

**LOW NOISE AND GOOD HFE LINEARITY**

These devices are designed to use on applications where good HFE linearity and low noise characteristics are required: Instrumentation, Hi-Fi Preamplifier.

| NPN    | PNP    | BV <sub>CEO</sub><br>(Volts) | Pd mW<br>25 °C<br>Amb. | H <sub>FE</sub> 10 μA/5 V |      |
|--------|--------|------------------------------|------------------------|---------------------------|------|
|        |        |                              |                        | Min.                      | Typ. |
| BC239  | BC309  | 45                           | 625                    | —                         | —    |
| BC239A | BC309A | 45                           | 625                    | —                         | 90   |
| BC239B | BC309B | 45                           | 625                    | —                         | 150  |
| BC239C | BC309C | 45                           | 625                    | —                         | 270  |
| BC413  | BC415  | 30                           | 625                    | 100                       | —    |
| BC413B | BC415B | 30                           | 625                    | 100                       | 150  |
| BC413C | BC415B | 30                           | 625                    | 100                       | 270  |
| BC414  | BC416  | 45                           | 625                    | 100                       | —    |
| BC414B | BC416B | 45                           | 625                    | 100                       | 150  |
| BC414C | BC416C | 45                           | 625                    | 100                       | 270  |
| BC549  | BC559  | 30                           | 625                    | 100                       | —    |
| BC549B | BC559B | 30                           | 625                    | 100                       | 150  |
| BC549C | BC559C | 30                           | 625                    | 100                       | 270  |
| BC550  | BC560  | 45                           | 625                    | 100                       | —    |
| BC550B | BC560B | 45                           | 625                    | 100                       | 150  |
| BC550C | BC560C | 45                           | 625                    | 100                       | 270  |
| MPSA18 |        | 45                           | 625                    | 400                       | 500  |

- (1) V<sub>T</sub>: Total Input Noise Voltage (see Application Note, BC413/BC414 and BC415/BC416 Data Sheets) at R<sub>s</sub> = 2 K, I<sub>C</sub> = 200 μA, V<sub>CE</sub> = 5 Volts.
- (2) N<sub>F</sub>: Noise Figure at R<sub>s</sub> = 2 K, I<sub>C</sub> = 200 μA, V<sub>CE</sub> = 5 Volts, F = 30 Hz to 15 KHz.

**HIGH CURRENT AMPLIFIER TRANSISTORS (TO-92)**

Useful in Low Power Audio Output Stages and Medium Current Switches.

| NPN      | PNP      | BV <sub>CEO</sub><br>(Volts) | Pd mW<br>25 °C<br>Amb. | I <sub>C</sub> (mA)<br>Cont. | H <sub>FE</sub> |
|----------|----------|------------------------------|------------------------|------------------------------|-----------------|
|          |          |                              |                        |                              | Min.            |
| BC337    | BC327    | 45                           | 625                    | 800                          | 100             |
| BC337-16 | BC327-16 | 45                           | 625                    | 800                          | 100             |
| BC337-25 | BC327-25 | 45                           | 625                    | 800                          | 160             |
| BC337-40 |          | 45                           | 625                    | 800                          | 250             |
| BC338    | BC328    | 25                           | 625                    | 800                          | 100             |
| BC338-16 | BC328-16 | 25                           | 625                    | 800                          | 100             |
| BC338-25 | BC328-25 | 25                           | 625                    | 800                          | 160             |
| BC338-40 |          | 25                           | 625                    | 800                          | 250             |
| BC445    | BC446    | 60                           | 625                    | 200                          | 70              |
| BC447    | BC448    | 80                           | 625                    | 200                          | 70              |
| BC449    | BC450    | 100                          | 625                    | 200                          | 70              |
| BC485    | BC486    | 45                           | 625                    | 1000                         | 60              |
| BC485A   | BC486A   | 45                           | 625                    | 1000                         | 100             |
| BC487    | BC488    | 60                           | 625                    | 1000                         | 60              |
| BC487A   | BC488A   | 60                           | 625                    | 1000                         | 160             |
| BC489    | BC490    | 80                           | 625                    | 1000                         | 60              |
| BC489A   | BC490A   | 80                           | 625                    | 1000                         | 100             |
| MPSA05   | MPSA55   | 60                           | 625                    | 500                          | 50              |
| MPSA06   | MPSA56   | 80                           | 625                    | 500                          | 50              |

<sup>1</sup> PNP/Typ.

**HIGH VOLTAGE AMPLIFIER TRANSISTORS (TO-92)**

| NPN    | PNP    | BV <sub>CEO</sub><br>(Volts) | Pd mW<br>25 °C<br>Amb. | I <sub>C</sub> max.<br>(mA)<br>Cont. | H <sub>FE</sub> @ |
|--------|--------|------------------------------|------------------------|--------------------------------------|-------------------|
|        |        |                              |                        |                                      | Min.              |
| MPSL01 | 2N5400 | 120                          | 625                    | 600                                  | 50                |
| 2N5550 |        | 140                          | 625                    | 600                                  | 60                |
| 2N5551 |        | 160                          | 625                    | 600                                  | 80                |
|        | 2N5401 | 150                          | 625                    | 600                                  | 60                |
| BF391  | BF491  | 200                          | 625                    | 500                                  | 40                |
| BF392  | BF492  | 250                          | 625                    | 500                                  | 40                |
| BF393  | BF493  | 300                          | 625                    | 500                                  | 40                |

| H <sub>FE</sub> 2 mA/5 V |      | (1) V <sub>T</sub> 120 Hz<br>mV |      | (2) N <sub>F</sub> (dB) |      | F <sub>T</sub> Typ.<br>(MHz) |
|--------------------------|------|---------------------------------|------|-------------------------|------|------------------------------|
| Min.                     | Max. | Typ.                            | Max. | Typ.                    | Max. |                              |
| 120                      | 800  | 9.5                             | —    | 2                       | 4    | 240                          |
| 120                      | 220  | 9.5                             | —    | 2                       | 4    | 240                          |
| 180                      | 460  | 9.5                             | —    | 2                       | 4    | 240                          |
| 380                      | 800  | 9.5                             | —    | 2                       | 4    | 240                          |
| 180                      | 800  | 8                               | 12   | 0.6                     | 2.5  | 250                          |
| 180                      | 460  | 8                               | 12   | 0.6                     | 2.5  | 250                          |
| 380                      | 800  | 8                               | 12   | 0.6                     | 2.5  | 250                          |
| 180                      | 800  | 8                               | 12   | 0.6                     | 2.5  | 250                          |
| 180                      | 460  | 8                               | 12   | 0.6                     | 2.5  | 250                          |
| 380                      | 800  | 8                               | 12   | 0.6                     | 2.5  | 250                          |
| 180                      | 800  | 8                               | 12   | 0.6                     | 2.5  | 250                          |
| 180                      | 460  | 8                               | 12   | 0.6                     | 2.5  | 250                          |
| 380                      | 800  | 8                               | 12   | 0.6                     | 2.5  | 250                          |
| 180                      | 800  | 8                               | 12   | 0.6                     | 2.5  | 250                          |
| 180                      | 460  | 8                               | 12   | 0.6                     | 2.5  | 250                          |
| 380                      | 800  | 8                               | 12   | 0.6                     | 2.5  | 250                          |
| 500                      | —    | 7                               | —    | —                       | 1.5  | 160                          |

| H <sub>FE</sub> @ |     | I <sub>C</sub><br>(mA) | V <sub>CE</sub><br>(Volts) | F <sub>T</sub> Typical<br>(MHz) | Pinning |
|-------------------|-----|------------------------|----------------------------|---------------------------------|---------|
| Max.              |     |                        |                            |                                 |         |
| 600               | 100 | 1                      |                            | 210                             | CBE     |
| 250               | 100 | 1                      |                            | 210                             | CBE     |
| 400               | 100 | 1                      |                            | 210                             | CBE     |
| 600               | 100 | 1                      |                            | 210                             | CBE     |
| 600               | 100 | 1                      |                            | 210                             | CBE     |
| 250               | 100 | 1                      |                            | 210                             | CBE     |
| 400               | 100 | 1                      |                            | 210                             | CBE     |
| 600               | 100 | 1                      |                            | 210                             | CBE     |
| —                 | 10  | 5                      |                            | 250/200 <sup>1</sup>            | CBE     |
| —                 | 10  | 5                      |                            | 250/200 <sup>1</sup>            | CBE     |
| —                 | 10  | 5                      |                            | 250/200 <sup>1</sup>            | CBE     |
| 400               | 100 | 2                      |                            | 200/150 <sup>1</sup>            | CBE     |
| 250               | 100 | 2                      |                            | 200/150 <sup>1</sup>            | CBE     |
| 400               | 100 | 2                      |                            | 200/150 <sup>1</sup>            | CBE     |
| 250               | 100 | 2                      |                            | 200/150 <sup>1</sup>            | CBE     |
| 400               | 100 | 2                      |                            | 200/150 <sup>1</sup>            | CBE     |
| 250               | 100 | 2                      |                            | 200/150 <sup>1</sup>            | CBE     |
| —                 | 100 | 1                      |                            | 150/175 <sup>1</sup>            | EBC     |
| —                 | 100 | 1                      |                            | 150/175 <sup>1</sup>            | EBC     |

| I <sub>C</sub><br>(mA) | V <sub>CE</sub><br>(Volts) | C <sub>RE</sub><br>(pF)<br>Typ. | F <sub>T</sub> Typ. @ I <sub>C</sub><br>(MHz) | I <sub>C</sub><br>(mA) | V <sub>CE</sub><br>(Volts) | Pinning |
|------------------------|----------------------------|---------------------------------|-----------------------------------------------|------------------------|----------------------------|---------|
| 10                     | 5                          | 3                               | 160                                           | 10                     | 10                         | EBC     |
| 10                     | 5                          | 3                               | 160                                           | 10                     | 10                         | EBC     |
| 10                     | 5                          | 3                               | 200                                           | 10                     | 10                         | EBC     |
| 10                     | 5                          | 4                               | 150                                           | 10                     | 10                         | EBC     |
| 10                     | 10                         | 1.6                             | 70                                            | 10                     | 60                         | EBC     |
| 10                     | 10                         | 1.6                             | 70                                            | 10                     | 60                         | EBC     |
| 10                     | 10                         | 1.6                             | 70                                            | 10                     | 60                         | EBC     |