

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.

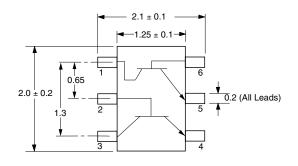
ABSOLUTE MAXIMUM RATINGS¹ (TA = 25°C)

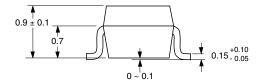
SYMBOLS	PARAMETERS	UNITS	RATINGS
Vсво	Collector to Base Voltage	V	20
VCEO	Collector to Emitter Voltage	V	10
VEBO	Emitter to Base Voltage	V	1.5
Ic	Collector Current	mA	65
PT	Total Power Dissipation 1 Die 2 Die	mW mW	110 200
TJ	Junction Temperature	°C	150
Тѕтс	Storage Temperature	°C	-65 to +150

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
- 6. Base Transistor 1

Note:

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

ELECTRICAL CHARACTERISTICS (TA = 25°C)

PART NUMBER PACKAGE OUTLINE			UPA812T \$06		
SYMBOLS	PARAMETERS AND CONDITIONS	UNITS	MIN	TYP	MAX
Ісво	Collector Cutoff Current at VcB = 10 V, IE = 0	μΑ			0.8
І ЕВО	Emitter Cutoff Current at VEB = 1 V, IC = 0	μΑ			0.8
hFE ¹	Forward Current Gain at VcE = 3 V, Ic = 7 mA		70	100	240
fτ	Gain Bandwidth at VcE = 3 V, Ic = 7 mA, f = 1 GHz	GHz	4.5	7.0	
Cre ²	Feedback Capacitance at VcB = 3 V, IE = 0, f = 1 MHz	pF			0.9
IS21El ²	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		

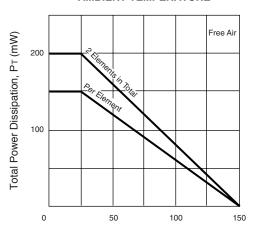
Notes: 1. Pulsed measurement, pulse width \leq 350 μ s, duty cycle \leq 2 %.

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.

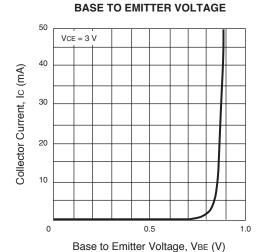
TYPICAL PERFORMANCE CURVES (TA = 25°C)

TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE

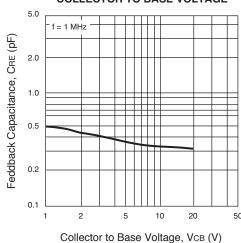


Ambient Temperature, Ta (°C)

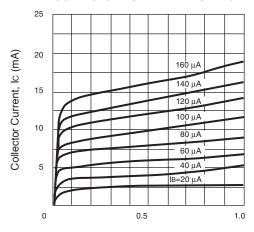
COLLECTOR CURRENT vs.



FEEDBACK CAPACITANCE vs. COLLECTOR TO BASE VOLTAGE

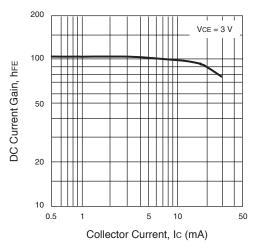


COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE

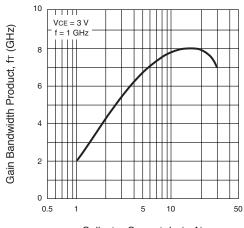


Collector to Emitter Voltage, VcE (V)

DC CURRENT GAIN vs. COLLECTOR CURRENT



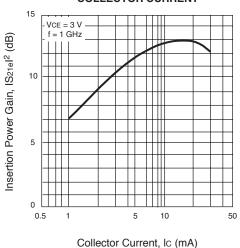
GAIN BANDWIDTH PRODUCT vs. COLLECTOR CURRENT



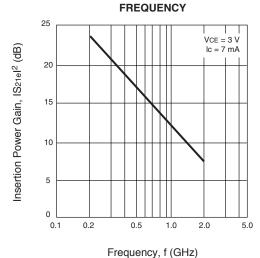
Collector Current, Ic (mA)

TYPICAL PERFORMANCE CURVES (TA = 25°C)

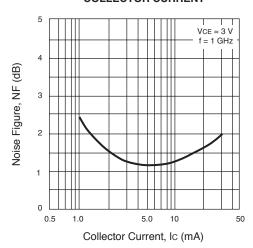
INSERTION POWER GAIN vs. COLLECTOR CURRENT



INSERTION POWER GAIN vs.



NOISE FIGURE vs. COLLECTOR CURRENT



ORDERING INFORMATION

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

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.



Facsimile: (408) 988-0279

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	
Lead (Pb)	< 1000 PPM	-A -AZ 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.

Important Information and Disclaimer: Information provided by CEL on its website or in other communications concerting the substance content of its products represents knowledge and belief as of the date that it is provided. CEL bases its knowledge and belief on information provided by third parties and makes no representation or warranty as to the accuracy of such information. Efforts are underway to better integrate information from third parties. CEL has taken and continues to take reasonable steps to provide representative and accurate information but may not have conducted destructive testing or chemical analysis on incoming materials and chemicals. CEL and CEL suppliers consider certain information to be proprietary, and thus CAS numbers and other limited information may not be available for release.

In no event shall CEL's liability arising out of such information exceed the total purchase price of the CEL part(s) at issue sold by CEL to customer on an annual basis.

See CEL Terms and Conditions for additional clarification of warranties and liability.