

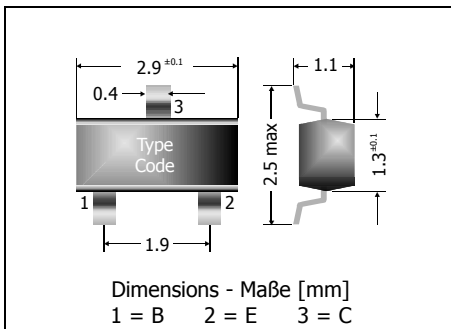
## MMBT5401

PNP

**Surface Mount General Purpose Si-Epi-Planar Transistors**  
**Si-Epi-Planar Universaltransistoren für die Oberflächenmontage**

PNP

Version 2007-11-09



Power dissipation – Verlustleistung

250 mW

Plastic case  
 Kunststoffgehäuse

SOT-23  
 (TO-236)

Weight approx. – Gewicht ca.

0.01 g

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

Standard packaging taped and reeled  
 Standard Lieferform gegurtet auf Rolle



### Maximum ratings (T<sub>A</sub> = 25°C)

### Grenzwerte (T<sub>A</sub> = 25°C)

|                                                      |        |                    | MMBT5401             |
|------------------------------------------------------|--------|--------------------|----------------------|
| Collector-Emitter-volt. – Kollektor-Emitter-Spannung | B open | - V <sub>CEO</sub> | 150 V                |
| Collector-Base-voltage – Kollektor-Basis-Spannung    | E open | - V <sub>CBO</sub> | 160 V                |
| Emitter-Base-voltage – Emitter-Basis-Spannung        | C open | - V <sub>EBO</sub> | 5 V                  |
| Power dissipation – Verlustleistung                  |        | P <sub>tot</sub>   | 250 mW <sup>1)</sup> |
| Collector current – Kollektorstrom (dc)              |        | - I <sub>C</sub>   | 600 mA               |
| Junction temperature – Sperrschichttemperatur        |        | T <sub>j</sub>     | -55...+150°C         |
| Storage temperature – Lagerungstemperatur            |        | T <sub>s</sub>     | -55...+150°C         |

### Characteristics (T<sub>j</sub> = 25°C)

### Kennwerte (T<sub>j</sub> = 25°C)

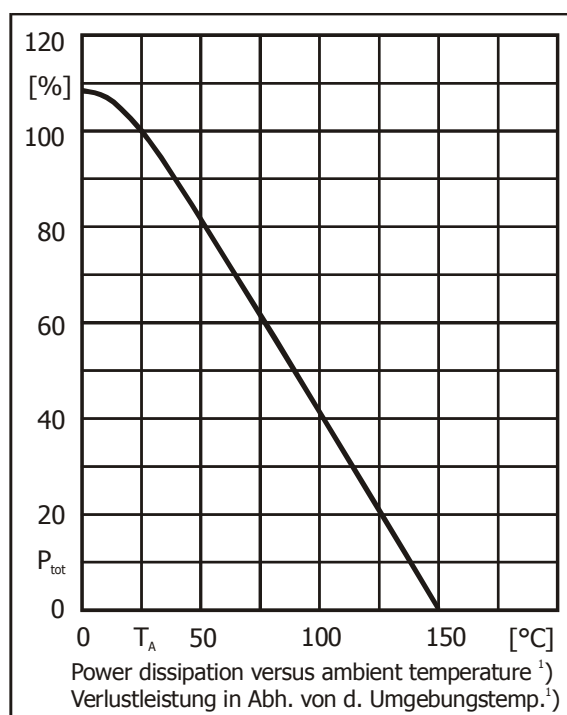
|                                                                                       |                      |                 | Min. | Typ.  | Max. |
|---------------------------------------------------------------------------------------|----------------------|-----------------|------|-------|------|
| DC current gain – Kollektor-Basis-Stromverhältnis <sup>2)</sup>                       |                      |                 |      |       |      |
| - V <sub>CE</sub> = 5 V, - I <sub>C</sub> = 1 mA                                      | MMBT5400             | h <sub>FE</sub> | 30   | –     | –    |
| - V <sub>CE</sub> = 5 V, - I <sub>C</sub> = 10 mA                                     |                      | h <sub>FE</sub> | 40   | –     | 180  |
| - V <sub>CE</sub> = 5 V, - I <sub>C</sub> = 50 mA                                     |                      | h <sub>FE</sub> | 40   | –     | –    |
| - V <sub>CE</sub> = 5 V, - I <sub>C</sub> = 1 mA                                      | MMBT5401             | h <sub>FE</sub> | 50   | –     | –    |
| - V <sub>CE</sub> = 5 V, - I <sub>C</sub> = 10 mA                                     |                      | h <sub>FE</sub> | 60   | –     | 240  |
| - V <sub>CE</sub> = 5 V, - I <sub>C</sub> = 50 mA                                     |                      | h <sub>FE</sub> | 50   | –     | –    |
| Collector-Emitter saturation voltage – Kollektor-Emitter-Sättigungsspg. <sup>2)</sup> |                      |                 |      |       |      |
| - I <sub>C</sub> = 10 mA, - I <sub>B</sub> = 1 mA                                     | - V <sub>CEsat</sub> | –               | –    | 0.2 V |      |
| - I <sub>C</sub> = 50 mA, - I <sub>B</sub> = 5 mA                                     | - V <sub>CEsat</sub> | –               | –    | 0.5 V |      |
| Base-Emitter saturation voltage – Basis-Emitter-Sättigungsspannung <sup>2)</sup>      |                      |                 |      |       |      |
| - I <sub>C</sub> = 10 mA, - I <sub>B</sub> = 1 mA                                     | - V <sub>BEsat</sub> | –               | –    | 1.0 V |      |
| - I <sub>C</sub> = 50 mA, - I <sub>B</sub> = 5 mA                                     | - V <sub>BEsat</sub> | –               | –    | 1.0 V |      |

1 Mounted on P.C. board with 3 mm<sup>2</sup> copper pad at each terminal  
 Montage auf Leiterplatte mit 3 mm<sup>2</sup> Kupferbelag (Löt-pad) an jedem Anschluss

2 Tested with pulses t<sub>p</sub> = 300 μs, duty cycle ≤ 2% – Gemessen mit Impulsen t<sub>p</sub> = 300 μs, Schaltverhältnis ≤ 2%

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

|                                                                                                               |          |             |                         |   |                  |
|---------------------------------------------------------------------------------------------------------------|----------|-------------|-------------------------|---|------------------|
| Collector-Base cutoff current – Kollektor-Basis-Reststrom                                                     |          |             |                         |   |                  |
| - $V_{CB} = 120\text{ V}$ , (E open)                                                                          | MMBT5401 | - $I_{CBO}$ | –                       | – | 50 nA            |
| - $V_{CB} = 120\text{ V}$ , $T_j = 100^{\circ}\text{C}$ , (E open)                                            | MMBT5401 | - $I_{CBO}$ | –                       | – | 50 $\mu\text{A}$ |
| Emitter-Base-cutoff current – Emitter-Basis-Reststrom                                                         |          |             |                         |   |                  |
| - $V_{EB} = 4\text{ V}$ , (C open)                                                                            |          | - $I_{EBO}$ | –                       | – | 50 nA            |
| Gain-Bandwidth Product – Transitfrequenz                                                                      |          |             |                         |   |                  |
| - $I_C = 10\text{ mA}$ , - $V_{CE} = 10\text{ V}$ , $f = 100\text{ MHz}$                                      |          | $f_T$       | 100 MHz                 | – | 300 MHz          |
| Collector-Base Capacitance – Kollektor-Basis-Kapazität                                                        |          |             |                         |   |                  |
| - $V_{CB} = 10\text{ V}$ , $I_E = i_e = 0$ , $f = 1\text{ MHz}$                                               |          | $C_{CBO}$   | –                       | – | 6 pF             |
| Noise figure – Rauschzahl                                                                                     |          |             |                         |   |                  |
| - $V_{CE} = 5\text{ V}$ , - $I_C = 200\text{ }\mu\text{A}$ ,<br>$R_S = 10\text{ }\Omega$ , $f = 1\text{ kHz}$ | MMBT5401 | F           | –                       | – | 8 dB             |
| Thermal resistance junction to ambient air<br>Wärmewiderstand Sperrschicht – umgebende Luft                   |          | $R_{thA}$   | < 420 K/W <sup>1)</sup> |   |                  |
| Recommended complementary NPN transistors<br>Empfohlene komplementäre NPN-Transistoren                        |          |             | MMBT5551                |   |                  |
| Marking - Stempelung                                                                                          |          |             | MMBT5401 = 2Lx          |   |                  |



1 Mounted on P.C. board with 3 mm<sup>2</sup> copper pad at each terminal  
Montage auf Leiterplatte mit 3 mm<sup>2</sup> Kupferbelag (Löt-pad) an jedem Anschluss