

Applications

- VHF and UHF wide band amplifier

Features

- High gain bandwidth product

$f_T = 6 \text{ GHz}$ at $V_{CE} = 3 \text{ V}$, $I_C = 10 \text{ mA}$

$f_T = 7.5 \text{ GHz}$ at $V_{CE} = 5 \text{ V}$, $I_C = 20 \text{ mA}$

- High power gain

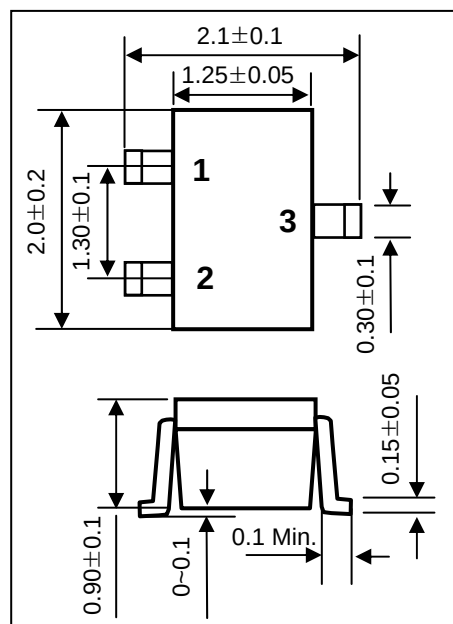
$|S_{21}|^2 = 9 \text{ dB}$ at $V_{CE} = 3 \text{ V}$, $I_C = 10 \text{ mA}$, $f = 1 \text{ GHz}$

- Low noise figure

$NF = 1.4 \text{ dB}$ at $V_{CE} = 3 \text{ V}$, $I_C = 10 \text{ mA}$, $f = 1 \text{ GHz}$

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	75	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

TBN6301 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
	I_{CEO}	$V_{CE} = 8\text{ V}, I_B = 0\text{ mA}$			10	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}	$V_{CE} = 3\text{ V}, I_C = 10\text{ mA}$	80		250	
Gain Bandwidth Product	f_T	$V_{CE} = 3\text{ V}, I_C = 10\text{ mA}$	5	6		GHz
		$V_{CE} = 5\text{ V}, I_C = 20\text{ mA}$	6	7.5		GHz
Insertion Power Gain	$ S_{21} ^2$	$V_{CE} = 3\text{ V}, I_C = 10\text{ mA}, f = 1\text{ GHz}$	7	9		dB
		$V_{CE} = 5\text{ V}, I_C = 20\text{ mA}, f = 1\text{ GHz}$	7	9.5		dB
Noise Figure	NF	$V_{CE} = 3\text{ V}, I_C = 10\text{ mA}, f = 1\text{ GHz}$		1.4	1.8	
Reverse Transfer Capacitance	C_{re}	$V_{CB} = 3\text{ V}, I_E = 0\text{ mA}, f = 1\text{ MHz}$		1.1		pF

☐ **h_{FE} Classification**

Marking	SB2	SB1
h_{FE} Value	80 - 160	125 - 250

☐ **Available Package**

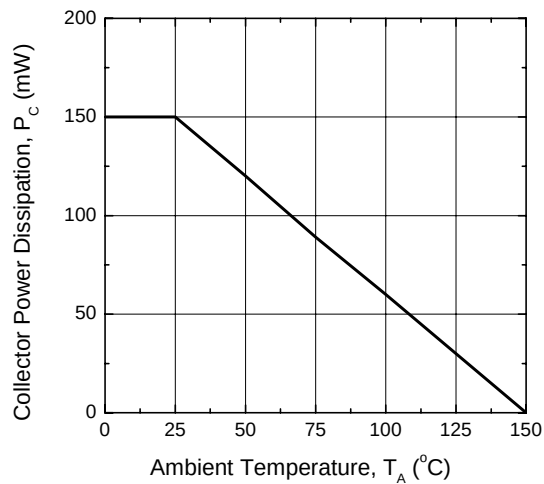
Unit in mm

Product	Package	Dimension
TBN6301U	SOT-323	2.0 x 1.25, 1.0t
TBN6301E	SOT-523	1.6 x 0.8, 0.8t

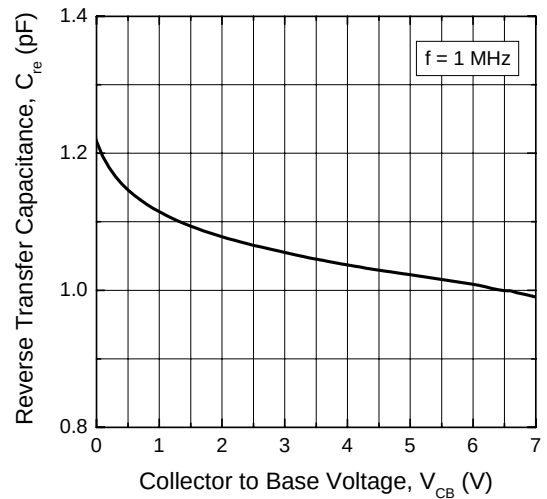
TBN6301 Series

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

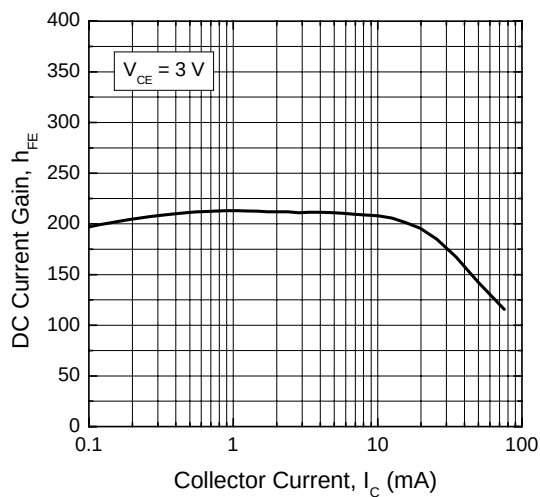
**Power Dissipation
vs. Ambient Temperature**



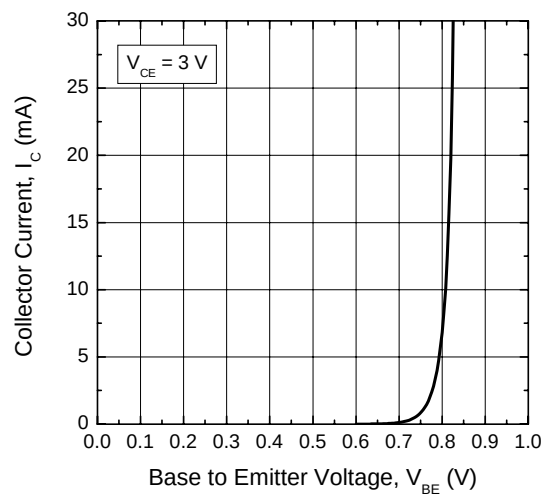
**Reverse Transfer Capacitance
vs. Collector to Base Voltage**



**DC Current Gain
vs. Collector Current**

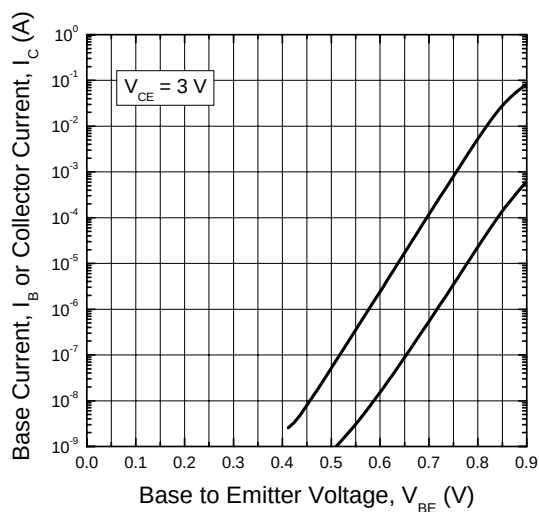


**Collector Current
vs. Base to Emitter Voltage**

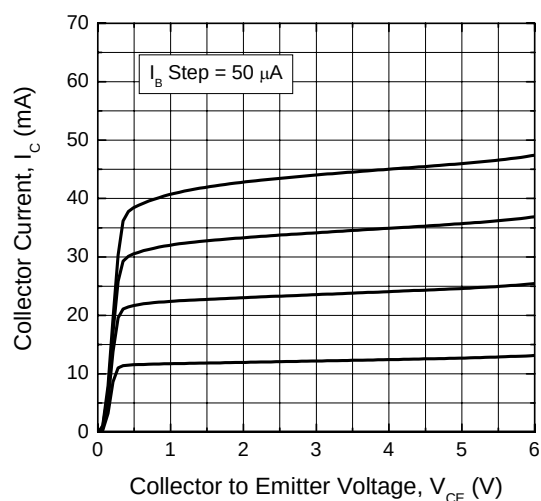


TBN6301 Series

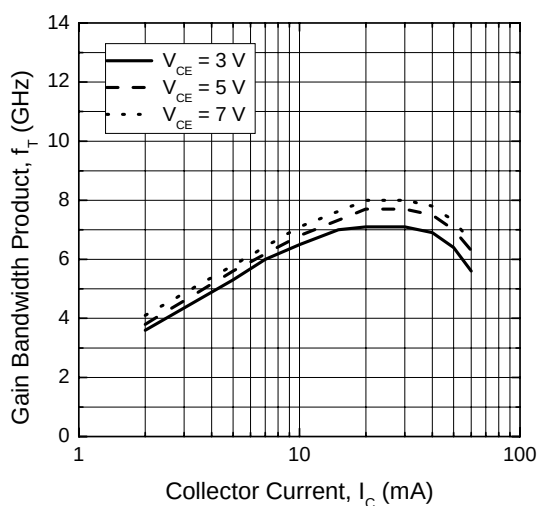
**Base Current, Collector Current
vs. Base to Emitter Voltage**



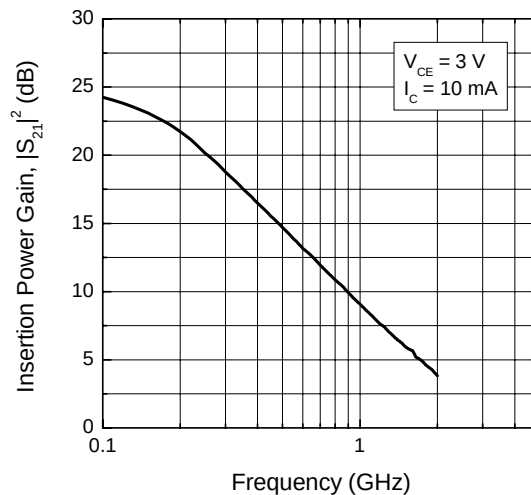
**Collector Current
vs. Collector to Emitter Voltage**



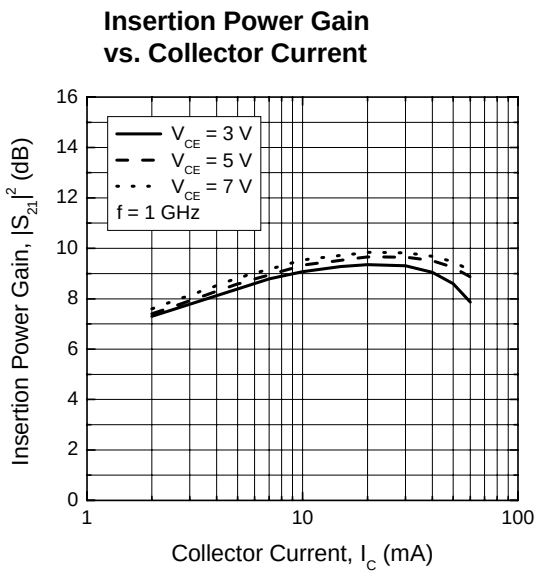
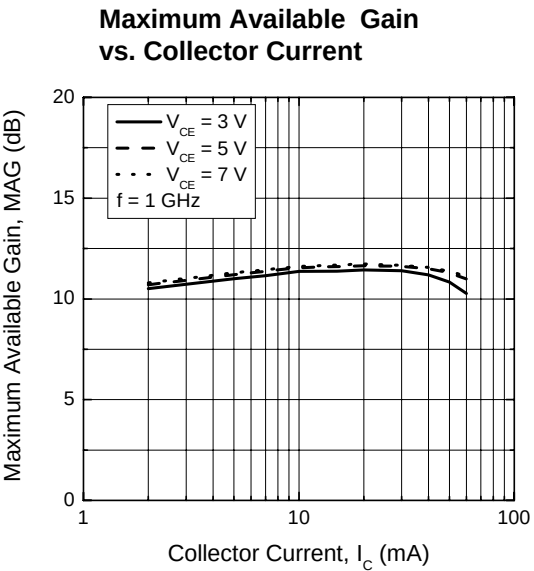
**Gain Bandwidth Product
vs. Collector Current**



**Insertion Power Gain
vs. Frequency**

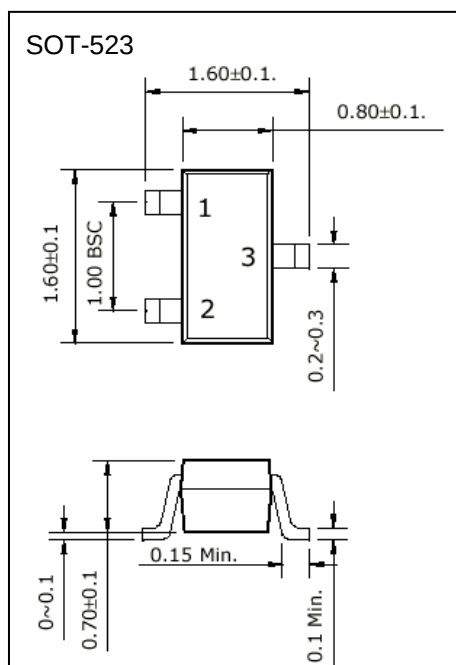


TBN6301 Series



TBN6301 Series

□ Dimensions of TBN6301E in mm



Pin Configuration

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