

BC638, BC640, BC640-16

High Current Transistors

PNP Silicon

Features

- Pb-Free Packages are Available*

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 @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	625 5.0	mW mW/ $^\circ\text{C}$
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	1.5 12	W mW/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-55 to +150	$^\circ\text{C}$

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.

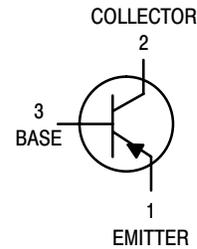
THERMAL CHARACTERISTICS

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



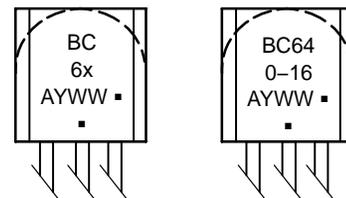
ON Semiconductor®

<http://onsemi.com>



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.

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

BC638, BC640, BC640-16

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 ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
----------------	--------	-----	-----	-----	------

OFF CHARACTERISTICS

Collector - Emitter Breakdown Voltage ($I_C = -10\text{ mAdc}$, $I_B = 0$)	BC638 BC640	$V_{(BR)CEO}$	-60 -80	- -	- -	Vdc
Collector - Base Breakdown Voltage ($I_C = -100\text{ }\mu\text{Adc}$, $I_E = 0$)	BC638 BC640	$V_{(BR)CBO}$	-60 -80	- -	- -	Vdc
Emitter - Base Breakdown Voltage ($I_E = -10\text{ }\mu\text{Adc}$, $I_C = 0$)		$V_{(BR)EBO}$	-5.0	-	-	Vdc
Collector Cutoff Current ($V_{CB} = -30\text{ Vdc}$, $I_E = 0$) ($V_{CB} = -30\text{ Vdc}$, $I_E = 0$, $T_A = 125^\circ\text{C}$)		I_{CBO}	- -	- -	-100 -10	nAdc μAdc

ON CHARACTERISTICS (Note 1)

DC Current Gain ($I_C = -5.0\text{ mAdc}$, $V_{CE} = -2.0\text{ Vdc}$) ($I_C = -150\text{ mAdc}$, $V_{CE} = -2.0\text{ Vdc}$) ($I_C = -500\text{ mA}$, $V_{CE} = -2.0\text{ V}$)	BC638 BC640 BC640-16	h_{FE}	25 40 40 100 25	- - - - -	- 160 160 250 -	-
Collector - Emitter Saturation Voltage ($I_C = -500\text{ mAdc}$, $I_B = -50\text{ mAdc}$)		$V_{CE(sat)}$	- -	-0.25 -0.5	-0.5 -	Vdc
Base - Emitter On Voltage ($I_C = -500\text{ mAdc}$, $V_{CE} = -2.0\text{ Vdc}$)		$V_{BE(on)}$	-	-	-1.0	Vdc

DYNAMIC CHARACTERISTICS

Current Gain - Bandwidth Product ($I_C = -50\text{ mAdc}$, $V_{CE} = -2.0\text{ Vdc}$, $f = 100\text{ MHz}$)		f_T	-	150	-	MHz
Output Capacitance ($V_{CB} = -10\text{ Vdc}$, $I_E = 0$, $f = 1.0\text{ MHz}$)		C_{ob}	-	9.0	-	pF
Input Capacitance ($V_{EB} = -0.5\text{ Vdc}$, $I_C = 0$, $f = 1.0\text{ MHz}$)		C_{ib}	-	110	-	pF

1. Pulse Test: Pulse Width $\leq 300\text{ }\mu\text{s}$, Duty Cycle 2.0%.

BC638, BC640, BC640-16

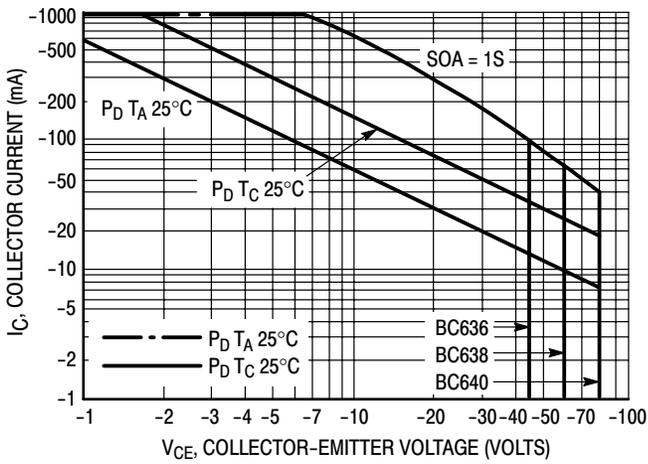


Figure 1. Active Region Safe Operating Area

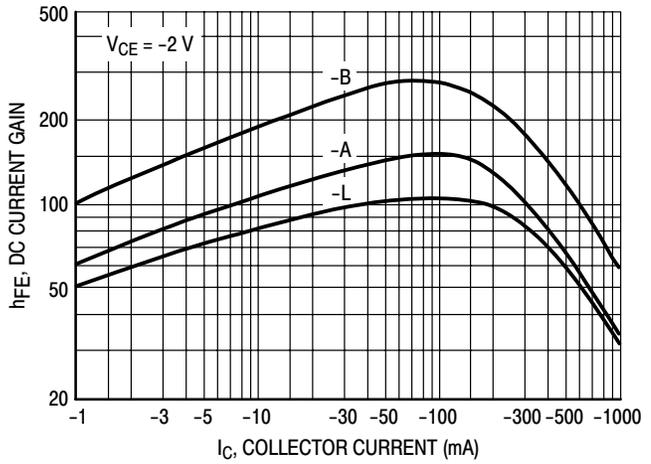


Figure 2. DC Current Gain

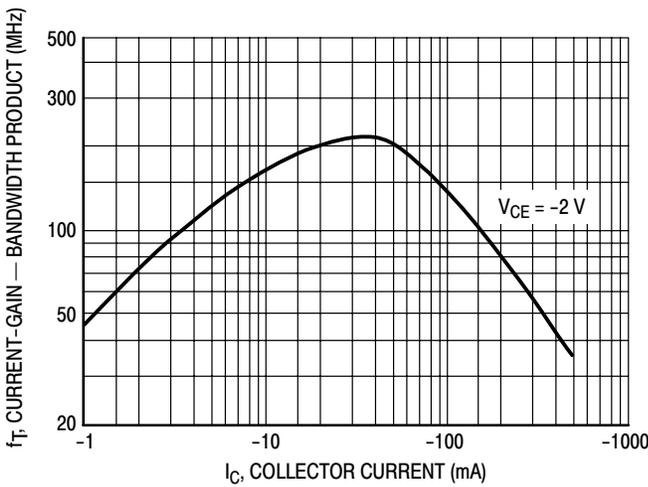


Figure 3. Current Gain Bandwidth Product

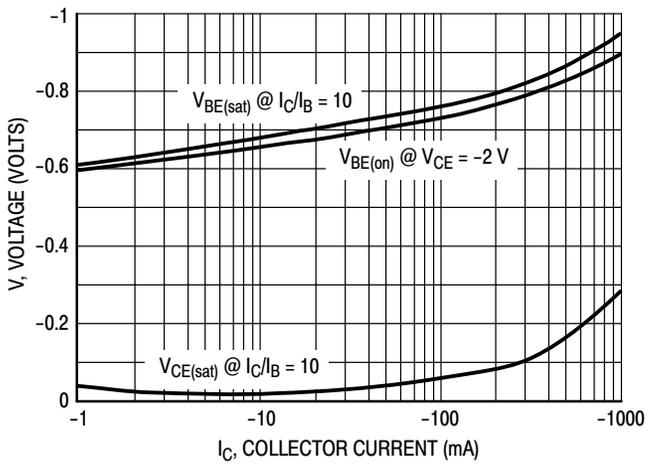


Figure 4. "Saturation" and "On" Voltages

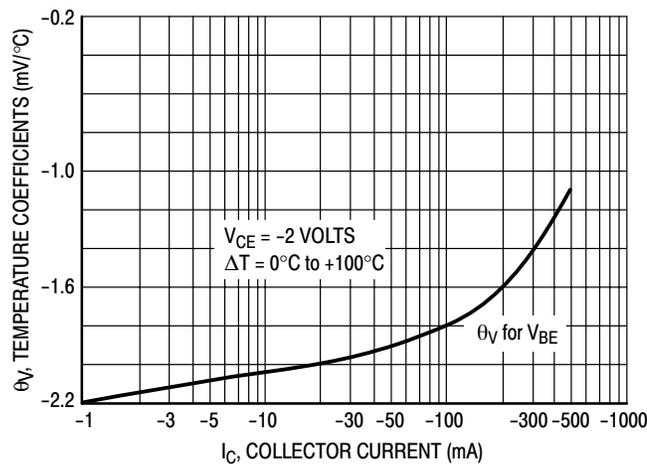
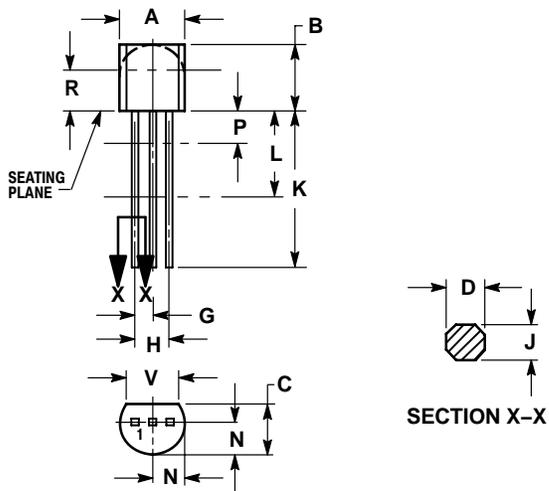


Figure 5. Temperature Coefficients

BC638, BC640, BC640-16

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. PIN 1. EMITTER
2. COLLECTOR
3. BASE

ON Semiconductor and  are registered trademarks of Semiconductor Components Industries, LLC (SCILLC). SCILLC reserves the right to make changes without further notice to any products herein. SCILLC makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does SCILLC assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. "Typical" parameters which may be provided in SCILLC data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. SCILLC does not convey any license under its patent rights nor the rights of others. SCILLC products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the SCILLC product could create a situation where personal injury or death may occur. Should Buyer purchase or use SCILLC products for any such unintended or unauthorized application, Buyer shall indemnify and hold SCILLC and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that SCILLC was negligent regarding the design or manufacture of the part. SCILLC is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

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
Fax: 480-829-7709 or 800-344-3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

N. American Technical Support: 800-282-9855 Toll Free
USA/Canada

Japan: ON Semiconductor, Japan Customer Focus Center
2-9-1 Kamimeguro, Meguro-ku, Tokyo, Japan 153-0051
Phone: 81-3-5773-3850

ON Semiconductor Website: <http://onsemi.com>

Order Literature: <http://www.onsemi.com/litorder>

For additional information, please contact your
local Sales Representative.