

PRELIMINARY DATA SHEET

NEC

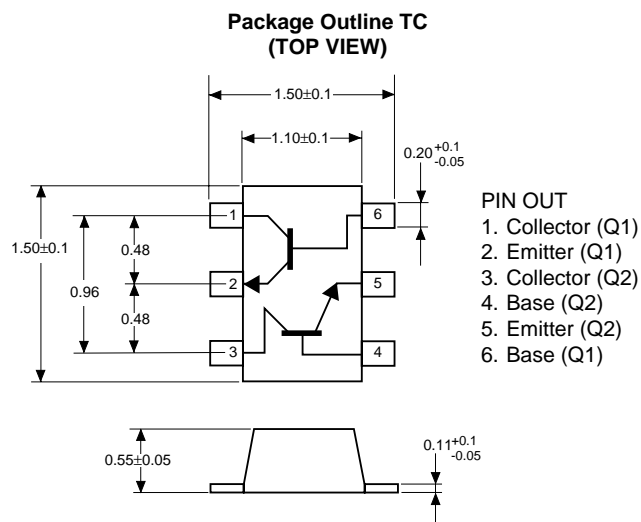
NPN SILICON EPITAXIAL TWIN TRANSISTOR

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_A = 25°C)

| PART NUMBER PACKAGE OUTLINE | | | | UPA836TC TC | | |
|--------------------------------|---|---|-------|----------------|------|------|
| | SYMBOLS | PARAMETERS AND CONDITIONS | UNITS | MIN | TYP | MAX |
| Q1 | ICBO | Collector Cutoff Current at V _{CB} = 5 V, I _E = 0 | μA | | | 0.1 |
| | IEBO | Emitter Cutoff Current at V _{EB} = 1 V, I _C = 0 | μA | | | 0.1 |
| | hFE | DC Current Gain ¹ at V _{CE} = 3 V, I _C = 10 mA | | 75 | | 150 |
| | ft | Gain Bandwidth at V _{CE} = 3 V, I _C = 10 mA, f = 2 GHz | GHz | 10 | 12 | |
| | Cre | Feedback Capacitance ² at V _{CB} = 3 V, I _E = 0, f = 1 MHz | pF | | 0.4 | 0.7 |
| | S _{21E} ² | Insertion Power Gain at V _{CE} = 3 V, I _C = 10 mA, f = 2 GHz | dB | 7 | 8.5 | |
| | NF | Noise Figure at V _{CE} = 3 V, I _C = 3 mA, f = 2 GHz | dB | | 1.5 | 2.5 |
| Q2 | ICBO | Collector Cutoff Current at V _{CB} = 5 V, I _E = 0 | μA | | | 0.1 |
| | IEBO | Emitter Cutoff Current at V _{EB} = 1 V, I _C = 0 | μA | | | 0.1 |
| | hFE | DC Current Gain ¹ at V _{CE} = 1 V, I _C = 3 mA | | 80 | | 160 |
| | ft | Gain Bandwidth (1) at V _{CE} = 1 V, I _C = 3 mA, f = 2 GHz | GHz | 4.0 | 4.5 | |
| | ft | 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 | | |

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 RATINGS¹ (T_A = 25°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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