

PRELIMINARY DATA SHEET

**NEC**

**NPN SILICON EPITAXIAL  
TWIN TRANSISTOR**

**UPA838TF**

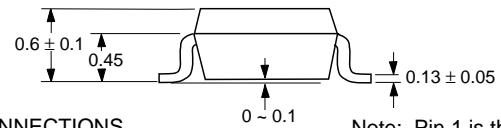
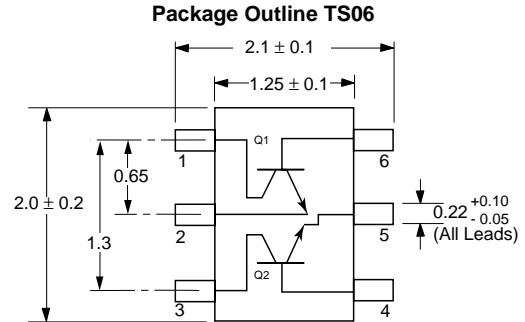
**FEATURES**

- **SMALL PACKAGE OUTLINE:**  
SOT-363 package measures just 2.0 mm x 1.25 mm
- **LOW HEIGHT PROFILE:**  
Just 0.60 mm high
- **TWO DIFFERENT DIE TYPES:**  
Q1 - Ideal oscillator transistor  
Q2 - Ideal buffer amplifier transistor

**DESCRIPTION**

The UPA838TF contains one NE688 and one NE687 NPN high frequency silicon bipolar chip. NEC's new low profile TF package is ideal for all portable wireless applications where reducing component height 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)



**PIN CONNECTIONS**

- 1. Collector (Q1)
- 2. Emitter (Q1)
- 3. Collector (Q2)
- 4. Base (Q2)
- 5. Emitter (Q2)
- 6. Base (Q1)

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

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

PART NUMBER PACKAGE OUTLINE				UPA838TF TS06		
	SYMBOLS	PARAMETERS AND CONDITIONS	UNITS	MIN	TYP	MAX
Q1	ICBO	Collector Cutoff Current at VCB = 5 V, IE = 0	μA			0.1
	IEBO	Emitter Cutoff Current at VEB = 1 V, IC = 0	μA			0.1
	hFE	DC Current Gain <sup>1</sup> at VCE = 1 V, IC = 3 mA		100		145
	fr	Gain Bandwidth (1) at VCE = 1 V, IC = 3 mA, f = 2 GHz	GHz	4.0	4.5	
	fr	Gain Bandwidth (2) at VCE = 3 V, IC = 20 mA, f = 2 GHz	GHz		9.0	
	Cre	Feedback Capacitance <sup>2</sup> at VCB = 1 V, IE = 0, f = 1 MHz	pF		0.75	0.85
	S21E  <sup>2</sup>	Insertion Power Gain (1) at VCE = 1 V, IC = 3 mA, f = 2 GHz	dB	2.5	3.5	
	S21E  <sup>2</sup>	Insertion Power Gain (2) at VCE = 3 V, IC = 20 mA, f = 2 GHz	dB		6.5	
	NF	Noise Figure (1) at VCE = 1 V, IC = 3 mA, f = 2 GHz	dB		1.7	2.5
NF	Noise Figure (2) at VCE = 3 V, IC = 7 mA, f = 2 GHz	dB		1.5		
Q2	ICBO	Collector Cutoff Current at VCB = 5 V, IE = 0	μA			0.1
	IEBO	Emitter Cutoff Current at VEB = 1 V, IC = 0	μA			0.1
	hFE	DC Current Gain <sup>1</sup> at VCE = 2 V, IC = 20 mA		70		140
	fr	Gain Bandwidth (1) at VCE = 2 V, IC = 20 mA, f = 2 GHz	GHz	9	11	
	fr	Gain Bandwidth (2) at VCE = 1 V, IC = 10 mA, f = 2 GHz	GHz	7	9	
	Cre	Feedback Capacitance <sup>2</sup> at VCB = 2 V, IE = 0, f = 1 MHz	pF		0.4	0.8
	S21E  <sup>2</sup>	Insertion Power Gain (1) at VCE = 2 V, IC = 20 mA, f = 2 GHz	dB	7	8.5	
	S21E  <sup>2</sup>	Insertion Power Gain (2) at VCE = 1 V, IC = 10 mA, f = 2 GHz	dB	6	7.5	
	NF	Noise Figure (1) at VCE = 2 V, IC = 3 mA, f = 2 GHz	dB	1.3	2	
NF	Noise Figure (2) at VCE = 1 V, IC = 3 mA, f = 2 GHz	dB	1.3	2		

- 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.

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

SYMBOLS	PARAMETERS	UNITS	RATINGS	
			Q1	Q2
V <sub>CB0</sub>	Collector to Base Voltage	V	9	5
V <sub>CE0</sub>	Collector to Emitter Voltage	V	6	3
V <sub>EB0</sub>	Emitter to Base Voltage	V	2	2
I <sub>c</sub>	Collector Current	mA	100	30
P <sub>T</sub>	Total Power Dissipation	mW	110	110
			200	
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
UPA838TF-T1	3000	Tape & Reel

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