3-GHz Frequency Divider

Description

U832BS use TEMIC's advanced bipolar process. RF input can be driven differential as well as single ended. Low current consumption makes the device suitable for mobile application.

Features

- U832BS divides by 2
- Very low current consumption (typically 12 mA)
- 3-GHz maximum operating frequency
- Supply voltage, typically 5 V
- ESD protection in accordance with MIL-STD. 883 method 3015 class 2

Benefits

- Extended operation time due to very low current consumption
- Only three external components
- Low RF input level reduces radiation problems

Block Diagram

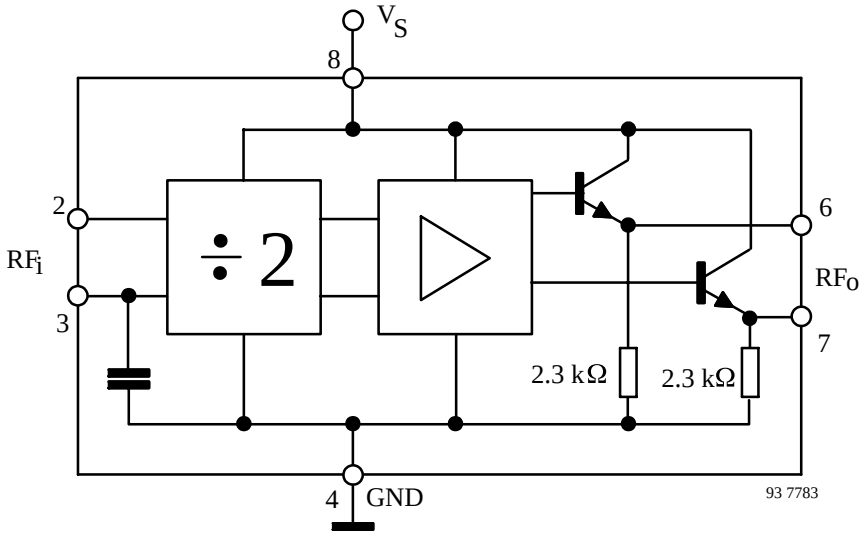


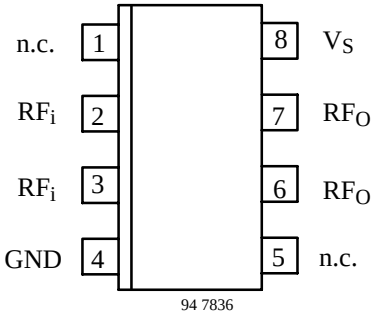
Figure 1. Block diagram

Ordering Information

Extended Type Number	Package	Remarks
U832BS-FP	SO8	

Pin Description

Pin	Symbol	Function
1	n.c.	Not connected
2	RF_i	RF input
3	RF_i	RF input with internal decoupling capacitor
4	GND	Ground
5	n.c.	Not connected
6	RF_O	Output
7	RF_O	Output
8	V_S	Supply voltage



Absolute Maximum Ratings

Parameters		Symbol	Value	Unit
Supply voltage	Pin 8	V_S	6	V
Input voltage range	Pins 2 and 3	V_i	0 to V_S	V
Junction temperature		T_j	125	°C
Storage temperature range		T_{stg}	– 40 to + 125	°C

Operating Range

Parameters	Symbol	Value	Unit
Supply voltage range	V_S	4.5 to 5.5	V
Ambient temperature range	T_{amb}	– 25 to + 85	°C

Thermal Resistance

Parameters		Symbol	Value	Unit
Junction ambient	SO8	R_{thJA}	175	K/W

Electrical Characteristics

V_S = 4.5 to 5.5 V, T_{amb} = 0 to + 70°C, referred to test circuit, unless otherwise specified.

Parameters	Test Conditions / Pin	Symbol	Min	Typ	Max	Unit
Supply current	V_S = 5 V Pin 8 U832BS (: 2)	I_S		12	16	mA
RF Input	Pin 2	RF_i				
Input sensitivity [1]	R_S = 50 Ω	V_{iRF}	80		300	mV
Input frequency range	R_S = 50 Ω Pin 2	f_{imin} f_{imax}	 3000		300	MHz
RF output	Pins 6 and 7	RF_O				
Output level	V_S = 5 V, R_6, R_7 = ∞ R_L = 50 Ω, R_6, R_7 = 1 K	V_{RFo}		−8 −5		dBm
DC output level	$R_L \geq$ 10 kΩ V_S = 5 V High Low	 RF_{DCH} RF_{DCL}		 3.6 3.1		 V V

1) RMS-voltage calculated from the measured available power. R_S = System resistance, R_L = Load resistance

Output Stage

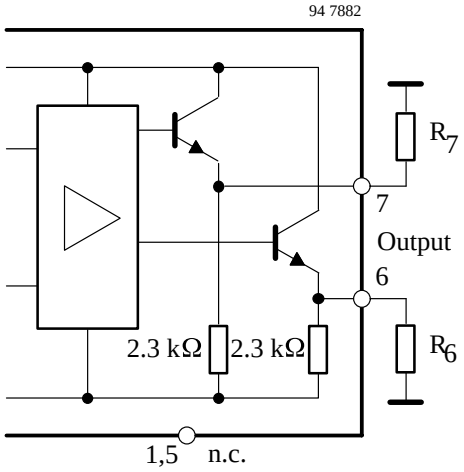


Figure 2.

Input Sensitivity vs. Frequency

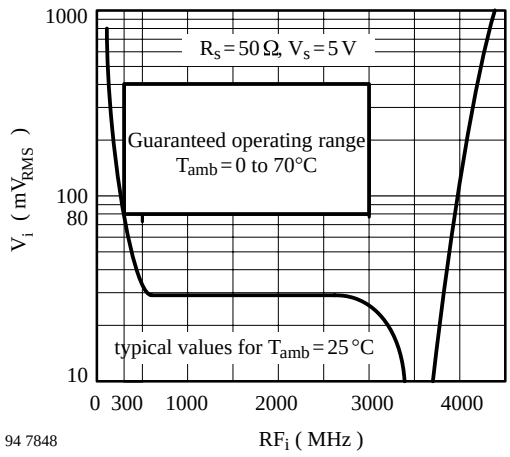


Figure 3.

Input Impedance S11

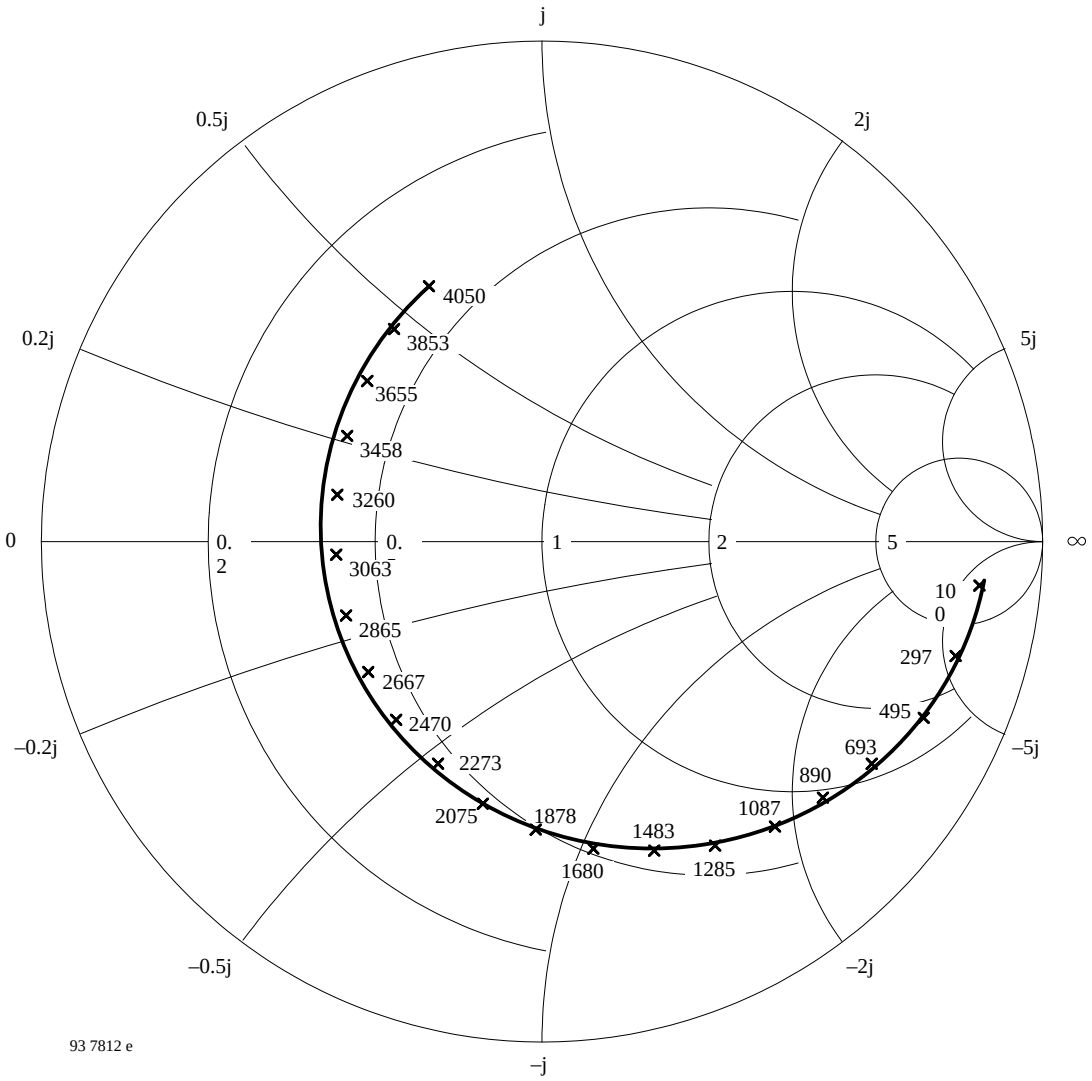
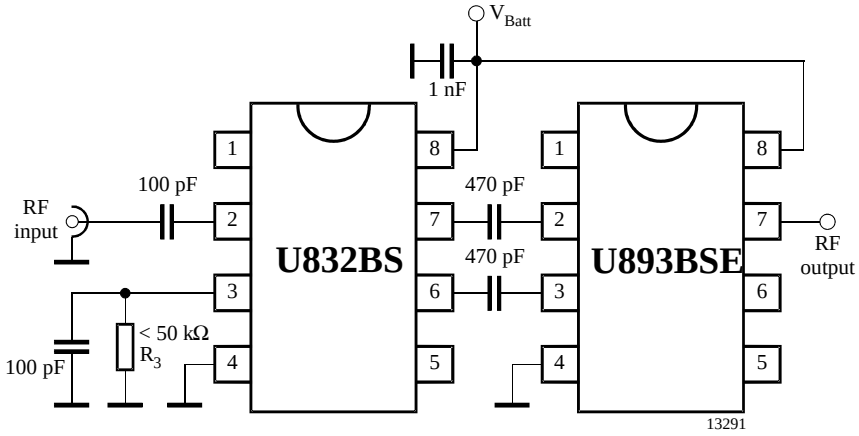


Figure 4.

Application

Master-Slave-D-Flip-Flops (MS-D-FF's) can be used for frequency division by feeding back the inverted output to the data input. Typical for this kind of dividers is a free–running oscillation of the first divider stage. Here, the input sensitivity of the circuit is minimal (see data sheet page 5: input sensitivity vs. frequency). An oscillation frequency of, e.g., 3.5 GHz (related to the input) will result in an output the part number of frequency of 3.5 GHz: 4 = 875 MHz. To indicate this, TEMIC's self-oscillating frequency dividers are ending with "S" (U832BS-AFP). This oscillation is often used for the quality control of ICs: the higher the frequency, the better the performance. It occurs only if the offset voltage of the input transistor pair is below a certain limit.

On the other hand, if this oscillation causes problems, e.g., in frequency counters, an external offset may be added. This can simply be done by connecting an ohmic resistor from Pin 3 (RF input) to ground. Using a value of R_3 = 47 kΩ will stop self oscillation without degrading the input sensitivity markly. Smaller values will decrease the sensitivity especially at higher frequencies.



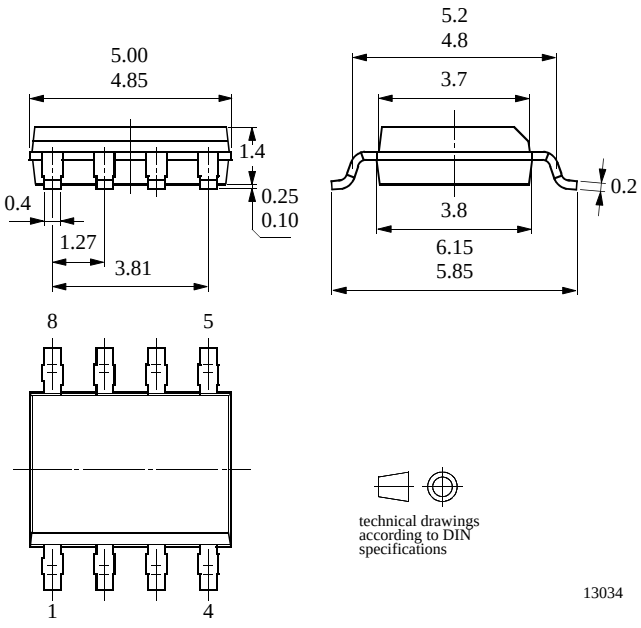
Important note:
Application examples have not been examined for series use or reliability, and no worst case scenarios heve been developed. Customers who adapt any of these proposals must carry out their own testing and be convinced that no negative consequences arise from the proposals.

Figure 5.

Package Information

Package SO8

Dimensions in mm



Ozone Depleting Substances Policy Statement

It is the policy of **TEMIC Semiconductor GmbH** to

1. Meet all present and future national and international statutory requirements.

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.

TEMIC Semiconductor GmbH has been able to use its policy of continuous improvements to eliminate the use of ODSs listed in the following documents.

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.

TEMIC Semiconductor GmbH can certify that our semiconductors are not manufactured with ozone depleting substances and do not contain such substances.

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