

PRELIMINARY DATA SHEET

**NEC**

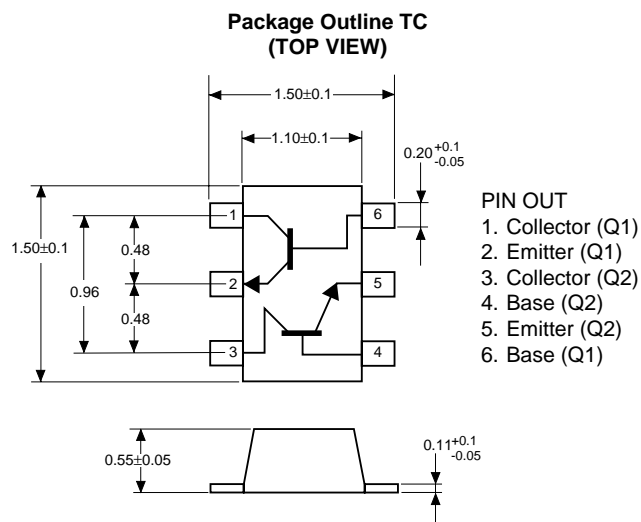
**NPN SILICON EPITAXIAL TWIN TRANSISTOR**

**UPA836TC**

**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
- **TWO DIFFERENT DIE TYPES:**  
Q1 - Ideal oscillator transistor  
Q2 - Ideal buffer amplifier transistor

**OUTLINE DIMENSIONS** (Units in mm)



**DESCRIPTION**

The UPA836TC contains one NE685 and one NE688 NPN high frequency silicon bipolar chip. 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.

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				UPA836TC TC		
	SYMBOLS	PARAMETERS AND CONDITIONS	UNITS	MIN	TYP	MAX
Q1	ICBO	Collector Cutoff Current at V <sub>CB</sub> = 5 V, I <sub>E</sub> = 0	μA			0.1
	IEBO	Emitter Cutoff Current at V <sub>EB</sub> = 1 V, I <sub>C</sub> = 0	μA			0.1
	hFE	DC Current Gain <sup>1</sup> at V <sub>CE</sub> = 3 V, I <sub>C</sub> = 10 mA		75		150
	ft	Gain Bandwidth at V <sub>CE</sub> = 3 V, I <sub>C</sub> = 10 mA, f = 2 GHz	GHz	10	12	
	Cre	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
Q2	ICBO	Collector Cutoff Current at V <sub>CB</sub> = 5 V, I <sub>E</sub> = 0	μA			0.1
	IEBO	Emitter Cutoff Current at V <sub>EB</sub> = 1 V, I <sub>C</sub> = 0	μA			0.1
	hFE	DC Current Gain <sup>1</sup> at V <sub>CE</sub> = 1 V, I <sub>C</sub> = 3 mA		80		160
	ft	Gain Bandwidth (1) at V <sub>CE</sub> = 1 V, I <sub>C</sub> = 3 mA, f = 2 GHz	GHz	4.0	4.5	
	ft	Gain Bandwidth (2) at V <sub>CE</sub> = 3 V, I <sub>C</sub> = 20 mA, f = 2 GHz	GHz		9.0	
	Cre	Feedback Capacitance <sup>2</sup> at V <sub>CB</sub> = 1 V, I <sub>E</sub> = 0, f = 1 MHz	pF		0.75	0.85
	S <sub>21E</sub>   <sup>2</sup>	Insertion Power Gain (1) at V <sub>CE</sub> = 1 V, I <sub>C</sub> = 3 mA, f = 2 GHz	dB	2.5	3.5	
	S <sub>21E</sub>   <sup>2</sup>	Insertion Power Gain (2) at V <sub>CE</sub> = 3 V, I <sub>C</sub> = 20 mA, f = 2 GHz	dB		6.5	
	NF	Noise Figure (1) at V <sub>CE</sub> = 1 V, I <sub>C</sub> = 3 mA, f = 2 GHz	dB		1.7	2.5
NF	Noise Figure (2) at V <sub>CE</sub> = 3 V, I <sub>C</sub> = 7 mA, f = 2 GHz	dB		1.5		

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 capacitances meter.

**California Eastern Laboratories**

**ABSOLUTE MAXIMUM RATINGS<sup>1</sup>** ( $T_A = 25^\circ\text{C}$ )

SYMBOLS	PARAMETERS	UNITS	RATINGS	
			Q1	Q2
V <sub>CB0</sub>	Collector to Base Voltage	V	9	9
V <sub>CE0</sub>	Collector to Emitter Voltage	V	6	6
V <sub>EB0</sub>	Emitter to Base Voltage	V	2	2
I <sub>c</sub>	Collector Current	mA	30	100
P <sub>T</sub>	Total Power Dissipation	mW	TBD	TBD
			TBD	
T <sub>J</sub>	Junction Temperature	°C	150	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.

**ORDERING INFORMATION**

PART NUMBER	QUANTITY	PACKAGING
UPA836TC-T1	3000	Tape & Reel

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