PMBT3903
PMBT3904

T-35-11

SILICON EPITAXIAL TRANSISTORS

N-P-N transistors in a microminiature (SMD) plastic envelope intended for surface mounted applications. They are primarily intended for use in telephony and professional communication equipment.

QUICK REFERENCE DATA

			PMBT3903	PMBT3904	
Collector-base voltage (open emitter)	V_{CBO}	max.	60		V
Collector-emitter voltage (open base)	V_{CEO}	max.	40		V
Emitter-base voltage (open collector)	V_{EBO}	max.	6		V
Collector current (d.c.)	I_C	max.	200		mA
Total power dissipation up to T_{amb} = 25 °C	P_{tot}	max.	300		mW
D.C. current gain I_C = 10 mA; V_{CE} = 1 V	h_{FE}	>	50	100	
		<	150	300	
Transition frequency at f = 35 MHz I_C = 10 mA; V_{CE} = 20 V	f_T	>	250	300	MHz

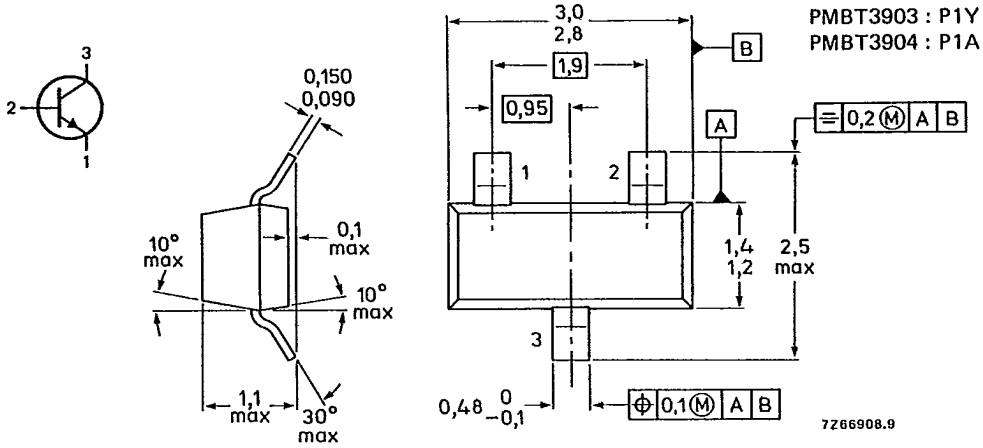
MECHANICAL DATA

Fig. 1 SOT-23.

Dimensions in mm

Marking code

PMBT3903 : P1Y
PMBT3904 : P1A



TOP VIEW

See also Soldering recommendations.

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RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Collector-base voltage (open emitter)	V_{CBO}	max.	60	V
Collector-emitter voltage (open base)	V_{CEO}	max.	40	V
Emitter-base voltage (open collector)	V_{EBO}	max.	6	V
Collector current (d.c.)	I_C	max.	200	mA
Total power dissipation* up to T_{amb} = 25 °C	P_{tot}	max.	300	mW
Storage temperature	T_{stg}		−65 to +150	°C
Junction temperature	T_j	max.	150	°C

THERMAL RESISTANCE**

$T_j = P\ (R_{th\ j\text{-}t} + R_{th\ t\text{-}s} + R_{th\ s\text{-}a}) + T_{amb}$

Thermal resistance from junction to ambient*	$R_{th\ j\text{-}a}$	=	430	K/W

CHARACTERISTICS

T_{amb} = 25 °C unless otherwise specified

Collector-emitter breakdown voltage▲ I_C = 1 mA; I_B = 0	$V_{(BR)CEO}$	min.	40	V
Collector-base breakdown voltage I_C = 10 μA; I_E = 0	$V_{(BR)CBO}$	min.	60	V
Emitter-base breakdown voltage I_E = 10 μA; I_C = 0	$V_{(BR)EBO}$	min.	6	V
Collector cut-off current V_{CE} = 30 V; V_{EB} = 3 V	I_{CEX}	max.	50	nA
Output capacitance at f = 1 MHz I_E = 0; V_{CB} = 5 V	C_c	max.	4	pF
Input capacitance at f = 1 MHz I_C = 0; V_{BE} = 0,5 V	C_e	max.	8	pF
Base current with reverse biased emitter junction V_{EB} = 3 V; V_{CE} = 30 V	I_{BEX}	max.	50	nA

* Mounted on a ceramic substrate: area = 10 x 8 mm²; thickness = 0,7 mm.
** See Thermal characteristics.
▲ Pulse test conditions: t_p = 300 μs; duty cycle ⩽ 2%.

Silicon epitaxial transistors

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Saturation voltages					
I_C = 10 mA; I_B = 1 mA	V_{CEsat}	max.	0,2		V
I_C = 50 mA; I_B = 5 mA	V_{CEsat}	max.	0,3		V
I_C = 10 mA; I_B = 1 mA	V_{BEsat}	min.	0,65		V
	V_{BEsat}	max.	0,85		V
I_C = 50 mA; I_B = 5 mA	V_{BEsat}	max.	0,95		V
D.C. current gain *					
I_C = 0,1 mA; V_{CE} = 1 V	h_{FE}	>	20	40	
I_C = 1 mA; V_{CE} = 1 V	h_{FE}	>	35	70	
I_C = 10 mA; V_{CE} = 1 V	h_{FE}	>	50	100	
	h_{FE}	<	150	300	
I_C = 50 mA; V_{CE} = 1 V	h_{FE}	>	30	60	
I_C = 100 mA; V_{CE} = 1 V	h_{FE}	>	15	30	
Transition frequency at f = 100 MHz					
I_C = 10 mA; V_{CE} = 20 V	f_T	min.	250	300	MHz
Noise figure at R_S = 1 kΩ					
I_C = 100 μA; V_{CE} = 5 V					
f = 10 Hz to 15,7 kHz	F	max.	6	5	dB
h-parameters (common emitter)					
I_C = 1 mA; V_{CE} = 10 V; f = 1 kHz					
Input impedance	h_{ie}		1 to 8	1 to 10	kΩ
Reverse voltage transfer ratio	h_{re}		0,1 to 5	0,5 to 8	10^{-4}
Small-signal current gain	h_{fe}		50 to 200	100 to 400	
Output admittance	h_{oe}		1 to 40	1 to 40	μS
Switching times					
Turn-on time when V_{CC} = 3 V; V_{BE} = 0,5 V					
I_C = 10 mA; I_{Bon} = 1 mA					
Delay time	t_d	<	35	35	ns
Rise time	t_r	<	35	35	ns
Turn-off time when V_{CC} = 3 V; I_C = 10 mA					
I_{Bon} = I_{Boff} = 1 mA					
Storage time	t_s	<	175	200	ns
Fall time	t_f	<	50	50	ns

* Pulse test conditions: t_p = 300 μs; duty cycle ≤ 2%.