# 2SC4807

Silicon NPN Epitaxial

HITACHI

## Application

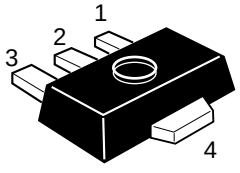
VHF / UHF wide band amplifier

## Features

- High gain bandwidth product
  $f_T$ = 4.4 GHz Typ
- High output power
  1 dB Power compression point Pcp = 24 dBm Typ at $V_{CE}$ = 5V , $I_C$ = 100 mA , f = 900 MHz

## Outline

UPAK




1. Base
2. Collector
3. Emitter
4. Collector (Flange)

Hitachi semiconductor

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

| Item | Symbol | Ratings | Unit |
|---|---|---|---|
| Collector to base voltage | $V_{CBO}$ | 20 | V |
| Collector to emitter voltage | $V_{CEO}$ | 15 | V |
| Emitter to base voltage | $V_{EBO}$ | 2 | V |
| Collector current | $I_C$ | 200 | mA |
| Collector power dissipation | $P_C$*[1] | 800 | mW |
| Junction temperature | Tj | 150 | °C |
| Storage temperature | Tstg | –55 to +150 | °C |

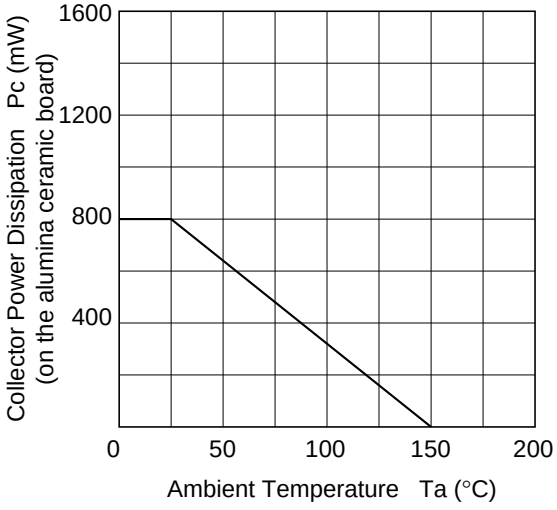
Note: 1. Value on the alumina ceramics board (12.5 x 20 x 0.7 mm)

## Electrical Characteristics (Ta = 25°C)

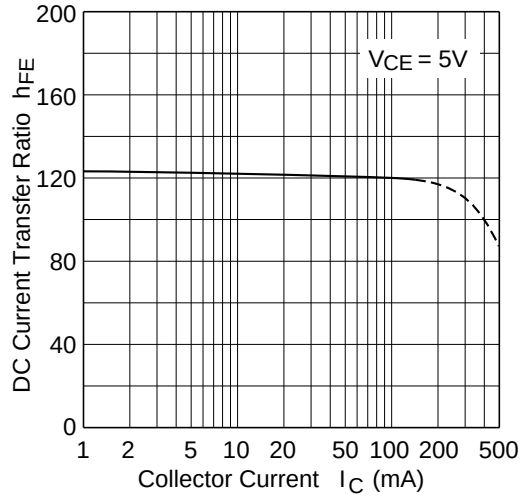
| Item | Symbol | Min | Typ | Max | Unit | Test conditions |
|---|---|---|---|---|---|---|
| Collector to base breakdown voltage | $V_{(BR)CBO}$ | 20 | 30 | — | V | $I_C$ = 10 µA, $I_E$ = 0 |
| Collector cutoff current | $I_{CBO}$ | — | — | 1 | µA | $V_{CB}$ = 15 V, $I_E$ = 0 |
| | $I_{CEO}$ | — | — | 1 | mA | $V_{CE}$ = 15 V, $R_{BE}$ = ∞ |
| Emitter cutoff current | $I_{EBO}$ | — | — | 10 | µA | $V_{EB}$ = 2 V, $I_C$ = 0 |
| DC current transfer ratio | $h_{FE}$ | 50 | 120 | 250 | | $V_{CE}$ = 5 V, $I_C$ = 100 mA |
| Collector output capacitance | Cob | — | 2.8 | 4.0 | pF | $V_{CB}$ = 5 V, $I_E$ = 0, f = 1 MHz |
| Gain bandwidth product | $f_T$ | 3.0 | 4.4 | — | GHz | $V_{CE}$ = 5 V, $I_C$ = 100 mA |
| Power gain | PG | 5.0 | 7.0 | — | dB | $V_{CE}$ = 5 V, $I_C$ = 100 mA, f = 900 MHz |
| Noise figure | NF | — | 2.5 | 4.0 | dB | $V_{CE}$ = 5 V, $I_C$ = 20 mA, f = 900 MHz |

Note: Marking is “ER”.

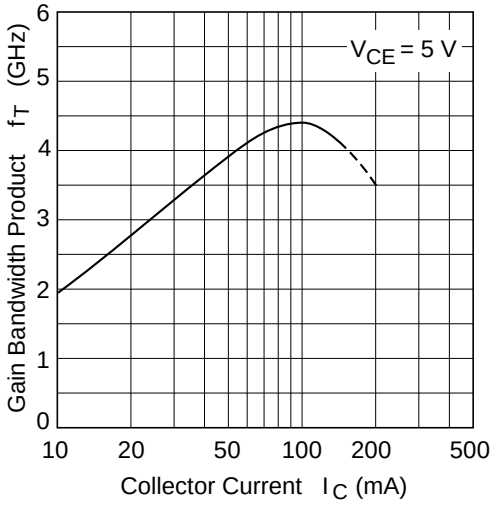
Maximum Collector Dissipation Curve



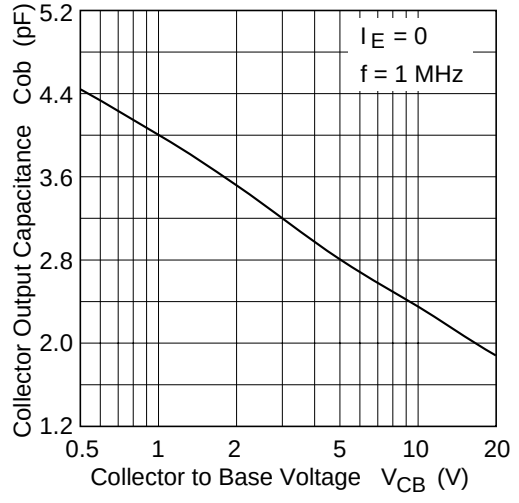

DC Current Transfer Ratio
vs. Collector Current



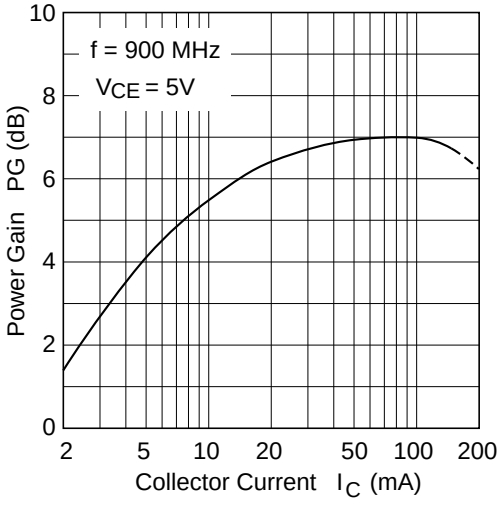

Gain Bandwidth Product
vs. Collector Current



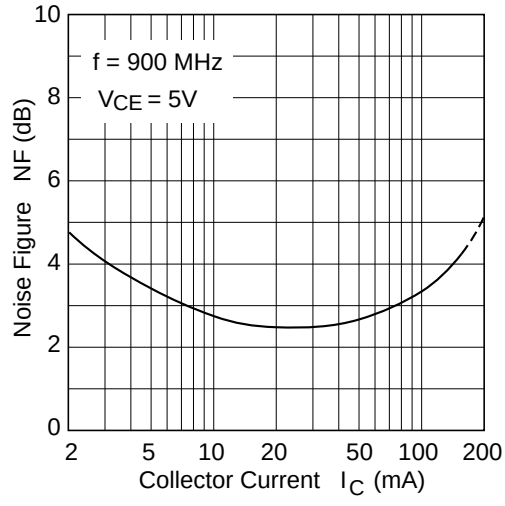

Collector Output Capacitance vs.
Collector to Base Voltage



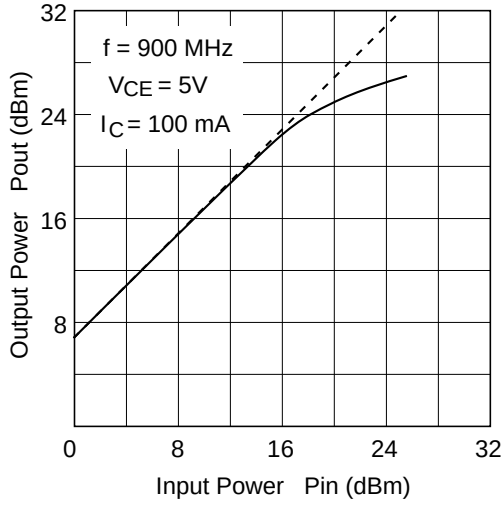
Power Gain vs. Collector Current



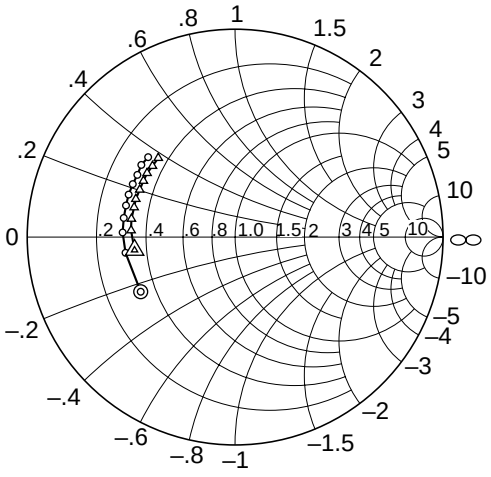

Noise Figure vs. Collector Current




Output Power vs. Input Power

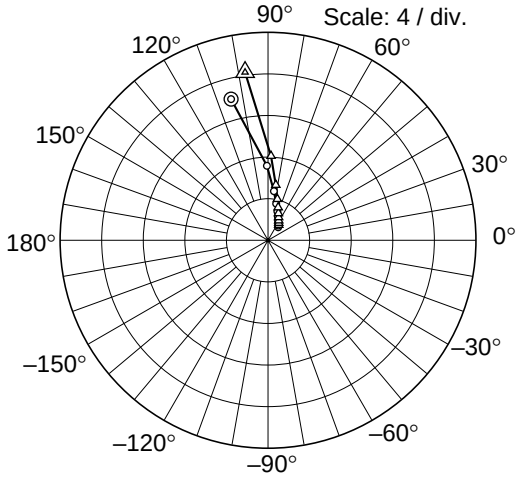


S11 Parameter vs. Frequency



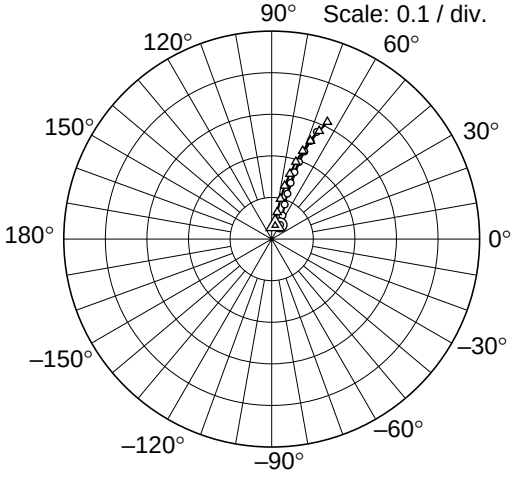

Condition: $V_{CE}$ = 5 V , Zo = 50 Ω
100 to 1000 MHz (100 MHz step)
($I_C$ = 20 mA)
($I_C$ = 100 mA)

S21 Parameter vs. Frequency



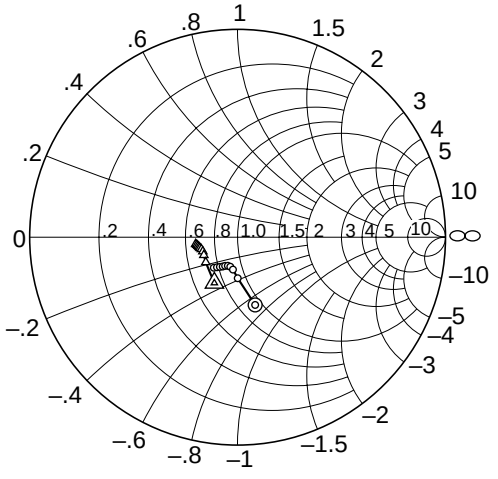

Condition: $V_{CE}$ = 5 V , Zo = 50 Ω
100 to 1000 MHz (100 MHz step)
($I_C$ = 20 mA)
($I_C$ = 100 mA)

S12 Parameter vs. Frequency




Condition: $V_{CE}$ = 5 V , Zo = 50 Ω
100 to 1000 MHz (100 MHz step)
($I_C$ = 20 mA)
($I_C$ = 100 mA)

S22 Parameter vs. Frequency




Condition: $V_{CE}$ = 5 V , Zo = 50 Ω
100 to 1000 MHz (100 MHz step)
($I_C$ = 20 mA)
($I_C$ = 100 mA)

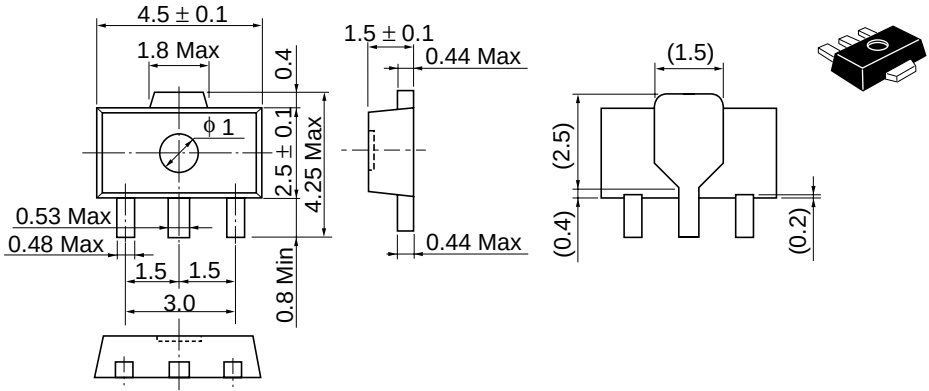
**S Parameter** ($V_{CE}$ = 5 V, $I_C$ = 20 mA, $Z_O$ = 50 Ω, Emitter Common)

| Freq. | S11 | | S21 | | S12 | | S22 | |
|---|---|---|---|---|---|---|---|---|
| (MHz) | MAG. | ANG. | MAG. | ANG. | MAG. | ANG. | MAG. | ANG. |
| 100 | 0.525 | –150.0 | 14.03 | 104.7 | 0.039 | 58.4 | 0.336 | –75.5 |
| 200 | 0.533 | –171.9 | 7.16 | 90.9 | 0.063 | 65.7 | 0.197 | –89.9 |
| 300 | 0.542 | 177.6 | 4.75 | 83.2 | 0.089 | 69.6 | 0.157 | –98.3 |
| 400 | 0.544 | 170.2 | 3.60 | 77.5 | 0.116 | 71.0 | 0.146 | –104.0 |
| 500 | 0.547 | 163.8 | 2.91 | 72.1 | 0.143 | 71.5 | 0.145 | –109.0 |
| 600 | 0.552 | 158.2 | 2.46 | 67.4 | 0.170 | 71.3 | 0.150 | –113.7 |
| 700 | 0.555 | 152.6 | 2.14 | 63.3 | 0.197 | 70.5 | 0.158 | –117.1 |
| 800 | 0.558 | 147.5 | 1.90 | 59.3 | 0.225 | 69.6 | 0.166 | –121.0 |
| 900 | 0.570 | 142.4 | 1.72 | 55.2 | 0.254 | 68.4 | 0.175 | –124.6 |
| 1000 | 0.569 | 137.4 | 1.58 | 51.9 | 0.280 | 67.2 | 0.186 | –128.1 |

**S Parameter** ($V_{CE}$ = 5 V, $I_C$ = 100 mA, $Z_O$ = 50 Ω, Emitter Common)

| Freq. | S11 | | S21 | | S12 | | S22 | |
|---|---|---|---|---|---|---|---|---|
| (MHz) | MAG. | ANG. | MAG. | ANG. | MAG. | ANG. | MAG. | ANG. |
| 100 | 0.488 | –172.8 | 16.32 | 97.8 | 0.034 | 76.2 | 0.248 | –116.9 |
| 200 | 0.502 | 176.3 | 8.08 | 88.0 | 0.066 | 78.6 | 0.195 | –141.9 |
| 300 | 0.507 | 170.0 | 5.34 | 82.0 | 0.099 | 77.8 | 0.184 | –152.2 |
| 400 | 0.507 | 163.6 | 4.03 | 77.2 | 0.132 | 76.4 | 0.181 | –157.9 |
| 500 | 0.514 | 159.0 | 3.27 | 72.8 | 0.163 | 74.5 | 0.184 | –161.8 |
| 600 | 0.513 | 153.6 | 2.75 | 68.8 | 0.195 | 72.7 | 0.189 | –164.0 |
| 700 | 0.518 | 148.5 | 2.40 | 65.1 | 0.225 | 70.7 | 0.192 | –165.8 |
| 800 | 0.524 | 144.0 | 2.13 | 61.3 | 0.254 | 68.5 | 0.196 | –167.6 |
| 900 | 0.525 | 139.3 | 1.93 | 57.8 | 0.284 | 66.3 | 0.200 | –169.4 |
| 1000 | 0.531 | 134.2 | 1.77 | 54.6 | 0.312 | 64.6 | 0.205 | –170.8 |

Unit: mm




| | |
|---|---|
| Hitachi Code | UPAK |
| JEDEC | — |
| EIAJ | Conforms |
| Weight (reference value) | 0.050 g |

## Cautions

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