

## Frequency Synthesizer for TV Tuner

### Description

The U6359B is a single chip PLL frequency synthesizer with 3-wire bus control. This IC contains an integrated preamplifier, a high frequency prescaler, a reference

frequency divider, a crystal oscillator, a phase/frequency detector together with a charge pump, a tuning voltage amplifier and 4 output ports.

### Features

- Integrated prescaler ÷ 8 with preamplifier
- Input frequency maximum 1024 MHz
- Tuning frequency steps 62.5 kHz
- 14-bit programmable counter
- Reference oscillator with 4 MHz crystal and ÷ 512 counter
- Phase detector (reference frequency 7.8125 kHz)
- 4 programmable port driver
- Lock output
- Microcomputer controlled via 3-wire bus
- SO20 package

### Block Diagram

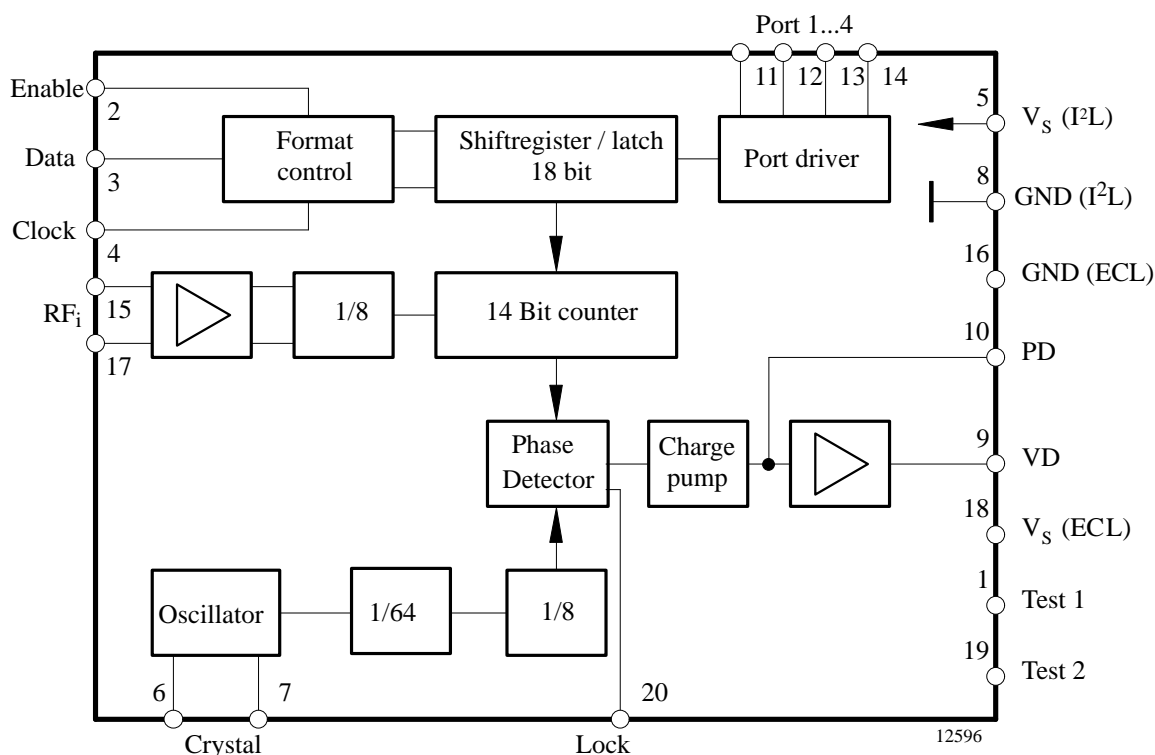


Figure 1. Block diagram

### Ordering Information

Extended Type Number	Package	Remarks
U6359B-BFLG3	SO20 plastic package	Taped and reeled

## Absolute Maximum Ratings

Reference point Pin 8, 16

Parameters	Symbol	Value	Unit
Supply voltage Pins 5 and 18	$V_S$	6	V
Input voltage range Pins 15 and 17	$V_{RFi}$	0 to $V_S$	V
Junction temperature	$T_j$	125	°C
Ambient temperature range	$T_{amb}$	-10 to + 65	°C
Storage temperature range	$T_{stg}$	-40 to +125	°C

## Pin Configuration

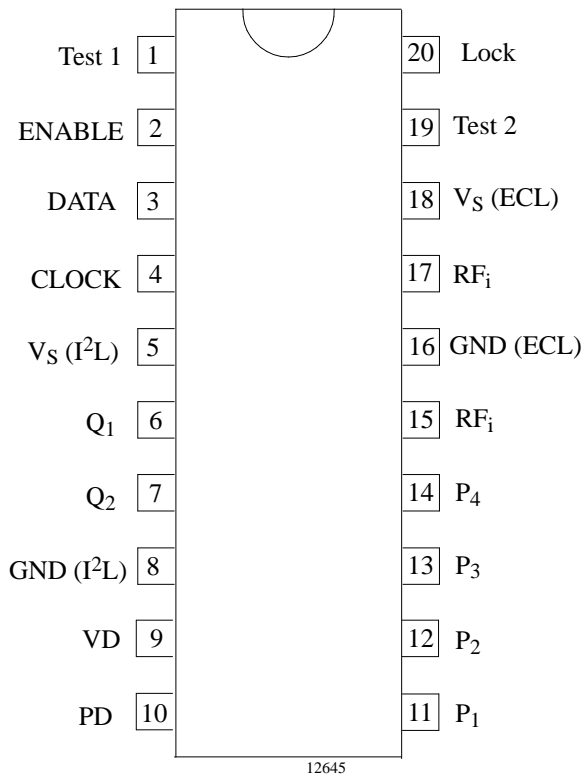


Figure 2. Pinning

Pin	Symbol	Function
1	Test 1	Test 1 input
2	ENABLE	Enable input
3	DATA	Data input
4	CLOCK	Clock input
5	$V_S$ (I <sup>2</sup> L)	Supply voltage (I <sup>2</sup> L)
6	$Q_1$	Crystal
7	$Q_2$	Crystal
8	GND (I <sup>2</sup> L)	Ground (I <sup>2</sup> L)
9	VD	Active filter output
10	PD	Charge pump output
11	$P_1$	Port output (open collector)
12	$P_2$	Port output (open collector)
13	$P_3$	Port output (open collector)
14	$P_4$	Port output (open collector)
15	$RF_i$	RF input
16	GND (ECL)	Ground (ECL)
17	$RF_i$	RF input
18	$V_S$ (ECL)	Supply voltage (ECL)
19	Test 2	Test 2 input
20	Lock	Lock output

## Electrical Characteristics

$V_S = 5\text{ V}$ ,  $T_{amb} = 25^\circ\text{C}$ , reference point pin 8, 16, unless otherwise specified

Parameters	Test Conditions / Pins	Symbol	Min.	Typ.	Max.	Unit
Supply voltage ECL	Pin 18	$V_{S1}$	4.5	5	5.5	V
$I^2L$	Pin 5	$V_{S2}$	4.5	5	5.5	V
Supply current ECL	Pin 18	$I_{S1}$	26	36	46	mA
$I^2L$	Pin 5	$I_{S2}$	7	11	16	mA
Input sensitivity	Pin 15	$V_i$		10		mV
Large signal compatibility	Pin 15	$V_i$	300			mV
Program scaling factor		T	1024		16383	
Maximum voltage band switch outputs	Pins 11, 12, 13 and 14	$V_{max}$	12			V
Input level Data, Clock, Enable, Test 1, Test 2		$V_{IH}$	3.0			V
		$V_{IL}$			0.8	V
Output level (Test mode) Data, Clock		$V_{OH}$	3.8			V
		$V_{OL}$			0.5	V

## Calculation of the Oscillator Frequency

- $f_{OSC} = f_{ref} \times 8 \times T$   
 $f_{OSC}$  : Locked oscillator frequency  
 $f_{ref}$  : Reference frequency  $4\text{ MHz} / 512 = 7.8125\text{ kHz}$   
 $T$  : Programmable scaling factor

## Bus Data Format

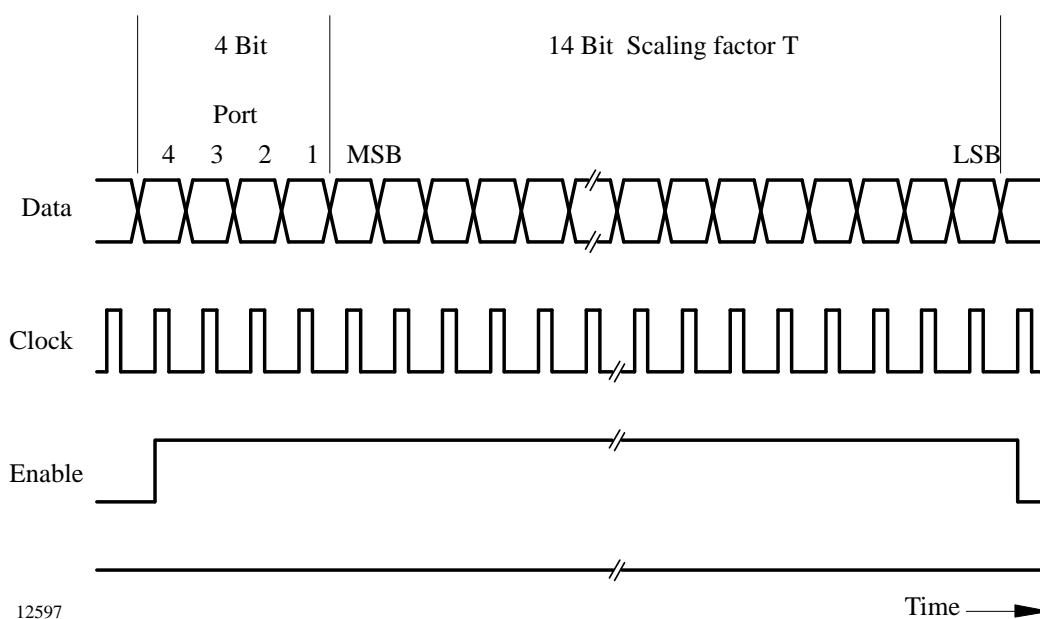
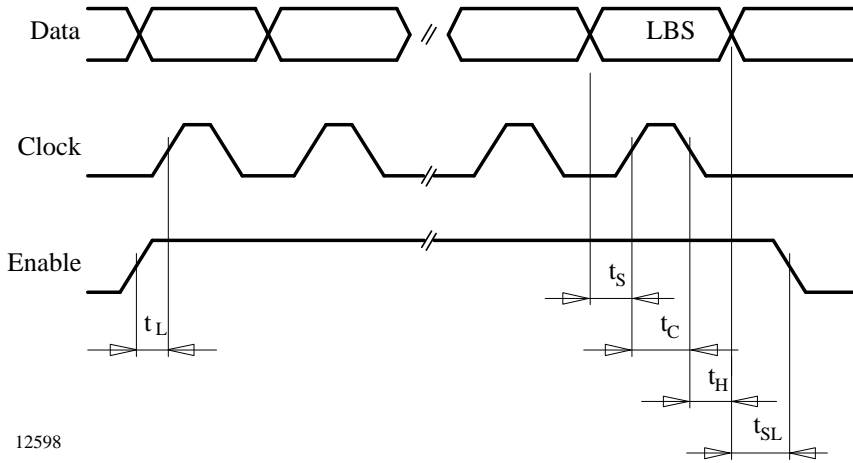


Figure 3.

## Bus Timing

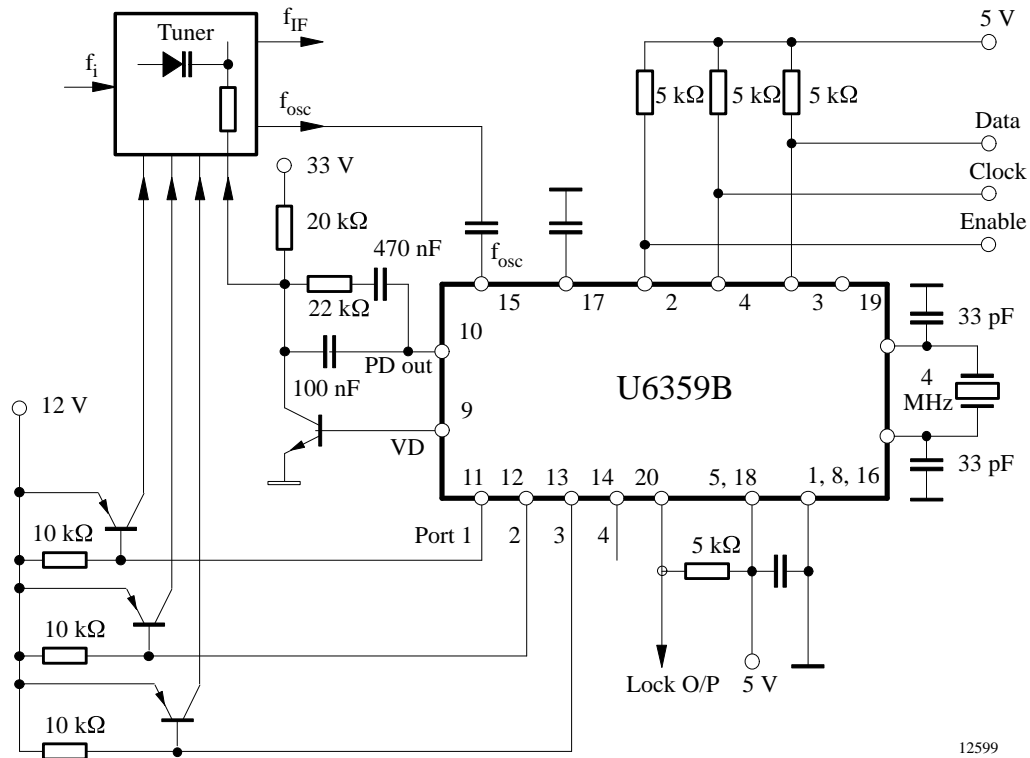
Parameters	Symbol	Min.	Typ.	Max.
Set up time	$t_s$	2		$\mu\text{s}$
Enable, hold time	$t_{SL}$	2		$\mu\text{s}$
Clock 'H'-pulse width	$t_C$	2		$\mu\text{s}$
Enable set up time	$t_L$	10		$\mu\text{s}$
Data hold time	$t_H$	2		$\mu\text{s}$



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Figure 4.

## Application Circuit



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Figure 5. Application circuit



## Ozone Depleting Substances Policy Statement

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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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