NEC

NPN SILICON EPITAXIAL TWIN TRANSISTOR

UPA838TF

FEATURES

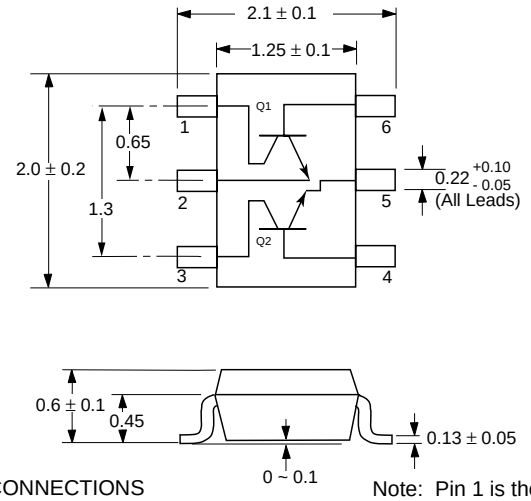
- **SMALL PACKAGE OUTLINE:**
  SOT-363 package measures just 2.0 mm x 1.25 mm
- **LOW HEIGHT PROFILE:**
  Just 0.60 mm high
- **TWO DIFFERENT DIE TYPES:**
  Q1 - Ideal oscillator transistor
  Q2 - Ideal buffer amplifier transistor

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)

Package Outline TS06



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 (T_A = 25°C)

	PART NUMBER PACKAGE OUTLINE			UPA838TF TS06		
	SYMBOLS	**PARAMETERS AND CONDITIONS**	**UNITS**	**MIN**	**TYP**	**MAX**
Q1	I_{CBO}	Collector Cutoff Current at V_{CB} = 5 V, I_E = 0	µA			0.1
	I_{EBO}	Emitter Cutoff Current at V_{EB} = 1 V, I_C = 0	µA			0.1
	h_{FE}	DC Current Gain[1] at V_{CE} = 1 V, I_C = 3 mA		100		145
	f_T	Gain Bandwidth (1) at V_{CE} = 1 V, I_C = 3 mA, f = 2 GHz	GHz	4.0	4.5	
	f_T	Gain Bandwidth (2) at V_{CE} = 3 V, I_C = 20 mA, f = 2 GHz	GHz		9.0	
	Cre	Feedback Capacitance[2] at V_{CB} = 1 V, I_E = 0, f = 1 MHz	pF		0.75	0.85
	$\|S_{21E}\|^2$	Insertion Power Gain (1) at V_{CE} = 1 V, I_C =3 mA, f = 2 GHz	dB	2.5	3.5	
	$\|S_{21E}\|^2$	Insertion Power Gain (2) at V_{CE} = 3 V, I_C =20 mA, f = 2 GHz	dB		6.5	
	NF	Noise Figure (1) at V_{CE} = 1 V, I_C = 3 mA, f = 2 GHz	dB		1.7	2.5
	NF	Noise Figure (2) at V_{CE} = 3 V, I_C = 7 mA, f = 2 GHz	dB		1.5	
Q2	I_{CBO}	Collector Cutoff Current at V_{CB} = 5 V, I_E = 0	µA			0.1
	I_{EBO}	Emitter Cutoff Current at V_{EB} = 1 V, I_C = 0	µA			0.1
	h_{FE}	DC Current Gain[1] at V_{CE} = 2 V, I_C = 20 mA		70		140
	f_T	Gain Bandwidth (1) at V_{CE} = 2 V, I_C = 20 mA, f = 2 GHz	GHz	9	11	
	f_T	Gain Bandwidth (2) at V_{CE} = 1 V, I_C = 10 mA, f = 2 GHz	GHz	7	9	
	Cre	Feedback Capacitance[2] at V_{CB} = 2 V, I_E = 0, f = 1 MHz	pF		0.4	0.8
	$\|S_{21E}\|^2$	Insertion Power Gain (1) at V_{CE} = 2 V, I_C =20 mA, f = 2 GHz	dB	7	8.5	
	$\|S_{21E}\|^2$	Insertion Power Gain (2) at V_{CE} = 1 V, I_C =10 mA, f = 2 GHz	dB	6	7.5	
	NF	Noise Figure (1) at V_{CE} = 2 V, I_C = 3 mA, f = 2 GHz	dB	1.3	2	
	NF	Noise Figure (2) at V_{CE} = 1 V, I_C = 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[1] (T_A = 25°C)

SYMBOLS	PARAMETERS	UNITS	RATINGS	
			Q1	Q2
V_{CBO}	Collector to Base Voltage	V	9	5
V_{CEO}	Collector to Emitter Voltage	V	6	3
V_{EBO}	Emitter to Base Voltage	V	2	2
I_C	Collector Current	mA	100	30
P_T	Total Power Dissipation	mW	110	110
			200	
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
UPA838TF-T1	3000	Tape & Reel