SILICON PLANAR EPITAXIAL TRANSISTORS

N-P-N silicon transistors, in a microminiature plastic envelope, intended for low level, low noise, low frequency purpose applications in hybrid circuits.

QUICK REFERENCE DATA

Collector-emitter voltage (V_{BE} = 0)	V_{CES}	max.	32	V
Collector-emitter voltage (open base)	V_{CEO}	max.	32	V
Collector current (d.c.)	I_C	max.	200	mA
Total power dissipation	P_{tot}	max.	250	mW
Junction temperature	T_j	max.	150	°C
Transition frequency at f = 100 MHz V_{CE} = 5 V; I_C = 10 mA	f_T	typ.	250	MHz
Noise figure at f = 1 kHz V_{CE} = 5 V; I_C = 200 μA; B = 200 Hz	F	typ.	2	dB

MECHANICAL DATA

Fig. 1 SOT-23.

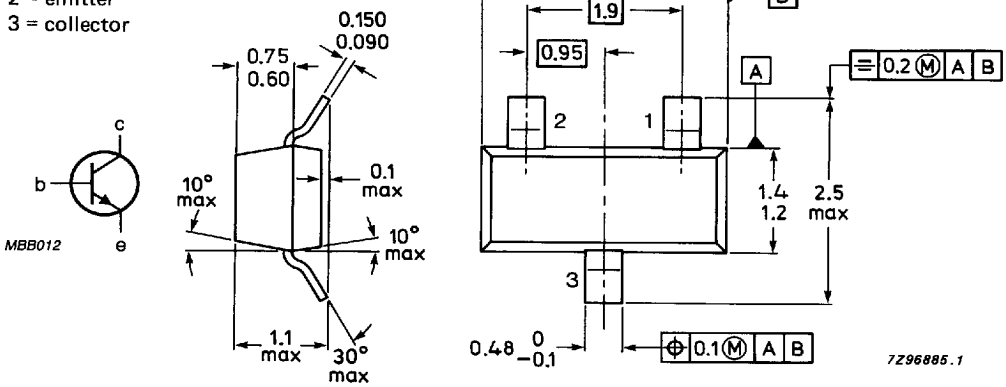
Dimensions in mm

Marking code

BCW60A = AAp
BCW60B = ABp
BCW60C = ACp
BCW60D = ADp

Pinning:

1 = base
2 = emitter
3 = collector



TOP VIEW

See also *Soldering recommendations.*

RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Collector-emitter voltage (V_{BE} = 0)	V_{CES}	max.	32 V
Collector-emitter voltage (open base)	V_{CEO}	max.	32 V
Emitter-base voltage (open collector)	V_{EBO}	max.	5 V
Collector current (d.c.)	I_C	max.	200 mA
Base current	I_B	max.	50 mA
Total power dissipation up to T_{amb} = 25 °C	P_{tot}	max.	250 mW
Storage temperature	T_{stg}		− 65 to + 150 °C
Junction temperature	T_j	max.	150 °C

THERMAL RESISTANCE

From junction to ambient*	$R_{th\ j\text{-}a}$	=	500 K/W

CHARACTERISTICS

T_{amb} = 25 °C unless otherwise specified

Collector-emitter cut-off current			
V_{BE} = 0; V_{CE} = 32 V	I_{CES}	<	20 nA
V_{BE} = 0; V_{CE} = 32 V; T_{amb} = 150 °C	I_{CES}	<	20 μA
Emitter-base cut-off current			
I_C = 0; V_{EB} = 4 V	I_{EBO}	<	20 nA
Saturation voltages			
at I_C = 10 mA; I_B = 0,25 mA	V_{CEsat}		0,05 to 0,35 V
	V_{BEsat}		0,6 to 0,85 V
at I_C = 50 mA; I_B = 1,25 mA	V_{CEsat}		0,1 to 0,55 V
	V_{BEsat}		0,7 to 1,05 V
Transition frequency at f = 100 MHz ▲	f_T	>	125 MHz
I_C = 10 mA; V_{CE} = 5 V		typ.	250 MHz
Collector capacitance at f = 1 MHz			
$I_E = I_e$ = 0; V_{CB} = 10 V	C_c	typ.	2,5 pF
Emitter capacitance at f = 1 MHz			
$I_C = I_c$ = 0; V_{EB} = 0,5 V	C_e	typ.	8 pF
Noise figure at R_S = 2 kΩ	F	typ.	2 dB
I_C = 200 μA; V_{CE} = 5 V; f = 1 kHz; B = 200 Hz		<	6 dB

* Mounted on a ceramic substrate of 8 mm x 10 mm x 0,7 mm.
▲ Measured under pulse conditions.

			BCW60A	60B	60C	60D	
D.C. current gain							
V_{CE} = 5 V; I_C = 10 μA	h_{FE}	>	–	20	40	100	
V_{CE} = 5 V; I_C = 2 mA	h_{FE}	>	120	180	250	380	
		<	220	310	460	630	
V_{CE} = 1 V; I_C = 50 mA	h_{FE}	>	50	70	90	100	
Input impedance							
V_{CE} = 5 V; I_C = 2 mA; f = 1 kHz	h_{ie}	typ.	2,7	3,6	4,5	7,5	kΩ
Reverse voltage transfer ratio							
V_{CE} = 5 V; I_C = 2 mA; f = 1 kHz	h_{re}	typ.	1,5	2	2	3	10^{-4}
Small-signal current gain							
V_{CE} = 5 V; I_C = 2 mA; f = 1 kHz	h_{fe}	typ.	200	260	330	520	
Output admittance							
V_{CE} = 5 V; I_C = 2 mA; f = 1 kHz	h_{oe}	typ.	18	24	30	50	μs
Base-emitter voltage							
V_{CE} = 5 V; I_C = 2 mA	V_{BE}		0,55 to 0,75				V
		typ.	0,65				V
V_{CE} = 5 V; I_C = 10 μA	V_{BE}	typ.	0,52				V
V_{CE} = 1 V; I_C = 50 mA	V_{BE}	typ.	0,78				V

Switching times

I_{Con} = 10 mA; I_{Bon} = $-I_{Boff}$ = 1 mA
V_{CC} = 10 V; R_L = 990 Ω

turn-on time ($t_d + t_r$)	t_{on}	typ.	85 ns
		<	150 ns
turn-off time ($t_s + t_f$)	t_{off}	typ.	480 ns
		<	800 ns

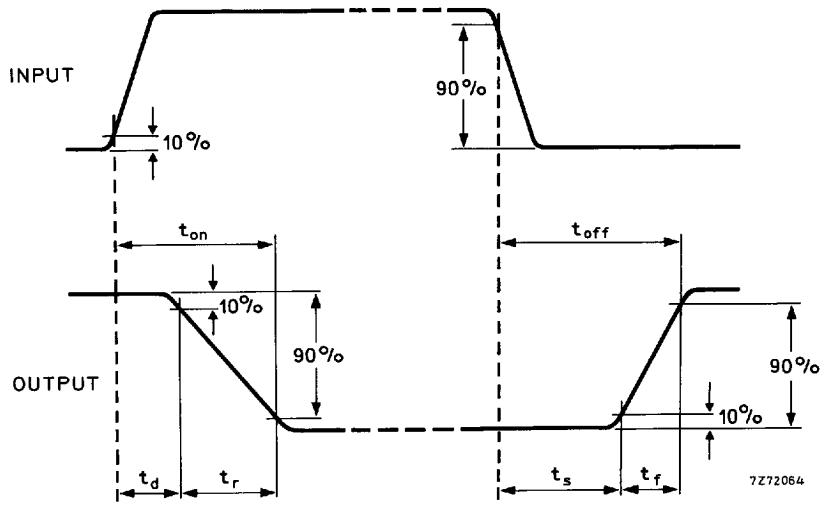


Fig. 2 Switching waveforms.