

SILICON PLANAR EPITAXIAL TRANSISTORS

N-P-N silicon transistors

Marking

BCW60A = AA

BCW60B = AB

BCW60C = AC

BCW60D = AD

PACKAGE OUTLINE DETAILS

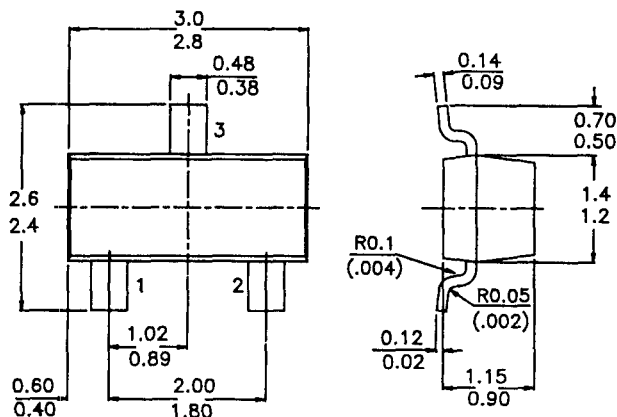
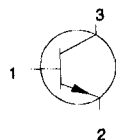
ALL DIMENSIONS IN mm

Pin configuration

1 = BASE

2 = EMITTER

3 = COLLECTOR



ABSOLUTE MAXIMUM RATINGS

Collector-emitter voltage ($V_{BE} = 0$)

Collector-emitter voltage (open base)

Collector current (d.c.)

Total power dissipation

Junction temperature

Transition frequency at $f = 100$ MHz

$V_{CE} = 5$ V; $I_C = 10$ mA

Noise figure at $f = 1$ kHz

$V_{CE} = 5$ V; $I_C = 200$ μ A; $B = 200$ Hz

V_{CES} max. 32 V

V_{CE0} max. 32 V

I_C max. 200 mA

P_{tot} max. 250 mW

T_j max. 150 $^{\circ}$ C

f_T typ. 250 MHz

F typ. 2 dB

RATINGS (at $T_A = 25^\circ\text{C}$ unless otherwise specified)

Limiting values

Collector-emitter voltage ($V_{BE} = 0$)	V_{CES}	max.	32 V
Collector-emitter voltage (open base)	V_{CE0}	max.	32 V
Emitter-base voltage (open collector)	V_{EB0}	max.	5 V
Collector current (d.c.)	I_C	max.	200 mA
Base current	I_B	max.	50 mA
Total power dissipation up to $T_{amb}: 25^\circ\text{C}$	P_{tot}	max.	250 mW
Storage temperature	T_{stg}	-55 to +150	$^\circ\text{C}$
Junction temperature	T_j	max.	150 $^\circ\text{C}$

THERMAL RESISTANCE

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

$T_{amb} = 25^\circ\text{C}$ unless otherwise specified

Collector-emitter cut-off current

$V_{BE} = 0; V_{CE} = 32\text{ V}$	I_{CES}	<	20 nA
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$V_{BE} = 0; V_{CE} = 32\text{ V}; T_{amb} = 150^\circ\text{C}$	I_{CES}	<	20 μA
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Emitter-base cut-off current

$I_C = 0; V_{EB} = 4\text{ V}$	I_{EB0}	<	20 nA
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Saturation voltages

at $I_C = 10\text{ mA}; I_B = 0,25\text{ mA}$	V_{CEsat}	0,05 to 0,35 V
	V_{BEsat}	0,6 to 0,85 V

at $I_C = 50\text{ mA}; I_B = 1,25\text{ mA}$	V_{CEsat}	0,1 to 0,55 V
	V_{BEsat}	0,7 to 1,05 V

Transition frequency at $f = 100\text{ MHz}$

$I_C = 10\text{ mA}; V_{CE} = 5\text{ V}$	f_T	>	125 MHz
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Collector capacitance at $f = 1\text{ MHz}$

$I_E = I_c = 0; V_{CB} = 10\text{ V}$	C_c	typ.	2,5 pF
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Emitter capacitance at $f = 1\text{ MHz}$

$I_C = I_c = 0; V_{EB} = 0,5\text{ V}$	C_e	typ.	8 pF
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Noise figure at $R_S = 2\text{ k}\Omega$

$I_C = 200\text{ }\mu\text{A}; V_{CE} = 5\text{ V}; f: 1\text{ kHz}; B = 200\text{ Hz}$	F	typ.	2 dB
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	F	<	6 dB
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D.C. current gain

		BCW60A	60B	60C	60D
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$V_{CE} = 5\text{ V}; I_C = 10\text{ }\mu\text{A}$	h_{FE}	>	-	20	40	100
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$V_{CE} = 5\text{ V}; I_C: 2\text{ mA}$	h_{FE}	>	120	180	250	380
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	h_{FE}	<	220	310	460	630
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$V_{CE} = 1\text{ V}; I_C: 50\text{ mA}$	h_{FE}	>	50	70	90	100
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Input impedance

$V_{CE} = 5\text{ V}; I_C = 2\text{ mA}, f = 1\text{ kHz}$	h_{ie}	typ.	2,7	3,6	4,5	7,5 k Ω
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		A	B	C	D
Reverse voltage transfer ratio					
$V_{CE} = 5 \text{ V}; I_C = 2 \text{ mA}; f = 1 \text{ kHz}$	h_{re} typ.	1,5	2	2	$3 \cdot 10^{-4}$
Small-signal current gain					
$V_{CE} = 5 \text{ V}; I_C = 2 \text{ mA}; f = 1 \text{ kHz}$	h_{fe} min.	125	175	250	350
	max.	250	350	500	700
Output admittance					
$V_{CE} = 5 \text{ V}; I_C = 2 \text{ mA}; f = 1 \text{ kHz}$	h_{oe} typ.	18	24	30	50 μs
Base-emitter voltage					
$V_{CE} = 5 \text{ V}; I_C = 2 \text{ mA}$	V_{BE}		0,55 to 0,75		V
	typ.		0,65		V
$V_{CE} = 5 \text{ V}; I_C = 10 \mu\text{A}$	V_{BE} typ.		0,52		V
$V_{CE} = 1 \text{ V}; I_C = 50 \text{ mA}$	V_{BE} typ.		0,78		V