

2SC1345

Silicon NPN Epitaxial

REJ03G0687-0300
(Previous ADE-208-1052A)

Rev.3.00

Sep.10.2005

Application

Low frequency low noise amplifier

Outline

RENESAS Package code: PRSS0003DA-A
(Package name: TO-92 (1))

1. Emitter
2. Collector
3. Base

Absolute Maximum Ratings

(Ta = 25°C)

| Item | Symbol | Ratings | Unit |
|------------------------------|-----------|-------------|------|
| Collector to base voltage | V_{CBO} | 55 | V |
| Collector to emitter voltage | V_{CEO} | 50 | V |
| Emitter to base voltage | V_{EBO} | 5 | V |
| Collector current | I_C | 100 | mA |
| Collector power dissipation | P_C | 200 | mW |
| Junction temperature | T_j | 150 | °C |
| Storage temperature | T_{stg} | -55 to +150 | °C |

Electrical Characteristics

(Ta = 25°C)

| Item | Symbol | Min | Typ | Max | Unit | Test conditions |
|---|---------------|-----|-----|------|---------|---|
| Collector to base breakdown voltage | $V_{(BR)CBO}$ | 55 | — | — | V | $I_C = -10 \mu A, I_E = 0$ |
| Collector to emitter breakdown voltage | $V_{(BR)CEO}$ | 50 | — | — | V | $I_C = 1 \text{ mA}, R_{BE} = \infty$ |
| Emitter to base breakdown voltage | $V_{(BR)EBO}$ | 5 | — | — | V | $I_E = 10 \mu A, I_C = 0$ |
| Collector cutoff current | I_{CBO} | — | — | 0.5 | μA | $V_{CB} = 18 \text{ V}, I_E = 0$ |
| Emitter cutoff current | I_{EBO} | — | — | 0.5 | μA | $V_{EB} = 2 \text{ V}, I_C = 0$ |
| DC current transfer ratio | h_{FE}^{*1} | 250 | — | 1200 | | $V_{CE} = 12 \text{ V}, I_C = 2 \text{ mA}$ |
| Base to emitter voltage | V_{BE} | — | — | 0.75 | V | $V_{CE} = 12 \text{ V}, I_C = 2 \text{ mA}$ |
| Collector to emitter saturation voltage | $V_{CE(sat)}$ | — | — | 0.5 | V | $I_C = 10 \text{ mA}, I_B = 1 \text{ mA}$ |
| Gain bandwidth product | f_T | — | 230 | — | MHz | $V_{CE} = 12 \text{ V}, I_C = 2 \text{ mA}$ |
| Collector output capacitance | C_{ob} | — | — | 3.5 | pF | $V_{CB} = 10 \text{ V}, I_E = 0, f = 1 \text{ MHz}$ |
| Noise figure | NF | — | — | 8 | dB | $V_{CE} = 6 \text{ V}, I_C = 0.1 \text{ mA}, f = 10 \text{ Hz}, R_g = 10 \text{ k}\Omega$ |
| | | — | — | 1 | dB | $V_{CE} = 6 \text{ V}, I_C = 0.1 \text{ mA}, f = 1 \text{ kHz}, R_g = 10 \text{ k}\Omega$ |

Note: 1. The 2SC1345 is grouped by h_{FE} as follows.

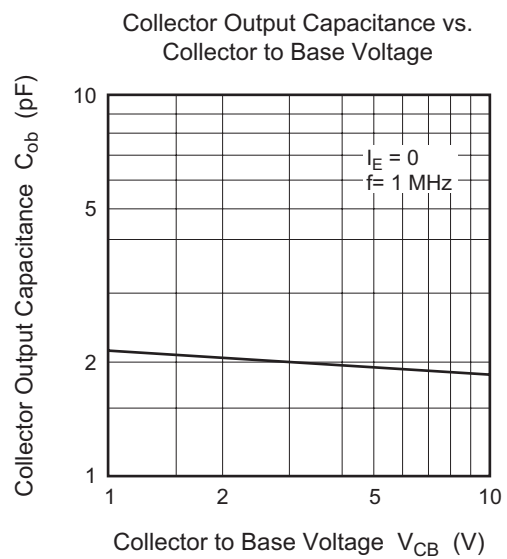
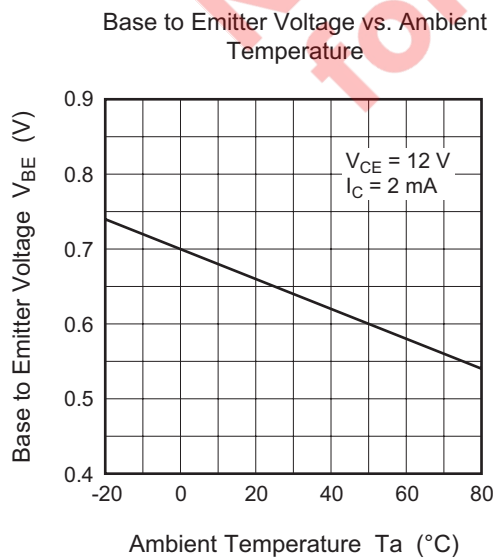
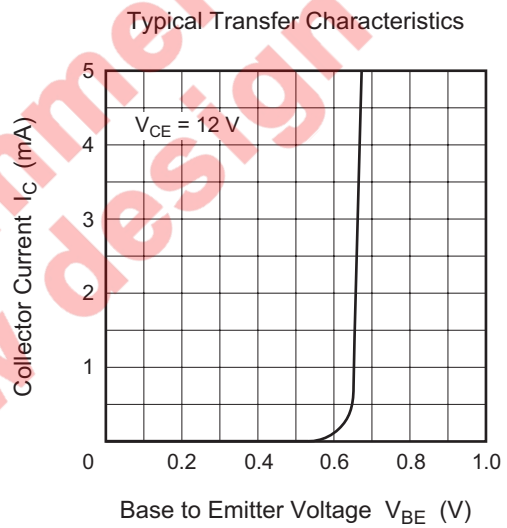
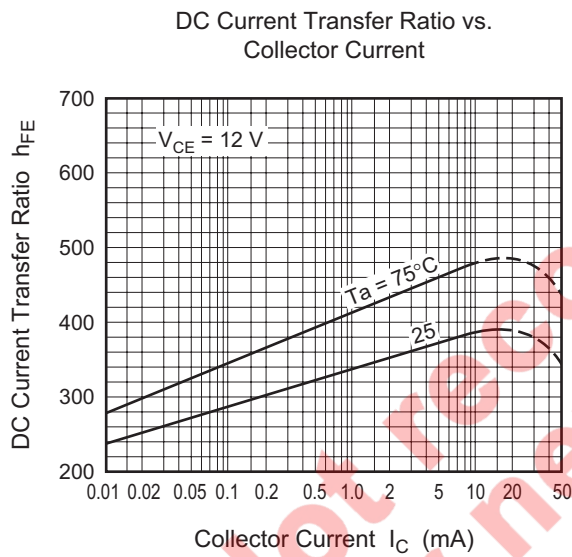
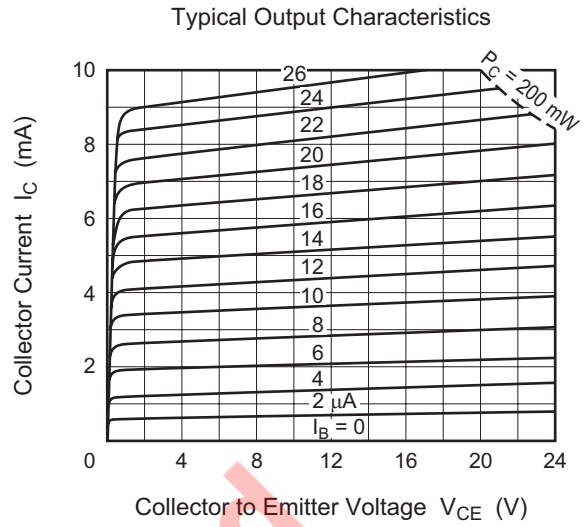
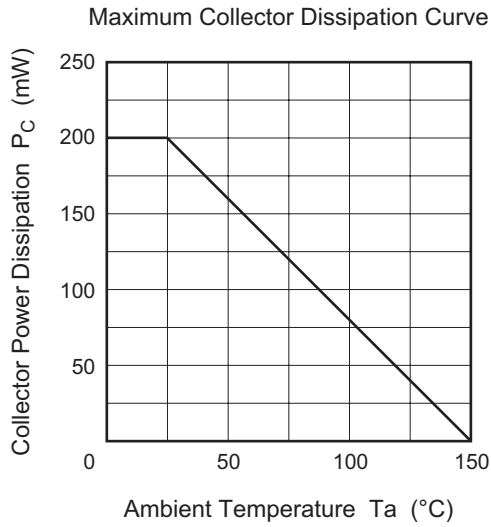
| D | E | F |
|------------|------------|-------------|
| 250 to 500 | 400 to 800 | 600 to 1200 |

Small Signal h Parameters

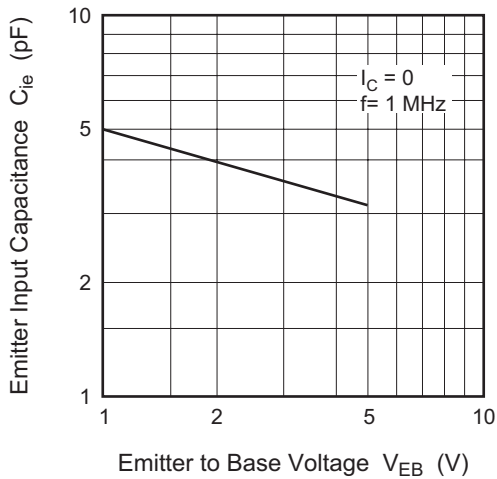
(V_{CE} = 5V, I_C = 0.1 mA, f = 270 Hz, Ta = 25°C, Emitter common)

| Item | Symbol | D | E | F | Unit |
|------------------------|----------|------|------|------|------------------|
| Input impedance | h_{ie} | 110 | 170 | 240 | k Ω |
| Voltage feedback ratio | h_{re} | 9.5 | 14.5 | 16 | $\times 10^{-4}$ |
| Current transfer ratio | h_{fe} | 340 | 540 | 825 | |
| Output admittance | h_{oe} | 12.0 | 12.5 | 13.5 | μS |

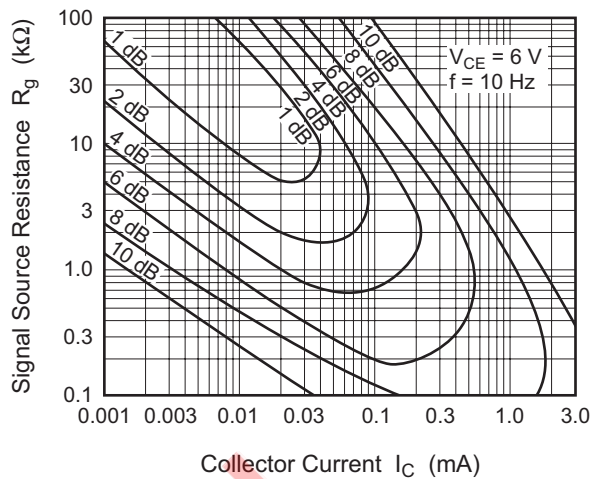
Main Characteristics



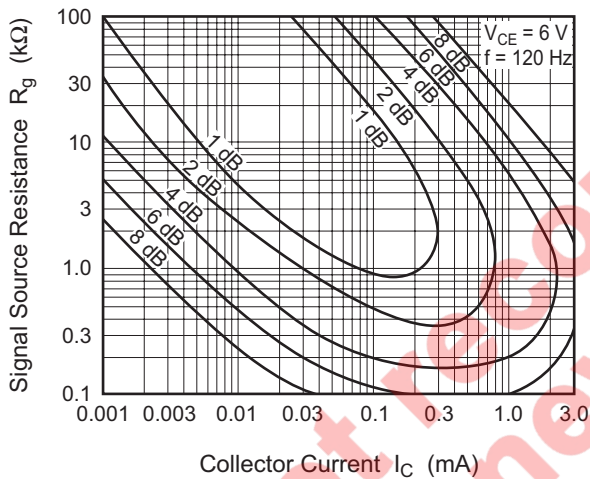
Emitter Input Capacitance vs. Emitter to Base Voltage



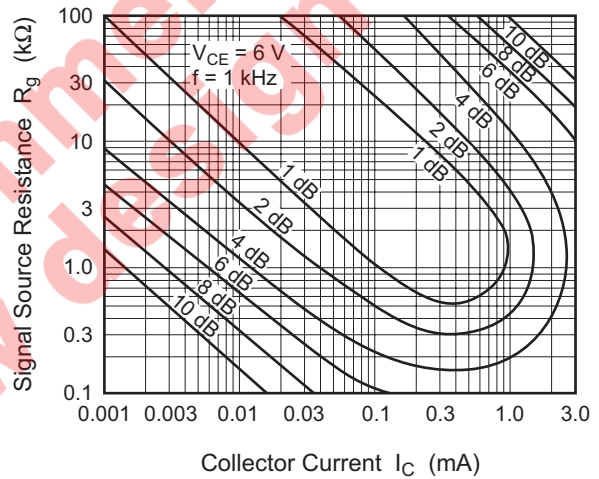
Contours of Constant Noise Figure



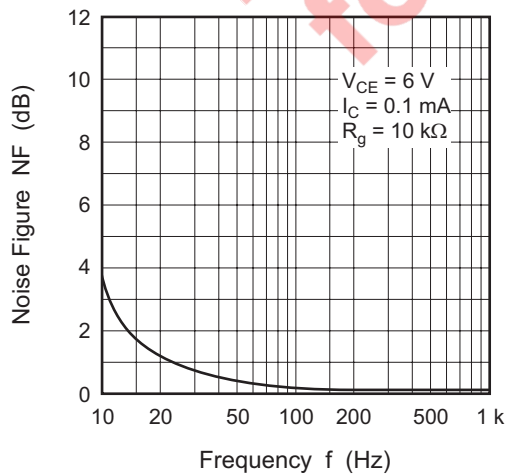
Contours of Constant Noise Figure



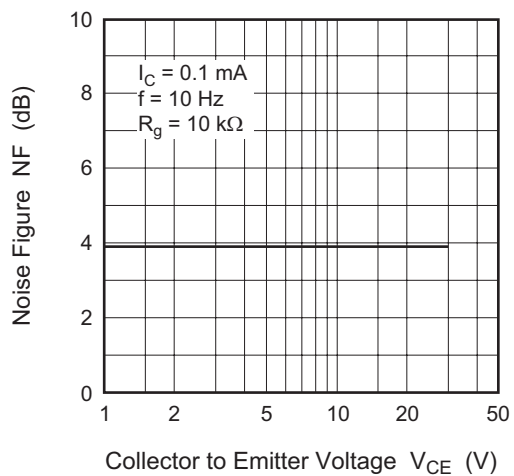
Contours of Constant Noise Figure

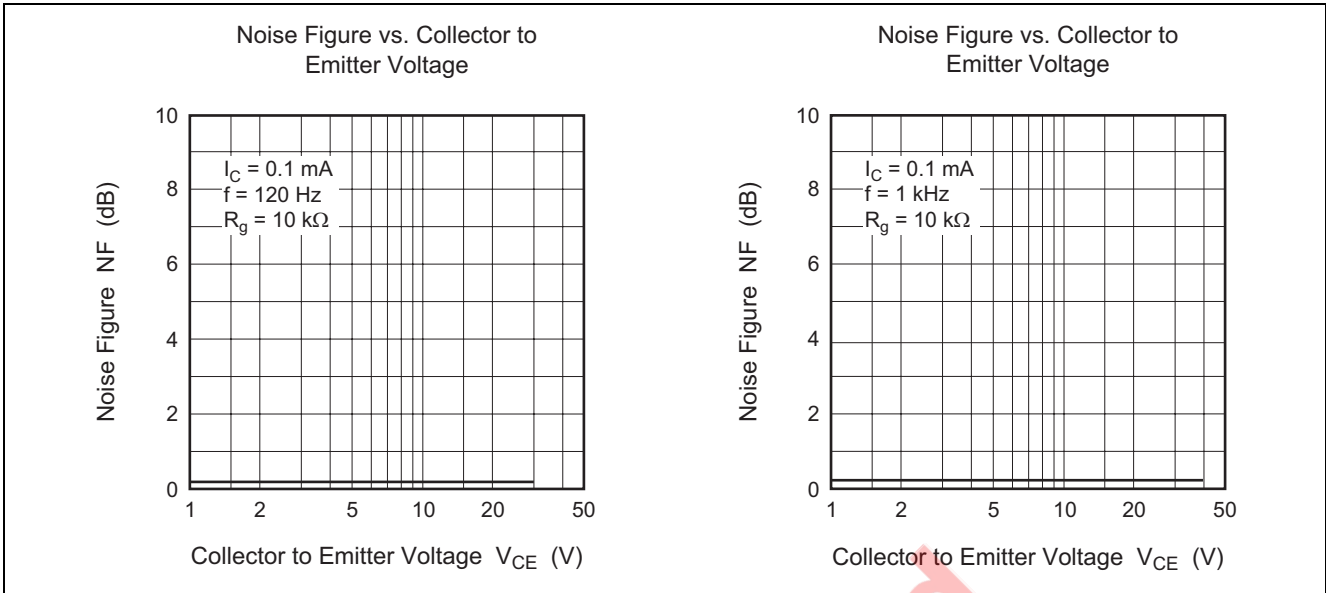


Noise Figure vs. Frequency



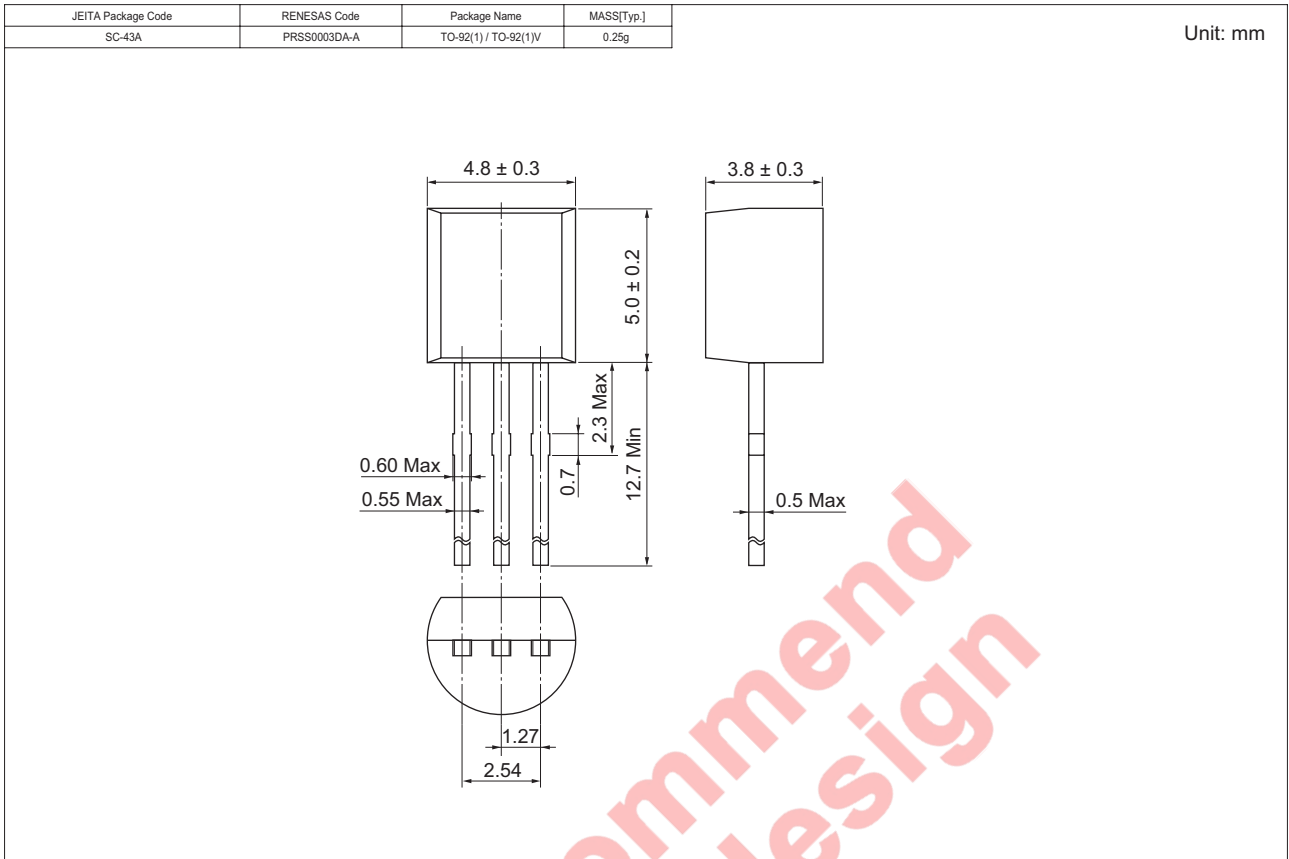
Noise Figure vs. Collector to Emitter Voltage





Not recommended for new design

Package Dimensions



Ordering Information

| Part Name | Quantity | Shipping Container |
|--------------|----------|-------------------------|
| 2SC1345ETZ-E | 2500 | Hold Box, Radial Taping |
| 2SC1345FTZ-E | | |

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