

# 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:  $|S_{21}E|^2 = 12 \text{ dB TYP at 1 GHz}$
- HIGH GAIN BANDWIDTH: ft = 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 ft, low voltage bias and small size make this device suited for various hand-held wireless applications.

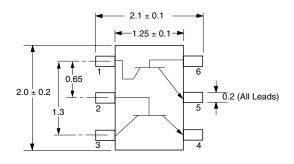
### ABSOLUTE MAXIMUM RATINGS<sup>1</sup> (TA = 25°C)

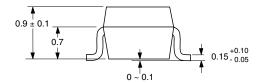
SYMBOLS	PARAMETERS	UNITS	RATINGS
Vсво	Collector to Base Voltage	V	20
VCEO	Collector to Emitter Voltage	V	10
VEBO	Emitter to Base Voltage	V	1.5
Ic	Collector Current	mA	65
PT	Total Power Dissipation 1 Die 2 Die	mW mW	110 200
TJ	Junction Temperature	°C	150
Тѕтс	Storage Temperature	°C	-65 to +150

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

#### **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
- Base Transistor 1Note:

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

#### ELECTRICAL CHARACTERISTICS (TA = 25°C)

PART NUMBER PACKAGE OUTLINE			UPA812T S06		
SYMBOLS	PARAMETERS AND CONDITIONS	UNITS	MIN	TYP	MAX
Ісво	Collector Cutoff Current at VcB = 10 V, IE = 0	μΑ			0.8
ІЕВО	Emitter Cutoff Current at VEB = 1 V, IC = 0	μА			0.8
hFE <sup>1</sup>	Forward Current Gain at VcE = 3 V, Ic = 7 mA		70	100	240
fт	Gain Bandwidth at VcE = 3 V, Ic = 7 mA, f = 1 GHz	GHz	4.5	7.0	
Cre <sup>2</sup>	Feedback Capacitance at VcB = 3 V, IE = 0, f = 1 MHz	pF			0.9
IS21El <sup>2</sup>	Insertion Power Gain at VcE = 3 V, Ic =7 mA, f = 1 GHz	dB	10	12	
NF	Noise Figure at VcE = 3 V, Ic = 7 mA, f = 1 GHz	dB		1.4	1.7
hFE1/hFE2	hfe Ratio: hfe1 = Smaller Value of Q1, or Q2 hfe2 = Larger Value of Q1 or Q2		0.85		

Notes: 1. Pulsed measurement, pulse width  $\leq$  350  $\mu$ s, duty cycle  $\leq$  2 %.

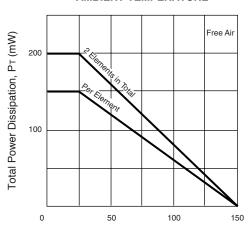
2. The emitter terminal should be connected to the ground terminal of the 3 terminal capacitance bridge.

For Tape and Reel version use part number UPA812T-T1, 3K per reel.

California Eastern Laboratories

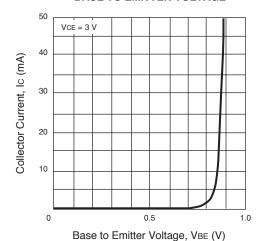
### TYPICAL PERFORMANCE CURVES (TA = 25°C)

## TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE

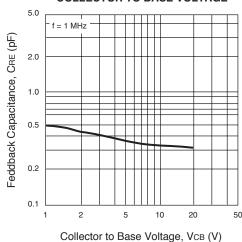


Ambient Temperature, Ta (°C)

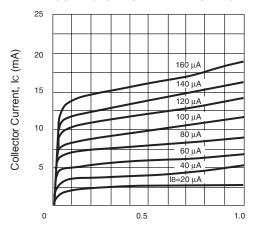
### COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE



# FEEDBACK CAPACITANCE vs. COLLECTOR TO BASE VOLTAGE

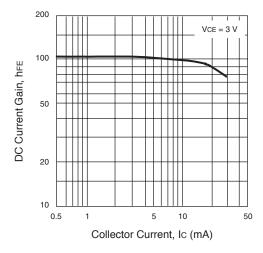


## COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE

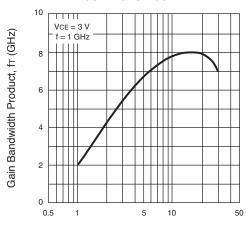


Collector to Emitter Voltage, VCE (V)

## DC CURRENT GAIN vs. COLLECTOR CURRENT



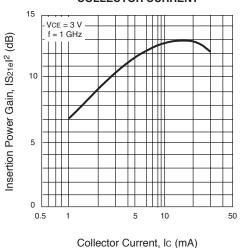
## GAIN BANDWIDTH PRODUCT vs. COLLECTOR CURRENT



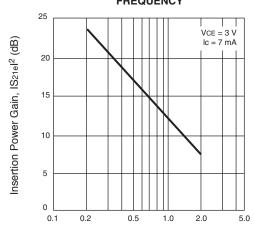
Collector Current, Ic (mA)

### TYPICAL PERFORMANCE CURVES (TA = 25°C)

## INSERTION POWER GAIN vs. COLLECTOR CURRENT

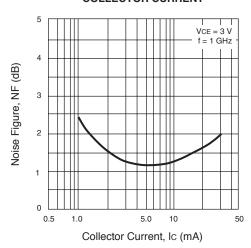


### INSERTION POWER GAIN vs. FREQUENCY



#### Frequency, f (GHz)

## NOISE FIGURE vs. COLLECTOR CURRENT



#### ORDERING INFORMATION

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

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Mercury	< 1000 PPM	Not Detected	
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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