

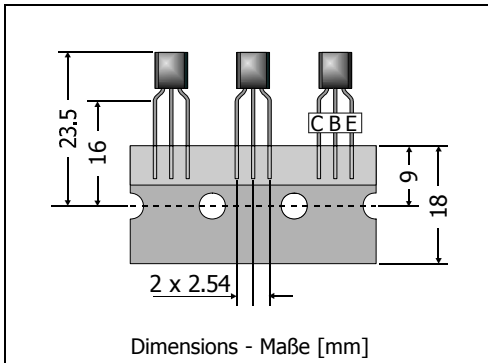
2N4401

NPN

General Purpose Si-Epitaxial Planar Transistors
Si-Epitaxial Planar-Transistoren für universellen Einsatz

NPN

Version 2006-09-12


 Power dissipation
 Verlustleistung

625 mW

 Plastic case
 Kunststoffgehäuse
TO-92
(10D3)

Weight approx. – Gewicht ca.

0.18 g

 Plastic material has UL classification 94V-0
 Gehäusematerial UL94V-0 klassifiziert

 Standard packaging taped in ammo pack
 Standard Lieferform getupet in Ammo-Pack
Maximum ratings ($T_A = 25^\circ\text{C}$)Grenzwerte ($T_A = 25^\circ\text{C}$)

| | | | 2N4401 |
|--|--------|-----------|----------------------|
| Collector-Emitter-volt. – Kollektor-Emitter-Spannung | B open | V_{CEO} | 40 V |
| Collector-Base-voltage – Kollektor-Basis-Spannung | E open | V_{CBO} | 60 V |
| Emitter-Base-voltage – Emitter-Basis-Spannung | C open | V_{EBO} | 6 V |
| Power dissipation – Verlustleistung | | P_{tot} | 250 mW ¹⁾ |
| Collector current – Kollektorstrom (dc) | | I_C | 600 mA |
| Junction temperature – Sperrschichttemperatur | | T_j | -55...+150°C |
| Storage temperature – Lagerungstemperatur | | T_s | -55...+150°C |

Characteristics ($T_j = 25^\circ\text{C}$)Kennwerte ($T_j = 25^\circ\text{C}$)

| | | Min. | Typ. | Max. |
|---|-------------|--------|------|--------|
| DC current gain – Kollektor-Basis-Stromverhältnis ²⁾ | | | | |
| $I_C = 0.1 \text{ mA}$, $V_{CE} = 1 \text{ V}$ | h_{FE} | 20 | – | – |
| $I_C = 1 \text{ mA}$, $V_{CE} = 1 \text{ V}$ | h_{FE} | 40 | – | – |
| $I_C = 10 \text{ mA}$, $V_{CE} = 1 \text{ V}$ | h_{FE} | 80 | – | – |
| $I_C = 150 \text{ mA}$, $V_{CE} = 1 \text{ V}$ | h_{FE} | 100 | – | 300 |
| $I_C = 500 \text{ mA}$, $V_{CE} = 2 \text{ V}$ | h_{FE} | 40 | – | – |
| Collector-Emitter saturation voltage – Kollektor-Emitter-Sättigungsspg. ²⁾ | | | | |
| $I_C = 150 \text{ mA}$, $I_B = 15 \text{ mA}$ | V_{CEsat} | – | – | 0.40 V |
| $I_C = 500 \text{ mA}$, $I_B = 50 \text{ mA}$ | V_{CEsat} | – | – | 0.75 V |
| Base-Emitter saturation voltage – Basis-Emitter-Sättigungsspannung ²⁾ | | | | |
| $I_C = 150 \text{ mA}$, $I_B = 15 \text{ mA}$ | V_{BEsat} | 0.75 V | – | 0.95 V |
| $I_C = 500 \text{ mA}$, $I_B = 50 \text{ mA}$ | V_{BEsat} | – | – | 1.2 V |

1 Mounted on P.C. board with 3 mm² copper pad at each terminal
 Montage auf Leiterplatte mit 3 mm² Kupferbelag (Lötpad) an jedem Anschluss

2 Tested with pulses $t_p = 300 \mu\text{s}$, duty cycle $\leq 2\%$ – Gemessen mit Impulsen $t_p = 300 \mu\text{s}$, Schaltverhältnis $\leq 2\%$

Characteristics ($T_j = 25^\circ\text{C}$)Kennwerte ($T_j = 25^\circ\text{C}$)

| | | Min. | Typ. | Max. | |
|--|---|-----------|-------------------------|--------|--------|
| Collector-Base cutoff current – Kollektor-Basis-Reststrom $V_{CE} = 35\text{ V}, V_{EB} = 0,4\text{ V}$ | | | | | |
| | I_{CBV} | – | – | 100 nA | |
| Emitter-Base cutoff current – Emitter-Basis-Reststrom $V_{CE} = 35\text{ V}, V_{EB} = 0,4\text{ V}$ | | | | | |
| | I_{EBV} | – | – | 100 nA | |
| Gain-Bandwidth Product – Transitfrequenz $I_C = 20\text{ mA}, V_{CE} = 10\text{ V}, f = 100\text{ MHz}$ | | | | | |
| | f_T | 250 MHz | – | – | |
| Collector-Base Capacitance – Kollektor-Basis-Kapazität $V_{CB} = 5\text{ V}, I_E = i_e = 0, f = 1\text{ MHz}$ | | | | | |
| | C_{CBO} | – | – | 6.5 pF | |
| Emitter-Base Capacitance – Emitter-Basis-Kapazität $V_{EB} = 0.5\text{ V}, I_C = i_c = 0, f = 1\text{ MHz}$ | | | | | |
| | C_{EBO} | – | – | 30 pf | |
| Switching times – Schaltzeiten (between 10% and 90% levels) | | | | | |
| delay time | $V_{CC} = 30\text{ V}, V_{EB} = 2\text{ V}$ $I_C = 150\text{ mA}, I_{B1} = 15\text{ mA}$ | t_d | – | – | 15 ns |
| rise time | | t_r | – | – | 20 ns |
| storage time | $V_{CC} = 30\text{ V}, I_C = 150\text{ mA},$ $I_{B1} = I_{B2} = 15\text{ mA}$ | t_s | – | – | 225 ns |
| fall time | | t_f | – | – | 30 ns |
| Thermal resistance junction to ambient air Wärmewiderstand Sperrschicht – umgebende Luft | | R_{thA} | < 200 K/W ¹⁾ | | |
| Recommended complementary PNP transistors Empfohlene komplementäre PNP-Transistoren | | 2N4403 | | | |

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Montage auf Leiterplatte mit 3 mm² Kupferbelag (Löt-pad) an jedem Anschluss