

# Low frequency transistor (−20V, −5A)

## 2SB1386 / 2SB1412 / 2SB1326

### ●Features

1) Low  $V_{CE(sat)}$ .

$$V_{CE(sat)} = -0.35V \text{ (Typ.)}$$

$$(I_C/I_B = -4A / -0.1A)$$

2) Excellent DC current gain characteristics.

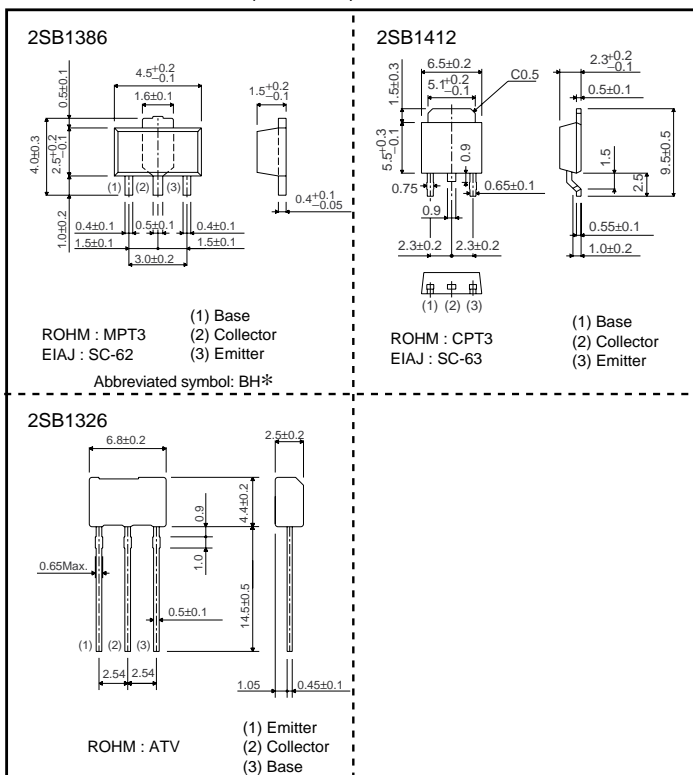
3) Complements the 2SD2098 / 2SD2118 / 2SD2097.

### ●Structure

Epitaxial planar type

PNP silicon transistor

### ●External dimensions (Unit : mm)



\* Denotes  $h_{FE}$

## Transistors

## ●Absolute maximum ratings (Ta=25°C)

Parameter		Symbol	Limits	Unit
Collector-base voltage		V <sub>CB0</sub>	−30	V
Collector-emitter voltage		V <sub>CE0</sub>	−20	V
Emitter-base voltage		V <sub>EB0</sub>	−6	V
Collector current		I <sub>c</sub>	−5	A(DC)
			−10	A(Pulse) *1
Collector power dissipation	2SB1386	P <sub>c</sub>	0.5	W
			2	W *2
	2SB1412		1	W
	2SB1326		10	W(Tc=25°C)
Junction temperature		T <sub>j</sub>	150	°C
Storage temperature		T <sub>stg</sub>	−55 to 150	°C

\*1 Single pulse, Pw=10ms

\*2 When mounted on a 40×40×0.7 mm ceramic board.

\*3 Printed circuit board glass epoxy board 1.6 mm thick with copper plating 100mm<sup>2</sup> or larger.

## ●Electrical characteristics (Ta=25°C)

Parameter		Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-base breakdown voltage		BV <sub>CB0</sub>	−30	−	−	V	I <sub>c</sub> = −50μA
Collector-emitter breakdown voltage		BV <sub>CE0</sub>	−20	−	−	V	I <sub>c</sub> = −1mA
Emitter-base breakdown voltage		BV <sub>EB0</sub>	−6	−	−	V	I <sub>E</sub> = −50μA
Collector cutoff current		I <sub>CBO</sub>	−	−	−0.5	μA	V <sub>CB</sub> = −20V
Emitter cutoff current		I <sub>EBO</sub>	−	−	−0.5	μA	V <sub>EB</sub> = −5V
Collector-emitter saturation voltage		V <sub>CE(sat)</sub>	−	0.35	−1.0	V	I <sub>c</sub> /I <sub>B</sub> = −4A/ −0.1A
DC current transfer ratio	2SB1386, 2SB1412	h <sub>FE</sub>	82	−	390	−	V <sub>CE</sub> = −2V, I <sub>c</sub> = −0.5A
	2SB1326		120	−	390	−	
Transition frequency		f <sub>T</sub>	−	120	−	MHz	V <sub>CE</sub> = −6V, I <sub>E</sub> = 50mA, f = 100MHz
Output capacitance		C <sub>ob</sub>	−	60	−	pF	V <sub>CB</sub> = −20V, I <sub>E</sub> = 0A, f = 1MHz

\* Measured using pulse current.

●Packaging specifications and h<sub>FE</sub>

Type	h <sub>FE</sub>	Package	Taping		
		Code	T100	TL	TV2
		Basic ordering unit (pieces)	1000	2500	2500
2SB1386	PQR		○	−	−
2SB1412	PQR		−	○	−
2SB1326	QR		−	−	○

h<sub>FE</sub> values are classified as follows :

Item	P	Q	R
h <sub>FE</sub>	82 to 180	120 to 270	180 to 390

## Transistors

## ●Electrical characteristic curves

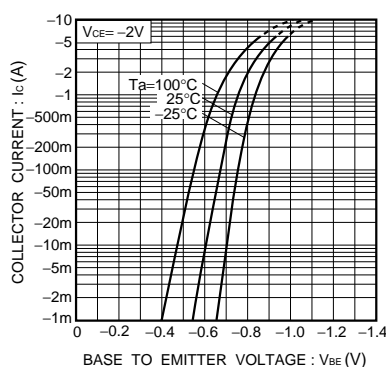


Fig.1 Grounded emitter propagation characteristics

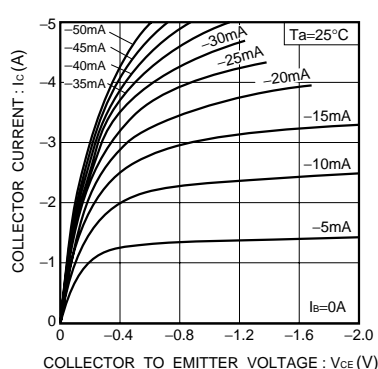


Fig.2 Grounded emitter output characteristics

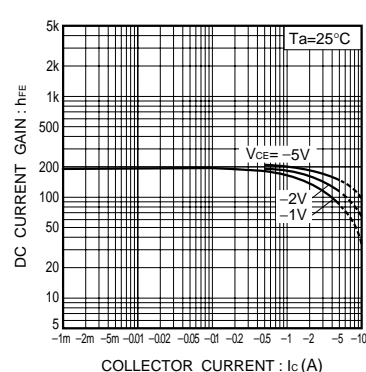


Fig.3 DC current gain vs. collector current ( I )

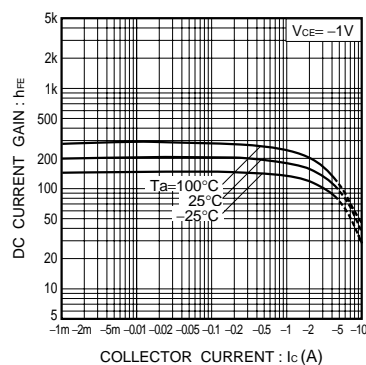


Fig.4 DC current gain vs. collector current (II)

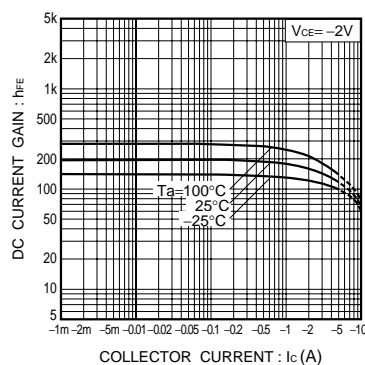


Fig.5 DC current gain vs. collector current (III)

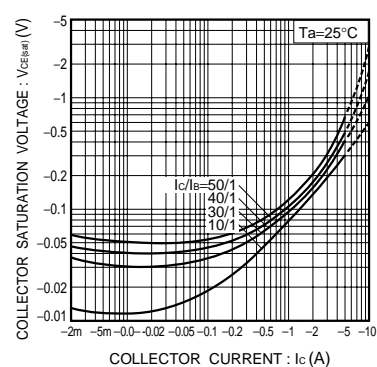


Fig.6 Collector-emitter saturation voltage vs. collector current ( I )

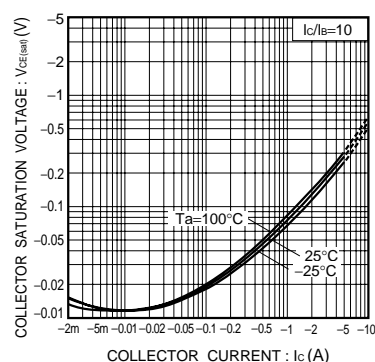


Fig.7 Collector-emitter saturation voltage vs. collector current (II)

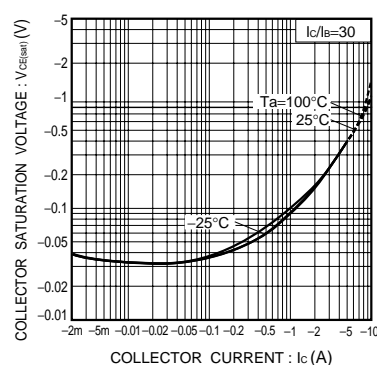


Fig.8 Collector-emitter saturation voltage vs. collector current (III)

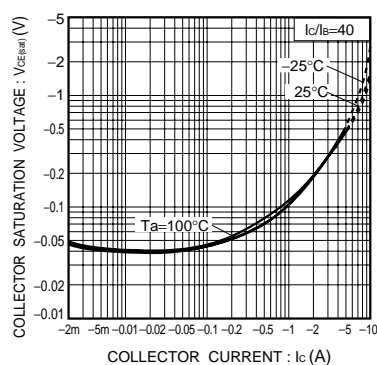


Fig.9 Collector-emitter saturation voltage vs. collector current (IV)

## Transistors

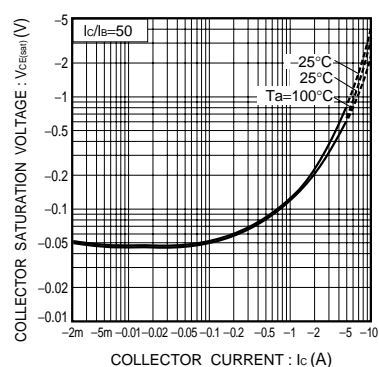


Fig.10 Collector-emitter saturation voltage vs. collector current (V)

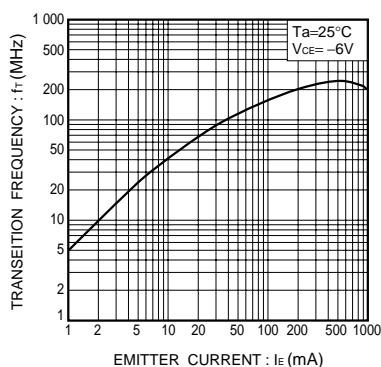


Fig.11 Gain bandwidth product vs. emitter current

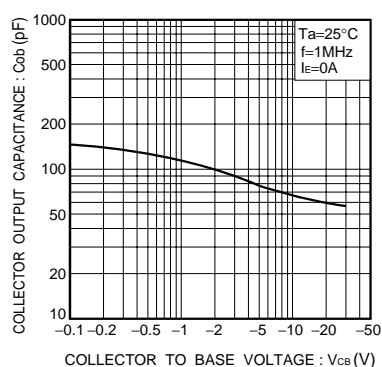


Fig.12 Collector output capacitance vs. collector-base voltage

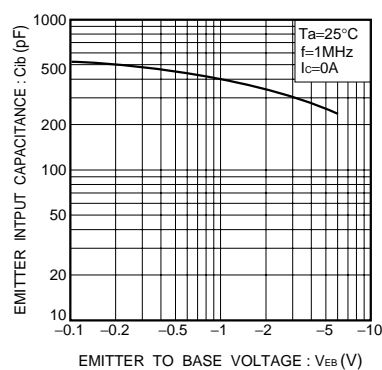


Fig.13 Emitter input capacitance vs. emitter-base voltage

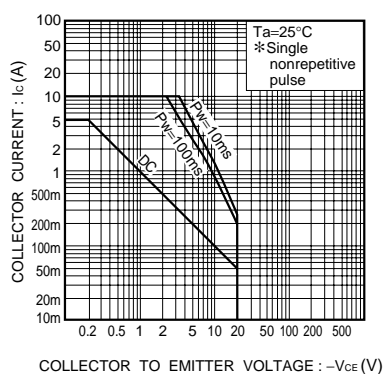


Fig.14 Safe operation area (2SB1412)

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