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# 2SB647, 2SB647A

Silicon PNP Epitaxial

# HITACHI

ADE-208-1025 (Z)  
1st. Edition  
Mar. 2001

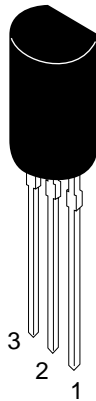
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## Application

- Low frequency power amplifier
- Complementary pair with 2SD667/A

## Outline

TO-92MOD



1. Emitter
2. Collector
3. Base

# 2SB647, 2SB647A

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

| Item                         | Symbol        | 2SB647      | 2SB647A     | Unit |
|------------------------------|---------------|-------------|-------------|------|
| Collector to base voltage    | $V_{CBO}$     | -120        | -120        | V    |
| Collector to emitter voltage | $V_{CEO}$     | -80         | -100        | V    |
| Emitter to base voltage      | $V_{EBO}$     | -5          | -5          | V    |
| Collector current            | $I_C$         | -1          | -1          | A    |
| Collector peak current       | $i_{C(peak)}$ | -2          | -2          | A    |
| Collector power dissipation  | $P_C$         | 0.9         | 0.9         | W    |
| Junction temperature         | $T_j$         | 150         | 150         | °C   |
| Storage temperature          | $T_{stg}$     | -55 to +150 | -55 to +150 | °C   |

## Electrical Characteristics (Ta = 25°C)

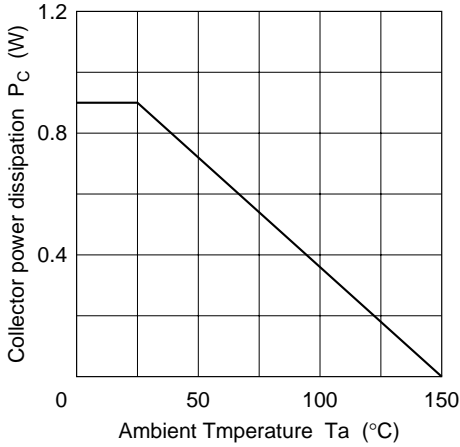
| Item                                    | Symbol         | 2SB647 |     |      | 2SB647A |     |      | Unit    | Test conditions  |
|---|----------------|--------|-----|------|---------|-----|------|---------|--|
|   |                | Min    | Typ | Max  | Min     | Typ | Max  |         |  |
| Collector to base breakdown voltage     | $V_{(BR)CBO}$  | -120   | —   | —    | -120    | —   | —    | V       | $I_C = -10 \mu A, I_E = 0$                               |
| Collector to emitter breakdown voltage  | $V_{(BR)CEO}$  | -80    | —   | —    | -100    | —   | —    | V       | $I_C = -1 \text{ mA}, R_{BE} = \infty$                   |
| Emitter to base breakdown voltage       | $V_{(BR)EBO}$  | -5     | —   | —    | -5      | —   | —    | V       | $I_E = -10 \mu A, I_C = 0$                               |
| Collector cutoff current                | $I_{CBO}$      | —      | —   | -10  | —       | —   | -10  | $\mu A$ | $V_{CB} = -100 \text{ V}, I_E = 0$                       |
| DC current transfer ratio               | $h_{FE1}^{*1}$ | 60     | —   | 320  | 60      | —   | 200  |         | $V_{CE} = -5 \text{ V}, I_C = -150 \text{ mA}^{*2}$      |
|   | $h_{FE2}$      | 30     | —   | —    | 30      | —   | —    |         | $V_{CE} = -5 \text{ V}, I_C = -500 \text{ mA}^{*2}$      |
| Collector to emitter saturation voltage | $V_{CE(sat)}$  | —      | —   | -1   | —       | —   | -1   | V       | $I_C = -500 \text{ mA}, I_B = -50 \text{ mA}^{*2}$       |
| Base to emitter voltage                 | $V_{BE}$       | —      | —   | -1.5 | —       | —   | -1.5 | V       | $V_{CE} = -5 \text{ V}, I_C = -150 \text{ mA}^{*2}$      |
| Gain bandwidth product                  | $f_T$          | —      | 140 | —    | —       | 140 | —    | MHz     | $V_{CE} = -5 \text{ V}, I_C = -150 \text{ mA}$           |
| Collector output capacitance            | $C_{ob}$       | —      | 20  | —    | —       | 20  | —    | pF      | $V_{CB} = -10 \text{ V}, I_E = 0$<br>$f = 1 \text{ MHz}$ |

Notes: 1. The 2SB647 and 2SB647A are grouped by  $h_{FE1}$  as follows.

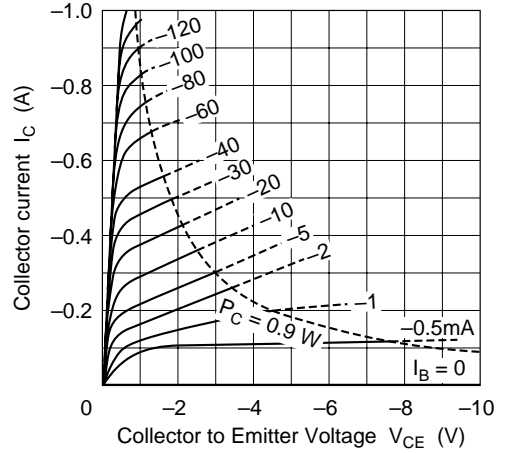
2. Pulse test

|         | B         | C          | D          |
|---------|-----------|------------|------------|
| 2SB647  | 60 to 120 | 100 to 200 | 160 to 320 |
| 2SB647A | 60 to 120 | 100 to 200 | —          |

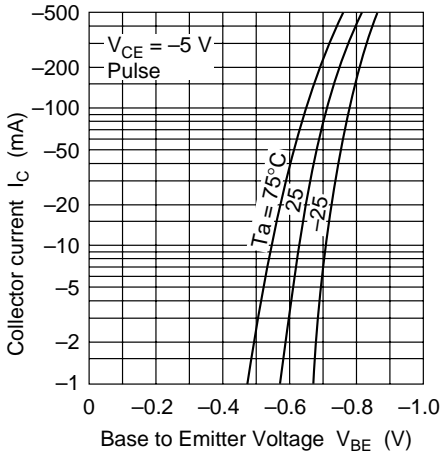
Maximum Collector Dissipation Curve



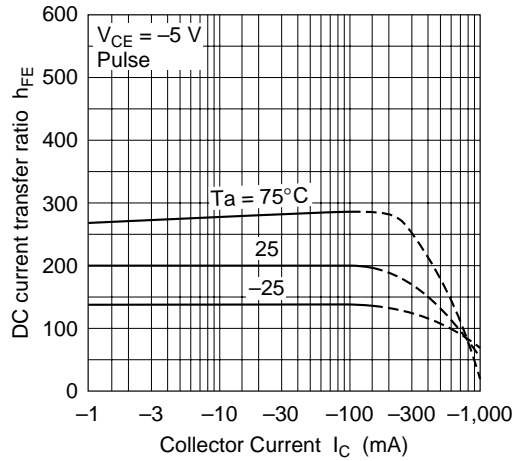
Typical Output Characteristics



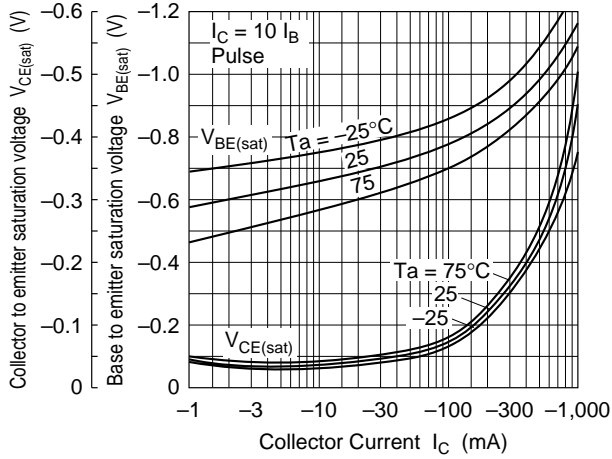
Typical Transfer Characteristics



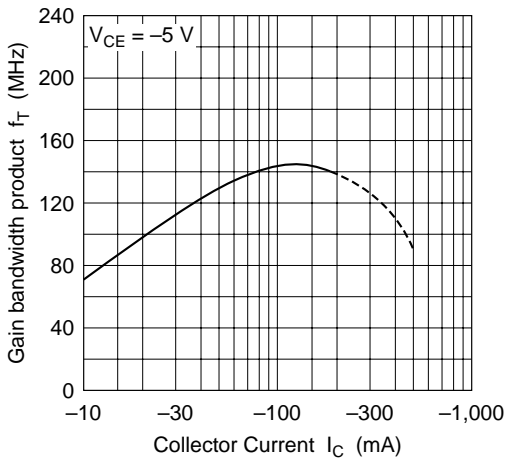
DC Current Transfer Ratio vs. Collector Current



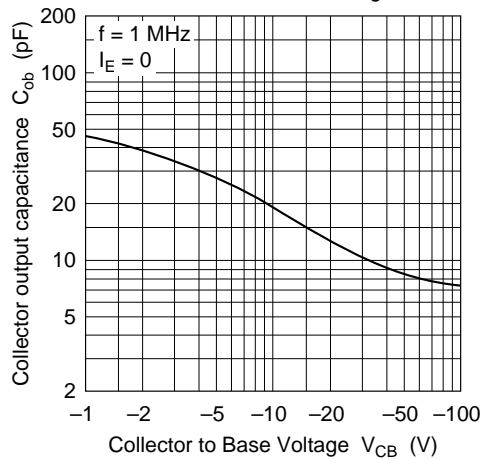
Saturation Voltage vs. Collector Current



Gain Bandwidth Product vs. Collector Current

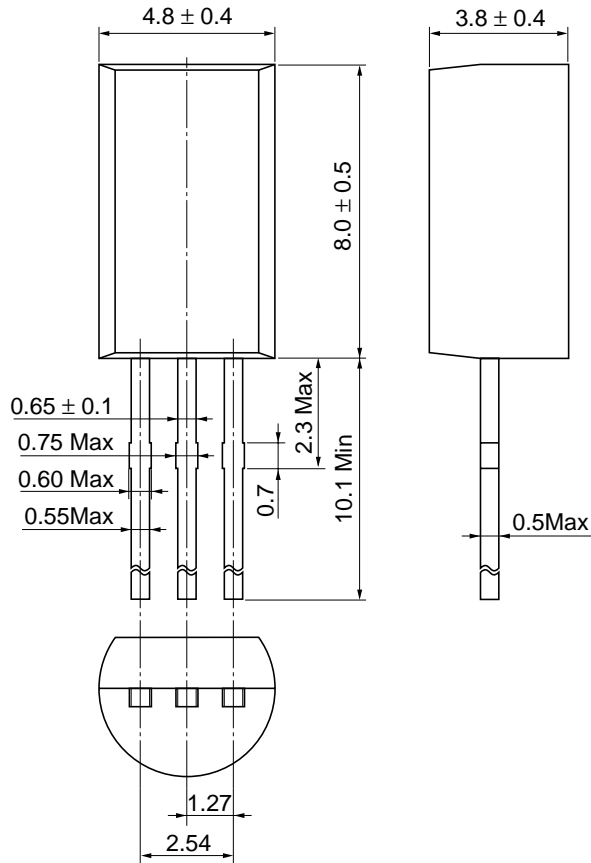


Collector Output Capacitance vs. Collector to Base Voltage



Package Dimensions

As of January, 2001  
Unit: mm



|                        |           |
|------------------------|-----------|
| Hitachi Code           | TO-92 Mod |
| JEDEC                  | —         |
| EIAJ                   | Conforms  |
| Mass (reference value) | 0.35 g    |

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# HITACHI

## 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 NorthAmerica : <http://semiconductor.hitachi.com/>  
Europe : <http://www.hitachi-eu.com/hel/ecg>  
Asia : <http://sicapac.hitachi-asia.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) 585160

Hitachi Asia Ltd.  
Hitachi Tower  
16 Collyer Quay #20-00,  
Singapore 049318  
Tel: <65>-538-6533/538-8577  
Fax: <65>-538-6933/538-3877  
URL: <http://www.hitachi.com.sg>

Hitachi Asia Ltd.  
(Taipei Branch Office)  
4/F, No. 167, Tun Hwa North Road,  
Hung-Kuo Building,  
Taipei (105), Taiwan  
Tel: <886>-(2)-2718-3666  
Fax: <886>-(2)-2718-8180  
Telex: 23222 HAS-TP  
URL: <http://www.hitachi.com.tw>

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  
URL: <http://www.hitachi.com.hk>

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