

# ON Semiconductor

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# BF421, BF423

## High Voltage Transistors

### PNP Silicon

#### Features

- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

#### MAXIMUM RATINGS

Rating	Symbol	BF421	BF423	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	$I_C$	-500		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/°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	$R_{\theta JA}$	150	°C/W
Thermal Resistance, Junction–to–Lead	$R_{\theta JL}$	68	°C/W

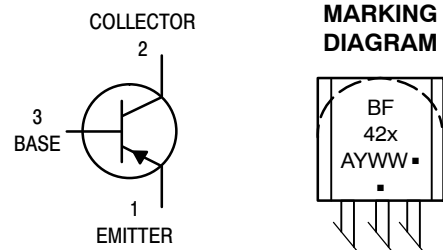
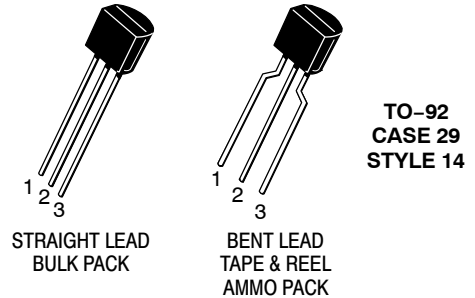
Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

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



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BF42x = Device Code  
x = 1 or 3

A = Assembly Location  
Y = Year  
WW = Work Week  
▪ = Pb-Free Package

(Note: Microdot may be in either location)

#### ORDERING INFORMATION

Device	Package	Shipping
BF421ZL1G	TO-92 (Pb-Free)	2000/Ammo Pack
BF423G	TO-92 (Pb-Free)	5000 Units/Box
BF423ZL1G	TO-92 (Pb-Free)	2000/Ammo Pack

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

# BF421, BF423

## 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) ( $I_C = -1.0\text{ mA}$ , $I_B = 0$ )	BF421 BF423	$V_{(BR)CEO}$	-300 -250	- -	Vdc
Collector – Base Breakdown Voltage ( $I_C = -100\ \mu\text{A}$ , $I_E = 0$ )	BF421 BF423	$V_{(BR)CBO}$	-300 -250	- -	Vdc
Emitter – Base Breakdown Voltage ( $I_E = -100\ \mu\text{A}$ , $I_C = 0$ )	BF421 BF423	$V_{(BR)EBO}$	-5.0 -5.0	- -	Vdc
Collector Cutoff Current ( $V_{CB} = -200\text{ Vdc}$ , $I_E = 0$ )	BF421 BF423	$I_{CBO}$	- -	-0.01 -	$\mu\text{A}$
Emitter Cutoff Current ( $V_{EB} = -5.0\text{ Vdc}$ , $I_C = 0$ )	BF421 BF423	$I_{EBO}$	- -	-100 -	nA

## ON CHARACTERISTICS

DC Current Gain ( $I_C = -25\text{ mA}$ , $V_{CE} = -20\text{ Vdc}$ )	BF421 BF423	$h_{FE}$	50 50	- -	-
Collector – Emitter Saturation Voltage ( $I_C = -20\text{ mA}$ , $I_B = -2.0\text{ mA}$ )		$V_{CE(sat)}$	-	-0.5	Vdc
Base – Emitter Saturation Voltage ( $I_C = -20\text{ mA}$ , $I_B = -2.0\text{ mA}$ )		$V_{BE(sat)}$	-	-2.0	Vdc

## SMALL-SIGNAL CHARACTERISTICS

Current – Gain – Bandwidth Product ( $I_C = -10\text{ mA}$ , $V_{CE} = -10\text{ Vdc}$ , $f = 20\text{ MHz}$ )		$f_T$	60	-	MHz
Common Emitter Feedback Capacitance ( $V_{CB} = -30\text{ Vdc}$ , $I_E = 0$ , $f = 1.0\text{ MHz}$ )		$C_{re}$	-	2.8	pF

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

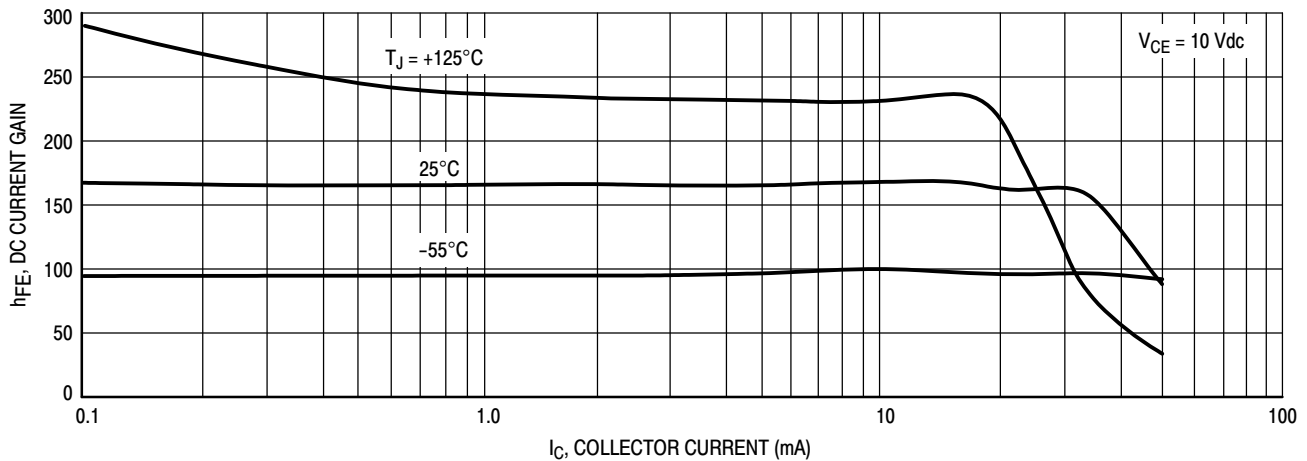


Figure 1. DC Current Gain

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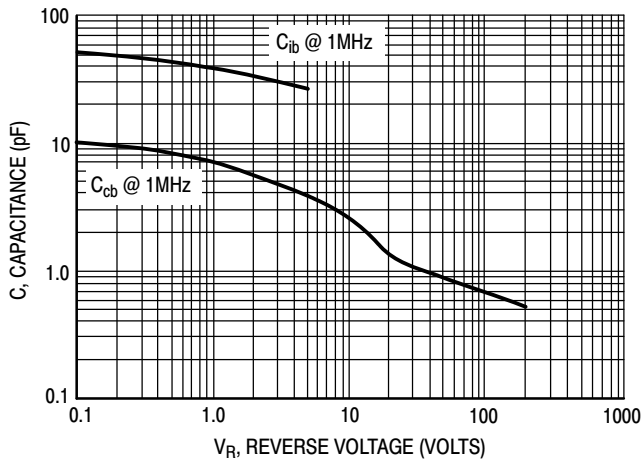


Figure 2. Capacitance

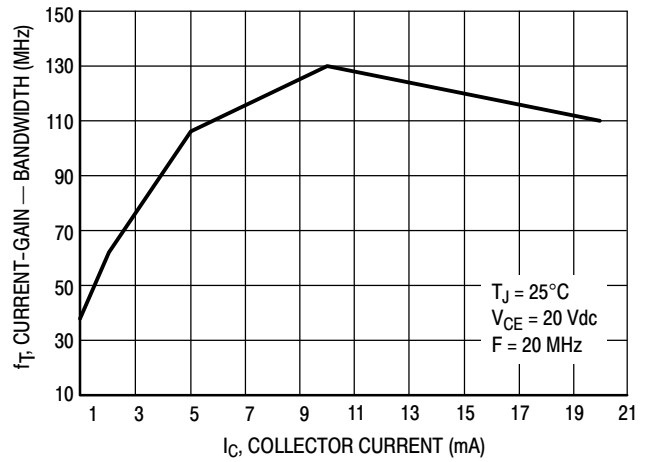


Figure 3. Current-Gain - Bandwidth

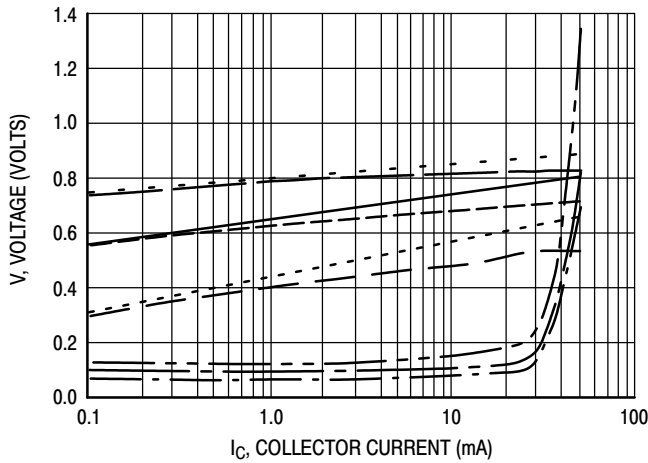


Figure 4. "ON" Voltages

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

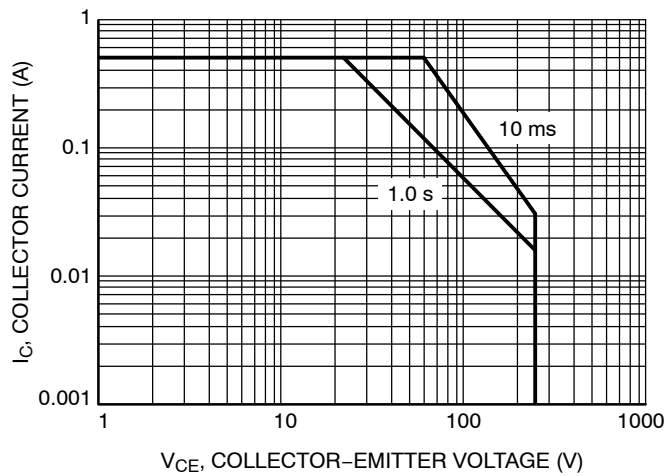
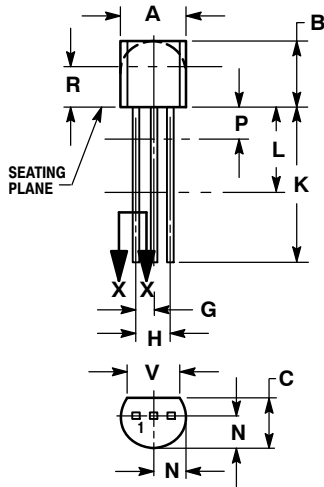


Figure 5. Safe Operating Area

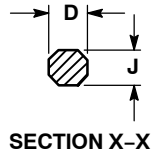
# BF421, BF423

## PACKAGE DIMENSIONS

TO-92 (TO-226)  
CASE 029-11  
ISSUE AM



STRAIGHT LEAD  
BULK PACK



SECTION X-X

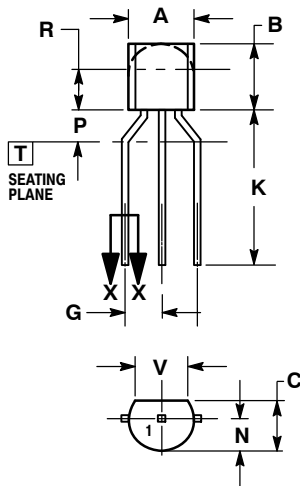
NOTES:

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.

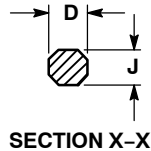
DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.175	0.205	4.45	5.20
B	0.170	0.210	4.32	5.33
C	0.125	0.165	3.18	4.19
D	0.016	0.021	0.407	0.533
G	0.045	0.055	1.15	1.39
H	0.095	0.105	2.42	2.66
J	0.015	0.020	0.39	0.50
K	0.500	---	12.70	---
L	0.250	---	6.35	---
N	0.080	0.105	2.04	2.66
P	---	0.100	---	2.54
R	0.115	---	2.93	---
V	0.135	---	3.43	---

STYLE 14:

- PIN 1. EMITTER
- COLLECTOR
- BASE



BENT LEAD  
TAPE & REEL  
AMMO PACK



SECTION X-X

NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
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	---

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