

SOT-343

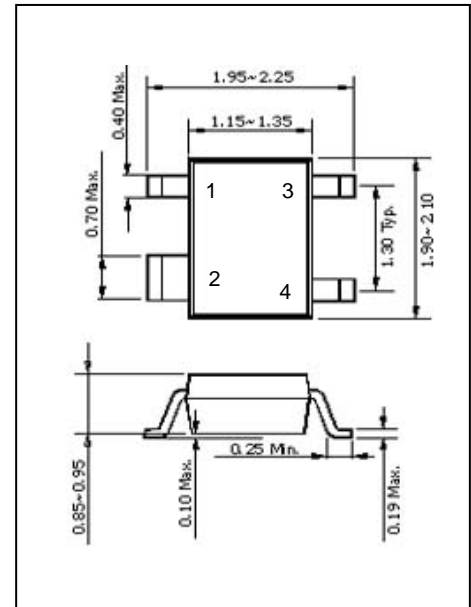
Unit in mm

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



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

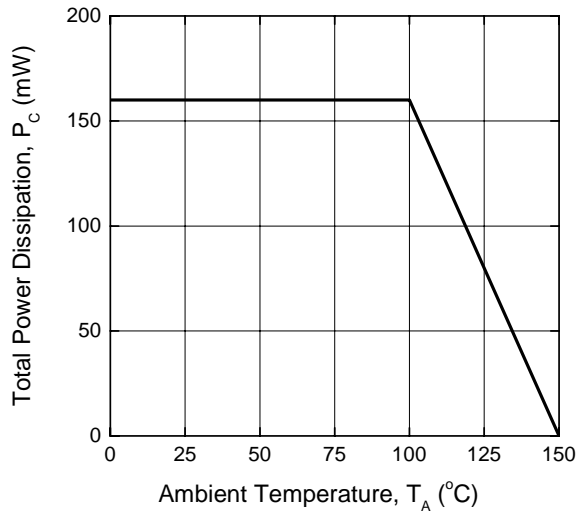
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Collector Cut-off Current	$I_{CBO}$	$V_{CB} = 9\text{ V}, I_E = 0\text{ mA}$	-	-	1.0	$\mu\text{A}$
	$I_{CEO}$	$V_{CE} = 3\text{ V}, I_B = 0\text{ mA}$	-	-	1.0	$\mu\text{A}$
Emitter Cut-off Current	$I_{EBO}$	$V_{EB} = 1\text{ V}, I_C = 0\text{ mA}$	-	-	0.5	$\mu\text{A}$
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

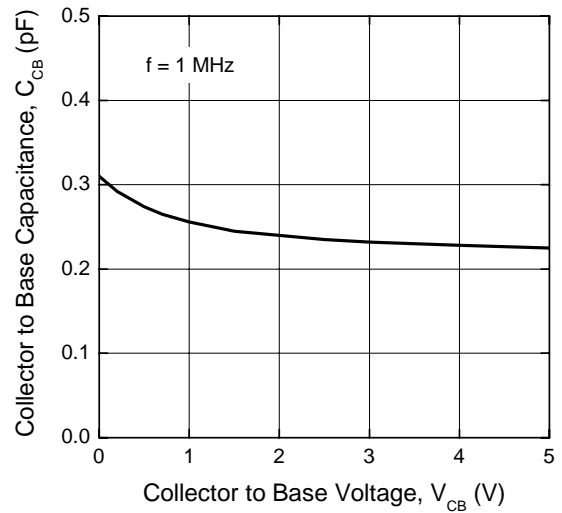
Marking	BE1	BE2
$h_{FE}$ Value	50 - 150	130 - 260

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

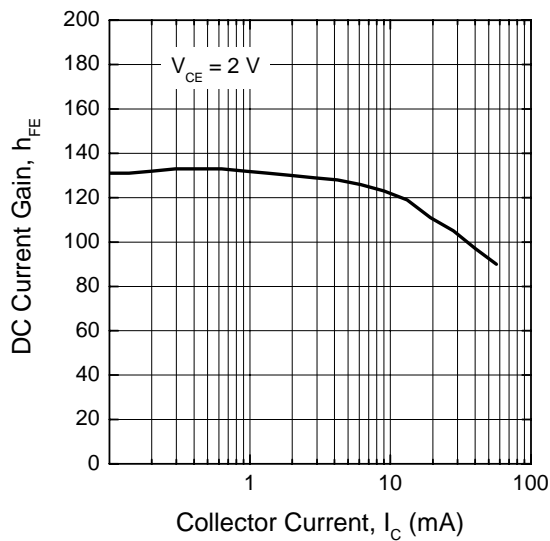
**Power Dissipation vs. Ambient Temperature**



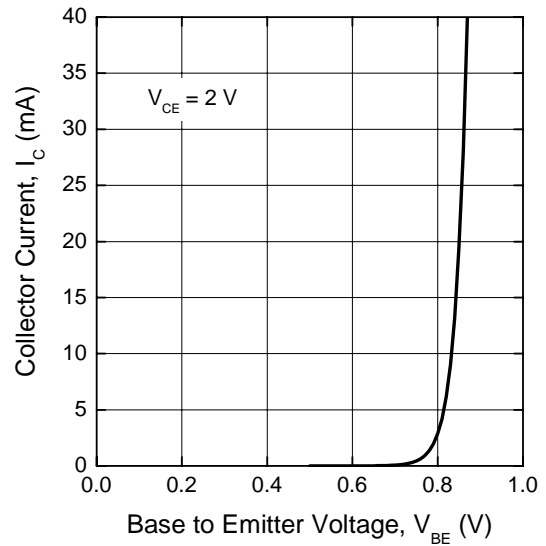
**Collector to Base Capacitance vs. Collector to Base Voltage**



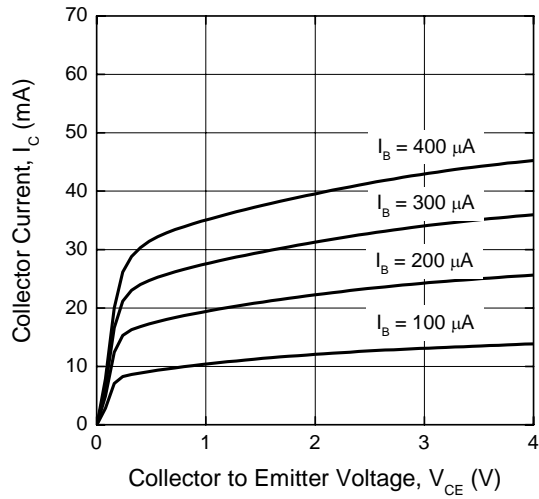
**DC Current Gain vs. Collector Current**



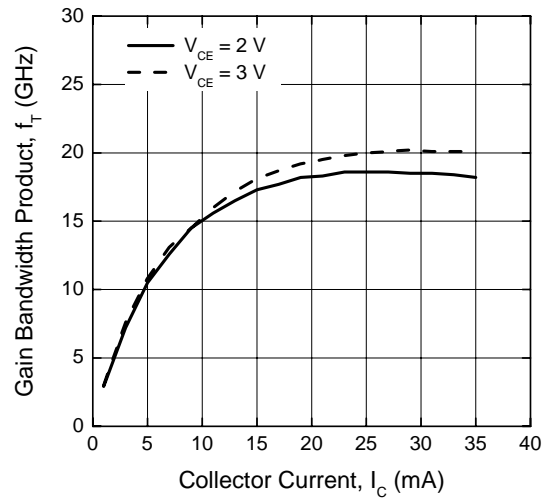
**Collector Current vs. Base to Emitter Voltage**



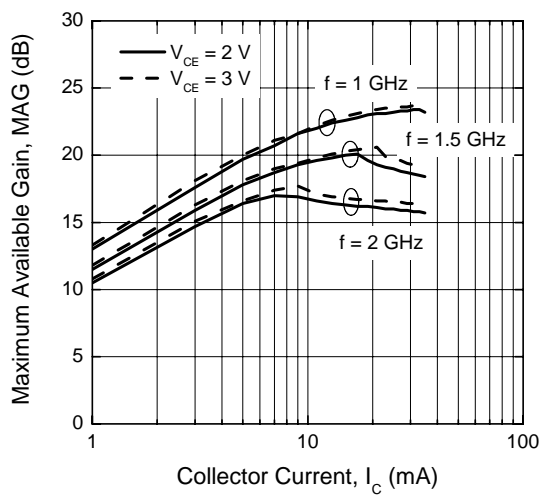
**Collector Current vs. Collector to Emitter Voltage**



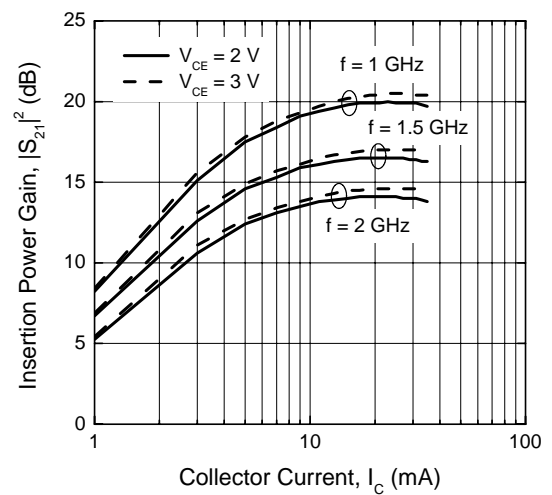
**Gain Bandwidth Product vs. Collector Current**



**Maximum Available Gain vs. Collector Current**

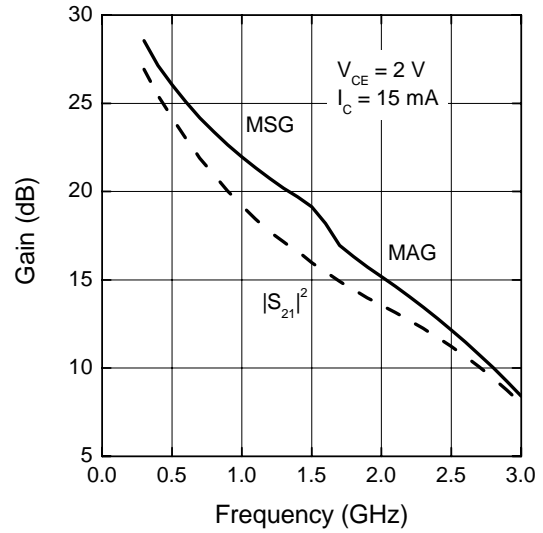
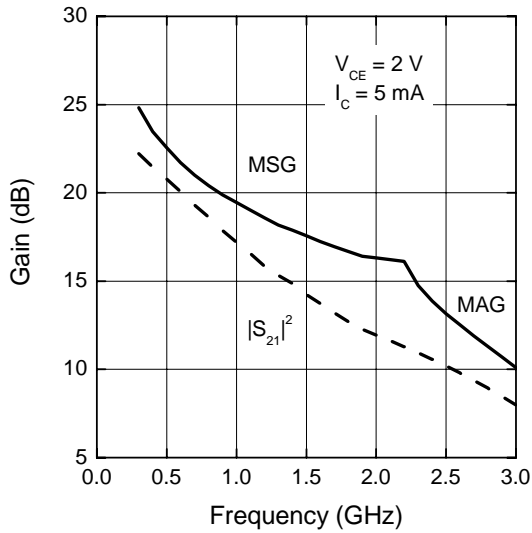


**Insertion Power Gain vs. Collector Current**



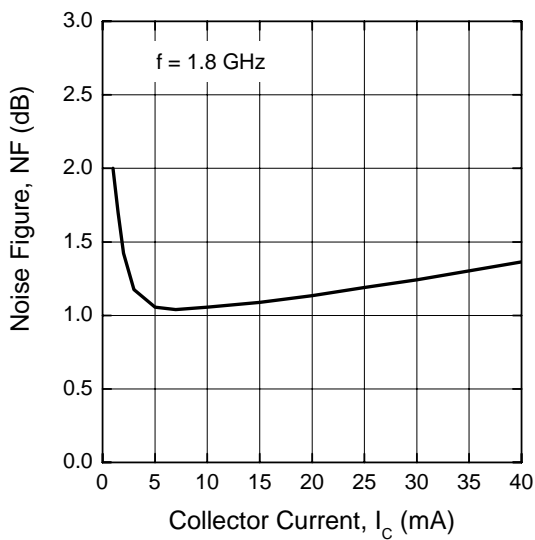
# THN420Z

**Power Gain vs. Frequency**



**Noise Figure vs. Collector Current**

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



**Noise Figure and Associated Gain Contours**

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

