

# ON Semiconductor

## Is Now

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# BC447, BC449, BC449A

## High Voltage Transistors

### NPN Silicon

#### Features

- Pb-Free Packages are Available\*

#### MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector – Emitter Voltage BC447 BC449, BC449A	$V_{CEO}$	80 100	Vdc
Collector-Base Voltage BC447 BC449, BC449A	$V_{CBO}$	80 100	Vdc
Emitter-Base Voltage	$V_{EBO}$	5.0	Vdc
Collector Current – Continuous	$I_C$	300	mAdc
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	625 5.0	mW mW/ $^\circ\text{C}$
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	1.5 12	W mW/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	$T_J, T_{stg}$	-55 to +150	$^\circ\text{C}$
Moisture Sensitivity Level (MSL) Electrostatic Discharge (ESD)		MSL: 1 NA	

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

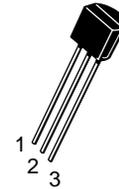
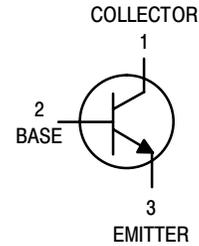
Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	200	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	83.3	$^\circ\text{C}/\text{W}$

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



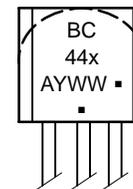
**ON Semiconductor®**

<http://onsemi.com>



**TO-92  
CASE 29  
STYLE 17**

#### MARKING DIAGRAM



BC44x = Device Code  
x = 7 or 9

A = Assembly Location

Y = Year

WW = Work Week

■ = Pb-Free Package

(Note: Microdot may be in either location)

#### ORDERING INFORMATION

Device	Package	Shipping
BC447	TO-92	5000 Units / Box
BC447G	TO-92 (Pb-Free)	5000 Units / Box
BC449	TO-92	5000 Units / Box
BC449G	TO-92 (Pb-Free)	5000 Units / Box
BC449A	TO-92	5000 Units / Box
BC449AG	TO-92 (Pb-Free)	5000 Units / Box

# BC447, BC449, BC449A

## ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
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### OFF CHARACTERISTICS

Collector–Emitter Breakdown Voltage (Note 1) (I <sub>C</sub> = 1.0 mA <sub>dc</sub> , I <sub>B</sub> = 0)	BC447 BC449, BC449A	V <sub>(BR)CEO</sub>	80 100	– –	– –	V <sub>dc</sub>
Collector–Base Breakdown Voltage (I <sub>C</sub> = 100 μA <sub>dc</sub> , I <sub>E</sub> = 0)	BC447 BC449, BC449A	V <sub>(BR)CBO</sub>	80 100	– –	– –	V <sub>dc</sub>
Emitter–Base Breakdown Voltage (I <sub>E</sub> = 10 μA <sub>dc</sub> , I <sub>C</sub> = 0)		V <sub>(BR)EBO</sub>	5.0	–	–	V <sub>dc</sub>
Collector Cutoff Current (V <sub>CB</sub> = 60 V <sub>dc</sub> , I <sub>E</sub> = 0) (V <sub>CB</sub> = 80 V <sub>dc</sub> , I <sub>E</sub> = 0)	BC447 BC449, BC449A	I <sub>CBO</sub>	– –	– –	100 100	nA <sub>dc</sub>

### ON CHARACTERISTICS (Note 1)

DC Current Gain (I <sub>C</sub> = 2.0 mA <sub>dc</sub> , V <sub>CE</sub> = 5.0 V <sub>dc</sub> )  (I <sub>C</sub> = 10 mA <sub>dc</sub> , V <sub>CE</sub> = 5.0 V <sub>dc</sub> )  (I <sub>C</sub> = 100 mA <sub>dc</sub> , V <sub>CE</sub> = 5.0 V <sub>dc</sub> )	BC447, BC449 BC449A BC447, BC449 BC449A BC447, BC449 BC449A	h <sub>FE</sub>	50 120 50 100 50 60	– – – – – –	460 220 – – – –	–
Collector–Emitter Saturation Voltage (I <sub>C</sub> = 100 mA <sub>dc</sub> , I <sub>B</sub> = 10 mA <sub>dc</sub> )		V <sub>CE(sat)</sub>	–	0.125	0.25	V <sub>dc</sub>
Base–Emitter Saturation Voltage (I <sub>C</sub> = 100 mA <sub>dc</sub> , I <sub>B</sub> = 10 mA <sub>dc</sub> )		V <sub>BE(sat)</sub>	–	0.85	–	V <sub>dc</sub>
Base–Emitter On Voltage (I <sub>C</sub> = 2.0 mA <sub>dc</sub> , V <sub>CE</sub> = 5.0 V <sub>dc</sub> ) (I <sub>C</sub> = 100 mA <sub>dc</sub> , V <sub>CE</sub> = 5.0 V <sub>dc</sub> ) (Note 1)		V <sub>BE(on)</sub>	0.55 –	– 0.76	0.7 1.2	V <sub>dc</sub>

### DYNAMIC CHARACTERISTICS

Current–Gain – Bandwidth Product (I <sub>C</sub> = 50 mA <sub>dc</sub> , V <sub>CE</sub> = 5.0 V <sub>dc</sub> , f = 100 MHz)	f <sub>T</sub>	100	200	–	MHz
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1. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle 2%

# BC447, BC449, BC449A

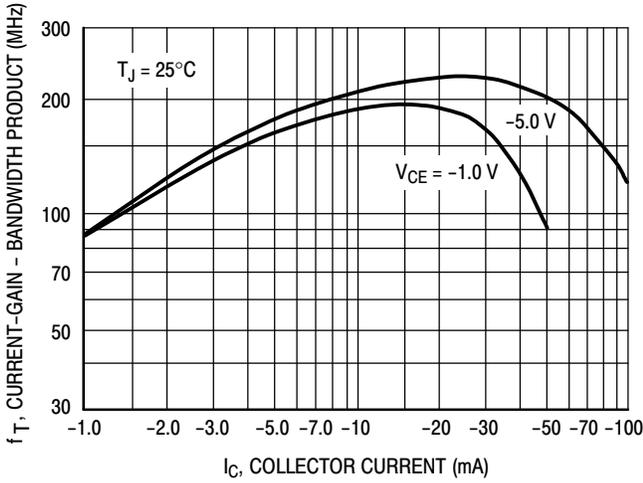


Figure 1. Current-Gain — Bandwidth Product

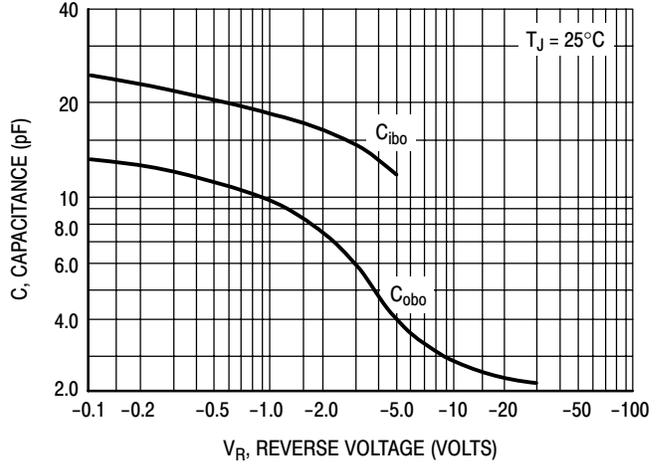


Figure 2. Capacitance

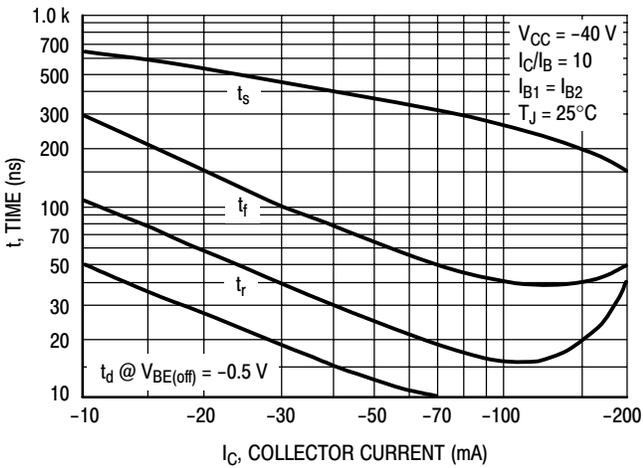


Figure 3. Switching Times

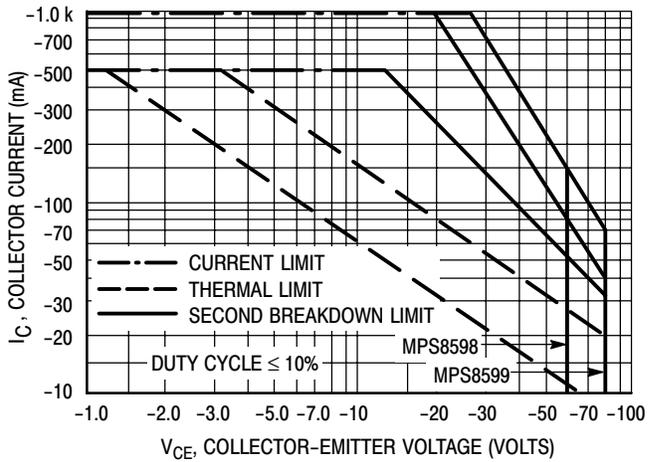


Figure 4. Active-Region Safe Operating Area

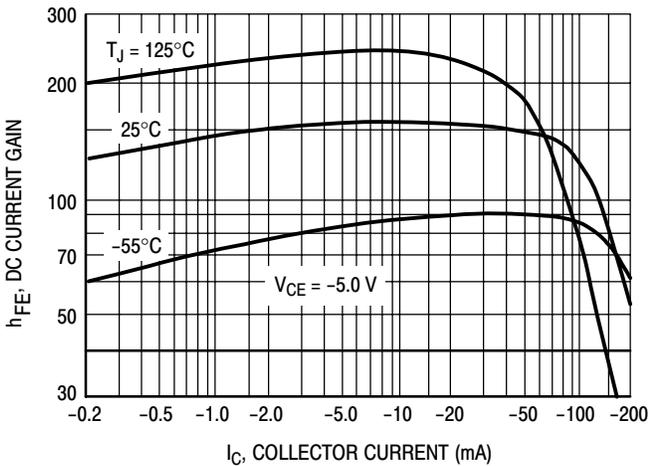


Figure 5. DC Current Gain

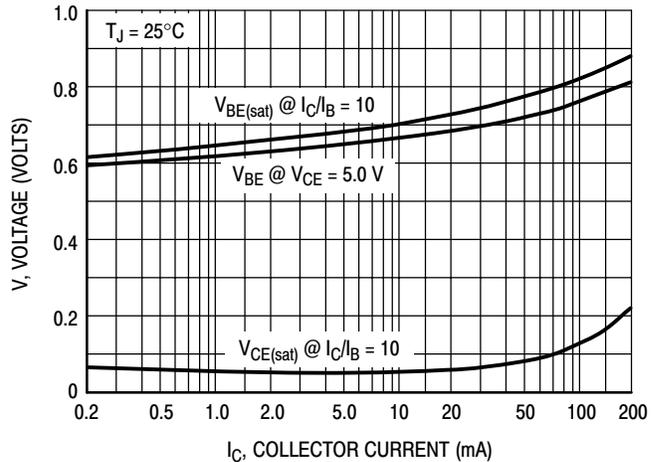


Figure 6. "ON" Voltages

# BC447, BC449, BC449A

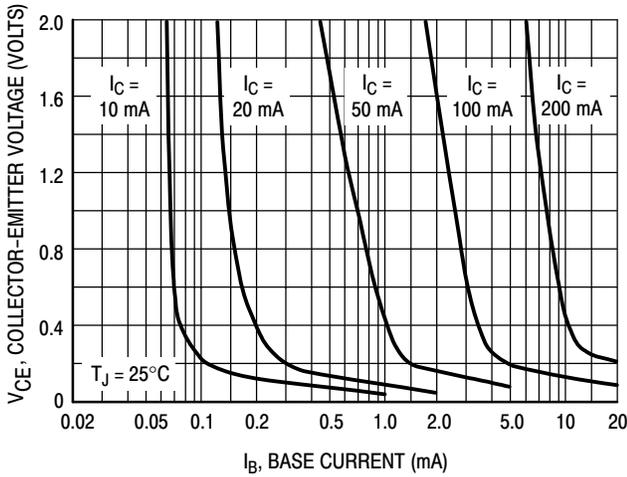


Figure 7. Collector Saturation Region

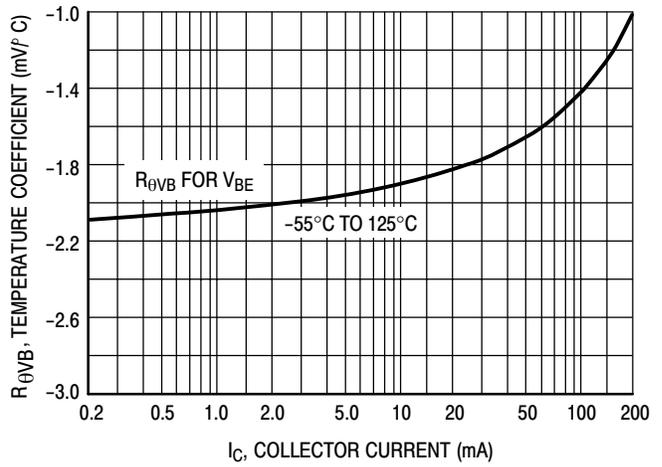


Figure 8. Base-Emitter Temperature Coefficient

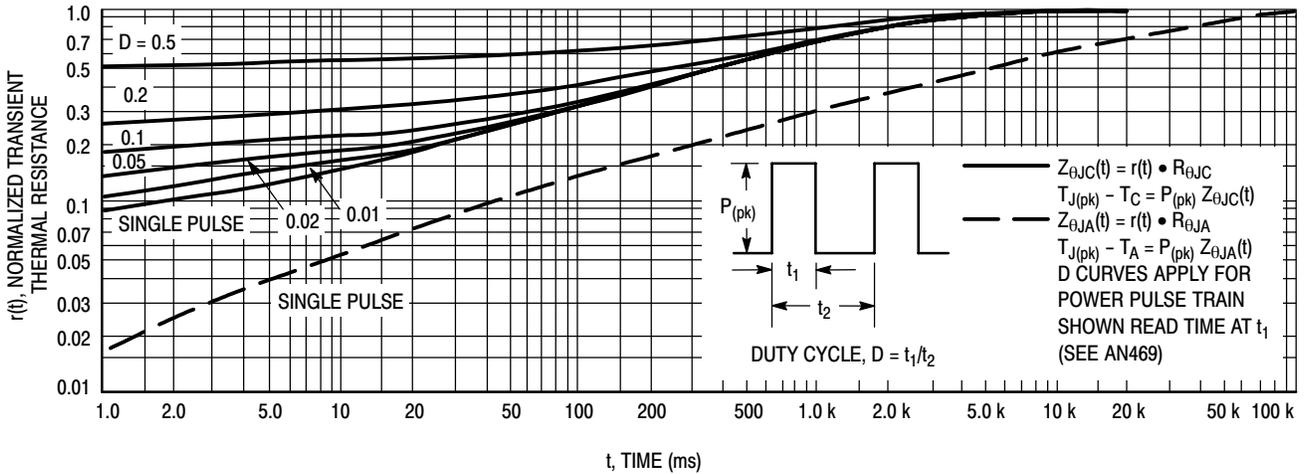
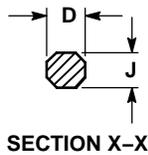
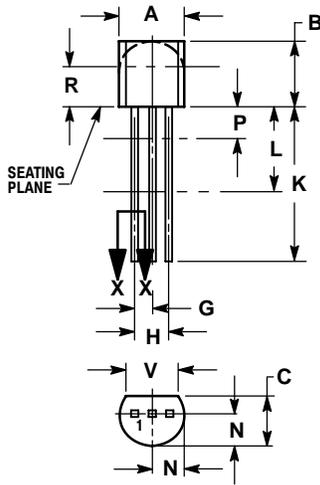


Figure 9. Thermal Response

# BC447, BC449, BC449A

## 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 17:**

1. COLLECTOR
2. BASE
3. EMITTER

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