

SILICON PLANAR EPITAXIAL TRANSISTORS

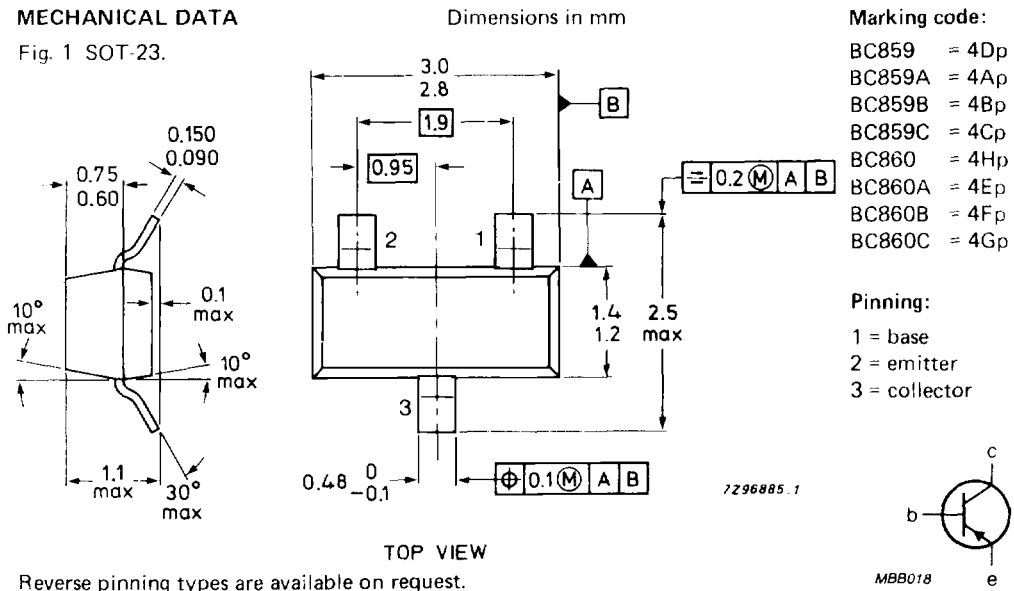
P-N-P transistors in a plastic SOT-23 package primarily intended for low-noise input stages in tape recorders, hi-fi amplifiers and other audio frequency equipment in thick and thin-film hybrid circuits.

QUICK REFERENCE DATA

		BC859	BC860	
Collector-emitter voltage (+ $V_{BE} = 1\text{ V}$)	$-V_{CEX}$ max.	30	50	V
Collector-emitter voltage (open base)	$-V_{CEO}$ max.	30	45	V
Collector current (peak value)	$-I_{CM}$ max.	200	200	mA
Total power dissipation up to $T_{amb} = 60\text{ }^{\circ}\text{C}$	P_{tot} max.	250	250	mW
Junction temperature	T_j max.	150	150	$^{\circ}\text{C}$
DC current gain				
$-I_C = 2\text{ mA}; -V_{CE} = 5\text{ V}$	h_{fe} >	125	125	
	h_{fe} <	800	800	
Transition frequency				
$-I_C = 10\text{ mA}; -V_{CE} = 5\text{ V}$	f_T >	100	100	MHz
Noise figure at $R_s = 2\text{ k}\Omega$				
$-I_C = 200\text{ }\mu\text{A}; -V_{CE} = 5\text{ V}$	F	typ. 1,2	1	dB
$f = 30\text{ Hz to }15\text{ kHz}$		< 4	3	dB
$f = 1\text{ kHz}; B = 200\text{ Hz}$	F	< 4	4	dB

MECHANICAL DATA

Fig. 1 SOT-23.



RATINGS

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

		BC859	BC860	
Collector-base voltage (open emitter)	$-V_{CBO}$ max.	30	50	V
Collector-emitter voltage (+ $V_{BE} = 1$ V)	$-V_{CEX}$ max.	30	50	V
Collector-emitter voltage (open base)	$-V_{CEO}$ max.	30	45	V
Emitter-base voltage (open collector)	$-V_{EBO}$ max.	5	5	V
Collector current (d.c.)	$-I_C$ max.	100		mA
Collector current (peak value)	$-I_{CM}$ max.	200		mA
Emitter current (peak value)	I_{EM} max.	200		mA
Base current (peak value)	$-I_{BM}$ max.	200		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 CHARACTERISTICS

Thermal resistance

From junction to amb	$R_{th\ j-t}$ =	500	K/W
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CHARACTERISTICS

$T_j = 25$ °C unless otherwise specified

Collector cut-off current

$I_E = 0; -V_{CB} = 30$ V; $T_j = 25$ °C	$-I_{CBO}$ typ.	1	nA
	$-I_{CBO} <$	15	nA
	$T_j = 150$ °C	4	µA

Base-emitter voltage ▲

$-I_C = 2$ mA; $-V_{CE} = 5$ V	$-V_{BE}$ typ.	650	mV
	$-I_C = 10$ mA; $-V_{CE} = 5$ V	600 to 750	mV
		820	mV

* Mounted on an FR4 printed-circuit board 8 mm x 10 mm x 0.7 mm.

▲ $-V_{BE}$ decreases by about 2 mV/K with increasing temperature.

Saturation voltages*

$-I_C = 10 \text{ mA}; -I_B = 0,5 \text{ mA}$

$-V_{CEsat}$	typ.	75	mV
	<	300	mV

$-V_{BEsat}$	typ.	700	mV
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$-I_C = 100 \text{ mA}; -I_B = 5 \text{ mA}$

$-V_{CEsat}$	typ.	250	mV
	<	650	mV

$-V_{BEsat}$	typ.	850	mV
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Collector capacitance at $f = 1 \text{ MHz}$

$I_E = I_e = 0; -V_{CB} = 10 \text{ V}$

C_C	typ.	4,5	μF
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Transition frequency at $f = 100 \text{ MHz}$

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

f_T	>	100	MHz
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Small-signal current gain at $f = 1 \text{ kHz}$

$-I_C = 2 \text{ mA}; -V_{CE} = 5 \text{ V}$

h_{fe}		125 to 800	
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Noise figure at $R_S = 2 \text{ k}\Omega$

$-I_C = 200 \mu\text{A}; -V_{CE} = 5 \text{ V}$

$f = 30 \text{ Hz to } 15 \text{ kHz}$

		BC859	BC860	
F	typ.	1,2	1	dB
	<	4	3	dB

$f = 1 \text{ kHz}; B = 200 \text{ Hz}$

F	typ.	1	1	dB
	<	4	4	dB

Equivalent noise voltage at $R_S = 2 \text{ k}\Omega$

$-I_C = 200 \mu\text{A}; -V_{CE} = 5 \text{ V}$

$f = 10 \text{ Hz to } 50 \text{ Hz}; T_{amb} = 25 \text{ }^\circ\text{C}$

V_n	<	-	0,11	μV
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D.C. current gain

$-I_C = 2 \text{ mA}; -V_{CE} = 5 \text{ V}; \text{ total range}$

A selections

B selections

C selections

h_{FE}	125 to 800
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h_{FE}	125 to 250
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h_{FE}	220 to 475
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h_{FE}	420 to 800
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* $-V_{BEsat}$ decreases by about 1,7 mV/K with increasing temperature.