

To all our customers

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

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# 2SA1083, 2SA1084, 2SA1085

Silicon PNP Epitaxial

**RENESAS**

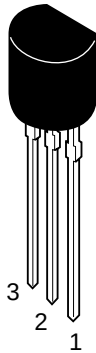
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## Application

- Low frequency low noise amplifier
- Complementary pair with 2SC2545, 2SC2546 and 2SC2547

## Outline

TO-92 (1)



1. Emitter
2. Collector
3. Base

2SA1083, 2SA1084, 2SA1085

Absolute Maximum Ratings (Ta = 25°C)

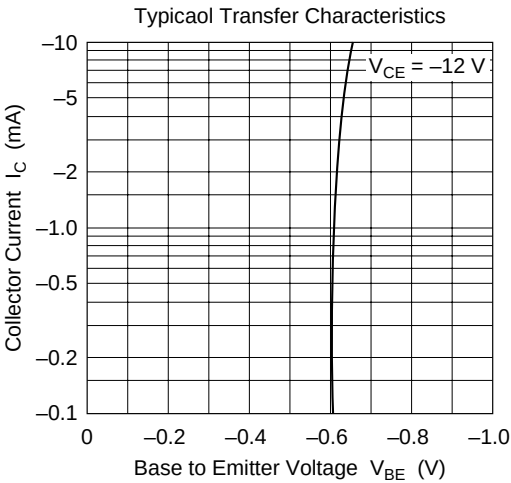
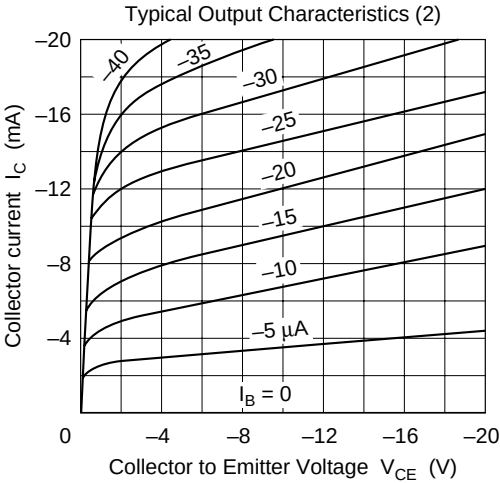
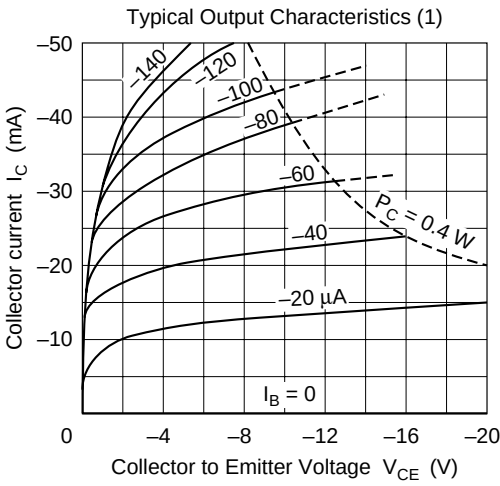
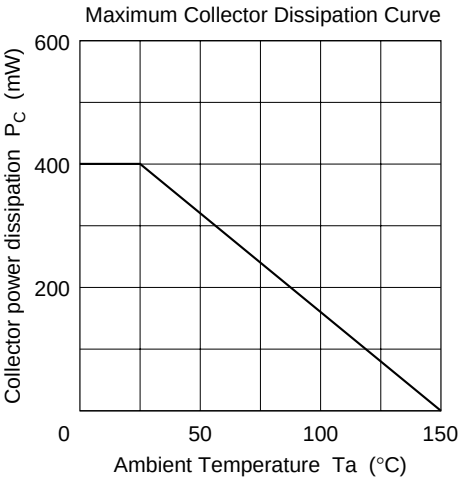
| Item                         | Symbol           | 2SA1083     | 2SA1084     | 2SA1085     | Unit |
|------------------------------|------------------|-------------|-------------|-------------|------|
| Collector to base voltage    | V <sub>CBO</sub> | −60         | −90         | −120        | V    |
| Collector to emitter voltage | V <sub>CEO</sub> | −60         | −90         | −120        | V    |
| Emitter to base voltage      | V <sub>EBO</sub> | −5          | −5          | −5          | V    |
| Collector current            | I <sub>C</sub>   | −100        | −100        | −100        | mA   |
| Emitter current              | I <sub>E</sub>   | 100         | 100         | 100         | mA   |
| Collector power dissipation  | P <sub>C</sub>   | 400         | 400         | 400         | mW   |
| Junction temperature         | T <sub>j</sub>   | 150         | 150         | 150         | °C   |
| Storage temperature          | T <sub>stg</sub> | −55 to +150 | −55 to +150 | −55 to +150 | °C   |

## Electrical Characteristics (Ta = 25°C)

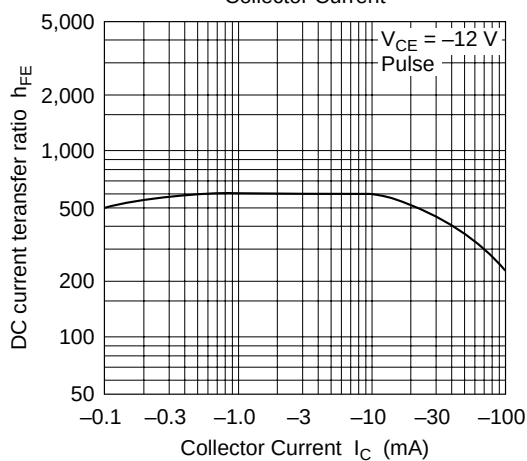
| Item                                    | Symbol        | 2SA1083 |      |      | 2SA1084 |      |      | 2SA1085 |      |      | Unit                      | Test conditions                                                                                                     |
|-----------------------------------------|---------------|---------|------|------|---------|------|------|---------|------|------|---------------------------|---------------------------------------------------------------------------------------------------------------------|
|                                         |               | Min     | Typ  | Max  | Min     | Typ  | Max  | Min     | Typ  | Max  |                           |                                                                                                                     |
| Collector to base breakdown voltage     | $V_{(BR)CBO}$ | -60     | —    | —    | -90     | —    | —    | -120    | —    | —    | V                         | $I_C = -10\text{ }\mu\text{A}$ , $I_E = 0$                                                                          |
| Collector to emitter breakdown voltage  | $V_{(BR)CEO}$ | -60     | —    | —    | -90     | —    | —    | -120    | —    | —    | V                         | $I_C = -1\text{ mA}$ ,<br>$R_{BE} = \infty$                                                                         |
| Emitter to base breakdown voltage       | $V_{(BR)EBO}$ | -5      | —    | —    | -5      | —    | —    | -5      | —    | —    | V                         | $I_E = -10\text{ }\mu\text{A}$ , $I_C = 0$                                                                          |
| Collector cutoff current                | $I_{CBO}$     | —       | —    | -0.1 | —       | —    | -0.1 | —       | —    | -0.1 | $\mu\text{A}$             | $V_{CB} = -50\text{ V}$ , $I_E = 0$                                                                                 |
| Emitter cutoff current                  | $I_{EBO}$     | —       | —    | -0.1 | —       | —    | -0.1 | —       | —    | -0.1 | $\mu\text{A}$             | $V_{EB} = -2\text{ V}$ , $I_C = 0$                                                                                  |
| DC current transfer ratio               | $h_{FE}^{*1}$ | 250     | —    | 800  | 250     | —    | 800  | 250     | —    | 800  |                           | $V_{CE} = -12\text{ V}$ ,<br>$I_C = -2\text{ mA}$                                                                   |
| Collector to emitter saturation voltage | $V_{CE(sat)}$ | —       | —    | -0.2 | —       | —    | -0.2 | —       | —    | -0.2 | V                         | $I_C = -10\text{ mA}$ ,<br>$I_B = -1\text{ mA}$                                                                     |
| Base to emitter voltage                 | $V_{BE}$      | —       | -0.6 | —    | —       | -0.6 | —    | —       | -0.6 | —    | V                         | $V_{CE} = -12\text{ V}$ ,<br>$I_C = -2\text{ mA}$                                                                   |
| Gain bandwidth product                  | $f_T$         | —       | 90   | —    | —       | 90   | —    | —       | 90   | —    | MHz                       | $V_{CE} = -12\text{ V}$ ,<br>$I_C = -2\text{ mA}$                                                                   |
| Collector output capacitance            | $C_{ob}$      | —       | 3.5  | —    | —       | 3.5  | —    | —       | 3.5  | —    | pF                        | $V_{CB} = -10\text{ V}$ , $I_E = 0$ ,<br>$f = 1\text{ MHz}$                                                         |
| Noise voltage referred to input         | $e_n$         | —       | 0.5  | —    | —       | 0.5  | —    | —       | 0.5  | —    | nV/<br>$\sqrt{\text{Hz}}$ | $V_{CE} = -6\text{ V}$ ,<br>$I_C = -10\text{ mA}$ ,<br>$f = 1\text{ kHz}$ ,<br>$R_g = 0$ , $\Delta f = 1\text{ Hz}$ |

Note: 1. The 2SA1083, 2SA1084 and 2SA1085 are grouped by  $h_{FE}$  as follows.

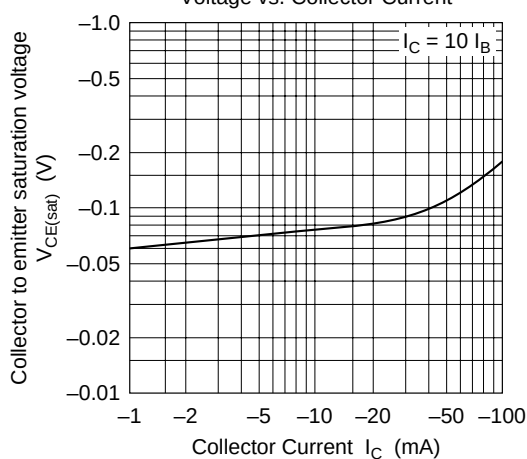
| D          | E          |
|------------|------------|
| 250 to 500 | 400 to 800 |



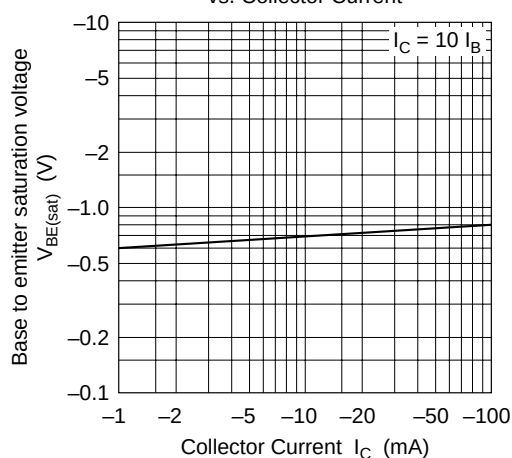
DC Current Transfer Ratio vs.  
Collector Current



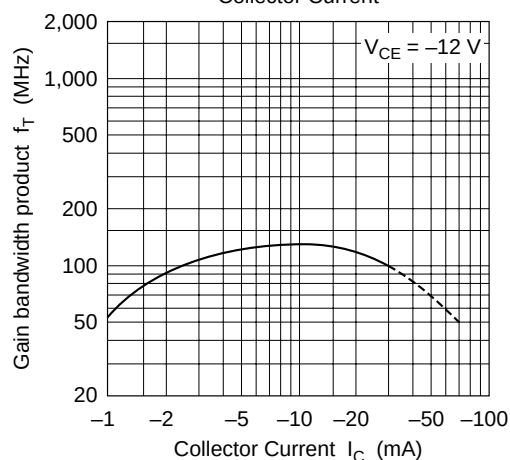
Collector to Emitter Saturation  
Voltage vs. Collector Current



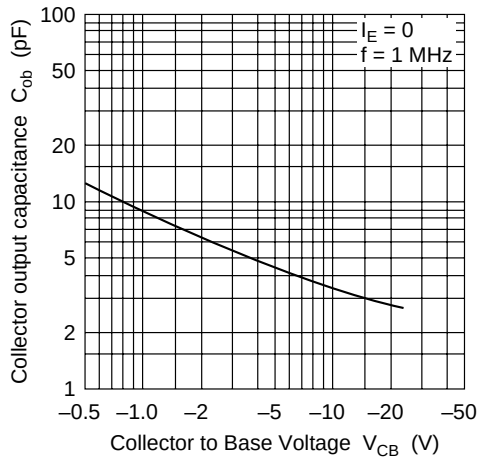
Base to Emitter Saturation Voltage  
vs. Collector Current



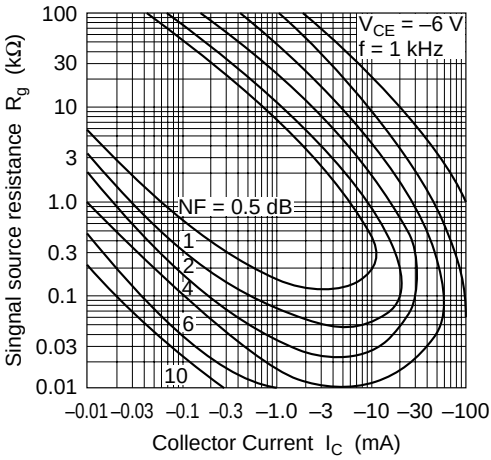
Gain Bandwidth Product vs.  
Collector Current



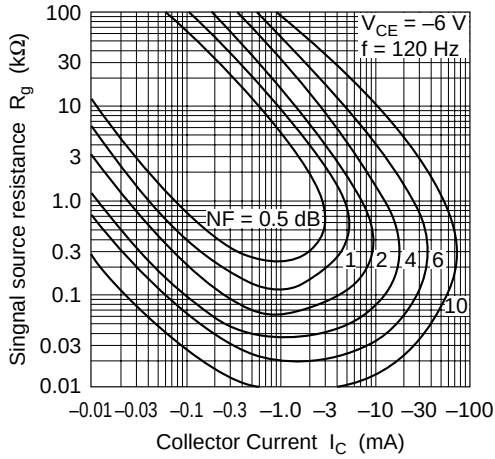
Collector Output Capacitance vs.  
Collector to Base Voltage



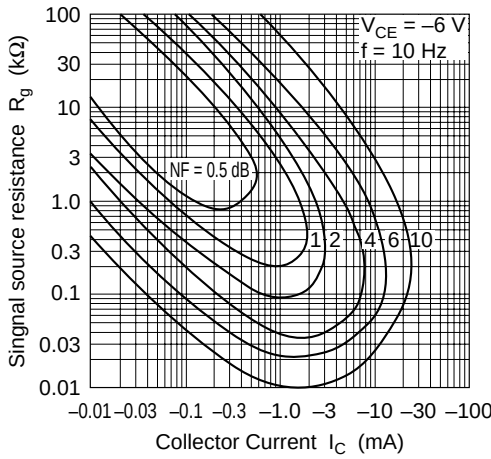
Contours of Constant Noise Figure (1)



Contours of Constant Noise Figure (2)



Contours of Constant Noise Figure (3)





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