BC489, A, B

High Current Transistors

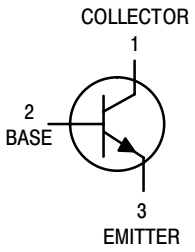
NPN Silicon

ON Semiconductor®

http://onsemi.com

Features

- Pb−Free Packages are Available*



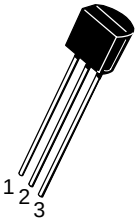
MAXIMUM RATINGS

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

THERMAL CHARACTERISTICS

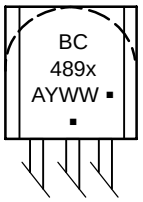
Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction−to−Ambient	$R_{\theta JA}$	200	°C/W
Thermal Resistance, Junction−to−Case	$R_{\theta JC}$	83.3	°C/W

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.



TO−92
CASE 29
STYLE 17

MARKING DIAGRAM



BC489x	= Device Code x = A or B
A	= Assembly Location
Y	= Year
WW	= Work Week
▪	= Pb−Free Package

(Note: Microdot may be in either location)

ORDERING INFORMATION

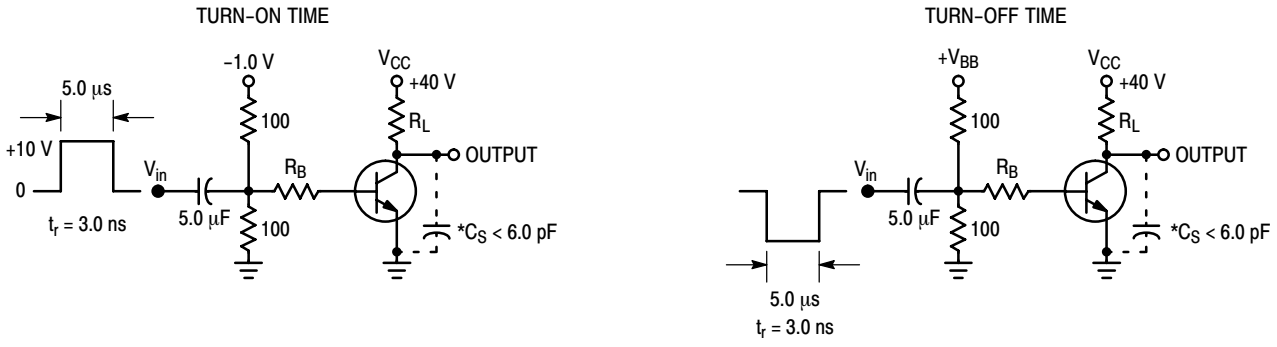
See detailed ordering and shipping information in the package dimensions section on page 5 of this data sheet.

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

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

Characteristic		Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Collector−Emitter Breakdown Voltage (Note 1) (I_C = 10 mAdc, I_B = 0)		$V_{(BR)CEO}$	80	−	−	Vdc
Collector−Base Breakdown Voltage (I_C = 100 μAdc, I_E = 0)		$V_{(BR)CBO}$	80	−	−	Vdc
Emitter−Base Breakdown Voltage (I_E = 10 μAdc, I_C = 0)		$V_{(BR)EBO}$	5.0	−	−	Vdc
Collector Cutoff Current (V_{CB} = 60 V, I_E = 0)		I_{CBO}	−	−	100	nAdc
ON CHARACTERISTICS						
DC Current Gain		h_{FE}				−
(I_C = 10 mAdc, V_{CE} = 2.0 Vdc)			40	−	−	
(I_C = 100 mAdc, V_{CE} = 2.0 Vdc)	BC489		60	−	400	
	BC489A		100	160	250	
	BC489B		160	260	400	
(I_C = 1.0 Adc, V_{CE} = 5.0 Vdc)			15	−	−	
Collector−Emitter Saturation Voltage		$V_{CE(sat)}$				Vdc
(I_C = 500 mAdc, I_B = 50 mAdc)			−	0.2	0.5	
(I_C = 1.0 Adc, I_B = 100 mAdc)			−	0.3	−	
Collector−Emitter Saturation Voltage		$V_{BE(sat)}$				Vdc
(I_C = 500 mAdc, I_B = 50 mAdc)			−	0.85	1.2	
(I_C = 1.0 Adc, I_B = 100 mAdc) (Note 1)			−	0.9	−	
DYNAMIC CHARACTERISTICS						
Current−Gain − Bandwidth Product (I_C = 50 mAdc, V_{CE} = 2.0 Vdc, f = 100 MHz)		f_T	−	200	−	MHz
Output Capacitance (V_{CB} = 10 Vdc, I_E = 0, f = 1.0 MHz)		C_{ob}	−	7.0	−	pF
Input Capacitance (V_{EB} = 0.5 Vdc, I_C = 0, f = 1.0 MHz)		C_{ib}	−	50	−	pF

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



*Total Shunt Capacitance of Test Jig and Connectors For PNP Test Circuits, Reverse All Voltage Polarities

Figure 1. Switching Time Test Circuits

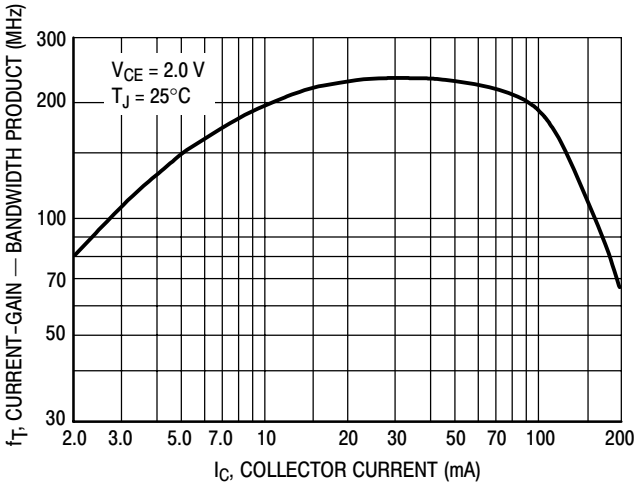


Figure 2. Current−Gain — Bandwidth Product

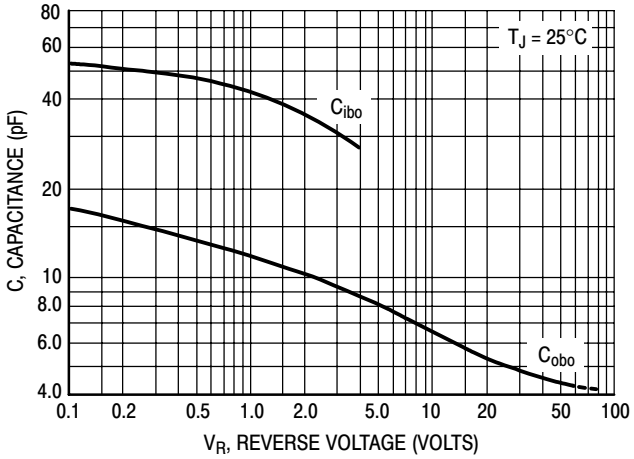


Figure 3. Capacitance

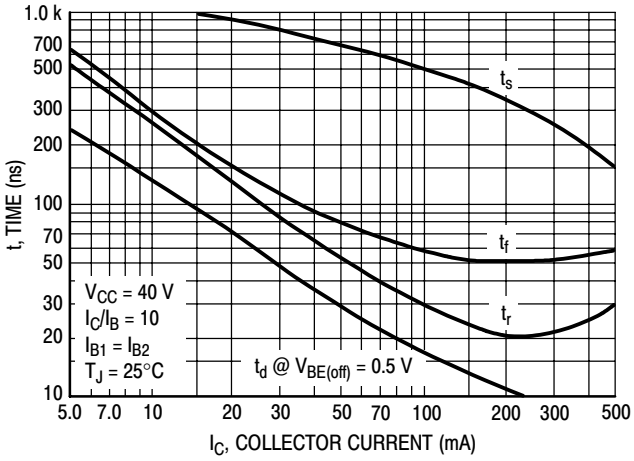


Figure 4. Switching Time

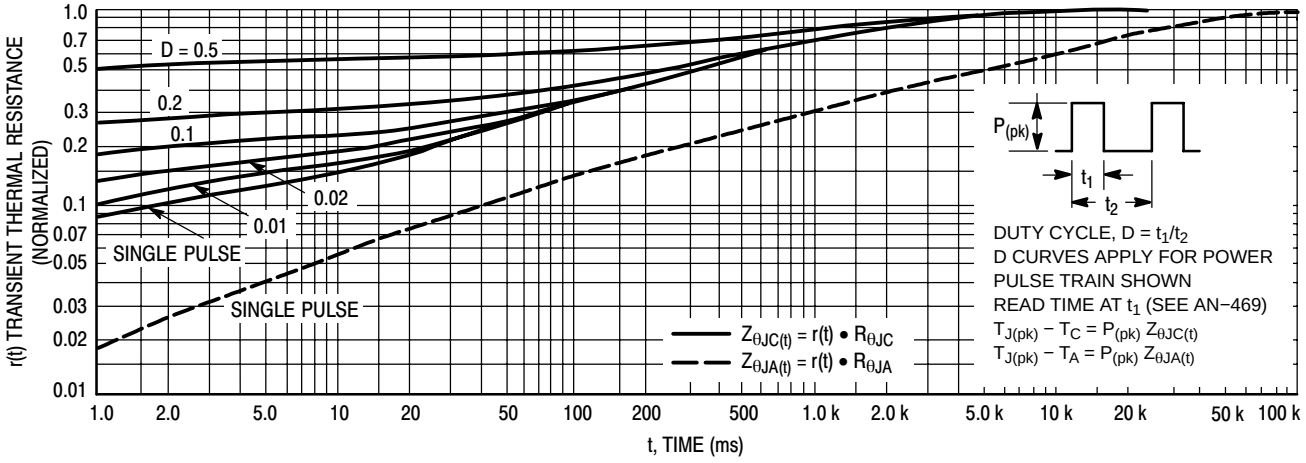


Figure 5. Thermal Response

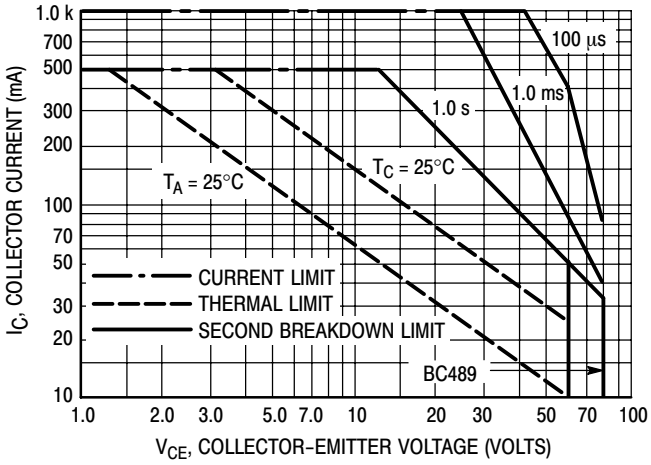


Figure 6. Active Region — Safe Operating Area

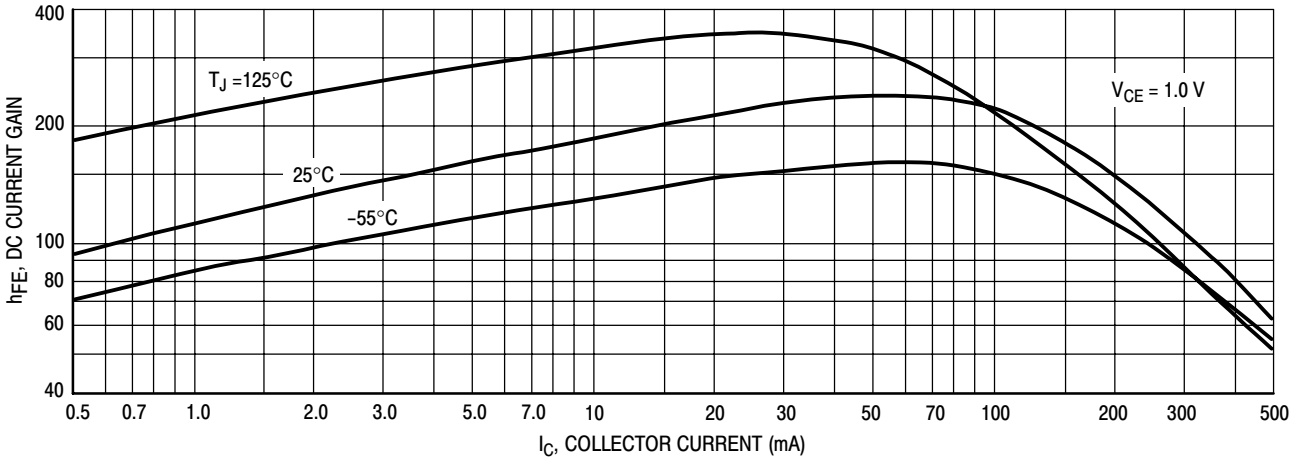


Figure 7. DC Current Gain

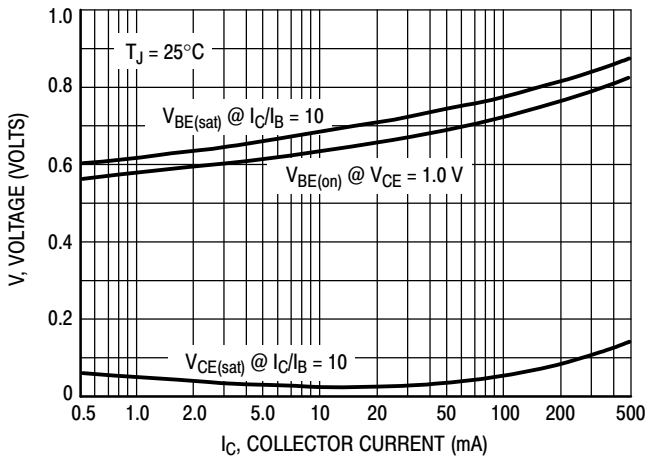


Figure 8. “On” Voltages

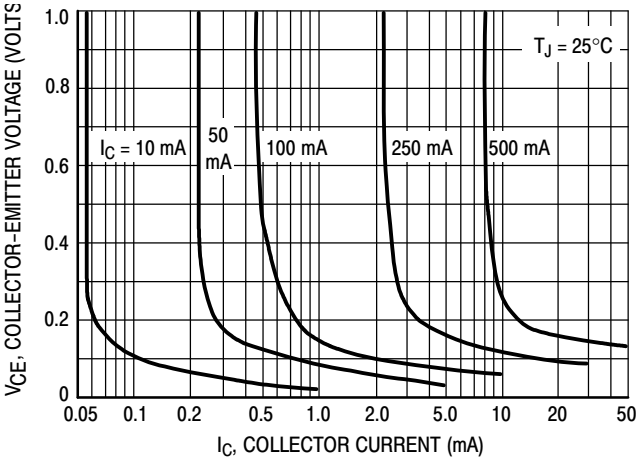


Figure 9. Collector Saturation Region

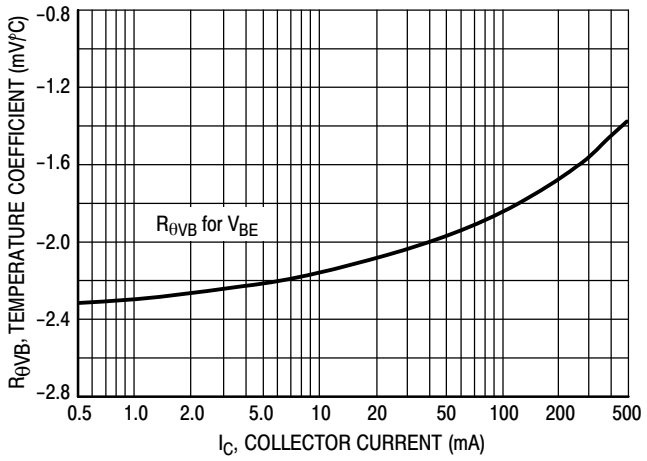


Figure 10. Base−Emitter Temperature Coefficient

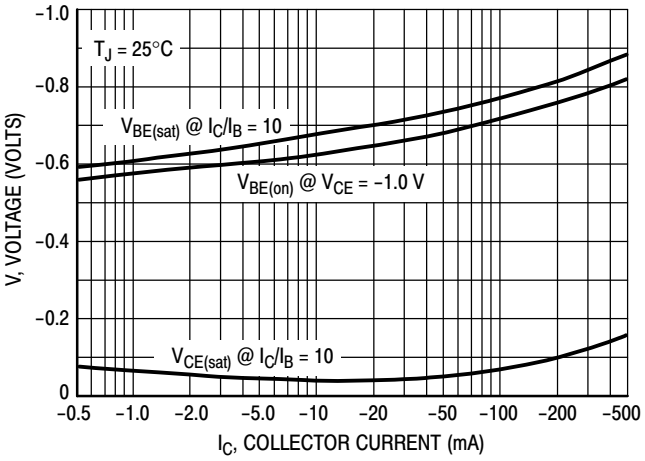


Figure 11. “On” Voltages

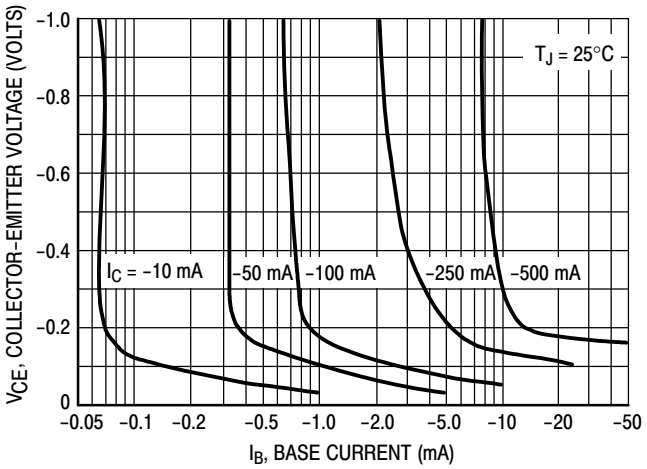


Figure 12. Collector Saturation Region

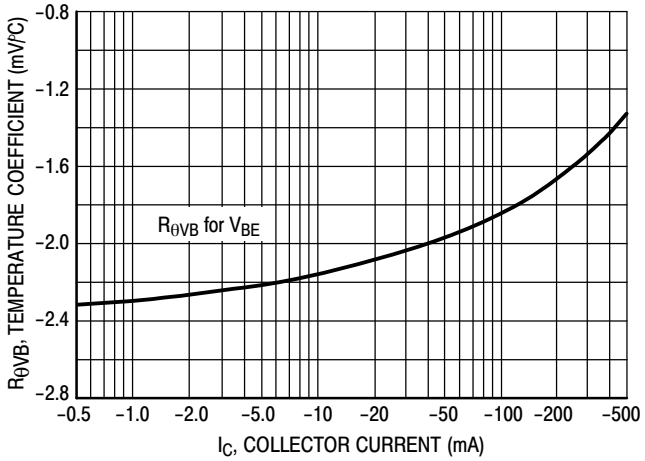


Figure 13. Base−Emitter Temperature Coefficient

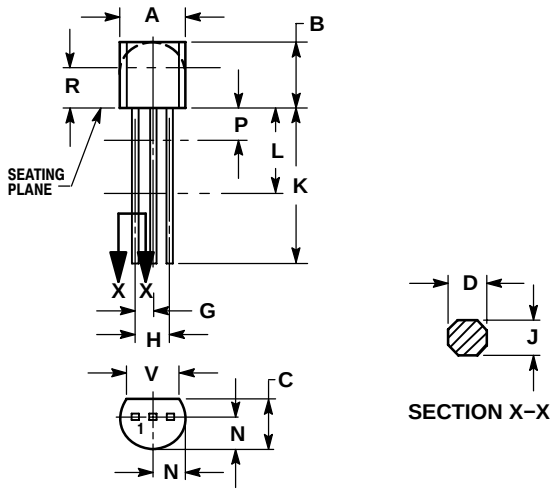
ORDERING INFORMATION

Device Order Number	Package Type	Shipping†
BC489	TO−92	5000 Units / Bulk
BC489G	TO−92 (Pb−Free)	5000 Units / Bulk
BC489RL1	TO−92	2000 / Tape & Reel
BC489RL1G	TO−92 (Pb−Free)	2000 / Tape & Reel
BC489A	TO−92	5000 Units / Bulk
BC489AG	TO−92 (Pb−Free)	5000 Units / Bulk
BC489AZL1	TO−92	2000 / Tape & Ammo Box
BC489AZL1G	TO−92 (Pb−Free)	2000 / Tape & Ammo Box
BC489BZL1	TO−92	2000 / Tape & Ammo Box
BC489BZL1G	TO−92 (Pb−Free)	2000 / Tape & 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.

PACKAGE DIMENSIONS

TO−92 (TO−226AA)
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.

	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 17:
PIN 1. COLLECTOR
2. BASE
3. EMITTER

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.

BC489/D