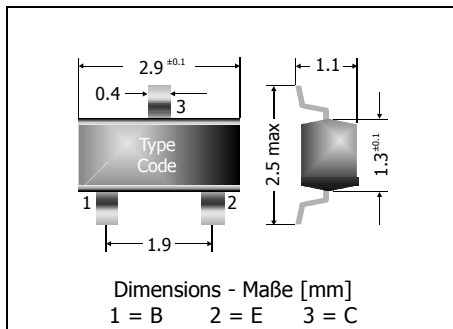


## MMBT3906

**PNP**
**Surface Mount Si-Epi-Planar Switching Transistors**  
**Si-Epi-Planar Schalttransistoren für die Oberflächenmontage**
**PNP**

Version 2009-04-02



Power dissipation – Verlustleistung

250 mW

Plastic case  
KunststoffgehäuseSOT-23  
(TO-236)

Weight approx. – Gewicht ca.

0.01 g

Plastic material has UL classification 94V-0  
Gehäusematerial UL94V-0 klassifiziertStandard packaging taped and reeled  
Standard Lieferform getupet auf Rolle

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

### Grenzwerte (T<sub>A</sub> = 25°C)

			MMBT3906
Collector-Emitter-volt. – Kollektor-Emitter-Spannung	B open	- V <sub>CEO</sub>	40 V
Collector-Base-voltage – Kollektor-Basis-Spannung	E open	- V <sub>CBO</sub>	40 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>	200 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>				
- I <sub>C</sub> = 0.1 mA, - V <sub>CE</sub> = 1 V	h <sub>FE</sub>	40	–	–
- I <sub>C</sub> = 1 mA, - V <sub>CE</sub> = 1 V	h <sub>FE</sub>	80	–	–
- I <sub>C</sub> = 10 mA, - V <sub>CE</sub> = 1 V	h <sub>FE</sub>	100	–	300
- I <sub>C</sub> = 50 mA, - V <sub>CE</sub> = 1 V	h <sub>FE</sub>	60	–	–
- I <sub>C</sub> = 100 mA, - V <sub>CE</sub> = 1 V	h <sub>FE</sub>	30	–	–
h-Parameters at/bei - V <sub>CE</sub> = 10 V, - I <sub>C</sub> = 1 mA, f = 1 kHz				
Small signal current gain – Kleinsignal-Stromverstärkung	h <sub>fe</sub>	100	–	400
Input impedance – Eingangs-Impedanz	h <sub>ie</sub>	2 kΩ	–	12 kΩ
Output admittance – Ausgangs-Leitwert	h <sub>oe</sub>	3 μS	–	60 μS
Reverse voltage transfer ratio – Spannungsrückwirkung	h <sub>re</sub>	0.1*10 <sup>-4</sup>	–	10*10 <sup>-4</sup>

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<sub>j</sub> = 25°C)****Kennwerte (T<sub>j</sub> = 25°C)**

	<b>Min.</b>	<b>Typ.</b>	<b>Max.</b>
Collector-Emitter saturation voltage – Kollektor-Sättigungsspannung <sup>2)</sup> - I <sub>C</sub> = 10 mA, - I <sub>B</sub> = 1 mA - I <sub>C</sub> = 50 mA, - I <sub>B</sub> = 5 mA	- V <sub>CEsat</sub> - V <sub>CEsat</sub>	- -	0.25 V 0.4 V
Base-Emitter saturation voltage – Basis-Sättigungsspannung <sup>2)</sup> - I <sub>C</sub> = 10 mA, - I <sub>B</sub> = 1 mA - I <sub>C</sub> = 50 mA, - I <sub>B</sub> = 5 mA	- V <sub>BEsat</sub> - V <sub>BEsat</sub>	0.65 V -	0.85 V 0.95 V
Collector-Emitter cutoff current – Kollektor-Emitter-Reststrom - V <sub>CE</sub> = 30 V, - V <sub>EB</sub> = 3 V	- I <sub>CEX</sub>	-	50 nA
Emitter-Base cutoff current – Emitter-Basis-Reststrom - V <sub>CE</sub> = 30 V, - V <sub>EB</sub> = 3 V	I <sub>EBV</sub>	-	50 nA
Gain-Bandwidth Product – Transitfrequenz - I <sub>C</sub> = 10 mA, - V <sub>CE</sub> = 20 V, f = 100 MHz	f <sub>T</sub>	250 MHz	-
Collector-Base Capacitance – Kollektor-Basis-Kapazität - V <sub>CB</sub> = 5 V, I <sub>E</sub> = i <sub>e</sub> = 0, f = 1 MHz	C <sub>CB0</sub>	-	4.5 pF
Emitter-Base Capacitance – Emitter-Basis-Kapazität - V <sub>EB</sub> = 0.5 V, I <sub>C</sub> = i <sub>c</sub> = 0, f = 1 MHz	C <sub>EB0</sub>	-	10 pF
Noise figure – Rauschzahl - V <sub>CE</sub> = 5 V, - I <sub>C</sub> = 100 μA, R <sub>G</sub> = 1 kΩ, f = 1 kHz	F	-	4 dB
Switching times – Schaltzeiten (between 10% and 90% levels)			
delay time - V <sub>CC</sub> = 3 V, - V <sub>BE</sub> = 0.5 V	t <sub>d</sub>	-	35 ns
rise time - I <sub>C</sub> = 10 mA, - I <sub>B1</sub> = 1 mA	t <sub>r</sub>	-	35 ns
storage time - V <sub>CC</sub> = 3 V, - I <sub>C</sub> = 10 mA,	t <sub>s</sub>	-	225 ns
fall time - I <sub>B1</sub> = I <sub>B2</sub> = 1 mA	t <sub>f</sub>	-	75 ns
Thermal resistance junction to ambient air Wärmewiderstand Sperrschicht – umgebende Luft	R <sub>thA</sub>	< 200 K/W <sup>1)</sup>	
Recommended complementary NPN transistors Empfohlene komplementäre NPN-Transistoren	MMBT3904		
Marking - Stempelung	MMBT3906 = 2A or 3E		

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

<sup>1)</sup> 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 (Lötpad) an jedem Anschluss