

SOT-23 Formed SMD Package

**CMBT3903
CMBT3904**

SILICON EPITAXIAL TRANSISTORS

N-P-N transistors

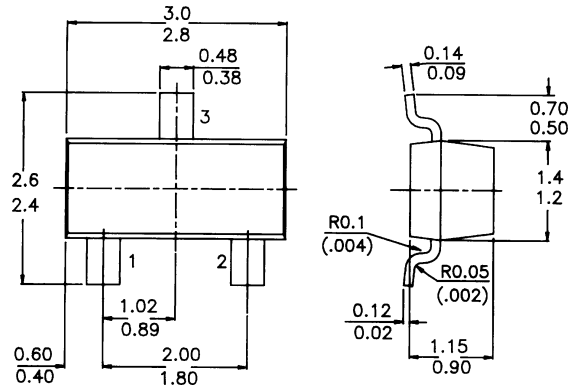
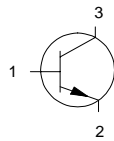
Marking

CMBT3903 = 1Y
CMBT3904 = 1A

PACKAGE OUTLINE DETAILS
ALL DIMENSIONS IN mm

Pin configuration

- 1 = BASE
- 2 = EMITTER
- 3 = COLLECTOR



ABSOLUTE MAXIMUM RATINGS

Collector-base voltage (open emitter)	V_{CB0}	max.	60 V
Collector-emitter voltage (open base)	V_{CE0}	max.	40 V
Emitter-base voltage (open collector)	V_{EB0}	max.	6 V
Collector current (DC)	I_C	max.	200 mA
Total power dissipation up to $T_{amb} = 25\text{ }^\circ\text{C}$	P_{tot}	max.	250 mW
DC current gain			
$I_C = 10\text{ mA}; V_{CE} = 1\text{ V}$	CMBT3903	>	50
		h_{FE}	< 150
$I_C = 10\text{ mA}; V_{CE} = 1\text{ V}$	CMBT3904	>	100
Transition frequency at $f = 35\text{ MHz}$		h_{FE}	< 300
$I_C = 10\text{ mA}; V_{CE} = 20\text{ V}$		f_T	> 300 MHz

CMBT3903
CMBT3904
RATINGS (at $T_A = 25^\circ\text{C}$ unless otherwise specified)

Limiting values

Collector-base voltage (open emitter)	V_{CB0}	max.	60 V
Collector-emitter voltage (open base)	V_{CE0}	max.	40 V
Emitter-base voltage (open collector)	V_{EB0}	max.	6 V
Collector current (d.c.)	I_C	max.	200 mA
Total power dissipation up to $T_{amb} = 25^\circ\text{C}$	P_{tot}	max.	250 mW
Storage temperature $^\circ\text{C}$	T_{stg}		-55 to +150
Junction temperature	T_j	max.	150 $^\circ\text{C}$

THERMAL RESISTANCE

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

Thermal resistance
from junction to ambient

$$R_{th\ j-a} = 500\ \text{K/W}$$

CHARACTERISTICS
 $T_{amb} = 25^\circ\text{C}$ unless otherwise specified

Collector-emitter breakdown voltage

$$I_C = 1\ \text{mA}; I_B = 0$$

$$V_{(BR)CEO}\ \text{min.}\ 40\ \text{V}$$

Collector-base breakdown voltage

$$I_C = 10\ \mu\text{A}; I_E = 0$$

$$V_{(BR)CBO}\ \text{min.}\ 60\ \text{V}$$

Emitter-base breakdown voltage

$$I_E = 10\ \mu\text{A}; I_C = 0$$

$$V_{(BR)EBO}\ \text{min.}\ 6\ \text{V}$$

Collector cut-off current

$$V_{CE} = 30\ \text{V}; V_{EB} = 3\ \text{V}$$

$$I_{CEX}\ \text{max.}\ 50\ \text{nA}$$

Output capacitance at $f = 1\ \text{MHz}$

$$I_E = 0; V_{CB} = 5\ \text{V}$$

$$C_c\ \text{max.}\ 4\ \text{pF}$$

Input capacitance at $f = 1\ \text{MHz}$

$$I_C = 0; V_{BE} = 0.5\ \text{V}$$

$$C_e\ \text{max.}\ 8\ \text{pF}$$

Base current
with reverse biased emitter junction

$$V_{EB} = 3\ \text{V}; V_{CE} = 30\ \text{V}$$

$$I_{BEX}\ \text{max.}\ 50\ \text{nA}$$

Saturation voltages

$$I_C = 10\ \text{mA}; I_B = 1\ \text{mA}$$

$$V_{CEsat}\ \text{max.}\ 0.2\ \text{V}$$

$$I_C = 50\ \text{mA}; I_B = 5\ \text{mA}$$

$$V_{CEsat}\ \text{max.}\ 0.3\ \text{V}$$

$$I_C = 10\ \text{mA}; I_B = 1\ \text{mA}$$

$$V_{BEsat}\ \text{min.}\ 0.65\ \text{V}$$

$$\text{max.}\ 0.85\ \text{V}$$

$$I_C = 50\ \text{mA}; I_B = 5\ \text{mA}$$

$$V_{BEsat}\ \text{max.}\ 0.95\ \text{V}$$

CMBT3903
CMBT3904

		CMBT3903	CMBT3904	
<i>D.C. current gain *</i>				
$I_C = 0,1 \text{ mA}; V_{CE} = 1 \text{ V}$	h_{FE}	> 20	40	
$I_C = 1 \text{ mA}; V_{CE} = 1 \text{ V}$	h_{FE}	> 35	70	
$I_C = 10 \text{ mA}; V_{CE} = 1 \text{ V}$	h_{FE}	> 50	100	
		< 150	300	
$I_C = 50 \text{ mA}; V_{CE} = 1 \text{ V}$	h_{FE}	> 30	60	
$I_C = 100 \text{ mA}; V_{CE} = 1 \text{ V}$	h_{FE}	> 15	30	
<i>Transition frequency at $f = 100 \text{ MHz}$</i>				
$I_C = 10 \text{ mA}; V_{CE} = 20 \text{ V}$	f_T	min. 250	300	MHz
<i>Noise figure at $R_S = 1 \text{ k}\Omega$</i>				
$I_C = 100 \mu\text{A}; V_{CE} = 5 \text{ V}$ $f = 10 \text{ Hz to } 15,7 \text{ kHz}$	F	max. 6	5	dB
<i>Small Signal Current Gain</i>				
$V_{CE} = 10\text{V}; I_C = 1 \text{ mA}; f = 1 \text{ KHz}$	h_{fe}	min. 50	100	
		max. 200	400	

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