

## TO-92 Plastic-Encapsulate Transistors

### 2N4124 TRANSISTOR (NPN)

#### FEATURES

- High DC Current Gain
- High Transition Frequency

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

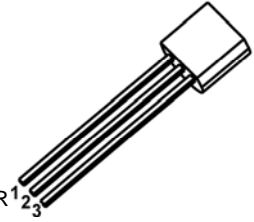
| Symbol          | Parameter                                   | Value    | Unit                        |
|-----------------|---|----------|-----------------------------|
| $V_{CBO}$       | Collector-Base Voltage                      | 30       | V                           |
| $V_{CEO}$       | Collector-Emitter Voltage                   | 25       | V                           |
| $V_{EBO}$       | Emitter-Base Voltage                        | 5        | V                           |
| $I_C$           | Collector Current                           | 0.2      | A                           |
| $P_C$           | Collector Power Dissipation                 | 350      | mW                          |
| $R_{\theta JA}$ | Thermal Resistance From Junction To Ambient | 357      | $^{\circ}\text{C}/\text{W}$ |
| $T_j$           | Junction Temperature                        | 150      | $^{\circ}\text{C}$          |
| $T_{stg}$       | Storage Temperature                         | -55~+150 | $^{\circ}\text{C}$          |

#### TO - 92

1. EMITTER

2. BASE

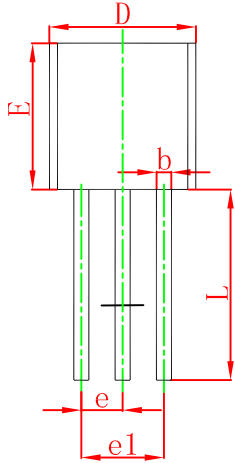
3. COLLECTOR<sup>1</sup><sub>2</sub><sup>3</sup>



#### ELECTRICAL CHARACTERISTICS ( $T_a=25^{\circ}\text{C}$ unless otherwise specified)

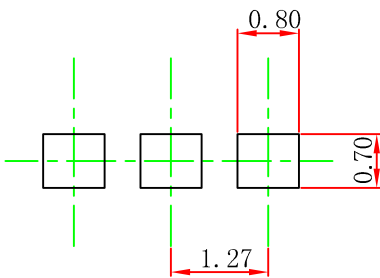
| Parameter                            | Symbol        | Test conditions                                       | Min | Typ | Max  | Unit |
|--------------------------------------|---------------|---|-----|-----|------|------|
| Collector-base breakdown voltage     | $V_{(BR)CBO}$ | $I_C=0.01\text{mA}, I_E=0$                            | 30  |     |      | V    |
| Collector-emitter breakdown voltage  | $V_{(BR)CEO}$ | $I_C=1\text{mA}, I_B=0$                               | 25  |     |      | V    |
| Emitter-base breakdown voltage       | $V_{(BR)EBO}$ | $I_E=0.01\text{mA}, I_C=0$                            | 5   |     |      | V    |
| Collector cut-off current            | $I_{CBO}$     | $V_{CB}=20\text{V}, I_E=0$                            |     |     | 50   | nA   |
| Emitter cut-off current              | $I_{EBO}$     | $V_{EB}=3\text{V}, I_C=0$                             |     |     | 50   | nA   |
| DC current gain                      | $h_{FE(1)}$   | $V_{CE}=1\text{V}, I_C=2\text{mA}$                    | 120 |     | 360  |      |
|                                      | $h_{FE(2)}$   | $V_{CE}=1\text{V}, I_C=50\text{mA}$                   | 60  |     |      |      |
| Collector-emitter saturation voltage | $V_{CE(sat)}$ | $I_C=50\text{mA}, I_B=5\text{mA}$                     |     |     | 0.3  | V    |
| Base-emitter saturation voltage      | $V_{BE(sat)}$ | $I_C=50\text{mA}, I_B=5\text{mA}$                     |     |     | 0.95 | V    |
| Collector output capacitance         | $C_{ob}$      | $V_{CB}=5\text{V}, I_E=0, f=1\text{MHz}$              |     |     | 4    | pF   |
| Transition frequency                 | $f_T$         | $V_{CE}=20\text{V}, I_C=10\text{mA}, f=100\text{MHz}$ | 300 |     |      | MHz  |

## TO-92 Package Outline Dimensions



| Symbol | Dimensions In Millimeters |        | Dimensions In Inches |       |
|--------|---------------------------|--------|----------------------|-------|
|        | Min                       | Max    | Min                  | Max   |
| A      | 3.300                     | 3.700  | 0.130                | 0.146 |
| A1     | 1.100                     | 1.400  | 0.043                | 0.055 |
| b      | 0.380                     | 0.550  | 0.015                | 0.022 |
| c      | 0.360                     | 0.510  | 0.014                | 0.020 |
| D      | 4.300                     | 4.700  | 0.169                | 0.185 |
| D1     | 3.430                     |        | 0.135                |       |
| E      | 4.300                     | 4.700  | 0.169                | 0.185 |
| e      | 1.270 TYP                 |        | 0.050 TYP            |       |
| e1     | 2.440                     | 2.640  | 0.096                | 0.104 |
| L      | 14.100                    | 14.500 | 0.555                | 0.571 |
| Φ      |                           | 1.600  |                      | 0.063 |
| h      | 0.000                     | 0.380  | 0.000                | 0.015 |

## TO-92 Suggested Pad Layout



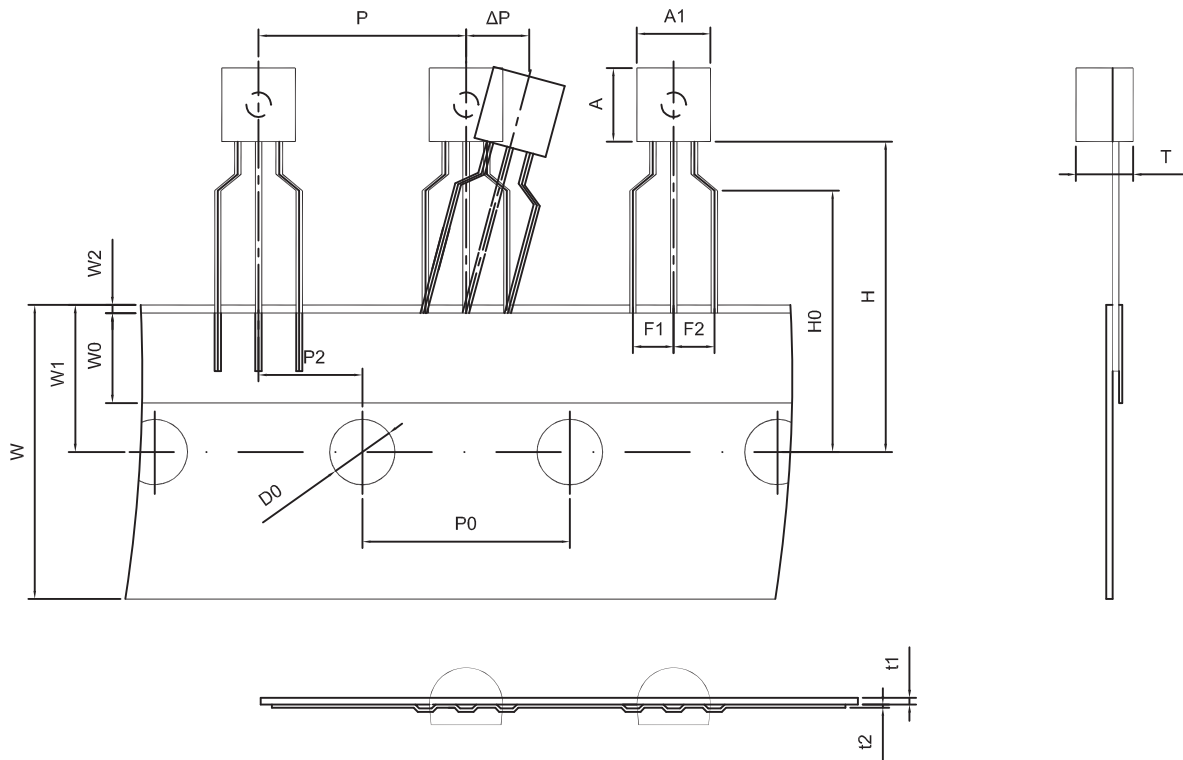
### Note:

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

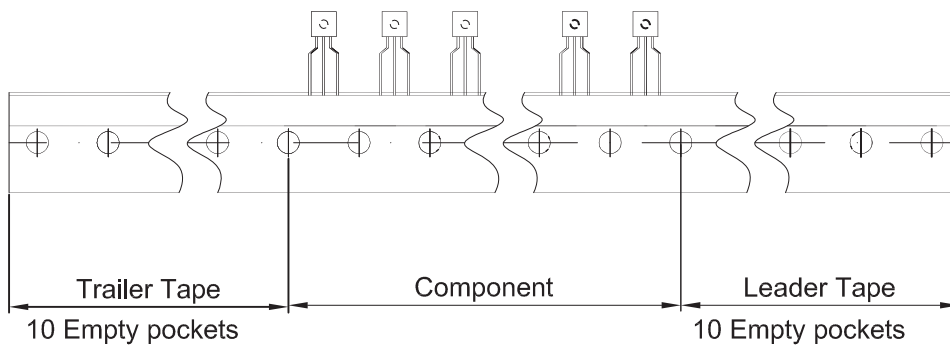
### NOTICE

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TO-92 PACKAGE TAPEING DIMENSION



| Dimiensions are in millimeter |     |          |      |      |      |     |     |      |
|-------------------------------|-----|----------|------|------|------|-----|-----|------|
| A1                            | A   | T        | P    | P0   | P2   | F1  | F2  | W    |
| 4.5                           | 4.5 | 3.5      | 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 MAX. | 19.0 | 16.0 | 4.0  | 0.4 | 0.2 | 0    |



| Package | Box      | Box Size(mm) | Carton     | Carton Size(mm) |
|---------|----------|--------------|------------|-----------------|
| TO-92   | 2000 pcs | 333×162×43   | 20,000 pcs | 350×340×250     |