

# BC637, BC639, BC639-16

## High Current Transistors

### NPN Silicon

#### Features

- These are Pb-Free Devices\*

#### MAXIMUM RATINGS

| Rating   | Symbol         | Value       | Unit                 |
|--|----------------|-------------|----------------------|
| Collector - Emitter Voltage  | BC637          | $V_{CEO}$   | Vdc                  |
|  | BC639          | 60          |                      |
| Collector - Base Voltage   | BC637          | $V_{CBO}$   | Vdc                  |
|  | BC639          | 60          |                      |
| Emitter - Base Voltage   | $V_{EBO}$      | 5.0         | Vdc                  |
| Collector Current - Continuous   | $I_C$          | 1.0         | Adc                  |
| Total Device Dissipation @ $T_A = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$          | 625         | mW                   |
|  |                | 5.0         | mW/ $^\circ\text{C}$ |
| Total Device Dissipation @ $T_C = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$          | 800         | mW                   |
|  |                | 12          | mW/ $^\circ\text{C}$ |
| Operating and Storage Junction<br>Temperature Range                                    | $T_J, T_{stg}$ | -55 to +150 | $^\circ\text{C}$     |

#### THERMAL CHARACTERISTICS

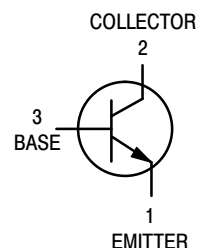
| Characteristic                          | Symbol          | Max  | Unit                      |
|---|-----------------|------|---------------------------|
| Thermal Resistance, Junction-to-Ambient | $R_{\theta JA}$ | 200  | $^\circ\text{C}/\text{W}$ |
| Thermal Resistance, Junction-to-Case    | $R_{\theta JC}$ | 83.3 | $^\circ\text{C}/\text{W}$ |

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

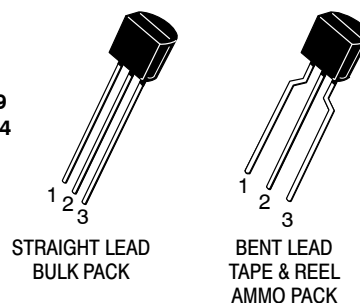


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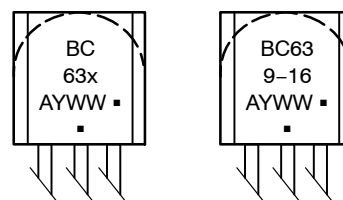
TO-92  
CASE 29  
STYLE 14



STRAIGHT LEAD  
BULK PACK

BENT LEAD  
TAPE & REEL  
AMMO PACK

#### MARKING DIAGRAMS



- x = 7 or 9
- A = Assembly Location
- Y = Year
- WW = Work Week
- = Pb-Free Package

(Note: Microdot may be in either location)

#### ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 2 of this data sheet.

\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

## BC637, BC639, BC639-16

### ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C unless otherwise noted)

| Characteristic   | Symbol         | Min                  | Typ      | Max    | Unit      |              |
|--|----------------|----------------------|----------|--------|-----------|--------------|
| <b>OFF CHARACTERISTICS</b>   |                |                      |          |        |           |              |
| Collector – Emitter Breakdown Voltage (Note 1)<br>(I <sub>C</sub> = 10 μAdc, I <sub>B</sub> = 0)   | BC637<br>BC639 | V <sub>(BR)CEO</sub> | 60<br>80 | –<br>– | –<br>–    | Vdc          |
| Collector – Emitter Zero–Gate Breakdown Voltage (Note 1)<br>(I <sub>C</sub> = 100 μAdc, I <sub>B</sub> = 0)  | BC639–16       | V <sub>(BR)CES</sub> | 120      | –      | –         | Vdc          |
| Collector – Base Breakdown Voltage<br>(I <sub>C</sub> = 100 μAdc, I <sub>E</sub> = 0)  | BC637<br>BC639 | V <sub>(BR)CBO</sub> | 60<br>80 | –<br>– | –<br>–    | Vdc          |
| Emitter – Base Breakdown Voltage<br>(I <sub>E</sub> = 10 μAdc, I <sub>C</sub> = 0)   |                | V <sub>(BR)EBO</sub> | 5.0      | –      | –         | Vdc          |
| Collector Cutoff Current<br>(V <sub>CB</sub> = 30 Vdc, I <sub>E</sub> = 0)<br>(V <sub>CB</sub> = 30 Vdc, I <sub>E</sub> = 0, T <sub>A</sub> = 125°C) |                | I <sub>CBO</sub>     | –<br>–   | –<br>– | 100<br>10 | nAdc<br>μAdc |

### ON CHARACTERISTICS (Note 1)

|   |                                |                      |                             |                       |                             |     |
|---|--------------------------------|----------------------|-----------------------------|-----------------------|-----------------------------|-----|
| DC Current Gain<br>(I <sub>C</sub> = 5.0 mAdc, V <sub>CE</sub> = 2.0 Vdc)<br>(I <sub>C</sub> = 150 mAdc, V <sub>CE</sub> = 2.0 Vdc)<br><br>(I <sub>C</sub> = 500 mA, V <sub>CE</sub> = 2.0 V) | BC637<br>BC639<br>BC639–16ZLT1 | h <sub>FE</sub>      | 25<br>40<br>40<br>100<br>25 | –<br>–<br>–<br>–<br>– | –<br>160<br>160<br>250<br>– | –   |
| Collector – Emitter Saturation Voltage<br>(I <sub>C</sub> = 500 mAdc, I <sub>B</sub> = 50 mAdc)   |                                | V <sub>CE(sat)</sub> | –                           | –                     | 0.5                         | Vdc |
| Base – Emitter On Voltage<br>(I <sub>C</sub> = 500 mAdc, V <sub>CE</sub> = 2.0 Vdc)   |                                | V <sub>BE(on)</sub>  | –                           | –                     | 1.0                         | Vdc |

### DYNAMIC CHARACTERISTICS

|  |  |                 |   |     |   |     |
|--|--|-----------------|---|-----|---|-----|
| Current Gain – Bandwidth Product<br>(I <sub>C</sub> = 50 mAdc, V <sub>CE</sub> = 2.0 Vdc, f = 100 MHz) |  | f <sub>T</sub>  | – | 200 | – | MHz |
| Output Capacitance<br>(V <sub>CB</sub> = 10 Vdc, I <sub>E</sub> = 0, f = 1.0 MHz)                      |  | C <sub>ob</sub> | – | 7.0 | – | pF  |
| Input Capacitance<br>(V <sub>EB</sub> = 0.5 Vdc, I <sub>C</sub> = 0, f = 1.0 MHz)                      |  | C <sub>ib</sub> | – | 50  | – | pF  |

1. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle 2.0%.

### ORDERING INFORMATION

| Device       | Package            | Shipping <sup>†</sup> |
|--------------|--------------------|-----------------------|
| BC637G       | TO–92<br>(Pb–Free) | 5000 Units / Bulk     |
| BC637RL1G    | TO–92<br>(Pb–Free) | 2000 / Tape & Reel    |
| BC639G       | TO–92<br>(Pb–Free) | 5000 Units / Bulk     |
| BC639RL1G    | TO–92<br>(Pb–Free) | 2000 / Tape & Reel    |
| BC639ZL1G    | TO–92<br>(Pb–Free) | 2000 / Ammo Box       |
| BC639–16ZL1G | TO–92<br>(Pb–Free) | 2000 / Ammo Box       |

<sup>†</sup>For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

# BC637, BC639, BC639-16

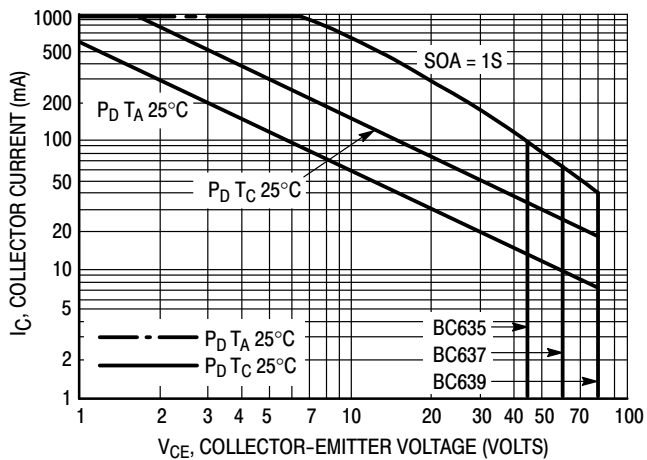


Figure 1. Active Region Safe Operating Area

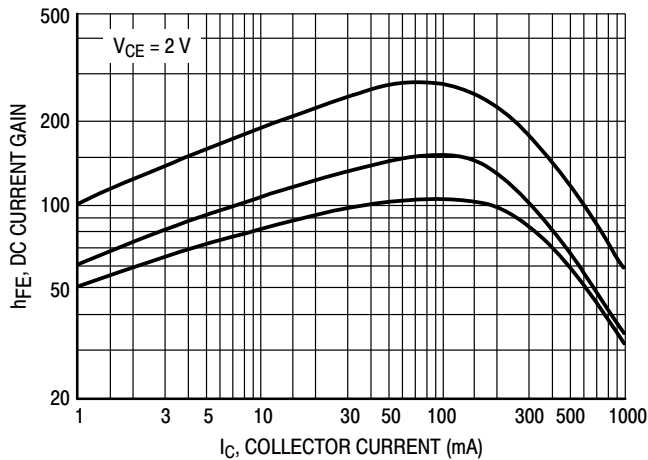


Figure 2. DC Current Gain

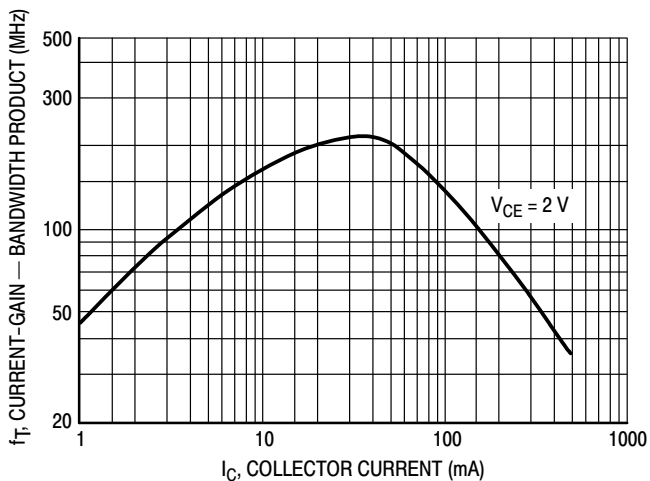


Figure 3. Current-Gain — Bandwidth Product

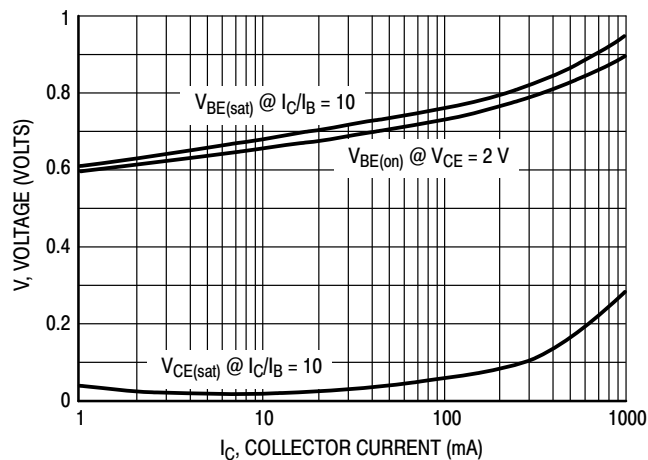


Figure 4. "Saturation" and "On" Voltages

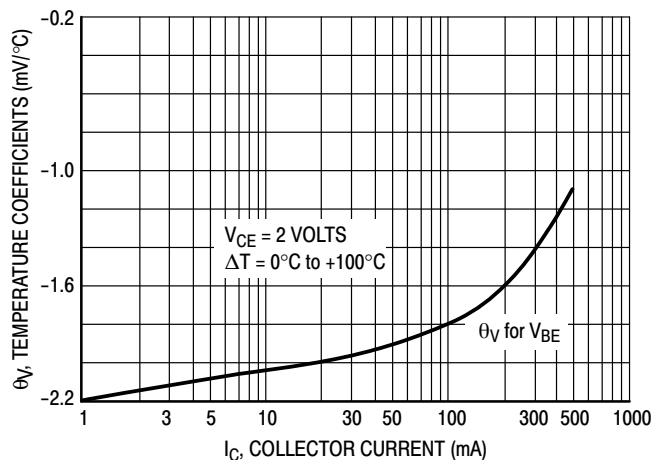
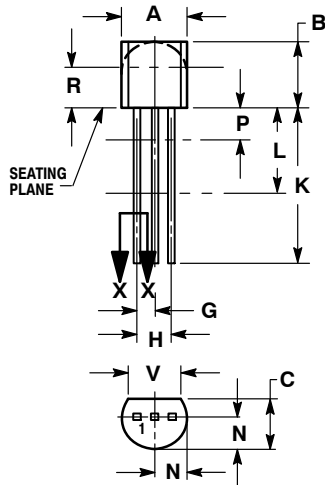


Figure 5. Temperature Coefficients

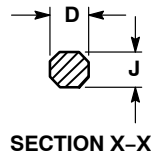
# BC637, BC639, BC639-16

## PACKAGE DIMENSIONS

TO-92 (TO-226)  
CASE 29-11  
ISSUE AM



STRAIGHT LEAD  
BULK PACK

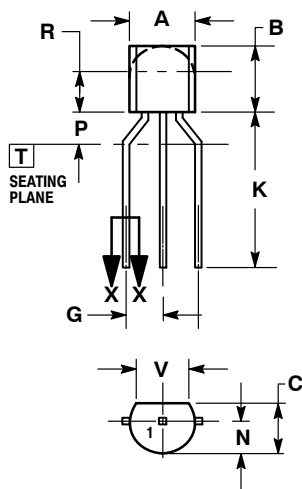


SECTION X-X

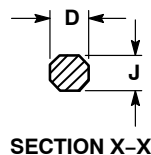
NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
4. LEAD DIMENSION IS UNCONTROLLED IN P AND BEYOND DIMENSION K MINIMUM.

| DIM | INCHES |       | MILLIMETERS |       |
|-----|--------|-------|-------------|-------|
|     | MIN    | MAX   | MIN         | MAX   |
| A   | 0.175  | 0.205 | 4.45        | 5.20  |
| B   | 0.170  | 0.210 | 4.32        | 5.33  |
| C   | 0.125  | 0.165 | 3.18        | 4.19  |
| D   | 0.016  | 0.021 | 0.407       | 0.533 |
| G   | 0.045  | 0.055 | 1.15        | 1.39  |
| H   | 0.095  | 0.105 | 2.42        | 2.66  |
| J   | 0.015  | 0.020 | 0.39        | 0.50  |
| K   | 0.500  | ---   | 12.70       | ---   |
| L   | 0.250  | ---   | 6.35        | ---   |
| N   | 0.080  | 0.105 | 2.04        | 2.66  |
| P   | ---    | 0.100 | ---         | 2.54  |
| R   | 0.115  | ---   | 2.93        | ---   |
| V   | 0.135  | ---   | 3.43        | ---   |



BENT LEAD  
TAPE & REEL  
AMMO PACK



SECTION X-X

NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
4. LEAD DIMENSION IS UNCONTROLLED IN P AND BEYOND DIMENSION K MINIMUM.

| DIM | MILLIMETERS |      |
|-----|-------------|------|
|     | MIN         | MAX  |
| A   | 4.45        | 5.20 |
| B   | 4.32        | 5.33 |
| C   | 3.18        | 4.19 |
| D   | 0.40        | 0.54 |
| G   | 2.40        | 2.80 |
| J   | 0.39        | 0.50 |
| K   | 12.70       | ---  |
| N   | 2.04        | 2.66 |
| P   | 1.50        | 4.00 |
| R   | 2.93        | ---  |
| V   | 3.43        | ---  |

STYLE 14:

1. EMITTER
2. COLLECTOR
3. BASE

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