BC638, BC640, BC640-16

High Current Transistors

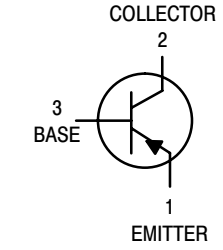
PNP Silicon

Features

- Pb−Free Packages are Available*

ON Semiconductor®

http://onsemi.com



MAXIMUM RATINGS

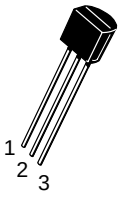
Rating	Symbol	Value	Unit
Collector-Emitter Voltage BC638 BC640	V_{CEO}	 −60 −80	Vdc
Collector-Base Voltage BC638 BC640	V_{CBO}	 −60 −80	Vdc
Emitter-Base Voltage	V_{EBO}	−5.0	Vdc
Collector Current − Continuous	I_C	−0.5	Adc
Total Device Dissipation @ T_A = 25°C Derate above 25°C	P_D	 625 5.0	 mW mW/°C
Total Device Dissipation @ T_C = 25°C Derate above 25°C	P_D	 1.5 12	 W mW/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	−55 to +150	°C

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.

THERMAL CHARACTERISTICS

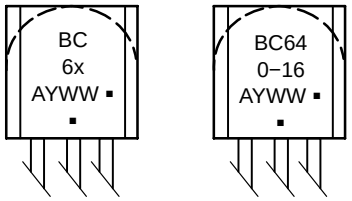
Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction−to−Ambient	$R_{\theta JA}$	200	°C/W
Thermal Resistance, Junction−to−Case	$R_{\theta JC}$	83.3	°C/W

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



TO−92
CASE 29
STYLE 14

MARKING DIAGRAMS



BC6x = Device Code
x = 3 or 4
BC640−16 = Specific Device Code
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.

ORDERING INFORMATION

Device	Package	Shipping
BC638	TO−92	5000 Units / Box
BC638G	TO−92 (Pb−Free)	5000 Units / Box
BC638ZL1	TO−92	2000 Units / Ammo Box
BC638ZL1G	TO−92 (Pb−Free)	2000 Units / Ammo Box
BC640	TO−92	5000 Units / Box
BC640G	TO−92 (Pb−Free)	5000 Units / Box
BC640ZL1	TO−92	2000 Units / Ammo Box
BC640ZL1G	TO−92 (Pb−Free)	2000 Units / Ammo Box
BC640−16	TO−92	5000 Units / Box
BC640−16G	TO−92 (Pb−Free)	5000 Units / Box

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Collector − Emitter Breakdown Voltage (I_C = −10 mAdc, I_B = 0)	BC638	$V_{(BR)CEO}$	−60	−	−	Vdc
	BC640		−80	−	−	
Collector − Base Breakdown Voltage (I_C = −100 μAdc, I_E = 0)	BC638	$V_{(BR)CBO}$	−60	−	−	Vdc
	BC640		−80	−	−	
Emitter − Base Breakdown Voltage (I_E = −10 μAdc, I_C = 0)		$V_{(BR)EBO}$	−5.0	−	−	Vdc
Collector Cutoff Current (V_{CB} = −30 Vdc, I_E = 0)		I_{CBO}	−	−	−100	nAdc
(V_{CB} = −30 Vdc, I_E = 0, T_A = 125°C)			−	−	−10	μAdc
ON CHARACTERISTICS (Note 1)						
DC Current Gain (I_C = −5.0 mAdc, V_{CE} = −2.0 Vdc)		h_{FE}	25	−	−	−
(I_C = −150 mAdc, V_{CE} = −2.0 Vdc)	BC638		40	−	160	
	BC640		40	−	160	
	BC640−16		100	−	250	
(I_C = −500 mA, V_{CE} = −2.0 V)			25	−	−	
Collector − Emitter Saturation Voltage (I_C = −500 mAdc, I_B = −50 mAdc)		$V_{CE(sat)}$	−	−0.25	−0.5	Vdc
			−	−0.5	−	
Base − Emitter On Voltage (I_C = −500 mAdc, V_{CE} = −2.0 Vdc)		$V_{BE(on)}$	−	−	−1.0	Vdc
DYNAMIC CHARACTERISTICS						
Current Gain − Bandwidth Product (I_C = −50 mAdc, V_{CE} = −2.0 Vdc, f = 100 MHz)		f_T	−	150	−	MHz
Output Capacitance (V_{CB} = −10 Vdc, I_E = 0, f = 1.0 MHz)		C_{ob}	−	9.0	−	pF
Input Capacitance (V_{EB} = −0.5 Vdc, I_C = 0, f = 1.0 MHz)		C_{ib}	−	110	−	pF

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

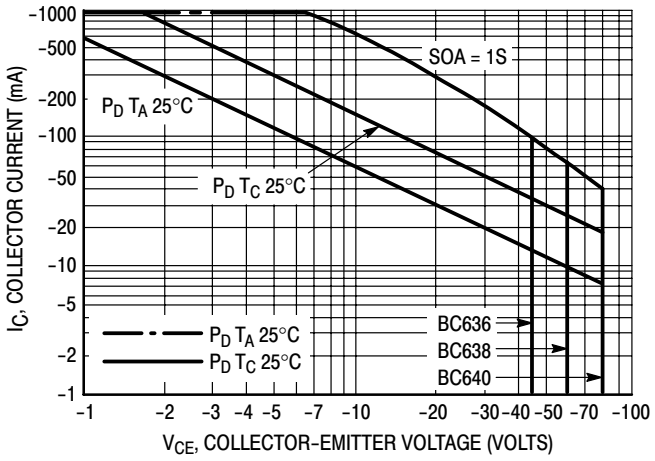


Figure 1. Active Region Safe Operating Area

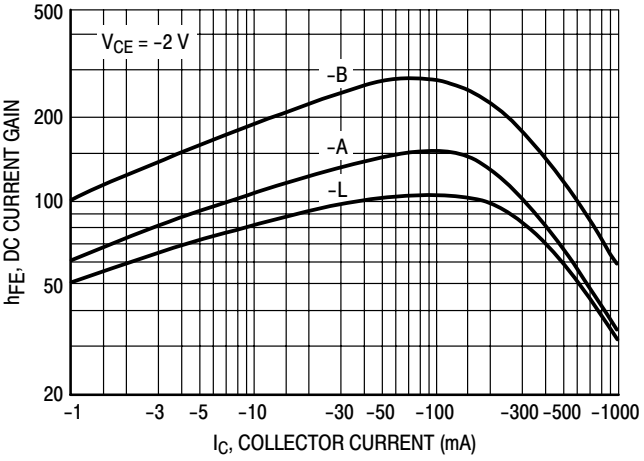


Figure 2. DC Current Gain

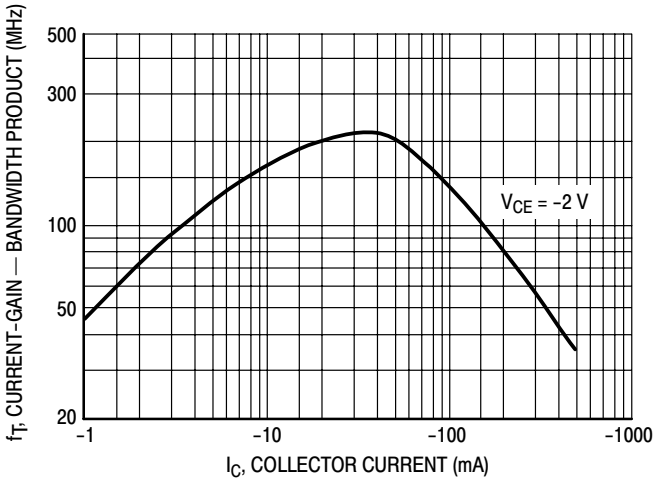


Figure 3. Current Gain Bandwidth Product

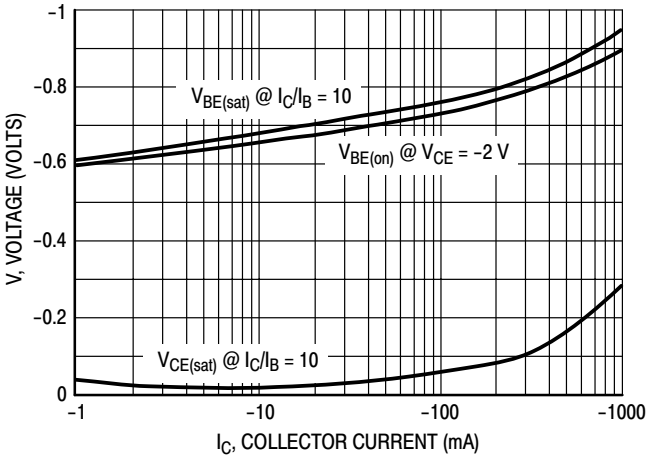


Figure 4. “Saturation” and “On” Voltages

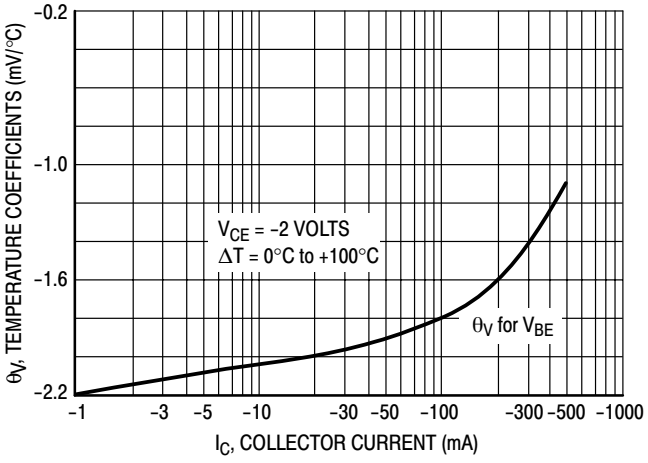
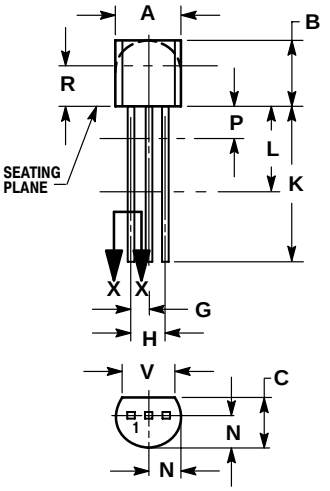
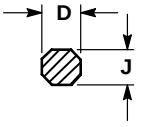


Figure 5. Temperature Coefficients

PACKAGE DIMENSIONS

TO−92 (TO−226)
CASE 29−11
ISSUE AL





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.

	INCHES		MILLIMETERS	
DIM	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:
PIN 1. EMITTER
2. COLLECTOR
3. BASE

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
Literature Distribution Center for ON Semiconductor
P.O. Box 61312, Phoenix, Arizona 85082−1312 USA
Phone: 480−829−7710 or 800−344−3860 Toll Free USA/Canada
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2−9−1 Kamimeguro, Meguro−ku, Tokyo, Japan 153−0051
Phone: 81−3−5773−3850

ON Semiconductor Website: http://onsemi.com

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