



**THE DATASHEET OF  
BF493SG**



# ON Semiconductor

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# BF493S

## High Voltage Transistor

### PNP Silicon

#### Features

- This is a Pb-Free Device\*

#### MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	$V_{CEO}$	-350	Vdc
Collector-Base Voltage	$V_{CBO}$	-350	Vdc
Emitter-Base Voltage	$V_{EBO}$	-6.0	Vdc
Collector Current - Continuous	$I_C$	-500	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	$^\circ\text{C}$

#### 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	$^\circ\text{C}/\text{W}$

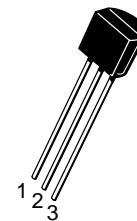
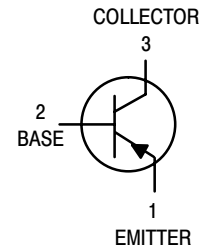
Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

\*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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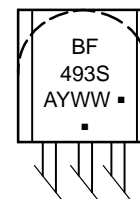
<http://onsemi.com>



TO-92  
CASE 29  
STYLE 1

STRAIGHT LEAD  
BULK PACK

#### MARKING DIAGRAM



A = Assembly Location

Y = Year

WW = Work Week

▪ = Pb-Free Package

(Note: Microdot may be in either location)

#### ORDERING INFORMATION

Device	Package	Shipping
BF493SG	TO-92 (Pb-Free)	5000 Units / Bulk

# BF493S

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

Characteristic	Symbol	Min	Max	Unit
<b>OFF CHARACTERISTICS</b>				
Collector–Emitter Breakdown Voltage (Note 1) ( $I_C = -1.0\text{ mA}$ , $I_B = 0$ )	$V_{(BR)CEO}$	-350	-	Vdc
Collector–Base Breakdown Voltage ( $I_C = -100\text{ }\mu\text{A}$ , $I_E = 0$ )	$V_{(BR)CBO}$	-350	-	Vdc
Emitter–Base Breakdown Voltage ( $I_E = -100\text{ }\mu\text{A}$ , $I_C = 0$ )	$V_{(BR)EBO}$	-6.0	-	Vdc
Collector Cutoff Current ( $V_{CE} = -250\text{ Vdc}$ )	$I_{CES}$	-	-10	nAdc
Emitter Cutoff Current ( $V_{EB} = -6.0\text{ Vdc}$ , $I_C = 0$ )	$I_{EBO}$	-	0.1	$\mu\text{Adc}$
Collector Cutoff Current ( $V_{CB} = -250\text{ Vdc}$ , $I_E = 0$ , $T_A = 25^\circ\text{C}$ ) ( $V_{CB} = -250\text{ Vdc}$ , $I_E = 0$ , $T_A = 100^\circ\text{C}$ )	$I_{CBO}$	-	-0.005 -1.0	$\mu\text{Adc}$

## ON CHARACTERISTICS

DC Current Gain ( $I_C = -1.0\text{ mA}$ , $V_{CE} = -10\text{ Vdc}$ ) ( $I_C = -10\text{ mA}$ , $V_{CE} = -10\text{ Vdc}$ )	$h_{FE}$	25 40	- -	-
Collector–Emitter Saturation Voltage ( $I_C = -20\text{ mA}$ , $I_B = -2.0\text{ mA}$ )	$V_{CE(sat)}$	-	-2.0	Vdc
Base–Emitter On Voltage ( $I_C = -20\text{ mA}$ , $I_B = -2.0\text{ mA}$ )	$V_{BE(sat)}$	-	-2.0	Vdc

## DYNAMIC CHARACTERISTICS

Current–Gain – Bandwidth Product ( $I_C = -10\text{ mA}$ , $V_{CE} = -20\text{ Vdc}$ , $f = 20\text{ MHz}$ )	$f_T$	50	-	MHz
Common–Emitter Feedback Capacitance ( $V_{CB} = -100\text{ Vdc}$ , $I_E = 0$ , $f = 1.0\text{ MHz}$ )	$C_{re}$	-	1.6	pF

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

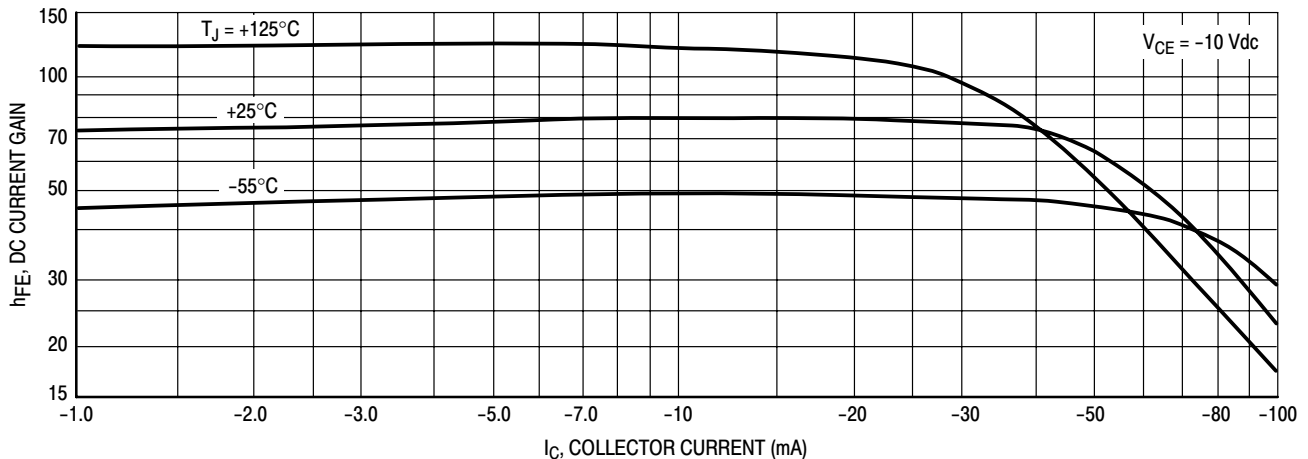


Figure 1. DC Current Gain

# BF493S

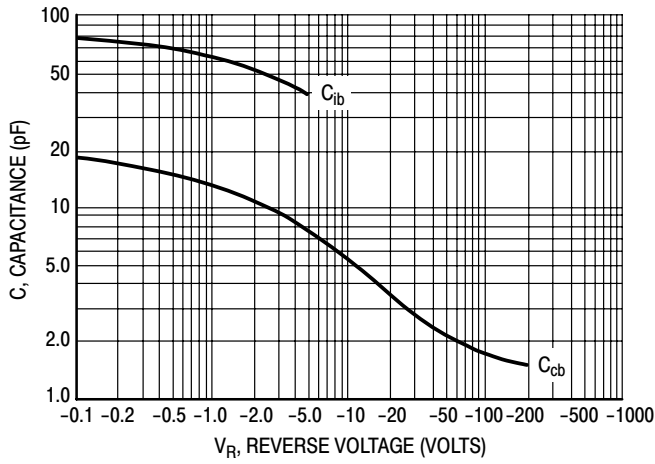


Figure 2. Capacitances

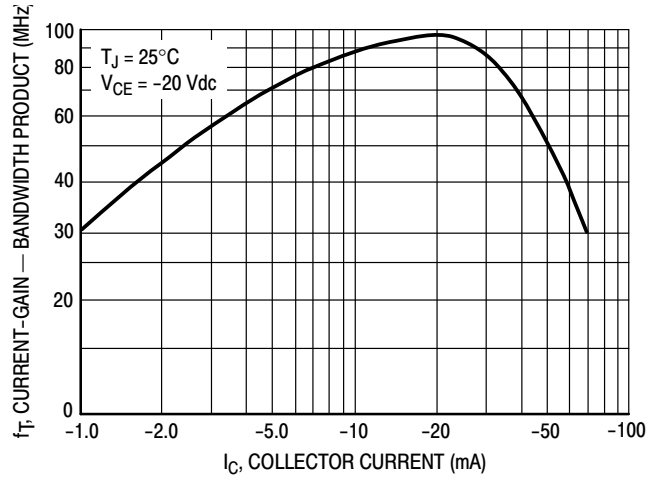


Figure 3. Current-Gain — Bandwidth Product

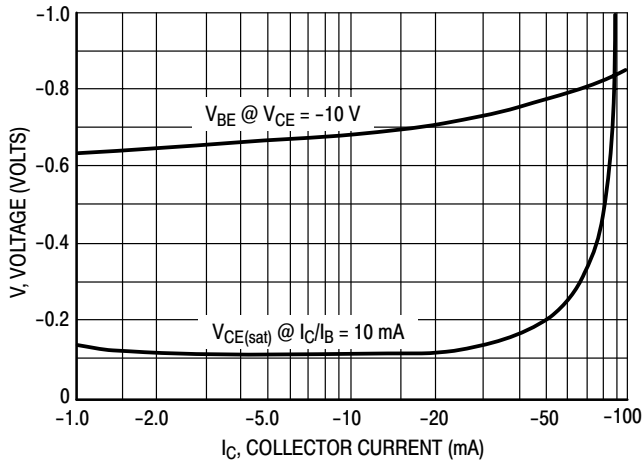


Figure 4. "On" Voltages

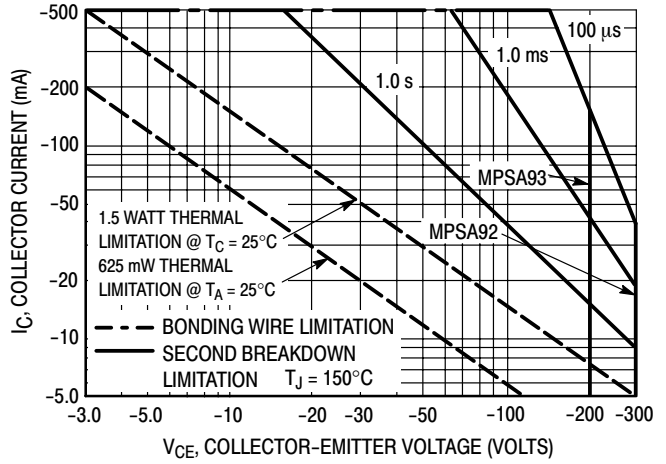
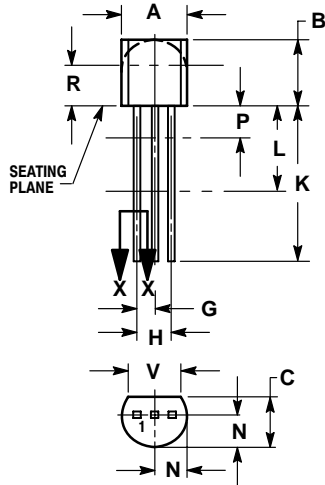


Figure 5. Active Region — Safe Operating Area

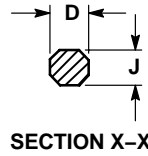
# BF493S

## PACKAGE DIMENSIONS

TO-92 (TO-226)  
CASE 29-11  
ISSUE AM



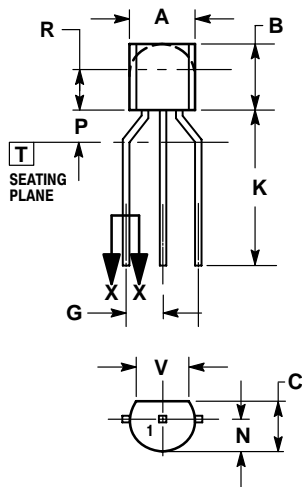
STRAIGHT LEAD  
BULK PACK



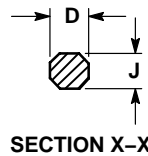
NOTES:

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	---



BENT LEAD  
TAPE & REEL  
AMMO PACK



NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
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4. LEAD DIMENSION IS UNCONTROLLED IN P AND BEYOND DIMENSION K MINIMUM.

DIM	MILLIMETERS	
	MIN	MAX
A	4.45	5.20
B	4.32	5.33
C	3.18	4.19
D	0.40	0.54
G	2.40	2.80
J	0.39	0.50
K	12.70	---
N	2.04	2.66
P	1.50	4.00
R	2.93	---
V	3.43	---

STYLE 1:

1. EMITTER
2. BASE
3. COLLECTOR

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