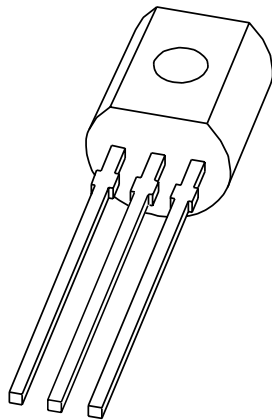


DATA SHEET



2N5400; 2N5401 **PNP high-voltage transistors**

Product specification
Supersedes data of September 1994
File under Discrete Semiconductors, SC04

1997 May 22

PNP high-voltage transistors

2N5400; 2N5401

FEATURES

- Low current (max. 300 mA)
- High voltage (max. 150 V).

APPLICATIONS

- General purpose switching and amplification
- Telephony applications.

DESCRIPTION

PNP high-voltage transistor in a TO-92; SOT54 plastic package. NPN complements: 2N5550 and 2N5551.

PINNING

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

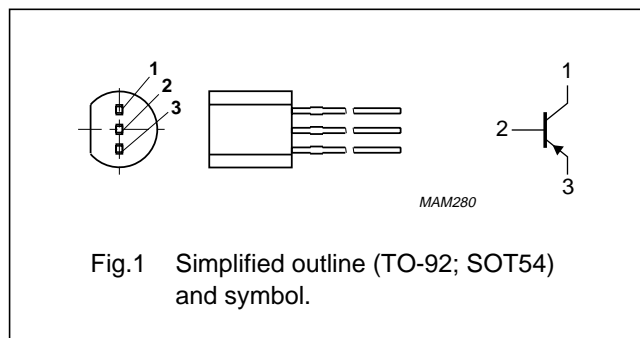


Fig.1 Simplified outline (TO-92; SOT54) and symbol.

QUICK REFERENCE DATA

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|------------------|---------------------------|---|------|------|------|
| V _{CBO} | collector-base voltage | open emitter | | | |
| | 2N5400 | | – | –130 | V |
| | 2N5401 | | – | –160 | V |
| V _{CEO} | collector-emitter voltage | open base | | | |
| | 2N5400 | | – | –120 | V |
| | 2N5401 | | – | –150 | V |
| I _{CM} | peak collector current | | – | –600 | mA |
| P _{tot} | total power dissipation | T _{amb} ≤ 25 °C | – | 630 | mW |
| h _{FE} | DC current gain | I _C = 10 mA; V _{CE} = –5 V | | | |
| | 2N5400 | | 40 | – | |
| | 2N5401 | | 60 | – | |
| f _T | transition frequency | I _C = –10 mA; V _{CE} = –10 V; f = 100 MHz | | | |
| | 2N5400 | | 100 | 400 | MHz |
| | 2N5401 | | 100 | 300 | MHz |

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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 | | | |
| | 2N5400 | | – | –130 | V |
| | 2N5401 | | – | –160 | V |
| V _{CEO} | collector-emitter voltage | open base | | | |
| | 2N5400 | | – | –120 | V |
| | 2N5401 | | – | –150 | V |
| V _{EBO} | emitter-base voltage | open collector | – | –5 | V |
| I _C | collector current (DC) | | – | –300 | mA |
| I _{CM} | peak collector current | | – | –600 | mA |
| I _{BM} | peak base current | | – | –100 | mA |
| P _{tot} | total power dissipation | T _{amb} ≤ 25 °C | – | 630 | mW |
| T _{stg} | storage temperature | | –65 | +150 | °C |
| T _j | junction temperature | | – | 150 | °C |
| T _{amb} | operating ambient temperature | | –65 | +150 | °C |

THERMAL CHARACTERISTICS

| SYMBOL | PARAMETER | CONDITIONS | VALUE | UNIT |
|---------------------|---|------------|-------|------|
| R _{th j-a} | thermal resistance from junction to ambient | note 1 | 200 | K/W |

Note

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

PNP high-voltage transistors

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CHARACTERISTICS

$T_{amb} = 25\text{ °C}$ unless otherwise specified.

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|-------------|--|---|------|------|---------------|
| I_{CBO} | collector cut-off current 2N5400 | $I_E = 0; V_{CB} = -100\text{ V}$ | – | –100 | nA |
| | | $I_E = 0; V_{CB} = -100\text{ V}; T_{amb} = 100\text{ °C}$ | – | –100 | μA |
| I_{CBO} | collector cut-off current 2N5401 | $I_E = 0; V_{CB} = -120\text{ V}$ | – | –50 | nA |
| | | $I_E = 0; V_{CB} = -120\text{ V}; T_{amb} = 100\text{ °C}$ | – | –50 | μA |
| I_{EBO} | emitter cut-off current | $I_C = 0; V_{EB} = -4\text{ V}$ | – | –50 | nA |
| h_{FE} | DC current gain 2N5400 2N5401 | $I_C = -1\text{ mA}; V_{CE} = -5\text{ V};$ see Fig.2 | 30 | – | |
| | | | 50 | – | |
| h_{FE} | DC current gain 2N5400 2N5401 | $I_C = -10\text{ mA}; V_{CE} = -5\text{ V};$ see Fig.2 | 40 | 180 | |
| | | | 60 | 240 | |
| h_{FE} | DC current gain 2N5400 2N5401 | $I_C = -50\text{ mA}; V_{CE} = -5\text{ V};$ see Fig.2 | 40 | – | |
| | | | 50 | – | |
| V_{CEsat} | collector-emitter saturation voltage | $I_C = -10\text{ mA}; I_B = -1\text{ mA}$ | – | –200 | mV |
| | | $I_C = -50\text{ mA}; I_B = -5\text{ mA}$ | – | –500 | mV |
| C_c | collector capacitance | $I_E = I_e = 0; V_{CB} = -10\text{ V}; f = 1\text{ MHz}$ | – | 6 | pF |
| f_T | transition frequency 2N5400 2N5401 | $I_C = -10\text{ mA}; V_{CE} = -10\text{ V}; f = 100\text{ MHz}$ | 100 | 400 | MHz |
| | | | 100 | 300 | MHz |
| F | noise figure | $I_C = -200\text{ }\mu\text{A}; V_{CE} = -5\text{ V}; R_S = 2\text{ k}\Omega;$ $f = 10\text{ Hz to }15.7\text{ kHz}$ | – | 8 | pF |

PNP high-voltage transistors

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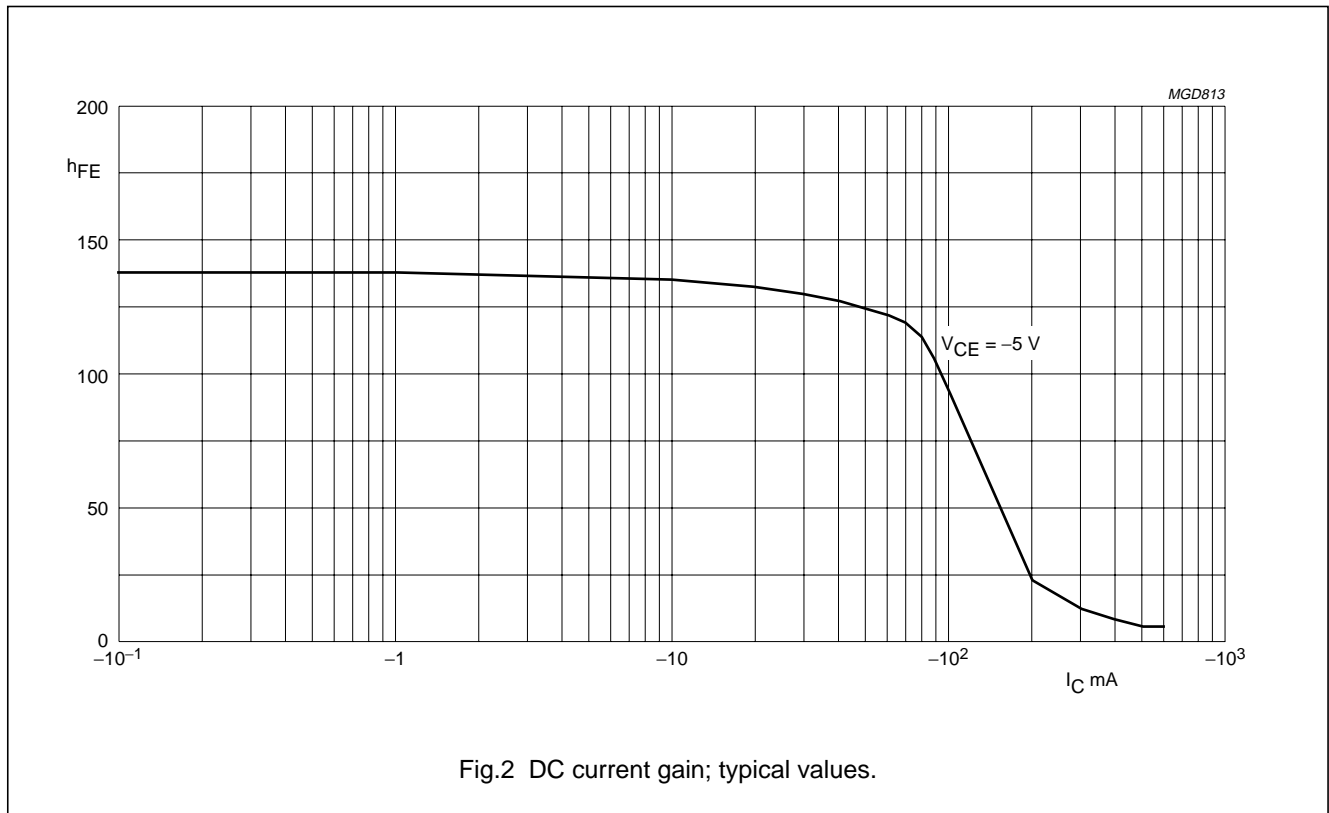


Fig.2 DC current gain; typical values.

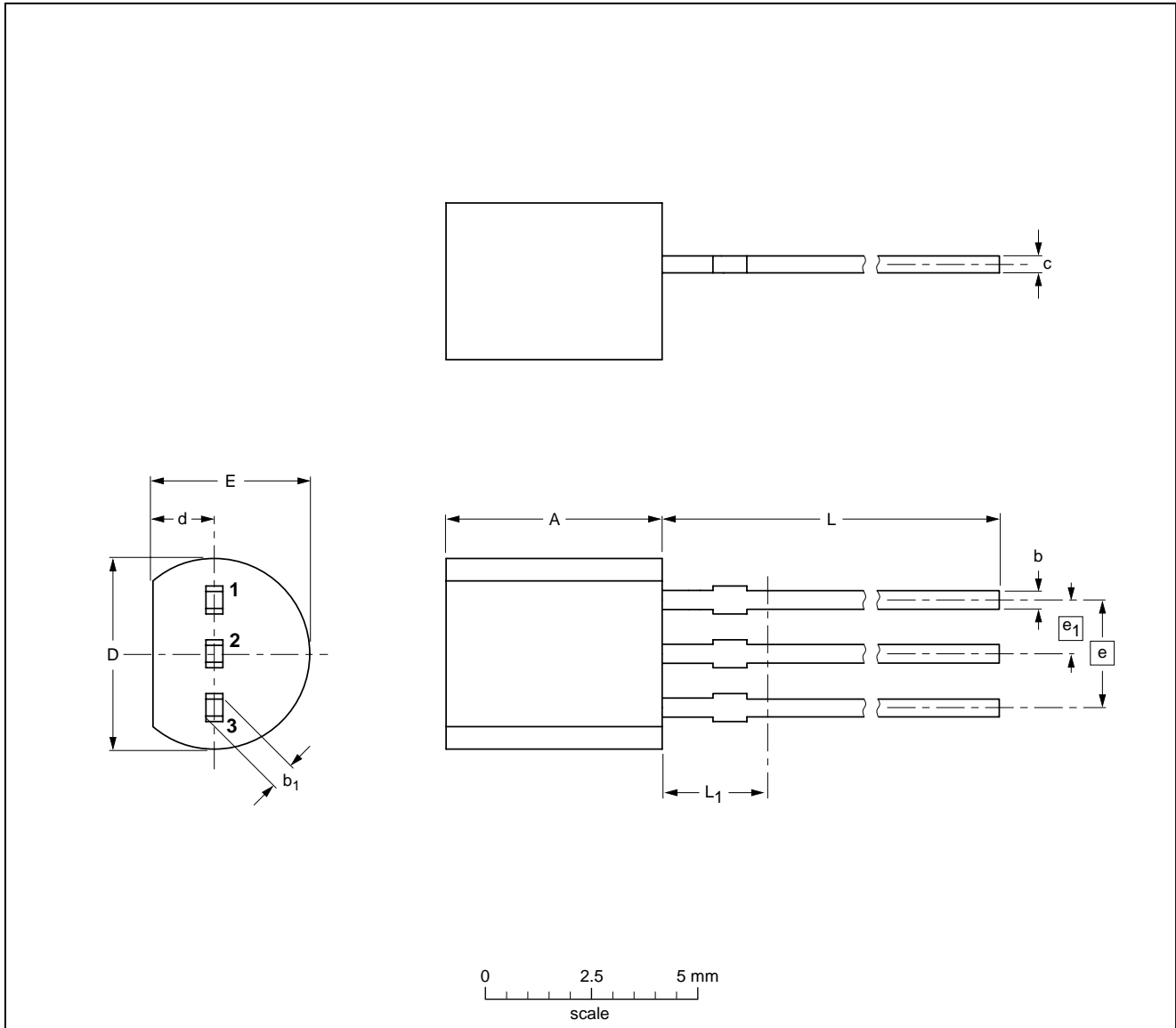
PNP high-voltage transistors

2N5400; 2N5401

PACKAGE OUTLINE

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

SOT54



DIMENSIONS (mm are the original dimensions)

| UNIT | A | b | b ₁ | c | D | d | E | e | e ₁ | L | L ₁ ⁽¹⁾ |
|------|------------|--------------|----------------|--------------|------------|------------|------------|------|----------------|--------------|-------------------------------|
| mm | 5.2 5.0 | 0.48 0.40 | 0.66 0.56 | 0.45 0.40 | 4.8 4.4 | 1.7 1.4 | 4.2 3.6 | 2.54 | 1.27 | 14.5 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 |

PNP high-voltage transistors

2N5400; 2N5401

DEFINITIONS

| | |
|---|---|
| Data sheet status | |
| 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. |
| Limiting values | |
| 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. | |
| Application information | |
| Where application information is given, it is advisory and does not form part of the specification. | |

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Printed in The Netherlands

117047/00/02/pp8

Date of release: 1997 May 22

Document order number: 9397 750 01945

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