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# 2SC1344, 2SC1345

Silicon NPN Epitaxial

# HITACHI

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## Application

Low frequency low noise amplifier

## Outline

TO-92 (1)



1. Emitter
2. Collector
3. Base

# 2SC1344, 2SC1345

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

| Item                         | Symbol    | 2SC1344     | 2SC1345     | Unit |
|------------------------------|-----------|-------------|-------------|------|
| Collector to base voltage    | $V_{CBO}$ | 30          | 55          | V    |
| Collector to emitter voltage | $V_{CEO}$ | 30          | 50          | V    |
| Emitter to base voltage      | $V_{EBO}$ | 5           | 5           | V    |
| Collector current            | $I_C$     | 100         | 100         | mA   |
| Collector power dissipation  | $P_C$     | 200         | 200         | mW   |
| Junction temperature         | $T_j$     | 150         | 150         | °C   |
| Storage temperature          | $T_{stg}$ | -55 to +150 | -55 to +150 | °C   |

## Electrical Characteristics (Ta = 25°C)

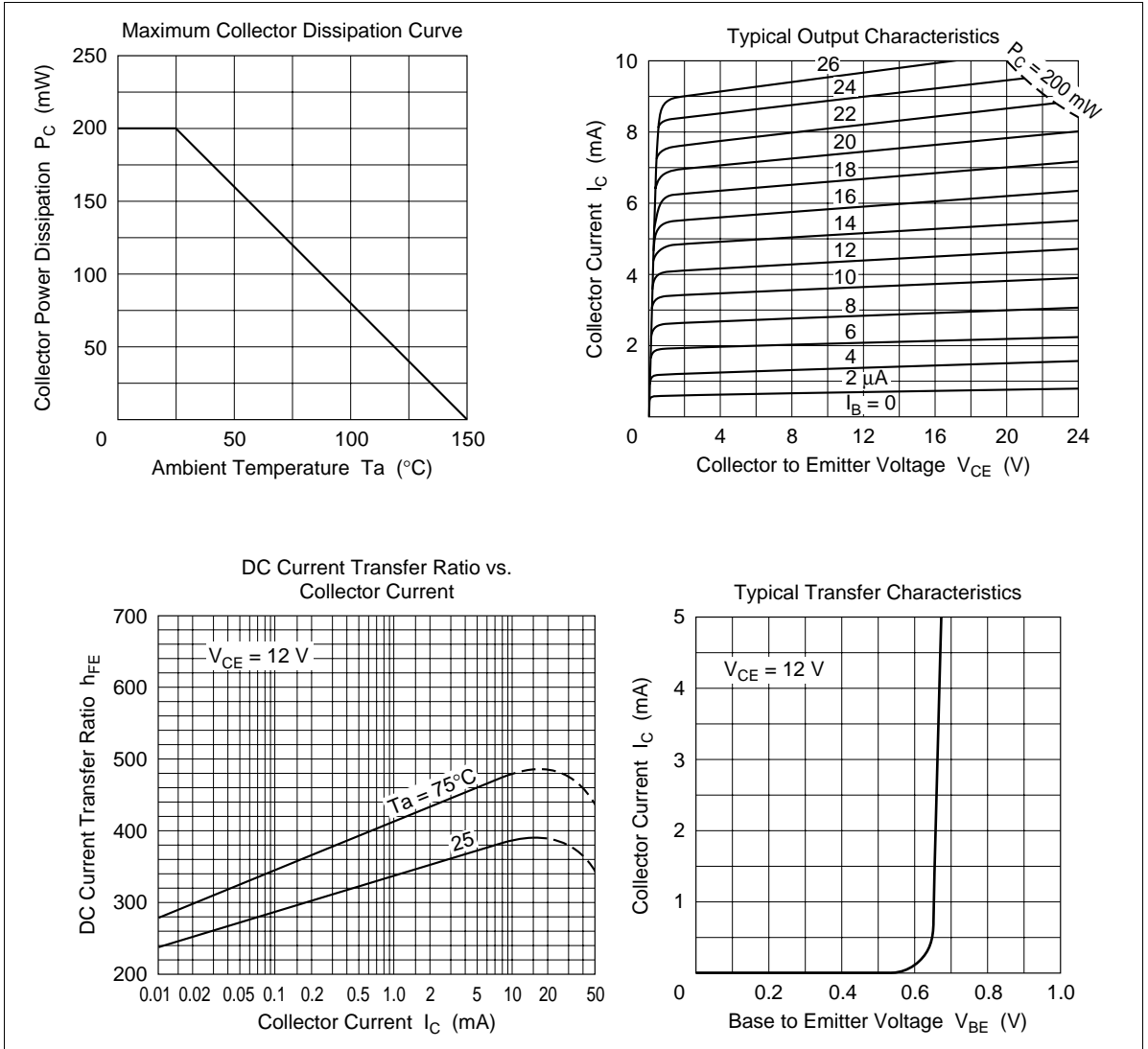
| Item                                    | Symbol        | 2SC1344 |     |      | 2SC1345 |     |      | Unit    | Test conditions   |
|---|---------------|---------|-----|------|---------|-----|------|---------|---|
|   |               | Min     | Typ | Max  | Min     | Typ | Max  |         |   |
| Collector to base breakdown voltage     | $V_{(BR)CBO}$ | 30      | —   | —    | 55      | —   | —    | V       | $I_C = -10 \mu A, I_E = 0$  |
| Collector to emitter breakdown voltage  | $V_{(BR)CEO}$ | 30      | —   | —    | 50      | —   | —    | 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                | $I_{CBO}$     | —       | —   | 0.5  | —       | —   | 0.5  | $\mu A$ | $V_{CB} = 18 \text{ V}, I_E = 0$  |
| Emitter cutoff current                  | $I_{EBO}$     | —       | —   | 0.5  | —       | —   | 0.5  | $\mu A$ | $V_{CB} = 2 \text{ V}, I_C = 0$   |
| DC current transfer ratio               | $h_{FE}^{*1}$ | 250     | —   | 1200 | 250     | —   | 1200 |         | $V_{CE} = 12 \text{ V}, I_C = 2 \text{ mA}$   |
| Base to emitter voltage                 | $V_{BE}$      | —       | —   | 0.75 | —       | —   | 0.75 | V       | $V_{CE} = 12 \text{ V}, I_C = 2 \text{ mA}$   |
| Collector to emitter saturation voltage | $V_{CE(sat)}$ | —       | —   | 0.5  | —       | —   | 0.5  | V       | $I_C = 10 \text{ mA}, I_B = 1 \text{ mA}$   |
| Gain bandwidth product                  | $f_T$         | —       | 230 | —    | —       | 230 | —    | MHz     | $V_{CE} = 12 \text{ V}, I_C = 2 \text{ mA}$   |
| Collector output capacitance            | $C_{ob}$      | —       | —   | 3.5  | —       | —   | 3.5  | pF      | $V_{CB} = 10 \text{ V}, I_E = 0, f = 1 \text{ MHz}$                                       |
| Noise figure                            | NF            | —       | —   | 8    | —       | —   | 8    | dB      | $V_{CE} = 6 \text{ V}, I_C = 0.1 \text{ mA}, f = 10 \text{ Hz}, R_g = 10 \text{ k}\Omega$ |
|   |               | —       | —   | 1    | —       | —   | 1    | dB      | $V_{CE} = 6 \text{ V}, I_C = 0.1 \text{ mA}, f = 1 \text{ kHz}, R_g = 10 \text{ k}\Omega$ |

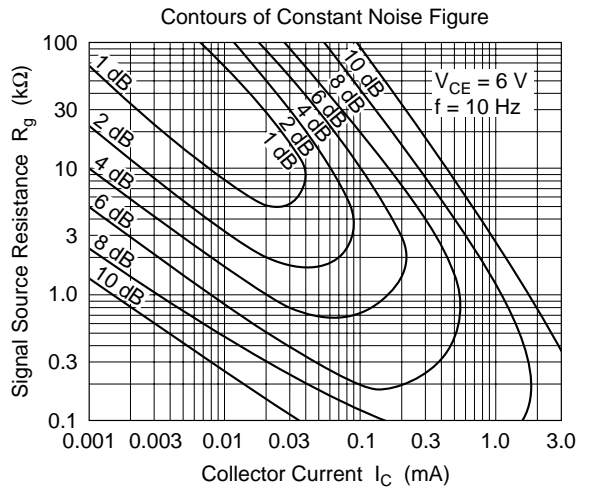
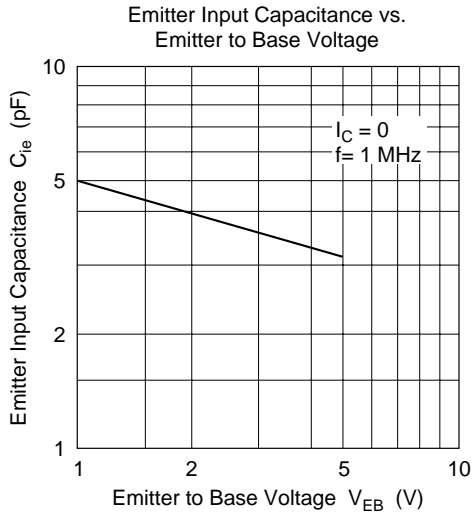
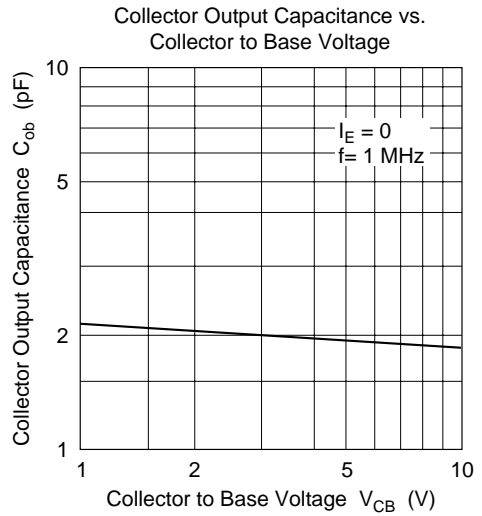
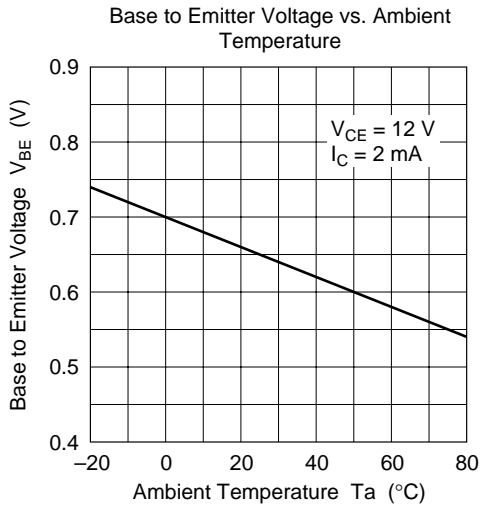
Note: 1. The 2SC1344 and 2SC1345 are grouped by  $h_{FE}$  as follows.

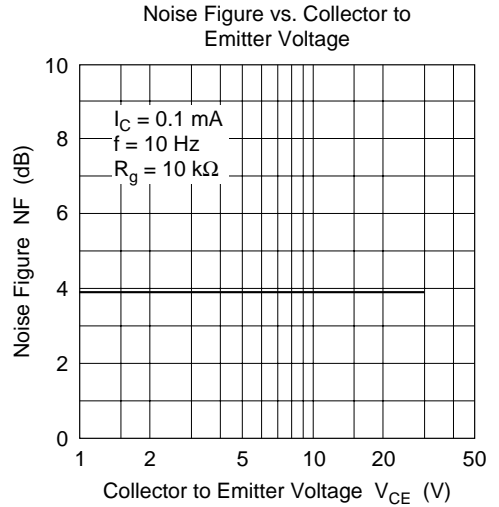
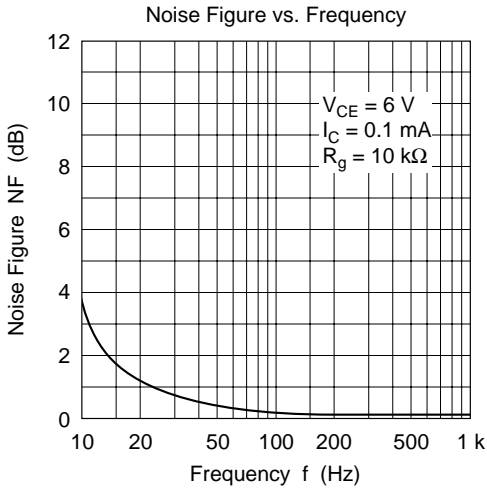
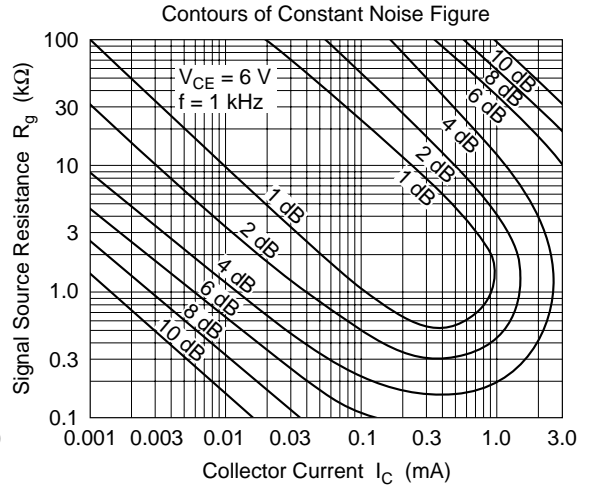
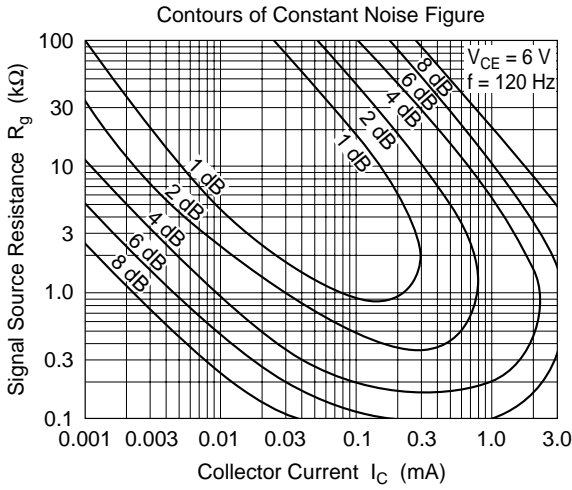
| D          | E          | F           |
|------------|------------|-------------|
| 250 to 500 | 400 to 800 | 600 to 1200 |

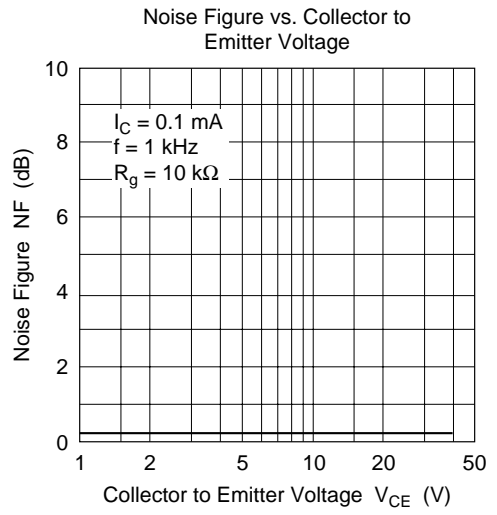
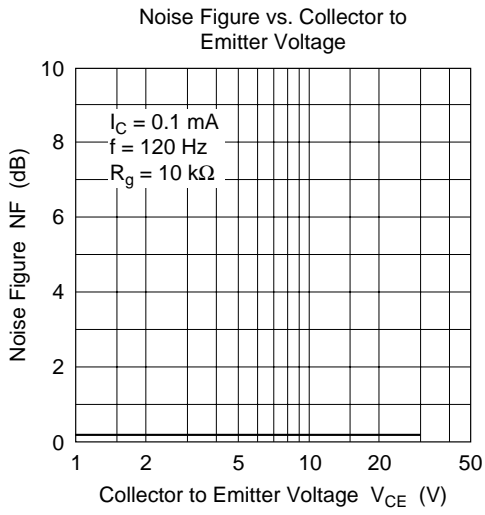
**Small Signal h Parameters** ( $V_{CE} = 5V$ ,  $I_C = 0.1 \text{ mA}$ ,  $f = 270 \text{ Hz}$ ,  $T_a = 25^\circ\text{C}$ , Emitter common)

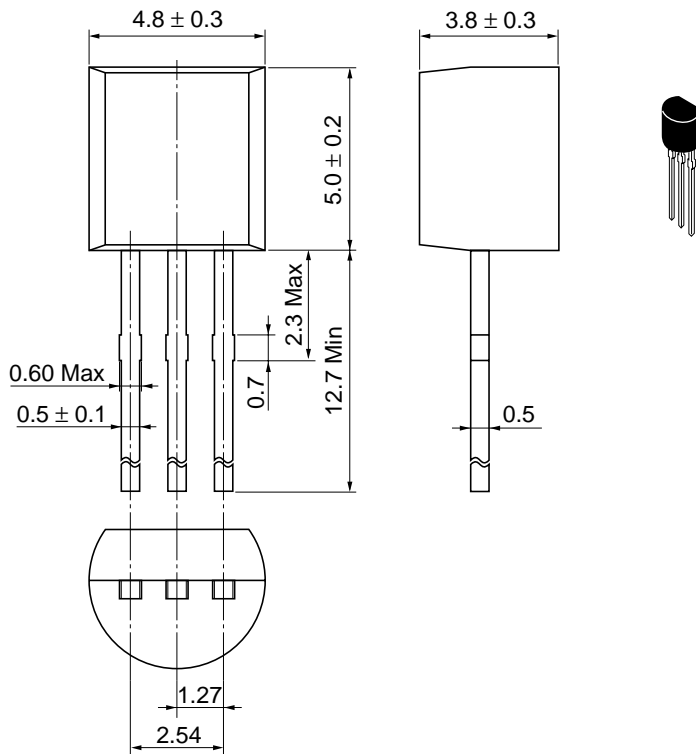
| Item                   | Symbol | D    | E    | F    | Unit             |
|------------------------|--------|------|------|------|------------------|
| Input impedance        | hie    | 110  | 170  | 240  | kΩ               |
| Voltage feedback ratio | hre    | 9.5  | 14.5 | 16   | $\times 10^{-4}$ |
| Current transfer ratio | hfe    | 340  | 540  | 825  |                  |
| Output admittance      | hoe    | 12.0 | 12.5 | 13.5 | μS               |











|                          |           |
|--------------------------|-----------|
| Hitachi Code             | TO-92 (1) |
| JEDEC                    | Conforms  |
| EIAJ                     | Conforms  |
| Weight (reference value) | 0.25 g    |

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