

# BC489, A, B

## High Current Transistors

### NPN Silicon

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

#### THERMAL CHARACTERISTICS

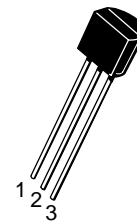
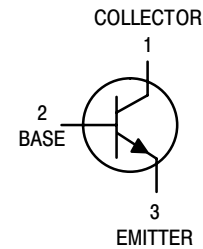
Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	200	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	83.3	$^\circ\text{C}/\text{W}$

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.



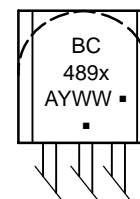
ON Semiconductor®

<http://onsemi.com>



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.

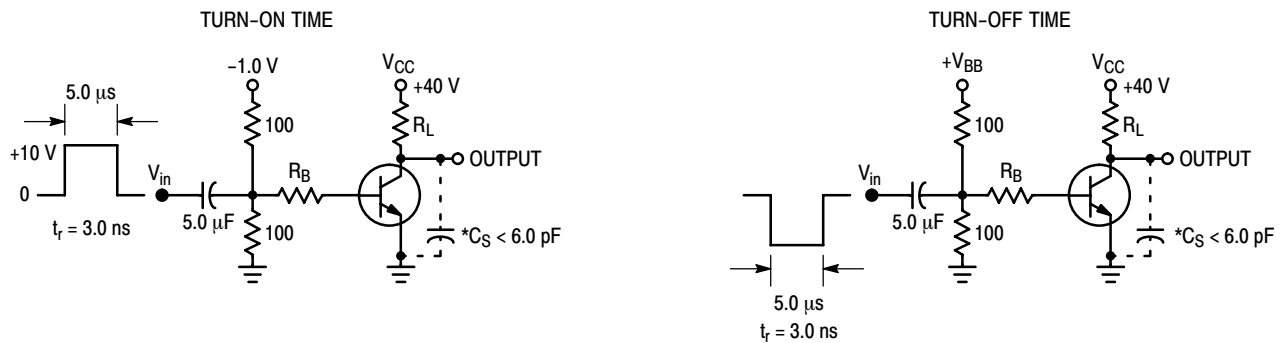
\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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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 (Note 1) (I <sub>C</sub> = 10 mA, I <sub>B</sub> = 0)	V <sub>(BR)CEO</sub>	80	–	–	Vdc
Collector–Base Breakdown Voltage (I <sub>C</sub> = 100 μA, I <sub>E</sub> = 0)	V <sub>(BR)CBO</sub>	80	–	–	Vdc
Emitter–Base Breakdown Voltage (I <sub>E</sub> = 10 μA, I <sub>C</sub> = 0)	V <sub>(BR)EBO</sub>	5.0	–	–	Vdc
Collector Cutoff Current (V <sub>CB</sub> = 60 V, I <sub>E</sub> = 0)	I <sub>CBO</sub>	–	–	100	nA
<b>ON CHARACTERISTICS</b>					
DC Current Gain (I <sub>C</sub> = 10 mA, V <sub>CE</sub> = 2.0 Vdc) (I <sub>C</sub> = 100 mA, V <sub>CE</sub> = 2.0 Vdc)  (I <sub>C</sub> = 1.0 A, V <sub>CE</sub> = 5.0 Vdc)	h <sub>FE</sub>	40 60 100 160 15	– – 160 260 –	– 400 250 400 –	–
Collector–Emitter Saturation Voltage (I <sub>C</sub> = 500 mA, I <sub>B</sub> = 50 mA) (I <sub>C</sub> = 1.0 A, I <sub>B</sub> = 100 mA)	V <sub>CE(sat)</sub>	– –	0.2 0.3	0.5 –	Vdc
Collector–Emitter Saturation Voltage (I <sub>C</sub> = 500 mA, I <sub>B</sub> = 50 mA) (I <sub>C</sub> = 1.0 A, I <sub>B</sub> = 100 mA) (Note 1)	V <sub>BE(sat)</sub>	– –	0.85 0.9	1.2 –	Vdc
<b>DYNAMIC CHARACTERISTICS</b>					
Current–Gain – Bandwidth Product (I <sub>C</sub> = 50 mA, 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%.



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

Figure 1. Switching Time Test Circuits

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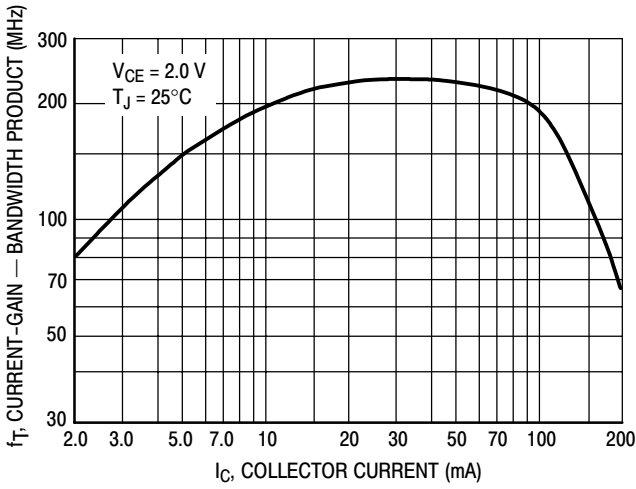


Figure 2. Current-Gain — Bandwidth Product

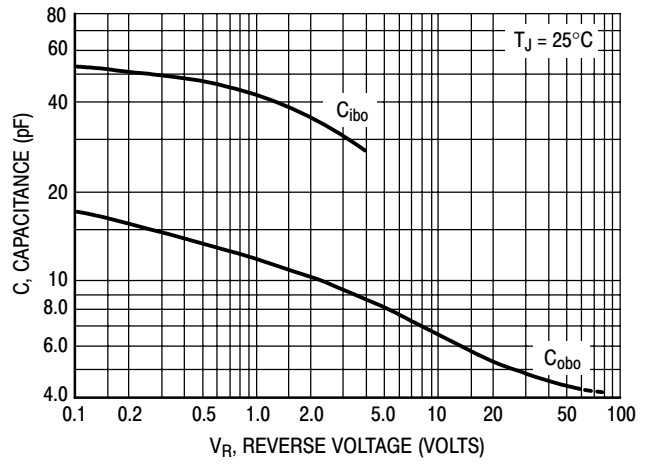


Figure 3. Capacitance

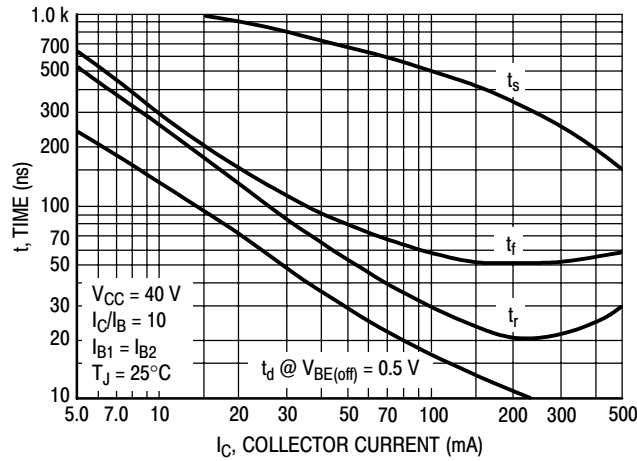


Figure 4. Switching Time

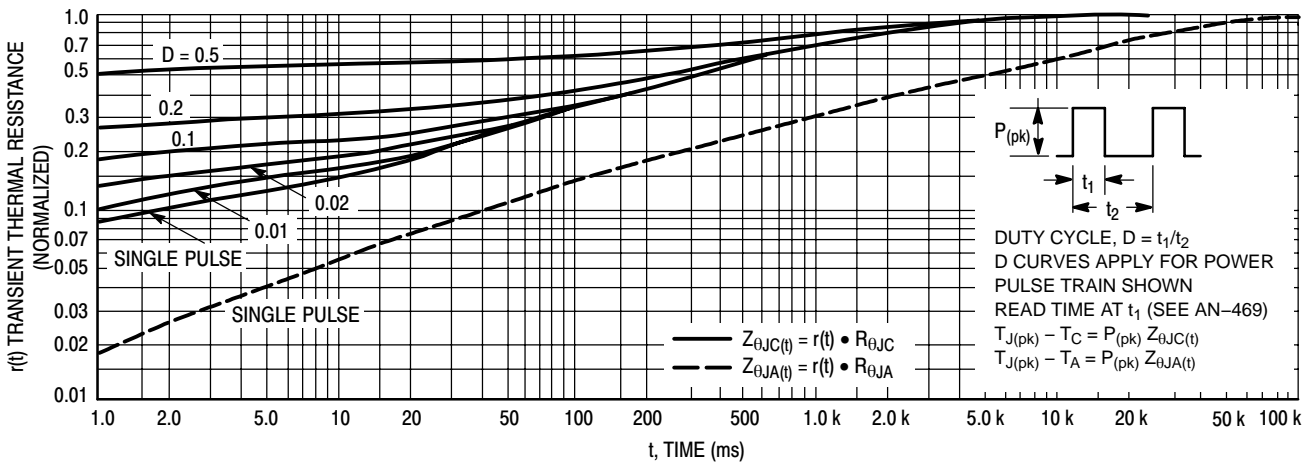


Figure 5. Thermal Response

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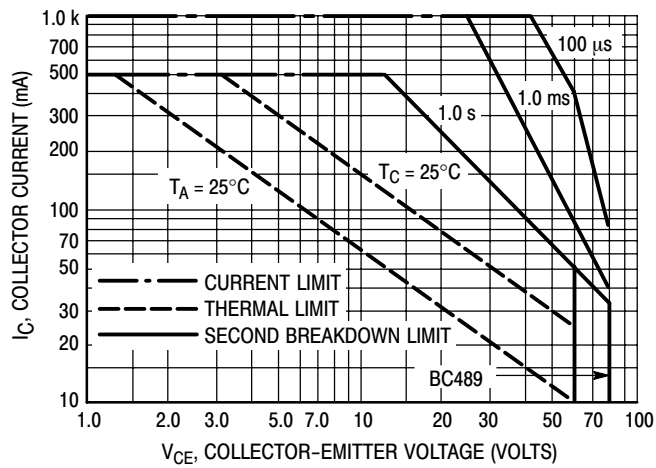


Figure 6. Active Region — Safe Operating Area

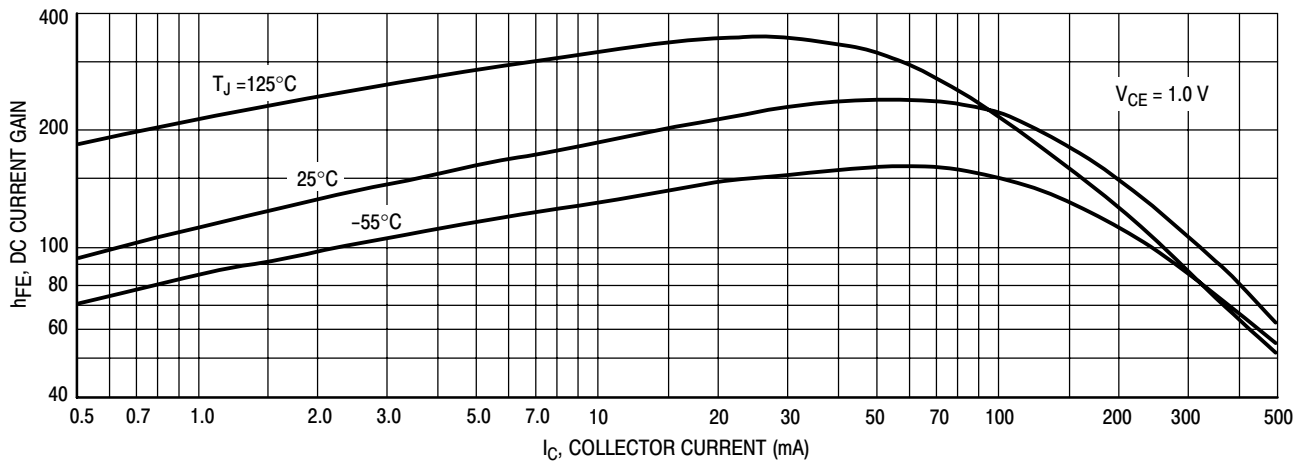


Figure 7. DC Current Gain

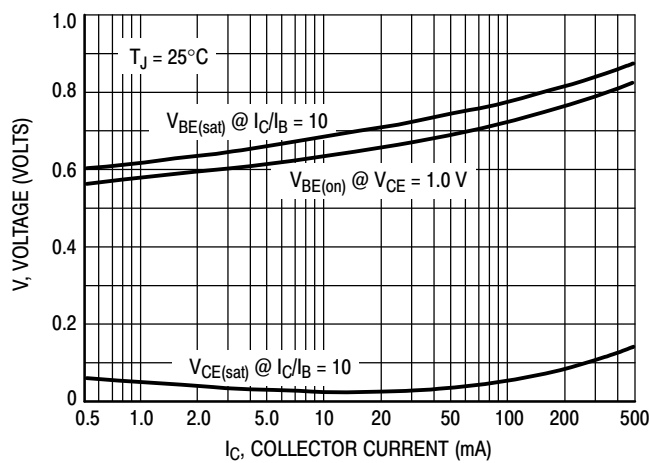


Figure 8. "On" Voltages

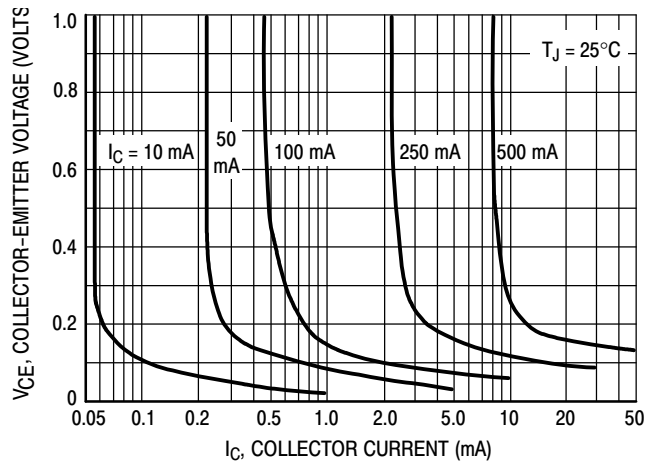


Figure 9. Collector Saturation Region

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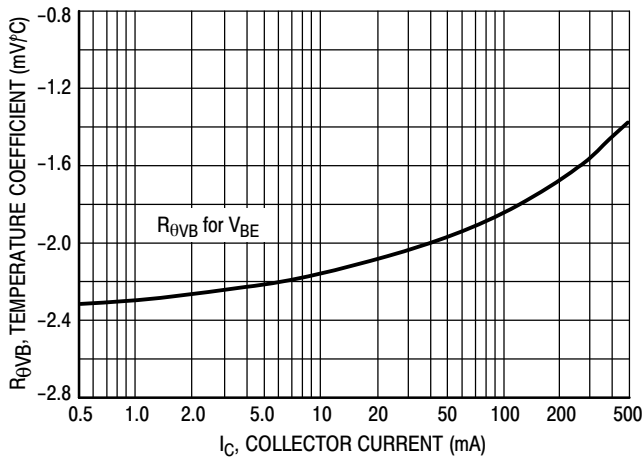


Figure 10. Base-Emitter Temperature Coefficient

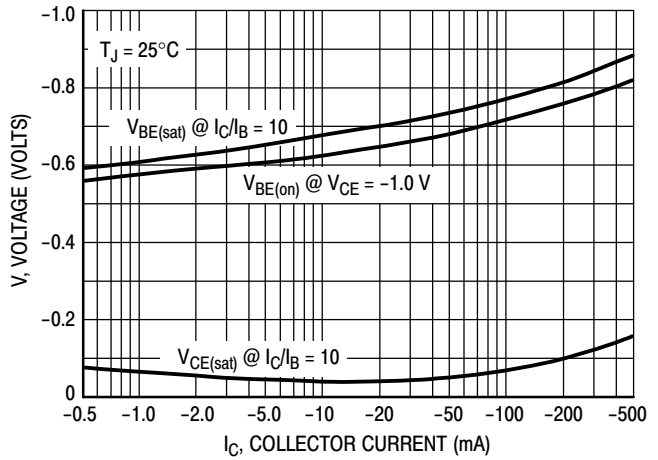


Figure 11. "On" Voltages

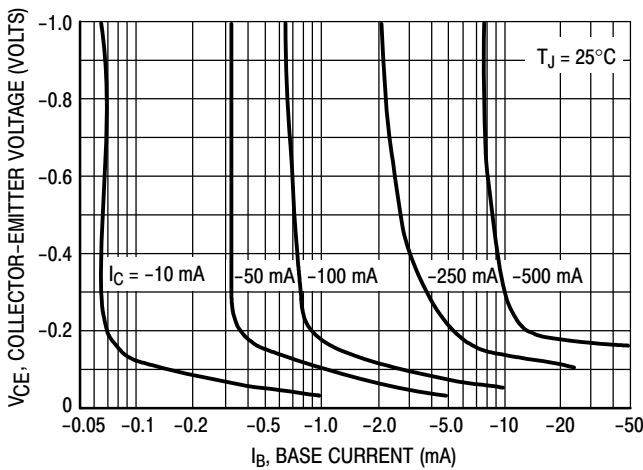


Figure 12. Collector Saturation Region

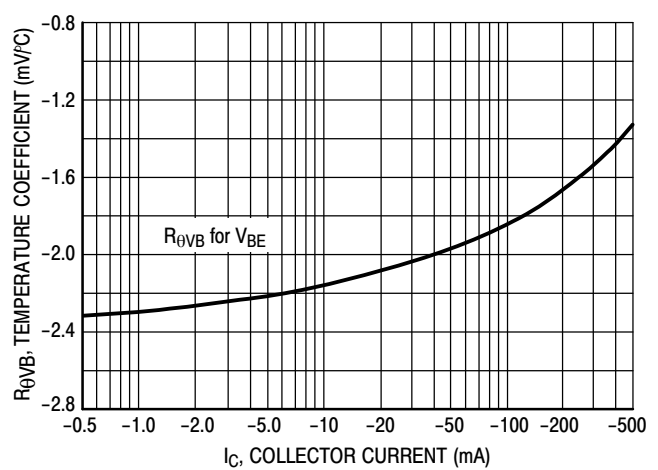


Figure 13. Base-Emitter Temperature Coefficient

### ORDERING INFORMATION

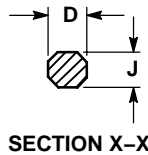
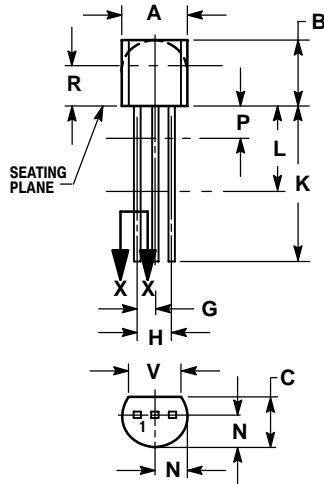
Device Order Number	Package Type	Shipping <sup>†</sup>
BC489	TO-92	5000 Units / Bulk
BC489G	TO-92 (Pb-Free)	5000 Units / Bulk
BC489RL1	TO-92	2000 / Tape & Reel
BC489RL1G	TO-92 (Pb-Free)	2000 / Tape & Reel
BC489A	TO-92	5000 Units / Bulk
BC489AG	TO-92 (Pb-Free)	5000 Units / Bulk
BC489AZL1	TO-92	2000 / 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

<sup>†</sup>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.

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## 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.

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 17:**

- PIN 1. COLLECTOR
- BASE
- EMITTER

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