

Silicon NPN Power Transistors

2SC3831

DESCRIPTION

- With TO-3PN package
- High voltage
- High speed switching

APPLICATIONS

- For switching regulator and general purpose applications

PINNING

| PIN | DESCRIPTION                          |
|-----|--------------------------------------|
| 1   | Base                                 |
| 2   | Collector;connected to mounting base |
| 3   | Emitter                              |

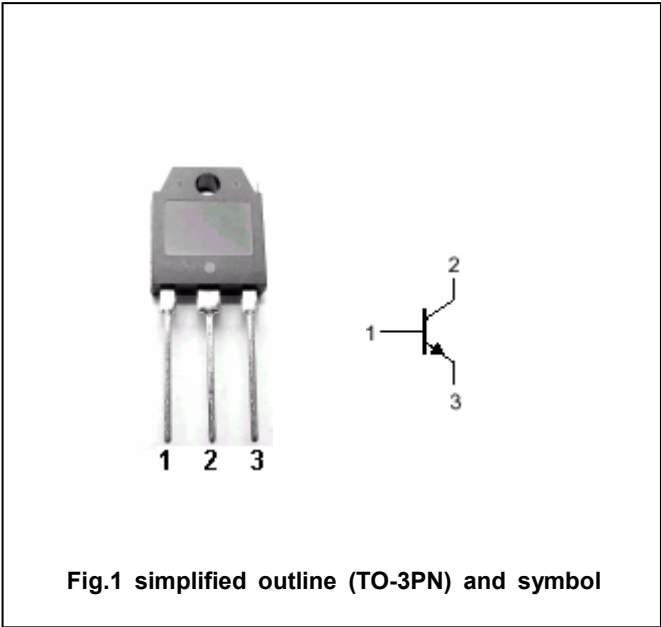


Fig.1 simplified outline (TO-3PN) and symbol

Absolute maximum ratings(Ta=□)

| SYMBOL           | PARAMETER                   | CONDITIONS          | VALUE   | UNIT |
|------------------|-----------------------------|---------------------|---------|------|
| V <sub>CBO</sub> | Collector-base voltage      | Open emitter        | 600     | V    |
| V <sub>CEO</sub> | Collector-emitter voltage   | Open base           | 500     | V    |
| V <sub>EBO</sub> | Emitter-base voltage        | Open collector      | 10      | V    |
| I <sub>C</sub>   | Collector current           |                     | 10      | A    |
| I <sub>CP</sub>  | Collector current-pulse     |                     | 20      | A    |
| I <sub>B</sub>   | Base current                |                     | 4       | A    |
| P <sub>C</sub>   | Collector power dissipation | T <sub>C</sub> =25□ | 100     | W    |
| T <sub>j</sub>   | Junction temperature        |                     | 150     | □    |
| T <sub>stg</sub> | Storage temperature         |                     | -55~150 | □    |

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## CHARACTERISTICS

T<sub>j</sub>=25℃ unless otherwise specified

| SYMBOL               | PARAMETER                            | CONDITIONS                                | MIN | TYP. | MAX | UNIT |
|----------------------|--------------------------------------|-------------------------------------------|-----|------|-----|------|
| V <sub>(BR)CEO</sub> | Collector-emitter breakdown voltage  | I <sub>C</sub> =25mA; I <sub>B</sub> =0   | 500 |      |     | V    |
| V <sub>CEsat</sub>   | Collector-emitter saturation voltage | I <sub>C</sub> =5A I <sub>B</sub> =1.0A   |     |      | 0.5 | V    |
| V <sub>BEsat</sub>   | Base-emitter saturation voltage      | I <sub>C</sub> =5A ;I <sub>B</sub> =1.0A  |     |      | 1.3 | V    |
| I <sub>CBO</sub>     | Collector cut-off current            | V <sub>CB</sub> =600V; I <sub>E</sub> =0  |     |      | 1   | mA   |
| I <sub>EBO</sub>     | Emitter cut-off current              | V <sub>EB</sub> =10V; I <sub>C</sub> =0   |     |      | 0.1 | mA   |
| h <sub>FE</sub>      | DC current gain                      | I <sub>C</sub> =5A ; V <sub>CE</sub> =4V  | 10  |      | 30  |      |
| f <sub>T</sub>       | Transition frequency                 | I <sub>C</sub> =1A ; V <sub>CE</sub> =12V |     | 8    |     | MHz  |
| C <sub>OB</sub>      | Output capacitance                   | f=1MHz ; V <sub>CB</sub> =10V             |     | 105  |     | pF   |

## Switching times

|                  |              |                                                                                                                 |  |  |     |    |
|------------------|--------------|-----------------------------------------------------------------------------------------------------------------|--|--|-----|----|
| t <sub>on</sub>  | Turn-on time | I <sub>C</sub> =5A; V <sub>CC</sub> =200V<br>I <sub>B1</sub> =0.5A; I <sub>B2</sub> =-1A<br>R <sub>L</sub> =40Ω |  |  | 1.0 | μs |
| t <sub>stg</sub> | Storage time |                                                                                                                 |  |  | 4.5 | μs |
| t <sub>f</sub>   | Fall time    |                                                                                                                 |  |  | 0.5 | μs |

**2SC3831**

Technical drawing of a component showing outline dimensions. The drawing includes a front view on the left and a side view on the right.

**Front View Dimensions:**

- Overall width: 15.60
- Overall height: 42.60
- Top section width: 13.50
- Top section height: 10.00
- Top section width: 8.00
- Top section height: 30- $\phi 1.50$
- Top section height: 10- $\phi 3.50$
- Top section height: 42.60
- Top section height: 40.60
- Top section height: 37.60
- Top section height: 36.60
- Top section height: 35.60
- Top section height: 26.80
- Top section height: 25.00
- Top section height: 22.60
- Top section height: 21.10
- Top section height: 19.30
- Top section height: 3.25
- Top section height: 2.00
- Top section height: 0.00
- Top section height: 2.00
- Top section height: 0.60
- Top section height: 10- $\phi 2.05 \pm 0.05$
- Top section height: R0.50
- Top section height: 12.00
- Top section height: R0.50

**Side View Dimensions:**

- Overall width: 10.90  $\pm 0.01$
- Overall height: 40.10
- Top section width: 4.80
- Top section height: 2.00  $\pm 0.005$
- Top section height: 3.00  $\pm 0.003$
- Top section height: 17.00
- Top section height: 7.00
- Top section height: 13.50
- Top section height: 3.00
- Top section height: 2.00
- Top section height: 0.60  $\pm 0.005$
- Top section height: 3.40  $\pm 0.05$
- Top section height: 1.00

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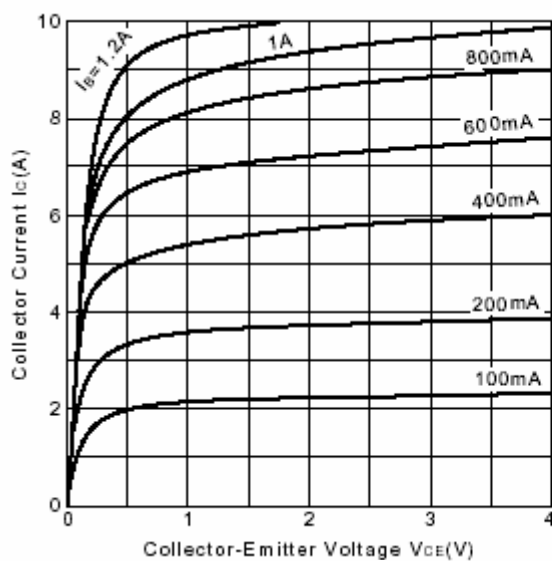


Fig.3 Static Characteristic

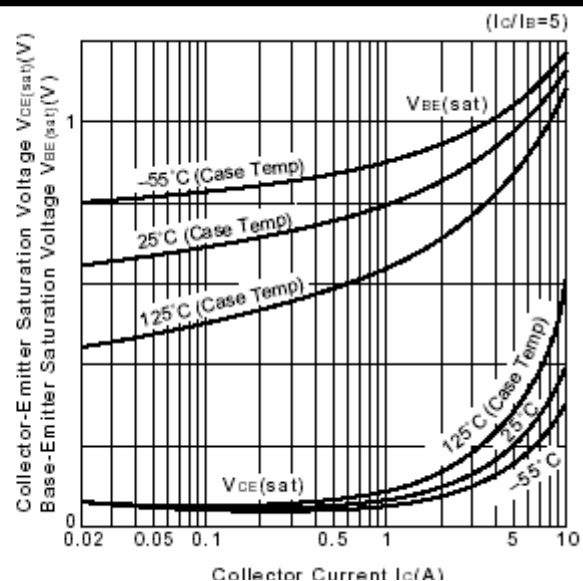
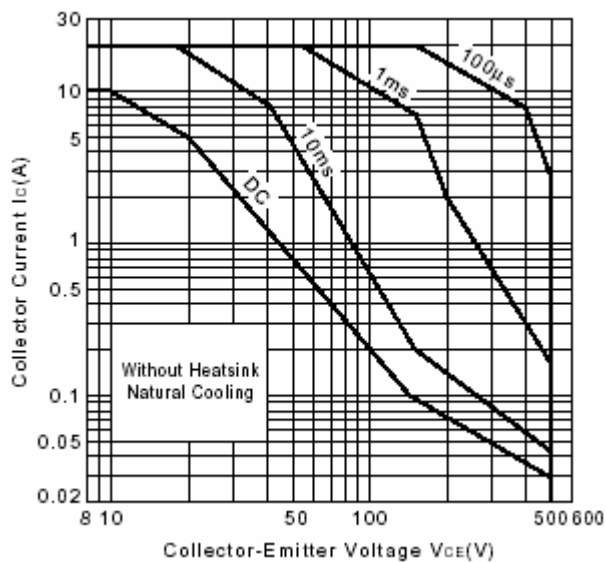
Fig.4 Base-Emitter Saturation Voltage  
Collector-Emitter Saturation Voltage

Fig.5 Safe Operating Area

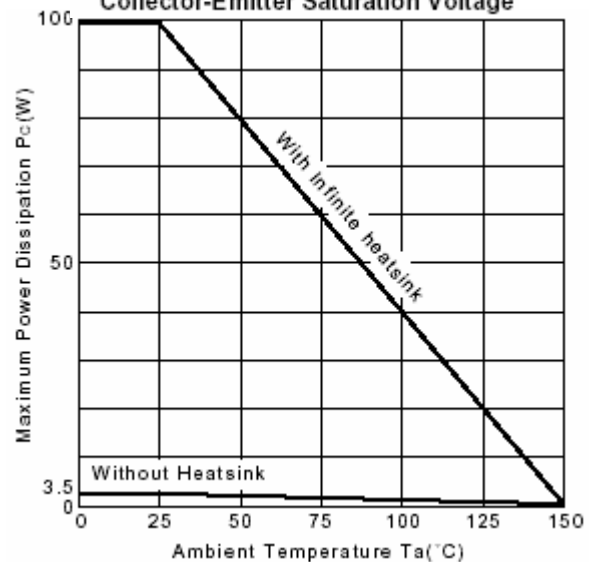


Fig.6 Power Derating

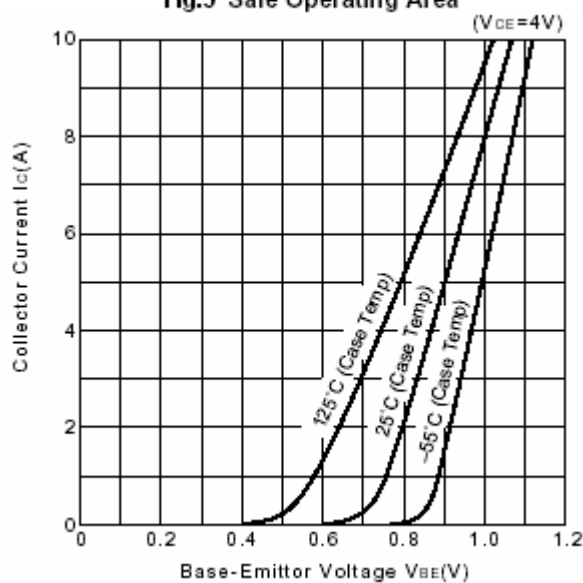
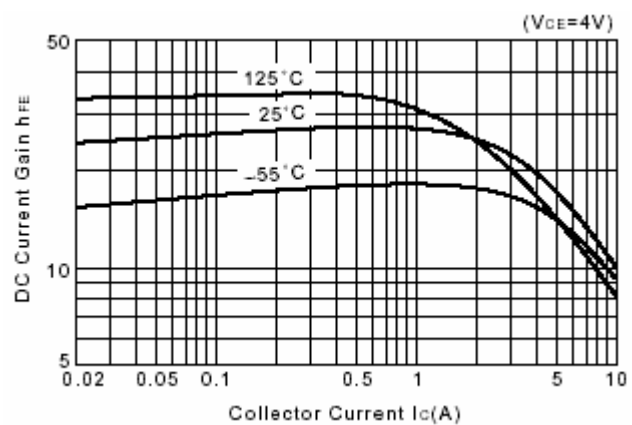
Fig.7  $I_C$ - $V_{BE}$ 

Fig.8 DC current Gain