

MAS1175

IC FOR 10.00 – 20.00 MHz VCTCXO

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

Preliminary

- Low Cost
- Low Power
- Wide Supply Voltage Range
- True Sine Wave Output
- Very High Level of Integration
- Electrically Trimmable
- Very Low Phase Noise

DESCRIPTION

The MAS1175 is an integrated circuit well suited to build VCTCXO for mobile communication. Only two external components are needed. Temperature calibration is achieved with three calibration points only. The trimming is done by a serial bus and the calibration information is stored in an internal PROM.

To build a VCTCXO only two additional components, a varactor and a crystal are needed. The compensation method is fully analog. IC compensation work is continuous without generating any steps or other interferences.

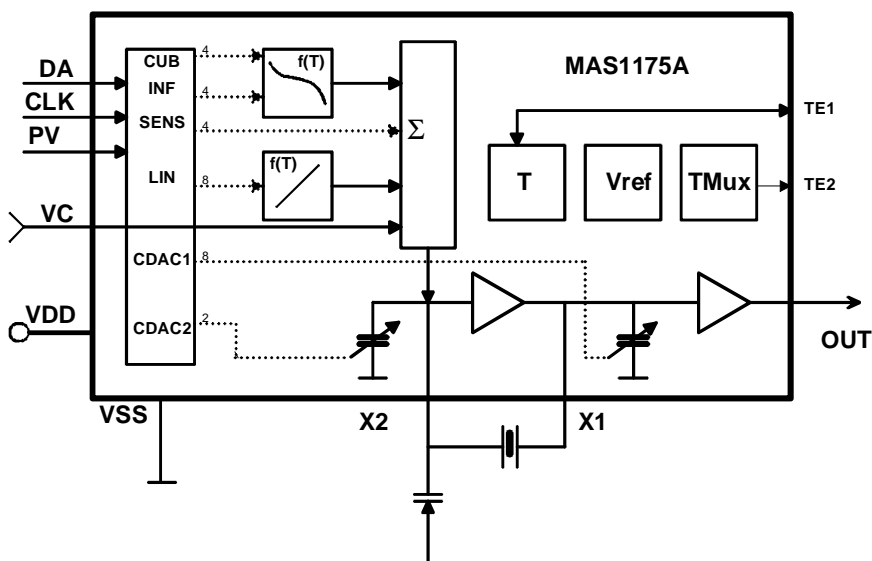
FEATURES

- Very small size
- Minimum current draw
- Wide operating temperature range
- Phase noise <-130 dBc/Hz at 1 kHz offset
- VCTCXO for mobile phones

APPLICATIONS

- VCTCXO for other telecommunications systems

BLOCK DIAGRAM



PIN DESCRIPTION

Pin Description	Symbol	x-coordinate	y-coordinate
Power Supply Voltage	VDD	263	1330
Programming Input	PV	503	1326
Serial Bus Clock Input	CLK	745	1321
Serial Bus Data Input	DA	1001	1321
Temperature Output	TE1	1246	1325
Test Multiplexer Output	TE2	1454	1325
Voltage Control Input	VC	190	231
Crystal Oscillator Output	X1	398	231
Crystal/Varactor Oscillator Input	X2	1355	231
Power Supply Ground	VSS	1828	242
Buffer Output	OUT	2031	231

Note: Because the substrate of the die is internally connected to VDD, the die has to be connected to VDD or left floating. Please make sure that VDD is the first pad to be bonded. Pick-and-place and all component assembly are recommended to be performed in ESD protected area.

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Min	Max	Unit	Note
Supply Voltage	$V_{DD} - V_{SS}$	-0.3	6.0	V	
Input Voltage	V_{IN}	$V_{SS} - 0.3$	$V_{DD} + 0.3$	V	1)
Power Dissipation	P_{MAX}		100	mW	
Operating Temperature	T_{OP}	-35	85	°C	
Storage Temperature	T_{ST}	-40	120	°C	

Note: Not valid for programming pins PV

RECOMMENDED OPERATION CONDITIONS

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Supply Voltage	V_{DD}		2.7	2.8	5.5	V
Supply Current	I_{CC}	$V_{CC} = 2.8$ Volt			1.8	mA
Operable Temperature	T_C		-30		+85	°C
Storage Temperature	T_S	Relative humidity = 15%...70%	-5		+40	°C
Crystal Pulling Sensitivity	S			30		ppm/pF
Load Capacitance	C_L			10		pF

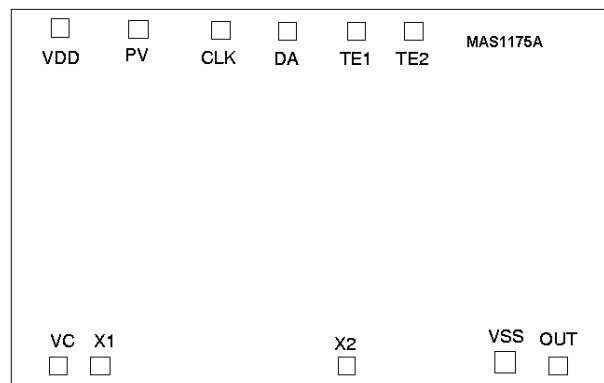
ELECTRICAL CHARACTERISTICS

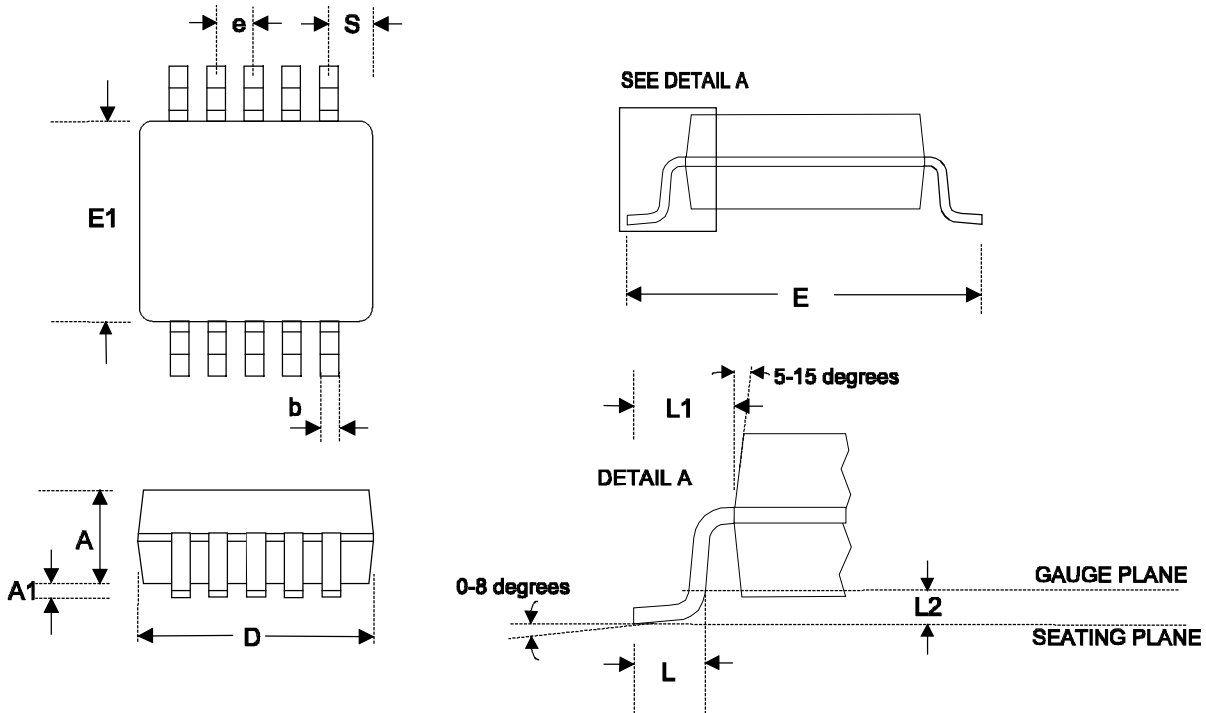
Parameter	Symbol	Min	Typ	Max	Unit	Note
Frequency range	f_o	10.00		20.00	MHz	
Voltage Control Range	V_C	0		Vdd		
Voltage Control Sensitivity	V_{CSSENS}		10		ppm/V	
Output Voltage (10k Ω // 10 pF)	V_{out}		1.0		Vpp	
Compensation Range \pm 2.5 ppm	T_C	-30		85	$^{\circ}$ C	
Compensation Range \pm 2.0 ppm	T_C	-25		75	$^{\circ}$ C	
Compensation Range linear part	a1	-0.7		0.0	ppm/K	
Compensation Inflection Point	INF	25		31	$^{\circ}$ C	
Compensation Range Cubic part	a3		95		ppm ² /K ³	
Compensation CDAC1 (8 Bit)	C_{X1}	C10		C10 + 18	pF	2)
Compensation CDAC2 (2 Bit)	C_{X2}	C20		C20 + 4	pF	3)
Startup Time	T_{START}		2		ms	

Note 2: typ C10 = 14pF

Note 3: typ C20 = 5pF (varactor capacitance has to be added)

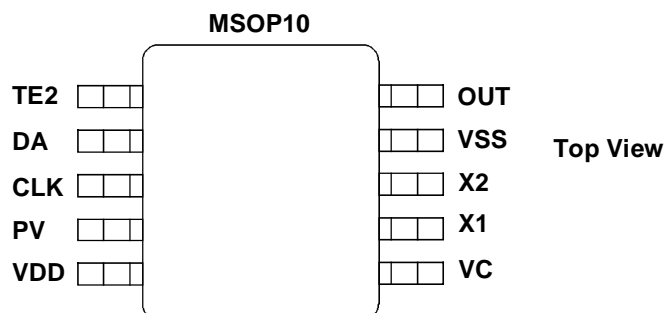
IC OUTLINES



DEVICE PACKAGE OUTLINES MSOP10


Dimension	Min	Typical	Max	Unit
A			1.10	mm
A1	0.05	0.10	0.15	mm
D	2.90	3.00	3.10	mm
E	4.75	4.90	5.05	mm
E1	2.90	3.00	3.10	mm
b	0.15	0.23	0.30	mm
L	0.40	0.55	0.70	mm
L1		0.95		BSC
e		0.50		BSC
S		0.50		BSC
L2		0.25		BSC

Dimensions according to JEDEC MO-187BA Standard

DEVICE OUTLINE CONFIGURATION


ORDERING INFORMATION

Product Code	Product	Package	Comments
MAS1175ATB1	IC FOR VCTCXO	Tested wafers, 480 µm	Die Size 2.233x1.556 mm
MAS1175ASM1-T	IC FOR VCTCXO	MSOP10	Tape & Reel

Please contact Micro Analog Systems Oy for other wafer thickness options.

LOCAL DISTRIBUTOR

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