



## **TO-92L Plastic-Encapsulate Transistors**

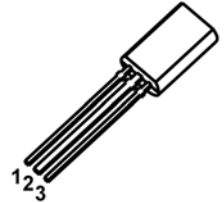
### **TPT5610** TRANSISTOR (PNP)

#### **FEATURES**

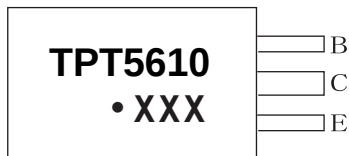
- Excellent Linearity of Current Gain
- Low saturation voltage
- Complementary to TPT5609

#### **TO-92L**

1. EMITTER
2. COLLECTOR
3. BASE

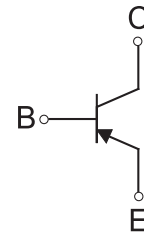


#### **MARKING**



TPT5610=Device code  
Solid dot= Green molding compound device,  
if none, the normal device  
XXX=Code

#### **Equivalent Circuit**



#### **ORDERING INFORMATION**

| Part Number | Package | Packing Method | Pack Quantity |
|-------------|---------|----------------|---------------|
| TPT5610     | TO-92L  | Bulk           | 500pcs/Bag    |
| TPT5610-TA  | TO-92L  | Tape           | 2000pcs/Box   |

#### **MAXIMUM RATINGS** (T<sub>a</sub>=25°C unless otherwise noted)

| Symbol                            | Parameter                                        | Value   | Unit |
|-----------------------------------|--------------------------------------------------|---------|------|
| V <sub>CBO</sub>                  | Collector- Base Voltage                          | -25     | V    |
| V <sub>CEO</sub>                  | Collector-Emitter Voltage                        | -20     | V    |
| V <sub>EBO</sub>                  | Emitter-Base Voltage                             | -5      | V    |
| I <sub>C</sub>                    | Collector Current -Continuous                    | -1      | A    |
| P <sub>C</sub>                    | Collector Power Dissipation                      | 1       | W    |
| T <sub>J</sub> , T <sub>stg</sub> | Operation Junction and Storage Temperature Range | -55-150 | °C   |

## ELECTRICAL CHARACTERISTICS

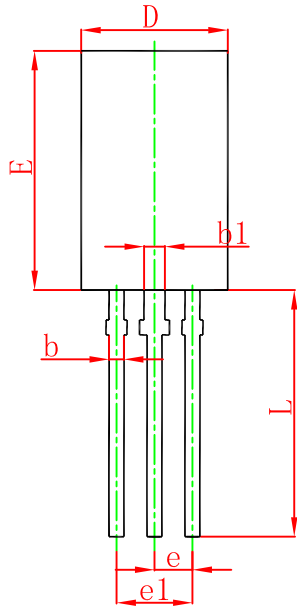
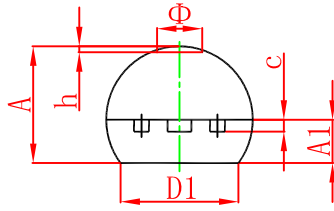
$T_a = 25^\circ\text{C}$  unless otherwise specified

| Parameter                            | Symbol        | Test conditions                                        | Min | Typ | Max  | Unit          |
|--------------------------------------|---------------|--------------------------------------------------------|-----|-----|------|---------------|
| Collector-base breakdown voltage     | $V_{(BR)CBO}$ | $I_C = -10\mu\text{A}$ , $I_E = 0$                     | -25 |     |      | V             |
| Collector-emitter breakdown voltage  | $V_{(BR)CEO}$ | $I_C = -1\text{mA}$ , $I_B = 0$                        | -20 |     |      | V             |
| Emitter-base breakdown voltage       | $V_{(BR)EBO}$ | $I_E = -10\mu\text{A}$ , $I_C = 0$                     | -5  |     |      | V             |
| Collector cut-off current            | $I_{CBO}$     | $V_{CB} = -20\text{V}$ , $I_E = 0$                     |     |     | -1   | $\mu\text{A}$ |
| Emitter cut-off current              | $I_{EBO}$     | $V_{EB} = -5\text{V}$ , $I_C = 0$                      |     |     | -1   | $\mu\text{A}$ |
| DC current gain                      | $h_{FE}$      | $V_{CE} = -2\text{V}$ , $I_C = -500\text{mA}$          | 60  |     | 240  |               |
| Collector-emitter saturation voltage | $V_{CE(sat)}$ | $I_C = -800\text{mA}$ , $I_B = -80\text{mA}$           |     |     | -0.5 | V             |
| Base-emitter voltage                 | $V_{BE}$      | $V_{CE} = -2\text{V}$ , $I_C = -500\text{mA}$          |     |     | -1   | V             |
| Transition frequency                 | $f_T$         | $V_{CE} = -2\text{V}$ , $I_C = -500\text{mA}$          |     | 350 |      | MHz           |
| Collector output capacitance         | $C_{ob}$      | $V_{CB} = -10\text{V}$ , $I_E = 0$ , $f = 1\text{MHz}$ |     | 38  |      | pF            |

### CLASSIFICATION OF $h_{FE}$

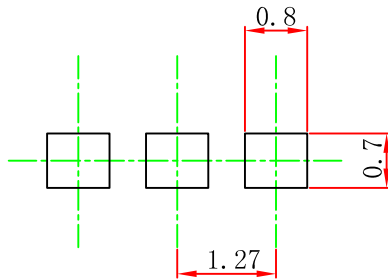
| Rank  | A      | B      | C       |
|-------|--------|--------|---------|
| Range | 60-120 | 85-170 | 120-240 |

## TO-92L Package Outline Dimensions



| Symbol | Dimensions In Millimeters |        | Dimensions In Inches |       |
|--------|---------------------------|--------|----------------------|-------|
|        | Min.                      | Max.   | Min.                 | Max.  |
| A      | 3.750                     | 4.050  | 0.148                | 0.159 |
| A1     | 1.280                     | 1.580  | 0.050                | 0.062 |
| b      | 0.380                     | 0.550  | 0.015                | 0.022 |
| b1     | 0.620                     | 0.780  | 0.024                | 0.031 |
| c      | 0.350                     | 0.450  | 0.014                | 0.018 |
| D      | 4.750                     | 5.050  | 0.187                | 0.199 |
| D1     | 4.000                     |        | 0.157                |       |
| E      | 7.850                     | 8.150  | 0.309                | 0.321 |
| e      | 1.270 TYP.                |        | 0.050 TYP.           |       |
| e1     | 2.440                     | 2.640  | 0.096                | 0.104 |
| L      | 13.800                    | 14.200 | 0.543                | 0.559 |
| Φ      |                           | 1.600  |                      | 0.063 |
| h      | 0.000                     | 0.300  | 0.000                | 0.012 |

## TO-92L Suggested Pad Layout



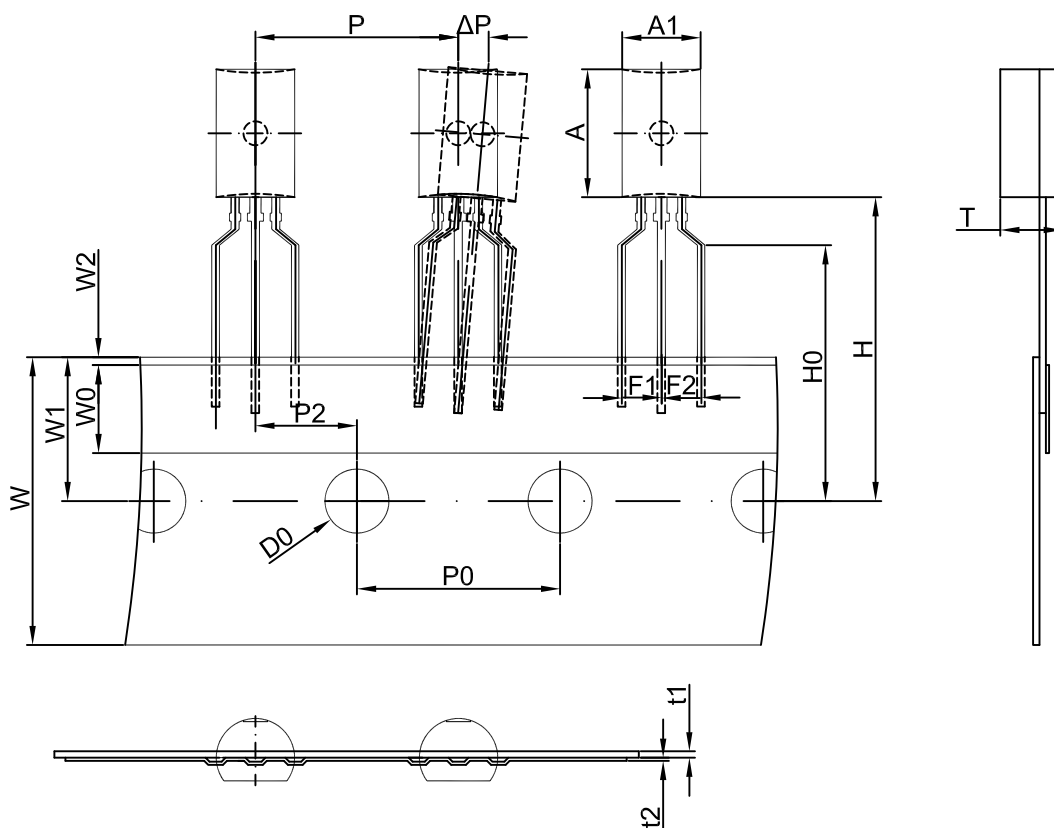
Note:

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

### NOTICE

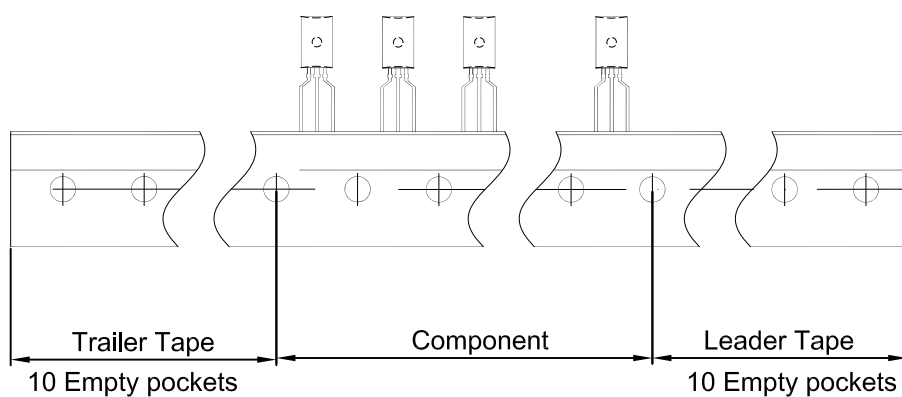
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## TO-92L PACKAGE TAPING DIMENSION



Dimensions are in millimeter

| A1  | A   | T   | P    | P0   | P2   | F1  | F2  | W    |
|-----|-----|-----|------|------|------|-----|-----|------|
| 4.9 | 8.0 | 3.9 | 12.7 | 12.7 | 6.35 | 2.5 | 2.5 | 18.0 |
| W0  | W1  | W2  | H    | H0   | D0   | t1  | t2  | ΔP   |
| 6.0 | 9.0 | 1.0 | 19.0 | 16.0 | 4.0  | 0.4 | 0.2 | 0    |



| Package | Box      | Box Size(mm) | Carton     | Carton Size(mm) |
|---------|----------|--------------|------------|-----------------|
| TO-92L  | 2000 pcs | 333×203×42   | 20,000 pcs | 493×400×264     |