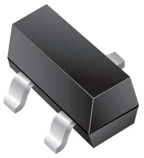
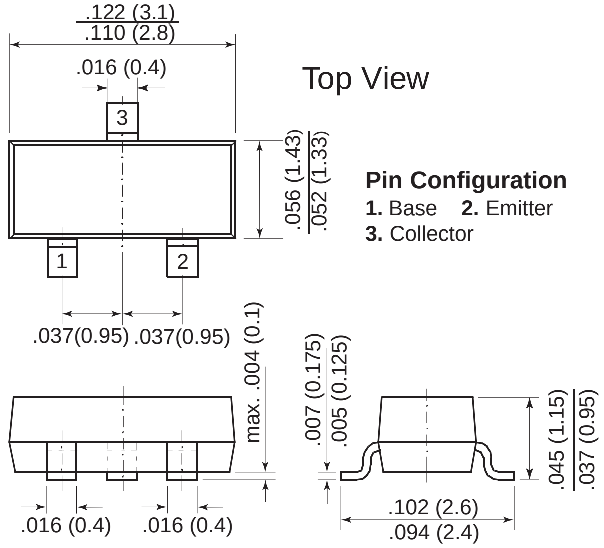
Small Signal Transistors (PNP)



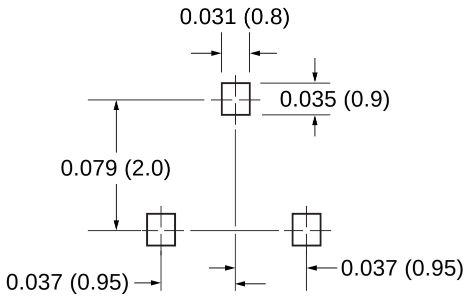
TO-236AB (SOT-23)



Pin Configuration
1. Base **2.** Emitter
3. Collector

Dimensions in inches and (millimeters)

Mounting Pad Layout



Features

- PNP Silicon Epitaxial Planar Transistors
- Suited for low level, low noise, low frequency applications in hybrid cicuits.
- Low Current, Low Voltage.
- As complementary types, BCW60 Series NPN transistors are recommended.

Mechanical Data

Case: SOT-23 Plastic Package

Weight: approx. 0.008g

Marking Code:
BCW61A = BA
BCW61B = BB
BCW61C = BC
BCW61D = BD

Packaging Codes/Options:
E8/10K per 13” reel (8mm tape), 30K/box
E9/3K per 7” reel (8mm tape), 30K/box

Maximum Ratings & Thermal Characteristics

Ratings at 25°C ambient temperature unless otherwise specified.

Parameter	Symbol	Value	Unit
Collector-Emitter Voltage (V_{BE} = 0)	$-V_{CES}$	32	V
Collector-Emitter Voltage	$-V_{CEO}$	32	V
Emitter-Base Voltage	$-V_{EBO}$	5.0	V
Collector Current (DC)	$-I_C$	100	mA
Peak Collector Current	$-I_{CM}$	200	mA
Base Current (DC)	$-I_B$	50	mA
Power Dissipation	P_{tot}	250	mW
Maximum Junction Temperature	T_j	150	°C
Storage Temperature Range	T_{STG}	–65 to +150	°C
Thermal Resistance, Junction to Ambient Air	$R_{\theta JA}$	500(1)	°C/W

Note:
(1) Mounted on FR-4 printed-ciruit board.

Electrical Characteristics

Ratings at 25°C ambient temperature unless otherwise specified.

		Symbol	Min.	TYP.	Max.	Unit
DC Current Gain						
at $-V_{CE}$ = 5 V, $-I_C$ = 10 µA	BCW61A	h_{FE}	–	–	–	–
at $-V_{CE}$ = 5 V, $-I_C$ = 10 µA	BCW61B	h_{FE}	30	–	–	–
at $-V_{CE}$ = 5 V, $-I_C$ = 10 µA	BCW61C	h_{FE}	40	–	–	–
at $-V_{CE}$ = 5 V, $-I_C$ = 10 µA	BCW61D	h_{FE}	100	–	–	–
at $-V_{CE}$ = 5 V, $-I_C$ = 2 mA	BCW61A	h_{FE}	120	–	220	–
at $-V_{CE}$ = 5 V, $-I_C$ = 2 mA	BCW61B	h_{FE}	180	–	310	–
at $-V_{CE}$ = 5 V, $-I_C$ = 2 mA	BCW61C	h_{FE}	250	–	460	–
at $-V_{CE}$ = 5 V, $-I_C$ = 2 mA	BCW61D	h_{FE}	380	–	630	–
at $-V_{CE}$ = 1 V, $-I_C$ = 50 mA	BCW61A	h_{FE}	60	–	–	–
at $-V_{CE}$ = 1 V, $-I_C$ = 50 mA	BCW61B	h_{FE}	80	–	–	–
at $-V_{CE}$ = 1 V, $-I_C$ = 50 mA	BCW61C	h_{FE}	100	–	–	–
at $-V_{CE}$ = 1 V, $-I_C$ = 50 mA	BCW61D	h_{FE}	110	–	–	–
Collector-Emitter Saturation Voltage						
at $-I_C$ = 10 mA, $-I_B$ = 0.25 mA		$-V_{CEsat}$	60	–	250	mV
at $-I_C$ = 50 mA, $-I_B$ = 1.25 mA		$-V_{CEsat}$	120	–	550	mV
Base-Emitter Saturation Voltage						
at $-I_C$ = 10 mA, $-I_B$ = 0.25 mA		$-V_{BEsat}$	600	–	850	mV
at $-I_C$ = 50 mA, $-I_B$ = 1.25 mA		$-V_{BEsat}$	680	–	1050	mV
Base-Emitter Voltage						
at $-V_{CE}$ = 5 V, $-I_C$ = 2 mA		$-V_{BE}$	600	650	750	mV
at $-V_{CE}$ = 5 V, $-I_C$ = 10 µA		$-V_{BE}$	–	550	–	mV
at $-V_{CE}$ = 1 V, $-I_C$ = 50 mA		$-V_{BE}$	–	720	–	mV
Collector-Emiter Cut-off Current						
at $-V_{CE}$ = 32 V, V_{EB}=0		$-I_{CES}$	–	–	20	nA
at $-V_{CE}$ = 32 V, V_{EB}=0, T_A = 150°C			–	–	20	µA
Emitter-Base Cut-off Current at $-V_{EB}$ = 4 V, I_C=0		$-I_{EBO}$	–	–	20	nA
Gain-Bandwidth Product at $-V_{CE}$ = 5 V, $-I_C$ = 10 mA, f = 100 MHz		f_T	100	–	–	MHz
Collector-Base Capacitance at $-V_{CB}$ = 10 V, f = 1 MHz, I_E=0		C_{CBO}	–	4.5	–	pF
Emitter-Base Capacitance at $-V_{EB}$ = 0.5 V, f = 1 MHz, I_C=0		C_{EBO}	–	11	–	pF
Noise Figure at $-V_{CE}$ = 5 V, $-I_C$ = 200 µA, R_S = 2 kΩ, f = 100 kHz, B = 200Hz		F	–	2	6	dB
Small Signal Current Gain at $-V_{CE}$ = 5V, $-I_C$ = 2 mA, f = 1.0 kHz	BCW60A	h_{fe}	–	200		
	BCW60B		–	260		
	BCW60C		–	330		
	BCW60D		–	520		
Turn-on Time at R_L = 990Ω (see fig. 1) $-V_{CC}$ = 10V, $-I_c$ = 10mA, $-I_{B(on)} = I_{B(off)}$ = 1mA		t_{on}	–	85	150	ns
Turn-off Time at R_L = 990Ω (see fig. 1) $-V_{CC}$ = 10V, $-I_c$ = 10mA, $-I_{B(on)} = I_{B(off)}$ = 1mA		t_{off}	–	480	800	ns

Fig. 1 - Switching Waveforms