

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

## 2SB1412

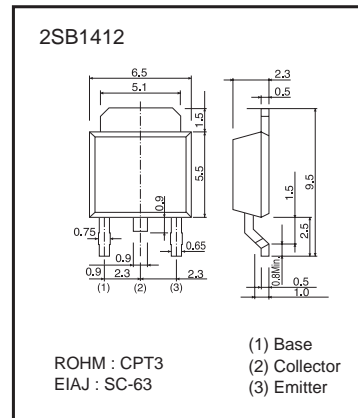
### ●Features

- 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 2SD2118.

### ●Structure

Epitaxial planar type  
 PNP silicon transistor

### ●Dimensions (Unit : mm)



\* Denotes  $h_{FE}$

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

| Parameter                   | Symbol           | Limits     | Unit        |
|-----------------------------|------------------|------------|-------------|
| Collector-base voltage      | $V_{CBO}$        | -30        | V           |
| Collector-emitter voltage   | $V_{CEO}$        | -20        | V           |
| Emitter-base voltage        | $V_{EBO}$        | -6         | V           |
| Collector current           | $I_C$            | -5         | A(DC)       |
|                             |                  | -10        | A(Pulse) *1 |
| Collector power dissipation | 2SB1412<br>$P_C$ | 1          | W           |
|                             |                  | 10         | W(Tc=25°C)  |
| Junction temperature        | $T_j$            | 150        | °C          |
| Storage temperature         | $T_{stg}$        | -55 to 150 | °C          |

\*1 Single pulse, Pw=10ms

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

| Parameter                            | Symbol        | Min. | Typ. | Max. | Unit    | Conditions                             |
|--------------------------------------|---------------|------|------|------|---------|--|
| Collector-base breakdown voltage     | $BV_{CBO}$    | -30  | -    | -    | V       | $I_C = -50\mu A$                       |
| Collector-emitter breakdown voltage  | $BV_{CEO}$    | -20  | -    | -    | V       | $I_C = -1mA$                           |
| Emitter-base breakdown voltage       | $BV_{EBO}$    | -6   | -    | -    | V       | $I_E = -50\mu A$                       |
| Collector cutoff current             | $I_{CBO}$     | -    | -    | -0.5 | $\mu A$ | $V_{CB} = -20V$                        |
| Emitter cutoff current               | $I_{EBO}$     | -    | -    | -0.5 | $\mu A$ | $V_{EB} = -5V$                         |
| Collector-emitter saturation voltage | $V_{CE(sat)}$ | -    | 0.35 | -1.0 | V       | $I_C/I_B = -4A / -0.1A$ *              |
| DC current transfer ratio            | $h_{FE}$      | 82   | -    | 390  | -       | $V_{CE} = -2V, I_C = -0.5A$ *          |
| Transition frequency                 | $f_T$         | -    | 120  | -    | MHz     | $V_{CE} = -6V, I_E = 50mA, f = 100MHz$ |
| Output capacitance                   | $C_{ob}$      | -    | 60   | -    | pF      | $V_{CB} = -20V, I_E = 0A, f = 1MHz$    |

\* Measured using pulse current.

●Packaging specifications and hFE

|         |     |                              |        |
|---------|-----|------------------------------|--------|
| Type    | hFE | Package                      | Taping |
|         |     | Code                         | TL     |
|         |     | Basic ordering unit (pieces) | 2500   |
| 2SB1412 | PQR |                              | ○      |

hFE values are classified as follows :

| Item | P         | Q          | R          |
|------|-----------|------------|------------|
| hFE  | 82 to 180 | 120 to 270 | 180 to 390 |

●Electrical characteristic curves

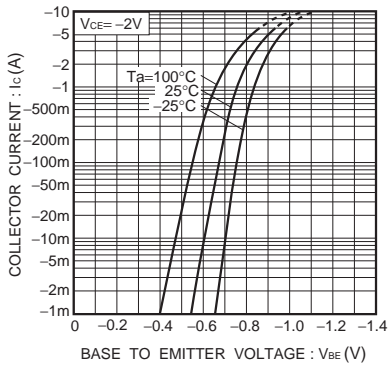


Fig.1 Grounded emitter propagation characteristics

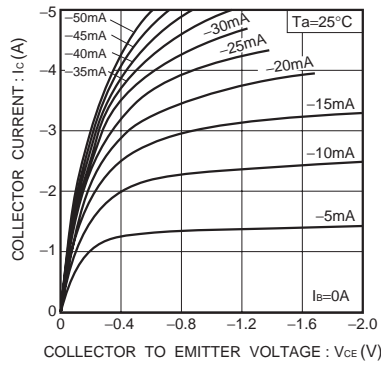


Fig.2 Grounded emitter output characteristics

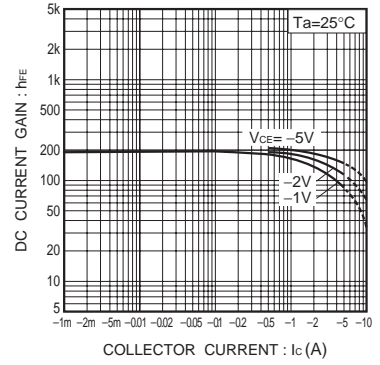


Fig.3 DC current gain vs. collector current ( I )

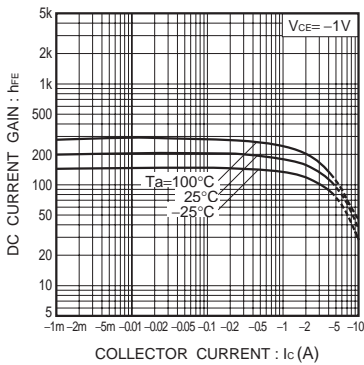


Fig.4 DC current gain vs. collector current (II)

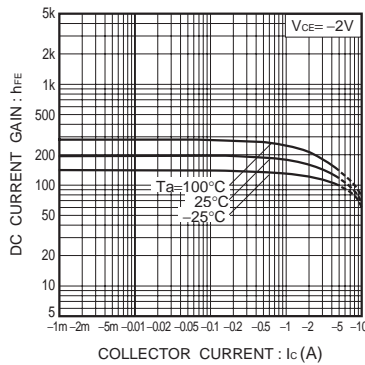


Fig.5 DC current gain vs. collector current (III)

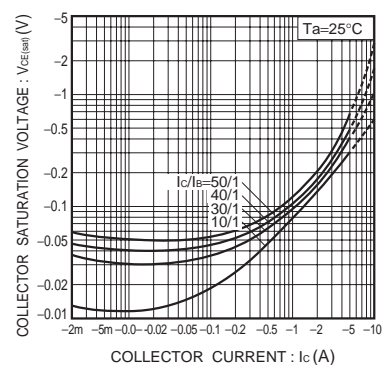


Fig.6 Collector-emitter saturation voltage vs. collector current ( I )

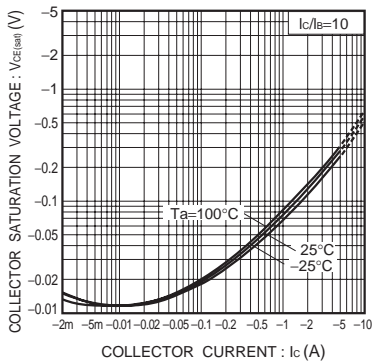


Fig.7 Collector-emitter saturation voltage vs. collector current (II)

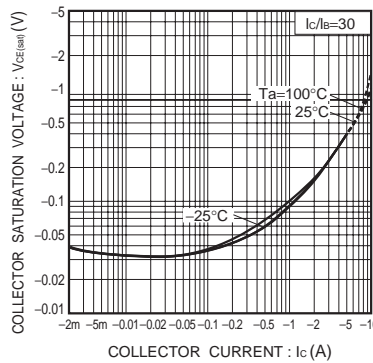


Fig.8 Collector-emitter saturation voltage vs. collector current (III)

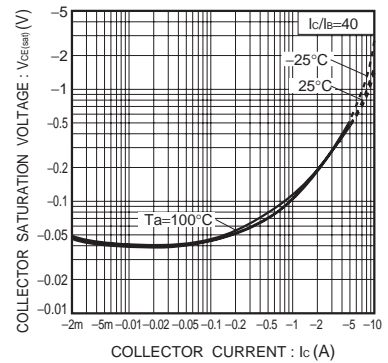


Fig.9 Collector-emitter saturation voltage vs. collector current (IV)

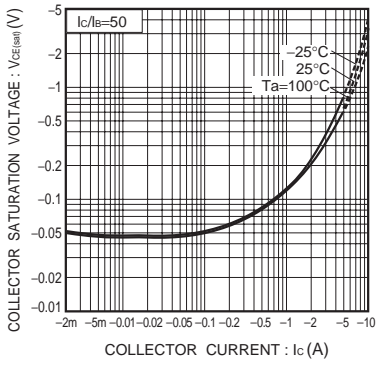


Fig.10 Collector-emitter saturation voltage vs. collector current (V)

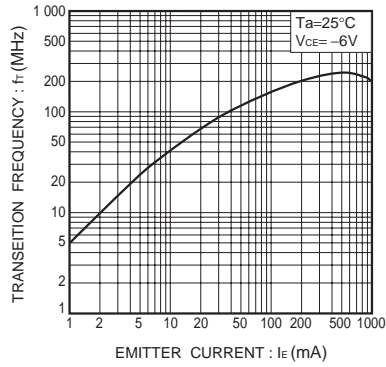


Fig.11 Gain bandwidth product vs. emitter current

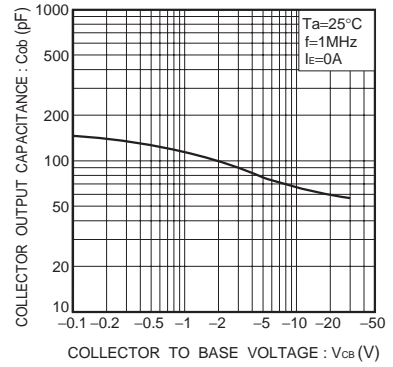


Fig.12 Collector output capacitance vs. collector-base voltage

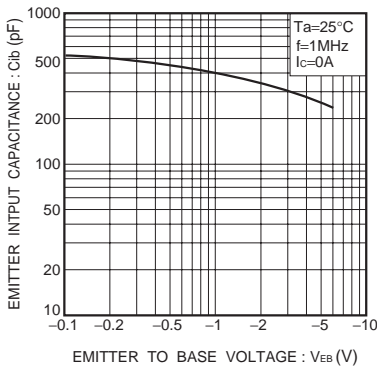


Fig.13 Emitter input capacitance vs. emitter-base voltage

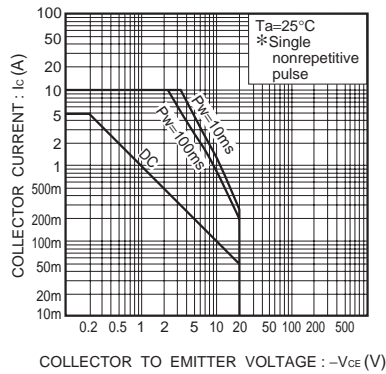


Fig.14 Safe operation area (2SB1412)

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