

# ON Semiconductor

## Is Now

# onsemi™

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[www.onsemi.com](http://www.onsemi.com)

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# BF420, BF422

## High Voltage Transistors

### NPN Silicon

#### Features

- Pb-Free Package is Available\*

#### MAXIMUM RATINGS

Rating	Symbol	BF420	BF422	Unit
Collector–Emitter Voltage	$V_{CEO}$	300	250	Vdc
Collector–Base Voltage	$V_{CBO}$	300	250	Vdc
Emitter–Base Voltage	$V_{EBO}$	5.0		Vdc
Collector Current – Continuous	$I_C$	50		mAdc
Collector Current – Peak	$I_{CM}$	100		mA
Total Device Dissipation (Note 1) @ $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	830	6.6	mW 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	$R_{\theta JA}$	150	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction–to–Lead	$R_{\theta JL}$	68	$^\circ\text{C}/\text{W}$

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.

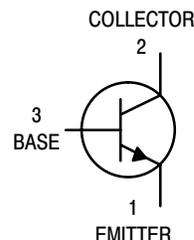
- Mounted on a FR4 board with 200 mm<sup>2</sup> of 1 oz copper and lead length of 5 mm.

\*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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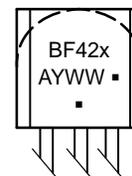
<http://onsemi.com>



#### MARKING DIAGRAM



TO-92  
CASE 29  
STYLE 14



BF42x = Device Code  
x = 0 or 2

A = Assembly Location

Y = Year

WW = Work Week

▪ = Pb-Free Package

(Note: Microdot may be in either location)

#### ORDERING INFORMATION

Device	Package	Shipping†
BF420ZL1	TO-92	2000/Ammo Box
BF420ZL1G	TO-92 (Pb-Free)	2000/Ammo Box
BF422	TO-92	5000 Units/Box
BF422G	TO-92 (Pb-Free)	5000 Units/Box
BF422RL1	TO-92	2000/Tape & Reel
BF422RL1G	TO-92 (Pb-Free)	2000/Tape & Reel
BF422ZL1	TO-92	2000/Ammo Pack
BF422ZL1G	TO-92 (Pb-Free)	2000/Ammo Pack

†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.

# BF420, BF422

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

Characteristic	Symbol	Min	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)	BF420 BF422	V <sub>(BR)CEO</sub>	300 250	– –	V <sub>dc</sub>
Collector–Base Breakdown Voltage (I <sub>C</sub> = 100 μA <sub>dc</sub> , I <sub>E</sub> = 0)	BF420 BF422	V <sub>(BR)CBO</sub>	300 250	– –	V <sub>dc</sub>
Emitter–Base Breakdown Voltage (I <sub>E</sub> = 100 μA <sub>dc</sub> , I <sub>C</sub> = 0)	BF420 BF422	V <sub>(BR)EBO</sub>	5.0 5.0	– –	V <sub>dc</sub>
Collector Cutoff Current (V <sub>CB</sub> = 200 V <sub>dc</sub> , I <sub>E</sub> = 0)	BF420 BF422	I <sub>CBO</sub>	– –	0.01 –	μA <sub>dc</sub>
Emitter Cutoff Current (V <sub>EB</sub> = 5.0 V <sub>dc</sub> , I <sub>C</sub> = 0)	BF420 BF422	I <sub>EBO</sub>	– –	100 –	nA <sub>dc</sub>

### ON CHARACTERISTICS

DC Current Gain (I <sub>C</sub> = 25 mA <sub>dc</sub> , V <sub>CE</sub> = 20 V <sub>dc</sub> )	BF420 BF422	h <sub>FE</sub>	50 50	– –	–
Collector–Emitter Saturation Voltage (I <sub>C</sub> = 20 mA <sub>dc</sub> , I <sub>B</sub> = 2.0 mA <sub>dc</sub> )		V <sub>CE(sat)</sub>	–	0.5	V <sub>dc</sub>
Base–Emitter Saturation Voltage (I <sub>C</sub> = 20 mA <sub>dc</sub> , I <sub>B</sub> = 2.0 mA <sub>dc</sub> )		V <sub>BE(sat)</sub>	–	2.0	V <sub>dc</sub>

### SMALL–SIGNAL CHARACTERISTICS

Current Gain – Bandwidth Product (I <sub>C</sub> = 10 mA <sub>dc</sub> , V <sub>CE</sub> = 10 V <sub>dc</sub> , f = 20 MHz)		f <sub>T</sub>	60	–	MHz
Common Emitter Feedback Capacitance (V <sub>CB</sub> = 30 V <sub>dc</sub> , I <sub>E</sub> = 0, f = 1.0 MHz)		C <sub>re</sub>	–	1.6	pF

1. Pulse Test: Pulse Width ≤ 300 μs; Duty Cycle ≤ 2.0%.

# BF420, BF422

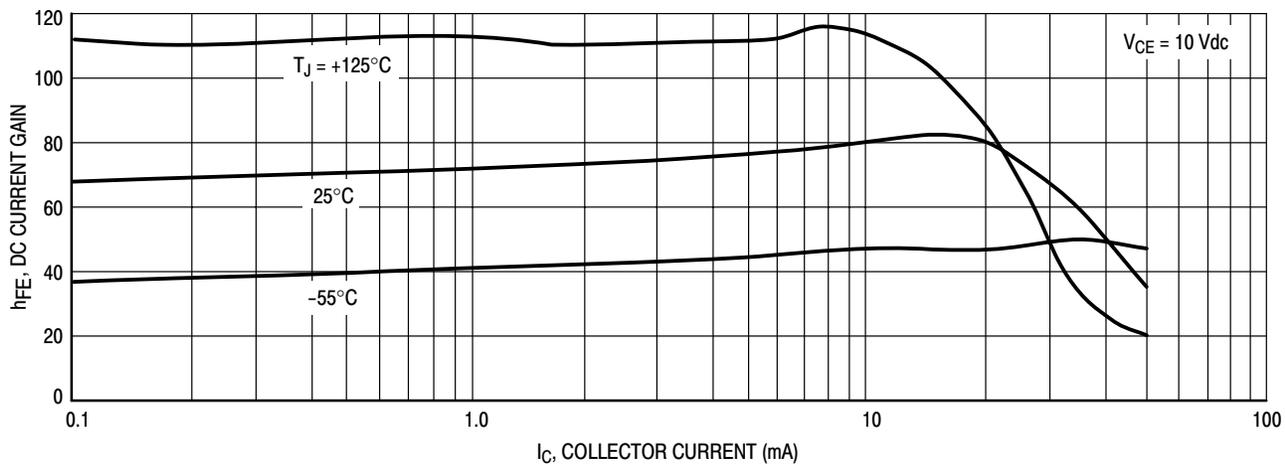


Figure 1. DC Current Gain

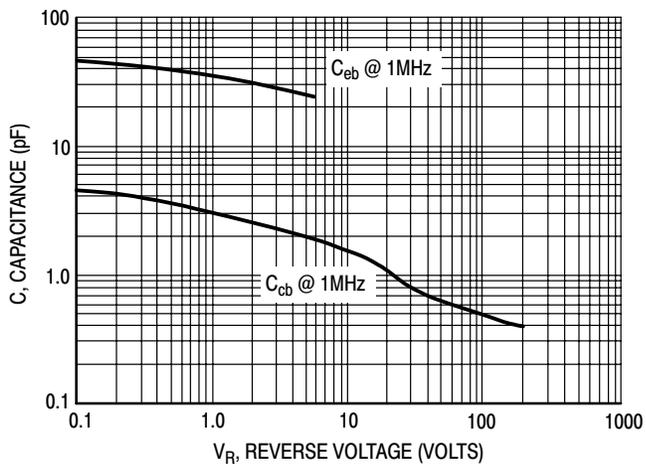


Figure 2. Capacitance

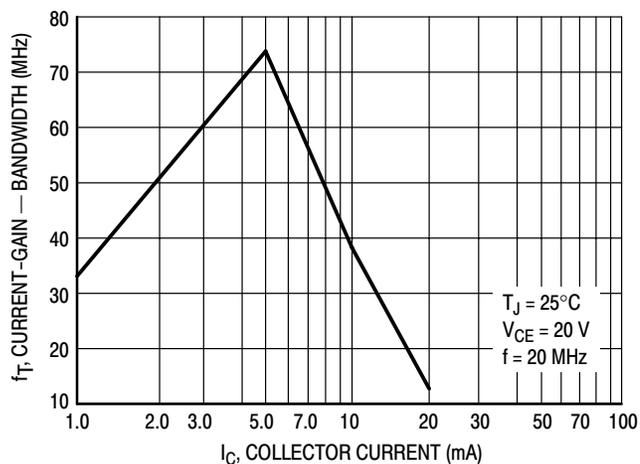


Figure 3. Current-Gain - Bandwidth

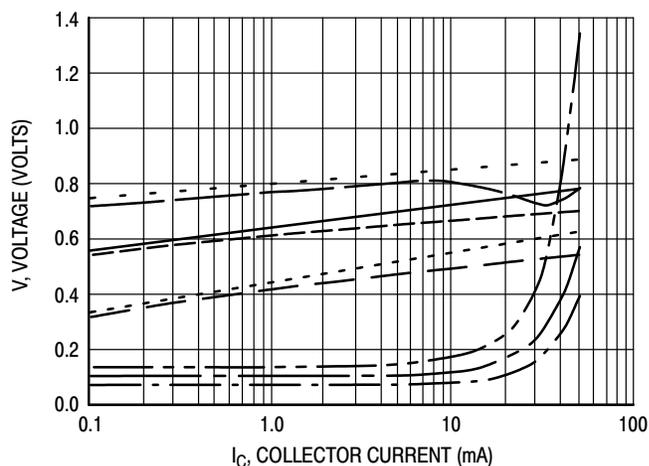


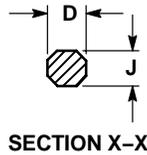
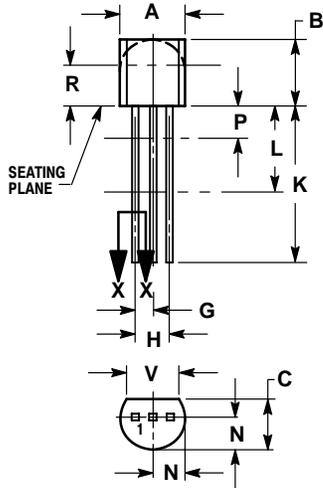
Figure 4. "ON" Voltages

- $V_{CE(sat)}$  @  $25^\circ\text{C}$ ,  $I_C/I_B = 10$
- $V_{CE(sat)}$  @  $125^\circ\text{C}$ ,  $I_C/I_B = 10$
- $V_{CE(sat)}$  @  $-55^\circ\text{C}$ ,  $I_C/I_B = 10$
- $V_{BE(on)}$  @  $25^\circ\text{C}$ ,  $I_C/I_B = 10$
- $V_{BE(on)}$  @  $125^\circ\text{C}$ ,  $I_C/I_B = 10$
- $V_{BE(on)}$  @  $-55^\circ\text{C}$ ,  $I_C/I_B = 10$
- $V_{BE(on)}$  @  $25^\circ\text{C}$ ,  $V_{CE} = 10 \text{ V}$
- $V_{BE(on)}$  @  $125^\circ\text{C}$ ,  $V_{CE} = 10 \text{ V}$
- $V_{BE(on)}$  @  $-55^\circ\text{C}$ ,  $V_{CE} = 10 \text{ V}$

# BF420, BF422

## PACKAGE DIMENSIONS

TO-92  
(TO-226)  
CASE 029-11  
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:

- PIN 1. EMITTER
- COLLECTOR
- BASE

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