
| D      | 2.800                     | 3.000 | 0.110                | 0.118 |
| E      | 1.200                     | 1.400 | 0.047                | 0.055 |
| E1     | 2.250                     | 2.550 | 0.089                | 0.100 |
| e      | 0.950 TYP                 |       | 0.037 TYP            |       |
| e1     | 1.800                     | 2.000 | 0.071                | 0.079 |
| L      | 0.550 REF                 |       | 0.022 REF            |       |
| L1     | 0.300                     | 0.500 | 0.012                | 0.020 |
| θ      | 0°                        | 8°    | 0°                   | 8°    |

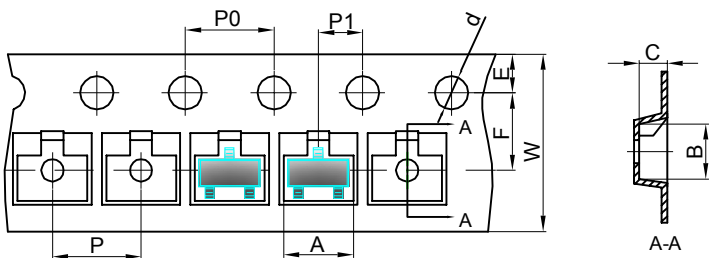
# SOT-23 Suggested Pad Layout



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

SOT-23 Tape and reel

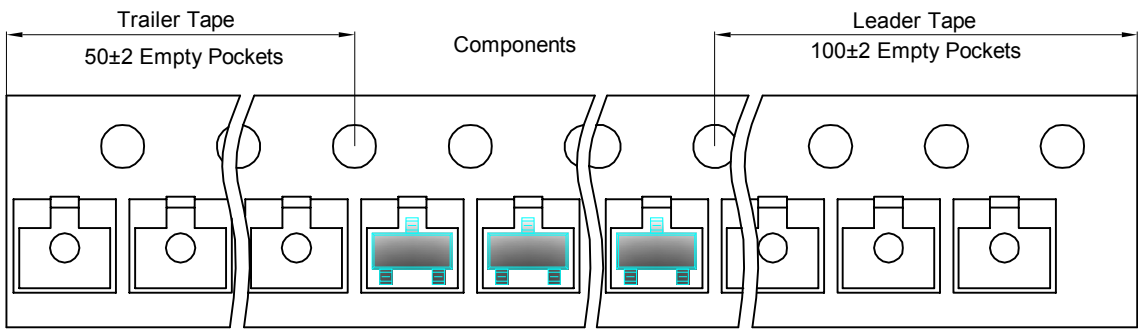
SOT-23 Embossed Carrier Tape



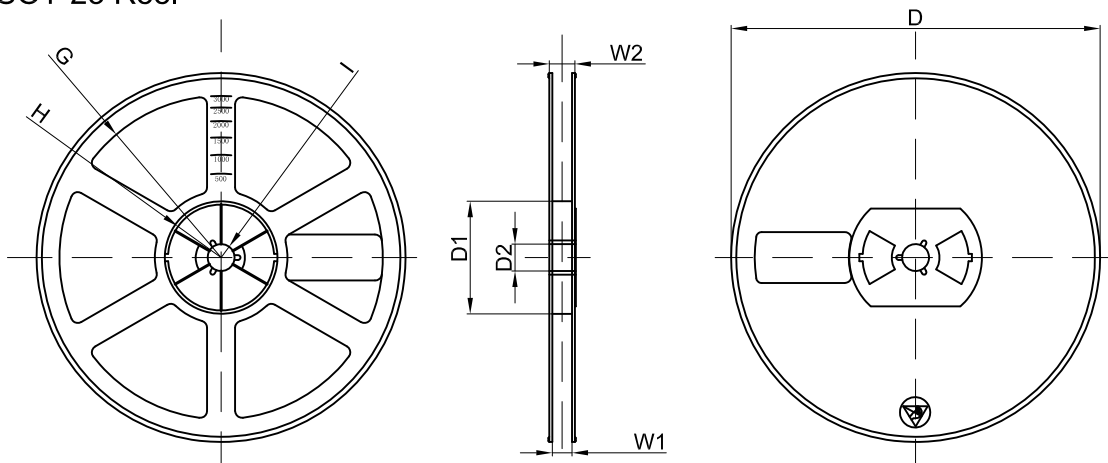
Packaging Description:  
SOT-23 parts are shipped in tape. The carrier tape is made from a dissipative (carbon filled) polycarbonate resin. The cover tape is a multilayer film (Heat Activated Adhesive in nature) primarily composed of polyester film, adhesive layer, sealant, and anti-static sprayed agent. These reeled parts in standard option are shipped with 3,000 units per 7" or 17.8cm diameter reel. The reels are clear in color and is made of polystyrene plastic (anti-static coated).

| Dimensions are in millimeter |      |      |      |       |      |      |      |      |      |      |
|------------------------------|------|------|------|-------|------|------|------|------|------|------|
| Pkg type                     | A    | B    | C    | d     | E    | F    | P0   | P    | P1   | W    |
| SOT-23                       | 3.15 | 2.77 | 1.22 | Ø1.50 | 1.75 | 3.50 | 4.00 | 4.00 | 2.00 | 8.00 |

SOT-23 Tape Leader and Trailer



SOT-23 Reel



| Dimensions are in millimeter |         |       |       |        |        |       |      |       |
|------------------------------|---------|-------|-------|--------|--------|-------|------|-------|
| Reel Option                  | D       | D1    | D2    | G      | H      | I     | W1   | W2    |
| 7"Dia                        | Ø178.00 | 54.40 | 13.00 | R78.00 | R25.60 | R6.50 | 9.50 | 12.30 |

| REEL     | Reel Size | Box        | Box Size(mm) | Carton      | Carton Size(mm) | G.W.(kg) |
|----------|-----------|------------|--------------|-------------|-----------------|----------|
| 3000 pcs | 7 inch    | 30,000 pcs | 203×203×195  | 120,000 pcs | 438×438×220     |          |