

Applications

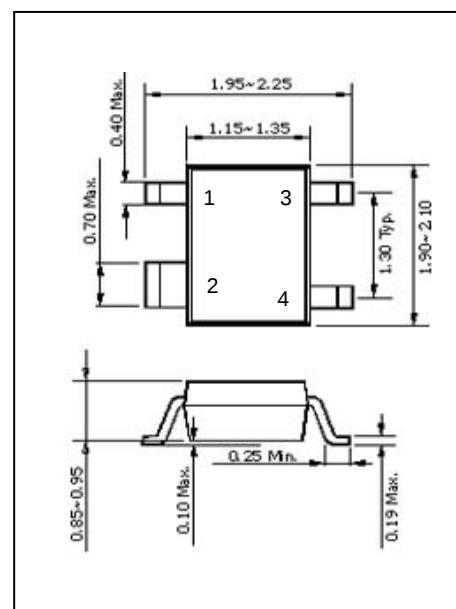
- Low noise amplifier, oscillator and buffer amplifier up to 3 GHz

Features

- High gain bandwidth product
 $f_T = 17 \text{ GHz}$ at $V_{CE} = 2 \text{ V}$, $I_C = 15 \text{ mA}$
 $f_T = 20 \text{ GHz}$ at $V_{CE} = 3 \text{ V}$, $I_C = 30 \text{ mA}$
- High power gain
 $|S_{21}|^2 = 16 \text{ dB}$ at $V_{CE} = 2 \text{ V}$, $I_C = 15 \text{ mA}$, $f = 1.5 \text{ GHz}$
- Low noise figure
 $NF = 1.1 \text{ dB}$ at $V_{CE} = 2 \text{ V}$, $I_C = 5 \text{ mA}$, $f = 1.8 \text{ GHz}$

SOT-343

Unit in mm



Pin Configuration

1. Base
2. Emitter
3. Emitter
4. Collector

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

Parameter	Symbol	Ratings	Unit
Collector to Base Breakdown Voltage	BV_{CBO}	10	V
Collector to Emitter Breakdown Voltage	BV_{CEO}	4.5	V
Emitter to Base Breakdown Voltage	BV_{EBO}	1.5	V
Collector Current	I_C	35	mA
Total Power Dissipation	P_{tot}	160	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

THN420Z

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

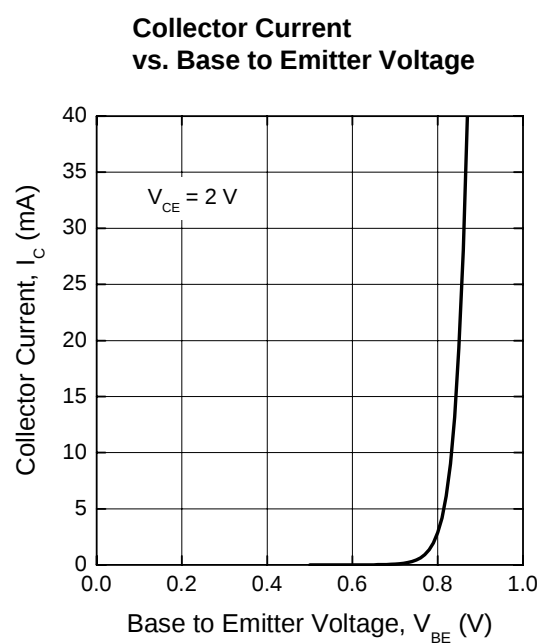
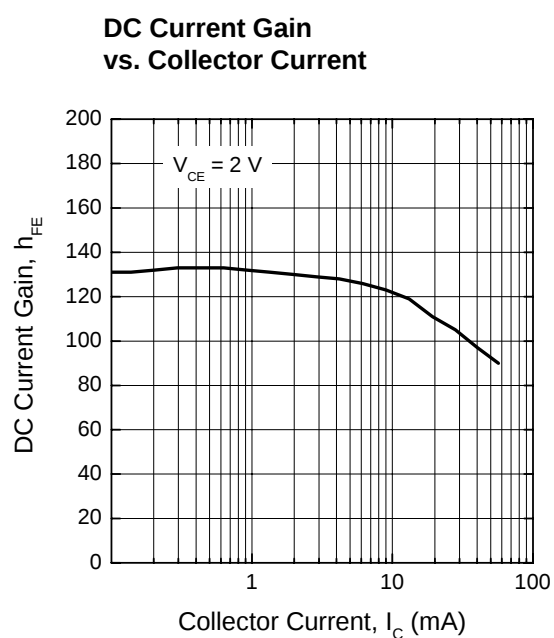
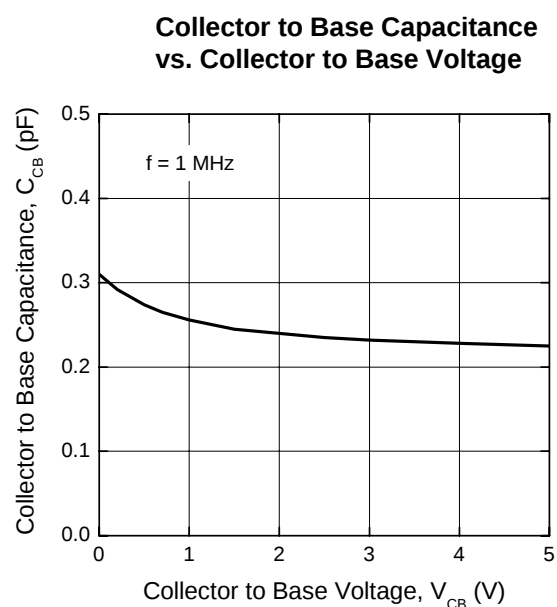
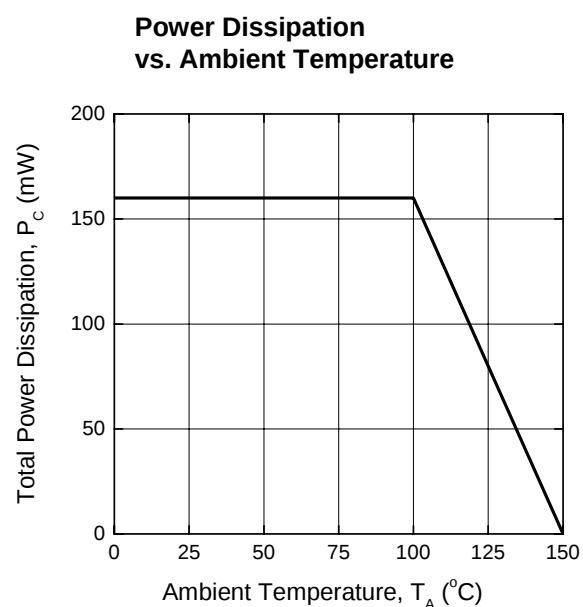
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Collector Cut-off Current	I_{CBO}	$V_{CB} = 9\text{ V}, I_E = 0\text{ mA}$	-	-	1.0	μA
	I_{CEO}	$V_{CE} = 3\text{ V}, I_B = 0\text{ mA}$	-	-	1.0	μA
Emitter Cut-off Current	I_{EBO}	$V_{EB} = 1\text{ V}, I_C = 0\text{ mA}$	-	-	0.5	μA
DC Current Gain	h_{FE}	$V_{CE} = 2\text{ V}, I_C = 20\text{ mA}$	50	-	260	
Gain Bandwidth Product	f_T	$V_{CE} = 2\text{ V}, I_C = 15\text{ mA}$	15	17	-	GHz
		$V_{CE} = 3\text{ V}, I_C = 30\text{ mA}$	18	20	-	GHz
Maximum Available Gain	MAG	$V_{CE} = 2\text{ V}, I_C = 15\text{ mA}, f = 1\text{ GHz}$	20	22	-	dB
		$V_{CE} = 2\text{ V}, I_C = 15\text{ mA}, f = 1.5\text{ GHz}$	18	20	-	dB
Insertion Power Gain	$ S_{21} ^2$	$V_{CE} = 2\text{ V}, I_C = 15\text{ mA}, f = 1\text{ GHz}$	17	19	-	dB
		$V_{CE} = 2\text{ V}, I_C = 15\text{ mA}, f = 1.5\text{ GHz}$	14	16	-	dB
Noise Figure	NF	$V_{CE} = 3\text{ V}, I_C = 5\text{ mA}, f = 1.8\text{ GHz}$	-	1.1	1.3	dB
Collector – Base Capacitance	C_{CB}	$V_{CB} = 2\text{ V}, I_E = 0\text{ mA}, f = 1\text{ MHz}$	-	0.24	-	pF

□ **h_{FE} Classification**

Marking	BE1	BE2
h_{FE} Value	50 - 150	130 - 260

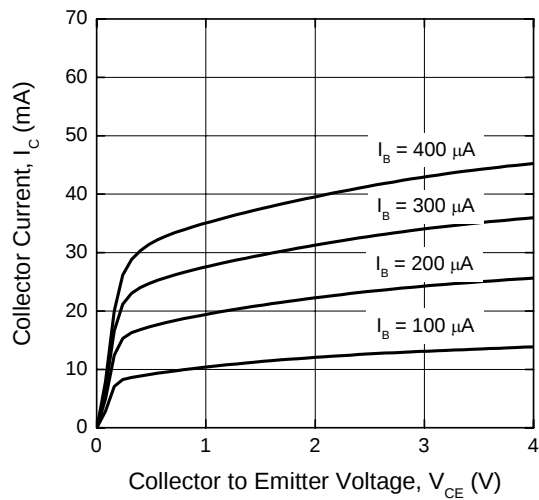
THN420Z

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

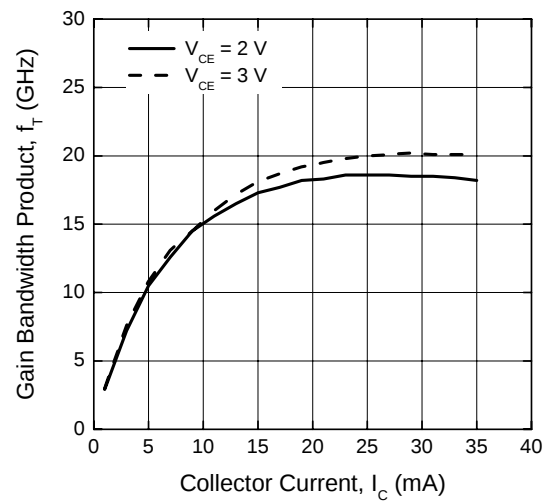


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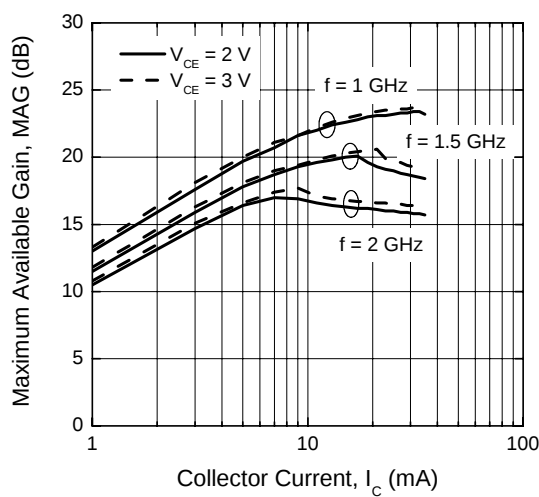
**Collector Current
vs. Collector to Emitter Voltage**



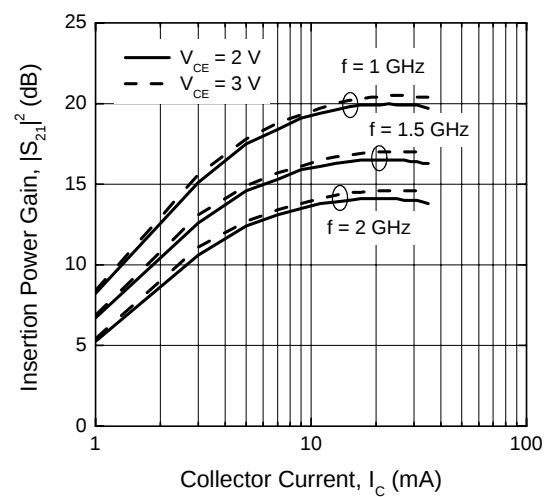
**Gain Bandwidth Product
vs. Collector Current**



**Maximum Available Gain
vs. Collector Current**

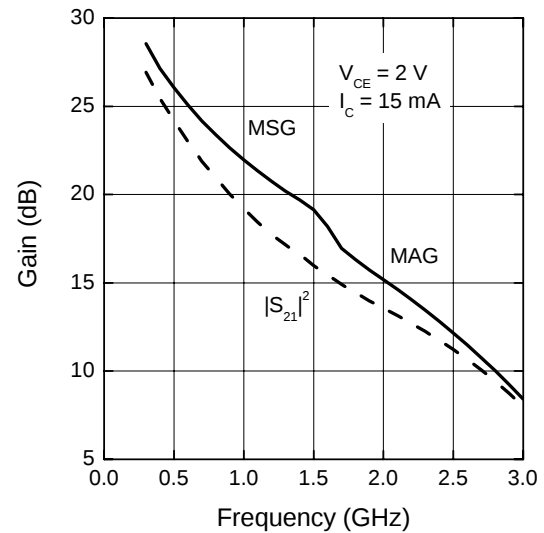
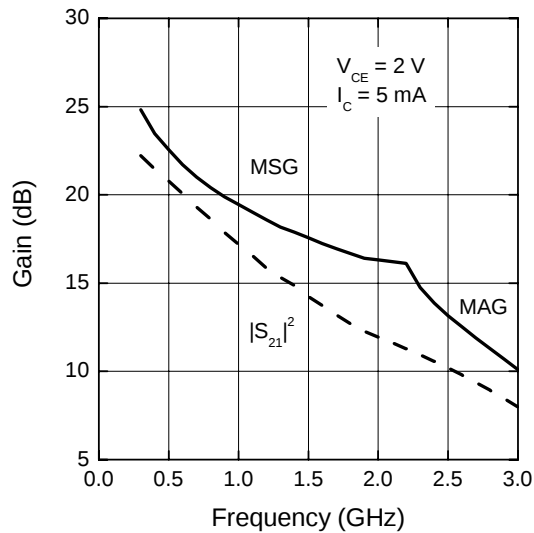


**Insertion Power Gain
vs. Collector Current**



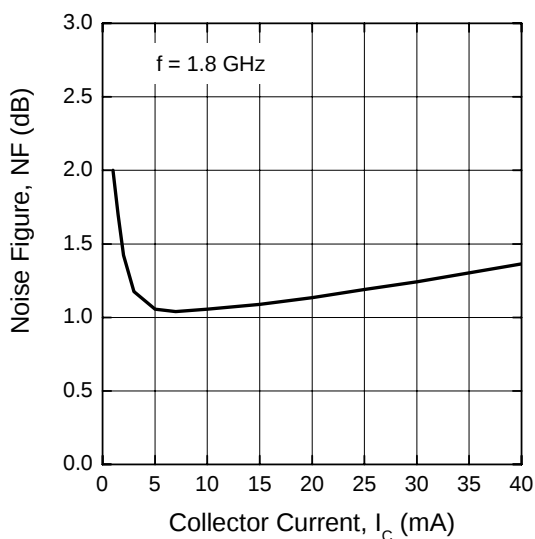
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**Power Gain
vs. Frequency**



**Noise Figure
vs. Collector Current**

at $V_{CE} = 2\text{ V}$, $I_C = \text{parameters}$, $Z_S = Z_{\text{Sopt}}$



**Noise Figure and
Associated Gain Contours**

at $V_{CE} = 2\text{ V}$, $I_C = 5\text{ mA}$, $f = 1.8\text{ GHz}$

