MK3754
Low Cost 54 MHz 3.3 Volt VCXO

Description

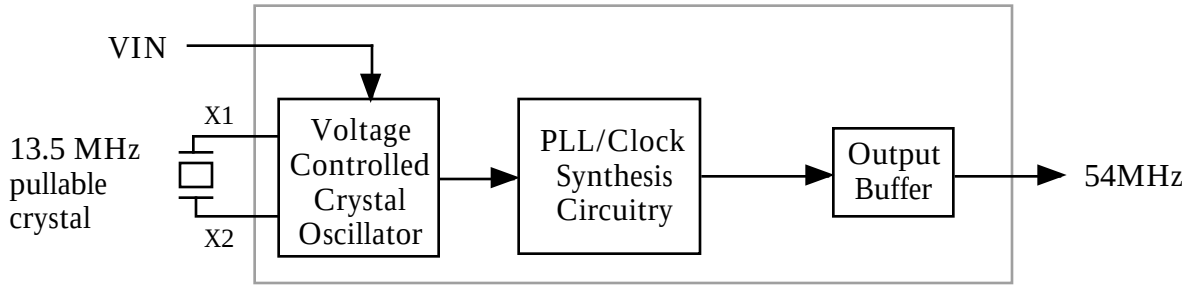
The MK3754 is ICS/Microclock's lowest cost, low jitter, high performance 3.3 Volt VCXO and PLL clock synthesizer designed to replace expensive 54 MHz VCXOs. The on-chip Voltage Controlled Crystal Oscillator accepts a 0 to 3.3 V input voltage to vary the output clocks by ±100 ppm. Using ICS/Microclock's patented VCXO and analog/digital Phase-Locked Loop (PLL) techniques, the device uses an inexpensive external 13.5 MHz pullable crystal input to produce a 54 MHz output clock.

The MK3754A is a drop-in replacement to the earlier MK3754S.

Features

- Packaged in 8 pin SOIC
- 3.3 V only operating voltage
- Uses an inexpensive 13.500 MHz external crystal
- On-chip VCXO (patented) with pull range of 200ppm (minimum)
- VCXO tuning voltage of 0 to 3.3 V
- 12mA output drive capability at TTL levels
- Advanced, low power, sub-micron CMOS process
- The A version is the latest, manufactured in a smaller geometry process. The MK3754A gives a wider pull range than the MK3754S, and so is recommended for all new designs, and cost reductions of existing designs.

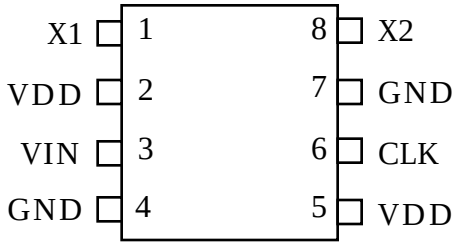
Block Diagram



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Pin Assignment

MK3754



8 pin (150 mil) SOIC

Pin Descriptions

Number	Name	Description
1	X1	Crystal connection. Connect to a pullable 13.5 MHz crystal.
2	VDD	VDD. Connect to +3.3 V.
3	VIN	Voltage input to VCXO. Zero to 3.3V analog input which controls the frequency of the VCXO.
4	GND	Connect to ground.
5	VDD	VDD. Connect to +3.3 V.
6	CLK	54 MHz clock output.
7	GND	Connect to ground.
8	X2	Crystal connection. Connect to a pullable 13.5 MHz crystal.

Pullable Crystal Specifications:

Correlation (load) Capacitance	14 pF
C0/C1	240 max
ESR	35 Ω max
Operating Temperature	0 to 70 °C
Initial Accuracy	±20 ppm
Temperature plus Aging Stability	±50 ppm

Electrical Specifications

Parameter	Conditions	Minimum	Typical	Maximum	Units
ABSOLUTE MAXIMUM RATINGS (note 1)					
Supply voltage, VDD	Referenced to GND			7	V
Inputs and Clock Outputs	Referenced to GND	-0.5		VDD+0.5	V
Ambient Operating Temperature		0		70	°C
Soldering Temperature	Max of 10 seconds			260	°C
Storage temperature		-65		150	°C
DC CHARACTERISTICS (VDD = 3.3 V unless noted)					
Operating Voltage, VDD		3.15		3.45	V
Output High Voltage, VOH	IOH=-12mA	2.4			V
Output Low Voltage, VOL	IOL=12mA			0.4	V
Output High Voltage, VOH, CMOS level	IOH=-4mA	VDD-0.4			V
Operating Supply Current, IDD	No Load		9		mA
Short Circuit Current			±50		mA
VIN, VCXO control voltage		0		3.3	V
AC CHARACTERISTICS (VDD = 3.3 V unless noted)					
Input Crystal Frequency			13.50000		MHz
Output Clock Rise Time	0.8 to 2.0V			1.5	ns
Output Clock Fall Time	2.0 to 0.8V			1.5	ns
Output Clock Duty Cycle	At 1.4V	40	50	60	%
Maximum Absolute Jitter, short term			100		ps
54 MHz output pullability, note 2	0V ≤ VIN ≤ 3.3 V	±100			ppm

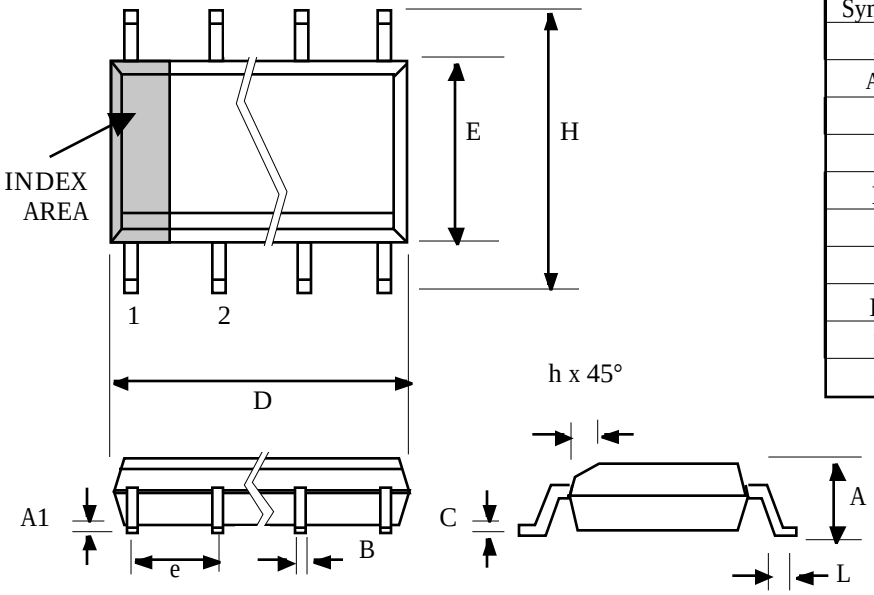
Notes: 1. Stresses beyond those listed under Absolute Maximum Ratings could cause permanent damage to the device. Prolonged exposure to levels above the operating limits but below the Absolute Maximums may affect device reliability.
2. With an ICS approved pullable crystal. The A version has a typical range of ±180 ppm.

External Components

The MK3754 requires a minimum number of external components for proper operation. A decoupling capacitor of 0.01µF should be connected between VDD and GND on pins 2 and 4, as close to the MK3754 as possible. A series termination resistor of 33 Ω may be used for the clock output. The input crystal must be connected as close to the chip as possible. The input crystal should be a parallel mode, pullable, AT cut, 13.5 MHz, with 14 pF load capacitance. Consult ICS for recommended suppliers. IMPORTANT - read application note MAN05 before laying out the PCB.

Package Outline and Package Dimensions

(For current dimensional specifications, see JEDEC Publication No. 95.)



8 pin SOIC

	Inches		Millimeters	
Symbol	Min	Max	Min	Max
A	0.0532	0.0688	1.35	1.75
A1	0.0040	0.0098	0.10	0.24
B	0.0130	0.0200	0.33	0.51
C	0.0075	0.0098	0.19	0.24
D	0.1890	0.1968	4.80	5.00
E	0.1497	0.1574	3.80	4.00
e	.050 BSC		1.27 BSC	
H	0.2284	0.2440	5.80	6.20
h	0.0099	0.0195	0.25	0.50
L	0.0160	0.0500	0.41	1.27

Ordering Information

Part/Order Number	Marking	Shipping packaging	Package	Temperature
MK3754A	MK3754A	tubes	8 pin SOIC	0-70 °C
MK3754ATR	MK3754A	tape and reel	8 pin SOIC	0-70 °C
MK3754S	MK3754S	tubes	8 pin SOIC	0-70 °C
MK3754STR	MK3754S	tape and reel	8 pin SOIC	0-70 °C

CHANGE HISTORY

Version	Date first published	Status	Comments
D	6/01/00		Added A version
C	12/29/99	Preliminary	Added JEDEC dimensions. Changed VDD to ±5%. Added crystal specs.
B	5/25/99	Preliminary	Updated specs for crystal capacitance, IDD, jitter.
A	4/19/99	Preliminary	Original

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