

# TO-92 Plastic Package Transistors (NPN)

| Maximum Ratings |                             |                             |                             |                                 |                    | Electrical Characteristics (Ta=25°C, Unless Otherwise Specified) |                          |                              |                          |                        |          |                       |                     |                                 |     |                                 |                          |                             |     |                             |          |                            |                             |                            |                   |                            |                 |  |         |
|-----------------|-----------------------------|-----------------------------|-----------------------------|---------------------------------|--------------------|------------------------------------------------------------------|--------------------------|------------------------------|--------------------------|------------------------|----------|-----------------------|---------------------|---------------------------------|-----|---------------------------------|--------------------------|-----------------------------|-----|-----------------------------|----------|----------------------------|-----------------------------|----------------------------|-------------------|----------------------------|-----------------|--|---------|
| Type No.        | V <sub>CBO</sub> (V)<br>Min | V <sub>CEO</sub> (V)<br>Min | V <sub>EB0</sub> (V)<br>Min | P <sub>D</sub> (W)<br>@ Tc=25°C | I <sub>C</sub> (A) | I <sub>CBO</sub> (μA)<br>Max                                     | V <sub>CB</sub> (V)<br>@ | I <sub>CES</sub> (μA)<br>Max | V <sub>CE</sub> (V)<br>@ | h <sub>FE</sub><br>Min | β<br>Max | I <sub>C</sub> & (mA) | V <sub>CE</sub> (V) | V <sub>CE(SAT)</sub> (V)<br>Max | Min | V <sub>BE(SAT)</sub> (V)<br>Max | I <sub>C</sub> (mA)<br>@ | C <sub>ob</sub> (pF)<br>Typ | Max | f <sub>t</sub> (MHz)<br>Min | β<br>Typ | I <sub>C</sub> (mA)<br>Max | t <sub>on</sub> (ns)<br>Max | N <sub>F</sub> (dB)<br>Max | β<br>@ Freq (MHz) | C <sub>m</sub> (pF)<br>Max | CDIL Case Style |  |         |
| BC637-16        | 60                          | 60                          | 5                           | 0.8                             | 1.0                | 0.1                                                              | 30                       |                              |                          | 25                     |          | 5                     | 2                   | 0.5                             |     |                                 | 500                      |                             | 7   |                             | 200      |                            | 50                          |                            |                   |                            |                 |  | TO-92-1 |
|                 |                             |                             |                             |                                 |                    |                                                                  |                          |                              |                          | 100                    | 250      | 150                   | 2                   |                                 |     |                                 |                          |                             |     |                             |          |                            |                             |                            |                   |                            |                 |  |         |
|                 |                             |                             |                             |                                 |                    |                                                                  |                          |                              |                          | 25                     |          | 500                   | 2                   |                                 |     |                                 |                          |                             |     |                             |          |                            |                             |                            |                   |                            |                 |  |         |
| BC639           | 80                          | 80                          | 5                           | 0.8                             | 1.0                | 0.1                                                              | 30                       |                              |                          | 25                     |          | 5                     | 2                   | 0.5                             |     |                                 | 500                      |                             | 7   |                             | 200      |                            | 10                          |                            |                   |                            |                 |  | TO-92-1 |
|                 |                             |                             |                             |                                 |                    |                                                                  |                          |                              |                          | 40                     | 160      | 150                   | 2                   |                                 |     |                                 |                          |                             |     |                             |          |                            |                             |                            |                   |                            |                 |  |         |
|                 |                             |                             |                             |                                 |                    |                                                                  |                          |                              |                          | 25                     |          | 500                   | 2                   |                                 |     |                                 |                          |                             |     |                             |          |                            |                             |                            |                   |                            |                 |  |         |
| BC639-10        | 80                          | 80                          | 5                           | 0.8                             | 1.0                | 0.1                                                              | 30                       |                              |                          | 25                     |          | 5                     | 2                   | 0.5                             |     |                                 | 500                      |                             | 7   |                             | 200      |                            | 50                          |                            |                   |                            |                 |  | TO-92-1 |
|                 |                             |                             |                             |                                 |                    |                                                                  |                          |                              |                          | 3                      | 160      | 150                   | 2                   |                                 |     |                                 |                          |                             |     |                             |          |                            |                             |                            |                   |                            |                 |  |         |
|                 |                             |                             |                             |                                 |                    |                                                                  |                          |                              |                          | 25                     |          | 500                   | 2                   |                                 |     |                                 |                          |                             |     |                             |          |                            |                             |                            |                   |                            |                 |  |         |
| BC639-16        | 80                          | 80                          | 5                           | 0.8                             | 1.0                | 0.1                                                              | 30                       |                              |                          | 25                     |          | 5                     | 2                   | 0.5                             |     |                                 | 500                      |                             | 7   |                             | 200      |                            | 50                          |                            |                   |                            |                 |  | TO-92-1 |
|                 |                             |                             |                             |                                 |                    |                                                                  |                          |                              |                          | 100                    | 250      | 150                   | 2                   |                                 |     |                                 |                          |                             |     |                             |          |                            |                             |                            |                   |                            |                 |  |         |
|                 |                             |                             |                             |                                 |                    |                                                                  |                          |                              |                          | 25                     |          | 500                   | 2                   |                                 |     |                                 |                          |                             |     |                             |          |                            |                             |                            |                   |                            |                 |  |         |
| BCX58           | 32                          | 32                          | 7                           | 0.625                           | 0.1                |                                                                  |                          | 0.01                         | 32                       | 120                    | 630      | 2                     | 5                   | 0.5                             |     | 1                               | 100                      | 1.8                         | 4.5 | 125                         |          | 10                         | 800                         | 6                          | 0.001             |                            |                 |  | TO-92-4 |
|                 |                             |                             |                             |                                 |                    |                                                                  |                          |                              |                          | 80                     | 1000     | 10                    | 1                   |                                 |     |                                 |                          |                             |     |                             |          |                            |                             |                            |                   |                            |                 |  |         |
|                 |                             |                             |                             |                                 |                    |                                                                  |                          |                              |                          | 40                     |          | 100                   | 1                   |                                 |     |                                 |                          |                             |     |                             |          |                            |                             |                            |                   |                            |                 |  |         |
|                 |                             |                             |                             |                                 |                    |                                                                  |                          |                              |                          | 20                     |          | 0.01                  | 5                   |                                 |     |                                 |                          |                             |     |                             |          |                            |                             |                            |                   |                            |                 |  |         |
| BCX58-10        | 32                          | 32                          | 7                           | 0.625                           | 0.1                |                                                                  |                          | 0.01                         | 32                       | 100                    |          | 0.01                  | 5                   | 0.5                             |     | 1                               | 100                      | 1.8                         | 4.5 | 125                         |          | 10                         | 800                         | 6                          |                   |                            |                 |  | TO-92-4 |
|                 |                             |                             |                             |                                 |                    |                                                                  |                          |                              |                          | 380                    | 630      | 2                     | 5                   |                                 |     |                                 |                          |                             |     |                             |          |                            |                             |                            |                   |                            |                 |  |         |
|                 |                             |                             |                             |                                 |                    |                                                                  |                          |                              |                          | 240                    | 1000     | 10                    | 1                   |                                 |     |                                 |                          |                             |     |                             |          |                            |                             |                            |                   |                            |                 |  |         |
|                 |                             |                             |                             |                                 |                    |                                                                  |                          |                              |                          | 60                     |          | 100                   | 2                   |                                 |     |                                 |                          |                             |     |                             |          |                            |                             |                            |                   |                            |                 |  |         |
| BCX58-7         | 32                          | 32                          | 7                           | 0.625                           | 0.1                |                                                                  |                          | 0.01                         | 32                       | 120                    | 220      | 2                     | 5                   | 0.5                             |     | 1                               | 100                      | 1.8                         | 4.5 | 125                         |          | 10                         | 800                         | 6                          | 0.001             |                            |                 |  | TO-92-4 |
|                 |                             |                             |                             |                                 |                    |                                                                  |                          |                              |                          | 80                     |          | 10                    | 1                   |                                 |     |                                 |                          |                             |     |                             |          |                            |                             |                            |                   |                            |                 |  |         |
|                 |                             |                             |                             |                                 |                    |                                                                  |                          |                              |                          | 40                     |          | 100                   | 1                   |                                 |     |                                 |                          |                             |     |                             |          |                            |                             |                            |                   |                            |                 |  |         |
|                 |                             |                             |                             |                                 |                    |                                                                  |                          |                              |                          | 20                     |          | 0.01                  | 5                   |                                 |     |                                 |                          |                             |     |                             |          |                            |                             |                            |                   |                            |                 |  |         |
| BCX58-8         | 32                          | 32                          | 7                           | 0.625                           | 0.1                |                                                                  |                          | 0.01                         | 32                       | 40                     |          | 0.01                  | 5                   | 0.5                             |     | 1                               | 100                      | 1.8                         | 4.5 | 125                         |          | 10                         | 800                         | 6                          | 0.001             |                            |                 |  | TO-92-4 |
|                 |                             |                             |                             |                                 |                    |                                                                  |                          |                              |                          | 180                    | 310      | 2                     | 5                   |                                 |     |                                 |                          |                             |     |                             |          |                            |                             |                            |                   |                            |                 |  |         |
|                 |                             |                             |                             |                                 |                    |                                                                  |                          |                              |                          | 120                    | 400      | 10                    | 1                   |                                 |     |                                 |                          |                             |     |                             |          |                            |                             |                            |                   |                            |                 |  |         |
|                 |                             |                             |                             |                                 |                    |                                                                  |                          |                              |                          | 45                     |          | 100                   | 1                   |                                 |     |                                 |                          |                             |     |                             |          |                            |                             |                            |                   |                            |                 |  |         |
| BCX58-9         | 32                          | 32                          | 7                           | 0.625                           | 0.1                |                                                                  |                          | 0.01                         | 32                       | 75                     |          | 0.01                  | 5                   | 0.5                             |     | 1                               | 100                      | 1.8                         | 4.5 | 125                         |          | 10                         | 800                         | 6                          | 0.001             |                            |                 |  | TO-92-4 |
|                 |                             |                             |                             |                                 |                    |                                                                  |                          |                              |                          | 250                    | 460      | 2                     | 5                   |                                 |     |                                 |                          |                             |     |                             |          |                            |                             |                            |                   |                            |                 |  |         |
|                 |                             |                             |                             |                                 |                    |                                                                  |                          |                              |                          | 160                    | 630      | 10                    | 1                   |                                 |     |                                 |                          |                             |     |                             |          |                            |                             |                            |                   |                            |                 |  |         |
|                 |                             |                             |                             |                                 |                    |                                                                  |                          |                              |                          | 60                     |          | 100                   | 1                   |                                 |     |                                 |                          |                             |     |                             |          |                            |                             |                            |                   |                            |                 |  |         |
| BCX59           | 45                          | 45                          | 7                           | 0.625                           | 0.1                |                                                                  |                          | 0.01                         | 45                       | 120                    | 630      | 2                     | 5                   | 0.5                             |     | 1                               | 100                      | 1.8                         | 4.5 | 125                         |          | 10                         | 800                         | 6                          | 0.001             |                            |                 |  | TO-92-4 |
|                 |                             |                             |                             |                                 |                    |                                                                  |                          |                              |                          | 80                     | 1000     | 10                    | 1                   |                                 |     |                                 |                          |                             |     |                             |          |                            |                             |                            |                   |                            |                 |  |         |
|                 |                             |                             |                             |                                 |                    |                                                                  |                          |                              |                          | 40                     |          | 100                   | 1                   |                                 |     |                                 |                          |                             |     |                             |          |                            |                             |                            |                   |                            |                 |  |         |
|                 |                             |                             |                             |                                 |                    |                                                                  |                          |                              |                          | 20                     |          | 0.01                  | 5                   |                                 |     |                                 |                          |                             |     |                             |          |                            |                             |                            |                   |                            |                 |  |         |
| BCX59-10        | 45                          | 45                          | 7                           | 0.625                           | 0.1                |                                                                  |                          | 0.01                         | 45                       | 100                    |          | 0.01                  | 5                   | 0.5                             |     |                                 | 100                      | 1.8                         | 4.5 | 125                         |          | 10                         | 800                         | 6                          |                   |                            |                 |  | TO-92-4 |
|                 |                             |                             |                             |                                 |                    |                                                                  |                          |                              |                          | 380                    | 600      | 2                     | 5                   |                                 | 1   |                                 | 100                      |                             |     |                             |          |                            |                             |                            |                   |                            |                 |  |         |
|                 |                             |                             |                             |                                 |                    |                                                                  |                          |                              |                          | 240                    | 1000     | 10                    | 1                   |                                 |     |                                 |                          |                             |     |                             |          |                            |                             |                            |                   |                            |                 |  |         |
|                 |                             |                             |                             |                                 |                    |                                                                  |                          |                              |                          | 60                     |          | 100                   | 2                   |                                 |     |                                 |                          |                             |     |                             |          |                            |                             |                            |                   |                            |                 |  |         |
| BCX59-7         | 45                          | 45                          | 7                           | 0.625                           | 0.1                |                                                                  |                          | 0.01                         | 45                       | 120                    | 220      | 2                     | 5                   | 0.5                             |     | 1                               | 100                      | 1.8                         | 4.5 | 125                         |          | 10                         | 800                         | 6                          | 0.001             |                            |                 |  | TO-92-4 |
|                 |                             |                             |                             |                                 |                    |                                                                  |                          |                              |                          | 80                     |          | 10                    | 1                   |                                 |     |                                 |                          |                             |     |                             |          |                            |                             |                            |                   |                            |                 |  |         |
|                 |                             |                             |                             |                                 |                    |                                                                  |                          |                              |                          | 40                     |          | 100                   | 1                   |                                 |     |                                 |                          |                             |     |                             |          |                            |                             |                            |                   |                            |                 |  |         |
|                 |                             |                             |                             |                                 |                    |                                                                  |                          |                              |                          | 20                     |          | 0.01                  | 5                   |                                 |     |                                 |                          |                             |     |                             |          |                            |                             |                            |                   |                            |                 |  |         |
| BCX59-8         | 45                          | 45                          | 7                           | 0.625                           | 0.1                |                                                                  |                          | 0.01                         | 45                       | 40                     |          | 0.01                  | 5                   | 0.5                             |     | 1                               | 100                      | 1.8                         | 4.5 | 125                         |          | 10                         | 800                         | 6                          | 0.001             |                            |                 |  | TO-92-4 |
|                 |                             |                             |                             |                                 |                    |                                                                  |                          |                              |                          | 180                    | 310      | 2                     | 5                   |                                 |     |                                 |                          |                             |     |                             |          |                            |                             |                            |                   |                            |                 |  |         |
|                 |                             |                             |                             |                                 |                    |                                                                  |                          |                              |                          | 120                    | 400      | 10                    | 1                   |                                 |     |                                 |                          |                             |     |                             |          |                            |                             |                            |                   |                            |                 |  |         |
|                 |                             |                             |                             |                                 |                    |                                                                  |                          |                              |                          | 45                     |          | 100                   | 1                   |                                 |     |                                 |                          |                             |     |                             |          |                            |                             |                            |                   |                            |                 |  |         |
| BCX59-9         | 45                          | 45                          | 7                           | 0.625                           | 0.1                |                                                                  |                          | 0.01                         | 45                       | 75                     |          | 0.01                  | 5                   | 0.5                             |     | 1                               | 100                      | 1.8                         | 4.5 | 125                         |          | 10                         | 800                         | 6                          | 0.001             |                            |                 |  | TO-92-4 |
|                 |                             |                             |                             |                                 |                    |                                                                  |                          |                              |                          | 250                    | 460      | 2                     | 5                   |                                 |     |                                 |                          |                             |     |                             |          |                            |                             |                            |                   |                            |                 |  |         |
|                 |                             |                             |                             |                                 |                    |                                                                  |                          |                              |                          | 160                    | 630      | 10                    | 1                   |                                 |     |                                 |                          |                             |     |                             |          |                            |                             |                            |                   |                            |                 |  |         |
|                 |                             |                             |                             |                                 |                    |                                                                  |                          |                              |                          | 60                     |          | 100                   | 1                   |                                 |     |                                 |                          |                             |     |                             |          |                            |                             |                            |                   |                            |                 |  |         |
| BF194           | 30                          | 20                          | 5                           | 0.4                             | 0.03               | 0.1                                                              | 20                       |                              |                          | 67                     | 220      | 1                     | 10                  |                                 |     |                                 |                          | 0.3                         |     |                             |          |                            | 1                           |                            | 3.5               |                            |                 |  | TO-92-2 |
|                 |                             |                             |                             |                                 |                    |                                                                  |                          |                              |                          | 6                      |          | 12                    | 7                   |                                 |     |                                 |                          |                             |     |                             |          |                            |                             |                            |                   |                            |                 |  |         |