



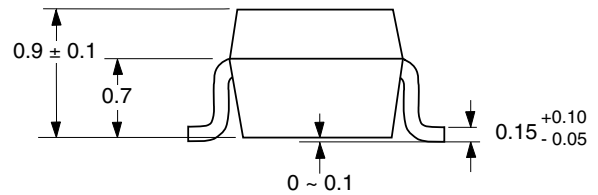
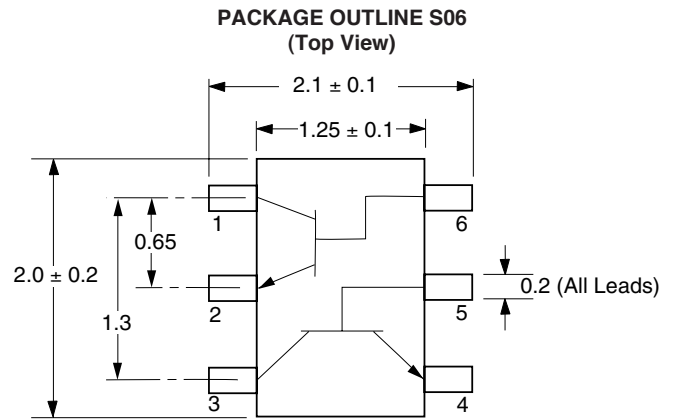
NPN SILICON HIGH FREQUENCY TRANSISTOR

UPA806T

FEATURES

- **SMALL PACKAGE STYLE:**
2 NE685 Die in a 2 mm x 1.25 mm package
- **LOW NOISE FIGURE:**
NF = 1.5 dB TYP at 2 GHz
- **HIGH GAIN:**
 $IS_{21E}I^2 = 8.5$ dB TYP at 2 GHz
- **HIGH GAIN BANDWIDTH:** $f_T = 12$ GHz
- **EXCELLENT LOW VOLTAGE, LOW CURRENT PERFORMANCE**

OUTLINE DIMENSIONS (Units in mm)



PIN OUT

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

Note:

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

DESCRIPTION

NEC's UPA806T 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.

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

PART NUMBER PACKAGE OUTLINE			UPA806T S06		
SYMBOLS	PARAMETERS AND CONDITIONS	UNITS	MIN	TYP	MAX
I_{CBO}	Collector Cutoff Current at $V_{CB} = 5$ V, $I_E = 0$	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 $V_{CE} = 3$ V, $I_C = 10$ mA		75	100	150
f_T	Gain Bandwidth at $V_{CE} = 3$ V, $I_C = 10$ mA, $f = 2$ GHz	GHz		12	
C_{re}^2	Feedback Capacitance at $V_{CB} = 3$ V, $I_E = 0$, $f = 1$ MHz	pF		0.4	0.7
$IS_{21E}I^2$	Insertion Power Gain at $V_{CE} = 3$ V, $I_C = 10$ mA, $f = 2$ GHz	dB	7	8.5	
NF	Noise Figure at $V_{CE} = 3$ V, $I_C = 3$ mA, $f = 2$ GHz	dB		1.5	2.5
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 $\leq 2\%$.

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 UPA806T-T1, 3K per reel.

California Eastern Laboratories

ABSOLUTE MAXIMUM RATINGS¹ (T_A = 25°C)

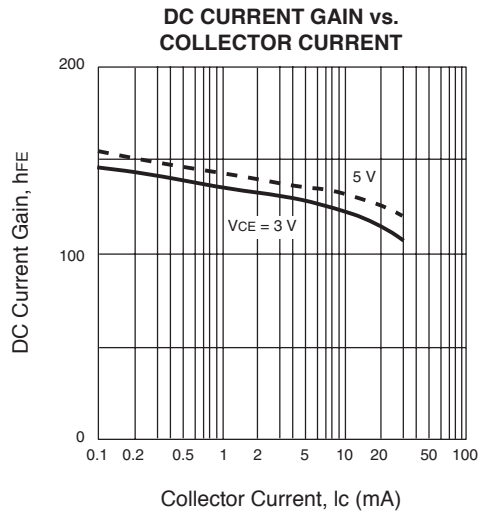
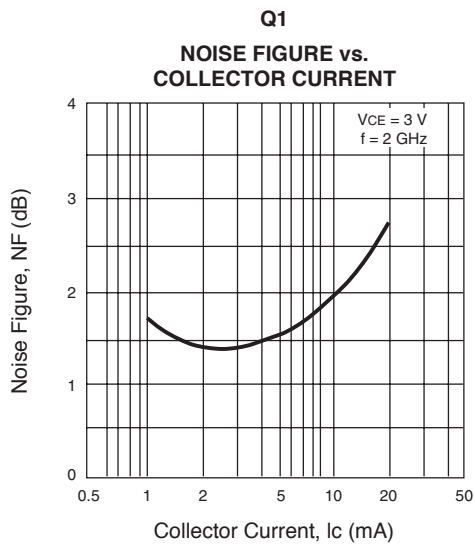
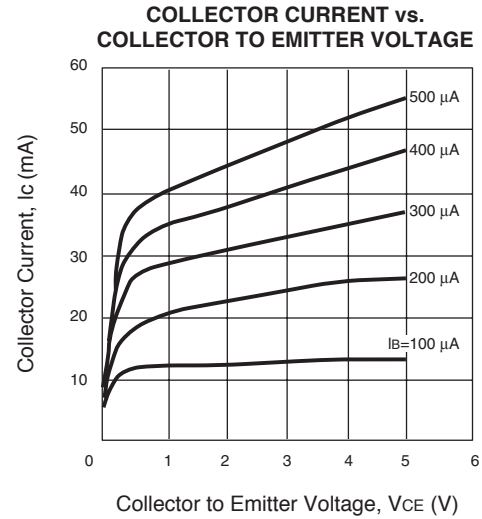
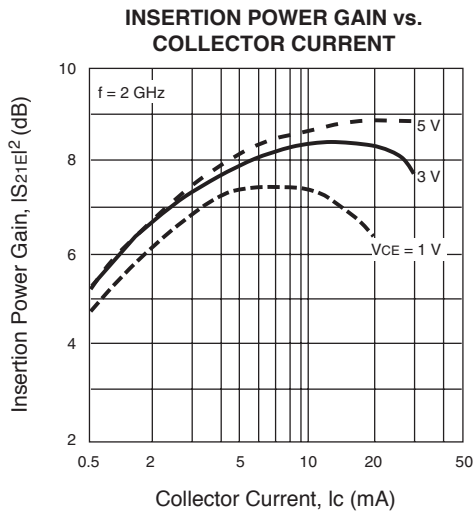
SYMBOLS	PARAMETERS	UNITS	RATINGS
V _{CBO}	Collector to Base Voltage	V	9
V _{CEO}	Collector to Emitter Voltage	V	6
V _{EBO}	Emitter to Base Voltage	V	2
I _C	Collector Current	mA	30
PT	Total Power Dissipation		
	1 Die	mW	110
	2 Die	mW	200
T _J	Junction Temperature	°C	150
T _{STG}	Storage Temperature	°C	-65 to +150

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

ORDERING INFORMATION

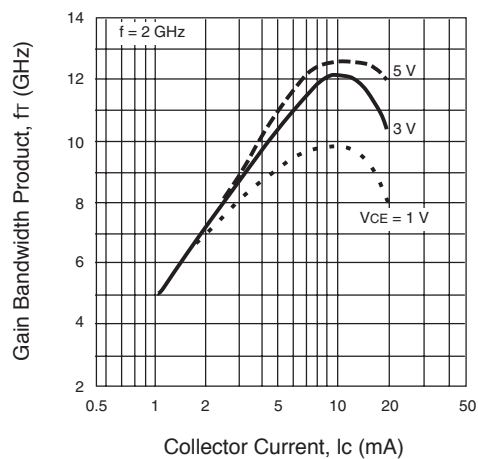
PART NUMBER	QUANTITY	PACKAGING
UPA806T-T1-A	3000	Tape & Reel

TYPICAL PERFORMANCE CURVES

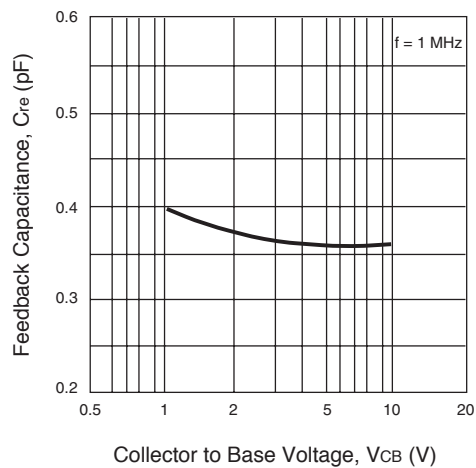


TYPICAL PERFORMANCE CURVES

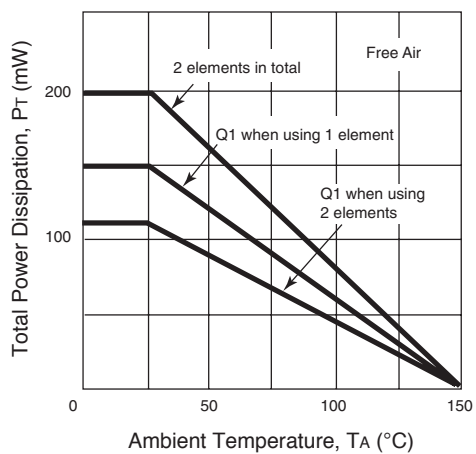
GAIN BANDWIDTH PRODUCT vs. COLLECTOR CURRENT



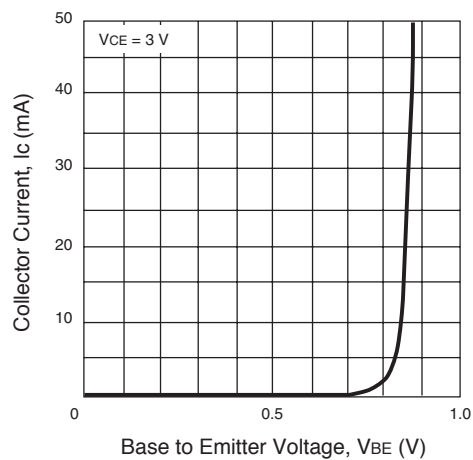
FEEDBACK CAPACITANCE vs. COLLECTOR TO BASE VOLTAGE



TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE



NONLINEAR MODEL

BJT NONLINEAR MODEL PARAMETERS(1)

Parameters	Q1 & Q2	Parameters	Q1 & Q2
IS	7e-16	MJC	0.34
BF	109	XCJC	0
NF	1	CJS	0
VAF	15	VJS	0.75
IKF	0.19	MJS	0
ISE	7.9e-13	FC	0.5
NE	2.19	TF	3e-12
BR	1	XTF	5.2
NR	1.08	VTF	4.58
VAR	12.4	ITF	0.01
IKR	Infinity	PTF	0
ISC	0	TR	1e-9
NC	2	EG	1.11
RE	1.3	XTB	0
RB	10	XTI	3
RBM	8.34	KF	0
IRB	0.009	AF	1
RC	10		
CJE	0.4e-12		
VJE	0.81		
MJE	0.5		
CJC	0.18e-12		
VJC	0.75		

(1) Gummel-Poon Model

UNITS

Parameter	Units
time	seconds
capacitance	farads
inductance	henries
resistance	ohms
voltage	volts
current	amps

MODEL RANGE

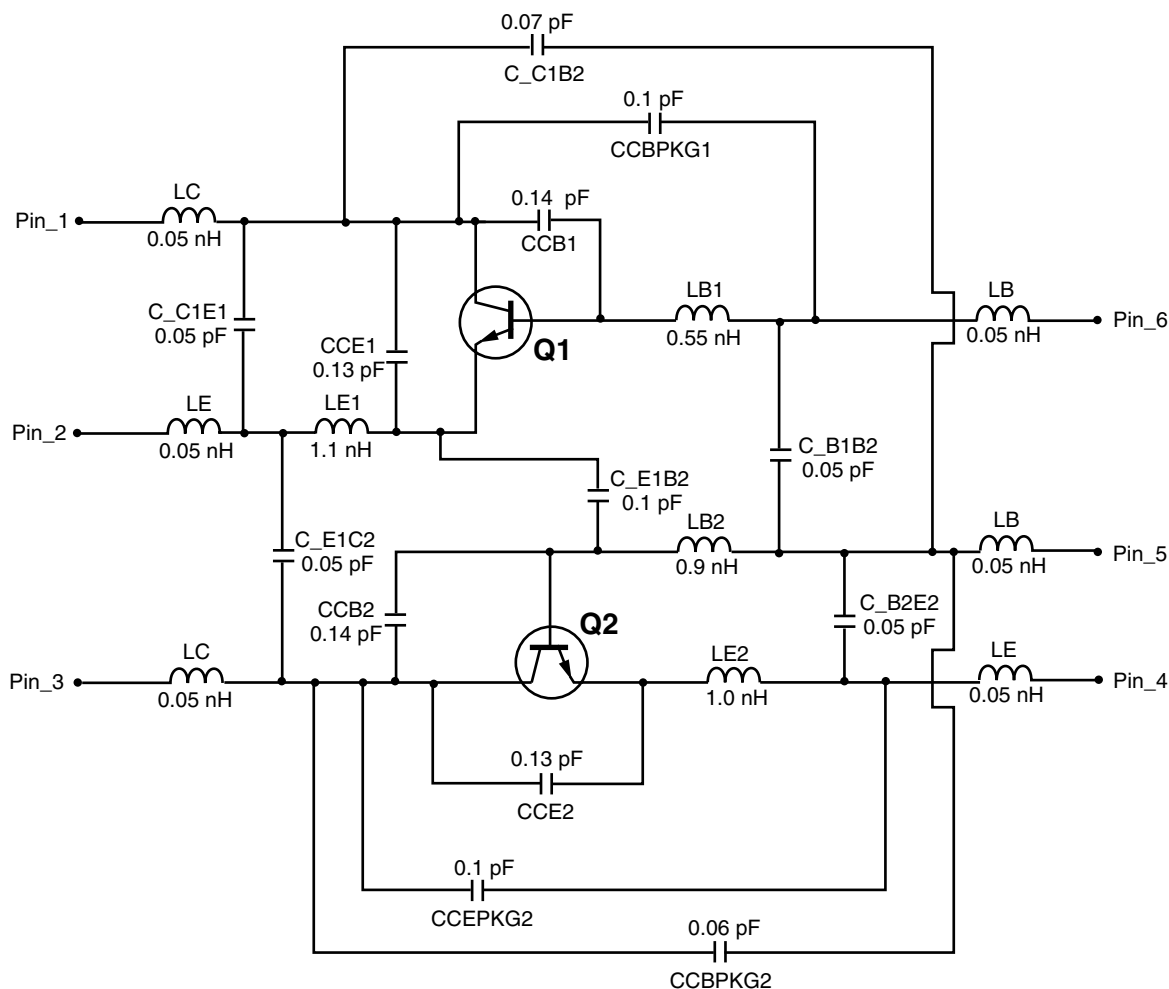
Frequency: 0.1 to 3.0 GHz
 Bias: $V_{CE} = 0.5 \text{ V to } 5 \text{ V}$, $I_C = 1 \text{ mA to } 10 \text{ mA}$
 Date: 10/98

Note:

This nonlinear model utilized the latest data available. See our Design Parameter Library at www.cel.com for this data.

NONLINEAR MODEL

SCHEMATIC



MODEL RANGE

Frequency: 0.1 to 3.0 GHz

Bias: $V_{CE} = 0.5 \text{ V}$ to 5 V , $I_c = 1 \text{ mA}$ to 10 mA

Date: 10/98

Life Support Applications

These NEC products are not intended for use in life support devices, appliances, or systems where the malfunction of these products can reasonably be expected to result in personal injury. The customers of CEL using or selling these products for use in such applications do so at their own risk and agree to fully indemnify CEL for all damages resulting from such improper use or sale.

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Subject: Compliance with EU Directives

CEL certifies, to its knowledge, that semiconductor and laser products detailed below are compliant with the requirements of European Union (EU) Directive 2002/95/EC Restriction on Use of Hazardous Substances in electrical and electronic equipment (RoHS) and the requirements of EU Directive 2003/11/EC Restriction on Penta and Octa BDE.

CEL Pb-free products have the same base part number with a suffix added. The suffix –A indicates that the device is Pb-free. The –AZ suffix is used to designate devices containing Pb which are exempted from the requirement of RoHS directive (*). In all cases the devices have Pb-free terminals. All devices with these suffixes meet the requirements of the RoHS directive.

This status is based on CEL’s understanding of the EU Directives and knowledge of the materials that go into its products as of the date of disclosure of this information.

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	(*)
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	

If you should have any additional questions regarding our devices and compliance to environmental standards, please do not hesitate to contact your local representative.

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