

# 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	-	mA
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	-	$\text{mW}$ $\text{mW}/^\circ\text{C}$
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

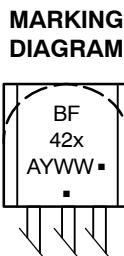
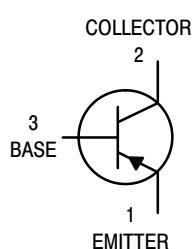
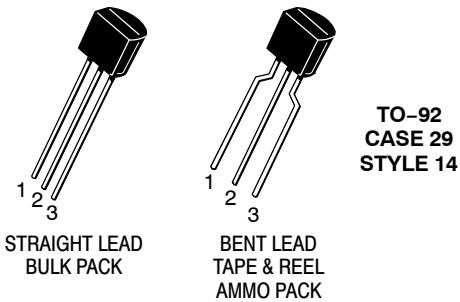
Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

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



ON Semiconductor®

<http://onsemi.com>



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

## ON CHARACTERISTICS

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

## SMALL-SIGNAL CHARACTERISTICS

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

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

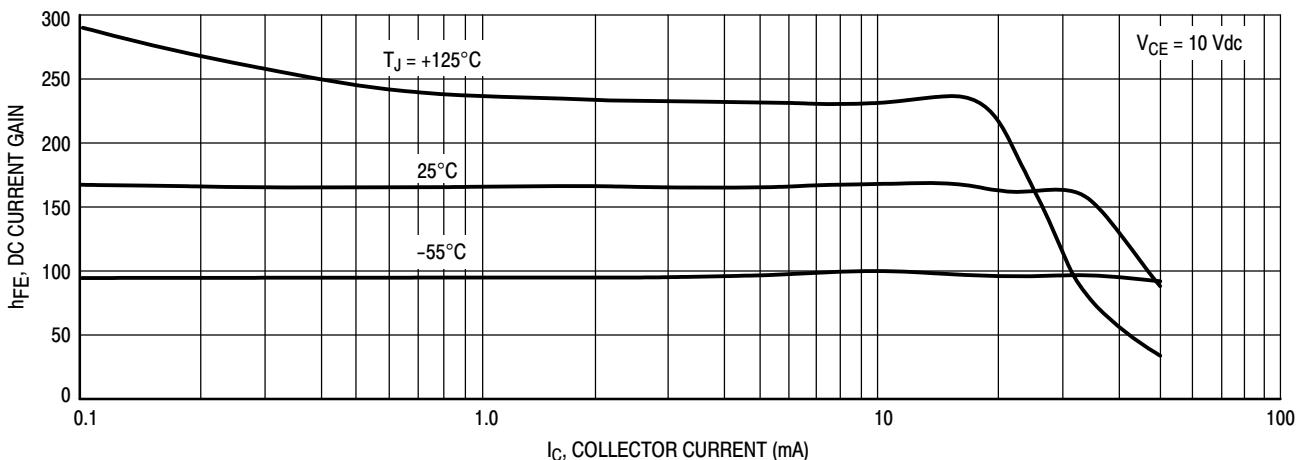


Figure 1. DC Current Gain

## BF421, BF423

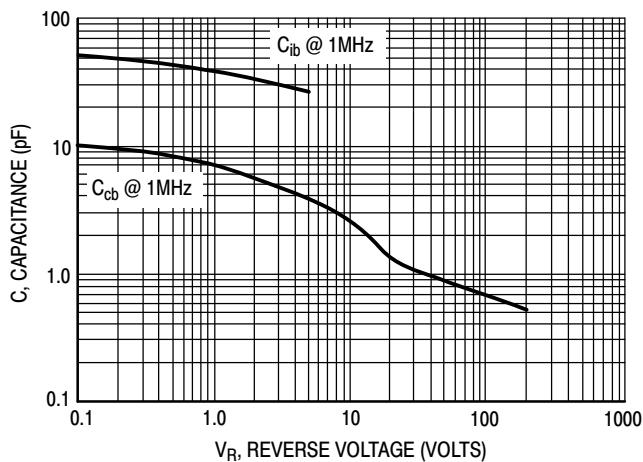


Figure 2. Capacitance

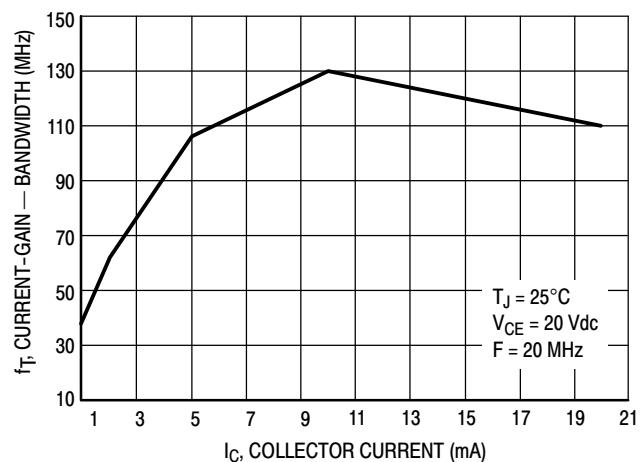


Figure 3. Current-Gain – Bandwidth

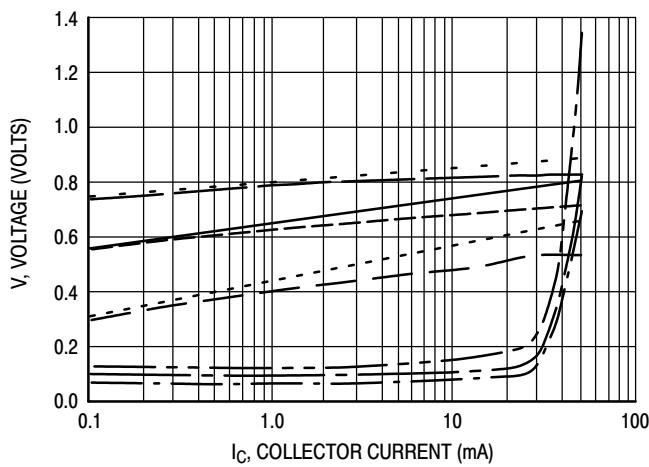


Figure 4. "ON" Voltages

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

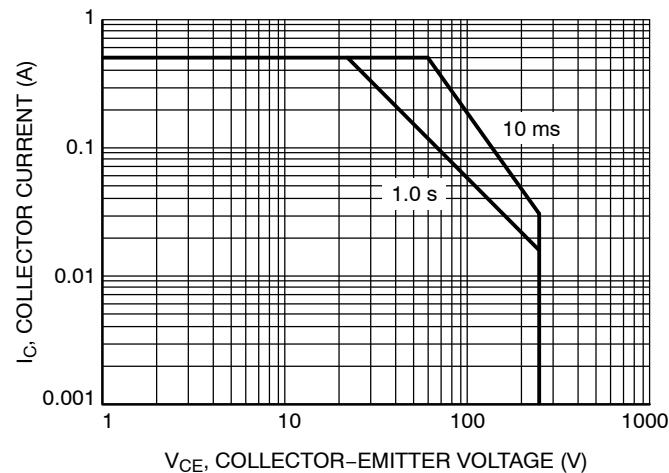
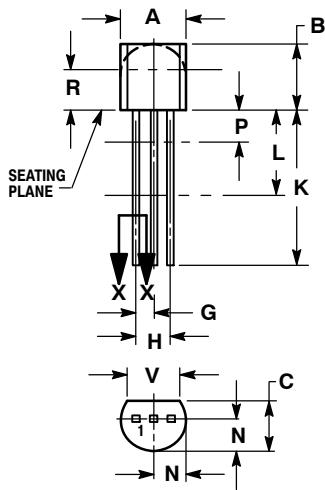
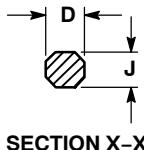


Figure 5. Safe Operating Area

## PACKAGE DIMENSIONS

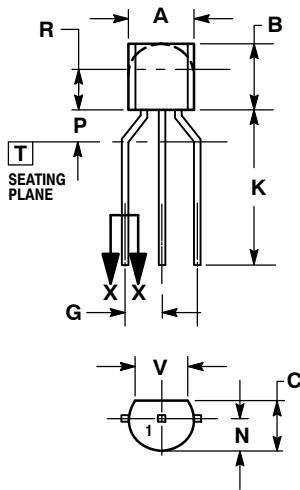
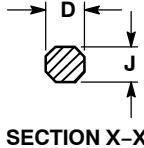
TO-92 (TO-226)  
CASE 029-11  
ISSUE AMSTRAIGHT LEAD  
BULK PACK

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	---

STYLE 14:  
PIN 1. Emitter  
2. Collector  
3. Base

BENT LEAD  
TAPE & REEL  
AMMO PACK

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	---

**ON Semiconductor** and  are registered trademarks of Semiconductor Components Industries, LLC (SCILLC). SCILLC reserves the right to make changes without further notice to any products herein. SCILLC makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does SCILLC assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. "Typical" parameters which may be provided in SCILLC data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. SCILLC does not convey any license under its patent rights nor the rights of others. SCILLC products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the SCILLC product could create a situation where personal injury or death may occur. Should Buyer purchase or use SCILLC products for any such unintended or unauthorized application, Buyer shall indemnify and hold SCILLC and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that SCILLC was negligent regarding the design or manufacture of the part. SCILLC is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

## PUBLICATION ORDERING INFORMATION

## LITERATURE FULFILLMENT:

Literature Distribution Center for ON Semiconductor  
P.O. Box 5163, Denver, Colorado 80217 USA  
Phone: 303-675-2175 or 800-344-3860 Toll Free USA/Canada  
Fax: 303-675-2176 or 800-344-3867 Toll Free USA/Canada  
Email: orderlit@onsemi.com

## N. American Technical Support: 800-282-9855 Toll Free

USA/Canada

## Europe, Middle East and Africa Technical Support:

Phone: 421 33 790 2910

## Japan Customer Focus Center

Phone: 81-3-5773-3850

ON Semiconductor Website: [www.onsemi.com](http://www.onsemi.com)Order Literature: <http://www.onsemi.com/orderlit>For additional information, please contact your local  
Sales Representative