



# PNP Transistor Bare Die – BC859

Rev 1.0  
08/01/19

General purpose medium power amplifier or switch in bare die form  
Complement to NPN BC849

## Features:

- High Collector Current
- Very low saturation voltage
- Well suited for low noise amplifier applications
- High Reliability Gold Back Metal
- High Reliability tested grades for Military + Space

## Ordering Information:

The following part suffixes apply:

- No suffix - MIL-STD-750 /2072 Visual Inspection
- "H" - MIL-STD-750 /2072 Visual Inspection + MIL-STD-38534 Class H LAT
- "K" - MIL-STD-750 /2072 Visual Inspection + MIL-STD-38534 Class K LAT

LAT = Lot Acceptance Test.

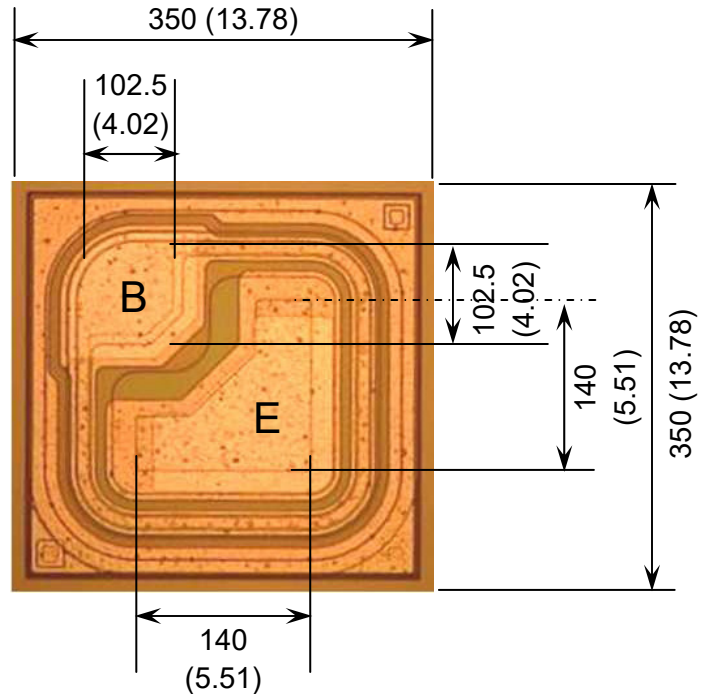
For further information on LAT process flows see below.

[www.siliconsupplies.com/quality/bare-die-lot-qualification](http://www.siliconsupplies.com/quality/bare-die-lot-qualification)

## Supply Formats:

- Default – Die in Waffle Pack (400 per tray capacity)
- Sawn Wafer on Tape – Specific request
- Unsawn Wafer – Specific request
- With additional electrical selection – Specific request
- Sawn as pairs or adjacent pair pick – Specific request

## Die Dimensions in $\mu\text{m}$ (mils)



**E** = EMITTER **B** = BASE

**DIE BACK** = COLLECTOR

## Mechanical Specification

|                                    |   |                       |
|------------------------------------|---|-----------------------|
| Die Size<br>(Excluding Saw Street) | 350 x 350<br>13.78 x 13.78              | $\mu\text{m}$<br>mils |
| Base Pad Size                      | 102.5 x 102.5<br>4.02 x 4.02            | $\mu\text{m}$<br>mils |
| Emitter Pad Size                   | 96 x 96<br>5.51 x 5.51                  | $\mu\text{m}$<br>mils |
| Die Thickness                      | 230 ( $\pm 15$ )<br>9.06 ( $\pm 0.59$ ) | $\mu\text{m}$<br>mils |
| Top Metal Composition              | Al - 1.3 $\mu\text{m}$                  |                       |
| Back Metal Composition             | AuAs - 0.9 $\mu\text{m}$                |                       |





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## Absolute Maximum Ratings $T_A = 25^\circ\text{C}$ unless otherwise stated

| PARAMETER                 | SYMBOL    | VALUE      | UNIT             |
|---------------------------|-----------|------------|------------------|
| Collector-Base Voltage    | $V_{CB0}$ | -30        | V                |
| Collector-Emitter Voltage | $V_{CEO}$ | -30        | V                |
| Emitter-Base Voltage      | $V_{EBO}$ | -5         | V                |
| Collector Current         | $I_C$     | -100       | mA               |
| Junction Temperature      | $T_J$     | 150        | $^\circ\text{C}$ |
| Storage Temperature       | $T_{stg}$ | -55 to 150 | $^\circ\text{C}$ |

## Electrical Characteristics $T_A = 25^\circ\text{C}$ unless otherwise stated

| PARAMETER                                       | SYMBOL        | CONDITIONS  | MIN  | TYP  | MAX  | UNIT |
|---|---------------|---|------|------|------|------|
| <b>OFF CHARACTERISTICS</b>                      |               |   |      |      |      |      |
| Collector-Base Breakdown Voltage                | $V_{(BR)CBO}$ | $I_C = -10\mu\text{A}, I_E = 0$   | -80  | -    | -    | V    |
| Collector-Emitter Breakdown Voltage             | $V_{(BR)CEO}$ | $I_C = -10\text{mA}, I_B = 0$   | -65  | -    | -    | V    |
| Emitter-Base Breakdown Voltage                  | $V_{(BR)EBO}$ | $I_E = -10\mu\text{A}, I_C = 0$   | -5   | -    | -    | V    |
| Collector Cut-off Current                       | $I_{CBO}$     | $V_{CB} = -30\text{V}, I_E = 0$   | -    | -    | -15  | nA   |
| <b>ON CHARACTERISTICS</b>                       |               |   |      |      |      |      |
| Forward-Current Transfer Ratio <sup>1</sup>     | $h_{FE}$      | $V_{CE} = -5\text{V}, I_C = -2\text{mA}$  | 110  | -    | 800  | -    |
| Collector-Emitter Saturation Voltage            | $V_{CE(sat)}$ | $I_C = -10\text{mA}, I_B = -0.5\text{mA}$   | -    | -90  | -300 | mV   |
|   |               | $I_C = -100\text{mA}, I_B = -5\text{mA}$  | -    | -250 | -650 | mV   |
| Base-Emitter Saturation Voltage                 | $V_{BE(sat)}$ | $I_C = -10\text{mA}, I_B = -0.5\text{mA}$   | -    | -700 | -    | mV   |
|   |               | $I_C = -100\text{mA}, I_B = -5\text{mA}$  | -    | -900 | -    | mV   |
| Base-Emitter On Voltage                         | $V_{BE(on)}$  | $I_C = -2\text{A}, V_{CE} = -5\text{V}$   | -600 | -660 | -750 | mV   |
|   |               | $I_C = -10\text{A}, V_{CE} = -5\text{V}$  | -    | -    | -800 | mV   |
| <b>SMALL SIGNAL CHARACTERISTICS<sup>2</sup></b> |               |   |      |      |      |      |
|   |               | $V_{CE} = -5\text{V}, I_C = -10\text{mA}, f = 10\text{MHz}$                                     | -    | 150  | -    | MHz  |
| Output Capacitance                              | $C_{obo}$     | $V_{CB} = -10\text{V}, I_E = 0, f = 1\text{MHz}$  | -    | -    | 6    | pF   |
| Noise Figure                                    | NF            | $V_{CE} = -5\text{V}, I_C = -200\mu\text{A}, R_G = 2\text{k}\Omega, f = 1\text{kHz}$            | -    | 1    | 4    | dB   |
|   |               | $V_{CE} = -5\text{V}, I_C = -200\mu\text{A}, R_G = 2\text{k}\Omega, f = 30 \sim 15000\text{Hz}$ | -    | 1.2  | 2    | dB   |

Note 1: Pulse Test: Pulse Width  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 2\%$

Note 2: Not production testing in die form. Characterized by chip design and tested in package

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