NEC

NPN SILICON HIGH FREQUENCY TRANSISTOR

UPA814T

FEATURES

- **SMALL PACKAGE STYLE:**
  2 NE688 Die in a 2 mm x 1.25 mm package
- **LOW NOISE FIGURE:**
  NF = 1.5 dB TYP at 2 GHz
- **HIGH GAIN BANDWIDTH:** f_T = 9 GHz
- **HIGH COLLECTOR CURRENT:** 100 mA

DESCRIPTION

The UPA814T 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.

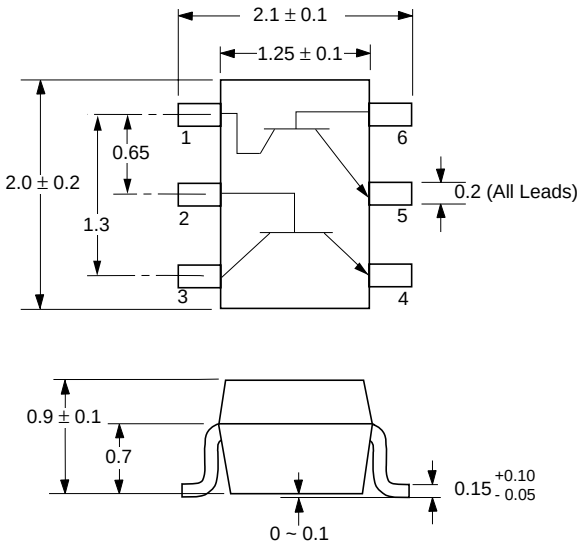
ABSOLUTE MAXIMUM RATINGS[1] (T_A = 25°C)

SYMBOLS	PARAMETERS	UNITS	RATINGS
V_{CBO}	Collector to Base Voltage	V	9
V_{CEO}	Collector to Emitter Voltage	V	6
V_{EBO}	Emitter to Base Voltage	V	2
I_C	Collector Current	mA	100
P_T	Total Power Dissipation 1 Die 2 Die	 mW mW	 110 200
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.

OUTLINE DIMENSIONS (Units in mm)

PACKAGE OUTLINE S06



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.

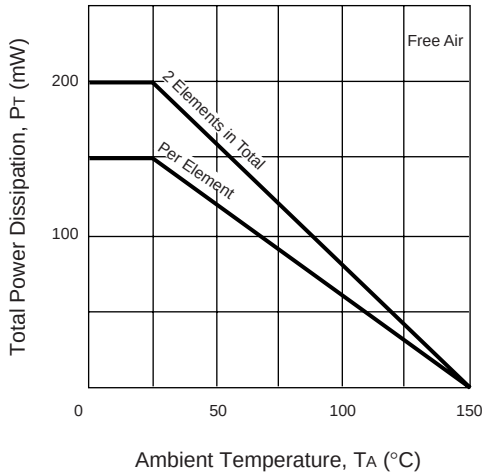
ELECTRICAL CHARACTERISTICS (T_A = 25°C)

PART NUMBER PACKAGE OUTLINE			UPA814T S06		
SYMBOLS	PARAMETERS AND CONDITIONS	UNITS	MIN	TYP	MAX
I_{CBO}	Collector Cutoff Current at V_{CB} = 5V, I_E = 0	µA			0.1
I_{EBO}	Emitter Cutoff Current at V_{EB} = 1 V, I_C = 0	µA			0.1
h_{FE}[1]	Forward Current Gain at V_{CE} = 1 V, I_C = 3 mA		80	110	160
f_T	Gain Bandwidth at V_{CE} = 3 V, I_C = 20 mA, f = 2 GHz	GHz		9.0	
Cre[2]	Feedback Capacitance at V_{CB} = 1 V, I_E = 0, f = 1 MHz	pF		0.75	0.85
$\|S_{21E}\|^2$	Insertion Power Gain at V_{CE} = 3 V, I_C =20 mA, f = 2 GHz	dB		6.5	
NF	Noise Figure at V_{CE} = 3 V, I_C = 7 mA, f = 2 GHz	dB		1.5	
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		

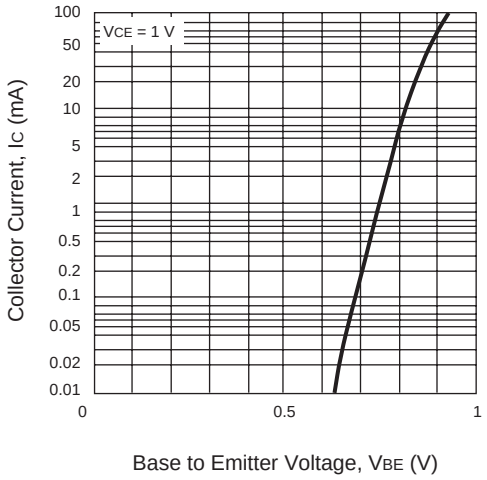
Notes: 1. Pulsed measurement, pulse width ≤ 350 µs, duty cycle ≤ 2 %.
2. The emitter terminal should be connected to the ground terminal of the 3 terminal capacitance bridge.
For Tape and Reel version use part number UPA814T-T1, 3K per reel.

TYPICAL PERFORMANCE CURVES (T_A = 25°C)

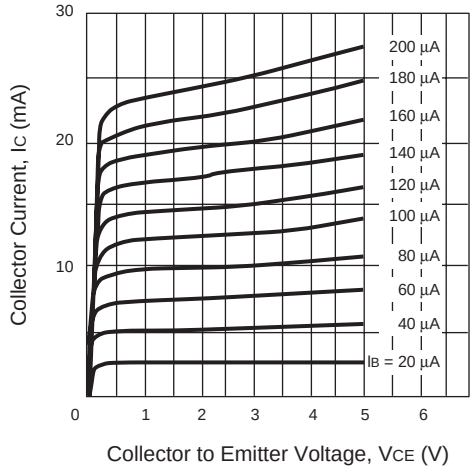
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



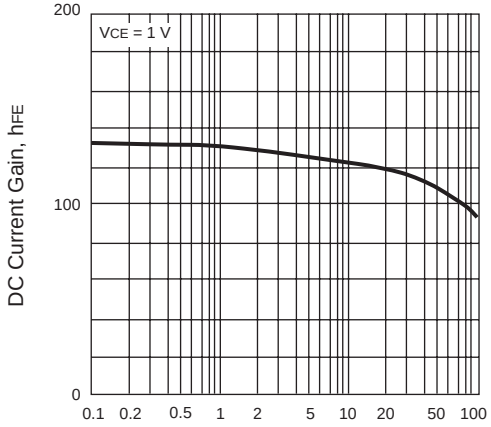
COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE



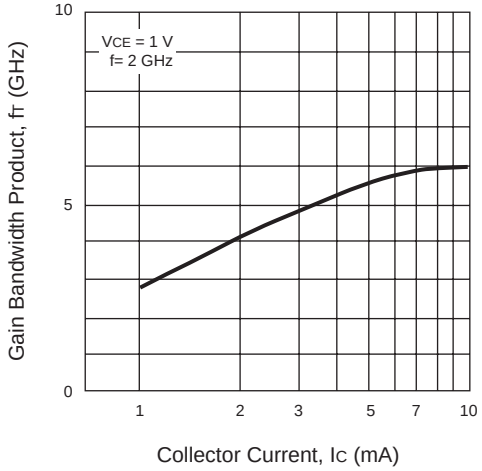
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



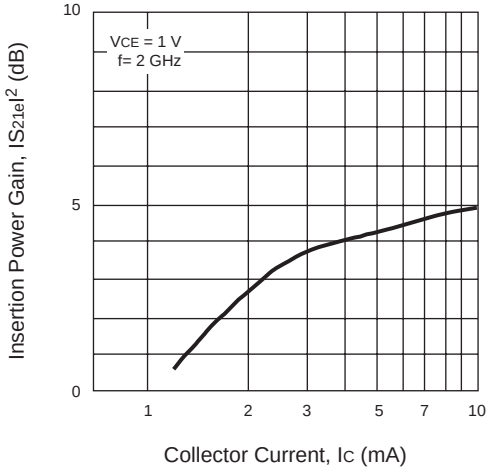
DC CURRENT GAIN vs. COLLECTOR CURRENT



GAIN BANDWIDTH PRODUCT vs. COLLECTOR CURRENT

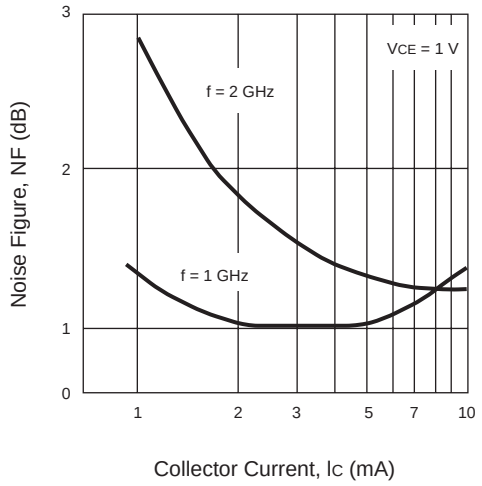


INSERTION POWER GAIN vs. COLLECTOR CURRENT

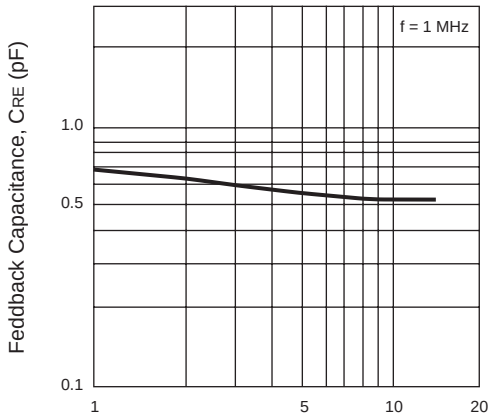


TYPICAL PERFORMANCE CURVES (T_A = 25°C)

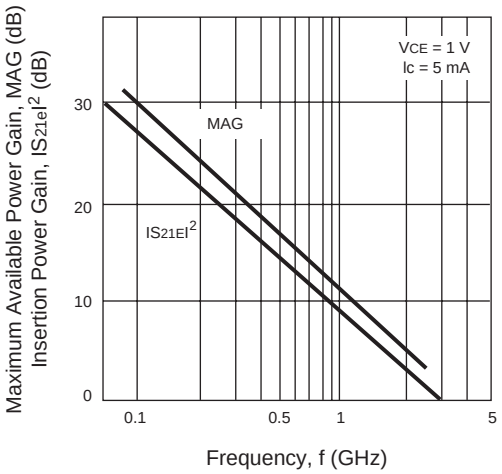
NOISE FIGURE vs. COLLECTOR CURRENT



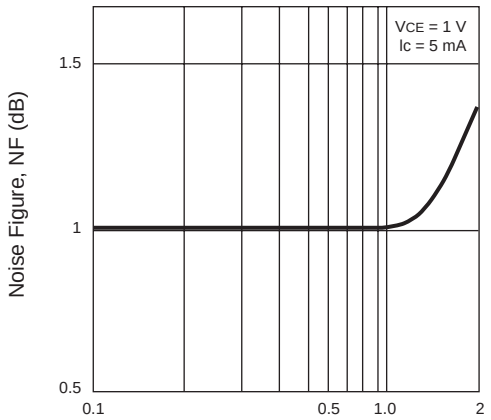
FEEDBACK CAPACITANCE vs. COLLECTOR TO BASE VOLTAGE



MAXIMUM AVAILABLE GAIN/INSERTION POWER GAIN vs. FREQUENCY



NOISE FIGURE vs. FREQUENCY



ORDERING INFORMATION

PART NUMBER	QUANTITY	PACKAGING
UPA814T-T1	3000	Tape & Reel