

### ■ Features, Benefits and Applications

- The world's only VCMO with programmable pull range:  $\pm 60$  PPM,  $\pm 120$  PPM,  $\pm 240$  PPM
- Typical pull range linearity of 0.06%
- 1-110 MHz frequency range
- LVCMOS/LVTTL compatible output
- Typical power consumption of 6.1 mA in active mode
- Typical VCMO tuning voltage: 0 V to 1.85 V for all Vdds
- Four industry-standard 4-pin packages: 2.5 x 2.0, 3.2 x 2.5, 5.0 x 3.2, 7.0 x 5.0 mm
- All-silicon timing device with outstanding reliability of 2 FIT (10x improvement over quartz-based devices), enhancing system MTBF
- Ultra short lead time
- Ideal for Set-top Box, DTV, DVD-R, instrumentation, low bandwidth analog PLL, networking and communications

### ■ Specifications

#### Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Output Frequency Range	f	1	–	110	MHz	
Frequency Stability	F_stab	-20	–	+20	PPM	Inclusive of: Initial stability, operating temperature, rated power, supply voltage change, load change.  <b><math>\pm 20</math> PPM is available for extended commercial temperature only.</b>
		-25	–	+25	PPM	
		-30	–	+30	PPM	
		-50	–	+50	PPM	
Pull Range <sup>[1,2]</sup>	PR	$\pm 60, \pm 120, \pm 240$			PPM	
Upper Control Voltage	VC_U	1.55	–	1.85	V	All Vdds. Voltage at which maximum deviation (+60, +120, +240 PPM) is guaranteed.
Lower Control Voltage	VC_L	0	–	0.1	V	All Vdds. Voltage at which maximum deviation (-60, -120, -240 PPM) is guaranteed.
Linearity	Lin	–	0.06	0.25	%	
Frequency Change Polarity	–	Positive slope			–	
Operating Temperature Range	T_use	-20	–	+70	°C	Extended Commercial
		-40	–	+85	°C	Industrial
Supply Voltage	Vdd	1.71	1.8	1.89	V	
		2.25	2.5	2.75	V	
		2.52	2.8	3.08	V	
		2.97	3.3	3.63	V	
Current Consumption	Idd	–	6.7	7.5	mA	No load condition, f = 20 MHz, Vdd = 2.5 V, 2.8 V or 3.3 V
		–	6.1	6.7	mA	No load condition, f = 20 MHz, Vdd = 1.8 V
Duty Cycle	DC	45	–	55	%	All Vdds. f $\leq$ 75 MHz
		40	–	60	%	All Vdds. f > 75 MHz
Rise/Fall Time	Tr, Tf	–	1	2.0	ns	Vdd = 2.5, 2.8 or 3.3 V, 20% - 80% Vdd level
		–	1	2.5	ns	Vdd = 1.8 V, 20% - 80% Vdd level
Output Voltage High	VOH	90	–	–	%Vdd	IOH = -4 mA (Vdd = 3.3 V) IOH = -3 mA (Vdd = 2.8 V and Vdd = 2.5 V) IOH = -2 mA (Vdd = 1.8 V)
Output Voltage Low	VOL	–	–	10	%Vdd	IOL = 4 mA (Vdd = 3.3 V) IOL = 3 mA (Vdd = 2.8 V and Vdd = 2.5 V) IOL = 2 mA (Vdd = 1.8 V)
Output Load	Ld	–	–	15	pF	Maximum frequency and supply voltage Contact SiTime for higher output load
Start-up Time	T_osc	–	–	10	ms	Time @ minimum supply voltage to be zero
RMS Period Jitter	T_jitt	–	–	6	ps	f = 75 MHz, Vdd = 1.8 V
		–	–	4	ps	f = 75 MHz, Vdd = 2.5 V, 2.8 V or 3.3 V
RMS Phase Jitter (random)	T_phj	–	0.6	–	ps	f = 75 MHz, Integration bandwidth = 900 kHz to 7.5 MHz, VDD = 2.5 V, 2.8 V, or 3.3 V
		–	0.8	–	ps	f = 75 MHz, Integration bandwidth = 900 kHz to 7.5 MHz, VDD = 1.8 V

#### Notes:

1. Absolute Pull Range (APR) is defined as the guaranteed pull range over temperature and voltage.
2. APR = pull range (PR) - frequency stability (F\_stab).

## ■ Specifications (Cont.)

### Pin Description Tables

Pin #1 Functionality
VIN
0 - 1.85 V: produces voltage dependent frequency change

Pin Map	
Pin	Connection
1	VIN
2	GND
3	CLK
4	VDD

### Absolute Maximum Ratings

Attempted operation outside the absolute maximum ratings of the part may cause permanent damage to the part. Actual performance of the IC is only guaranteed within the operational specifications, not at absolute maximum ratings.

Parameter	Min.	Max.	Unit
Storage Temperature	-65	150	°C
VDD	-0.5	4	V
Electrostatic Discharge	–	6000	V
Theta JA (with copper plane on VDD and GND)	–	75	°C/W
Theta JC (with PCB traces of 0.010 inch to all pins)	–	24	°C/W
Soldering Temperature (follow standard Pb free soldering guidelines)	–	260	°C
Number of Program Writes	–	1	NA
Program Retention over -40 to 125 °C, Process, VDD (0 to 3.65 V)	1,000+	–	years

### Environmental Compliance

Parameter	Condition/Test Method
Mechanical Shock	MIL-STD-883F, Method 2002; 50kG
Mechanical Vibration	MIL-STD-883F, Method 2007; 70G
Temperature Cycle	JESD22, Method A104
Solderability	MIL-STD-883F, Method 2003
Moisture Sensibility Level	MSL1 @ 260 °C

### ■ Dimensions and Land Patterns

Package Size – Dimensions (Unit: mm) <sup>[3]</sup>	Recommended Land Pattern (Unit: mm) <sup>[4]</sup>
<p><b>2.5 x 2.0 x 0.75 mm</b></p>	
<p><b>3.2 x 2.5 x 0.75 mm</b></p>	
<p><b>5.0 x 3.2 x 0.75 mm</b></p>	
<p><b>7.0 x 5.0 x 0.90 mm</b></p>	

**Notes:**

3. Y denotes manufacturing origin and XXXX denotes manufacturing lot number. The value of "Y" will depend on the assembly location of the device.
4. A capacitor of value 0.1  $\mu$ F between Vdd and GND is recommended.
5. The 7050 package with part number designation "-8" has NO center pad.

■ Part No. Guide - How to Order

The Part No. Guide is for reference only. For real-time customization and exact part number, use the SiTime [Part Number Generator](#).

### SiT3701AC-14-18F - 105.12345T



**Notes:**

- 6. Contact SiTime for different drive strength options for driving higher loads or reducing EMI.
- 7. Without Center Pad.

### Frequency Stability vs. Temperature Range Options

Frequency Stability (PPM)	Temperature Range	Supply Voltage			
		1.8 V	2.5 V	2.8 V	3.3 V
±20	C (-20 to +70 °C)	✓	✓	✓	✓
	I (-40 to +85 °C)	-	-	-	-
±25	C (-20 to +70 °C)	✓	✓	✓	✓
	I (-40 to +85 °C)	✓	✓	✓	✓
±30	C (-20 to +70 °C)	✓	✓	✓	✓
	I (-40 to +85 °C)	✓	✓	✓	✓
±50	C (-20 to +70 °C)	✓	✓	✓	✓
	I (-40 to +85 °C)	✓	✓	✓	✓

© SiTime Corporation 2010. The information contained herein is subject to change at any time without notice. SiTime assumes no responsibility or liability for any loss, damage or defect of a Product which is caused in whole or in part by (i) use of any circuitry other than circuitry embodied in a SiTime product, (ii) misuse or abuse including static discharge, neglect or accident, (iii) unauthorized modification or repairs which have been soldered or altered during assembly and are not capable of being tested by SiTime under its normal test conditions, or (iv) improper installation, storage, handling, warehousing or transportation, or (v) being subjected to unusual physical, thermal, or electrical stress.

**Disclaimer:** SiTime makes no warranty of any kind, express or implied, with regard to this material, and specifically disclaims any and all express or implied warranties, either in fact or by operation of law, statutory or otherwise, including the implied warranties of merchantability and fitness for use or a particular purpose, and any implied warranty arising from course of dealing or usage of trade, as well as any common-law duties relating to accuracy or lack of negligence, with respect to this material, any sitime product and any product documentation. products sold by sitime are not suitable or intended to be used in a life support application or component, to operate nuclear facilities, or in other mission critical applications where human life may be involved or at stake. all sales are made conditioned upon compliance with the critical uses policy set forth below.

**CRITICAL USE EXCLUSION POLICY**  
BUYER AGREES NOT TO USE SITIME'S PRODUCTS FOR ANY APPLICATION OR IN ANY COMPONENTS USED IN LIFE SUPPORT DEVICES OR TO OPERATE NUCLEAR FACILITIES OR FOR USE IN OTHER MISSION-CRITICAL APPLICATIONS OR COMPONENTS WHERE HUMAN LIFE OR PROPERTY MAY BE AT STAKE.

SiTime owns all rights, title and interest to the intellectual property related to SiTime's products, including any software, firmware, copyright, patent, or trademark. The sale of SiTime products does not convey or imply any license under patent or other rights. SiTime retains the copyright and trademark rights in all documents, catalogs and plans supplied pursuant to or ancillary to the sale of products or services by SiTime. Unless otherwise agreed to in writing by SiTime, any reproduction, modification, translation, compilation, or representation of this material shall be strictly prohibited.