

**Applications**

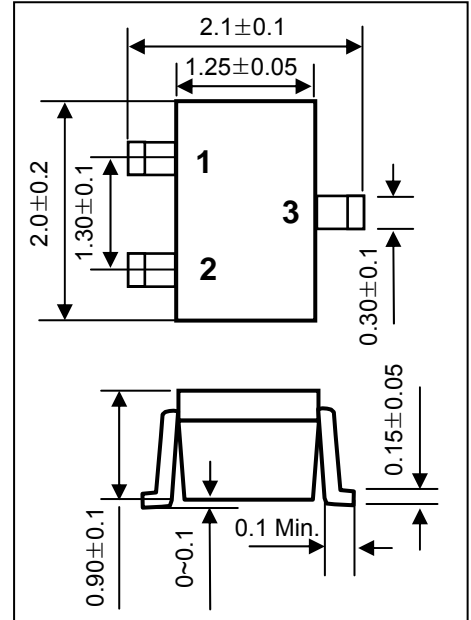
- VHF and UHF low noise amplifier
- Wide band amplifier

**Features**

- High gain bandwidth product  
 $f_T = 8 \text{ GHz}$  at  $V_{CE} = 3 \text{ V}$ ,  $I_C = 7 \text{ mA}$   
 $f_T = 9 \text{ GHz}$  at  $V_{CE} = 3 \text{ V}$ ,  $I_C = 20 \text{ mA}$
- High power gain  
 $|S_{21}|^2 = 11.4 \text{ dB}$  at  $V_{CE} = 3 \text{ V}$ ,  $I_C = 7 \text{ mA}$ ,  $f = 1 \text{ GHz}$
- Low noise figure  
 $NF = 1.2 \text{ dB}$  at  $V_{CE} = 3 \text{ V}$ ,  $I_C = 3 \text{ mA}$ ,  $f = 1 \text{ GHz}$

**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	$I_C$	65	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

# TBN4227 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	$\mu\text{A}$
Emitter Cut-off Current	$I_{EBO}$	$V_{EB} = 2\text{ V}, I_C = 0\text{ mA}$	-	-	0.5	$\mu\text{A}$
DC Current Gain	$h_{FE}$	$V_{CE} = 3\text{ V}, I_C = 7\text{ mA}$	70	100	250	
Gain Bandwidth Product	$f_T$	$V_{CE} = 3\text{ V}, I_C = 7\text{ mA}$	5.0	8.0	-	GHz
Insertion Power Gain	$ S_{21} ^2$	$V_{CE} = 3\text{ V}, I_C = 7\text{ mA}, f = 1\text{ GHz}$	9.0	11.4	-	dB
Noise Figure	NF	$V_{CE} = 3\text{ V}, I_C = 3\text{ mA}, f = 1\text{ GHz}$	-	1.2	2.0	dB
Reverse Transfer Capacitance	$C_{re}$	$V_{CB} = 3\text{ V}, I_E = 0\text{ mA}, f = 1\text{ MHz}$	-	0.62	0.9	pF

**$h_{FE}$  Classification**

Marking	SL2	SL1
$h_{FE}$ Value	70 - 140	125 - 250

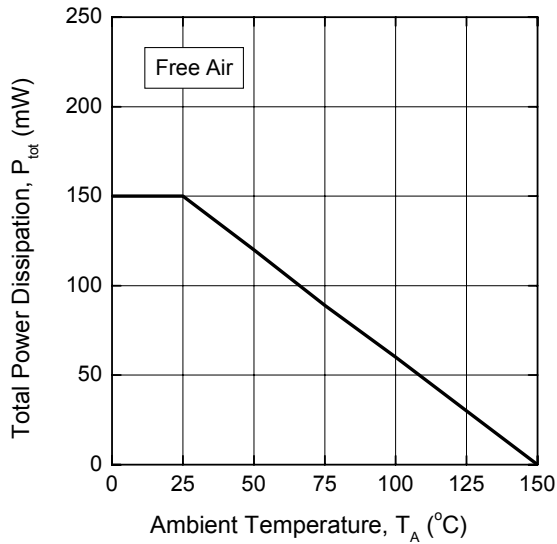
**Available Package**      Unit in mm

Product	Package	Dimension
TBN4227S	SOT-23	2.9 x 1.3, 1.2t
TBN4227U	SOT-323	2.0 x 1.25, 1.0t
TBN4227E	SOT-523	1.6 x 0.8, 0.8t
TBN4227KF	SOT-623F	1.4 x 0.8, 0.6t

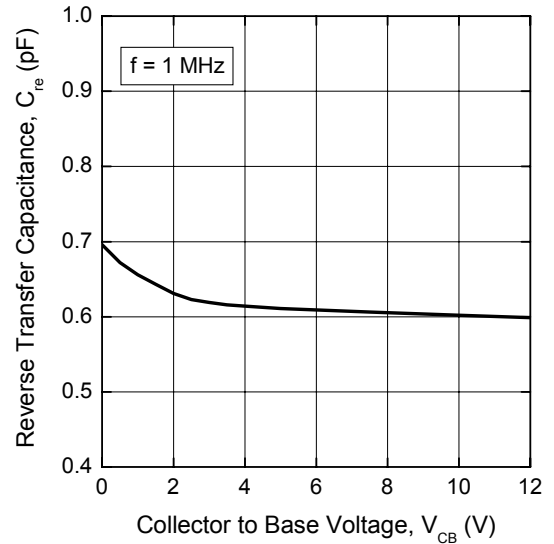
# TBN4227 Series

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

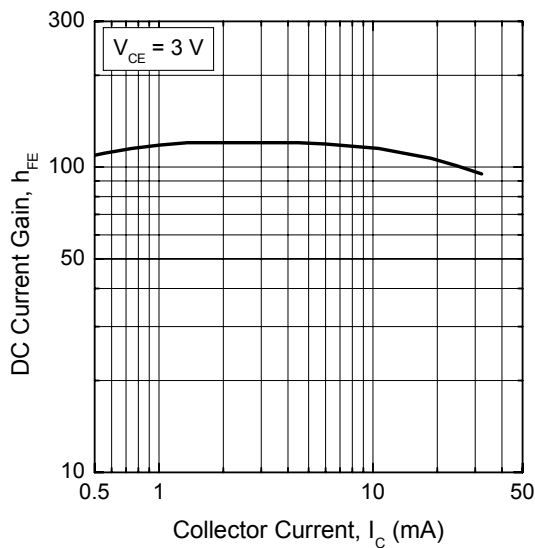
**Total Power Dissipation vs. Ambient Temperature**



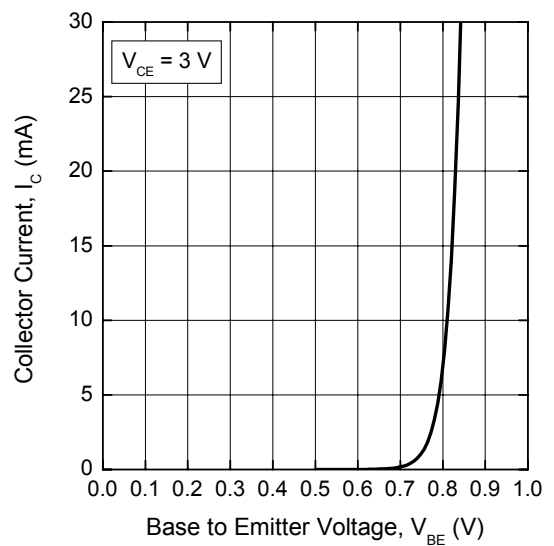
**Reverse Transfer Capacitance vs. Collector to Base Voltage**



**DC Current Gain vs. Collector Current**

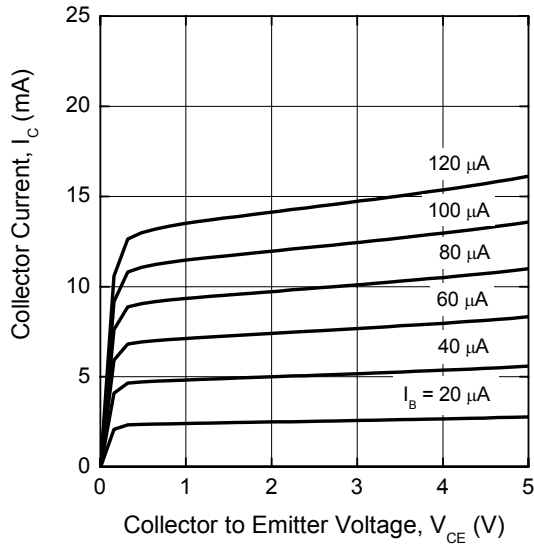


**Collector Current vs. Base to Emitter Voltage**

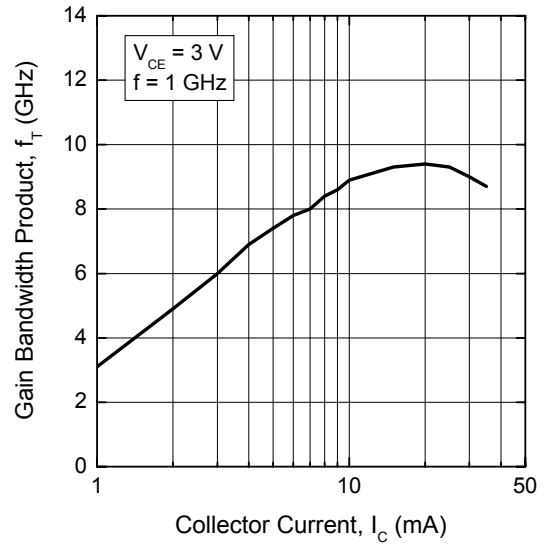


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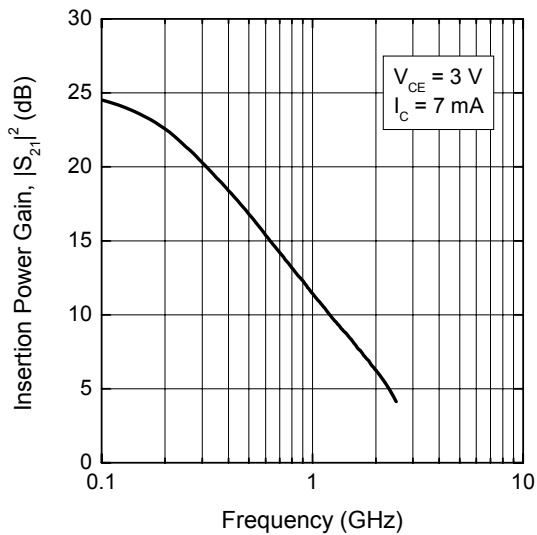
**Collector Current vs. Collector to Emitter Voltage**



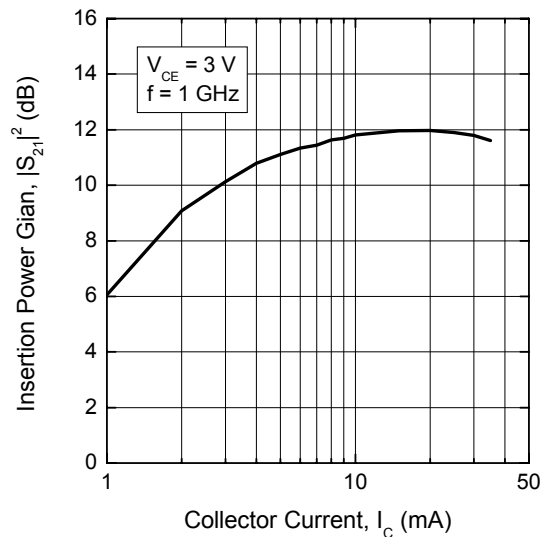
**Gain Bandwidth Product vs. Collector Current**



**Insertion Power Gain vs. Frequency**

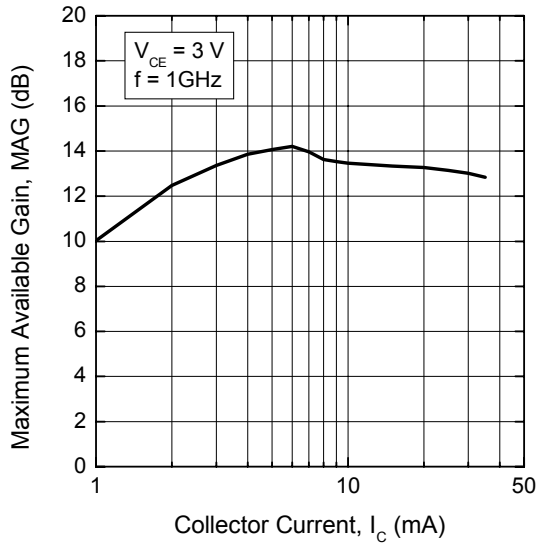


**Insertion Power Gain vs. Collector Current**

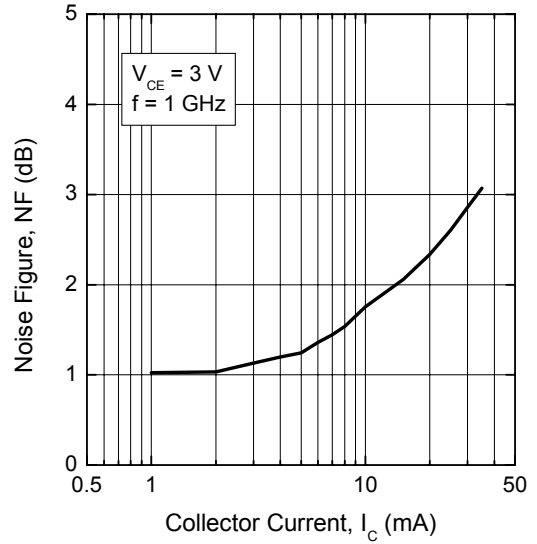


# TBN4227 Series

**Maximum Available Gain vs. Collector Current**



**Noise Figure vs. Collector Current**



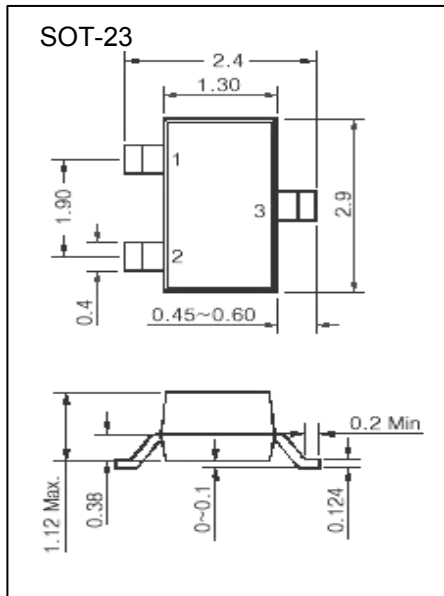
**Noise Parameter vs. Frequency**

(at  $V_{CE} = 3\text{ V}$ ,  $I_C = 3\text{ mA}$ )

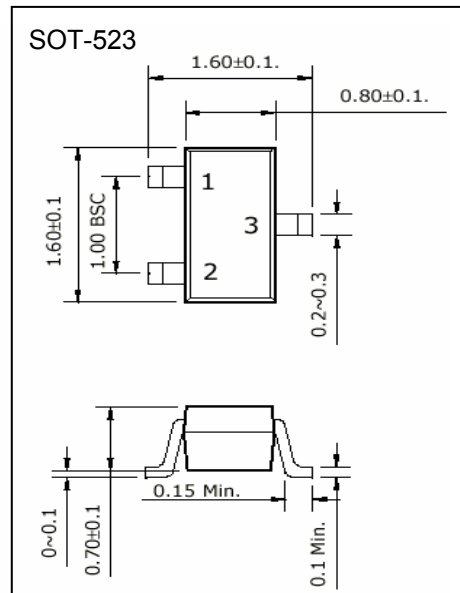
Frequency (GHz)	Fmin (dB)	m	$\Gamma_{opt}$		Association gain (dB)	$G_{max}$ (dB)
			Mag	Phase		
0.9	1.193	0.383	0.5427	37.04	10.477	13.809
1	1.147	0.376	0.5287	40.24	9.799	13.274
1.5	1.302	0.327	0.4514	56.36	7.374	9.887
1.8	1.636	0.313	0.353	67.11	6.607	8.27

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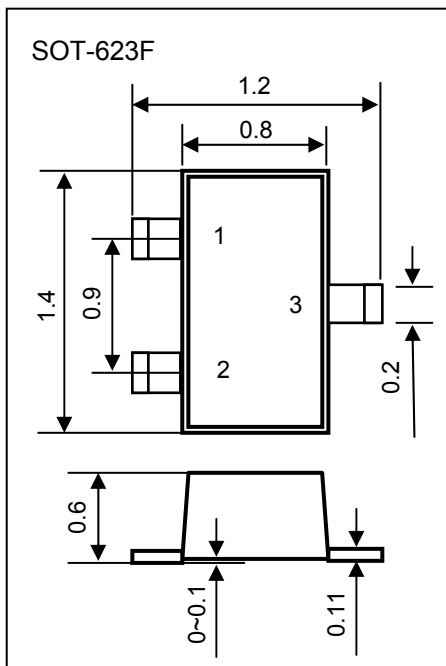
## □ Dimensions of TBN4227S in mm



## □ Dimensions of TBN4227E in mm



## □ Dimensions of TBN4227KF in mm



## Pin Configuration

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

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