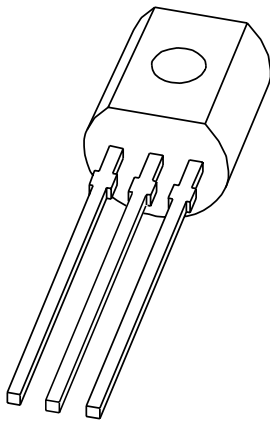


# DATA SHEET



**2N5088**

**NPN general purpose transistor**

Product specification  
Supersedes data of 1997 Jul 03  
File under Discrete Semiconductors, SC04

1997 Sep 03

# NPN general purpose transistor

# 2N5088

## FEATURES

- Low current (max. 100 mA)
- Low voltage (max. 30 V).

## APPLICATIONS

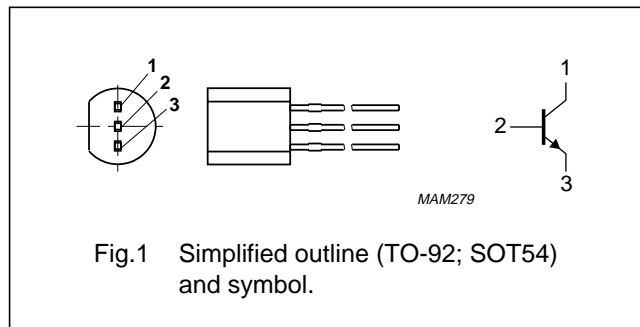
- Low noise stages in audio equipment.

## DESCRIPTION

NPN transistor in a TO-92; SOT54 plastic package.  
PNP complement: 2N5087.

## PINNING

| PIN | DESCRIPTION |
|-----|-------------|
| 1   | collector   |
| 2   | base        |
| 3   | emitter     |



## QUICK REFERENCE DATA

| SYMBOL    | PARAMETER                 | CONDITIONS  | MIN. | MAX. | UNIT |
|-----------|---------------------------|---|------|------|------|
| $V_{CBO}$ | collector-base voltage    | open emitter  | –    | 35   | V    |
| $V_{CEO}$ | collector-emitter voltage | open base   | –    | 30   | V    |
| $I_{CM}$  | peak collector current    |   | –    | 200  | mA   |
| $P_{tot}$ | total power dissipation   | $T_{amb} \leq 25\text{ }^\circ\text{C}$   | –    | 500  | mW   |
| $h_{FE}$  | DC current gain           | $I_C = 1\text{ mA}; V_{CE} = 5\text{ V}$  | 350  | –    |      |
| $f_T$     | transition frequency      | $I_C = 500\text{ }\mu\text{A}; V_{CE} = 5\text{ V}; f = 100\text{ MHz}$   | 50   | –    | MHz  |
| F         | noise figure              | $I_C = 200\text{ }\mu\text{A}; V_{CE} = 5\text{ V}; R_S = 2\text{ k}\Omega;$<br>$f = 10\text{ Hz to }15.7\text{ kHz}$ | –    | 3    | dB   |

## NPN general purpose transistor

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**LIMITING VALUES**

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL    | PARAMETER                     | CONDITIONS                           | MIN. | MAX. | UNIT |
|-----------|-------------------------------|--------------------------------------|------|------|------|
| $V_{CBO}$ | collector-base voltage        | open emitter                         | –    | 35   | V    |
| $V_{CEO}$ | collector-emitter voltage     | open base                            | –    | 30   | V    |
| $V_{EBO}$ | emitter-base voltage          | open collector                       | –    | 4.5  | V    |
| $I_C$     | collector current (DC)        |                                      | –    | 100  | mA   |
| $I_{CM}$  | peak collector current        |                                      | –    | 200  | mA   |
| $I_{BM}$  | peak base current             |                                      | –    | 200  | mA   |
| $P_{tot}$ | total power dissipation       | $T_{amb} \leq 25\text{ °C}$ ; note 1 | –    | 500  | mW   |
| $T_{stg}$ | storage temperature           |                                      | –65  | +150 | °C   |
| $T_j$     | junction temperature          |                                      | –    | 150  | °C   |
| $T_{amb}$ | operating ambient temperature |                                      | –65  | +150 | °C   |

**Note**

1. Transistor mounted on an FR4 printed-circuit board.

**THERMAL CHARACTERISTICS**

| SYMBOL        | PARAMETER                                   | CONDITIONS | VALUE | UNIT |
|---------------|---|------------|-------|------|
| $R_{th\ j-a}$ | thermal resistance from junction to ambient | note 1     | 250   | K/W  |

**Note**

1. Transistor mounted on an FR4 printed-circuit board.

**CHARACTERISTICS** $T_j = 25\text{ °C}$  unless otherwise specified.

| SYMBOL      | PARAMETER                            | CONDITIONS   | MIN. | MAX. | UNIT |
|-------------|--------------------------------------|--|------|------|------|
| $I_{CBO}$   | collector cut-off current            | $I_E = 0$ ; $V_{CB} = 20\text{ V}$   | –    | 50   | nA   |
| $I_{EBO}$   | emitter cut-off current              | $I_C = 0$ ; $V_{EB} = 4.5\text{ V}$  | –    | 50   | nA   |
| $h_{FE}$    | DC current gain                      | $I_C = 100\text{ }\mu\text{A}$ ; $V_{CE} = 5\text{ V}$   | 300  | 900  |      |
|             |                                      | $I_C = 1\text{ mA}$ ; $V_{CE} = 5\text{ V}$  | 350  | –    |      |
|             |                                      | $I_C = 10\text{ mA}$ ; $V_{CE} = 5\text{ V}$   | 300  | –    |      |
| $V_{CEsat}$ | collector-emitter saturation voltage | $I_C = 10\text{ mA}$ ; $I_B = 1\text{ mA}$   | –    | 500  | mV   |
| $V_{BE}$    | base-emitter voltage                 | $I_C = 10\text{ mA}$ ; $V_{CE} = 5\text{ V}$   | –    | 800  | mV   |
| $C_c$       | collector capacitance                | $I_E = i_e = 0$ ; $V_{CB} = 5\text{ V}$ ; $f = 1\text{ MHz}$   | –    | 4    | pF   |
| $C_e$       | emitter capacitance                  | $I_C = i_c = 0$ ; $V_{EB} = 0.5\text{ V}$ ; $f = 1\text{ MHz}$   | –    | 12   | pF   |
| $f_T$       | transition frequency                 | $I_C = 500\text{ }\mu\text{A}$ ; $V_{CE} = 5\text{ V}$ ; $f = 100\text{ MHz}$  | 50   | –    | MHz  |
| F           | noise figure                         | $I_C = 200\text{ }\mu\text{A}$ ; $V_{CE} = 5\text{ V}$ ; $R_S = 2\text{ k}\Omega$ ;<br>$f = 10\text{ Hz to }15.7\text{ kHz}$ | –    | 3    | dB   |

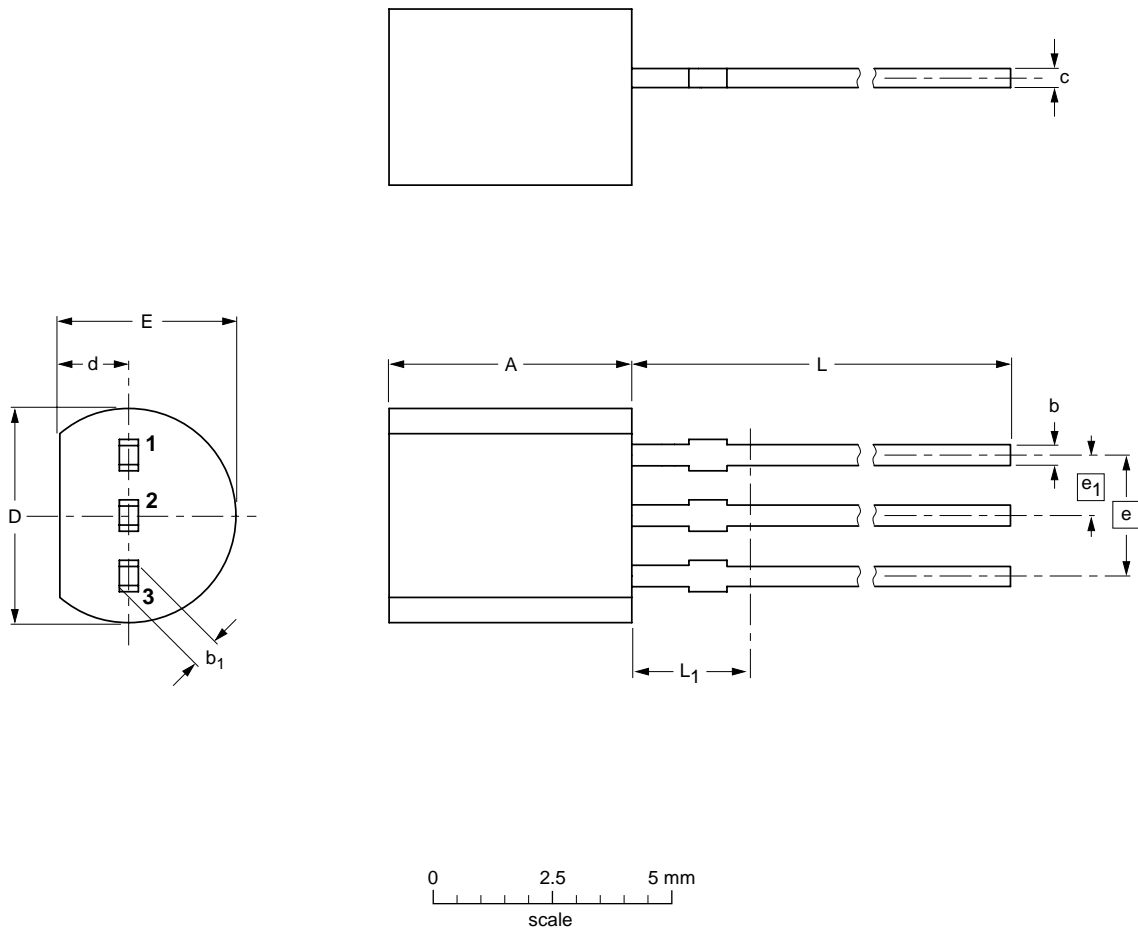
NPN general purpose transistor

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PACKAGE OUTLINE

Plastic single-ended leaded (through hole) package; 3 leads

SOT54



DIMENSIONS (mm are the original dimensions)

| UNIT | A          | b            | b <sub>1</sub> | c            | D          | d          | E          | e    | e <sub>1</sub> | L            | L <sub>1</sub> <sup>(1)</sup> |
|------|------------|--------------|----------------|--------------|------------|------------|------------|------|----------------|--------------|-------------------------------|
| mm   | 5.2<br>5.0 | 0.48<br>0.40 | 0.66<br>0.56   | 0.45<br>0.40 | 4.8<br>4.4 | 1.7<br>1.4 | 4.2<br>3.6 | 2.54 | 1.27           | 14.5<br>12.7 | 2.5                           |

Note

1. Terminal dimensions within this zone are uncontrolled to allow for flow of plastic and terminal irregularities.

| OUTLINE VERSION | REFERENCES |       |       | EUROPEAN PROJECTION | ISSUE DATE |
|-----------------|------------|-------|-------|---------------------|------------|
|                 | IEC        | JEDEC | EIAJ  |                     |            |
| SOT54           |            | TO-92 | SC-43 |                     | 97-02-28   |

## NPN general purpose transistor

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**DEFINITIONS**

| <b>Data Sheet Status</b>  |   |
|---|---|
| Objective specification   | This data sheet contains target or goal specifications for product development.       |
| Preliminary specification   | This data sheet contains preliminary data; supplementary data may be published later. |
| Product specification   | This data sheet contains final product specifications.                                |
| <b>Limiting values</b>  |   |
| Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability. |   |
| <b>Application information</b>  |   |
| Where application information is given, it is advisory and does not form part of the specification.   |   |

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NPN general purpose transistor

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**NOTES**

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**NOTES**

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Printed in The Netherlands

117047/00/03/pp8

Date of release: 1997 Sep 03

Document order number: 9397 750 02824

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