

# MAS6720

## IC FOR 32.768 kHz XO

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

*Preliminary*

- Low Cost
- Low Supply Voltage
- Low Current Consumption
- CMOS Output
- Very High Level of Integration

### DESCRIPTION

MAS6720 is an integrated circuit well suited to make a fundamental crystal oscillator (XO): only one additional component, a crystal, is needed.

MAS6720 includes an oscillator and an output buffer circuits.

### FEATURES

- Very small size
- Minimum current draw
- Wide operating temperature range
- CMOS output

### APPLICATIONS

- XO for wrist watches
- XO for clocks
- XO for battery operated systems

### BLOCK DIAGRAM

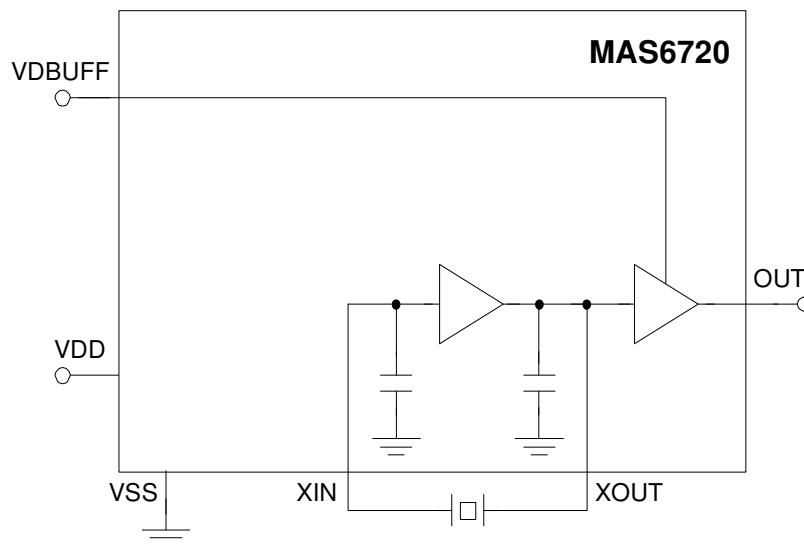


Figure 1. Block diagram of MAS6720.

## 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	
Power Dissipation	$P_{MAX}$		120	mW	
Operating Temperature	$T_{OP}$	-40	85	°C	
Storage Temperature	$T_{ST}$	-55	150	°C	

**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

## RECOMMENDED OPERATION CONDITIONS

Parameter	Symbol	Conditions	Min	Typ	Max	Unit	Note
Supply Voltage	$V_{DD}$		1.2	1.5	3.6	V	1)
Current Consumption	$I_{DD}$			1.6	8.0	μA	
Crystal Load Capacitance	$C_L$			12.5		pF	2)

**Note 1:** If  $V_{DD} = 3.6V$ , it is recommended to connect 1nF capacitor to  $V_{DD}$  pin.

**Note 2:** For other load capacitance options contact to Micro Analog Systems Oy.

## ELECTRICAL CHARACTERISTICS FOR 1.5V SUPPLY VOLTAGE

$T_A = -40^\circ\text{C}$  to  $+85^\circ\text{C}$ , typical values at  $T_A = +27^\circ\text{C}$ ,  $V_{DD} = 1.5V$ ,  $f_0 = 32.768\text{ kHz}$ , Output Load = 15 pF, unless otherwise specified.

Parameter	Symbol	Min	Typ	Max	Unit	Note
Output Load			15	35	pF	
Crystal Frequency Range when Output Load is Maximum 35pF	$f_0$	30.00	32.768	100.00	kHz	
Output Voltage Range		0	$V_{D,BUFF}$	$V_{DD}$	V	1)
Rise and Fall Time			3	4	ns	
Start-up Time	$T_{START}$		0.5		s	
Duty Cycle		40	48-52	60	%	

**Note 1:** The output voltage is controlled with  $V_{D,BUFF}$ . Basically  $V_{OUT} = V_{D,BUFF}$  and  $V_{D,BUFF}$  can be varied between  $0 \leq V_{D,BUFF} \leq V_{DD}$ .

## PIN DESCRIPTION

Pin Description	Symbol	x-coordinate	y-coordinate
Power Supply Voltage	VDD	141	569
Power Supply for Output Buffer	VDBUFF	141	376
Crystal Oscillator Input	XIN	450	141
Crystal Oscillator Output	XOUT	303	141
Power Supply Ground	VSS	588	379
Buffer Output	OUT	588	594

**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.

## IC OUTLINES

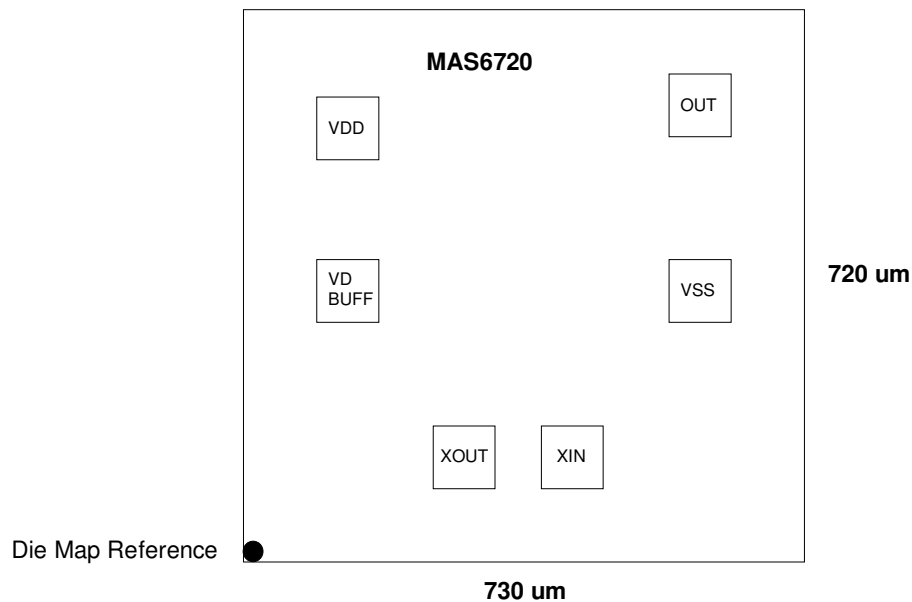


Figure 2. IC outlines.

**Note1:** Die map reference is the actual left bottom corner of the sawn chip.

**Note2:** See coordinates in pin description.

**Note3:** Die dimensions include 80 μm scribes for both sides.

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## ORDERING INFORMATION

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Product Code	Output Frequency	Crystal Load (pF)	Wafer thickness	Comments
MAS6720A1TG00	$f_o$	12.5	215 $\mu\text{m}$	Tested, wafer

Contact Micro Analog Systems Oy for crystal loads between 7.0 pF and 16.0 pF.

Contact Micro Analog Systems Oy for other wafer thickness options.

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## MICRO ANALOG SYSTEMS OY CONTACTS

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