

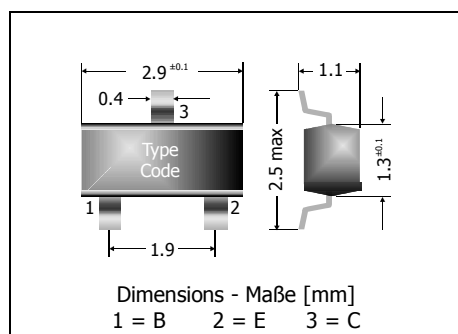
MMBT3906

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
 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 ($T_A = 25^\circ\text{C}$)Grenzwerte ($T_A = 25^\circ\text{C}$)

			MMBT3906
Collector-Emitter-volt. – Kollektor-Emitter-Spannung	B open	- V_{CE0}	40 V
Collector-Base-voltage – Kollektor-Basis-Spannung	E open	- V_{CBO}	40 V
Emitter-Base-voltage – Emitter-Basis-Spannung	C open	- V_{EBO}	5 V
Power dissipation – Verlustleistung		P_{tot}	250 mW ¹⁾
Collector current – Kollektorstrom (dc)		- I_C	200 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}	40	–	–
- $I_C = 1\text{ mA}$, - $V_{CE} = 1\text{ V}$	h_{FE}	80	–	–
- $I_C = 10\text{ mA}$, - $V_{CE} = 1\text{ V}$	h_{FE}	100	–	300
- $I_C = 50\text{ mA}$, - $V_{CE} = 1\text{ V}$	h_{FE}	60	–	–
- $I_C = 100\text{ mA}$, - $V_{CE} = 1\text{ V}$	h_{FE}	30	–	–
h-Parameters at/bei - $V_{CE} = 10\text{ V}$, - $I_C = 1\text{ mA}$, $f = 1\text{ kHz}$				
Small signal current gain – Kleinsignal-Stromverstärkung	h_{fe}	100	–	400
Input impedance – Eingangs-Impedanz	h_{ie}	2 k Ω	–	12 k Ω
Output admittance – Ausgangs-Leitwert	h_{oe}	3 μS	–	60 μS
Reverse voltage transfer ratio – Spannungsrückwirkung	h_{re}	$0.1 \cdot 10^{-4}$	–	$10 \cdot 10^{-4}$

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

Characteristics (T_j = 25°C)**Kennwerte (T_j = 25°C)**

		Min.	Typ.	Max.
Collector-Emitter saturation voltage – Kollektor-Sättigungsspannung ²⁾				
- I _C = 10 mA, - I _B = 1 mA	- V _{CEsat}	–	–	0.25 V
- I _C = 50 mA, - I _B = 5 mA	- V _{CEsat}	–	–	0.4 V
Base-Emitter saturation voltage – Basis-Sättigungsspannung ²⁾				
- I _C = 10 mA, - I _B = 1 mA	- V _{BEsat}	0.65 V	–	0.85 V
- I _C = 50 mA, - I _B = 5 mA	- V _{BEsat}	–	–	0.95 V
Collector-Emitter cutoff current – Kollektor-Emitter-Reststrom				
- V _{CE} = 30 V, - V _{EB} = 3 V	- I _{CEX}	–	–	50 nA
Emitter-Base cutoff current – Emitter-Basis-Reststrom				
- V _{CE} = 30 V, - V _{EB} = 3 V	I _{EBV}	–	–	50 nA
Gain-Bandwidth Product – Transitfrequenz				
- I _C = 10 mA, - V _{CE} = 20 V, f = 100 MHz	f _T	250 MHz	–	–
Collector-Base Capacitance – Kollektor-Basis-Kapazität				
- V _{CB} = 5 V, I _E = i _e = 0, f = 1 MHz	C _{CBO}	–	–	4.5 pF
Emitter-Base Capacitance – Emitter-Basis-Kapazität				
- V _{EB} = 0.5 V, I _C = i _c = 0, f = 1 MHz	C _{EBO}	–	–	10 pf
Noise figure – Rauschzahl				
- V _{CE} = 5 V, - I _C = 100 µA, R _G = 1 kΩ, f = 1 kHz	F	–	–	4 dB
Switching times – Schaltzeiten (between 10% and 90% levels)				
delay time	- V _{CC} = 3 V, - V _{BE} = 0.5 V	t _d	–	35 ns
rise time	- I _C = 10 mA, - I _{B1} = 1mA	t _r	–	35 ns
storage time	- V _{CC} = 3 V, - I _C = 10 mA,	t _s	–	225 ns
fall time	- I _{B1} = I _{B2} = 1 mA	t _f	–	75 ns
Thermal resistance junction to ambient air Wärmewiderstand Sperrschicht – umgebende Luft		R _{thA}	< 200 K/W ¹⁾	
Recommended complementary NPN transistors Empfohlene komplementäre NPN-Transistoren		MMBT3904		
Marking - Stempelung		MMBT3906 = 2A or 3E		

²⁾ Tested with pulses t_p = 300 µs, duty cycle ≤ 2% – Gemessen mit Impulsen t_p = 300 µs, Schaltverhältnis ≤ 2%

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