



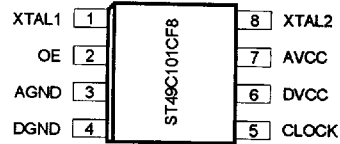
PREPROGRAMMED HIGH SPEED FREQUENCY MULTIPLIER

DESCRIPTION

The ST49C101/102 is a mask programmable monolithic analog CMOS device, designed to replace existing high frequency crystal/oscillator with single low frequency crystal. The ST49C101/102 provides high speed and low jitter clock output.

ST49C101/102 is designed in a 1.2 μ process to achieve 100 MHz speed for high end frequencies.

SOIC Package

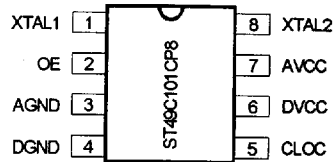


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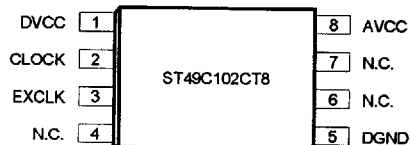
FEATURES

- Can replace expensive high frequency oscillator.
- Mask programmable analog phase locked loop
- Low power single 5V CMOS technology
- 8 pin DIP or SOIC package.
- Crystal oscillator circuit on board

Dip Package



TSSOP Package



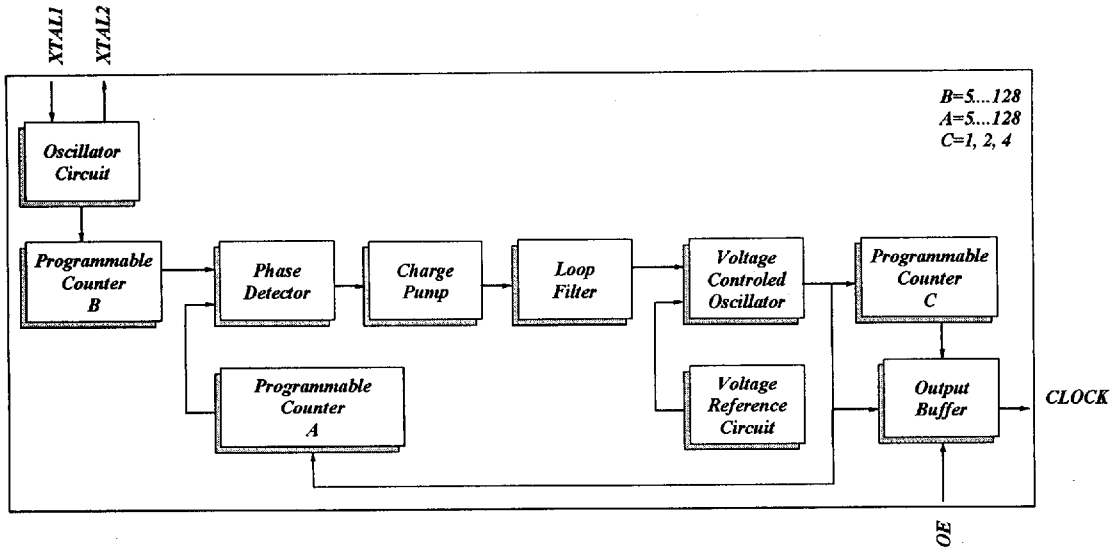
ORDERING INFORMATION

Part number	Package	Operating temperature
ST49C101CP8	Plastic-DIP	0° C to +70° C
ST49C101CF8	SOIC	0° C to +70° C
ST49C102CT8	TSSOP	0° C to +70° C

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BLOCK DIAGRAM



SYMBOL DESCRIPTION (ST49C101)

Symbol	Pin	Signal Type	Pin Description
XTAL1	1	I	Crystal or External Clock input. A crystal can be connected to this pin and XTAL2 pin to generate internal phase locked loop reference clock. For external clock, XTAL2 is left open or used as buffered clock output.
OE	2*	I	Clock Output Enable (Active high). CLOCK output is three stated when this pin is low.
AGND	3	O	Analog ground.
DGND	4	O	Digital ground.
CLOCK	5	O	Programmed output clock.
DVCC	6	I	Positive supply voltage. Single +5 volts.
AVCC	7	I	Analog supply voltage. Single +5 volts.
XTAL2	8	O	Crystal output.

* Has internal pull-up resistor

SYMBOL DESCRIPTION (ST49C102)

Symbol	Pin	Signal Type	Pin Description
DVCC	1	I	Digital Positive supply voltage. Single +5 volts.
CLOCK	2	O	Pre-programmed output clock.
EXCLK	3	I	External Clock input. Input reference clock.
DGND	5	O	Digital ground.
AVCC	8	I	Analog supply voltage. Single +5 volts.

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EXTERNAL CLOCK CONNECTION

To minimize the noise pickup, it is recommended to connect 0.047 μ F capacitor to XTAL1, and keep the lead length of the capacitor to XTAL1 to a minimum to reduce noise susceptibility.

FREQUENCY SELECT CALCULATION

The ST49C101/102 contains an analog phase locked loop circuit with digital closed loop dividers and a final output divider to achieve the desired dividing ratios for the clock output.

The accuracy of the frequencies produced by the ST49C101/102 depends on the input frequency and divider ratios. The formula for calculating the exact output frequency is as follows:

$$\text{CLOCK} = (\text{Reference clock}) \times 2A / (BXC)$$

where A=5, 6, 7,.....128
 B=5, 6, 7,.....128
 C=1,2,4

Preprogrammed options:

ST49C101-X	Factor	Max. Output Frequency
ST49C101-01	12	100 MHz
ST49C101-02	6	100 MHz
ST49C101-03	8	130 MHz
ST49C101-04	4	100 MHz

ST49C102	Input Frequency	Output Frequency
ST49C102	40MHz	60MHz

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ABSOLUTE MAXIMUM RATINGS

Supply range
Voltage at any pin
Operating temperature
Storage temperature
Package dissipation

7 Volts
GND-0.3 V to VCC+0.3 V
0° C to +70° C
-40° C to +150° C
500 mW

DC ELECTRICAL CHARACTERISTICS

T_A = 0 - 70° C, V_{CC} = 5.0 V ± 10% unless otherwise specified.

Symbol	Parameter	Limits			Units	Conditions
		Min	Typ	Max		
V _{IL}	Input low level	2.0		0.8	V	I _{OL} = 8.0 mA I _{OH} = 8.0 mA Pin 2 only VIN = V _{CC} Pin 2 No load. CLOCK = 100MHz
V _{IH}	Input high level				V	
V _{OL}	Output low level	2.8		0.5	V	
V _{OH}	Output high level				V	
I _{IL}	Input low current	55		-100	μA	
I _{IH}	Input high current				μA	
I _{CC}	Operating current	65			mA	
R _{IN}	Input pull-up resistance	50	75	100	kΩ	

AC ELECTRICAL CHARACTERISTICS

T_A = 0 - 70° C, V_{CC} = 5.0 V ± 10% unless otherwise specified.

Symbol	Parameter	Limits			Units	Conditions
		Min	Typ	Max		
T _{1,2}	CLOCK rise/fall time		1.5	3	ns	Load = 30 pF, 0.6V - 2.2V 1.4V switch point V _{CC} /2 switch point
T ₄	Duty cycle	40	48/52	60	%	
T ₅	Duty cycle	45	48/52	55	%	
T ₃	Jitter 1 sigma		±0.5	±2	%	
T ₃	Jitter absolute		±2	±5	%	
T _{IN}	Input reference frequency	7	10	25	MHz	
T _{OUT}	Output frequency			130	MHz	

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DC ELECTRICAL CHARACTERISTICS (ST49C101-02 and -04 ONLY)

$T_A=0 - 70^\circ \text{C}$, $V_{CC}=3.0\text{V} \pm 10\%$ unless otherwise specified.

Symbol	Parameter	Limits			Units	Conditions
		Min	Typ	Max		
V_{IL}	Input low level	2.0		0.8	V	$I_{OL} = 4.0 \text{ mA}$ $I_{OH} = 4.0 \text{ mA}$ Pin 2 only $V_{IN}=V_{CC}$ Pin 2 No load. CLOCK=80 MHz
V_{IH}	Input high level					
V_{OL}	Output low level			0.5	V	
V_{OH}	Output high level	2.0			V	
I_{IL}	Input low current			-100	μA	
I_{IH}	Input high current			1	μA	
I_{CC}	Operating current		40	60	mA	
R_{IN}	Input pull-up resistance	50	75	100	$\text{k}\Omega$	

AC ELECTRICAL CHARACTERISTICS (ST49C101-02 and -04 ONLY)

$T_A=0 - 70^\circ \text{C}$, $V_{CC}=3.0\text{V} \pm 10\%$ unless otherwise specified.

Symbol	Parameter	Limits			Units	Conditions
		Min	Typ	Max		
$T_{1,2}$	CLOCK rise/fall time		2	3	ns	Load 30pF, 0.6V - 2.2V $V_{CC}/2$ switch point
T_5	Duty cycle	45	48/52	55	%	
T_3	Jitter 1 sigma		± 0.5	± 2	%	
T_3	Jitter absolute		± 2	± 5	%	
T_{IN}	Input reference frequency	7	10	20	MHz	
T_{OUT}	Output frequency			80	MHz	

