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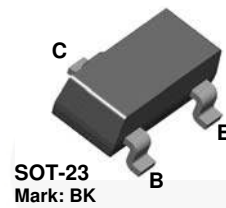
March 2014

# BCX71K

## PNP General-Purpose Amplifier

### Description

This device is designed for applications requiring extremely high-current gain at collector currents to 300 mA. Sourced from process 68.



### Ordering Information

Part Number	Marking	Package	Packing Method
BCX71K	BK	SOT-23 3L	Tape and Reel

### Absolute Maximum Ratings<sup>(1),(2)</sup>

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only. Values are at  $T_A = 25^\circ\text{C}$  unless otherwise noted.

Symbol	Parameter	Value	Unit
$V_{CEO}$	Collector-Emitter Voltage	-45	V
$V_{CES}$	Collector-Emitter Voltage	-45	V
$V_{EBO}$	Emitter-Base Voltage	-5	V
$I_C$	Collector Current - Continuous	-500	mA
$T_J, T_{STG}$	Junction and Storage Temperature Range	-55 to +150	$^\circ\text{C}$

#### Notes:

1. These ratings are based on a maximum junction temperature of  $150^\circ\text{C}$ .
2. These are steady-state limits. Fairchild Semiconductor should be consulted on applications involving pulsed or low-duty-cycle operations.

### Thermal Characteristics<sup>(3)</sup>

Values are at  $T_A = 25^\circ\text{C}$  unless otherwise noted.

Symbol	Parameter	Max.	Unit
$P_D$	Total Device Dissipation	350	mW
	Derate Above $T_A = 25^\circ\text{C}$	2.8	mW/ $^\circ\text{C}$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	357	$^\circ\text{C}/\text{W}$

#### Note:

3. Device mounted on FR-4 PCB 40 mm X 40 mm X 1.5 mm.

### Electrical Characteristics

Values are at  $T_A = 25^\circ\text{C}$  unless otherwise noted.

Symbol	Parameter	Conditions	Min.	Max.	Unit
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage	$I_C = -1.0\text{ mA}$ , $I_B = 0$	-45		V
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage	$I_E = -10\ \mu\text{A}$ , $I_C = 0$	-5.0		V
$I_{CES}$	Collector Cut-Off Current	$V_{CE} = -45\text{ V}$ , $I_E = 0$		-20	nA
		$V_{CE} = -45\text{ V}$ , $I_E = 0$ , $T_A = 100^\circ\text{C}$		-20	$\mu\text{A}$
$h_{FE}$	DC Current Gain	$I_C = -10\ \mu\text{A}$ , $V_{CE} = -5.0\text{ V}$	100		
		$I_C = -2.0\text{ mA}$ , $V_{CE} = -5.0\text{ V}$	380	630	
		$I_C = -50\text{ mA}$ , $V_{CE} = -1.0\text{ V}$	110		
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C = -10\text{ mA}$ , $I_B = -0.25\text{ mA}$	-0.06	-0.25	V
		$I_C = -50\text{ mA}$ , $I_B = -1.25\text{ mA}$	-0.12	-0.55	
$V_{BE(sat)}$	Base-Emitter Saturation Voltage	$I_C = -10\text{ mA}$ , $I_B = -0.25\text{ mA}$	-0.60	-0.85	V
		$I_C = -50\text{ mA}$ , $I_B = -1.25\text{ mA}$	-0.68	-1.05	
$V_{BE(on)}$	Base-Emitter On Voltage	$I_C = -2.0\text{ mA}$ , $V_{CE} = -5.0\text{ V}$	-0.60	-0.75	V
$C_{ob}$	Output Capacitance	$V_{CB} = -10\text{ V}$ , $I_E = 0$ , $f = 1.0\text{ MHz}$		6.0	pF
NF	Noise Figure	$I_C = -0.2\text{ mA}$ , $V_{CE} = -5.0\text{ V}$ , $R_S = 2.0\text{ k}\Omega$ , $f = 1.0\text{ kHz}$ , $B_W = 200\text{ Hz}$		6.0	dB
$t_{on}$	Turn-On Time	$I_C = -10\text{ mA}$ , $I_{B1} = -1.0\text{ mA}$		150	ns
$t_{off}$	Turn-Off Time	$I_{B2} = -1.0\text{ mA}$ , $V_{BB} = -3.6\text{ V}$ , $R_1 = R_2 = 5.0\text{ k}\Omega$ , $R_L = 990\ \Omega$ ,		800	ns

## Typical Performance Characteristics

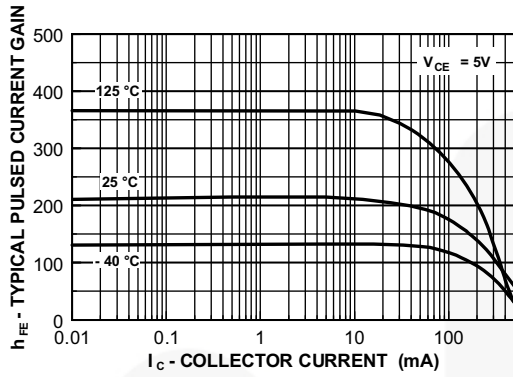


Figure 1. Typical Pulsed Current Gain vs. Collector Current

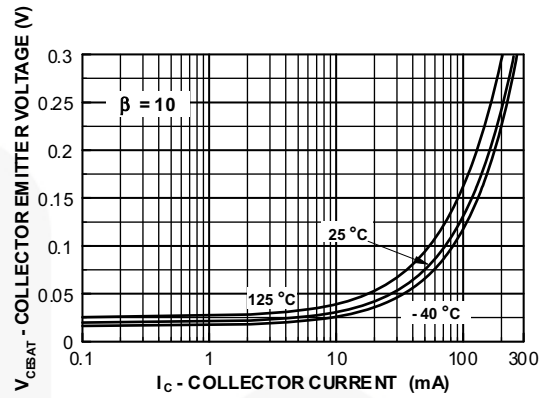


Figure 2. Collector-Emitter Saturation Voltage vs. Collector Current

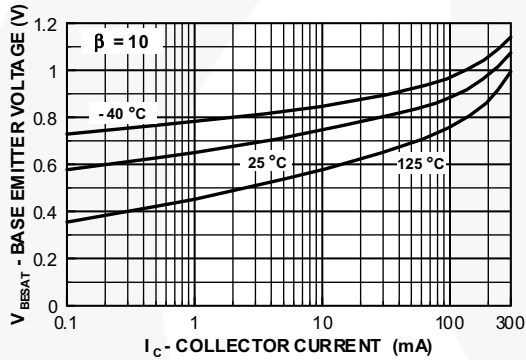


Figure 3. Base-Emitter Saturation Voltage vs. Collector Current

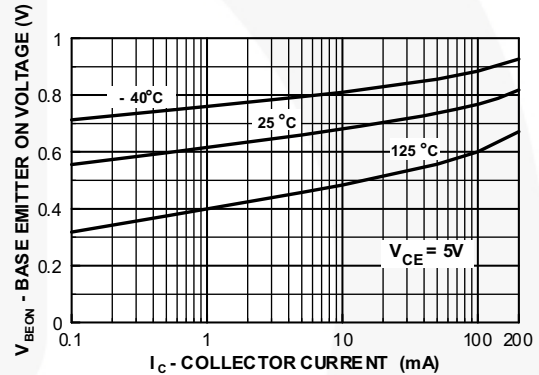


Figure 4. Base-Emitter On Voltage vs. Collector Current

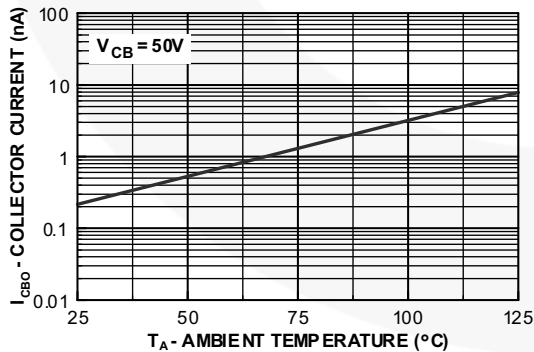


Figure 5. Collector Cut-Off Current vs. Ambient Temperature

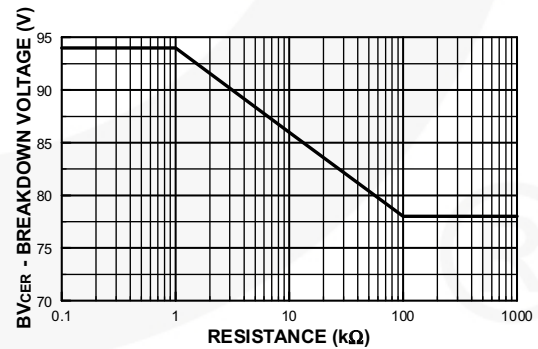


Figure 6. Collector-Emitter Breakdown Voltage with Resistance Between Emitter-Base

Typical Performance Characteristics (Continued)

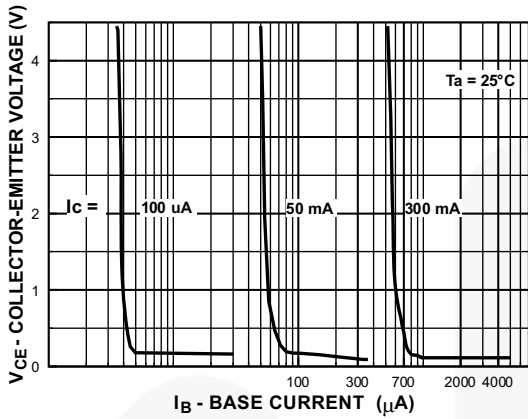


Figure 7. Collector Saturation Region

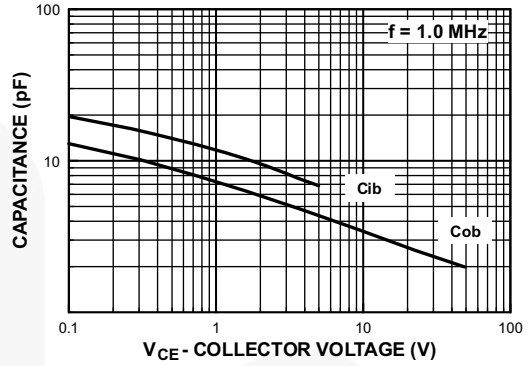


Figure 8. Input and Output Capacitance vs. Reverse Voltage

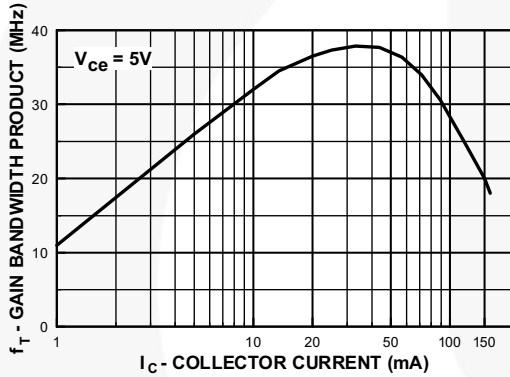


Figure 9. Gain Bandwidth Product vs. Collector Current

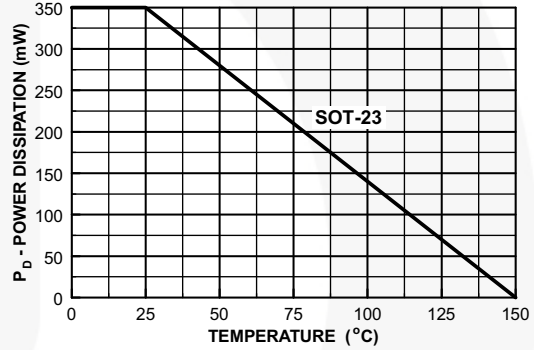
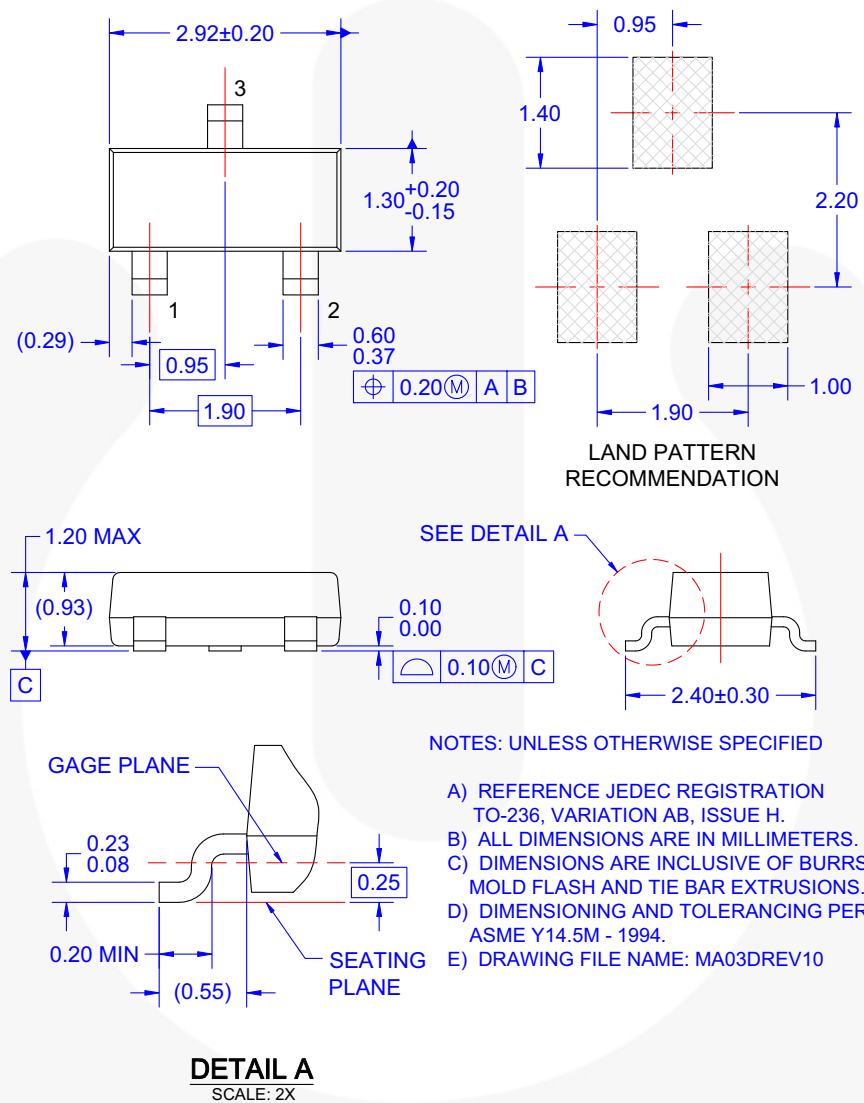


Figure 10. Power Dissipation vs. Ambient Temperature

## Physical Dimensions

### SOT-23



**Figure 11. 3-LEAD, SOT23, JEDEC TO-236, LOW PROFILE (ACTIVE)**

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