

To all our customers

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Renesas Technology Corp.  
Customer Support Dept.  
April 1, 2003

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# 2SC2816

Silicon NPN Triple Diffused

**RENESAS**

ADE-208-887 (Z)  
1st. Edition  
September 2000

## Application

High voltage, high speed and high power switching

## Outline

TO-220AB



1. Base
2. Collector (Flange)
3. Emitter

## Absolute Maximum Ratings (Ta = 25°C)

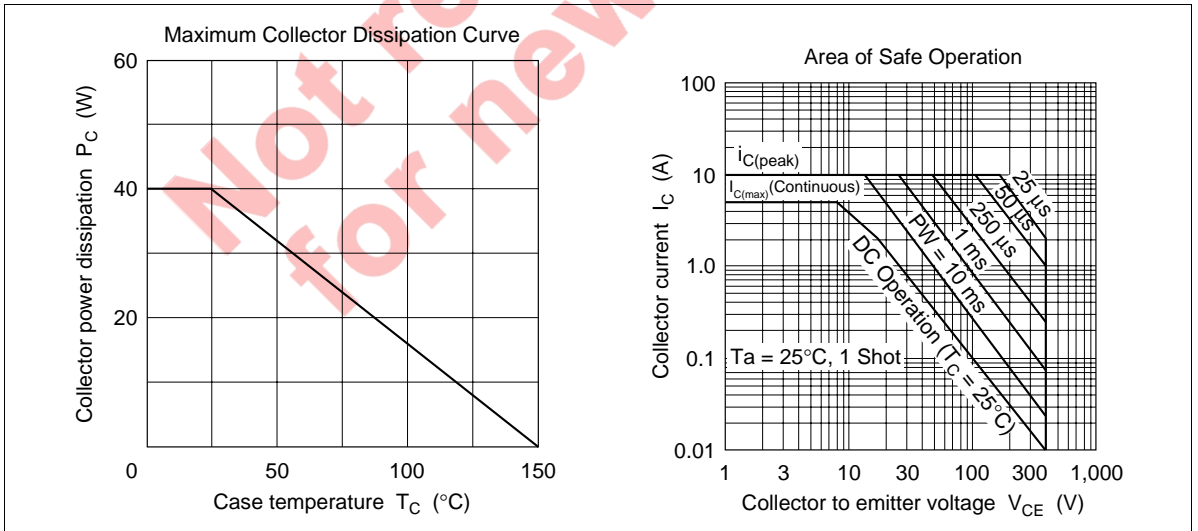
| Item                         | Symbol        | Rated       | Unit |
|------------------------------|---------------|-------------|------|
| Collector to base voltage    | $V_{CBO}$     | 500         | V    |
| Collector to emitter voltage | $V_{CEO}$     | 400         | V    |
| Emitter to base voltage      | $V_{EBO}$     | 7           | V    |
| Collector current            | $I_C$         | 5           | A    |
| Collector peak current       | $I_{C(peak)}$ | 10          | A    |
| Base current                 | $I_B$         | 2.5         | A    |
| Collector power dissipation  | $P_C^{*1}$    | 40          | W    |
| Junction temperature         | $T_j$         | 150         | °C   |
| Storage temperature          | $T_{stg}$     | -55 to +150 | °C   |

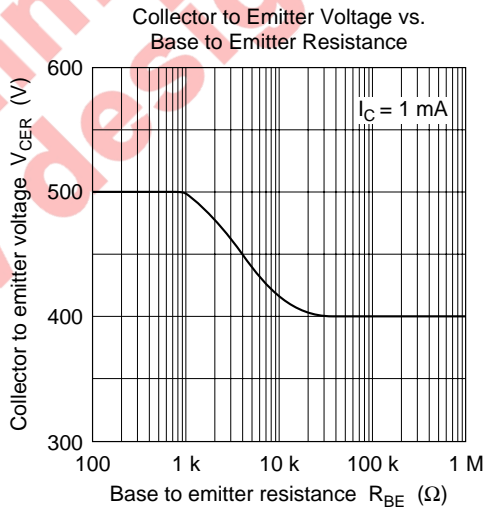
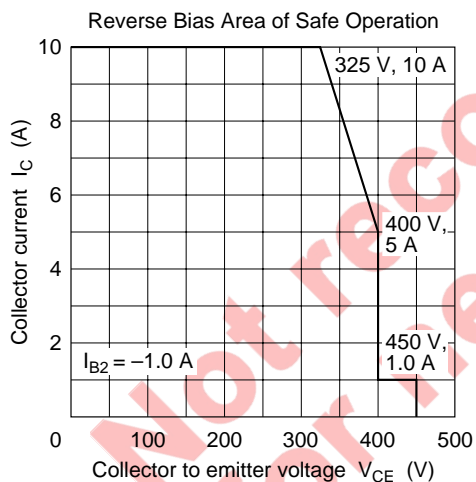
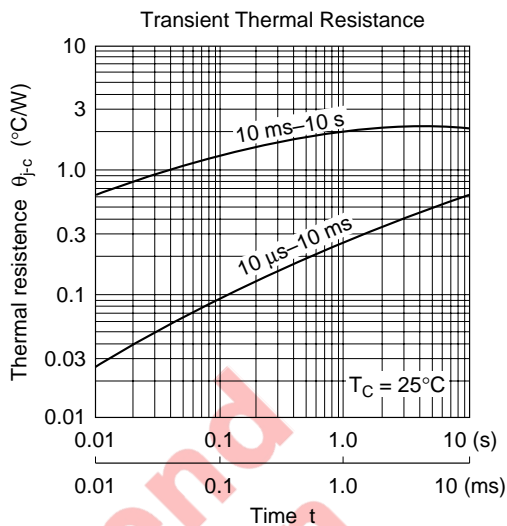
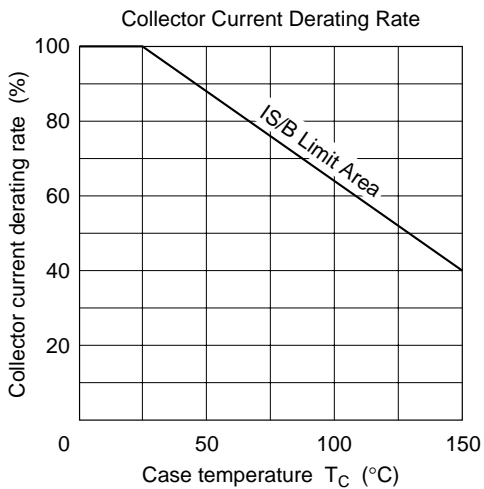
Note: 1. Value at  $T_C = 25^\circ\text{C}$ .

## Electrical Characteristics (Ta = 25°C)

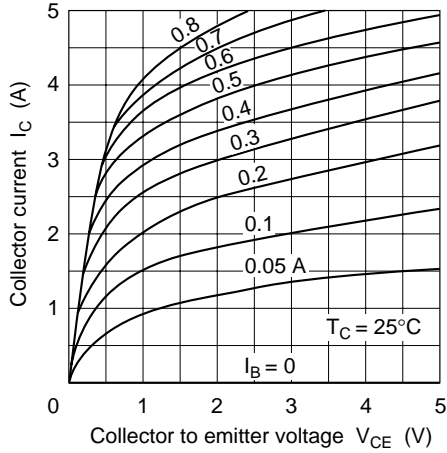
| Item                                    | Symbol         | Min | Typ | Max | Unit          | Test conditions   |
|---|----------------|-----|-----|-----|---------------|---|
| Collector to emitter sustain voltage    | $V_{CEO(sus)}$ | 400 | —   | —   | V             | $I_C = 0.2 \text{ A}$ , $R_{BE} = \infty$ , $L = 100 \text{ mH}$  |
|   | $V_{CEX(sus)}$ | 400 | —   | —   | V             | $I_C = 5 \text{ A}$ , $I_{B1} = -I_{B2} = 1.0 \text{ A}$<br>$V_{BE} = -5.0 \text{ V}$ , $L = 180 \text{ } \mu\text{H}$ ,<br>Clamped |
| Emitter to base breakdown voltage       | $V_{(BR)EBO}$  | 7   | —   | —   | V             | $I_E = 10 \text{ mA}$ , $I_C = 0$   |
| Collector cutoff current                | $I_{CBO}$      | —   | —   | 50  | $\mu\text{A}$ | $V_{CB} = 400 \text{ V}$ , $I_E = 0$  |
|   | $I_{CEO}$      | —   | —   | 50  | $\mu\text{A}$ | $V_{CE} = 350 \text{ V}$ , $R_{BE} = \infty$  |
| DC current transfer ratio               | $h_{FE1}$      | 15  | —   | —   |               | $V_{CE} = 5.0 \text{ V}$ , $I_C = 2.5 \text{ A}^{*1}$   |
|   | $h_{FE2}$      | 7   | —   | —   |               | $V_{CE} = 5.0 \text{ V}$ , $I_C = 5 \text{ A}^{*1}$   |
| Collector to emitter saturation voltage | $V_{CE(sat)}$  | —   | —   | 1.0 | V             | $I_C = 2.5 \text{ A}$ , $I_B = 0.5 \text{ A}^{*1}$  |
| Base to emitter saturation voltage      | $V_{BE(sat)}$  | —   | —   | 1.5 | V             | $I_C = 2.5 \text{ A}$ , $I_B = 0.5 \text{ A}^{*1}$  |
| Turn on time                            | $t_{on}$       | —   | —   | 0.5 | $\mu\text{s}$ | $I_C = 5 \text{ A}$ , $I_{B1} = -I_{B2} = 1.0 \text{ A}$ ,  |
| Storage time                            | $t_{stg}$      | —   | —   | 1.5 | $\mu\text{s}$ | $V_{CC} \cong 150 \text{ V}$  |
| Fall time                               | $t_f$          | —   | 0.3 | 0.5 | $\mu\text{s}$ |   |

Note: 1. Pulse test.

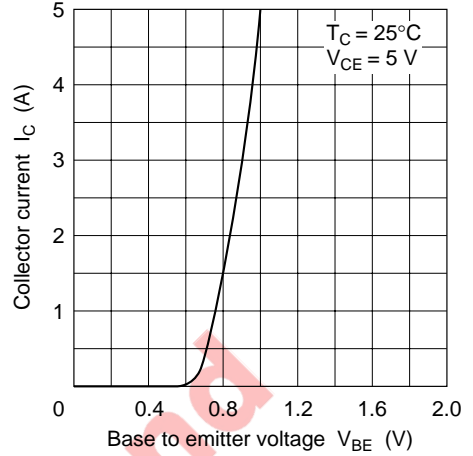




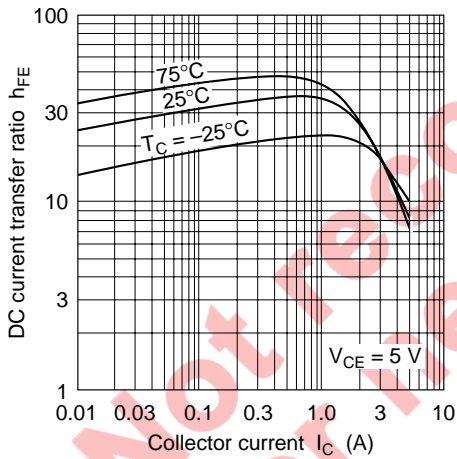
Typical Output Characteristics



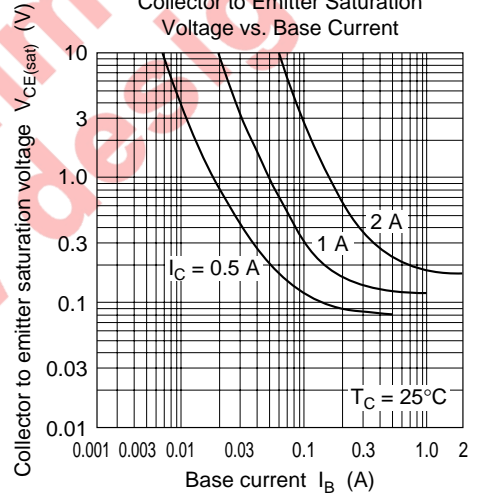
Typical Transfer Characteristics

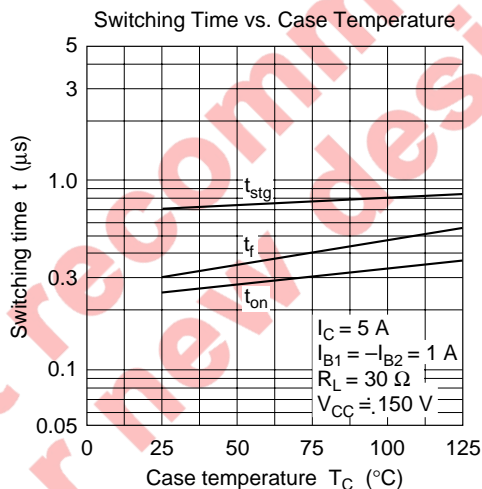
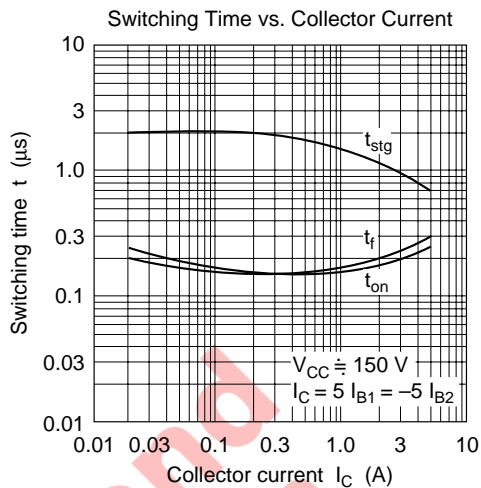
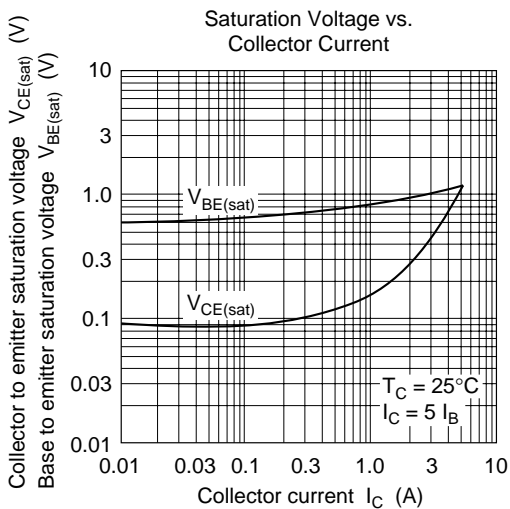


DC Current Transfer Ratio vs. Collector Current



Collector to Emitter Saturation Voltage vs. Base Current





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