

# Low $V_{CE(sat)}$ Transistor(Strobe flash)

## 2SD2098 / 2SD2118 / 2SD2097 / 2SD2166

●Features

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

$$V_{CE(sat)} = 0.25V \text{ (Typ.)}$$

$$(I_c / I_B = 4A / 0.1A)$$

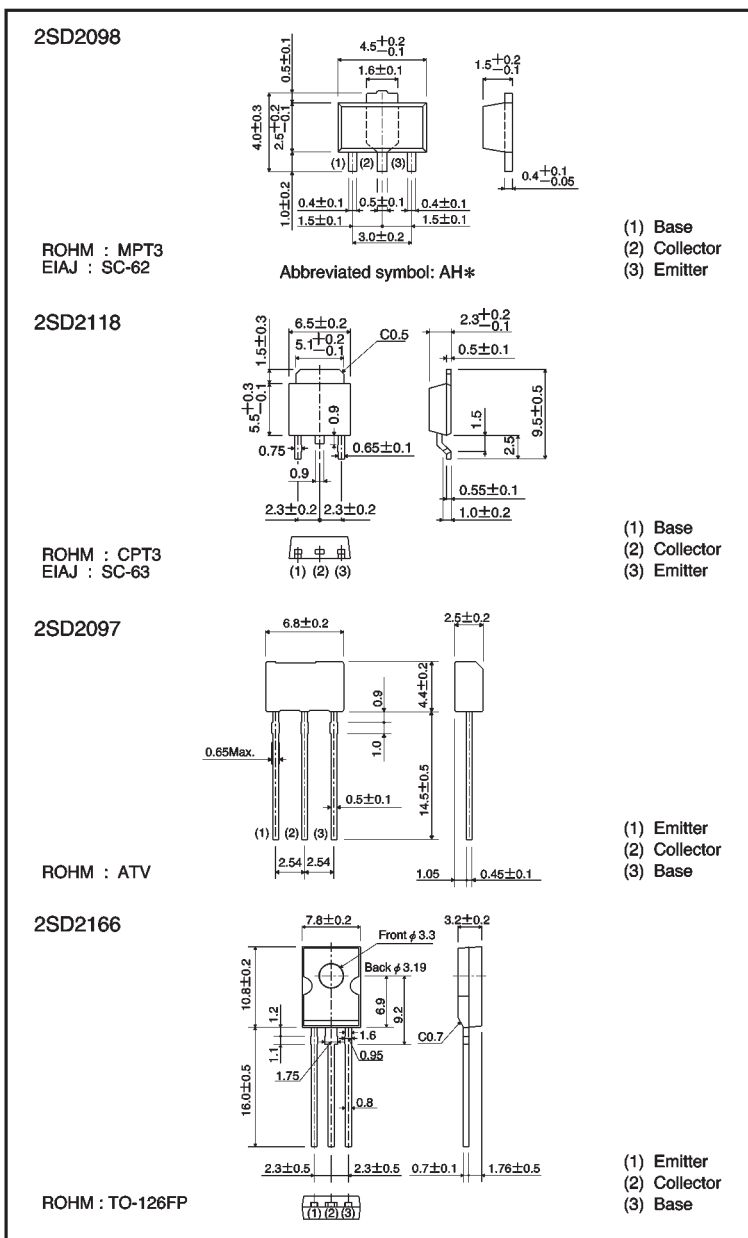
2) Excellent DC current gain characteristics.

3) Complements the  
2SB1386 / 2SB1412 / 2SB1326 /  
2SB1436.

●Structure

Epitaxial planar type  
NPN silicon transistor

●External dimensions (Units: mm)



\* Denotes hFE

(96-229-D204)

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

| Parameter                   |         | Symbol           | Limits   | Unit                    |
|-----------------------------|---------|------------------|----------|-------------------------|
| Collector-base voltage      |         | V <sub>CB0</sub> | 50       | 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)                   |
|                             |         | I <sub>cP</sub>  | 10       | A(Pulse) *1             |
| Collector power dissipation | 2SD2098 | P <sub>c</sub>   | 0.5      | W *2                    |
|                             |         |                  | 2        |                         |
|                             | 1       |                  |          |                         |
|                             | 2SD2118 |                  | 10       | W(T <sub>c</sub> =25°C) |
|                             | 2SD2097 |                  | 1        | W *3                    |
|                             | 2SD2116 |                  | 1.5      |                         |
| Junction temperature        |         | T <sub>j</sub>   | 150      | °C                      |
| Storage temperature         |         | T <sub>stg</sub> | -55~+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>    | 50   | —    | —    | 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> =40V                                 |
| Emitter cutoff current               | I <sub>EB0</sub>     | —    | —    | 0.5  | μA   | V <sub>EB</sub> =5V                                  |
| Collector-emitter saturation voltage | V <sub>CE(sat)</sub> | —    | 0.25 | 1.0  | V    | I <sub>c</sub> /I <sub>B</sub> =4A/0.1A *            |
| DC current transfer ratio            | h <sub>FE</sub>      | 120  | —    | 390  | —    | V <sub>CE</sub> =2V, I <sub>c</sub> =0.5A *          |
| Transition frequency                 | f <sub>T</sub>       | —    | 150  | —    | MHz  | V <sub>CE</sub> =6V, I <sub>E</sub> =-50mA, f=100MHz |
| Output capacitance                   | C <sub>ob</sub>      | —    | 30   | —    | pF   | V <sub>CE</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 |      |      | Bulk |
|---------|-----------------|------------------------------|--------|------|------|------|
|         |                 | Code                         | T100   | TL   | TV2  | —    |
|         |                 | Basic ordering unit (pieces) | 1000   | 2500 | 2500 | 1000 |
| 2SD2098 | QR              | ○                            | —      | —    | —    | —    |
| 2SD2118 | QR              | —                            | ○      | —    | —    | —    |
| 2SD2097 | QR              | —                            | —      | ○    | —    | —    |
| 2SD2166 | QR              | —                            | —      | —    | ○    | —    |

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

| Item     | Q       | R       |
|----------|---------|---------|
| $h_{FE}$ | 120~270 | 180~390 |

●Electrical characteristic curves

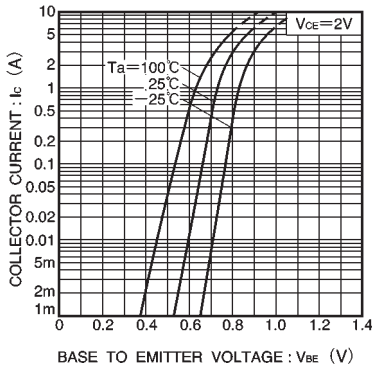


Fig.1 Grounded emitter propagation characteristics

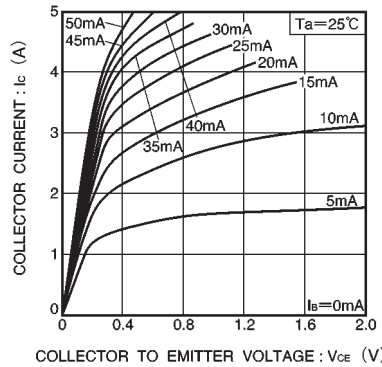


Fig.2 Grounded emitter output characteristics

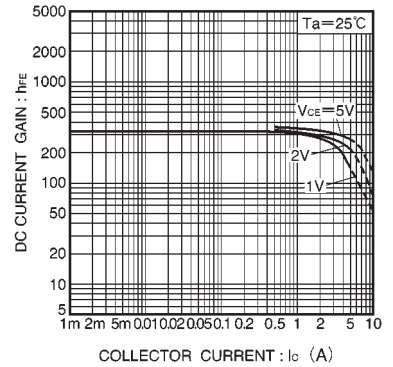


Fig.3 DC current gain vs. collector current ( I )

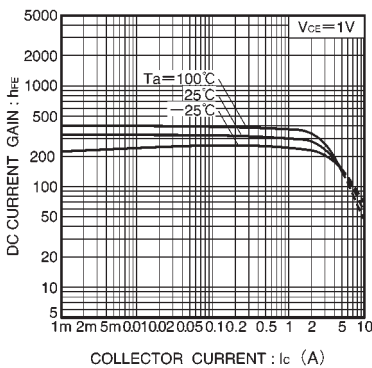


Fig.4 DC current gain vs. collector current ( II )

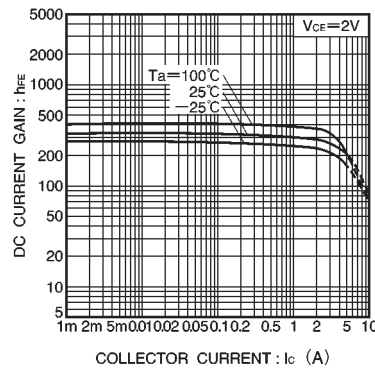


Fig.5 DC current gain vs. collector current ( III )

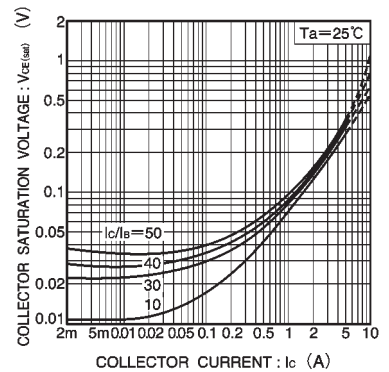


Fig.6 Collector-emitter saturation voltage vs. collector current ( I )

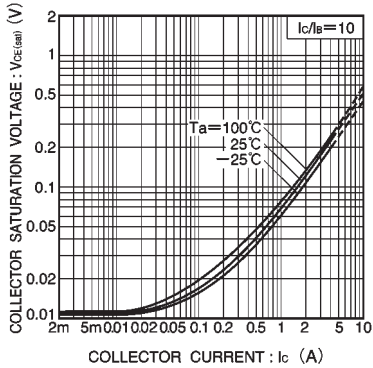


Fig.7 Collector-emitter saturation voltage vs. collector current (II)

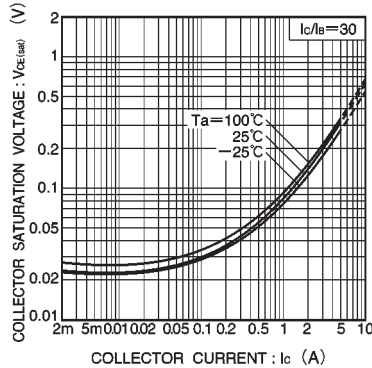


Fig.8 Collector-emitter saturation voltage vs. collector current (III)

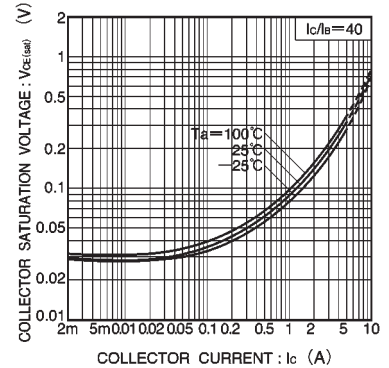


Fig.9 Collector-emitter saturation voltage vs. collector current (IV)

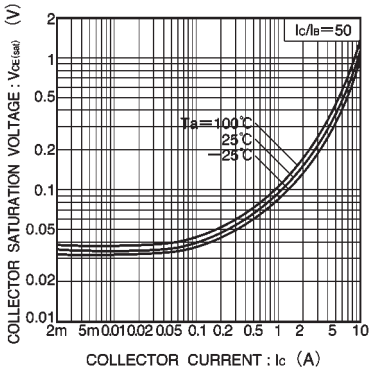


Fig.10 Collector-emitter saturation voltage vs. collector current (V)

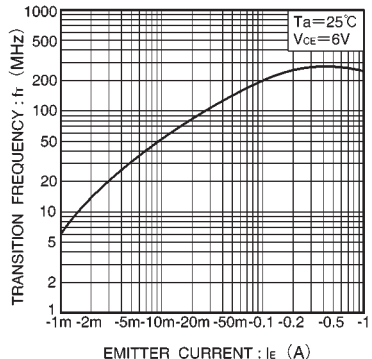


Fig.11 Gain bandwidth product vs. emitter current

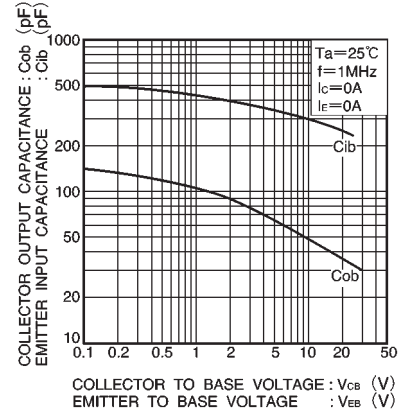


Fig.12 Collector output capacitance vs. collector-base voltage  
Emitter input capacitance vs. emitter-base voltage

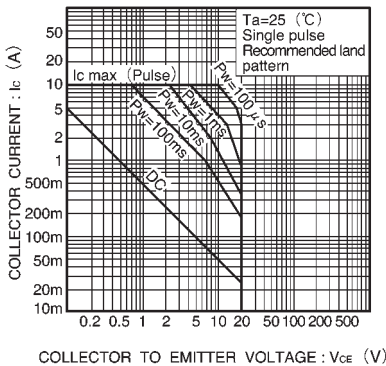


Fig.13 Safe operating area (2SD2098)

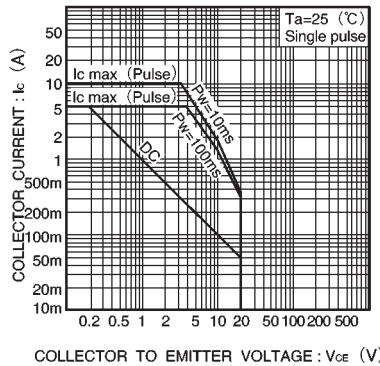


Fig.14 Safe operating area (2SD2118)