



SOT-23 Formed SMD Package

CMBT4401

SILICON PLANAR EPITAXIAL TRANSISTOR

N-P-N transistor

Marking

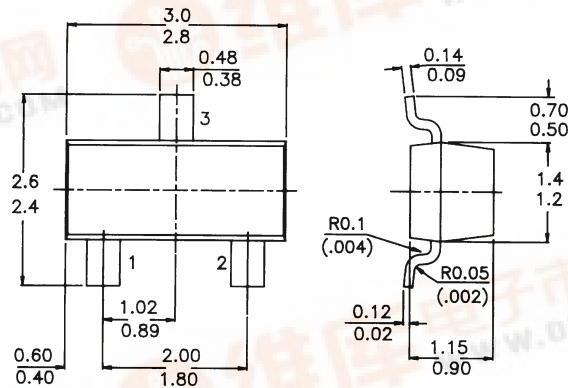
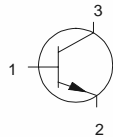
CMBT4401 = 2X

PACKAGE OUTLINE DETAILS

ALL DIMENSIONS IN mm

Pin configuration

1 = BASE
2 = EMITTER
3 = COLLECTOR



ABSOLUTE MAXIMUM RATINGS

Collector-emitter voltage

V_{CEO} max. 40 V

Collector current (DC)

I_C max. 600 mA

DC current gain

$I_C = 150$ mA; $V_{CE} = 1$ V

h_{FE} min. 100

max. 300

Total power dissipation up to $T_{amb} = 25$ °C

P_{tot} max 250 mW

RATINGS (at $T_A = 25$ °C unless otherwise specified)

Limiting values

Collector-emitter voltage

V_{CEO} max. 40 V

Collector-base voltage

V_{CBO} max. 60 V

Emitter-base voltage

V_{EBO} max. 6 V

Collector current (DC)

I_C max. 600 mA

Total power dissipation up to $T_{amb} = 25$ °C

P_{tot} max 250 mW

Storage temperature range

T_{stg} -55 to +150 °C

Junction temperature

T_j max. 150 °C



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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

$$I_C = 1.0\ \text{mA}; I_B = 0$$

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

Collector-base breakdown voltage

$$I_C = 100\ \mu\text{A}; I_E = 0$$

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

Emitter-base breakdown voltage

$$I_E = 100\ \mu\text{A}; I_C = 0$$

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

Base cut-off current

$$V_{CE} = 35\ \text{V}; V_{EB} = 0.4\ \text{V}$$

$$I_{BEX} < 0.1\ \mu\text{A}$$

Collector cut-off current

$$V_{CE} = 35\ \text{V}; V_{EB} = 0.4\ \text{V}$$

$$I_{CEX} < 0.1\ \mu\text{A}$$

D.C. current gain

$$I_C = 0.1\ \text{mA}; V_{CE} = 1\ \text{V}$$

$$h_{FE} > 20$$

$$I_C = 1.0\ \text{mA}; V_{CE} = 1\ \text{V}$$

$$h_{FE} > 40$$

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

$$h_{FE} > 80$$

$$I_C = 150\ \text{mA}; V_{CE} = 1\ \text{V}$$

$$h_{FE} \quad 100\ \text{to}\ 300$$

$$I_C = 500\ \text{mA}; V_{CE} = 2\ \text{V}$$

$$h_{FE} > 40$$

Saturation voltage

$$I_C = 150\ \text{mA}; I_B = 15\ \text{mA}$$

$$V_{CEsat} < 0.4\ \text{V}$$

$$V_{BEsat} \quad 0.75\ \text{to}\ 0.95\ \text{V}$$

$$I_C = 500\ \text{mA}; I_B = 50\ \text{mA}$$

$$V_{CEsat} < 0.75\ \text{V}$$

$$V_{BEsat} < 1.2\ \text{V}$$

Transition frequency

$$f = 100\ \text{MHz}; I_C = 20\ \text{mA}; V_{CE} = 10\ \text{V}$$

$$f_T > 250\ \text{MHz}$$

Collector-base capacitance

$$I_E = 0; V_{CB} = 5\ \text{V}; f = 100\ \text{kHz}$$

$$C_{cb} < 8\ \text{pF}$$

Emitter-base capacitance

$$I_C = 0; V_{BE} = 0.5\ \text{V}; f = 100\ \text{kHz}$$

$$C_{eb} < 30\ \text{pF}$$

Input impedance; $f = 1\ \text{kHz}$;

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

$$h_{ie} \quad \begin{matrix} \text{min.} & 1\ \text{k}\Omega \\ \text{max.} & 8\ \text{k}\Omega \end{matrix}$$

Voltage feed-back ratio

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

$$h_{re} \quad \begin{matrix} \text{min.} & 0.1 \times 10^{-4} \\ \text{max.} & 30 \times 10^{-4} \end{matrix}$$

Small-signal current gain; $f = 1\ \text{kHz}$;

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

$$h_{fe} \quad \begin{matrix} \text{min.} & 40 \\ \text{max.} & 500 \end{matrix}$$

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Output admittance; $f = 1 \text{ kHz}$;

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

h_{oe}	<i>min.</i>	1 μS
	<i>max.</i>	30 μS

Switching times (resistive load)

Turn-on time

$$I_C = 150 \text{ mA}; I_{B1} = 15 \text{ mA};$$

$$V_{CC} = 30 \text{ V}; V_{EB} = 2 \text{ V}$$

delay time

t_d	<i>max.</i>	15 ns
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rise time

t_r	<i>max.</i>	20 ns
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Turn-off time

$$I_C = 150 \text{ mA}; V_{CC} = 30 \text{ V};$$

$$I_{B1} = I_{B2} = 15 \text{ mA}$$

storage time

t_s	<i>max.</i>	225 ns
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fall time

t_f	<i>max.</i>	30 ns
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Disclaimer

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