

# Power Transistor (50V, 3A)

## 2SD1760 / 2SD1864 / 2SD1762

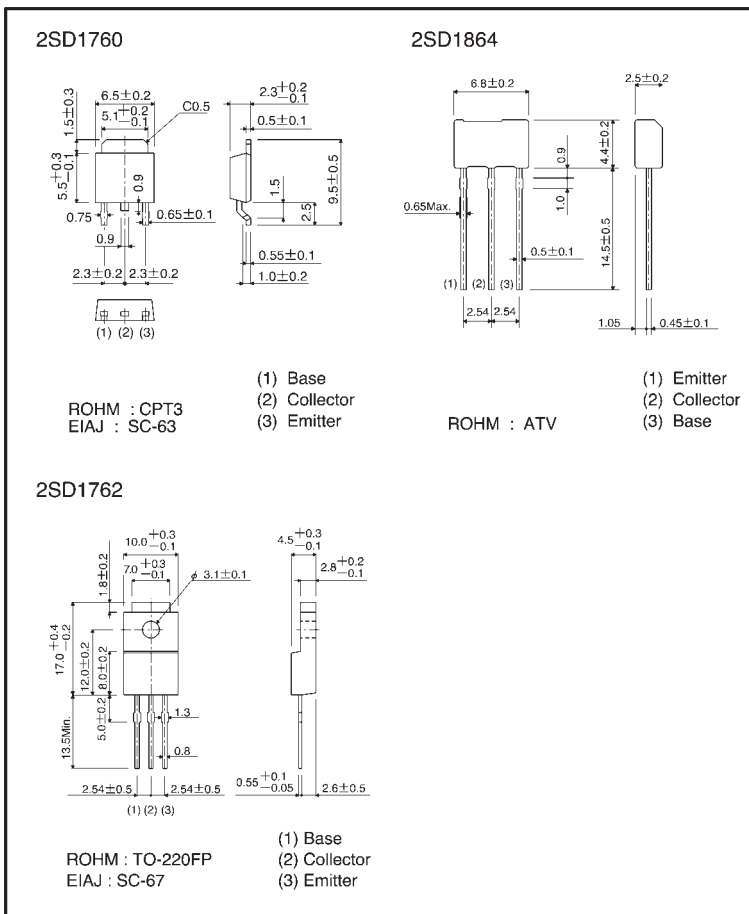
### ●Features

- 1) Low  $V_{CE(sat)}$ ,  
 $V_{CE(sat)} = 0.5V$  (Typ.)  
( $I_C/I_B = 2A/0.2A$ )
- 2) Complements the  
2SB1184 / 2SB1243 / 2SB1185.

### ●Structure

Epitaxial planar type  
NPN silicon transistor

### ●External dimensions (Units: mm)



● Absolute maximum ratings (Ta = 25°C)

| Parameter                   |         | Symbol           | Limits   | Unit           |
|-----------------------------|---------|------------------|----------|----------------|
| Collector-base voltage      |         | V <sub>CBO</sub> | 60       | V              |
| Collector-emitter voltage   |         | V <sub>CEO</sub> | 50       | V              |
| Emitter-base voltage        |         | V <sub>EBO</sub> | 5        | V              |
| Collector current           |         | I <sub>C</sub>   | 3        | A (DC)         |
|                             |         |                  | 4.5      | A (Pulse) *1   |
| Collector power dissipation | 2SD1760 | P <sub>C</sub>   | 15       | W (Tc=25°C) *2 |
|                             | 2SD1864 |                  | 1        | W              |
|                             | 2SD1762 |                  | 25       | W (Tc=25°C) *2 |
| 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 Printed circuit board, 1.7mm thick, collector 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>CBO</sub>    | 60   | —    | —    | V    | I <sub>C</sub> =50 μA                                  |
| Collector-emitter breakdown voltage  |                  | BV <sub>CEO</sub>    | 50   | —    | —    | V    | I <sub>C</sub> =1mA                                    |
| Emitter-base breakdown voltage       |                  | BV <sub>EBO</sub>    | 5    | —    | —    | V    | I <sub>E</sub> =50 μA                                  |
| Collector cutoff current             |                  | I <sub>CBO</sub>     | —    | —    | 1    | μA   | V <sub>CB</sub> =40V                                   |
| Emitter cutoff current               |                  | I <sub>EBO</sub>     | —    | —    | 1    | μA   | V <sub>EB</sub> =4V                                    |
| Collector-emitter saturation voltage |                  | V <sub>CE(sat)</sub> | —    | 0.5  | 1    | V    | I <sub>C</sub> /I <sub>B</sub> =2A/0.2A *              |
| DC current transfer ratio            | 2SD1760, 2SD1864 | h <sub>FE</sub>      | 82   | —    | 390  | —    | V <sub>CE</sub> =3V, I <sub>C</sub> =0.5A *            |
|                                      | 2SD1762          |                      | 60   |      | 320  |      |                                                        |
| Transition frequency                 |                  | f <sub>T</sub>       | —    | 90   | —    | MHz  | V <sub>CE</sub> =5V, I <sub>E</sub> =-500mA, f=30MHz * |
| Output capacitance                   |                  | C <sub>ob</sub>      | —    | 40   | —    | pF   | V <sub>CB</sub> =10V, 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                         | TL     | TV2  | —    |
|         |                 | Basic ordering unit (pieces) | 2500   | 2500 | 200  |
| 2SD1760 | PQR             | ○                            | —      | —    | —    |
| 2SD1864 | PQR             | —                            | ○      | —    | —    |
| 2SD1762 | DEF             | —                            | —      | ○    | —    |

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

| Item            | P      | Q       | R       |
|-----------------|--------|---------|---------|
| h <sub>FE</sub> | 82~180 | 120~270 | 180~390 |

| Item            | D      | E       | F       |
|-----------------|--------|---------|---------|
| h <sub>FE</sub> | 60~120 | 100~200 | 160~320 |

## ●Electrical characteristic curves

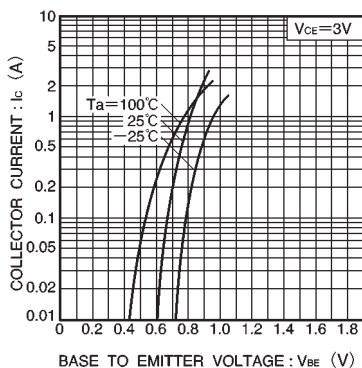


Fig.1 Grounded emitter propagation characteristics

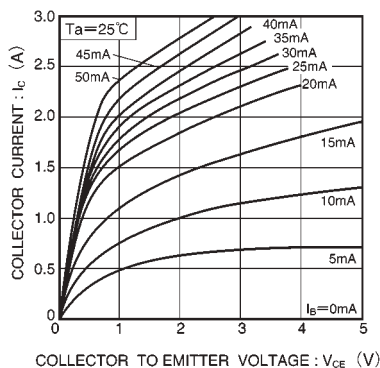


Fig.2 Grounded emitter output characteristics (I)

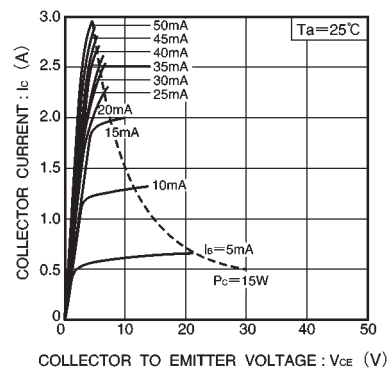


Fig.3 Grounded-emitter output characteristics (II)

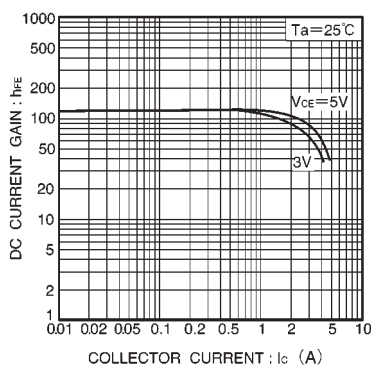


Fig.4 DC current gain vs. collector current (I)

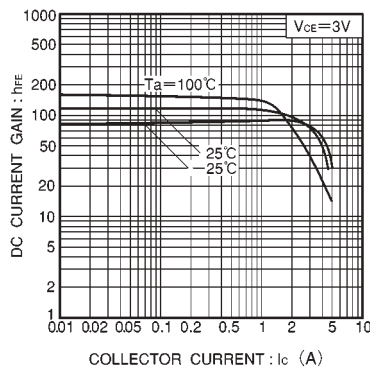


Fig.5 DC current gain vs. collector current (II)

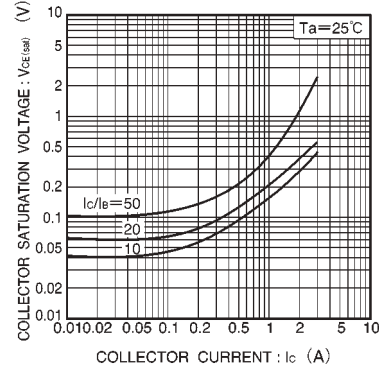


Fig.6 Collector-emitter saturation voltage vs. collector current

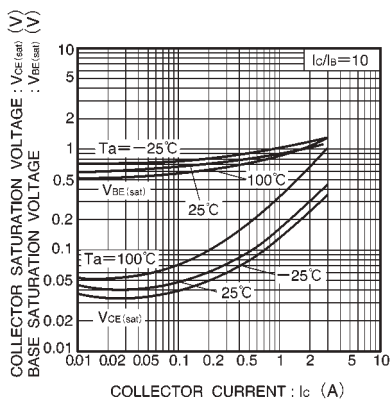
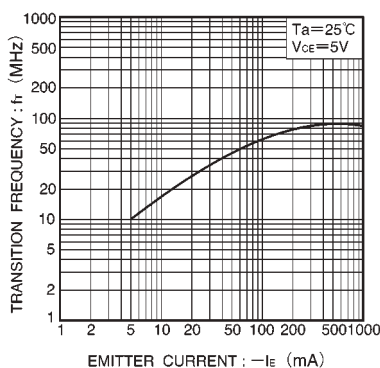
Fig.7 Collector-emitter saturation voltage vs. collector current  
Base-emitter saturation voltage vs. collector current

Fig.8 Gain bandwidth product vs. emitter current

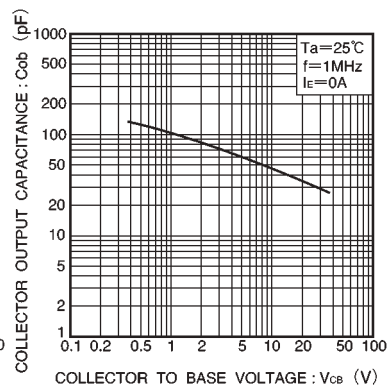


Fig.9 Collector output capacitance vs. collector-base voltage

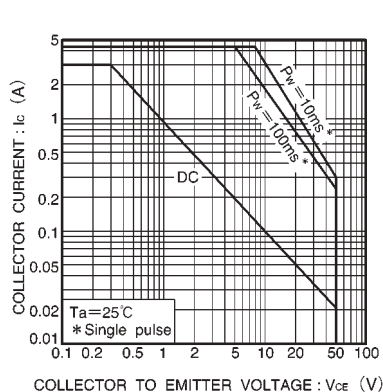


Fig.10 Safe operating area  
(2SD1760)

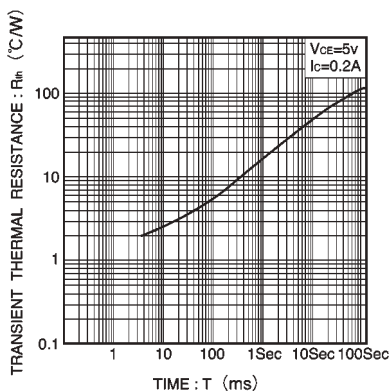


Fig.11 Transient thermal resistance  
(2SD1760)

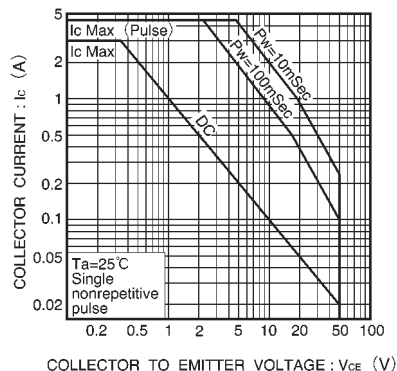


Fig.12 Safe operating area  
(2SD1864)

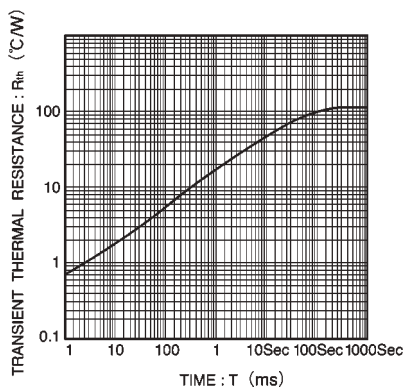


Fig.13 Transient thermal resistance  
(2SD1864)

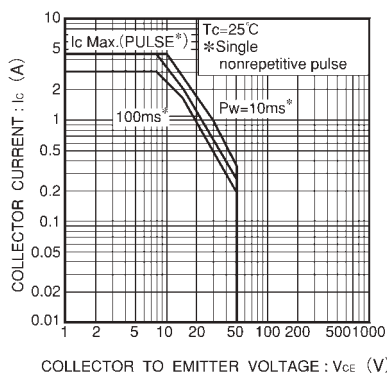


Fig.14 Safe operating area  
(2SD1762)

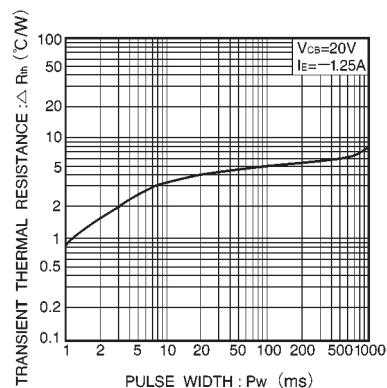


Fig.15 Transient thermal resistance  
(2SD1762)