

## SILICON POWER TRANSISTOR

# 2SB1094

### PNP SILICON EPITAXIAL TRANSISTOR FOR LOW-FREQUENCY POWER AMPLIFIER

#### FEATURES

- The 2SB1094 features ratings covering a wide range of applications and is ideal for power supplies or a variety of drives in audio and other equipment.:
- $V_{CEO} \geq -60\text{ V}$ ,  $V_{EBO} \geq -7.0\text{ V}$ ,  $I_{C(DC)} \leq -3.0\text{ A}$
- Mold package that does not require an insulating board or insulation bushing
- Complementary transistor with 2SD1585

#### QUALITY GRADES

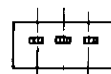
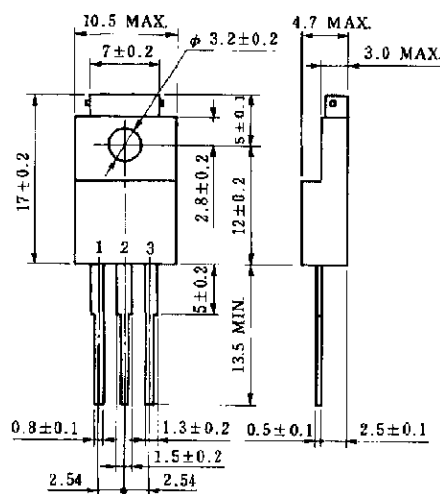
- Standard
- Please refer to "Quality Grades on NEC Semiconductor Devices" (Document No. C11531E) published by NEC Corporation to know the specification of quality grade on the devices and its recommended applications.

#### ABSOLUTE MAXIMUM RATINGS ( $T_a = 25^\circ\text{C}$ )

Parameter	Symbol	Ratings	Unit
Collector to base voltage	$V_{CBO}$	-60	V
Collector to emitter voltage	$V_{CEO}$	-60	V
Emitter to base voltage	$V_{EBO}$	-7.0	V
Collector current (DC)	$I_{C(DC)}$	-3.0	A
Collector current (pulse)	$I_{C(pulse)}^*$	-5.0	A
Base current (DC)	$I_{B(DC)}$	-0.6	A
Total power dissipation	$P_T$ ( $T_c = 25^\circ\text{C}$ )	15	W
Total power dissipation	$P_T$ ( $T_a = 25^\circ\text{C}$ )	2.0	W
Junction temperature	$T_j$	150	$^\circ\text{C}$
Storage temperature	$T_{stg}$	-55 to +150	$^\circ\text{C}$

\*  $PW \leq 10\text{ ms}$ , duty cycle  $\leq 50\%$

#### PACKAGE DRAWING (UNIT: mm)



Electrode Connection

1. Base
2. Collector
3. Emitter

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Not all devices/types available in every country. Please check with local NEC representative for availability and additional information.

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector cutoff current	$I_{CBO}$	$V_{CB} = -60\text{ V}, I_E = 0$			-10	$\mu\text{A}$
Emitter cutoff current	$I_{EBO}$	$V_{EB} = -7.0\text{ V}, I_C = 0$			-10	$\mu\text{A}$
DC current gain	$h_{FE1}^{**}$	$V_{CE} = -5.0\text{ V}, I_C = -50\text{ mA}$	20			
DC current gain	$h_{FE2}^{**}$	$V_{CE} = -5.0\text{ V}, I_C = -0.5\text{ A}$	40	100	200	
Collector saturation voltage	$V_{CE(sat)}^{**}$	$I_C = -2.0\text{ A}, I_B = -0.2\text{ A}$		-0.5	-1.5	V
Base saturation voltage	$V_{BE(sat)}^{**}$	$I_C = -2.0\text{ A}, I_B = -0.2\text{ A}$		-1.1	-2.0	V
Collector capacitance	$C_{cb}$	$V_{CB} = -10\text{ V}, I_E = 0, f = 1.0\text{ MHz}$		70		pF
Gain bandwidth product	$f_T$	$V_{CE} = -5.0\text{ V}, I_C = -0.1\text{ A}$		20		MHz

## h<sub>FE</sub> CLASSIFICATION

Marking	M	L	K
hFE2	40 to 80	60 to 120	100 to 200

**TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE**

2-mm thick aluminum silicon grease

With infinite heatsink ( $T_c = 25^\circ\text{C}$ )

200  $\text{cm}^2$   
100  $\text{cm}^2$   
50  $\text{cm}^2$   
20  $\text{cm}^2$

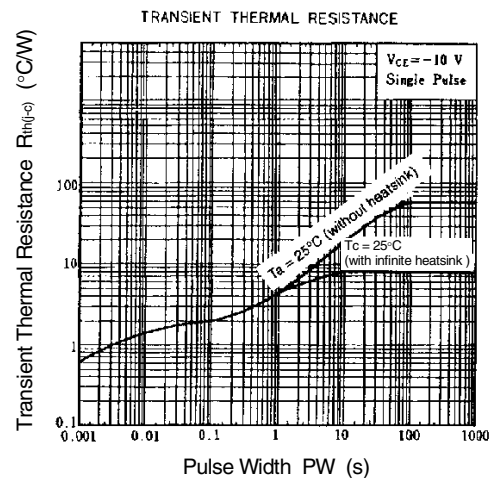
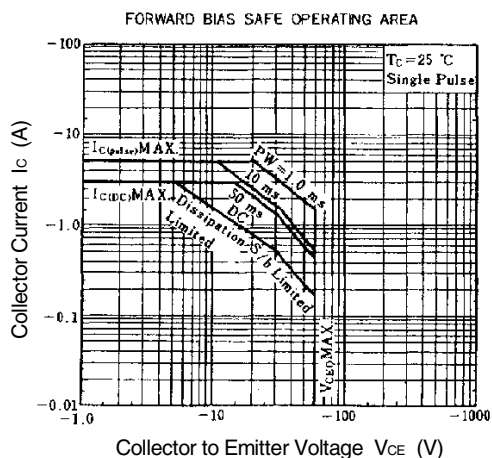
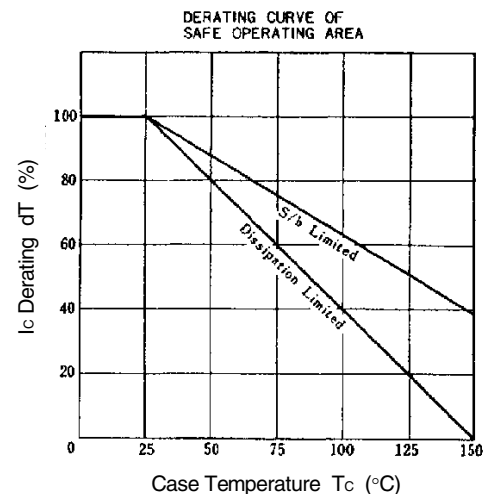
Without heatsink

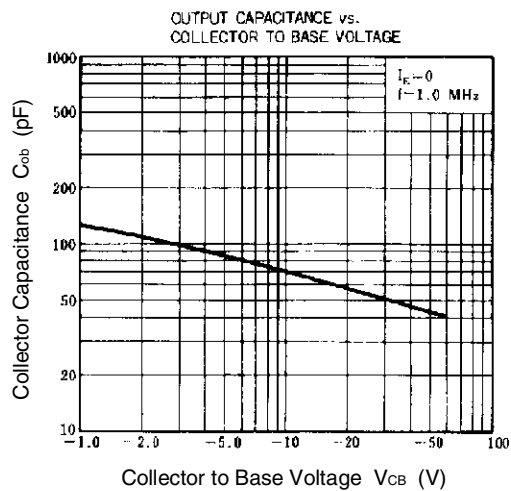
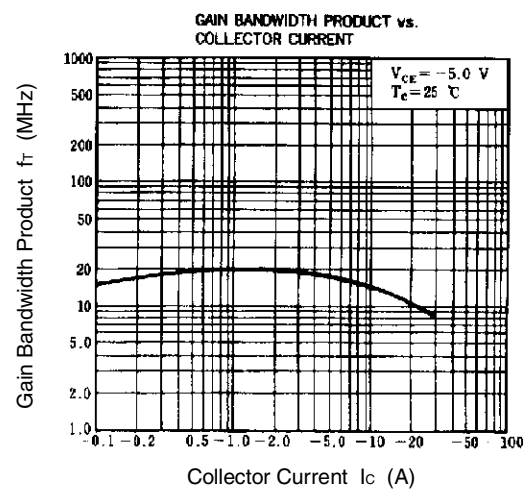
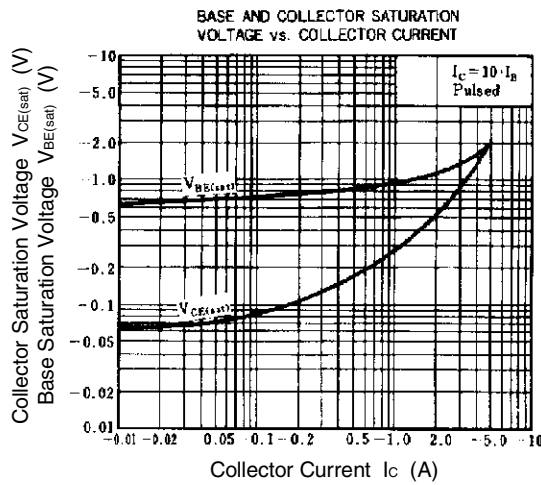
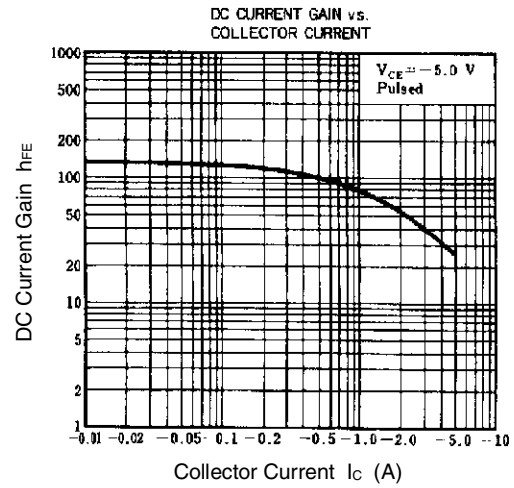
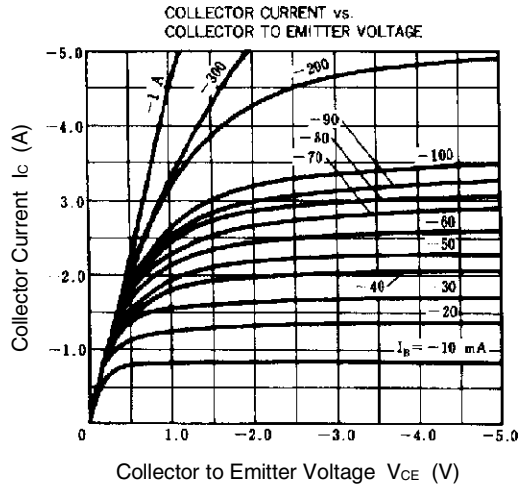
Total Power Dissipation  $P_T$  (W)

Ambient Temperature  $T_a$  ( $^\circ\text{C}$ )

Detailed description: This is a line graph showing the relationship between total power dissipation and ambient temperature for different heat sink configurations. The y-axis represents Total Power Dissipation  $P_T$  in Watts, ranging from 0 to 30 in increments of 5. The x-axis represents Ambient Temperature  $T_a$  in degrees Celsius, ranging from 0 to 175 in increments of 25. There are five main groups of lines. The first group, labeled 'Without heatsink', consists of four horizontal lines at  $P_T$  values of approximately 1.5, 2.5, 3.5, and 4.5 W. The second group, labeled 'With infinite heatsink ( $T_c = 25^\circ\text{C}$ )', consists of four lines that converge at  $T_a = 130^\circ\text{C}$  and  $P_T = 0$  W. These lines are labeled with heat sink areas: 20  $\text{cm}^2$ , 50  $\text{cm}^2$ , 100  $\text{cm}^2$ , and 200  $\text{cm}^2$ . The lines for 20  $\text{cm}^2$  and 50  $\text{cm}^2$  start at  $T_a = 25^\circ\text{C}$  with  $P_T$  values of approximately 5.5 W and 10.5 W, respectively. The lines for 100  $\text{cm}^2$  and 200  $\text{cm}^2$  start at  $T_a = 25^\circ\text{C}$  with  $P_T$  values of approximately 10.5 W and 15.5 W, respectively. A legend in the top right corner indicates that the lines represent '2-mm thick aluminum silicon grease'.

Ambient Temperature $T_a$ ( $^\circ\text{C}$ )	Without heatsink (W)	20 $\text{cm}^2$ (W)	50 $\text{cm}^2$ (W)	100 $\text{cm}^2$ (W)	200 $\text{cm}^2$ (W)
25	1.5, 2.5, 3.5, 4.5	5.5	10.5	10.5	15.5
50	1.5, 2.5, 3.5, 4.5	4.5	9.0	9.0	13.5
75	1.5, 2.5, 3.5, 4.5	3.5	7.5	7.5	11.5
100	1.5, 2.5, 3.5, 4.5	2.5	6.0	6.0	9.5
125	1.5, 2.5, 3.5, 4.5	1.5	4.5	4.5	7.5
130	1.5, 2.5, 3.5, 4.5	0	0	0	0





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