



NPN SILICON HIGH FREQUENCY TRANSISTOR

UPA812T

FEATURES

- **SMALL PACKAGE STYLE:**
2 NE681 Die in a 2 mm x 1.25 mm package
- **LOW NOISE FIGURE:**
NF = 1.4 dB TYP at 1 GHz
- **HIGH GAIN:**
 $IS_{21E}I^2 = 12$ dB TYP at 1 GHz
- **HIGH GAIN BANDWIDTH:** $f_T = 7$ GHz
- **LOW CURRENT OPERATION**

DESCRIPTION

NEC's UPA812T is two NPN high frequency silicon epitaxial transistors encapsulated in an ultra small 6 pin SMT package. Each transistor is independently mounted and easily configured for either dual transistor or cascode operation. The high f_T , low voltage bias and small size make this device suited for various hand-held wireless applications.

ABSOLUTE MAXIMUM RATINGS¹ ($T_A = 25^\circ\text{C}$)

SYMBOLS	PARAMETERS	UNITS	RATINGS
V _{CB0}	Collector to Base Voltage	V	20
V _{CE0}	Collector to Emitter Voltage	V	10
V _{EB0}	Emitter to Base Voltage	V	1.5
I _C	Collector Current	mA	65
P _T	Total Power Dissipation		
	1 Die	mW	110
	2 Die	mW	200
T _J	Junction Temperature	°C	150
T _{STG}	Storage Temperature	°C	-65 to +150

Note: 1. Operation in excess of any one of these parameters may result in permanent damage.

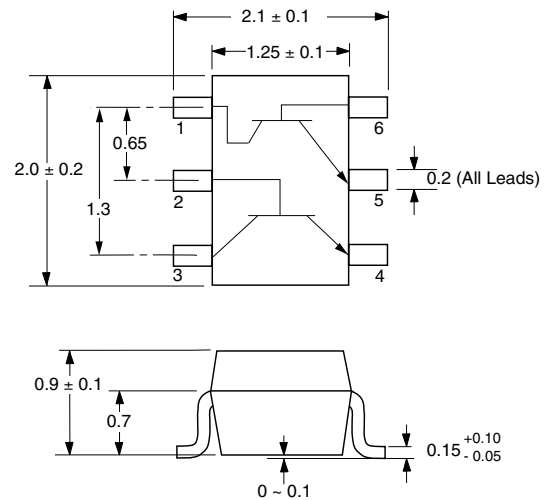
ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$)

PART NUMBER PACKAGE OUTLINE			UPA812T S06		
SYMBOLS	PARAMETERS AND CONDITIONS	UNITS	MIN	TYP	MAX
I _{CB0}	Collector Cutoff Current at V _{CB} = 10 V, I _E = 0	μA			0.8
I _{EB0}	Emitter Cutoff Current at V _{EB} = 1 V, I _C = 0	μA			0.8
h _{FE} ¹	Forward Current Gain at V _{CE} = 3 V, I _C = 7 mA		70	100	240
f _T	Gain Bandwidth at V _{CE} = 3 V, I _C = 7 mA, f = 1 GHz	GHz	4.5	7.0	
C _{re} ²	Feedback Capacitance at V _{CB} = 3 V, I _E = 0, f = 1 MHz	pF			0.9
IS _{21E} I ²	Insertion Power Gain at V _{CE} = 3 V, I _C = 7 mA, f = 1 GHz	dB	10	12	
NF	Noise Figure at V _{CE} = 3 V, I _C = 7 mA, f = 1 GHz	dB		1.4	1.7
h _{FE1} /h _{FE2}	h _{FE} Ratio: h _{FE1} = Smaller Value of Q ₁ , or Q ₂ h _{FE2} = Larger Value of Q ₁ or Q ₂		0.85		

Notes: 1. Pulsed measurement, pulse width ≤ 350 μs, duty cycle ≤ 2 %.
2. The emitter terminal should be connected to the ground terminal of the 3 terminal capacitance bridge.
For Tape and Reel version use part number UPA812T-T1, 3K per reel.

OUTLINE DIMENSIONS (Units in mm)

PACKAGE OUTLINE S06
(Top View)



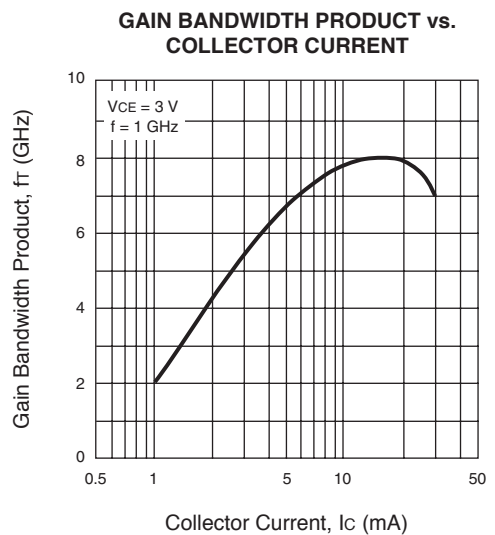
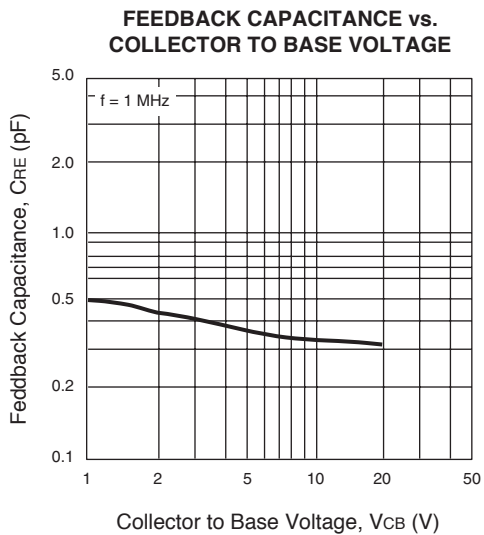
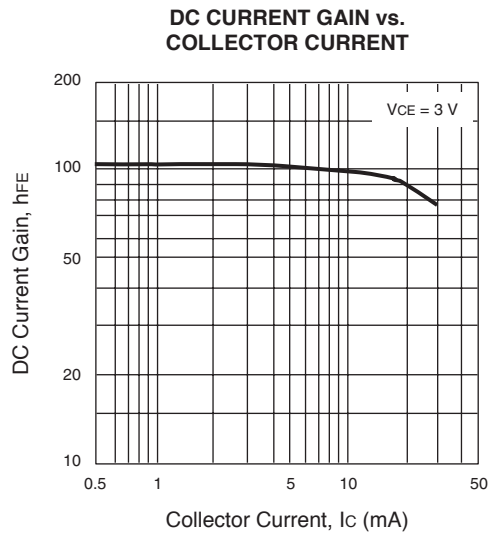
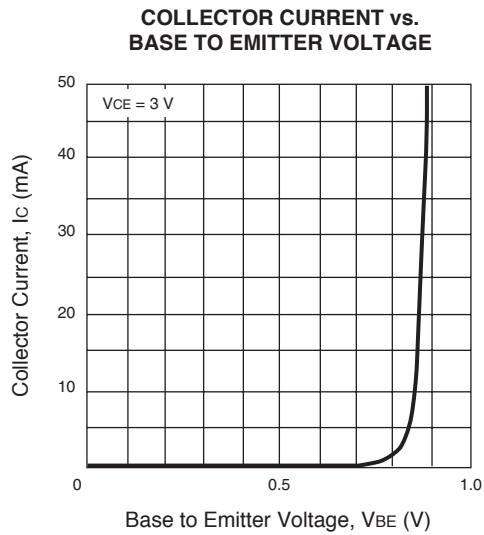
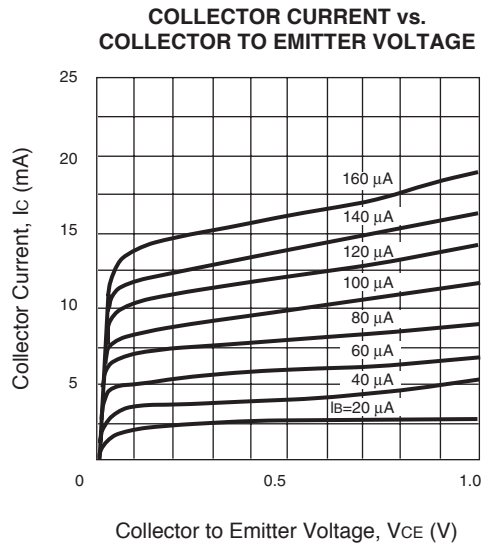
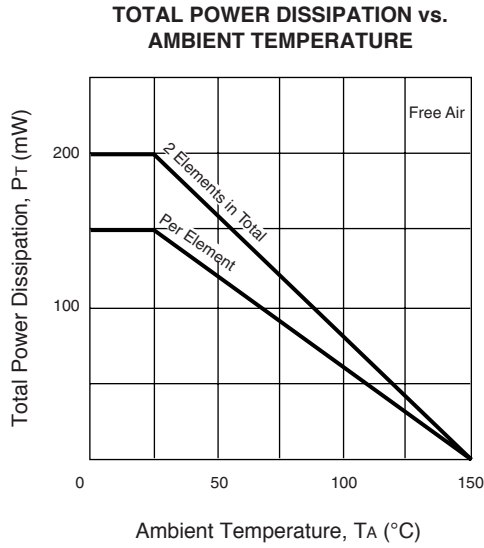
PIN OUT

1. Collector Transistor 1
2. Base Transistor 2
3. Collector Transistor 2
4. Emitter Transistor 2
5. Emitter Transistor 1
6. Base Transistor 1

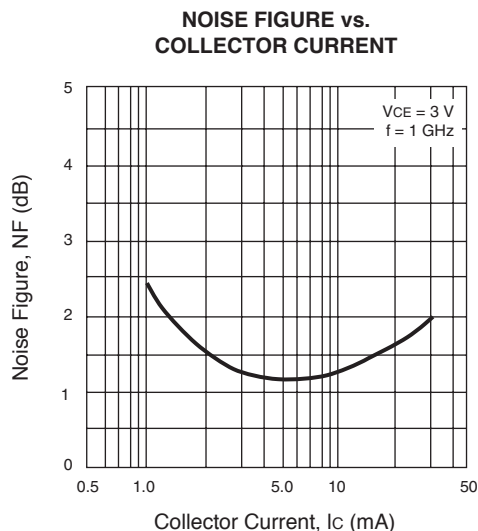
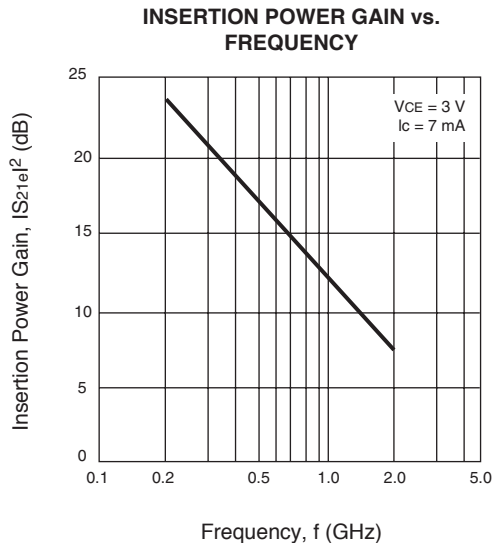
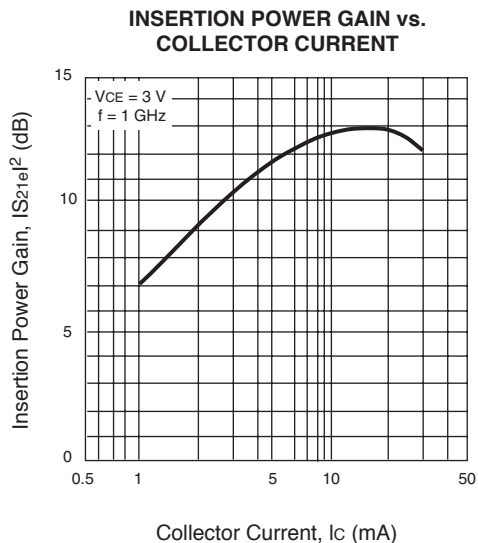
Note:

Pin 3 is identified with a circle on the bottom of the package.

TYPICAL PERFORMANCE CURVES (TA = 25°C)



TYPICAL PERFORMANCE CURVES (T_A = 25°C)



ORDERING INFORMATION

PART NUMBER	QUANTITY	PACKAGING
UPA812T-T1-A	3000	Tape & Reel

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Restricted Substance per RoHS	Concentration Limit per RoHS (values are not yet fixed)	Concentration contained in CEL devices	
		-A	-AZ
Lead (Pb)	< 1000 PPM	Not Detected	(*)
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Cadmium	< 100 PPM	Not Detected	
Hexavalent Chromium	< 1000 PPM	Not Detected	
PBB	< 1000 PPM	Not Detected	
PBDE	< 1000 PPM	Not Detected	

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