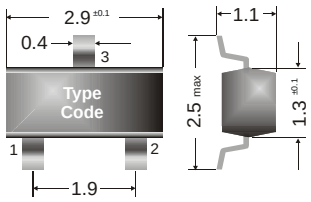
NPN **Surface mount Si-Epitaxial PlanarTransistors** **NPN**
Si-Epitaxial PlanarTransistoren für die Oberflächenmontage

Version 2004-05-04



Dimensions / Maße in mm
1 = B 2 = E 3 = C

Power dissipation – Verlustleistung 250 mW

Plastic case SOT-23
Kunststoffgehäuse (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°C) **Grenzwerte (T_A = 25°C)**

			MMBT2222	MMBT2222A
Collector-Emitter-voltage	B open	V_{CE0}	30 V	40 V
Collector-Base-voltage	E open	V_{CB0}	60 V	75 V
Emitter-Base-voltage	C open	V_{EB0}	5 V	6 V
Power dissipation – Verlustleistung		P_{tot}	250 mW [1])	
Collector current – Kollektorstrom (dc)		I_C	600 mA	
Junction temp. – Sperrschichttemperatur		T_j	150°C	
Storage temperature – Lagerungstemperatur		T_S	- 65…+ 150°C	

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

			Min.	Typ.	Max.
Collector-Base cutoff current – Kollektorreststrom					
I_E = 0, V_{CB} = 50 V	MMBT2222	I_{CB0}	–	–	10 nA
I_E = 0, V_{CB} = 60 V	MMBT2222A	I_{CB0}	–	–	10 nA
I_E = 0, V_{CB} = 50 V, T_j = 150°C	MMBT2222	I_{CB0}	–	–	10 µA
I_E = 0, V_{CB} = 60 V, T_j = 150°C	MMBT2222A	I_{CB0}	–	–	10 µA
Emitter-Base cutoff current – Emitterreststrom					
I_C = 0, V_{EB} = 3 V	MMBT2222A	I_{EB0}	–	–	100 nA
Collector saturation voltage – Kollektor-Sättigungsspannung [1])					
I_C = 150 mA, I_B = 15 mA	MMBT2222	V_{CEsat}	–	–	400 mV
	MMBT2222A	V_{CEsat}	–	–	300 mV
I_C = 500 mA, I_B = 50 mA	MMBT2222	V_{CEsat}	–	–	1.6 V
	MMBT2222A	V_{CEsat}	–	–	1 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

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

			Min.	Typ.	Max.
Base saturation voltage – Basis-Sättigungsspannung [1]					
I_C = 150 mA, I_B = 15 mA	MMBT2222	V_{BEsat}	–	–	1.3 V
	MMBT2222A	V_{BEsat}	600 mV	–	1.2 V
I_C = 500 mA, I_B = 50 mA	MMBT2222	V_{BEsat}	–	–	2.6 V
	MMBT2222A	V_{BEsat}	–	–	2 V
DC current gain – Kollektor-Basis-Stromverhältnis [1]					
V_{CE} = 10 V, I_C = 0.1 mA		h_{FE}	35	–	–
V_{CE} = 10 V, I_C = 1 mA		h_{FE}	50	–	–
V_{CE} = 10 V, I_C = 10 mA		h_{FE}	75	–	–
V_{CE} = 10 V, I_C = 150 mA		h_{FE}	100	–	300
V_{CE} = 1 V, I_C = 150 mA		h_{FE}	50	–	–
V_{CE} = 10 V, I_C = 500 mA		h_{FE}	40	–	–
h-Parameters at V_{CE} = 10V, f = 1 kHz, I_C = 1 mA / 10 mA [2]					
Small signal current gain Kleinsignal-Stromverstärkung	MMBT2222	h_{fe}	50	–	300
	MMBT2222A	h_{fe}	75	–	375
Input impedance Eingangs-Impedanz	MMBT2222	h_{ie}	2 kΩ	–	8 kΩ
	MMBT2222A	h_{ie}	0.25 kΩ	–	1.25 kΩ
Output admittance Ausgangs-Leitwert	MMBT2222	h_{oe}	5 µS	–	35 µS
	MMBT2222A	h_{oe}	25 µS	–	200 µS
Gain-Bandwidth Product – Transitfrequenz					
V_{CE} = 10 V, I_C = 10 mA, f = 100 MHz		f_T	250 MHz	–	–
Collector-Base Capacitance – Kollektor-Basis-Kapazität					
V_{CB} = 10 V, I_E = i_e = 0, f = 1 MHz		C_{CB0}	–	4 pF	8 pF
Emitter-Base Capacitance – Emitter-Basis-Kapazität					
V_{EB} = 0.5 V, I_C = i_c = 0, f = 1 MHz		C_{EB0}	–	20 pF	25 pF
Noise figure – Rauschzahl					
V_{CE} = 10 V, I_C = 100 µA, R_S = 1 kΩ, f = 1 kHz	MMBT2222A	F	–	–	4 dB
Switching times – Schaltzeiten					
delay time	V_{CC} = 30 V, - V_{BE} = 0.5 V	t_d	–	–	10 ns
rise time	I_C = 150 mA, I_{B1} = 15 mA	t_r	–	–	25 ns
storage time	V_{CC} = 30 V, I_C = 150 mA	t_s	–	–	225 ns
fall time	I_{B1} = - I_{B2} = 15 mA	t_f	–	–	60 ns
Thermal resistance junction to ambient air Wärmewiderstand Sperrschicht – umgebende Luft		R_{thA}			420 K/W [3]
Recommended complementary PNP transistors Empfohlene komplementäre PNP-Transistoren					MMBT2907, MMBT2907A
Marking - Stempelung			MMBT2222 = (M)1B		MMBT2222A = 1P

[1] Tested with pulses t_p = 300 µs, duty cycle ≤ 2% – Gemessen mit Impulsen t_p = 300 µs, Schaltverhältnis ≤ 2%
[2] MMBT2222: I_C = 1 mA, MMBT2222A: I_C = 10 mA
[3] Mounted on P.C. board with 3 mm² copper pad at each terminal
Montage auf Leiterplatte mit 3 mm² Kupferbelag (Lötpad) an jedem Anschluß