



1.1-GHz Prescaler for PLLs in TV, CATV and SAT TV Tuners

Technology: Bipolar

Features

- U813BS ECL output stage
- U813BSE emitter-follower output stage
- 3 scaling factors 64/128/256, programmable at Pin 5
- High input sensitivity
- Low output impedance
- Low power consumption
- Pin-compatible to the U6xxB-series except Pin 5
- Electrostatic protection according to MIL-STD. 883

Case

| | |
|---------------------------|-------------------------|
| 8-pin dual-inline plastic | (U813BS, U813BSE) |
| 8-pin SO plastic | (U813BS-FP, U813BSE-FP) |
| 6-pin SIP plastic | (U813BS-SP, U813BSE-SP) |

Block Diagram

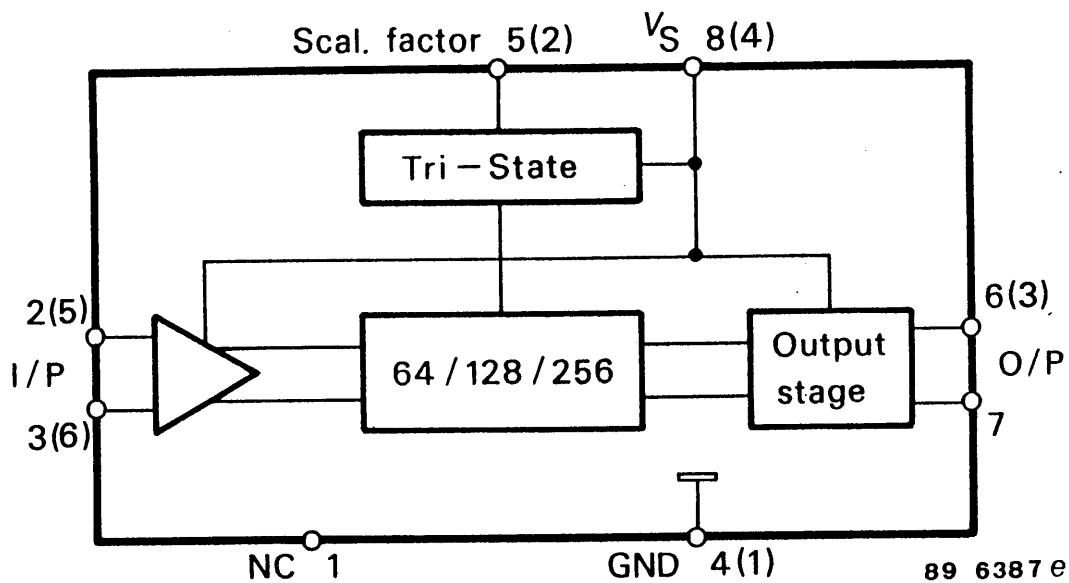


Figure 1. Block diagram

Absolute Maximum Ratings

Reference point pin 4 (1)

| Parameters | Symbol | Value | Unit |
|--|-----------|-------------|------|
| Supply voltage Pin 8 (4) | V_S | 6 | V |
| Input-voltage range Pin 2, 3, 5 (2, 5, 6) | V_i | 0 to V_S | V |
| Junction temperature | T_j | 125 | °C |
| Storage-temperature range | T_{stg} | -40 to +125 | °C |
| Ambient-temperature range | T_{amb} | -25 to +70 | °C |

Thermal Resistance

| Parameters | Symbol | Value | Unit |
|--------------------------|------------|-------|------|
| Junction ambient DIP8 | R_{thJA} | 100 | K/W |
| SIP6 | | 100 | |
| SO8 | | 175 | |

Note:

The device is self-oscillating without input signal

Pin Description (Dip8, SO8)

| Pin | Function |
|------|-------------------|
| 1 | Not connected |
| 2, 3 | Input |
| 4 | Ground |
| 5 | Switch 64/128/256 |
| 6, 7 | Output |
| 8 | V_S |

Pin Description (SIP6)

| Pin | Function |
|-----|-------------------|
| 1 | Ground |
| 2 | Switch 64/128/256 |
| 3 | Output |
| 4 | V_S |
| 5,6 | Input |

Notes:

Pin numbers without brackets apply to DIP8 and SO8 package,
Pin numbers with brackets to SIP6

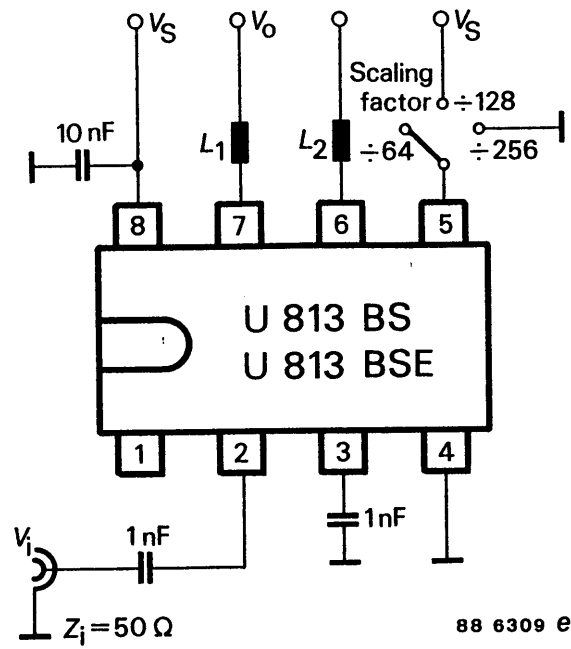
RMS voltage calculated from the available power measured

Electrical Characteristics

$V_S = 4.5$ to 5.5 V, $T_{amb} = 0$ to $+70^\circ\text{C}$, referred to test circuit, unless otherwise specified

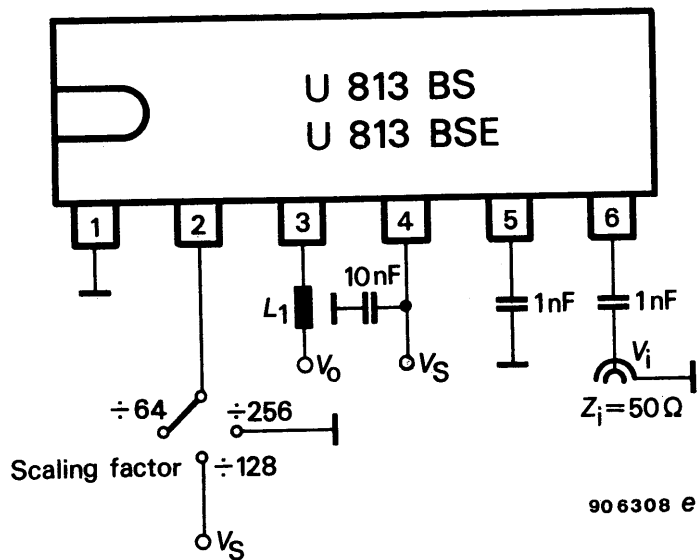
| Parameters | Test Conditions / Pin | Symbol | Min. | Typ. | Max. | Unit |
|----------------------------|--|--------------------------|-------------|------|------|----------|
| Supply current | $V_S = 5$ V U813BS Pin 8 (4) | I_S | | 35 | 45 | mA |
| | U813BSE Pin 8 (4) | I_S | | 38 | 50 | mA |
| Input sensitivity | $R_G = 50 \Omega$ $f_i = 70$ to 1000 MHz Pin 2, 3 (5, 6) | V_i | | | 10 | mV |
| | $f_i = 1000$ to 1100 MHz Pin 2, 3 (5, 6) | V_i | | | 15 | mV |
| Large-signal compatibility | $R_G = 50 \Omega$ Pin 2, 3 (5, 6) | V_i | 300 | | | mV |
| Frequency range | | f_{imin} f_{imax} | 1100 | | 70 | MHz |
| Output stage | | | | | | |
| a. Balanced ECL output | | | | | | |
| Voltage swing each output | $R_L = 10$ k// 13 pF Pin 6, 7 (3) | V_O | 0.8 | | | V_{pp} |
| Output impedance | Pin 6, 7 (3) | Z_O | | 500 | | Ω |
| b. Emitter follower | | | | | | |
| Voltage swing each output | $R_L = 10$ k// 13 pF Pin 6, 7 (3) | V_O | 1 | | | V_{pp} |
| Output impedance | Pin 6, 7 (3) | Z_O | | 200 | | Ω |
| Switching voltage for | \therefore 64 Pin 5 (2) | V_{SF} | | open | | |
| | \therefore 128 Pin 5 (2) | V_{SF} | $V_S - 0.5$ | | | V |
| | \therefore 256 Pin 5 (2) | V_{SF} | | 0 | 0.5 | V |

Test Circuits



DIP 8/SO 8

Figure 2.



SIP 6

$L_1 = L_2 = 150 \text{ nH}$ (6 turns CuL 0.45 mm \varnothing on 4 mm \varnothing)

Figure 3.

Output Circuits

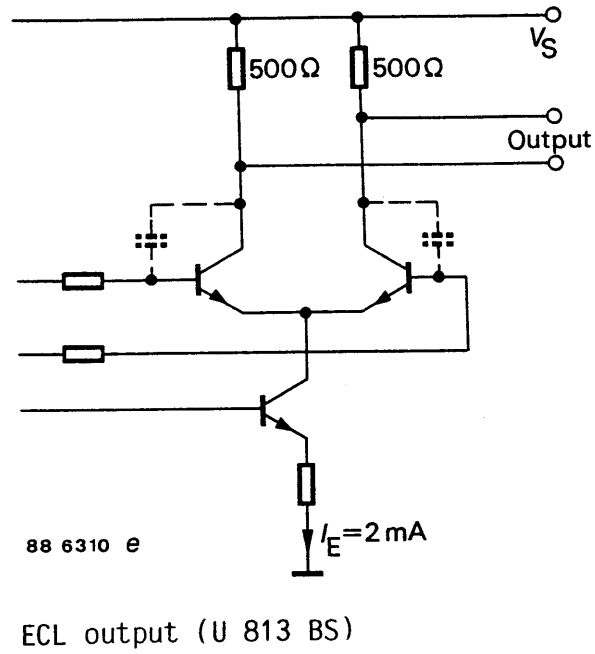


Figure 4.

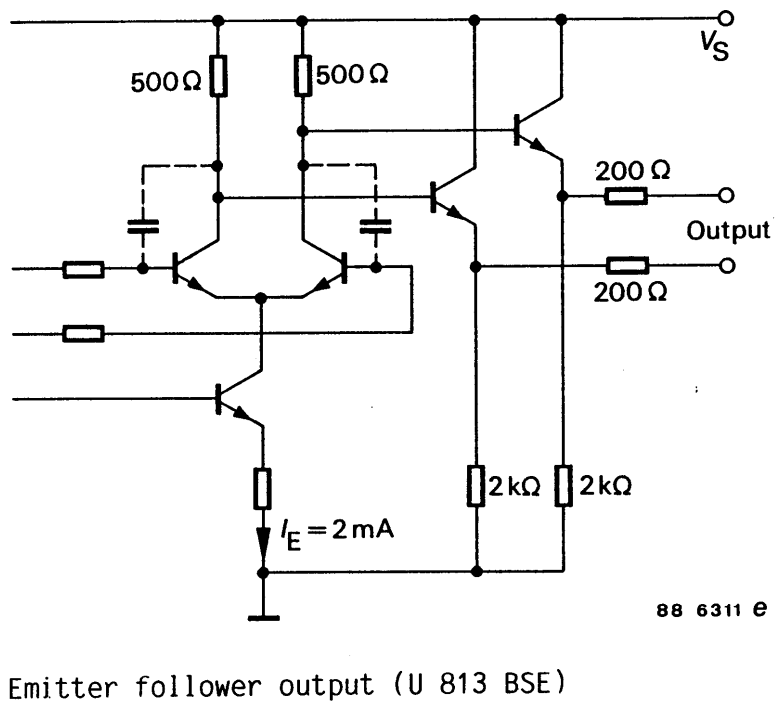
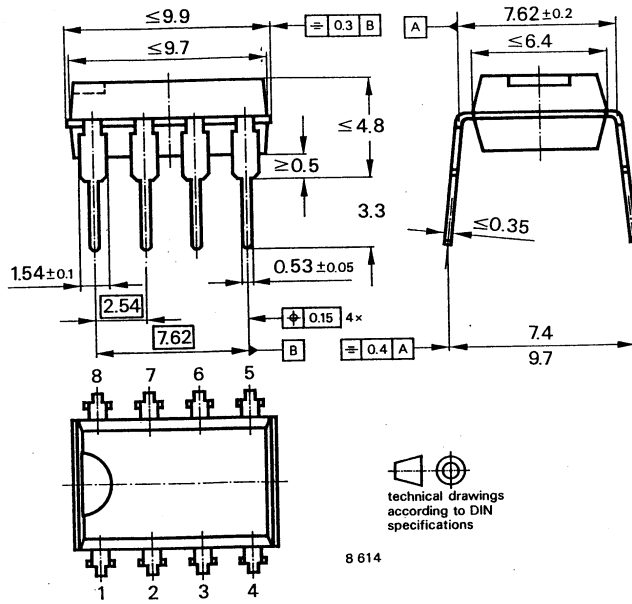


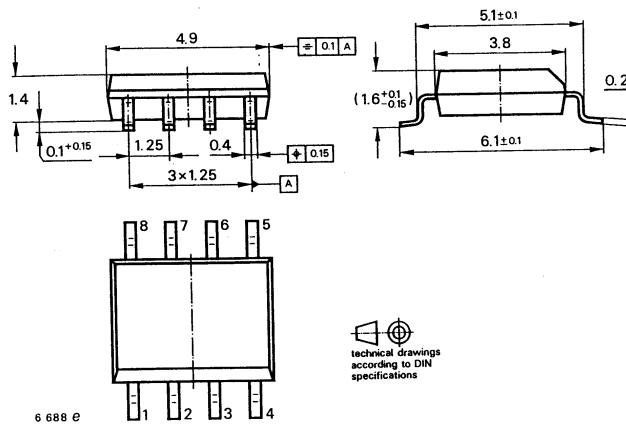
Figure 5.

U813BS/U813BSE

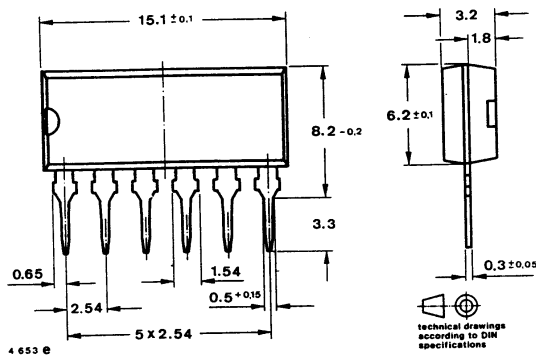
Dimensions in mm



Case
DIP 8-leads



Case
S0 8
(SOT 96 A)



Case
SIP 6
6-leads

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2. Regularly and continuously improve the performance of our products, processes, distribution and operating systems with respect to their impact on the health and safety of our employees and the public, as well as their impact on the environment.

It is particular concern to control or eliminate releases of those substances into the atmosphere which are known as ozone depleting substances (ODSs).

The Montreal Protocol (1987) and its London Amendments (1990) intend to severely restrict the use of ODSs and forbid their use within the next ten years. Various national and international initiatives are pressing for an earlier ban on these substances.

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1. Annex A, B and list of transitional substances of the Montreal Protocol and the London Amendments respectively
2. Class I and II ozone depleting substances in the Clean Air Act Amendments of 1990 by the Environmental Protection Agency (EPA) in the USA
3. Council Decision 88/540/EEC and 91/690/EEC Annex A, B and C (transitional substances) respectively.

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