

# NEC

## NPN SILICON HIGH FREQUENCY TRANSISTOR

### UPA808TC

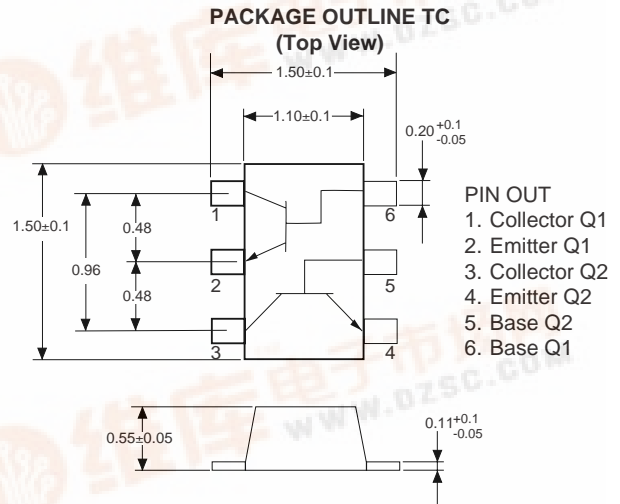
#### FEATURES

- **SMALL PACKAGE OUTLINE:**  
1.5 mm x 1.1 mm, 33% smaller than conventional SOT-363 package
- **LOW HEIGHT PROFILE**  
Just 0.55 mm high
- **FLAT LEAD STYLE:**  
Reduced lead inductance improves electrical performance
- **HIGH COLLECTOR CURRENT:**  
IC MAX = 65 mA

#### DESCRIPTION

The UPA808TC contains two NE687 NPN high frequency silicon bipolar chips. NEC's new ultra small TC package is ideal for all portable wireless applications where reducing board space is a prime consideration. Each transistor chip is independently mounted and easily configured for two stage cascode LNAs and other applications.

#### OUTLINE DIMENSIONS (Units in mm)



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

SYMBOLS	PARAMETERS	UNITS	RATINGS
VCBO	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	mW	TBD
	2 Die	mW	TBD
TJ	Junction Temperature	°C	150
TSTG	Storage Temperature	°C	-65 to +150

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

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

PART NUMBER PACKAGE OUTLINE			UPA808TC TC		
SYMBOLS	PARAMETERS AND CONDITIONS	UNITS	MIN	TYP	MAX
ICBO	Collector Cutoff Current at VCB = 10 V, IE = 0	μA			0.1
IEBO	Emitter Cutoff Current at VEB = 1 V, IC = 0	μA			0.1
hFE	Forward Current Gain <sup>1</sup> at VCE = 3 V, IC = 7 mA		70	100	140
fT	Gain Bandwidth at VCE = 3 V, IC = 7 mA	GHz	9	11	
Cre	Feedback Capacitance <sup>2</sup> at VCB = 3 V, IE = 0, f = 1 MHz	pF		0.4	0.8
S21E  <sup>2</sup>	Insertion Power Gain at VCE = 3 V, IC = 7 mA, f = 1 GHz	dB	7	8.5	
NF	Noise Figure at VCE = 3 V, IC = 7 mA, f = 1 GHz	dB		1.3	2

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 UPA808TC-T1, 3K per reel.

## NONLINEAR MODEL

### BJT NONLINEAR MODEL PARAMETERS <sup>(1)</sup>

Parameters	Q1, Q2	Parameters	Q1, Q2
IS	8e-17	MJC	0.53
BF	128	XCJC	1
NF	1	CJS	0
VAF	17	VJS	0.75
IKF	0.18	MJS	0
ISE	3.3e-15	FC	0.37
NE	1.48	TF	8e-12
BR	9.05	XTF	11.9
NR	1.05	VTF	9.55
VAR	4.3	ITF	1.78
IKR	0.009	PTF	69.1
ISC	4e-15	TR	1e-9
NC	1.5	EG	1.11
RE	0.8	XTB	0
RB	11.1	XTI	3
RBM	2.46	KF	0
IRB	0.017	AF	1
RC	7.5		
CJE	0.415e-12		
VJE	0.68		
MJE	0.53		
CJC	0.102e-12		
VJC	0.29		

(1) Gummel-Poon Model

**Note:**

This nonlinear model utilized the latest data available.  
See our Design Parameter Library at [www.cel.com](http://www.cel.com) for this data.

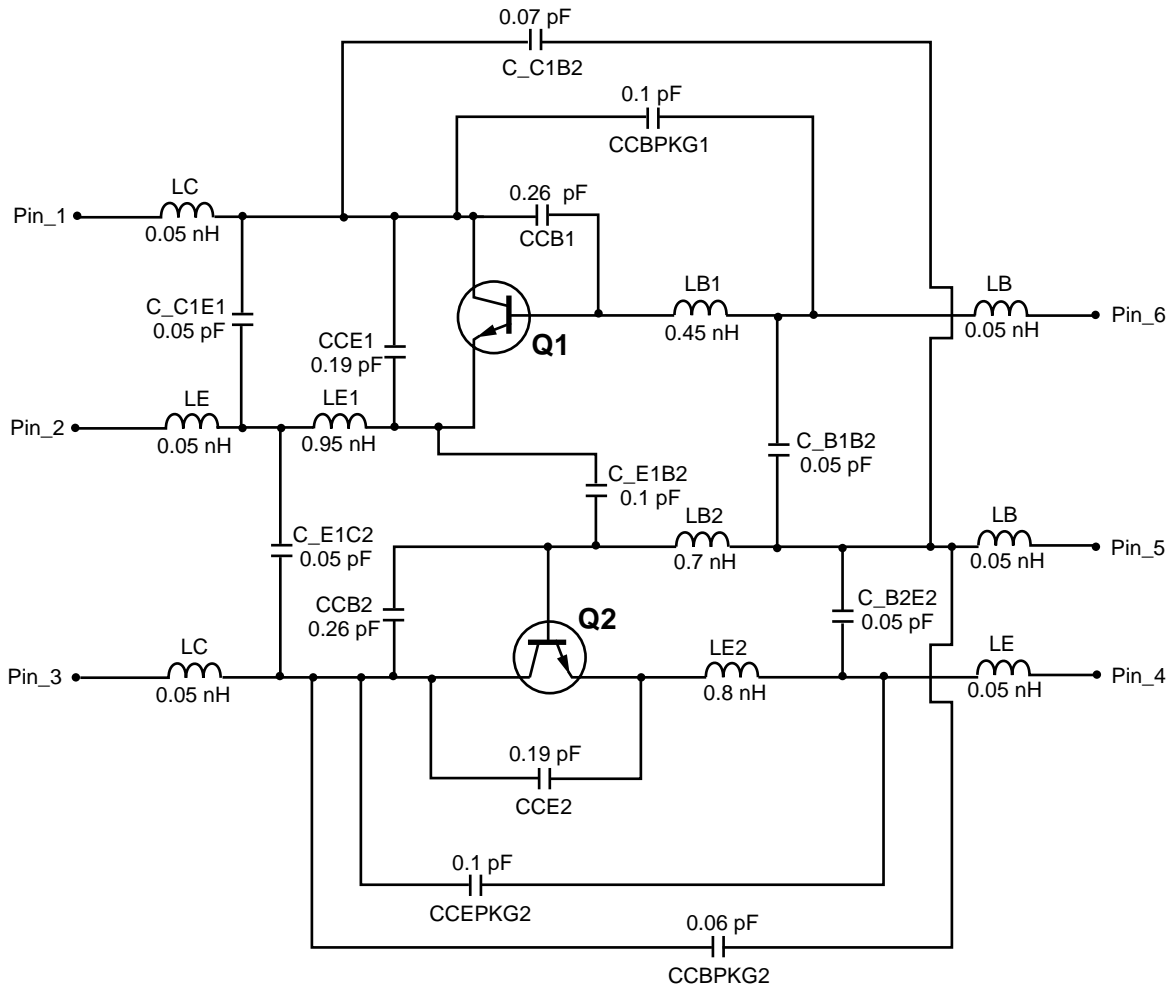
### UNITS

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

### MODEL RANGE

Frequency: 0.1 to 7.0 GHz  
Bias: V<sub>CE</sub> = 0.5 V to 2 V, I<sub>c</sub> = 0.5 mA to 10 mA  
Date: 02/01

SCHEMATIC



MODEL RANGE

Frequency: 0.1 to 7.0 GHz  
 Bias: V<sub>CE</sub> = 0.5 V to 2 V, I<sub>c</sub> = 0.5 mA to 10 mA  
 Date: 02/01

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.