

# MAS1178

## IC FOR 10.00 – 20.00 MHz VCXO

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

### DESCRIPTION

The MAS1178 is an integrated circuit well suited to build VCXO for mobile communication. The trimming is done by a serial bus and the calibration information is stored in an internal PROM.

To build a VCXO only one additional component, a crystal is needed.

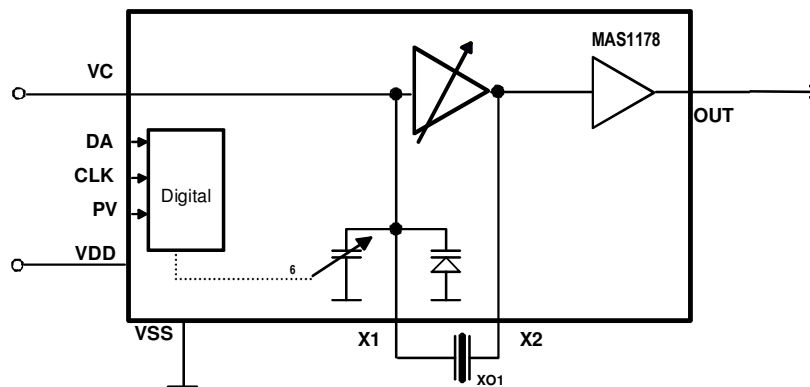
### FEATURES

- Very small size
- Minor current draw
- Wide operating temperature range
- Phase noise <-130 dBc/Hz at 1 kHz offset
- Square wave output

### APPLICATIONS

- VCXO for mobile phones
- VCXO for other telecommunications systems

### BLOCK DIAGRAM



## PIN DESCRIPTION

Pin Description	Symbol	x-coordinate	y-coordinate
Power Supply Voltage	VDD	182	1317
Serial Bus Clock Input	CLK	645	1329
Serial Bus Data Input	DA	418	1329
Programming Input	PV	876	1311
Voltage Control Input	VC	215	213
Crystal Oscillator Output	X2	1053	209
Crystal/Varactor Oscillator Input	X1	434	209
Power Supply Ground	VSS	617	2267
Buffer Output	OUT	1218	1329

**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.

## 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	$T_{ST}$	-55	150	°C	

**Note 1:** Not valid for programming pin PV

## RECOMMENDED OPERATION CONDITIONS

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Supply Voltage	$V_{DD}$		2.7	2.8	5.5	V
Supply Current	$I_{dd}$	Vdd = 2.8 Volt		2.3		mA
Operable Temperature	$T_C$		-30		+85	°C
Storage Temperature	$T_S$	Relative humidity = 15%...70%	-5		+40	°C

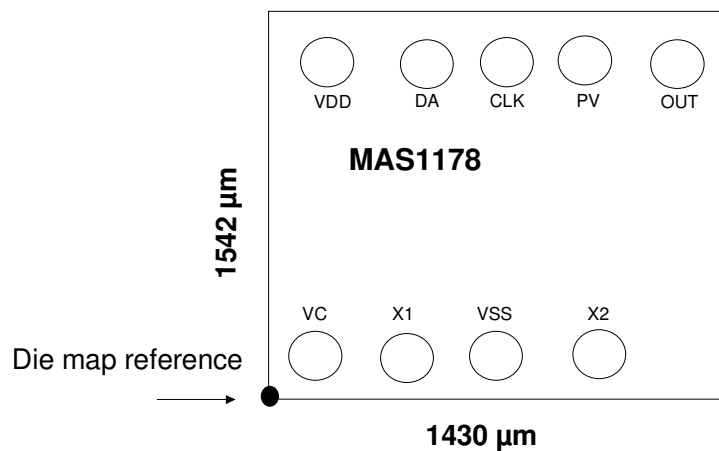
## ELECTRICAL CHARACTERISTICS

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	$V_{CSENS}$		30		ppm/V	1)
Output Voltage (10 pF, Vdd 2.7V)	$V_{out}$		2.3		Vpp	
Output Voltage (10 pF, Vdd 5.0V)	$V_{out}$		4.5		Vpp	
Rise and Fall Time (10-50pF)				10	ns	
Output Symmetry			40-60		%	
Trimming CDAC (6 Bit)	$C_{X1}$	C20		C20 + 12	pF	2)
Startup Time	$T_{START}$		2		ms	

**Note 1:** Vc sense is depending on the crystal used.

**Note 2:** Typ. C20 = 5 pF

## IC OUTLINES



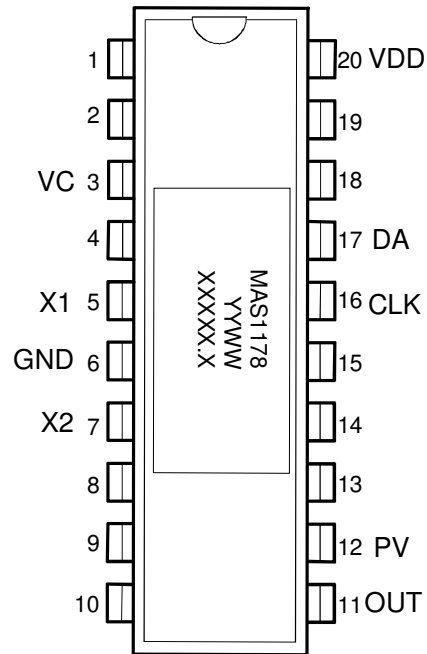
**Note 1:** MAS1178 pads are round with 80 μm diameter at opening.

**Note 2:** Pins PV, CLK and DA must not be connected in VCXO module end-user application.

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**SAMPLES IN SB20 DIL PACKAGE**

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

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## ORDERING INFORMATION

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Product Code	Product	Package	Comments
MAS1178ATC1	IC FOR VCXO	EWS tested wafers 400 $\mu\text{m}$	Die size 1430 x 1542 $\mu\text{m}$
MAS1178ATF1	IC FOR VCXO	EWS tested wafers 254 $\mu\text{m}$	Die size 1430 x 1542 $\mu\text{m}$
MAS1178	IC FOR VCXO	SMD Package T.B.D.	

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

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## LOCAL DISTRIBUTOR

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## MICRO ANALOG SYSTEMS OY CONTACTS

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