

**SOT-23 Formed SMD Package**

**CMBT2222  
CMBT2222A**

*SILICON PLANAR EPITAXIAL TRANSISTORS*

*N-P-N silicon transistors*

**Marking**

CMBT2222 = 1B

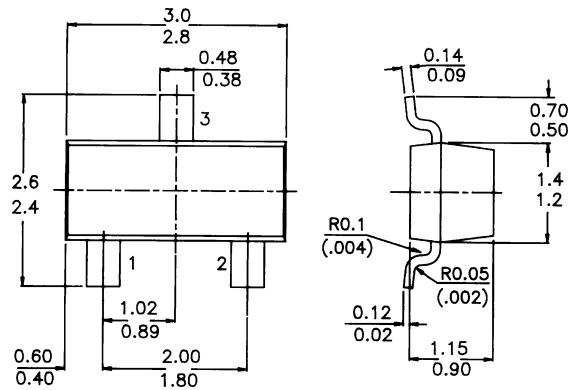
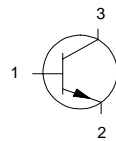
CMBT2222A = 1P

**PACKAGE OUTLINE DETAILS**

ALL DIMENSIONS IN mm

**Pin configuration**

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



**ABSOLUTE MAXIMUM RATINGS**

|  |                | <b>CMBT2222</b> | <b>CMBT2222A</b> |     |
|--|----------------|-----------------|------------------|-----|
| Collector-base voltage (open emitter)                              | $V_{CB0}$ max. | 60              | 75               | V   |
| Collector-emitter voltage (open base)                              | $V_{CE0}$ max. | 30              | 40               | V   |
| Emitter base voltage (open collector)                              | $V_{EB0}$ max. | 5,0             | 6,0              | V   |
| Collector current (d.c.)   | $I_C$ max.     | 600             |                  | mA  |
| Total power dissipation up to $T_{amb} = 25\text{ }^\circ\text{C}$ | $P_{tot}$ max. | 250             |                  | mW  |
| D.C. current gain  |                |                 |                  |     |
| $I_C = 150\text{mA}; V_{CE} = 10\text{V}$                          | $h_{FE}$       | 100 to 300      |                  |     |
| $I_C = 500\text{mA}; V_{CE} = 10\text{V}$                          | $h_{FE} >$     | 30              | 40               |     |
| Transition frequency at $f = 100\text{ MHz}$                       |                |                 |                  |     |
| $I_C = 20\text{ mA}; V_{CE} = 20\text{ V}$                         | $f_T >$        | 250             | 300              | MHz |

**CMBT2222**  
**CMBT2222A**

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

Limiting values

|  |                | <b>CMBT2222</b> | <b>CMBT2222A</b> |                  |
|--|----------------|-----------------|------------------|------------------|
| Collector-base voltage (open emitter)                      | $V_{CBO}$ max. | 60              | 75               | V                |
| Collector-emitter voltage (open base)                      | $V_{CEO}$ max. | 30              | 40               | V                |
| Emitter-base voltage (open collector)                      | $V_{EBO}$ max. | 5,0             | 6,0              | V                |
| Collector current (d.c.)                                   | $I_C$ max.     | 600             |                  | mA               |
| Total power dissipation up to $T_{amb} = 25^\circ\text{C}$ | $P_{tot}$ max. | 250             |                  | mW               |
| Storage temperature range                                  | $T_{stg}$      | -55 to +150     |                  | $^\circ\text{C}$ |
| Junction temperature                                       | $T_j$ max.     | 150             |                  | $^\circ\text{C}$ |

**THERMAL RESISTANCE**

|                          |               |     |     |
|--------------------------|---------------|-----|-----|
| From junction to ambient | $R_{th\ j-a}$ | 500 | K/W |
|--------------------------|---------------|-----|-----|

**CHARACTERISTICS**

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

|  |                 | <b>CMBT2222</b> | <b>CMBT2222A</b> |               |
|--|-----------------|-----------------|------------------|---------------|
| Collector cut-off current                                |                 |                 |                  |               |
| $I_E = 0; V_{CB} = 50\text{ V}$                          | $I_{CBO} <$     | 0,01            |                  | $\mu\text{A}$ |
| $I_E = 0; V_{CB} = 60\text{ V}$                          | $I_{CBO} <$     | -               | 0,01             | $\mu\text{A}$ |
| $I_E = 0; V_{CB} = 50\text{ V}; T_j = 125^\circ\text{C}$ | $I_{CBO} <$     | 10              | -                | $\mu\text{A}$ |
| $I_E = 0; V_{CB} = 60\text{ V}; T_j = 125^\circ\text{C}$ | $I_{CBO} <$     | -               | 10               | $\mu\text{A}$ |
| $V_{EB} = 3\text{ V}; V_{CE} = 60\text{ V}$              | $I_{CEX} <$     | -               | 10               | nA            |
| Base current   |                 |                 |                  |               |
| with reverse biased emitter junction                     |                 |                 |                  |               |
| $V_{FB} = 3\text{V}; V_{CE} = 60\text{V}$                | $I_{BEX} <$     | -               | 20               | nA            |
| Emitter cut-off current                                  |                 |                 |                  |               |
| $I_C = 0; V_{EB} = 3\text{V}$                            | $I_{EBO} <$     | -               | 10               | nA            |
| Saturation voltages                                      |                 |                 |                  |               |
| $I_C = 150\text{ mA}; I_B = 15\text{ mA}$                | $V_{CEsat} <$   | 400             | 300              | mV            |
|  | $V_{BEsat} <$   | 1.3             | -                | V             |
|  | $V_{BEsat}$     | -               | 0,6 to 1,2       | V             |
| $I_C = 500\text{ mA}; I_B = 50\text{ mA}$                | $V_{CEsat} <$   | 1.6             | 1.0              | V             |
|  | $V_{BEsat} <$   | 2.6             | 2.0              | V             |
| Breakdown voltages                                       |                 |                 |                  |               |
| $I_C = 1,0\mu\text{A}; I_B = 0$                          | $V_{(BR)CEO} >$ | 30              | 40               | V             |
| $I_C = 100\mu\text{A}; I_E = 0$                          | $V_{(BR)CBO} >$ | 60              | 75               | V             |
| $I_C = 0; I_E = 10\mu\text{A}$                           | $V_{(BR)EBO} >$ | 5,0             | 6,0              | V             |

**CMBT2222**  
**CMBT2222A**

|  |          | <u>CMBT2222</u> | <u>CMBT2222A</u> |         |
|--|----------|-----------------|------------------|---------|
| <i>D.C. current gain</i>   |          |                 |                  |         |
| $I_C = 0,1 \text{ mA}; V_{CE} = 10\text{V}$  | $h_{FE}$ | >               | 35               |         |
| $I_C = 1 \text{ mA}; V_{CE} = 10\text{V}$  | $h_{FE}$ | >               | 50               |         |
| $I_C = 10 \text{ mA}; V_{CE} = 10 \text{ V}$                                       | $h_{FE}$ | >               | 75               |         |
| $I_C = 10 \text{ mA}; V_{CE} = 10 \text{ V}; T_{amb} = -55 \text{ }^\circ\text{C}$ | $h_{FE}$ | >               | 35               |         |
| $I_C = 150\text{mA}; V_{CE} = 10\text{V}$  | $h_{FE}$ |                 | 100 to 300       |         |
| $I_C = 150 \text{ mA}; V_{CE} = 1 \text{ V}$                                       | $h_{FE}$ | >               | 50               |         |
| $I_C = 500 \text{ mA}; V_{CE} = 10 \text{ V}$                                      | $h_{FE}$ | >               | 30               | 40      |
| <i>Transition frequency at <math>f = 100 \text{ MHz}</math></i>                    |          |                 |                  |         |
| $I_C = 20 \text{ mA}; V_{CE} = 20 \text{ V}$                                       | $f_T$    | >               | 250              | 300 MHz |
| <i>Output capacitance at <math>f = 1 \text{ MHz}</math></i>                        |          |                 |                  |         |
| $I_E = 0; V_{CB} = 10\text{V}$   | $C_o$    | <               | 8,0              | pF      |
| <i>Input capacitance at <math>f = 1 \text{ MHz}</math></i>                         |          |                 |                  |         |
| $I_C = 0; V_{EB} = 0,5\text{V}$  | $C_i$    | <               | 30               | 25 pF   |
| <i>Noise figure at <math>R_S = 1 \text{ k}\Omega</math></i>                        |          |                 |                  |         |
| $I_C = 100\mu\text{A}; V_{CE} = 10\text{V}; f = 1 \text{ kHz}$                     | $F$      | <               | 4,0              | dB      |
| <i>Switching times (between 10% and 90% levels)</i>                                |          |                 |                  |         |
| <i>Turn-on time switched to <math>I_C = 150 \text{ mA}</math></i>                  |          |                 |                  |         |
| delay time   | $t_d$    | <               | 10               | ns      |
| rise time  | $t_r$    | <               | 25               | ns      |
| <i>Turn-off time switched from <math>I_C = 150 \text{ mA}</math></i>               |          |                 |                  |         |
| storage time   | $t_s$    | <               | 225              | ns      |
| fall time  | $t_f$    | <               | 60               | ns      |
| <i>Small Signal Current Gain</i>   |          |                 |                  |         |
| $V_{CE} = 10\text{V}; I_C = 1 \text{ mA}; f = 1 \text{ KHz}$                       | $h_{fe}$ | >               | 50               |         |
|  |          | <               | 300              |         |
| $V_{CE} = 10\text{V}; I_C = 10\text{mA}; f = 1 \text{ KHz}$                        | $h_{fe}$ | >               | 75               |         |
|  |          | <               | 375              |         |

## Disclaimer

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