

# BC635, BC637, BC639, BC639-16

## High Current Transistors

### NPN Silicon

#### Features

- Pb-Free Packages are Available\*

#### MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector - Emitter Voltage BC635 BC637 BC639	$V_{CEO}$	45 60 80	Vdc
Collector - Base Voltage BC635 BC637 BC639	$V_{CBO}$	45 60 80	Vdc
Emitter - Base Voltage	$V_{EBO}$	5.0	Vdc
Collector Current – Continuous	$I_C$	1.0	Adc
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	625 5.0	mW mW/ $^\circ\text{C}$
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	800 12	mW mW/ $^\circ\text{C}$
Operating and Storage Junction 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	$^\circ\text{C}/\text{W}$

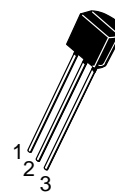
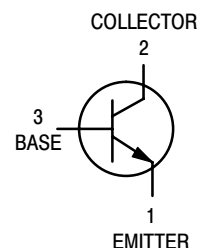
Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

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



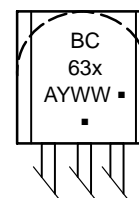
ON Semiconductor®

<http://onsemi.com>



TO-92  
CASE 29  
STYLE 14

#### MARKING DIAGRAM



BC63x = Device Code  
x = 5, 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 4 of this data sheet.

# BC635, 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) (I <sub>C</sub> = 10 μAdc, I <sub>B</sub> = 0)	BC635 BC637 BC639	V <sub>(BR)CEO</sub>	45 60 80	– – –	– – –	Vdc
Collector – Emitter Zero–Gate Breakdown Voltage(Note 1) (I <sub>C</sub> = 100 μAdc, I <sub>B</sub> = 0)	BC639–16	V <sub>(BR)CES</sub>	120	–	–	Vdc
Collector – Base Breakdown Voltage (I <sub>C</sub> = 100 μAdc, I <sub>E</sub> = 0)	BC635 BC637 BC639	V <sub>(BR)CBO</sub>	45 60 80	– – –	– – –	Vdc
Emitter – Base Breakdown Voltage (I <sub>E</sub> = 10 μAdc, I <sub>C</sub> = 0)		V <sub>(BR)EBO</sub>	5.0	–	–	Vdc
Collector Cutoff Current (V <sub>CB</sub> = 30 Vdc, I <sub>E</sub> = 0) (V <sub>CB</sub> = 30 Vdc, I <sub>E</sub> = 0, T <sub>A</sub> = 125°C)		I <sub>CBO</sub>	– –	– –	100 10	nAdc μAdc

## ON CHARACTERISTICS (Note 1)

DC Current Gain (I <sub>C</sub> = 5.0 mAdc, V <sub>CE</sub> = 2.0 Vdc) (I <sub>C</sub> = 150 mAdc, V <sub>CE</sub> = 2.0 Vdc)	BC635 BC637 BC639 BC639–16ZLT1	h <sub>FE</sub>	25 40 40 40 100 25	– – – – – –	– 250 160 160 250 –	–
Collector – Emitter Saturation Voltage (I <sub>C</sub> = 500 mAdc, I <sub>B</sub> = 50 mAdc)		V <sub>CE(sat)</sub>	–	–	0.5	Vdc
Base – Emitter On Voltage (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 (I <sub>C</sub> = 50 mAdc, V <sub>CE</sub> = 2.0 Vdc, f = 100 MHz)		f <sub>T</sub>	–	200	–	MHz
Output Capacitance (V <sub>CB</sub> = 10 Vdc, I <sub>E</sub> = 0, f = 1.0 MHz)		C <sub>ob</sub>	–	7.0	–	pF
Input Capacitance (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%.

BC635, BC637, BC639, BC639-16

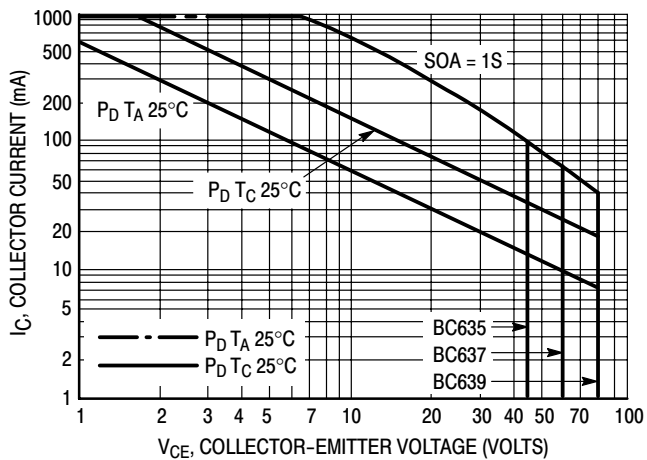


Figure 1. Active Region Safe Operating Area

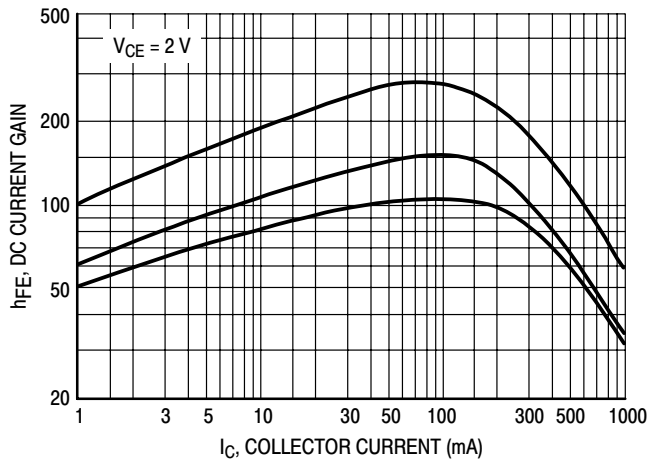


Figure 2. DC Current Gain

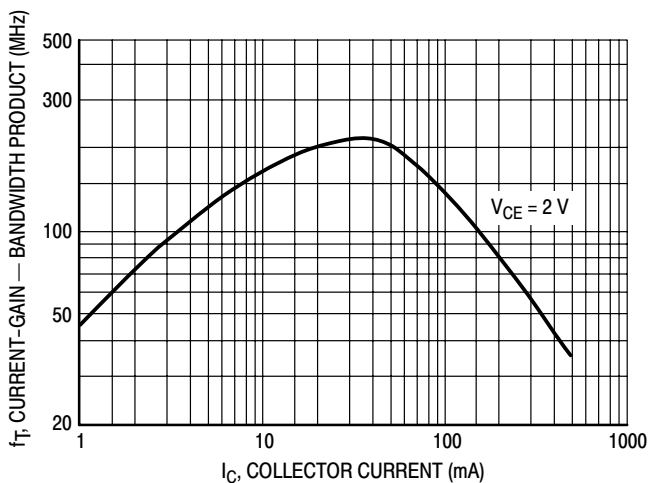


Figure 3. Current-Gain — Bandwidth Product

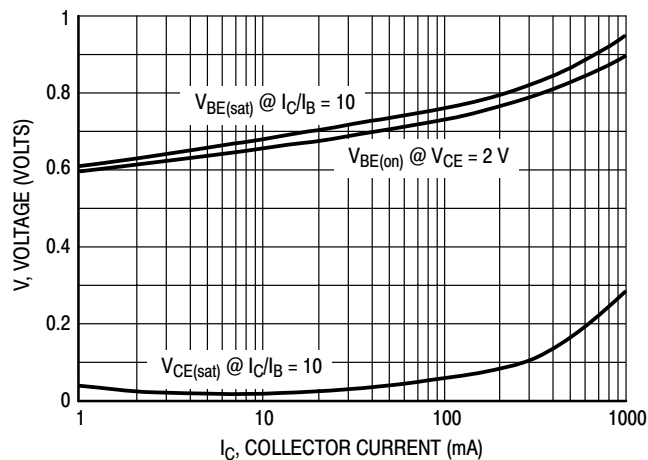


Figure 4. "Saturation" and "On" Voltages

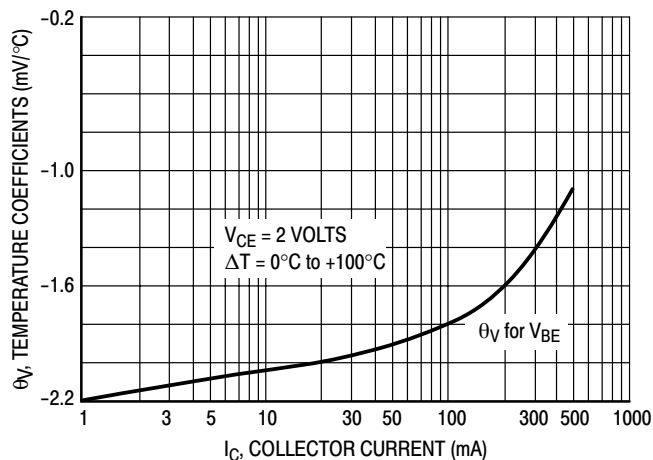


Figure 5. Temperature Coefficients

**BC635, BC637, BC639, BC639-16****DEVICE ORDERING INFORMATION**

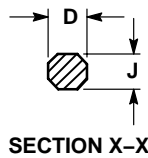
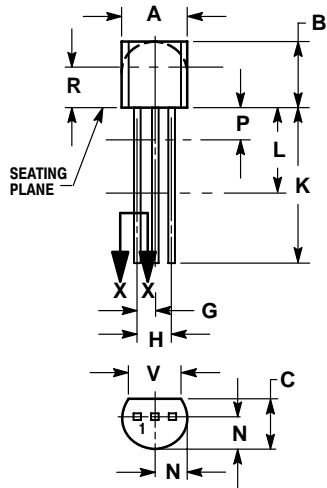
<b>Device</b>	<b>Package</b>	<b>Shipping†</b>
BC635RL1	TO-92	2000 / Tape & Reel
BC635RL1G	TO-92 (Pb-Free)	2000 / Tape & Reel
BC635ZL1	TO-92	2000 / Tape & Reel
BC635ZL1G	TO-92 (Pb-Free)	2000 / Tape & Reel
BC637	TO-92	5000 Units / Box
BC637G	TO-92 (Pb-Free)	5000 Units / Box
BC639	TO-92	5000 Units / Box
BC639G	TO-92 (Pb-Free)	5000 Units / Box
BC639RL1	TO-92	2000 / Tape & Reel
BC639RL1G	TO-92 (Pb-Free)	2000 / Tape & Reel
BC639ZL1	TO-92	2000 / Ammo Box
BC639ZL1G	TO-92 (Pb-Free)	2000 / Ammo Box
BC639-16ZL1	TO-92	2000 / Ammo Box
BC639-16ZL1G	TO-92 (Pb-Free)	2000 / Ammo Box

†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.

# BC635, BC637, BC639, BC639-16

## PACKAGE DIMENSIONS

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



### 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	---

### STYLE 14:

1. EMITTER
2. COLLECTOR
3. BASE

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