



**THE DATASHEET OF  
2SB1412TLR**



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

## 2SB1386 / 2SB1412 / 2SB1326

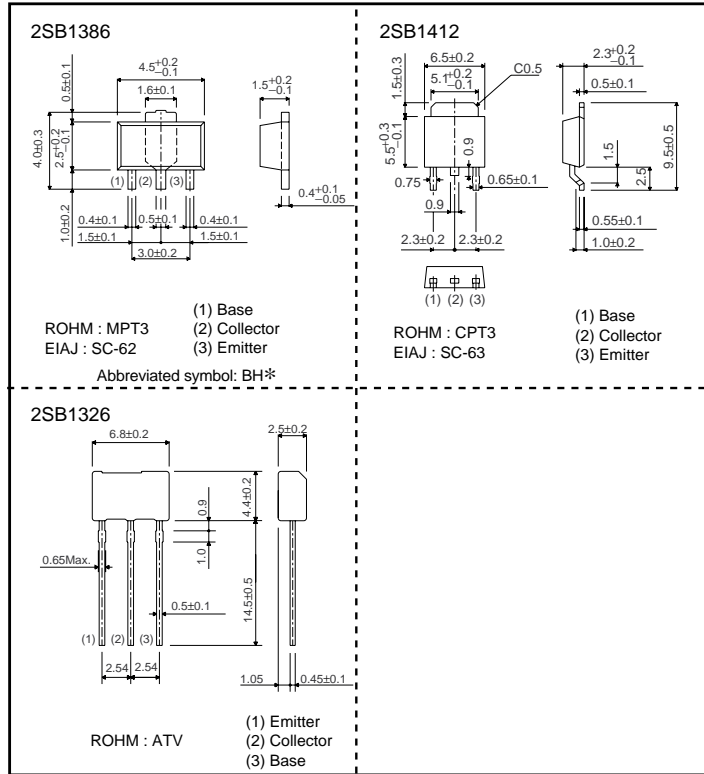
●Features

- 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.

●Structure

Epitaxial planar type  
 PNP silicon transistor

●External dimensions (Unit : mm)



## 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	P <sub>c</sub>	0.5	W
		2	W *2
		1	W
		10	W(T <sub>c</sub> =25°C)
2SB1326	1	W *3	
Junction temperature	T <sub>j</sub>	150	°C
Storage temperature	T <sub>stg</sub>	-55 to 150	°C

\*1 Single pulse, P<sub>w</sub>=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>E</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

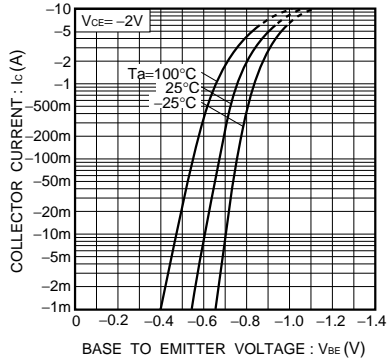


Fig.1 Grounded emitter propagation characteristics

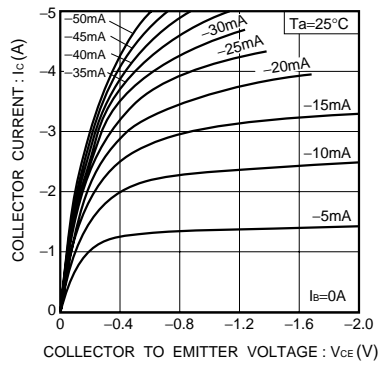


Fig.2 Grounded emitter output characteristics

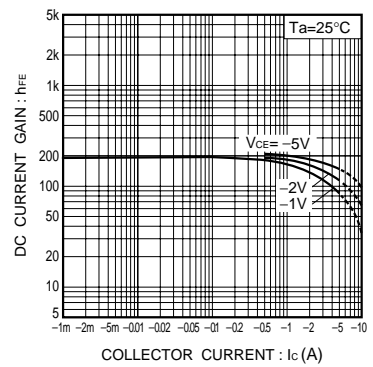


Fig.3 DC current gain vs. collector current ( I )

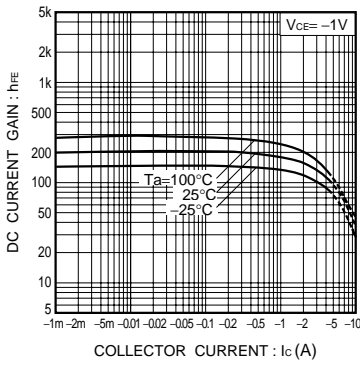


Fig.4 DC current gain vs. collector current (II)

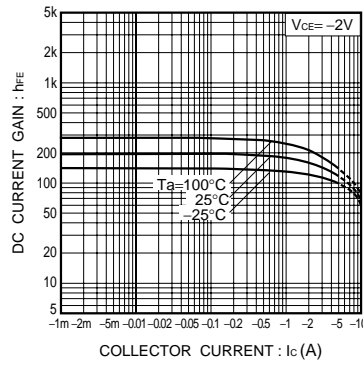


Fig.5 DC current gain vs. collector current (III)

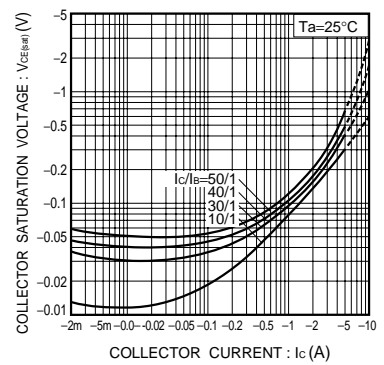


Fig.6 Collector-emitter saturation voltage vs. collector current ( I )

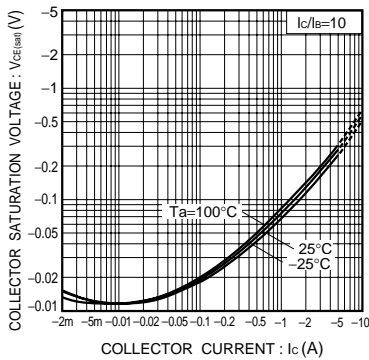


Fig.7 Collector-emitter saturation voltage vs. collector current (II)

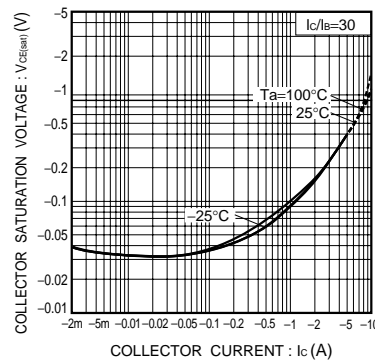


Fig.8 Collector-emitter saturation voltage vs. collector current (III)

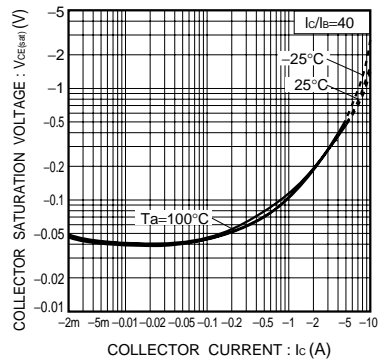


Fig.9 Collector-emitter saturation voltage vs. collector current (IV)

Transistors

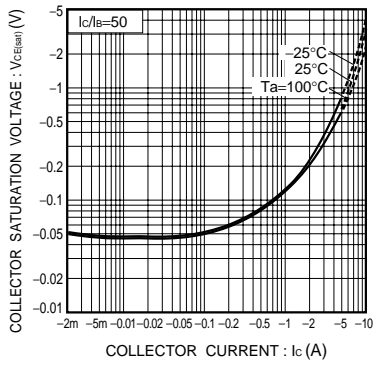


Fig.10 Collector-emitter saturation voltage vs. collector current (V)

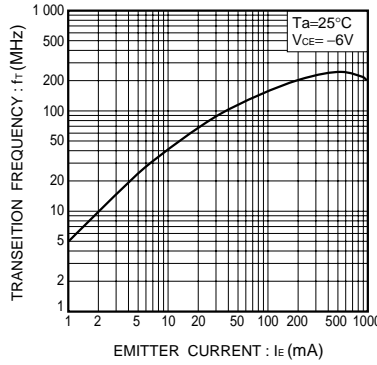


Fig.11 Gain bandwidth product vs. emitter current

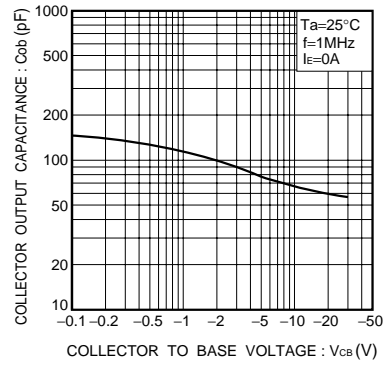


Fig.12 Collector output capacitance vs. collector-base voltage

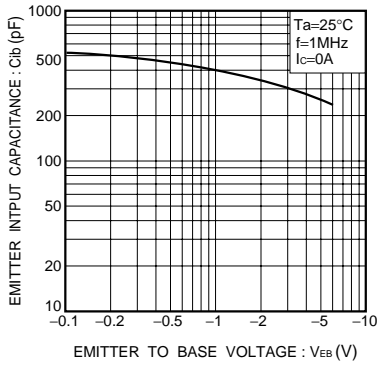


Fig.13 Emitter input capacitance vs. emitter-base voltage

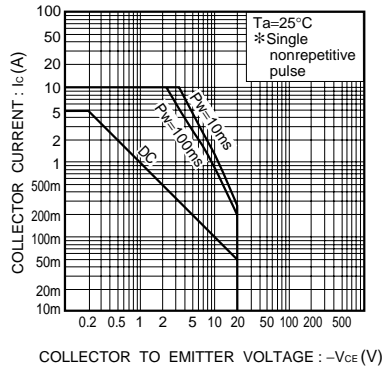


Fig.14 Safe operation area (2SB1412)

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