

# 2SD970(K)

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Silicon NPN Triple Diffused

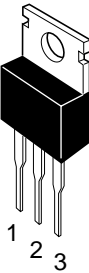
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## Application

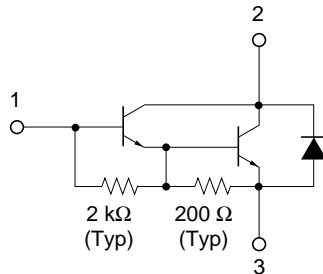
Medium speed and power switching complementary pair with 2SB791(K)

## Outline

TO-220AB



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



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

| Item                         | Symbol        | Ratings     | Unit |
|------------------------------|---------------|-------------|------|
| Collector to base voltage    | $V_{CBO}$     | 120         | V    |
| Collector to emitter voltage | $V_{CEO}$     | 120         | V    |
| Emitter to base voltage      | $V_{EBO}$     | 7           | V    |
| Collector current            | $I_C$         | 8           | A    |
| Collector peak current       | $I_{C(peak)}$ | 12          | 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  $T_C = 25^\circ\text{C}$ .

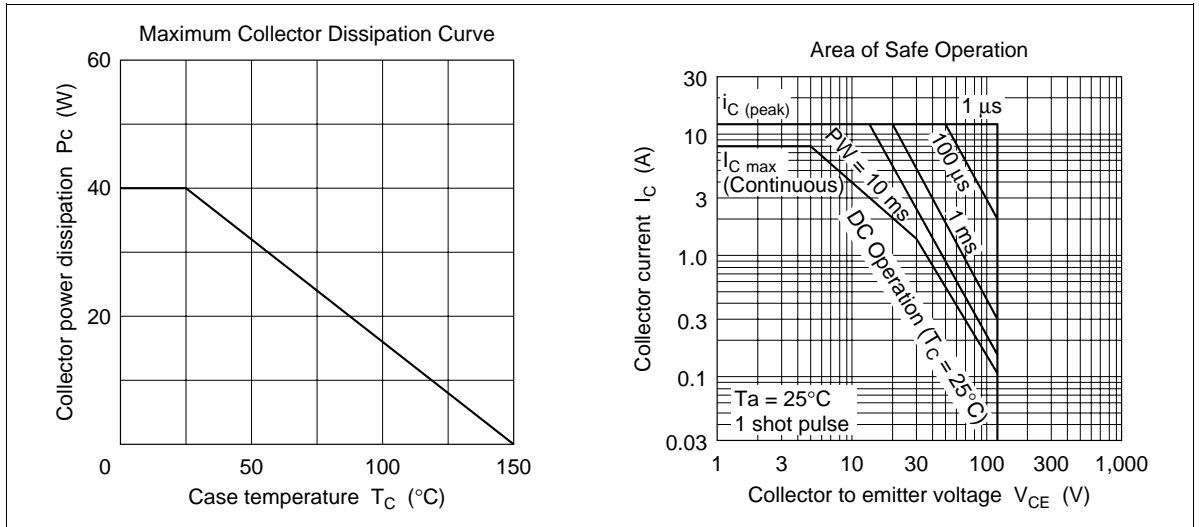
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## Electrical Characteristics (Ta = 25°C)

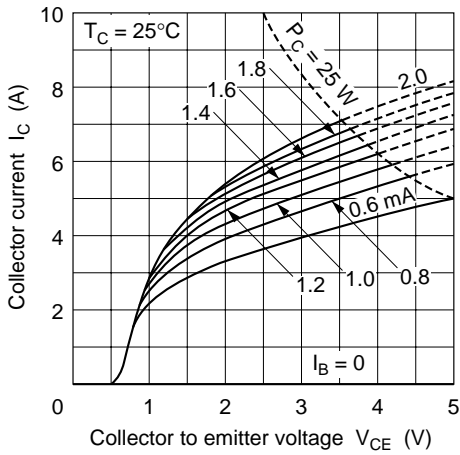
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| Item                                    | Symbol         | Min  | Typ | Max   | Unit          | Test conditions   |
|---|----------------|------|-----|-------|---------------|---|
| Collector to emitter breakdown voltage  | $V_{(BR)CEO}$  | 120  | —   | —     | V             | $I_C = 25 \text{ mA}$ , $R_{BE} = \infty$               |
| Emitter to base breakdown voltage       | $V_{(BR)EBO}$  | 7    | —   | —     | V             | $I_E = 50 \text{ mA}$ , $I_C = 0$                       |
| Collector cutoff current                | $I_{CBO}$      | —    | —   | 100   | $\mu\text{A}$ | $V_{CB} = 120 \text{ V}$ , $I_E = 0$                    |
|   | $I_{CEO}$      | —    | —   | 10    | $\mu\text{A}$ | $V_{CE} = 100 \text{ V}$ , $R_{BE} = \infty$            |
| DC current transfer ratio               | $h_{FE}$       | 1000 | —   | 20000 |               | $V_{CE} = 3 \text{ V}$ , $I_C = 4 \text{ A}^{*1}$       |
| Collector to emitter saturation voltage | $V_{CE(sat)1}$ | —    | —   | 1.5   | V             | $I_C = 4 \text{ A}$ , $I_B = 8 \text{ mA}^{*1}$         |
|   | $V_{CE(sat)2}$ | —    | —   | 3.0   | V             | $I_C = 8 \text{ A}$ , $I_B = 80 \text{ mA}^{*1}$        |
| Base to emitter saturation voltage      | $V_{BE(sat)1}$ | —    | —   | 2.0   | V             | $I_C = 4 \text{ A}$ , $I_B = 8 \text{ mA}^{*1}$         |
|   | $V_{BE(sat)2}$ | —    | —   | 3.5   | V             | $I_C = 8 \text{ A}$ , $I_B = 80 \text{ mA}^{*1}$        |
| Turn on time                            | $t_{on}$       | —    | 0.4 | —     | $\mu\text{s}$ | $I_C = 4 \text{ A}$ , $I_{B1} = -I_{B2} = 8 \text{ mA}$ |
| Storage time                            | $t_{stg}$      | —    | 5.4 | —     | $\mu\text{s}$ |   |
| Fall time                               | $t_f$          | —    | 1.1 | —     | $\mu\text{s}$ |   |

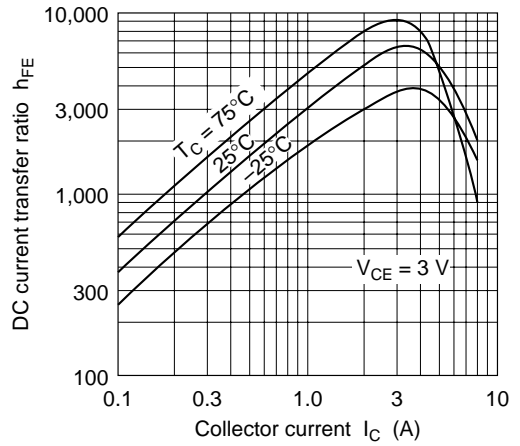
Note: 1. Pulse test.



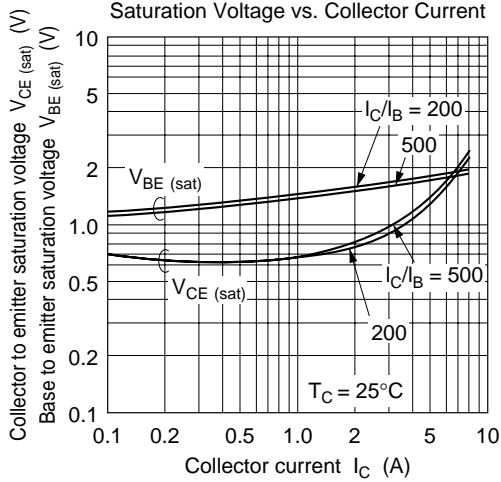
Typical Output Characteristics



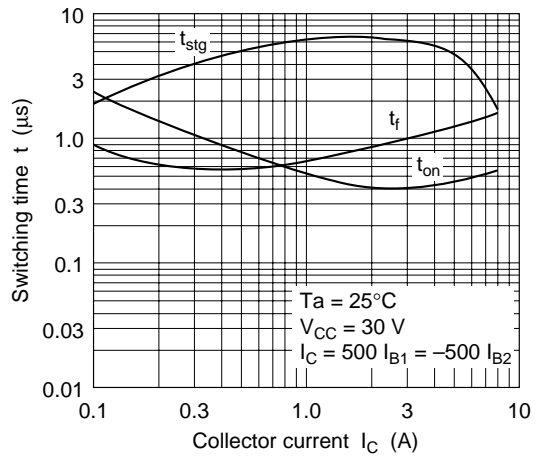
DC Current Transfer Ratio vs. Collector Current

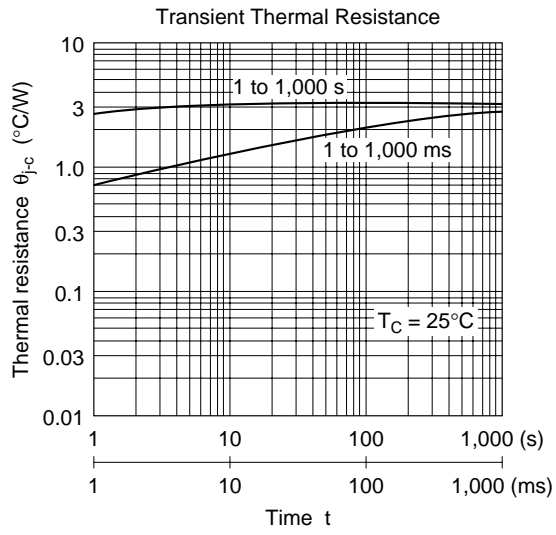


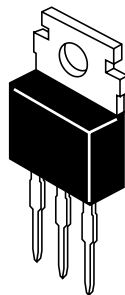
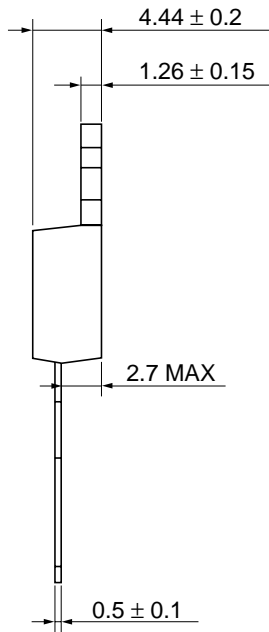
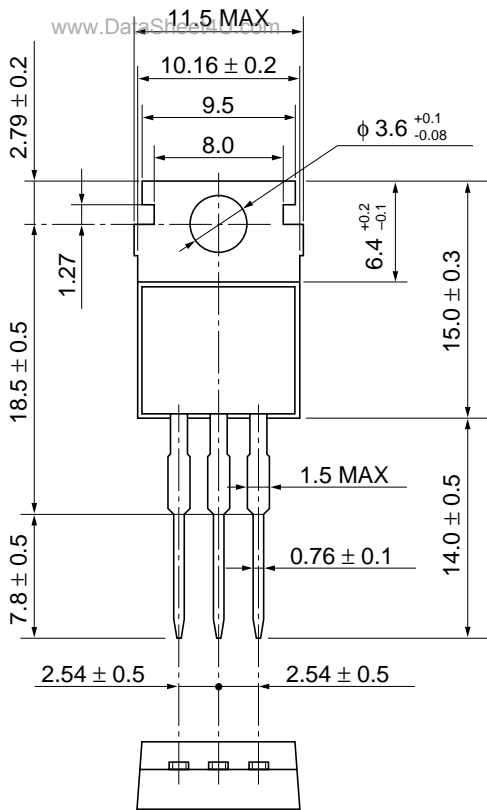
Saturation Voltage vs. Collector Current



Switching Time vs. Collector Current







| Hitachi Code                    | JEDEC    | EIAJ     | Weight (reference value) |
|---------------------------------|----------|----------|--------------------------|
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## Hitachi, Ltd.

Semiconductor & Integrated Circuits.  
Nippon Bldg., 2-6-2, Ohte-machi, Chiyoda-ku, Tokyo 100-0004, Japan  
Tel: Tokyo (03) 3270-2111 Fax: (03) 3270-5109

URL      North America      : <http://semiconductor.hitachi.com/>  
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## For further information write to:

Hitachi Semiconductor  
(America) Inc.  
179 East Tasman Drive,  
San Jose, CA 95134  
Tel: <1> (408) 433-1990  
Fax: <1>(408) 433-0223

Hitachi Europe GmbH  
Electronic components Group  
Dornacher Straße 3  
D-85622 Feldkirchen, Munich  
Germany  
Tel: <49> (89) 9 9180-0  
Fax: <49> (89) 9 29 30 00

Hitachi Europe Ltd.  
Electronic Components Group.  
Whitebrook Park  
Lower Cookham Road  
Maidenhead  
Berkshire SL6 8YA, United Kingdom  
Tel: <44> (1628) 585000  
Fax: <44> (1628) 778322

Hitachi Asia Pte. Ltd.  
16 Collyer Quay #20-00  
Hitachi Tower  
Singapore 049318  
Tel: 535-2100  
Fax: 535-1533

Hitachi Asia Ltd.  
Taipei Branch Office  
3F, Hung Kuo Building, No.167,  
Tun-Hwa North Road, Taipei (105)  
Tel: <886> (2) 2718-3666  
Fax: <886> (2) 2718-8180

Hitachi Asia (Hong Kong) Ltd.  
Group III (Electronic Components)  
7/F., North Tower, World Finance Centre,  
Harbour City, Canton Road, Tsim Sha Tsui,  
Kowloon, Hong Kong  
Tel: <852> (2) 735 9218  
Fax: <852> (2) 730 0281  
Telex: 40815 HITEC HX

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