

# BC635, BC637, BC639, BC639-16

## High Current Transistors

NPN Silicon



ON Semiconductor

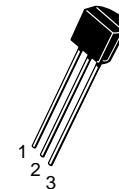
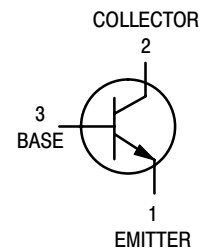
<http://onsemi.com>

### MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	$V_{CEO}$	45	Vdc
		60	
		80	
Collector-Base Voltage	$V_{CBO}$	45	Vdc
		60	
		80	
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	mW
		5.0	mW/ $^\circ\text{C}$
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	800	mW
		12	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	$^\circ\text{C}/\text{W}$



TO-92 (TO-226AA)  
CASE 29  
STYLE 14

### ORDERING INFORMATION

Device	Package	Shipping
BC635RL1	TO-92	2000/Tape & Reel
BC635ZL1	TO-92	2000/Ammo Pack
BC637	TO-92	5000 Units/Box
BC639	TO-92	5000 Units/Box
BC639RL1	TO-92	2000/Tape & Reel
BC639ZL1	TO-92	2000/Ammo Pack
BC639-16ZL1	TO-92	2000/Ammo Pack

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## 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 (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 (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 (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 —	—
(I <sub>C</sub> = 500 mA, V <sub>CE</sub> = 2.0 V)						
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%.

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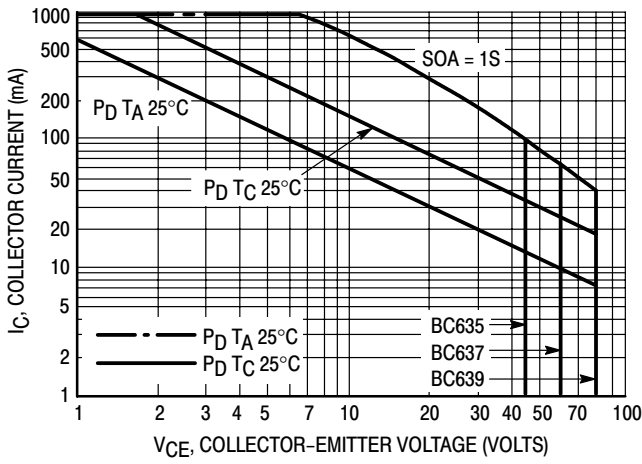


Figure 1. Active Region Safe Operating Area

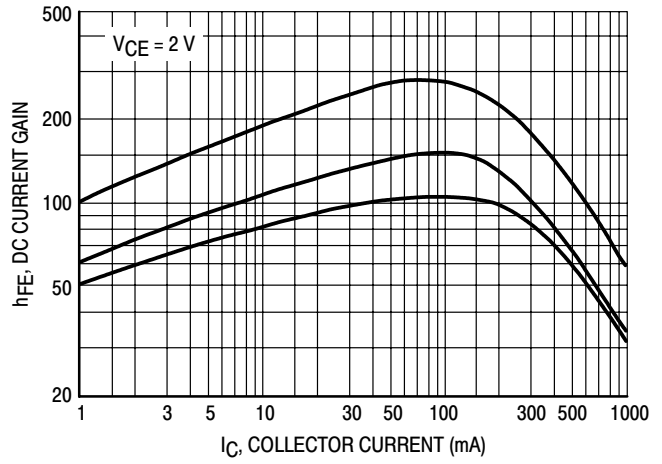


Figure 2. DC Current Gain

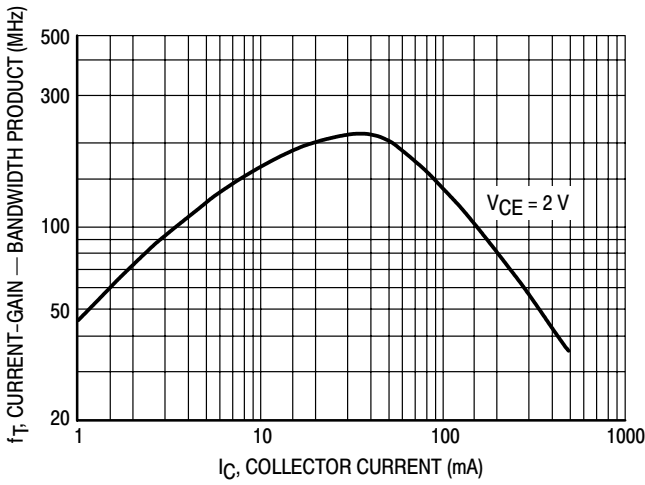


Figure 3. Current-Gain — Bandwidth Product

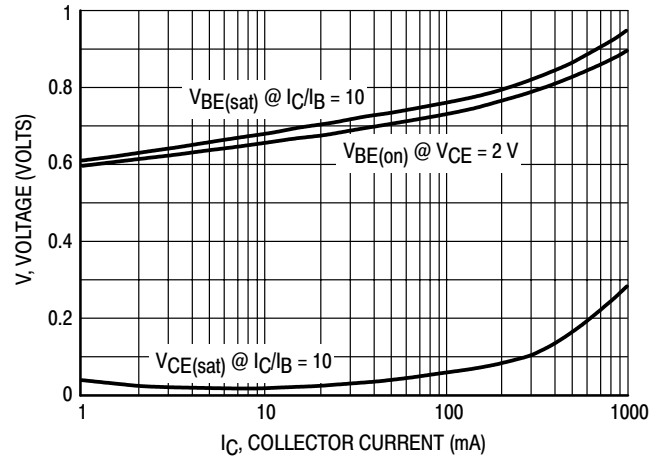


Figure 4. "Saturation" and "On" Voltages

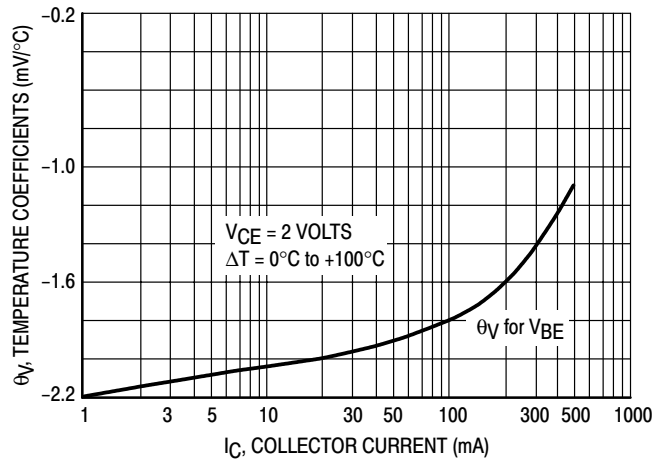
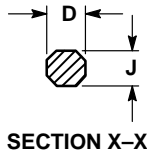
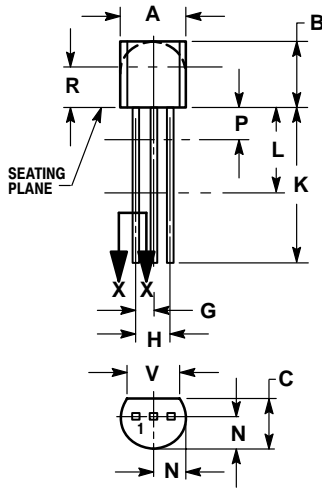


Figure 5. Temperature Coefficients

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## 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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