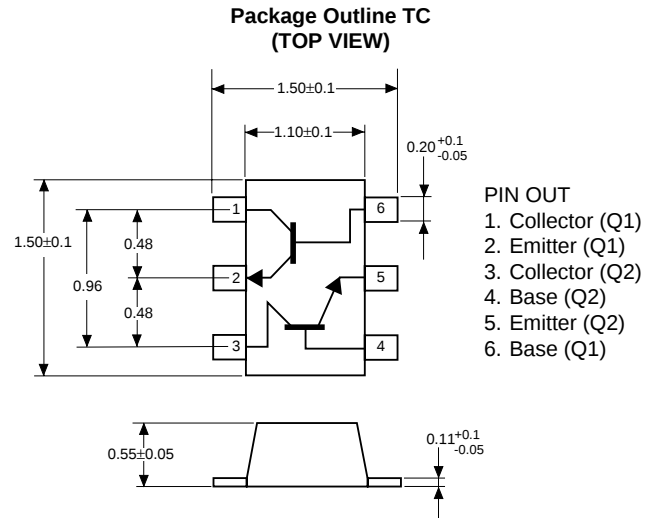


NEC**NPN SILICON EPITAXIAL TWIN TRANSISTOR****UPA836TC****FEATURES**

- **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

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.

OUTLINE DIMENSIONS (Units in mm)

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

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

PART NUMBER PACKAGE OUTLINE				UPA836TC TC		
	SYMBOLS	PARAMETERS AND CONDITIONS	UNITS	MIN	TYP	MAX
Q1	ICBO	Collector Cutoff Current at $V_{CB} = 5\text{ V}$, $I_E = 0$	μA			0.1
	IEBO	Emitter Cutoff Current at $V_{EB} = 1\text{ V}$, $I_C = 0$	μA			0.1
	hFE	DC Current Gain ¹ at $V_{CE} = 3\text{ V}$, $I_C = 10\text{ mA}$		75		150
	f _r	Gain Bandwidth at $V_{CE} = 3\text{ V}$, $I_C = 10\text{ mA}$, $f = 2\text{ GHz}$	GHz	10	12	
	C _{re}	Feedback Capacitance ² at $V_{CB} = 3\text{ V}$, $I_E = 0$, $f = 1\text{ MHz}$	pF		0.4	0.7
	S _{21E} ²	Insertion Power Gain at $V_{CE} = 3\text{ V}$, $I_C = 10\text{ mA}$, $f = 2\text{ GHz}$	dB	7	8.5	
	NF	Noise Figure at $V_{CE} = 3\text{ V}$, $I_C = 3\text{ mA}$, $f = 2\text{ GHz}$	dB		1.5	2.5
Q2	ICBO	Collector Cutoff Current at $V_{CB} = 5\text{ V}$, $I_E = 0$	μA			0.1
	IEBO	Emitter Cutoff Current at $V_{EB} = 1\text{ V}$, $I_C = 0$	μA			0.1
	hFE	DC Current Gain ¹ at $V_{CE} = 1\text{ V}$, $I_C = 3\text{ mA}$		80		160
	f _r	Gain Bandwidth (1) at $V_{CE} = 1\text{ V}$, $I_C = 3\text{ mA}$, $f = 2\text{ GHz}$	GHz	4.0	4.5	
	f _r	Gain Bandwidth (2) at $V_{CE} = 3\text{ V}$, $I_C = 20\text{ mA}$, $f = 2\text{ GHz}$	GHz		9.0	
	C _{re}	Feedback Capacitance ² at $V_{CB} = 1\text{ V}$, $I_E = 0$, $f = 1\text{ MHz}$	pF		0.75	0.85
	S _{21E} ²	Insertion Power Gain (1) at $V_{CE} = 1\text{ V}$, $I_C = 3\text{ mA}$, $f = 2\text{ GHz}$	dB	2.5	3.5	
	S _{21E} ²	Insertion Power Gain (2) at $V_{CE} = 3\text{ V}$, $I_C = 20\text{ mA}$, $f = 2\text{ GHz}$	dB		6.5	
	NF	Noise Figure (1) at $V_{CE} = 1\text{ V}$, $I_C = 3\text{ mA}$, $f = 2\text{ GHz}$	dB		1.7	2.5
	NF	Noise Figure (2) at $V_{CE} = 3\text{ V}$, $I_C = 7\text{ mA}$, $f = 2\text{ GHz}$	dB		1.5	

Notes: 1. Pulsed measurement, pulse width $\leq 350\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
2. Collector to base capacitance when measured with capacitance meter (automatic balanced bridge method), with emitter connected to guard pin of capacitances meter.

ABSOLUTE MAXIMUM RATINGS¹ ($T_A = 25^\circ\text{C}$)

SYMBOLS	PARAMETERS	UNITS	RATINGS	
			Q1	Q2
V _{CB0}	Collector to Base Voltage	V	9	9
V _{CE0}	Collector to Emitter Voltage	V	6	6
V _{EB0}	Emitter to Base Voltage	V	2	2
I _C	Collector Current	mA	30	100
P _T	Total Power Dissipation	mW	TBD	TBD
			TBD	
T _J	Junction Temperature	°C	150	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
UPA836TC-T1	3000	Tape & Reel

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