

# BC637, BC639, BC639-16

## High Current Transistors

### NPN Silicon

#### Features

- These are Pb-Free Devices\*

#### MAXIMUM RATINGS

| Rating                                                                                 | Symbol         | Value       | Unit                       |
|----------------------------------------------------------------------------------------|----------------|-------------|----------------------------|
| Collector - Emitter Voltage<br>BC637<br>BC639                                          | $V_{CEO}$      | 60<br>80    | Vdc                        |
| Collector - Base Voltage<br>BC637<br>BC639                                             | $V_{CBO}$      | 60<br>80    | Vdc                        |
| 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<br>5.0  | mW<br>mW/ $^\circ\text{C}$ |
| Total Device Dissipation @ $T_C = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$          | 800<br>12   | mW<br>mW/ $^\circ\text{C}$ |
| Operating and Storage Junction<br>Temperature Range                                    | $T_J, T_{stg}$ | -55 to +150 | $^\circ\text{C}$           |

#### THERMAL CHARACTERISTICS

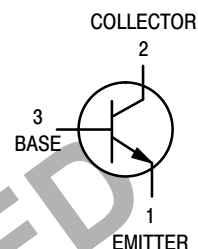
| Characteristic                          | Symbol          | Max  | Unit               |
|-----------------------------------------|-----------------|------|--------------------|
| Thermal Resistance, Junction-to-Ambient | $R_{\theta JA}$ | 200  | $^\circ\text{C/W}$ |
| Thermal Resistance, Junction-to-Case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

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.

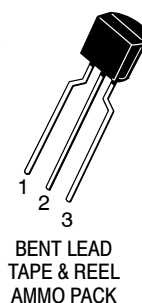
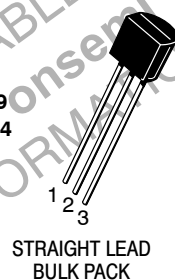


ON Semiconductor®

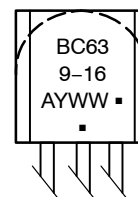
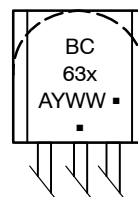
<http://onsemi.com>



TO-92  
CASE 29  
STYLE 14



#### 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)                                                     | 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)                                          | V <sub>(BR)CES</sub> | 120      | –      | –         | Vdc          |
| Collector – Base Breakdown Voltage<br>(I <sub>C</sub> = 100 µAdc, I <sub>E</sub> = 0)                                                                | 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) | 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.

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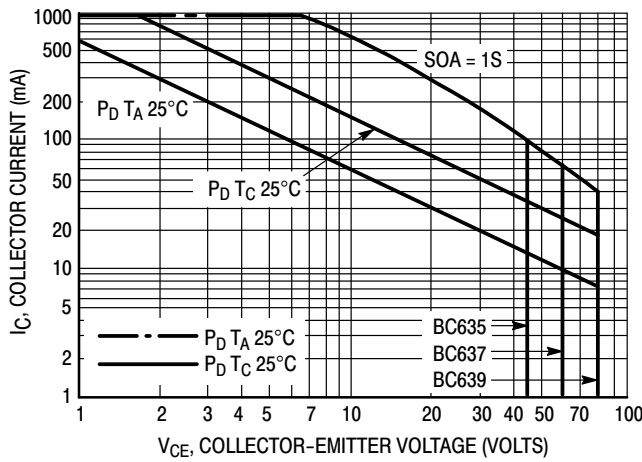


Figure 1. Active Region Safe Operating Area

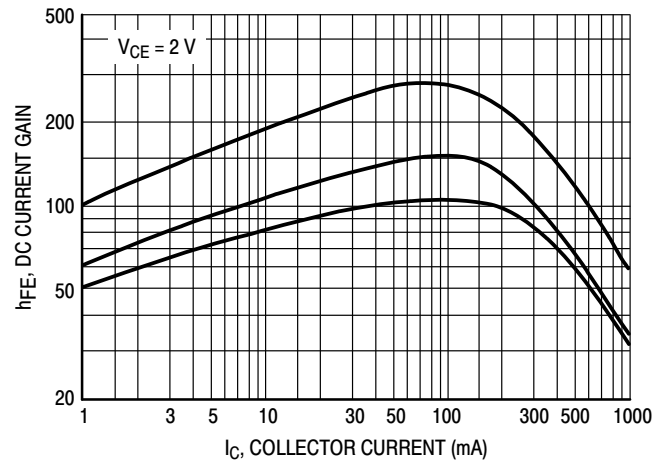


Figure 2. DC Current Gain

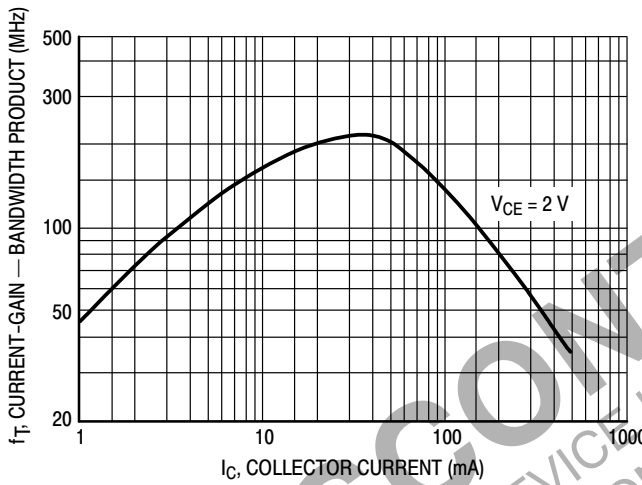


Figure 3. Current-Gain — Bandwidth Product

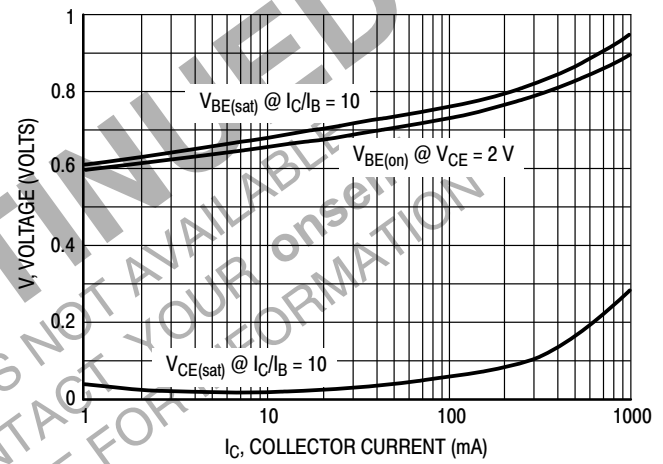


Figure 4. "Saturation" and "On" Voltages

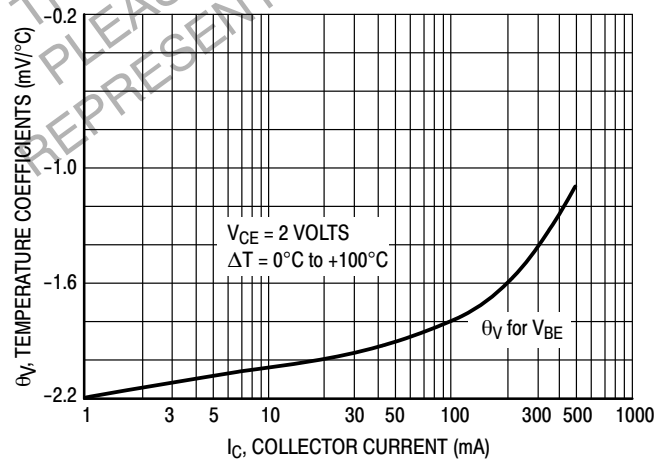


Figure 5. Temperature Coefficients

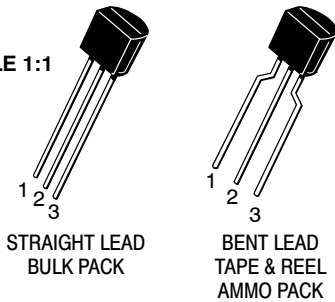
REVISION HISTORY

| Revision | Description of Changes | Date      |
|----------|------------------------|-----------|
| 2        | Document Discontinued. | 3/10/2026 |

This document has undergone updates prior to the inclusion of this revision history table. The changes tracked here only reflect updates made on the noted approval dates.

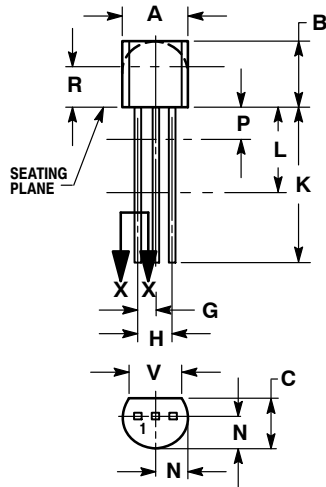
**DISCONTINUED**  
THIS DEVICE IS NOT AVAILABLE  
PLEASE CONTACT YOUR onsemi  
REPRESENTATIVE FOR INFORMATION

SCALE 1:1

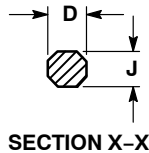


TO-92 (TO-226)  
CASE 29-11  
ISSUE AM

DATE 09 MAR 2007



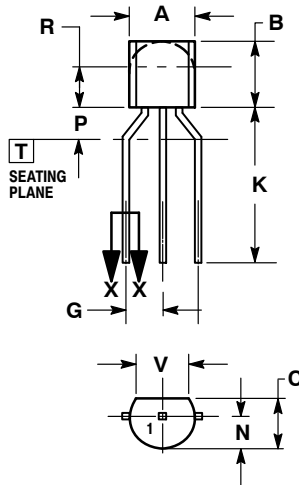
STRAIGHT LEAD  
BULK PACK



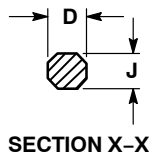
NOTES:

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



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        | ---  |

STYLES ON PAGE 2

|                  |                |                                                                                                                                                                                     |
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**ISSUE AM**

DATE 09 MAR 2007

|                                                               |                                                                      |                                                              |                                                                 |                                                             |
|---------------------------------------------------------------|----------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------------|-------------------------------------------------------------|
| STYLE 1:<br>PIN 1. EMITTER<br>2. BASE<br>3. COLLECTOR         | STYLE 2:<br>PIN 1. BASE<br>2. EMITTER<br>3. COLLECTOR                | STYLE 3:<br>PIN 1. ANODE<br>2. ANODE<br>3. CATHODE           | STYLE 4:<br>PIN 1. CATHODE<br>2. CATHODE<br>3. ANODE            | STYLE 5:<br>PIN 1. DRAIN<br>2. SOURCE<br>3. GATE            |
| STYLE 6:<br>PIN 1. GATE<br>2. SOURCE & SUBSTRATE<br>3. DRAIN  | STYLE 7:<br>PIN 1. SOURCE<br>2. DRAIN<br>3. GATE                     | STYLE 8:<br>PIN 1. DRAIN<br>2. GATE<br>3. SOURCE & SUBSTRATE | STYLE 9:<br>PIN 1. BASE 1<br>2. EMITTER<br>3. BASE 2            | STYLE 10:<br>PIN 1. CATHODE<br>2. GATE<br>3. ANODE          |
| STYLE 11:<br>PIN 1. ANODE<br>2. CATHODE & ANODE<br>3. CATHODE | STYLE 12:<br>PIN 1. MAIN TERMINAL 1<br>2. GATE<br>3. MAIN TERMINAL 2 | STYLE 13:<br>PIN 1. ANODE 1<br>2. GATE<br>3. CATHODE 2       | STYLE 14:<br>PIN 1. EMITTER<br>2. COLLECTOR<br>3. BASE          | STYLE 15:<br>PIN 1. ANODE 1<br>2. CATHODE<br>3. ANODE 2     |
| STYLE 16:<br>PIN 1. ANODE<br>2. GATE<br>3. CATHODE            | STYLE 17:<br>PIN 1. COLLECTOR<br>2. BASE<br>3. EMITTER               | STYLE 18:<br>PIN 1. ANODE<br>2. CATHODE<br>3. NOT CONNECTED  | STYLE 19:<br>PIN 1. GATE<br>2. ANODE<br>3. CATHODE              | STYLE 20:<br>PIN 1. NOT CONNECTED<br>2. CATHODE<br>3. ANODE |
| STYLE 21:<br>PIN 1. COLLECTOR<br>2. EMITTER<br>3. BASE        | STYLE 22:<br>PIN 1. SOURCE<br>2. GATE<br>3. DRAIN                    | STYLE 23:<br>PIN 1. GATE<br>2. SOURCE<br>3. DRAIN            | STYLE 24:<br>PIN 1. EMITTER<br>2. COLLECTOR/ANODE<br>3. CATHODE | STYLE 25:<br>PIN 1. MT 1<br>2. GATE<br>3. MT 2              |
| STYLE 26:<br>PIN 1. $V_{CC}$<br>2. GROUND 2<br>3. OUTPUT      | STYLE 27:<br>PIN 1. MT<br>2. SUBSTRATE<br>3. MT                      | STYLE 28:<br>PIN 1. CATHODE<br>2. ANODE<br>3. GATE           | STYLE 29:<br>PIN 1. NOT CONNECTED<br>2. ANODE<br>3. CATHODE     | STYLE 30:<br>PIN 1. DRAIN<br>2. GATE<br>3. SOURCE           |
| STYLE 31:<br>PIN 1. GATE<br>2. DRAIN<br>3. SOURCE             | STYLE 32:<br>PIN 1. BASE<br>2. COLLECTOR<br>3. EMITTER               | STYLE 33:<br>PIN 1. RETURN<br>2. INPUT<br>3. OUTPUT          | STYLE 34:<br>PIN 1. INPUT<br>2. GROUND<br>3. LOGIC              | STYLE 35:<br>PIN 1. GATE<br>2. COLLECTOR<br>3. EMITTER      |

|                         |                       |                                                                                                                                                                                     |
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