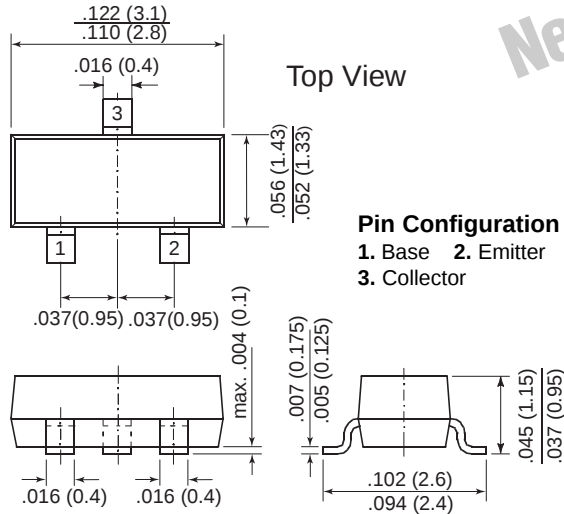


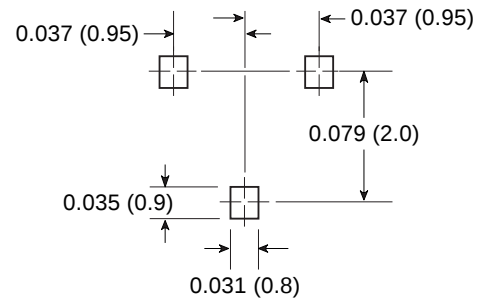


TO-236AB (SOT-23)



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 circuits.
- 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)

E9/3K per 7" reel (8mm tape)

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	Volts
Collector-Emitter Voltage	$-V_{CEO}$	32	Volts
Emitter-Base Voltage	$-V_{EBO}$	5.0	Volts
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

Notes:

(1) Mounted on FR-4 printed-circuit board.

Small Signal Transistors (PNP)

Electrical Characteristics Ratings at 25°C ambient temperature unless otherwise specified.

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

Fig. 1 - Switching Waveforms

