

**SOT-23 Formed SMD Package**

**CMBT3906**

**SILICON EPITAXIAL TRANSISTOR**

*P-N-P transistor*

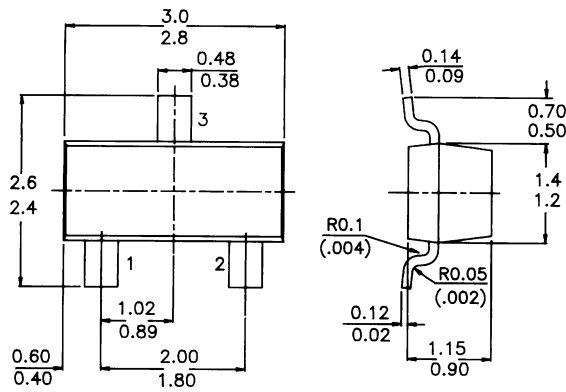
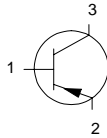
**Marking**

CMBT3906 = 2A

**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.	40 V
Collector-emitter voltage (open base)	$-V_{CE0}$	max.	40 V
Emitter-base voltage (open collector)	$-V_{EB0}$	max.	5 V
Collector current (d.c.)	$-I_C$	max.	200 mA
Total power dissipation up to $T_{amb} = 25\text{ }^\circ\text{C}$	$P_{tot}$	max.	250 mW
D.C. current gain	$h_{FE}$		100 to 300
Transition frequency at $f = 100\text{ MHz}$	$f_T$	min.	250 MHz
$-I_C = 10\text{ mA}; -V_{CE} = 1\text{ V}$			
$-I_C = 10\text{ mA}; -V_{CE} = 20\text{ V}$			

## CMBT3906

### RATINGS

#### Limiting values

Collector-base voltage (open emitter)	$-V_{CB0}$	max.	40 V
Collector-emitter voltage (open base)	$-V_{CE0}$	max.	40 V
Emitter-base voltage (open collector)	$-V_{EB0}$	max.	5 V
Collector current (d.c.)	$-I_C$	max.	200 mA
Total power dissipation up to $T_{amb} = 25\text{ }^{\circ}\text{C}$	$P_{tot}$	max.	250 mW
Storage temperature	$T_{stg}$		-55 to +150 $^{\circ}\text{C}$

### THERMAL CHARACTERISTICS

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

#### Thermal resistance

from junction to ambient

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

### CHARACTERISTICS

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

#### Collector-emitter breakdown voltage

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

$$-V_{(BR)CE0}\ \text{min.}\ 40\ \text{V}$$

#### Collector-base breakdown voltage

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

$$-V_{(BR)CB0}\ \text{min.}\ 40\ \text{V}$$

#### Emitter-base breakdown voltage

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

$$-V_{(BR)EB0}\ \text{min.}\ 5\ \text{V}$$

#### Collector cut-off current

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

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

#### Base current

with reverse biased emitter junction

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

#### Output capacitance at $f = 100\ \text{kHz}$

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

$$C_c\ \text{max.}\ 4,5\ \text{pF}$$

#### Input capacitance at $f = 100\ \text{kHz}$

$I_C = 0; -V_{BE} = 0,5\ \text{V}$

$$C_e\ \text{max.}\ 10\ \text{pF}$$

#### Saturation voltages

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

$$-V_{CEsat}\ \text{max.}\ 0,25\ \text{V}$$

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

$$-V_{CEsat}\ \text{max.}\ 0,4\ \text{V}$$

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

$$-V_{BEsat}\ \text{max.}\ 0,85\ \text{V}$$

$$\text{min.}\ 0,65\ \text{V}$$

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

$$-V_{BEsat}\ \text{max.}\ 0,95\ \text{V}$$

#### D.C. current gain

$-I_C = 0,1\ \text{mA}; -V_{CE} = 1\ \text{V}$

$$h_{FE}\ \text{min.}\ 60$$

$-I_C = 1\ \text{mA}; -V_{CE} = 1\ \text{V}$

$$h_{FE}\ \text{min.}\ 80$$

$-I_C = 10\ \text{mA}; -V_{CE} = 1\ \text{V}$

$$h_{FE}\ \text{min.}\ 100$$

$$\text{max.}\ 300$$

## CMBT3906

$-I_C = 50 \text{ mA}; -V_{CE} = 1 \text{ V}$	$h_{FE}$	<i>min.</i>	60
$-I_C = 100 \text{ mA}; -V_{CE} = 1 \text{ V}$	$h_{FE}$	<i>min.</i>	30
Transition frequency at $f = 100 \text{ MHz}$			
$-I_C = 10 \text{ mA}; -V_{CE} = 20 \text{ V}$	$f_T$	<i>min.</i>	250 MHz
Noise figure at $R_S = 1 \text{ k}\Omega$			
$-I_C = 100 \mu\text{A}; -V_{CE} = 5 \text{ V}$	$F$	<i>max.</i>	4 dB
$f = 10 \text{ Hz to } 15,7 \text{ kHz}$			
Small Signal Current Gain			
$V_{CE} = 10 \text{ V}; I_C = 1 \text{ mA}; f = 1 \text{ KHz}$	$h_{fe}$	<i>min.</i>	100
		<i>max.</i>	400

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