MAS6282

This is preliminary information on a new product under development. Micro Analog Systems Oy reserves the right to make any changes without notice.

IC FOR 6.50 – 40.00 MHz VCTCXO

Preliminary

- **Min. Supply Voltage 2.6 V**
- **Max. Frequency 40 MHz**
- **True Sine Wave Output**
- **Frequency Stability ±2.0 ppm**
- **Suitable for Ultra Small VCTCXO**
- **Very Low Phase Noise**

DESCRIPTION

The MAS6282 is an integrated circuit well suited to build VCTCXO for mobile communication. Temperature calibration is achieved in three calibration temperatures only. The trimming is done through a serial bus and the calibration information is stored in an internal PROM. This means no rework for trimming is needed.

To build a VCTCXO only a crystal is required in addition to MAS6282. The compensation method is fully analog, working continuously without generating any steps or other interference.
Output is true sine wave resulting in lower harmonics than with clipped sine wave output.

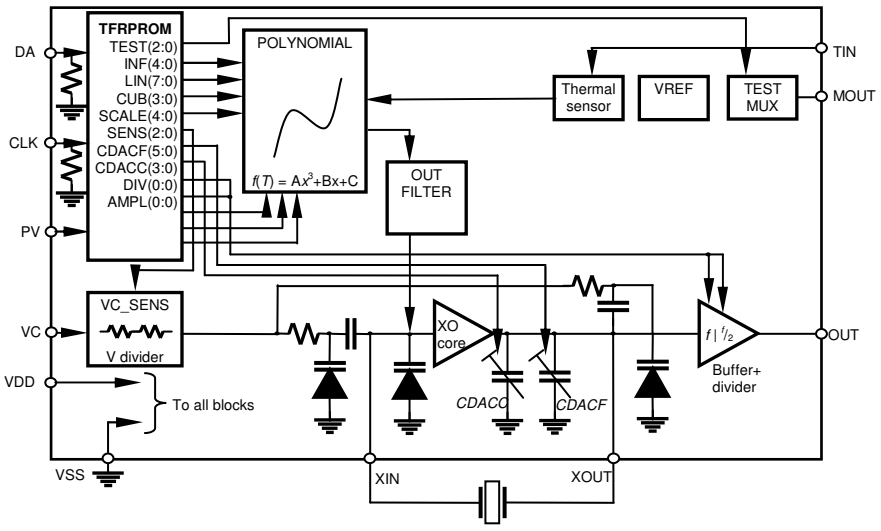
FEATURES

- Very small size
- Minimum Vdd 2.6V
- No voltage reference capacitor needed
- Programmable VC-sensitivity
- Divider option selectable by a PROM bit
- Output peak voltage (amplitude) option selectable by a PROM bit

APPLICATIONS

- VCTCXO for mobile phones
- VCTCXO for other applications

BLOCK DIAGRAM



PIN DESCRIPTION

Pin Description MAS6282A	Symbol	x-coordinate	y-coordinate
Crystal/Varactor Oscillator Input	XIN	185	1229
Power Supply Voltage	VDD	436	1229
Serial Bus Data Input	DA	1071	1229
Serial Bus Clock Input	CLK	1342	1229
Buffer Output	OUT	1612	1229
Voltage Control Input	VC	209	152
Crystal Oscillator Output	XOUT	477	152
Temperature Output	TIN	780	152
Programming Input	PV	1071	152
Test Multiplexer Output	MOUT	1335	152
Power Supply Ground	VSS	1612	152

Note: Because the substrate of the die is internally connected to GND, the die has to be connected to GND or left floating. Please make sure that GND is the first pad to be bonded. Pick-and-place and all component assembly are recommended to be performed in ESD protected area.
Note: Pad coordinates are measured from the left bottom corner of the chip to the center of the pads. The coordinates may vary depending on sawing width and location, however, distances between pads are accurate.
Note: Test Multiplexer Output is for testing only and must not be connected in module.

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Min	Max	Unit	Note
Supply Voltage	$V_{DD} - V_{SS}$	–0.3	5.5	V	
Input Voltage	V_{IN}	V_{SS} -0.3	V_{DD} + 0.3	V	1)
Power Dissipation	P_{MAX}		20	mW	2)
Storage Temperature	T_{ST}	–55	150	°C	
ESD Rating; HBM		±2		kV	3)
Latchup Current Limit	I_{LUT}	±100		mA	

Note: Stresses beyond the values listed may cause a permanent damage to the device. The device may not operate under these conditions, but it will not be destroyed
Note 1: Not valid for programming pin PV
Note 2: Value depends on a thermal resistance of the used packade
Note 3: In pins XIN and XOUT maximum ESD rating is 1 kV.

RECOMMENDED OPERATION CONDITIONS

Parameter	Symbol	Conditions	Min	Typ	Max	Unit	Note
Supply voltage	V_{DD}		2.6	2.8	4.0	V	
Supply current	I_{CC}	Vdd = 2.8 V, f_c =26 MHz		1.3		mA	
Supply current	I_{CC}	Vdd = 2.8 V, f_c =40 MHz		1.5		mA	
Operating temperature	T_{OP}		–40		+85	°C	
Crystal load capacitance	C_L			8		pF	1)
Crystal pulling sensitivity	S		18		30	ppm/pF	
Crystal Rs	R_S			20	50	Ω	

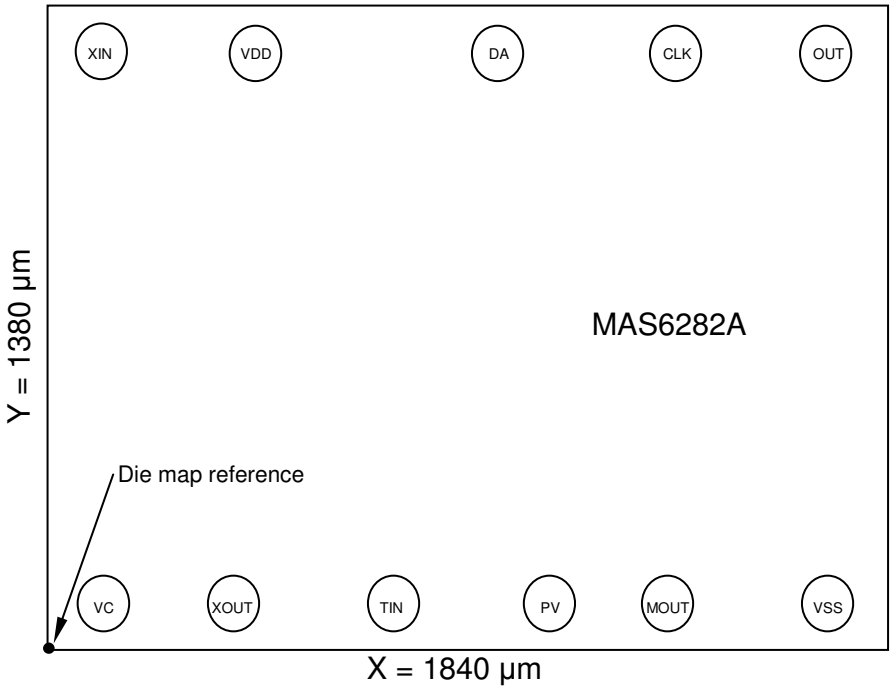
Note 1: CDACF = 32 and CDACC = 8

ELECTRICAL CHARACTERISTICS

Parameter		Symbol	Min	Typ	Max	Unit	Note
Crystal frequency range for MAS6282		f_c	13.00		40.00	MHz	1)
Voltage control range		V_C	0	1.3	VDD	V	
Voltage control sensitivity (SENS=7)		V_{CSENS}		10		ppm/V	2)
Frequency vs. supply voltage		df_o			±0.2	ppm	3)
Frequency vs. load change		df_o			±0.2	ppm	4)
Output voltage (10 kΩ || 10 pF)		V_{out}	0.6	0.8/1.0		Vpp	5)
Power Consumption		P			8	mW	8)
Harmonic distortion				-25		dBc	
Compensation range ±2.0 ppm		T_C	–30		85	°C	
Compensation range linear part		a1	–0.7		0.0	ppm/K	
Compensation inflection point		INF	20.5		36	°C	
Compensation range cubic part		a3		95		ppm^2/K^3	
Fine compensation CDACF (6 Bit)		C_{XOUT}	C10		C10 + 0.95	pF	6)
Coarse compensation CDACC (4 Bit)		C_{XOUT}	C20		C20 + 6.75	pF	6)
Start-up time		T_{START}		2		ms	
Phase noise	@ 10Hz	φ_n			–90	dBc/Hz	7)
	@ 100Hz				–113		
	@ 1kHz				–136		
	@ 10kHz				–148		
	@ 100kHz				–155		

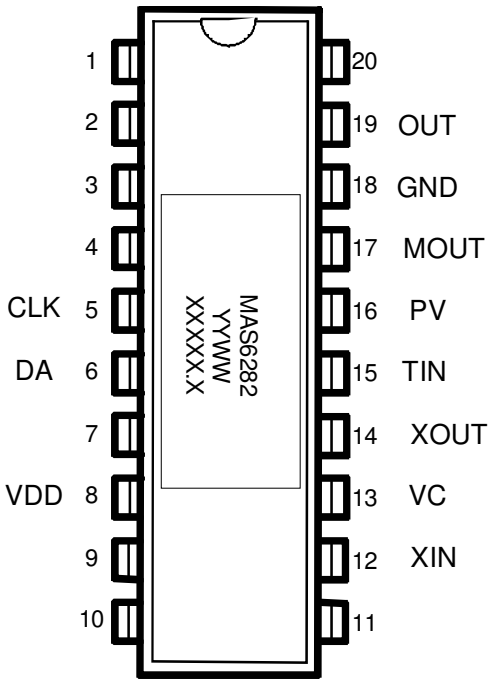
Note 1: Frequency division by two is selected by PROM bit DIV: 0=no division, 1=div by 2
Thus IC output frequency range is 6.5 MHz – 40 MHz.
Note 2: Depending on crystal pulling
Note 3: VDD±5%
Note 4: R=10 kΩ±10%, C=10 pF±10%
Note 5: 0.8 V / 1.0 V output is selected by PROM bit AMPL: 0=0.8 Vpp, 1=1.0Vpp
Note 6: Typically C10 = 3.1 pF at CDACF=0, CDACC=0
Note 7: Not measured in production testing; guaranteed by design
Note 8: Max power consumption is 8 mW when V_{DD} is 4V

IC OUTLINE



Note 1: MAS6282 pads are round with 80 µm diameter at opening.
Note 2: Pins CLK and DA can either be connected to VSS or left floating, pin PV can either be connected to VSS or left floating and pin TIN must be left floating in VCTCXO module end-user application.
Note 3: Die map reference is the actual left bottom corner of the sawn chip.
Note 4: See coordinates in pin description on page 2.

SAMPLES IN SBDIL 20 PACKAGE



Top marking:
YYWW = Year, Week
XXXXX.X = Lot number

ORDERING INFORMATION

Product Code	Product	Package	Comments
MAS6282A1TG00	IC for 6.5MHz to 40MHz VCTCXO	EWS Tested wafers 215 µm	Die Size 1.840 x 1.380 mm

Contact Micro Analog Systems Oy for other wafer thickness options.

◆ **The formation of product code**

Product name	Design version	Package type	Delivery format
MAS6282	A1	TG = 215 µm thick EWS tested wafer	00 = bare wafer

LOCAL DISTRIBUTOR

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