

# HTT1213S

Silicon NPN Epitaxial Twin Transistor

# HITACHI

ADE-208-1448(Z)

Preliminary  
Rev. 0  
Aug. 2001

## Features

- Include 2 transistors in a small size SMD package: SMFPAK-6 (6 Leads: 1.5 x 1.1 x 0.55 mm)

**Q1:**  
Equivalent  
Buffer Transistor

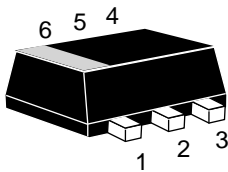
**Q2:**  
Equivalent  
OSC Transistor

2SC5700

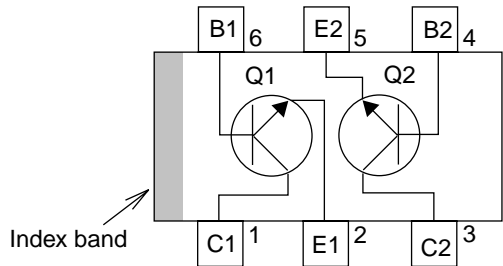
2SC5700

## Outline

SMFPAK-6



Pin Arrangement



- |                 |               |
|-----------------|---------------|
| 1. Collector Q1 | 4. Base Q2    |
| 2. Emitter Q1   | 5. Emitter Q2 |
| 3. Collector Q2 | 6. Base Q1    |

Note: Marking is "CK1".

# HTT1213S

## Absolute Maximum Ratings

( $T_a = 25\text{ }^\circ\text{C}$ )

| Item                         | Symbol    | Ratings     |                  |
|------------------------------|-----------|-------------|------------------|
|                              |           | Q1 and Q2   | Unit             |
| Collector to base voltage    | $V_{CBO}$ | 15          | V                |
| Collector to emitter voltage | $V_{CEO}$ | 4           | V                |
| Emitter to base voltage      | $V_{EBO}$ | 1.5         | V                |
| Collector current            | $I_C$     | 50          | mA               |
| Collector power dissipation  | $P_C$     | Total 220*  | mW               |
| Junction temperature         | $T_j$     | 150         | $^\circ\text{C}$ |
| Storage temperature          | $T_{stg}$ | -55 to +150 | $^\circ\text{C}$ |

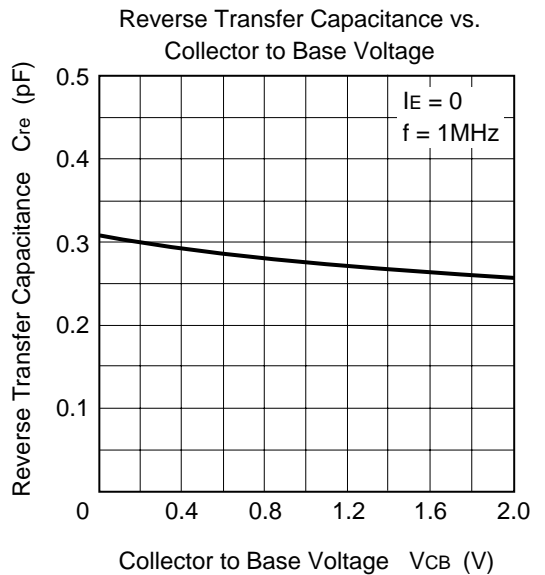
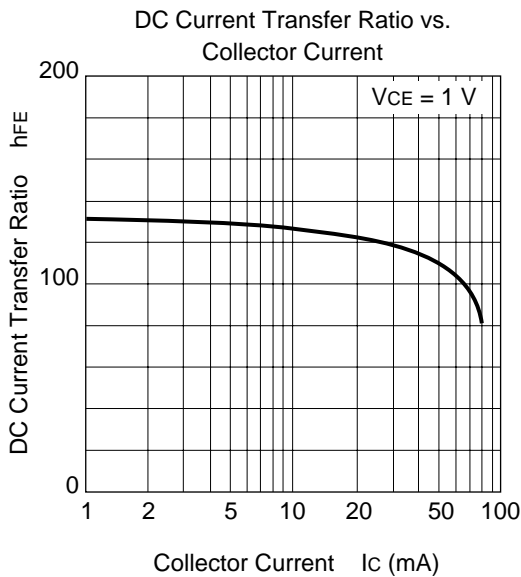
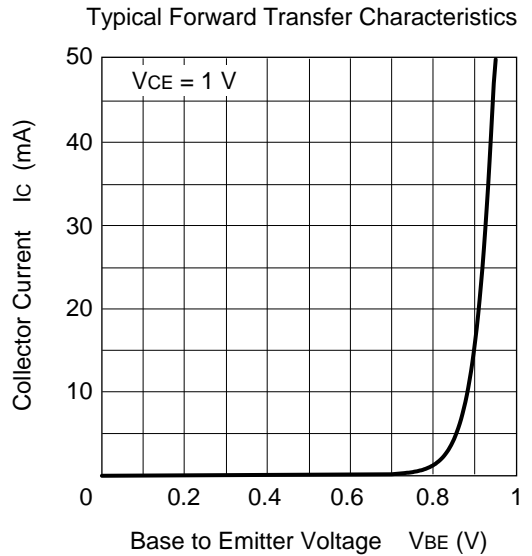
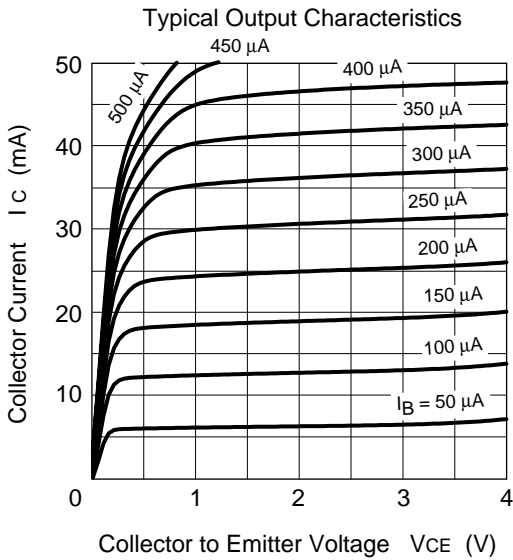
\*Value on PCB. (FR-4 (13 x 13 x 0.635 mm) )

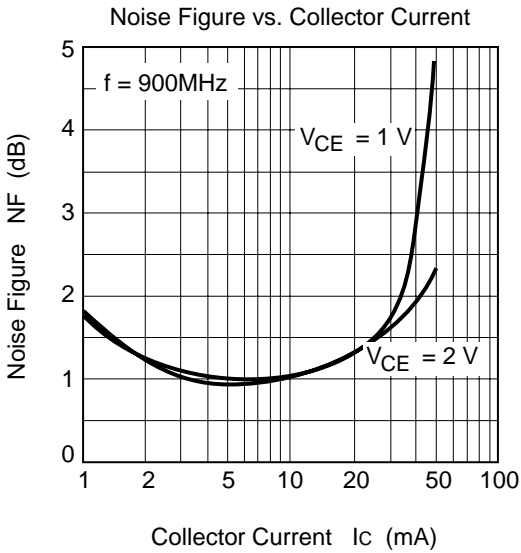
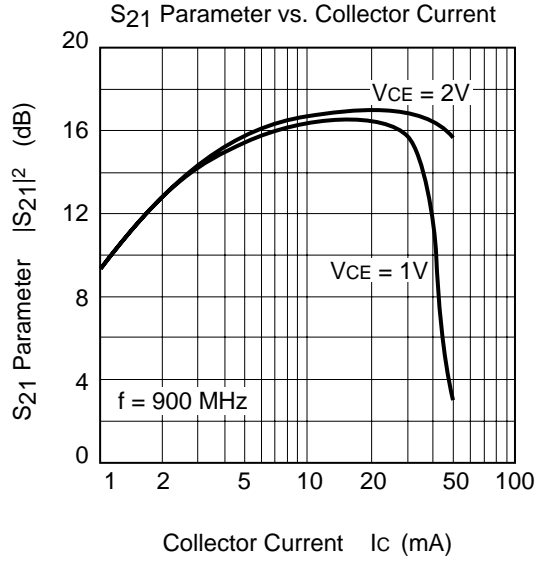
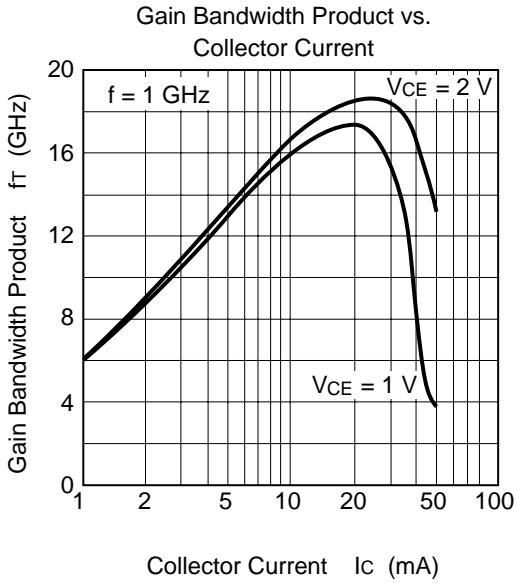
## Electrical Characteristics (Q1 and Q2)

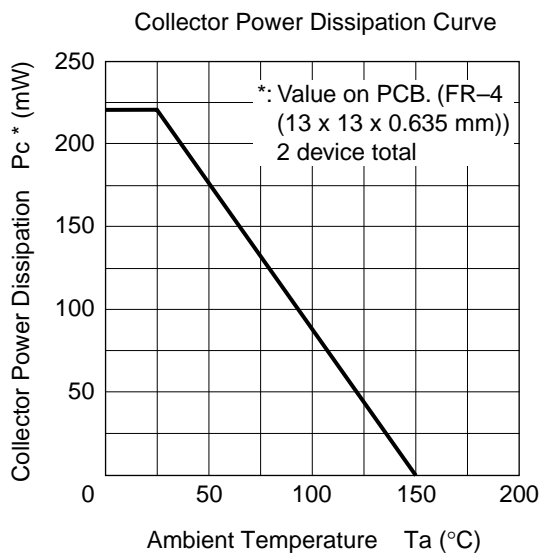
( $T_a = 25\text{ }^\circ\text{C}$ )

| Item                                | Symbol        | Min | Typ  | Max  | Unit | Test conditions   |
|-------------------------------------|---------------|-----|------|------|------|---|
| Collector to base breakdown voltage | $V_{(BR)CBO}$ | 15  | —    | —    | V    | $I_C = 10\text{ }\mu\text{A}$ , $I_E = 0$                               |
| Collector cutoff current            | $I_{CBO}$     | —   | —    | 0.1  | mA   | $V_{CB} = 15\text{ V}$ , $I_E = 0$                                      |
| Collector cutoff current            | $I_{CEO}$     | —   | —    | 1    | mA   | $V_{CE} = 4\text{ V}$ , $R_{BE} = \text{infinite}$                      |
| Emitter cutoff current              | $I_{EBO}$     | —   | —    | 0.2  | mA   | $V_{EB} = 0.8\text{ V}$ , $I_C = 0$                                     |
| DC current transfer ratio           | $h_{FE}$      | 100 | 130  | 170  | —    | $V_{CE} = 1\text{ V}$ , $I_C = 5\text{ mA}$                             |
| Reverse transfer capacitance        | $C_{fe}$      | —   | 0.30 | 0.45 | pF   | $V_{CB} = 1\text{ V}$ , $f = 1\text{ MHz}$<br>Emitter ground            |
| Gain bandwidth product              | $f_T$         | 10  | 13   | —    | GHz  | $V_{CE} = 1\text{ V}$ , $I_C = 5\text{ mA}$ , $f = 1\text{ GHz}$        |
| Forward transfer coefficient        | $ S_{21} ^2$  | 13  | 16   | —    | dB   | $V_{CE} = 1\text{ V}$ , $I_C = 5\text{ mA}$ ,<br>$f = 900\text{ MHz}$ , |
| Noise figure                        | NF            | —   | 1.0  | 2.0  | dB   | $\Gamma_S = \Gamma_L = 50\text{ }\Omega$                                |

Main Characteristics (Q1 and Q2)



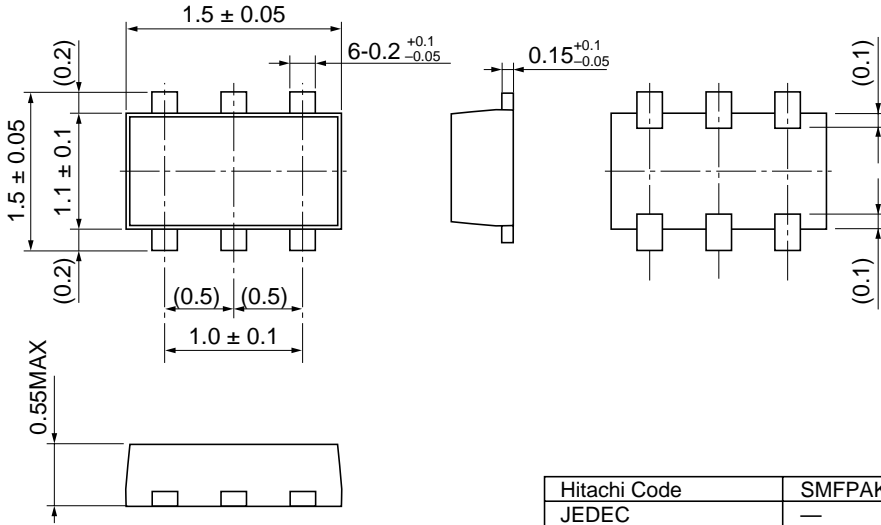




## Package Dimensions

As of July, 2001

Unit: mm



|                        |          |
|------------------------|----------|
| Hitachi Code           | SMFPAK-6 |
| JEDEC                  | —        |
| JEITA                  | Conforms |
| Mass (reference value) | 0.0025 g |

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