



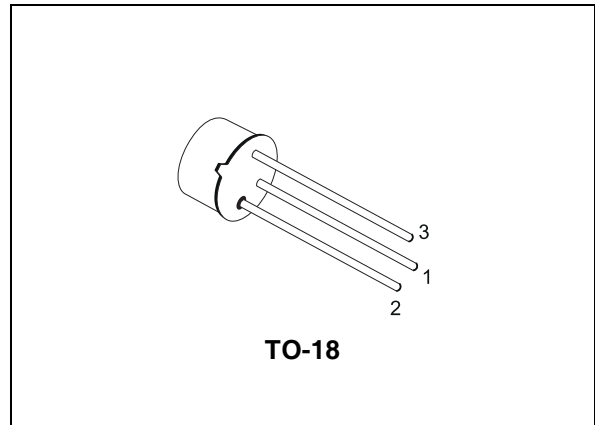
# BC107 BC107B

## Low noise general purpose audio amplifiers

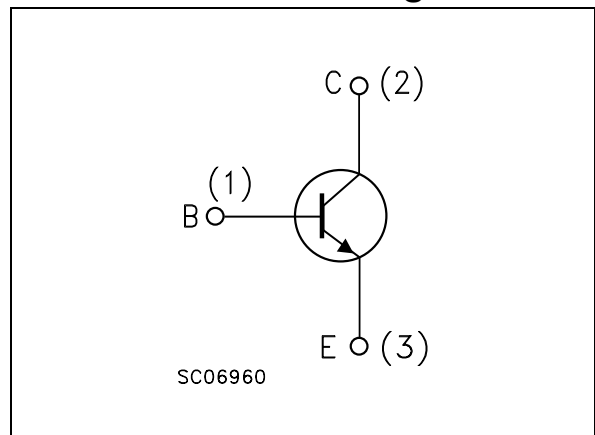
### Description

The BC107 and BC107B are silicon planar epitaxial NPN transistors in TO-18 metal case.

They are suitable for use in driver stages, low noise input stages and signal processing circuits of television receivers. The PNP complementary types are BC177 and BC177B respectively.



### Internal schematic diagram



### Order codes

| Part Number | Marking | Package | Packing |
|-------------|---------|---------|---------|
| BC107       | BC107   | TO-18   | Bag     |
| BC107A      | BC107B  | TO-18   | Bag     |

# 1 Electrical ratings

**Table 1. Absolute maximum rating**

| Symbol    | Parameter                                            | Value      | Unit             |
|-----------|------------------------------------------------------|------------|------------------|
| $V_{CBO}$ | Collector-emitter voltage ( $I_E = 0$ )              | 50         | V                |
| $V_{CEO}$ | Collector-emitter voltage ( $I_B = 0$ )              | 45         | V                |
| $V_{EBO}$ | Emitter-base voltage ( $I_C = 0$ )                   | 6          | V                |
| $I_C$     | Collector current                                    | 100        | mA               |
| $P_{tot}$ | Total dissipation at $T_{amb} \leq 25^\circ\text{C}$ | 0.3        | W                |
|           | at $T_{case} \leq 25^\circ\text{C}$                  | 0.75       | W                |
| $T_{stg}$ | Storage temperature                                  | -55 to 175 | $^\circ\text{C}$ |
| $T_J$     | Max. operating junction temperature                  | 175        | $^\circ\text{C}$ |

**Table 2. Thermal data**

| Symbol         | Parameter                               | Value | Unit               |
|----------------|-----------------------------------------|-------|--------------------|
| $R_{thj-case}$ | Thermal resistance junction-case max    | 200   | $^\circ\text{C/W}$ |
| $R_{thj-amb}$  | Thermal resistance junction-ambient max | 500   | $^\circ\text{C/W}$ |

## 2 Electrical characteristics

( $T_{CASE} = 25^{\circ}C$ ; unless otherwise specified)

**Table 3. Electrical characteristics**

| Symbol              | Parameter                                         | Test Conditions                                                                                                                              | Min.                 | Typ.               | Max.       | Unit                     |
|---------------------|---------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|----------------------|--------------------|------------|--------------------------|
| $I_{CBO}$           | Collector cut-off current<br>( $I_E = 0$ )        | $V_{CB} = 40V$<br>$V_{CB} = 40V$ $T_C = 150^{\circ}C$                                                                                        |                      |                    | 15<br>15   | nA<br>$\mu A$            |
| $V_{(BR)CBO}$       | Collector-base breakdown voltage ( $I_E = 0$ )    | $I_C = 10\mu A$                                                                                                                              | 50                   |                    |            | V                        |
| $V_{(BR)CEO}^{(1)}$ | Collector-emitter breakdown voltage ( $I_B = 0$ ) | $I_C = 10mA$                                                                                                                                 | 45                   |                    |            | V                        |
| $V_{(BR)EBO}$       | Emitter-base breakdown voltage ( $I_C = 0$ )      | $I_E = 10\mu A$                                                                                                                              | 6                    |                    |            | V                        |
| $V_{CE(sat)}^{(1)}$ | Collector-emitter saturation voltage              | $I_C = 10mA$ $I_B = 0.5mA$<br>$I_C = 100mA$ $I_B = 5mA$                                                                                      |                      | 70<br>200          | 250<br>600 | mV<br>mV                 |
| $V_{BE(sat)}^{(1)}$ | Base-emitter saturation voltage                   | $I_C = 10mA$ $I_B = 0.5mA$<br>$I_C = 100mA$ $I_B = 5mA$                                                                                      |                      | 750<br>950         |            | mV<br>mV                 |
| $V_{BE(on)}^{(1)}$  | Base-emitter on voltage                           | $I_C = 2mA$ $V_{CE} = 5V$<br>$I_C = 10mA$ $V_{CE} = 5V$                                                                                      | 550                  | 650<br>700         | 700<br>770 | mV<br>mV                 |
| $h_{FE}$            | DC current gain                                   | $I_C = 2mA$ $V_{CE} = 5V$<br><b>for BC107</b><br><b>for BC107B</b><br>$I_C = 10\mu A$ $V_{CE} = 5V$<br><b>for BC107</b><br><b>for BC107B</b> | 110<br>200<br><br>40 | <br><br>120<br>150 | 450<br>450 |                          |
| $h_{fe}$            | Small signal current gain                         | $I_C = 2mA$ $V_{CE} = 5V$<br>$f = 1kHz$<br><b>for BC107</b><br><b>for BC107B</b><br>$I_C = 10mA$ $V_{CE} = 5V$<br>$f = 100MHz$               |                      | 250<br>300<br>2    |            |                          |
| $C_{CBO}$           | Collector-base capacitance                        | $I_E = 0$ $V_{CB} = 10V$<br>$f = 1MHz$                                                                                                       |                      | 4                  | 6          | pF                       |
| $C_{EBO}$           | Emitter-base capacitance                          | $I_C = 0$ $V_{EB} = 0.5V$<br>$f = 1MHz$                                                                                                      |                      | 12                 |            | pF                       |
| NF                  | Noise figure                                      | $I_C = 0.2mA$ $V_{CE} = 5V$ $f = 1kHz$<br>$R_G = 2k\Omega$ $B = 200Hz$                                                                       |                      | 2                  | 10         | dB                       |
| $h_{ie}$            | Input impedance                                   | $I_C = 2mA$ $V_{CE} = 5V$<br>$f = 1kHz$<br><b>for BC107</b><br><b>for BC107B</b>                                                             |                      | 4<br>4.8           |            | k $\Omega$<br>k $\Omega$ |

| Symbol   | Parameter             | Test Conditions                                                                                       | Min. | Typ.       | Max. | Unit                           |
|----------|-----------------------|-------------------------------------------------------------------------------------------------------|------|------------|------|--------------------------------|
| $h_{re}$ | Reverse voltage ratio | $I_C = 2\text{mA}$ $V_{CE} = 5\text{V}$<br>$f = 1\text{kHz}$<br><b>for BC107</b><br><b>for BC107B</b> |      | 2.2<br>2.7 |      | $10^{-4}$<br>$10^{-4}$         |
| $h_{oe}$ | Output admittance     | $I_C = 2\text{mA}$ $V_{CE} = 5\text{V}$<br>$f = 1\text{kHz}$<br><b>for BC107</b><br><b>for BC107B</b> |      | 30<br>26   |      | $\mu\text{S}$<br>$\mu\text{S}$ |

(1) Pulsed: Pulse duration = 300  $\mu\text{s}$ , duty cycle  $\leq 1\%$

## 2.1 Electrical characteristics (curves)

Figure 1. DC normalized current gain

Figure 2. Collector-emitter saturation voltage

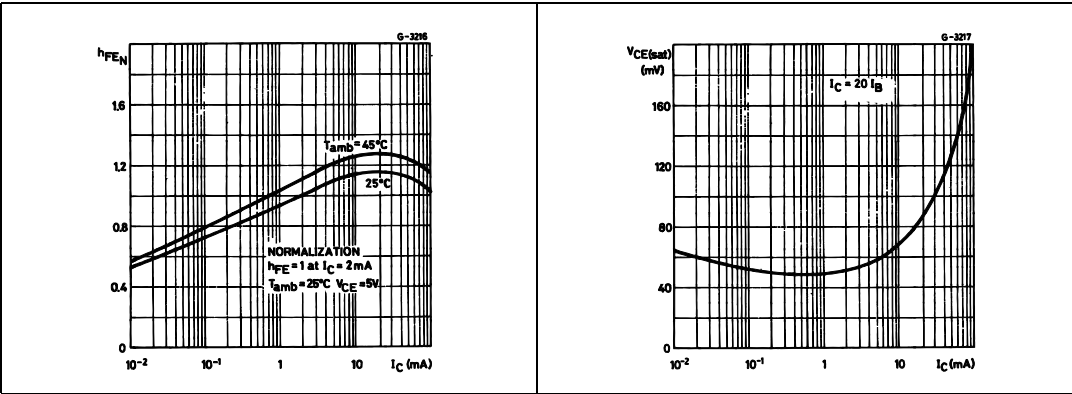


Figure 3. Collector-base capacitance

Figure 4. Transition frequency

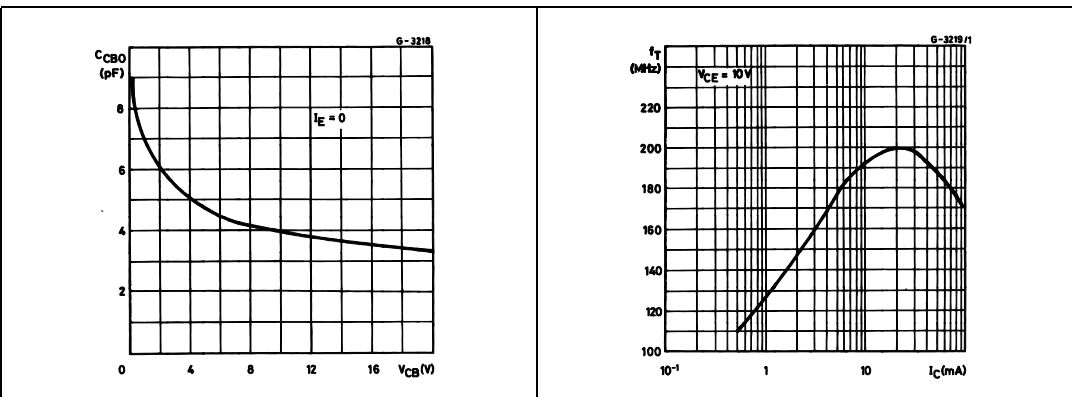
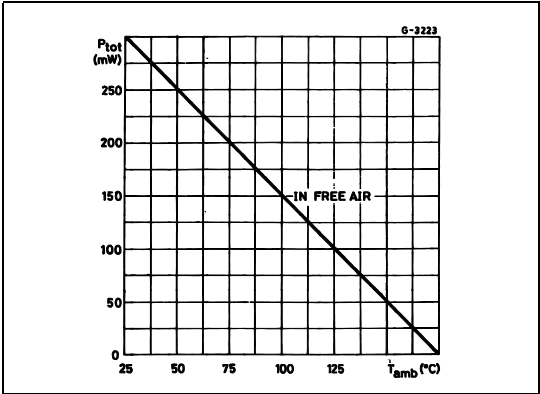


Figure 5. Power rating chart

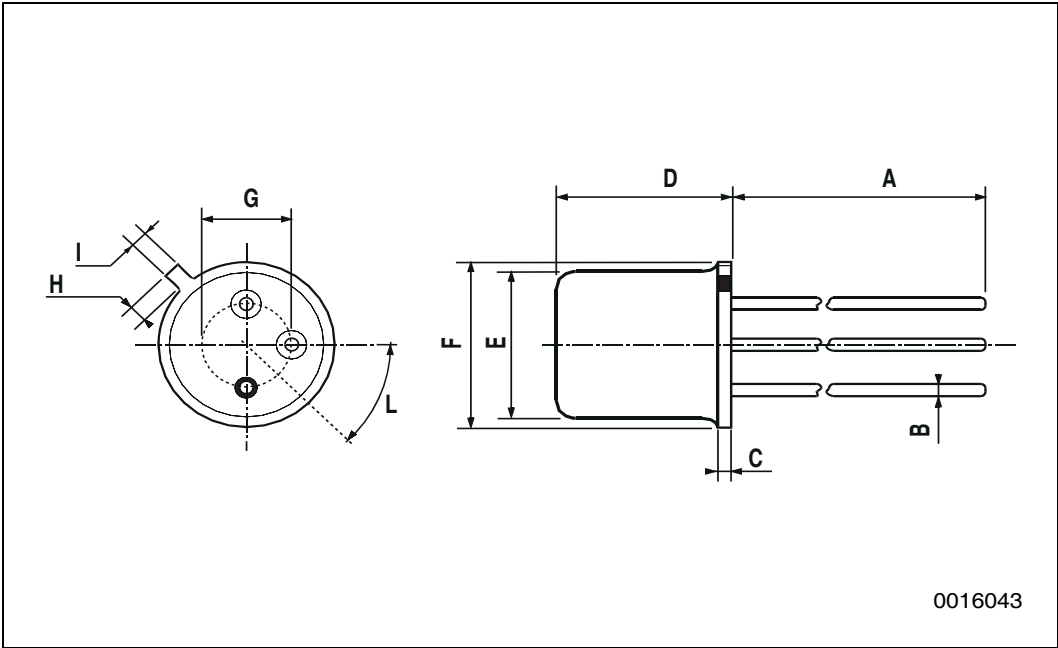


### 3 Package mechanical data

In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a Lead-free second level interconnect . The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: [www.st.com](http://www.st.com)

TO-18 MECHANICAL DATA

| DIM. | mm   |      |      | inch  |       |       |
|------|------|------|------|-------|-------|-------|
|      | MIN. | TYP. | MAX. | MIN.  | TYP.  | MAX.  |
| A    |      | 12.7 |      |       | 0.500 |       |
| B    |      |      | 0.49 |       |       | 0.019 |
| D    |      |      | 5.3  |       |       | 0.208 |
| E    |      |      | 4.9  |       |       | 0.193 |
| F    |      |      | 5.8  |       |       | 0.228 |
| G    | 2.54 |      |      | 0.100 |       |       |
| H    |      |      | 1.2  |       |       | 0.047 |
| I    |      |      | 1.16 |       |       | 0.045 |
| L    | 45°  |      |      | 45°   |       |       |



## 4 Revision history

**Table 4. Revision history**

| Date        | Revision | Changes                           |
|-------------|----------|-----------------------------------|
| 01-Dec-2002 | 1        | First release                     |
| 06-Nov-2006 | 2        | The document has been reformatted |

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