

# Low Frequency Transistor (-20V, -5A)

## 2SB1386 / 2SB1412 / 2SB1326 / 2SB1436

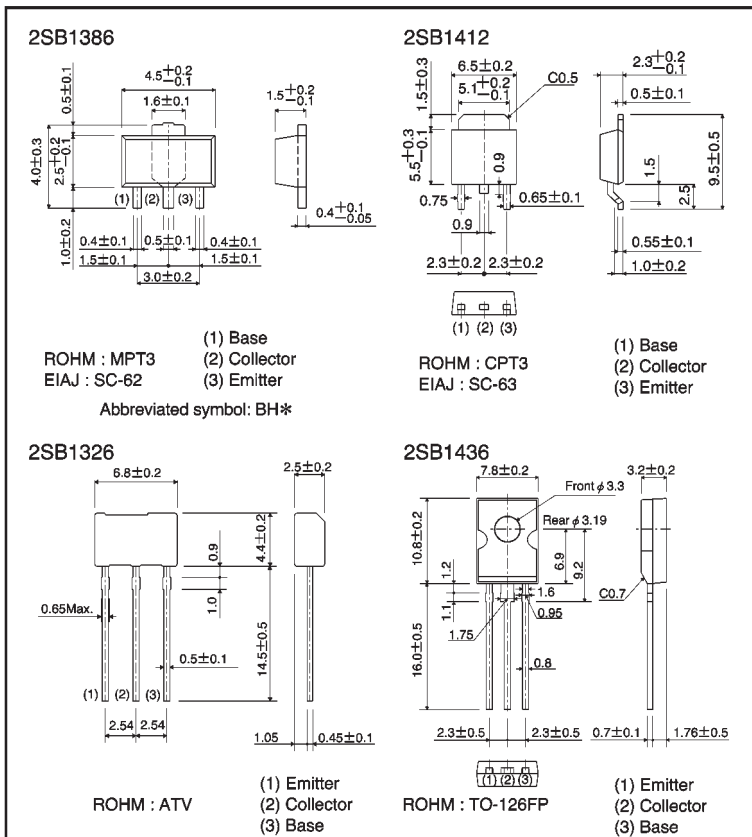
● Features

- 1) Low  $V_{CE(sat)}$   
 $V_{CE(sat)} = -0.35V$  (Typ.)  
( $I_C / I_B = -4A / -0.1A$ )
- 2) Excellent DC current gain characteristics.
- 3) Complements the 2SD2098 / 2SD2118 / 2SD2097 / 2SD2166.

● Structure

Epitaxial planar type  
PNP silicon transistor

● External dimensions (Units: mm)



\* Denotes hFE

## ● 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
			10	W (T <sub>c</sub> =25°C)
	2SB1326		1	W *3
1.5		W		
2SB1436	5	W (T <sub>c</sub> =25°C)		
Junction temperature		T <sub>j</sub>	150	°C
Storage temperature		T <sub>stg</sub>	-55~+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> = -50 μA
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> = -50 μA
Collector cutoff current		I <sub>CB0</sub>	—	—	-0.5	μA	V <sub>CB</sub> = -20V
Emitter cutoff current		I <sub>EB0</sub>	—	—	-0.5	μA	V <sub>EB</sub> = -5V
Collector-emitter saturation voltage		V <sub>CE(sat)</sub>	—	—	-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	—	
	2SB1436		180	—	390	—	
Transition frequency		f <sub>r</sub>	—	120	—	MHz	V <sub>CE</sub> = -6V, I <sub>E</sub> = 50mA, f = 30MHz
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  $h_{FE}$

Type	$h_{FE}$	Package	Taping			Bulk
		Code	T100	TL	TV2	—
		Basic ordering unit (pieces)	1000	2500	2500	1000
2SB1386	PQR	○	—	—	—	
2SB1412	PQR	—	○	—	—	
2SB1326	QR	—	—	○	—	
2SB1436	R	—	—	—	○	

$h_{FE}$  values are classified as follows:

Item	P	Q	R
$h_{FE}$	82~180	120~270	180~390

●Electrical characteristic curves

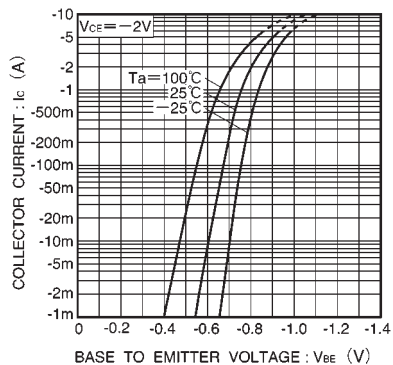


Fig.1 Grounded emitter propagation characteristics

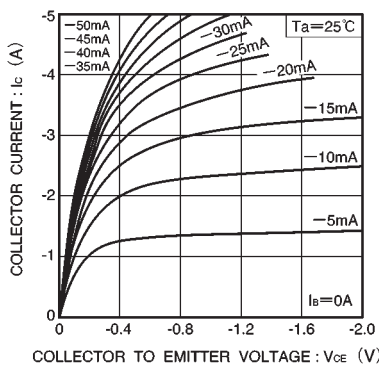


Fig.2 Grounded emitter output characteristics

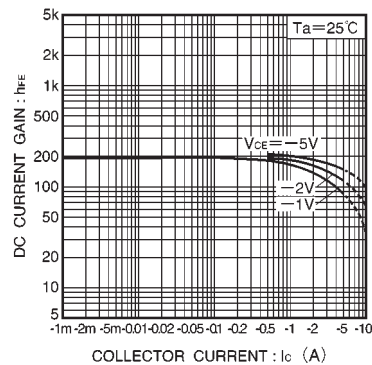


Fig.3 DC current gain vs. collector current ( I )

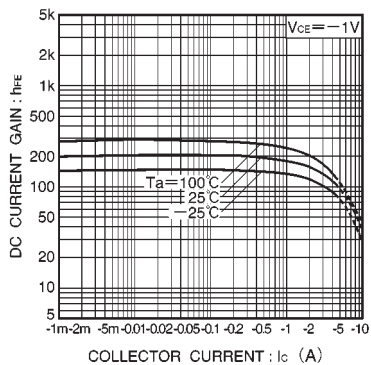


Fig.4 DC current gain vs. collector current ( II )

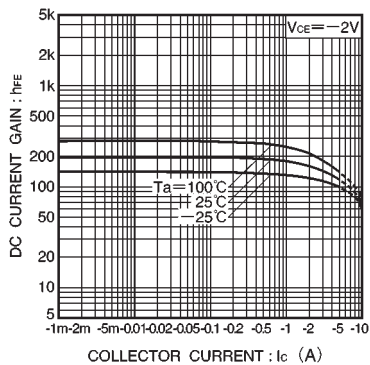


Fig.5 DC current gain vs. collector current ( III )

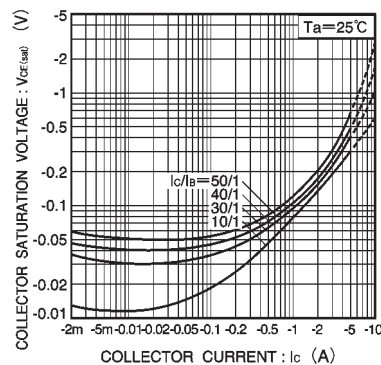


Fig.6 Collector-emitter saturation voltage vs. collector current ( I )

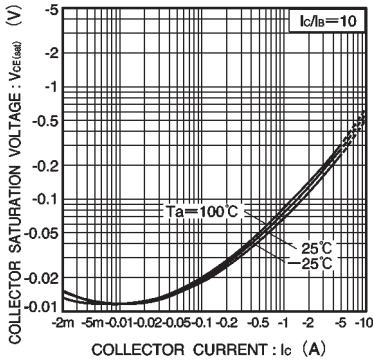


Fig.7 Collector-emitter saturation voltage vs. collector current (I)

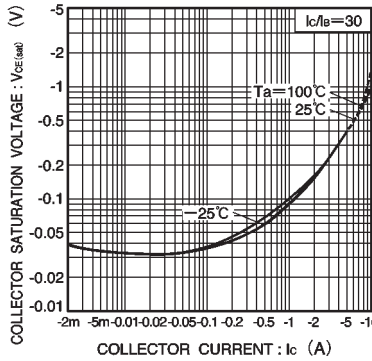


Fig.8 Collector-emitter saturation voltage vs. collector current (III)

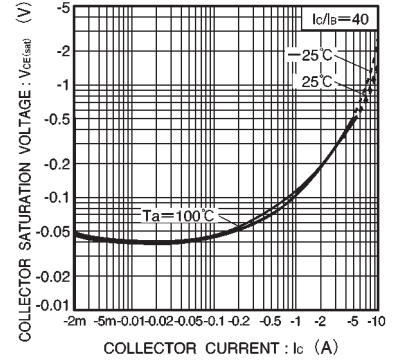


Fig.9 Collector-emitter saturation voltage vs. collector current (IV)

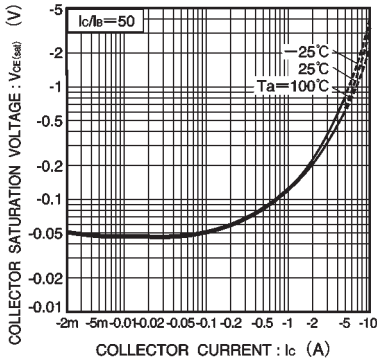


Fig.10 Collector-emitter saturation voltage vs. collector current (V)

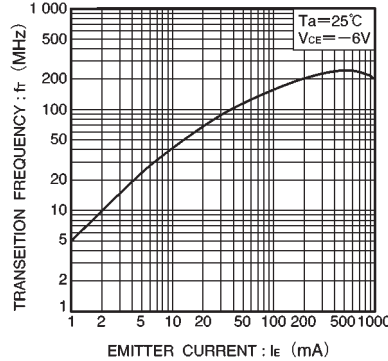


Fig.11 Gain bandwidth product vs. emitter current

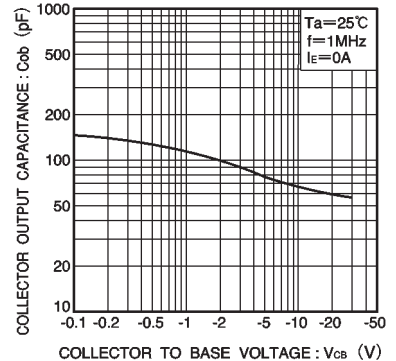


Fig.12 Collector output capacitance vs. collector-base voltage

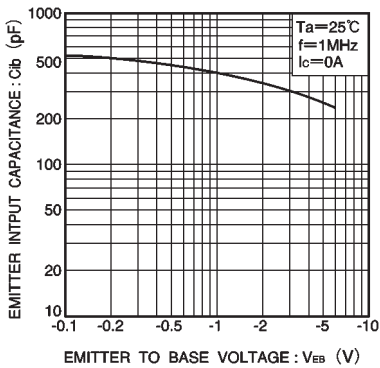


Fig.13 Emitter input capacitance vs. emitter-base voltage

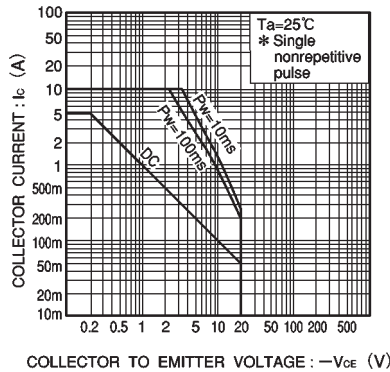


Fig.14 Safe operation area (2SB1412)