

Applications

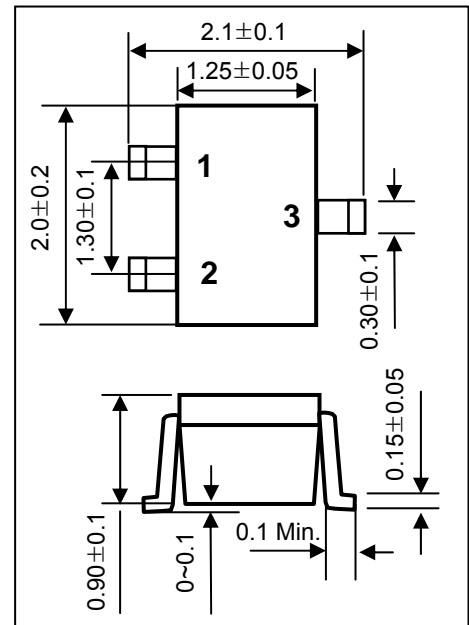
- VHF and UHF low noise amplifier
- Wide band amplifier

Features

- High gain bandwidth product
 $f_T = 6 \text{ GHz}$ at $V_{CE} = 3 \text{ V}$, $I_C = 7 \text{ mA}$
 $f_T = 8 \text{ GHz}$ at $V_{CE} = 3 \text{ V}$, $I_C = 30 \text{ mA}$
- High power gain
 $|S_{21}|^2 = 9.0 \text{ dB}$ at $V_{CE} = 3 \text{ V}$, $I_C = 7 \text{ mA}$, $f = 1 \text{ GHz}$
- Low noise figure
 $NF = 1.2 \text{ dB}$ at $V_{CE} = 3 \text{ V}$, $I_C = 7 \text{ mA}$, $f = 1 \text{ GHz}$

SOT-323

Unit in mm



Pin Configuration

1. Base
2. Emitter
3. Collector

Absolute Maximum Ratings ($T_A = 25 \text{ }^\circ\text{C}$)

| Parameter | Symbol | Ratings | Unit |
|--------------------------------|------------|-----------|------------------|
| Collector to Base Voltage | BV_{CBO} | 20 | V |
| Collector to Emitter Voltage | BV_{CEO} | 8 | V |
| Emitter to Base Voltage | BV_{EBO} | 3 | V |
| Collector Current | I_C | 100 | mA |
| Total Power Dissipation | P_{tot} | 150 | mW |
| Operating Junction Temperature | T_j | 150 | $^\circ\text{C}$ |
| Storage Temperature | T_{stg} | -65 ~ 150 | $^\circ\text{C}$ |

Caution : Electro Static Discharge sensitive device

TBN4226 Series

Electrical Characteristics ($T_A = 25\text{ }^\circ\text{C}$)

| Parameter | Symbol | Test Conditions | Min. | Typ. | Max. | Unit |
|------------------------------|--------------|--|------|------|------|---------------|
| Collector Cut-off Current | I_{CBO} | $V_{CB} = 15\text{ V}, I_E = 0\text{ mA}$ | - | - | 0.5 | μA |
| Emitter Cut-off Current | I_{EBO} | $V_{EB} = 2\text{ V}, I_C = 0\text{ mA}$ | - | - | 0.5 | μA |
| DC Current Gain | h_{FE} | $V_{CE} = 3\text{ V}, I_C = 7\text{ mA}$ | 70 | 100 | 250 | |
| Gain Bandwidth Product | f_T | $V_{CE} = 3\text{ V}, I_C = 7\text{ mA}$ | 4.0 | 6.0 | - | GHz |
| Insertion Power Gain | $ S_{21} ^2$ | $V_{CE} = 3\text{ V}, I_C = 7\text{ mA}, f = 1\text{ GHz}$ | 7.0 | 9.0 | - | dB |
| Noise Figure | NF | $V_{CE} = 3\text{ V}, I_C = 7\text{ mA}, f = 1\text{ GHz}$ | - | 1.2 | 2.0 | dB |
| Reverse Transfer Capacitance | C_{re} | $V_{CB} = 3\text{ V}, I_E = 0\text{ mA}, f = 1\text{ MHz}$ | - | 0.9 | 1.4 | pF |

h_{FE} Classification

| | | |
|----------------|----------|-----------|
| Marking | SM2 | SM1 |
| h_{FE} Value | 70 - 140 | 125 - 250 |

Available Package

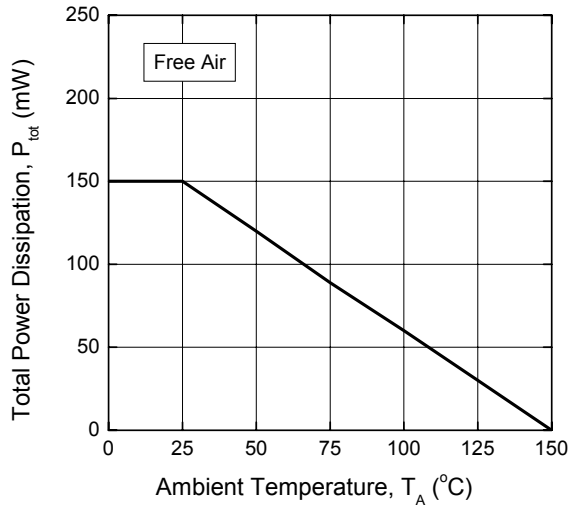
Unit in mm

| Product | Package | Dimension |
|-----------|----------|------------------|
| TBN4226S | SOT-23 | 2.9 × 1.3, 1.2t |
| TBN4226U | SOT-323 | 2.0 × 1.25, 1.0t |
| TBN4226E | SOT-523 | 1.6 × 0.8, 0.8t |
| TBN4226KF | SOT-623F | 1.4 × 0.8, 0.6t |

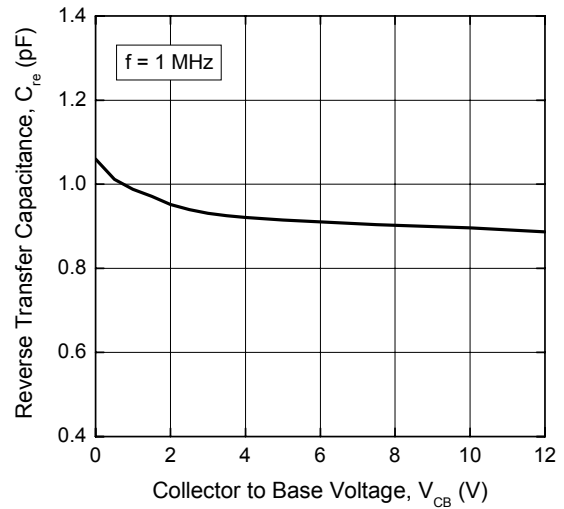
TBN4226 Series

□ **Typical Characteristics** ($T_A = 25\text{ }^\circ\text{C}$, unless otherwise specified)

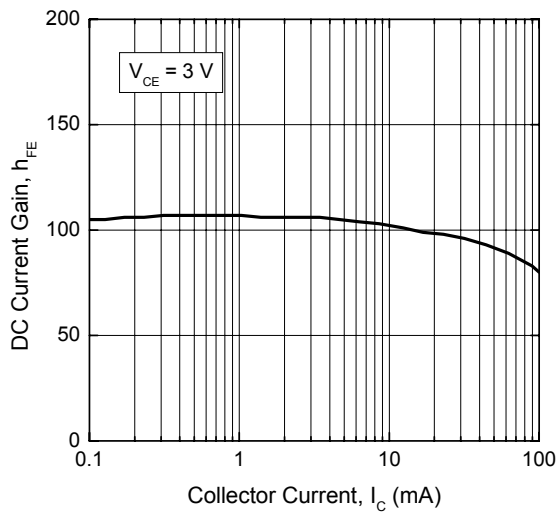
Total Power Dissipation vs. Ambient Temperature



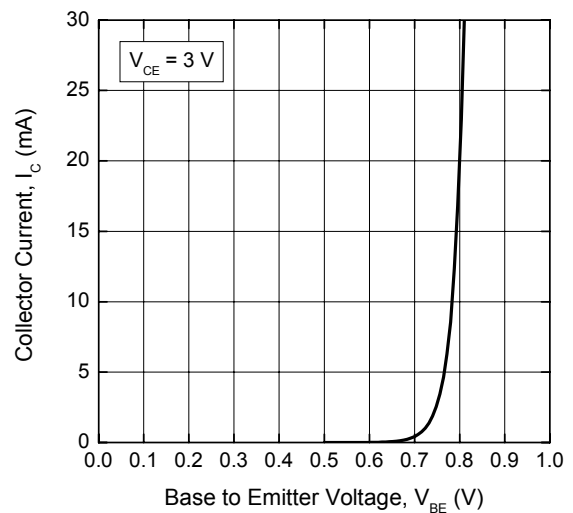
Reverse Transfer Capacitance vs. Collector to Base Voltage



DC Current Gain vs. Collector Current

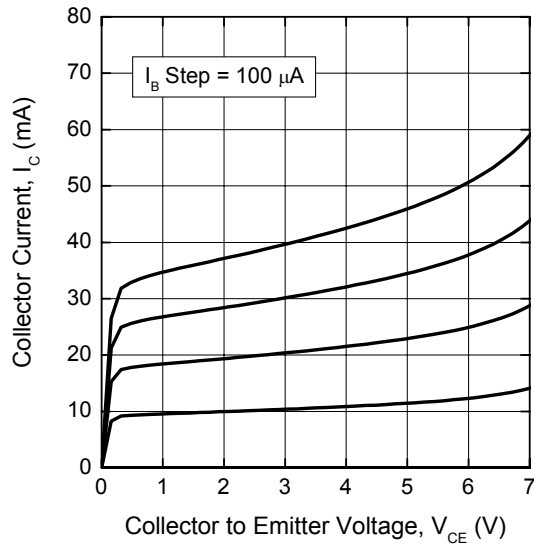


Collector Current vs. Base to Emitter Voltage

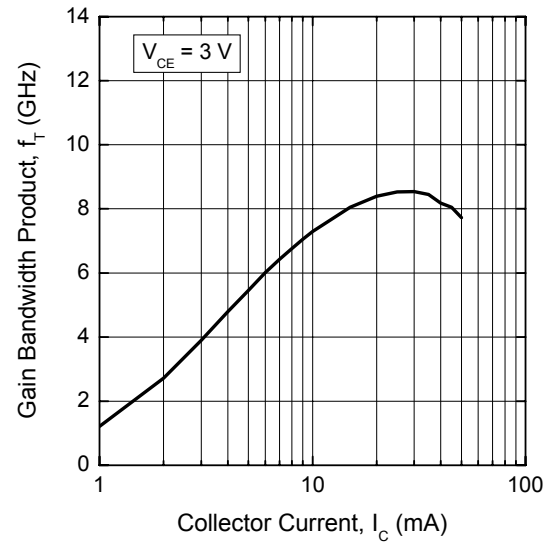


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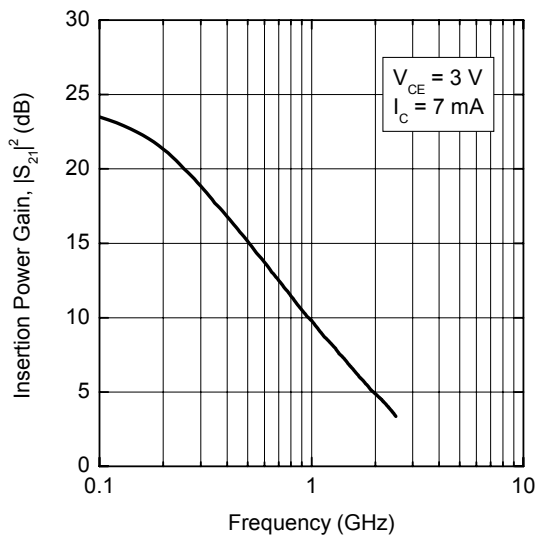
Collector Current vs. Collector to Emitter Voltage



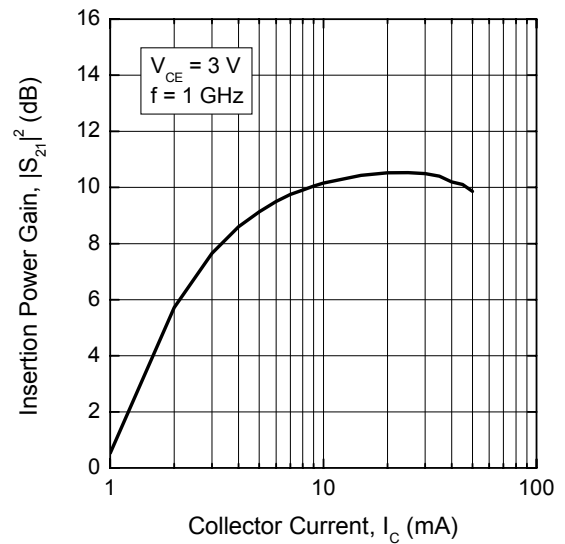
Gain Bandwidth Product vs. Collector Current



Insertion Power Gain vs. Frequency

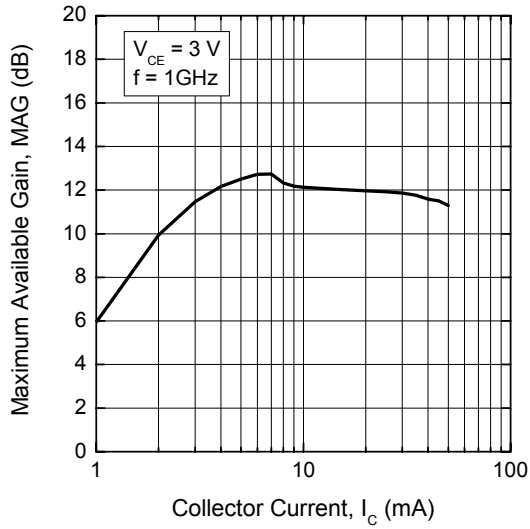


Insertion Power Gain vs. Collector Current

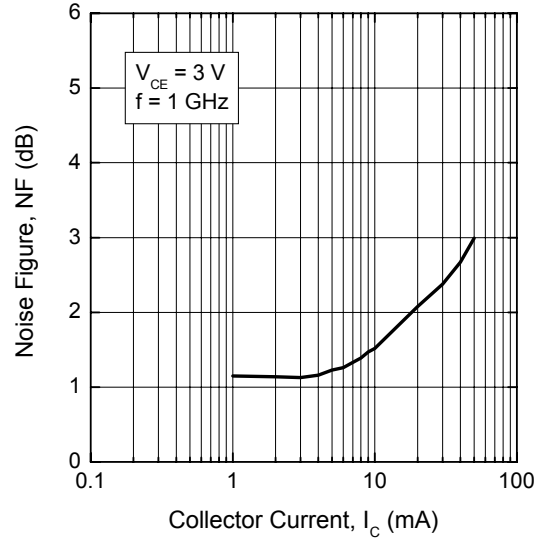


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Maximum Available Gain vs. Collector Current



Noise Figure vs. Collector Current

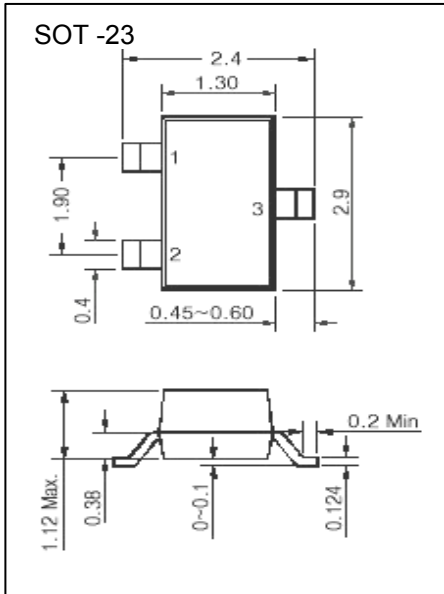


Noise Parameter vs. Frequency

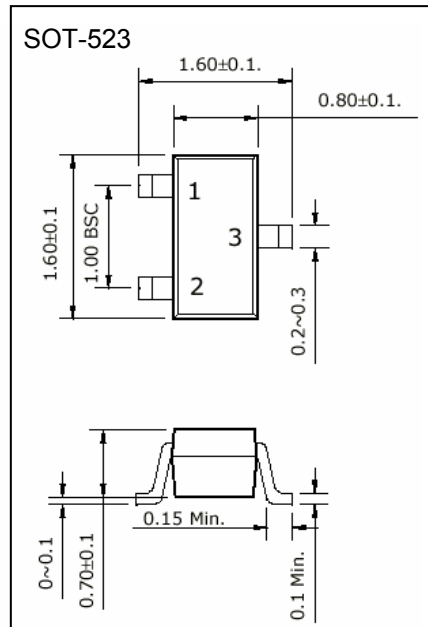
| Frequency (GHz) | Fmin (dB) | m | Γ_{opt} | | Association gain (dB) | G_{max} (dB) |
|-----------------|-----------|------|----------------|--------|-----------------------|----------------|
| | | | Mag | Phase | | |
| 0.9 | 1.27 | 0.11 | 0.290 | 144.4 | 11.58 | 12.98 |
| 1.0 | 1.16 | 0.09 | 0.301 | 141.3 | 10.60 | 11.83 |
| 1.5 | 1.79 | 0.08 | 0.436 | -162.9 | 8.13 | 8.57 |
| 2.0 | 1.91 | 0.11 | 0.543 | -143.2 | 6.45 | 6.89 |

TBN4226 Series

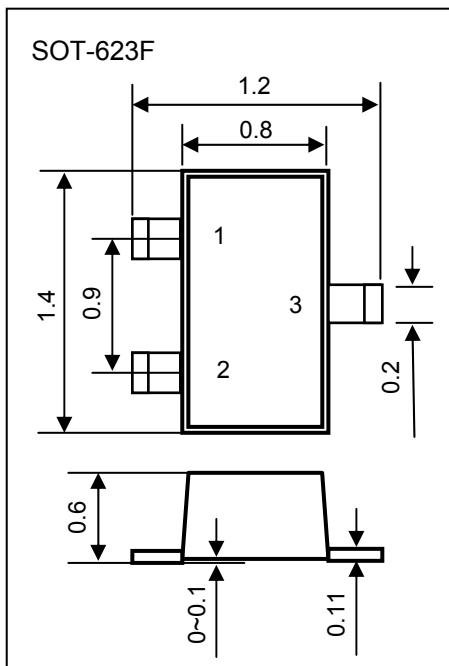
□ Dimensions of TBN4226S in mm



□ Dimensions of TBN4226E in mm



□ Dimensions of TBN4226KF in mm



Pin Configuration

(SOT-23, SOT-523, SOT-623F)

| Pin No. | Symbol | Description |
|---------|--------|-------------|
| 1 | B | Base |
| 2 | E | Emitter |
| 3 | C | Collector |