



ZHEJIANG UNIU-NE Technology CO., LTD

浙江宇力微新能源科技有限公司



## 78S05M Data Sheet

V 1.1

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## Positive voltage regulators

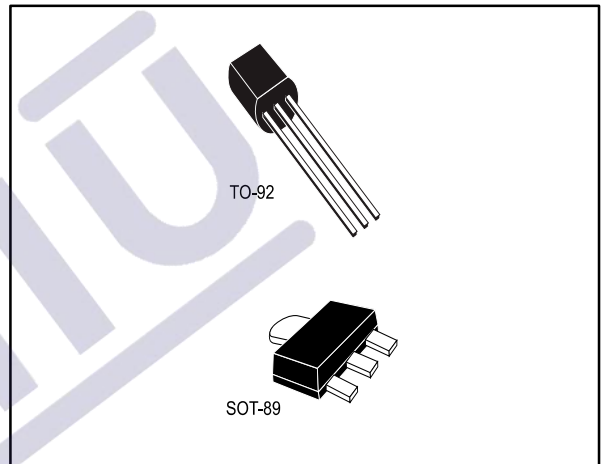
### Description

The 78S05M series of three terminal positive regulators employ internal current limiting and thermal shutdown, making them essentially indestructible. If adequate heat-sink is provided, they can deliver up to 150 mA output current.

They are intended as fixed voltage regulators in a wide range of applications including local or on-card regulation for elimination of noise and distribution problems associated with single-point regulation. In addition, they can be used with power pass elements to make high-current voltage regulators. The 78S05M series used as Zener diode/resistor combination replacement, offers improvement along with lower quiescent current and lower noise.

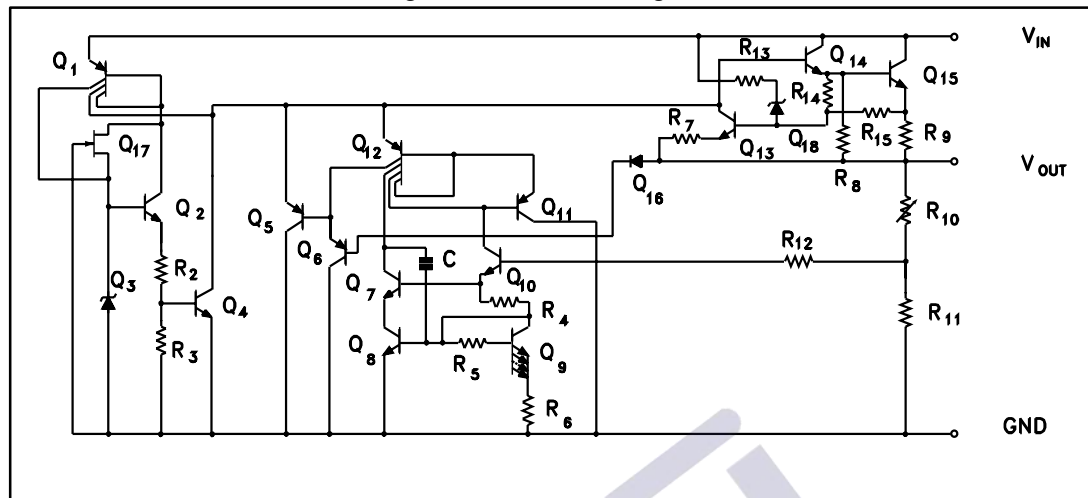
### Features

- Output current up to 150 mA
- Output voltages of 5V
- thermal overload protection
- Internal Short Circuit Current Limiting
- No external components are required
- Available in  $\pm 2\%$



## Diagram

Figure 1: Schematic diagram



## Pin configuration

Figure 2: Pin connection (top view, bottom view for TO-92)

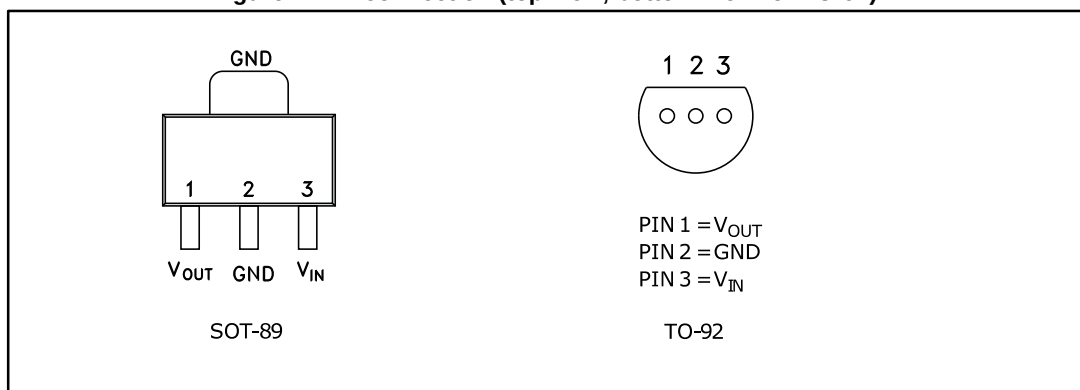
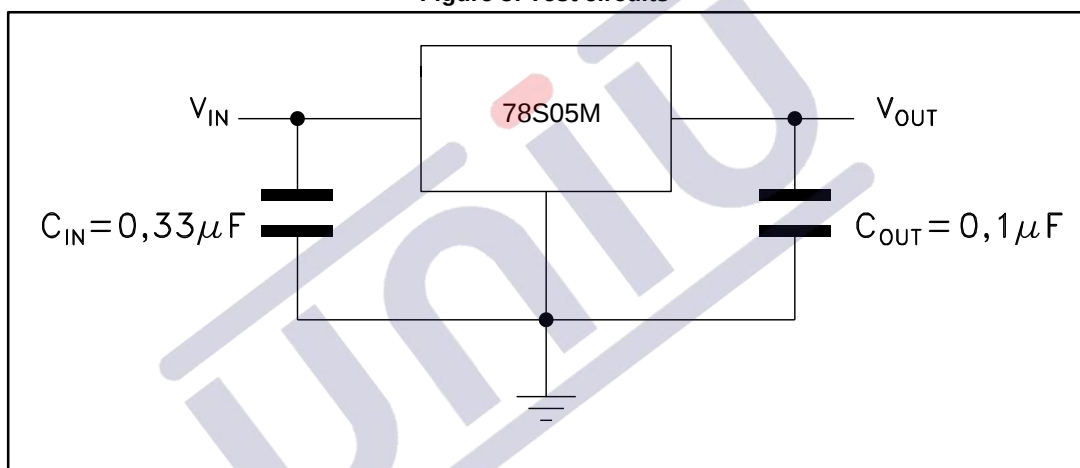


Figure 3: Test circuits



## Maximum ratings

Table 1: Absolute maximum ratings

| Symbol    | Parameter                            |                                     | Value      | Unit |
|-----------|--------------------------------------|-------------------------------------|------------|------|
| $V_I$     | DC Input voltage                     | $V_O = 3.3 \text{ to } 9 \text{ V}$ | 30         | V    |
|           |                                      | $V_O = 12 \text{ to } 15 \text{ V}$ | 35         |      |
| $I_O$     | Output current                       |                                     | 150        | mA   |
| $T_{OP}$  | Operating junction temperature range |                                     | -40 to 125 | °C   |
| $T_{STG}$ | Storage temperature range            |                                     | -55 to 150 | °C   |
| $P_D$     | Power dissipation                    | TO92                                | 500        | mW   |
|           |                                      | SOT89                               | 500        |      |

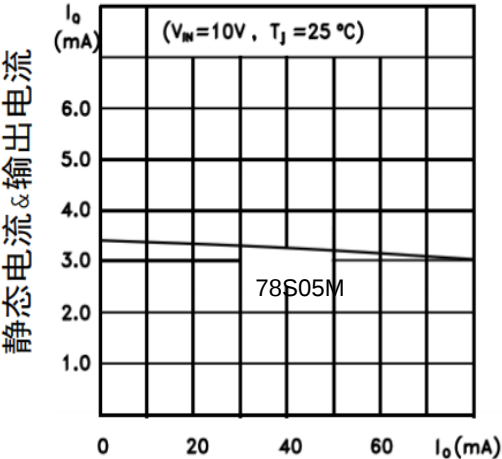
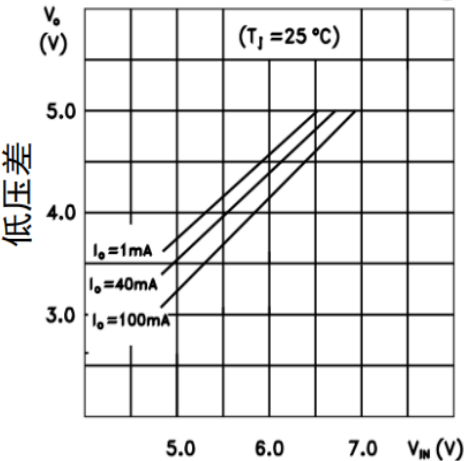
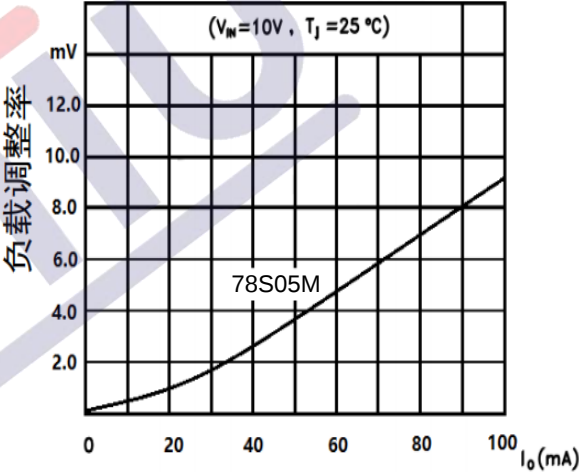
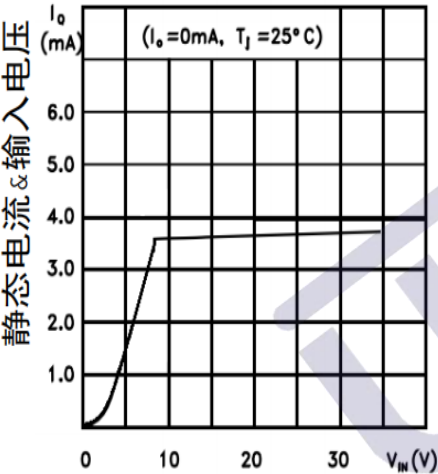
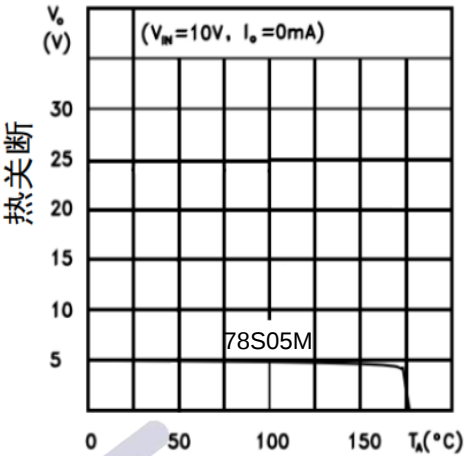
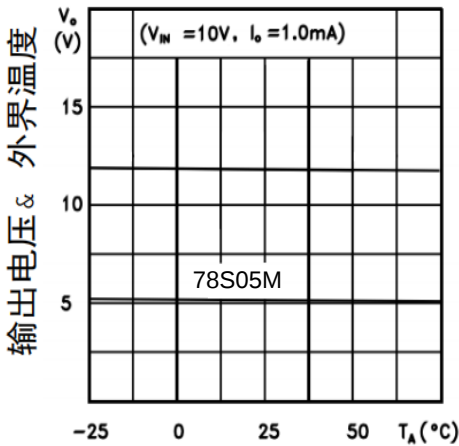
## Electrical characteristics

### ELECTRICAL CHARACTERISTICS

(unless otherwise noted,  $V_i=10V$ ,  $I_o=40mA$ ,  $-30^{\circ}C < T_j < 85^{\circ}C$ ,  $C_1=0.33\mu F$ ,  $C_o=0.1\mu F$ )

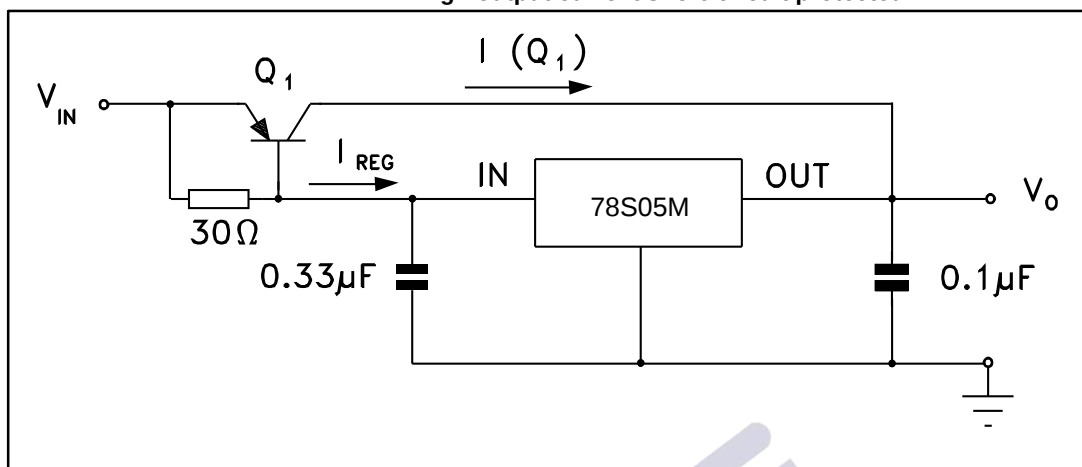
| Characteristics             | Symbol       | Test conditions                                                 | Min. | Typ. | Max. | Unit    |
|-----------------------------|--------------|-----------------------------------------------------------------|------|------|------|---------|
| Output Voltage              | $V_o$        | $T_j=25^{\circ}C$<br>$7V \leq V_i \leq 20V, I_o=5mA \sim 150mA$ | 4.9  |      | 5.1  | V       |
| Load Regulation             | $\Delta V_o$ | $T_j=25^{\circ}C, I_o=5mA \sim 150mA$                           |      | 25   | 100  | mV      |
|                             |              | $T_j=25^{\circ}C, I_o=5mA \sim 100mA$                           |      | 10   | 50   |         |
| Line Regulation             | $\Delta V_o$ | $7V \leq V_i \leq 25V, I_o=100mA$ ,<br>$T_j=25^{\circ}C$        |      | 4    | 100  | mV      |
|                             |              | $8V \leq V_i \leq 25V, I_o=100mA$ ,<br>$T_j=25^{\circ}C$        |      | 2    | 50   |         |
| Quiescent Current           | $I_q$        | $T_j=25^{\circ}C$                                               |      | 3.2  | 6    | mA      |
| Quiescent Current<br>Charge | $\Delta I_q$ | $8V \leq V_i \leq 25V, I_o=100mA$                               |      |      | 0.8  | mA      |
|                             |              | $5mA \leq I_o \leq 150mA$                                       |      |      | 0.5  |         |
| Output noise voltage        | $V_N$        | $10Hz \leq f \leq 100kHz$                                       |      | 40   |      | $\mu V$ |
| Supply voltage rejection    | $RR$         | $10V \leq V_i \leq 20V$ ; $f=120Hz$ ; $T_j=25^{\circ}C$         | 41   | 50   |      | dB      |
| Dropout voltage             | $V_d$        | $T_j=25^{\circ}C$                                               |      | 1.7  |      | V       |

Typical performance

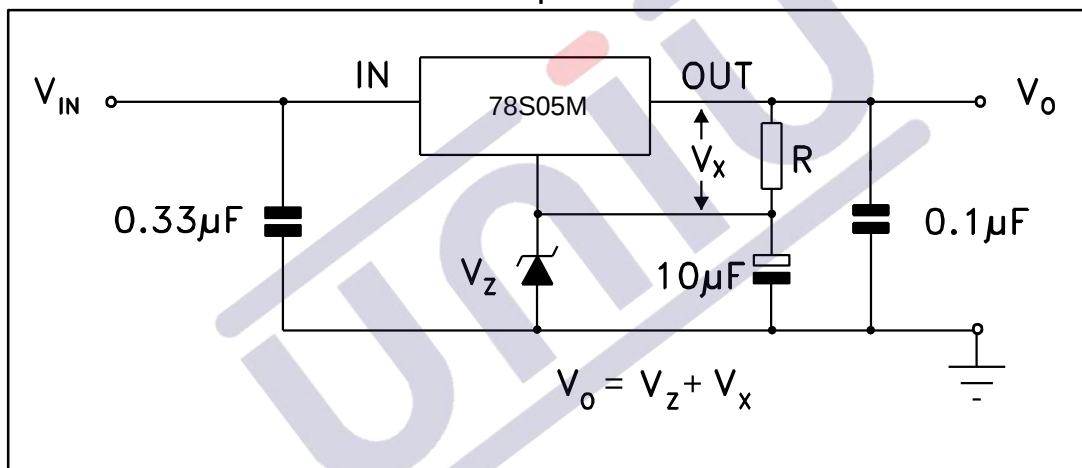


## Typical application

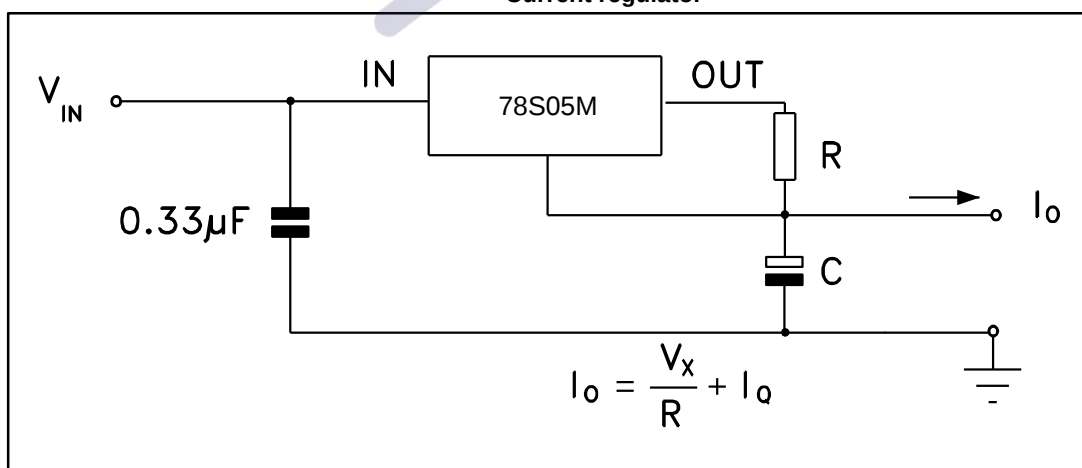
High output current short-circuit protected



Output boost circuit



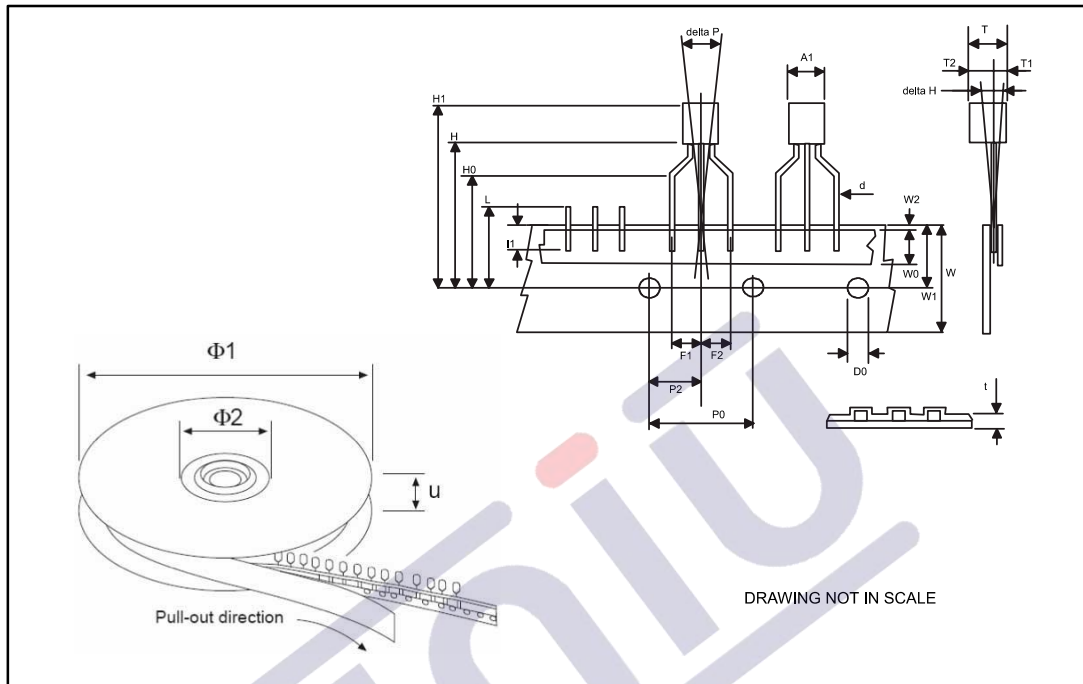
Current regulator



## Package information

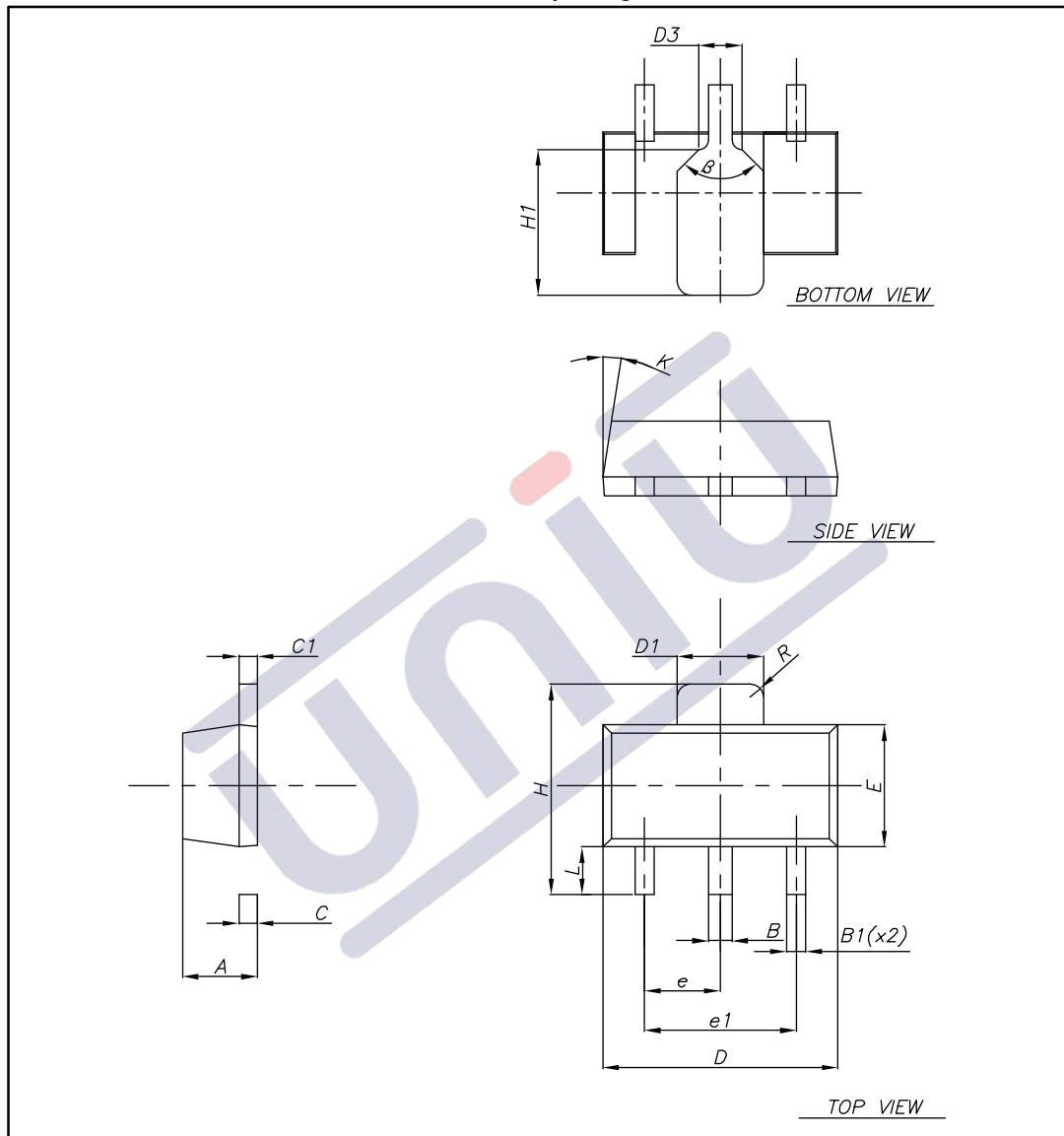
### TO-92 packing information

: TO-92 tape and reel outline



TO-92 tape and reel mechanical data

| Dim.    | mm    |       |       |
|---------|-------|-------|-------|
|         | Min.  | Typ.  | Max.  |
| A1      |       |       | 4.80  |
| T       |       |       | 3.80  |
| T1      |       |       | 1.60  |
| T2      |       |       | 2.30  |
| d       | 0.45  | 0.47  | 0.48  |
| P0      | 12.50 | 12.70 | 12.90 |
| P2      | 5.65  | 6.35  | 7.05  |
| F1, F2  | 2.40  | 2.50  | 2.94  |
| F3      | 4.98  | 5.08  | 5.48  |
| delta H | -2.00 |       | 2.00  |
| W       | 17.50 | 18.00 | 19.00 |
| W0      | 5.5   | 6.00  | 6.5   |
| W1      | 8.50  | 9.00  | 9.25  |
| W2      |       |       | 0.50  |
| H       |       | 18.50 | 21    |
| H3      | 0.5   | 1     | 2     |
| H0      | 15.50 | 16.00 | 18.8  |
| H1      |       | 25.0  | 27.0  |
| D0      | 3.80  | 4.00  | 4.20  |
| t       |       |       | 0.90  |
| L       |       |       | 11.00 |
| l1      | 3.00  |       |       |
| delta P | -1.00 |       | 1.00  |
| Ø1      | 352   | 355   | 358   |
| Ø2      | 28    | 30    | 32    |
| u       | 44    | 47    | 50    |

**SOT-89 package information****SOT-89 package outline**

SOT -89 mechanical data

| Dim. | mm   |      |      |
|------|------|------|------|
|      | Min. | Typ. | Max. |
| A    | 1.40 |      | 1.60 |
| B    | 0.44 |      | 0.56 |
| B1   | 0.36 |      | 0.48 |
| C    | 0.35 |      | 0.44 |
| C1   | 0.35 |      | 0.44 |
| D    | 4.40 |      | 4.60 |
| D1   | 1.62 |      | 1.83 |
| D3   |      | 0.90 |      |
| E    | 2.29 |      | 2.60 |
| e    | 1.42 |      | 1.57 |
| e1   | 2.92 |      | 3.07 |
| H    | 3.94 |      | 4.25 |
| H1   | 2.70 |      | 3.10 |
| K    | 1°   |      | 8°   |
| L    | 0.89 |      | 120  |
| R    |      | 0.25 |      |
| β    |      | 90°  |      |

SOT-89 carrier tape outline

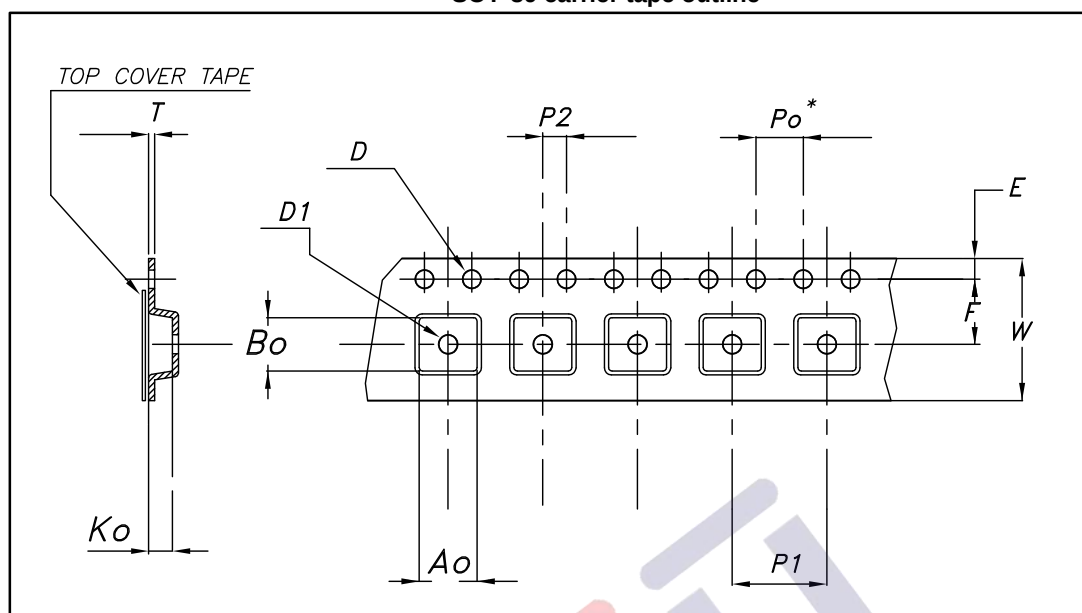


Table : SOT8-89 carrier tape mechanical data

| Dim. | mm     |           |
|------|--------|-----------|
|      | Value  | Tolerance |
| Ao   | 4.91   | ± 0.10    |
| Bo   | 4.52   | ± 0.10    |
| Ko   | 1.90   | ± 0.10    |
| F    | 5.50   | ± 0.10    |
| E    | 1.75   | ± 0.10    |
| W    | 12     | ± 0.30    |
| P2   | 2      | ± 0.10    |
| Po   | 4      | ± 0.10    |
| P1   | 8      | ± 0.10    |
| T    | 0.30   | ± 0.10    |
| D    | Ø 1.55 | ± 0.05    |
| D1   | Ø 1.60 | ± 0.10    |

## 1.版本记录

| DATE       | REV. | DESCRIPTION       |
|------------|------|-------------------|
| 2018/04/19 | 1.0  | First Release     |
| 2021/11/10 | 1.1  | Layout adjustment |
|            |      |                   |
|            |      |                   |

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