

**NPN SILICON EPITAXIAL  
TWIN TRANSISTOR**

**UPA826TC**

**FEATURES**

- **SMALL PACKAGE STYLE:**  
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

**DESCRIPTION**

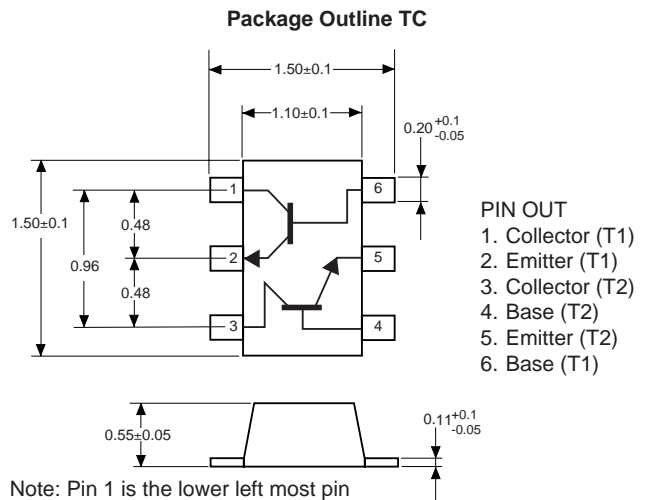
The UPA826TC contains two NE685 NPN high frequency silicon bipolar chips. NEC's new ultra small TC package is ideal for all portable wireless applications where reducing board space is a prime consideration. Each transistor chip is independently mounted and easily configured for oscillator buffer amplifier and other applications.

**OUTLINE DIMENSIONS (Units in mm)**

**ABSOLUTE MAXIMUM RATINGS<sup>1</sup> (T<sub>A</sub> = 25°C)**

SYMBOLS	PARAMETERS	UNITS	RATINGS
V <sub>CB0</sub>	Collector to Base Voltage	V	9
V <sub>CE0</sub>	Collector to Emitter Voltage	V	6
V <sub>EB0</sub>	Emitter to Base Voltage	V	2
I <sub>C</sub>	Collector Current	mA	30
P <sub>T</sub>	Total Power Dissipation 1 Element 2 Elements	mW mW	TBD TBD
T <sub>J</sub>	Junction Temperature	°C	150
T <sub>STG</sub>	Storage Temperature	°C	-65 to +150

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



Note: Pin 1 is the lower left most pin as the package lettering is oriented and read left to right.

**ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C)**

PART NUMBER PACKAGE OUTLINE			UPA826TC TC		
SYMBOLS	PARAMETERS AND CONDITIONS	UNITS	MIN	TYP	MAX
I <sub>CBO</sub>	Collector Cutoff Current at V <sub>CB</sub> = 5 V, I <sub>E</sub> = 0	μA			0.1
I <sub>EBO</sub>	Emitter Cutoff Current at V <sub>EB</sub> = 1 V, I <sub>C</sub> = 0	μA			0.1
h <sub>FE</sub>	DC Current Gain <sup>1</sup> at V <sub>CE</sub> = 3 V, I <sub>C</sub> = 10 mA		75	110	150
f <sub>T</sub>	Gain Bandwidth at V <sub>CE</sub> = 3 V, I <sub>C</sub> = 10 mA, f = 2 GHz	GHz		12	
C <sub>re</sub>	Feedback Capacitance <sup>2</sup> at V <sub>CB</sub> = 3 V, I <sub>E</sub> = 0, f = 1 MHz	pF		0.4	0.7
S <sub>21E</sub>   <sup>2</sup>	Insertion Power Gain at V <sub>CE</sub> = 3 V, I <sub>C</sub> = 10 mA, f = 2 GHz	dB	7	8.5	
NF	Noise Figure at V <sub>CE</sub> = 3 V, I <sub>C</sub> = 3 mA, f = 2 GHz	dB		1.5	2.5

- Notes: 1. Pulsed measurement, pulse width ≤ 350 μs, duty cycle ≤ 2 %.  
 2. Collector to base capacitance when measured with capacitance meter (automatic balanced bridge method), with emitter connected to guard pin of capacitance meter.  
 3. For tape and reel version, use part number UPA826TC-T1, 3K per reel.

## 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

#### 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.

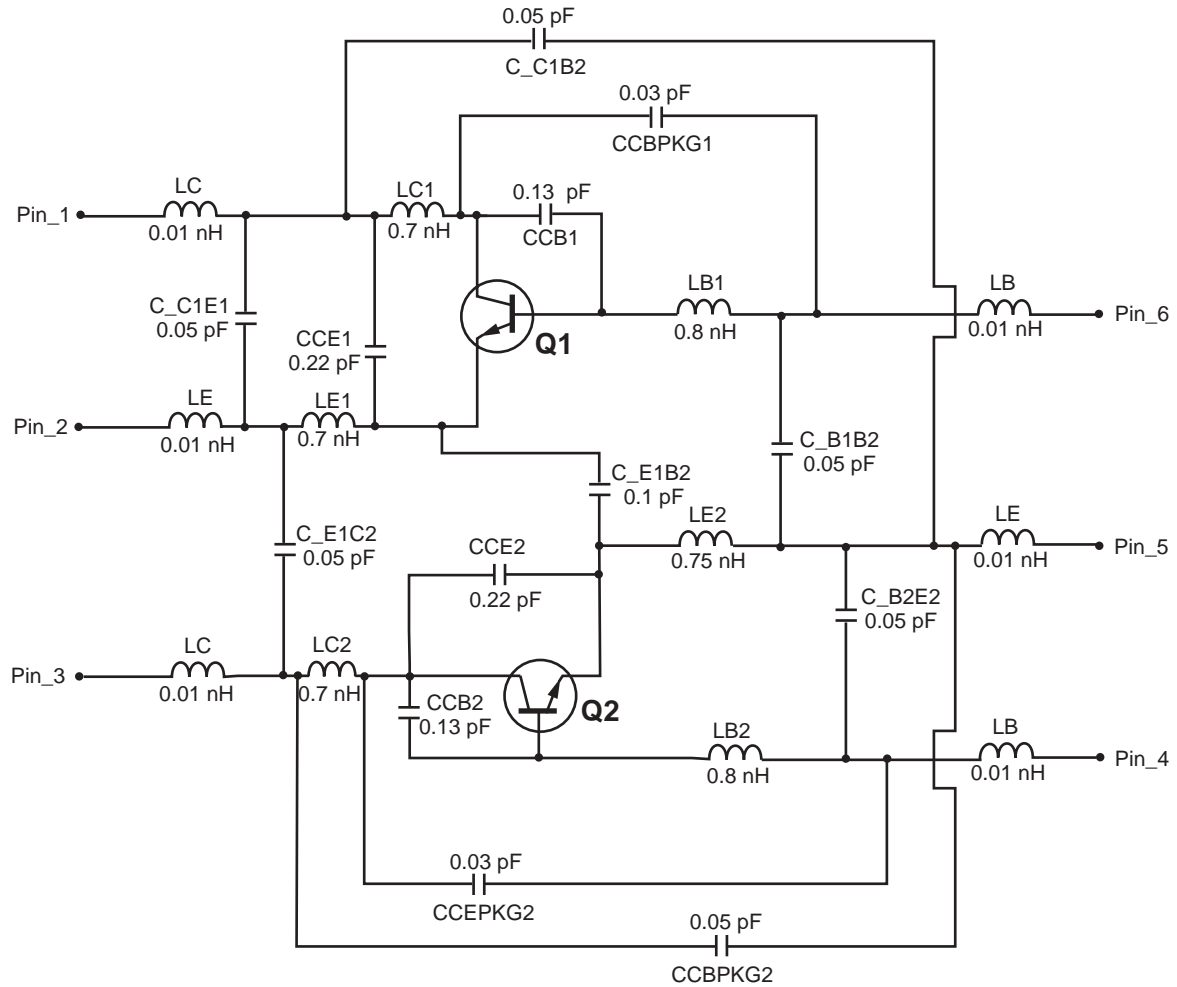
### UNITS

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

#### MODEL RANGE

Frequency: 0.1 to 7.0 GHz  
Bias:  $V_{CE} = 0.5$  V to 5 V,  $I_c = 0.5$  mA to 20 mA  
Date: 02/01

SCHEMATIC



MODEL RANGE

Frequency: 0.1 to 7.0 GHz  
 Bias:  $V_{CE} = 0.5 \text{ V to } 5 \text{ V}$ ,  $I_c = 0.5 \text{ mA to } 20 \text{ mA}$   
 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.