MAS9271

IC FOR 10.00 – 40.00 MHz PXO

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

DESCRIPTION

The MAS9271 is an integrated circuit well suited to make initial offset trimming of the crystal in oscillator. The trimming is done by a serial bus and the calibration information is stored in an internal PROM.

To build a Precision Crystal Oscillator (PXO) only one additional component, a crystal is needed.

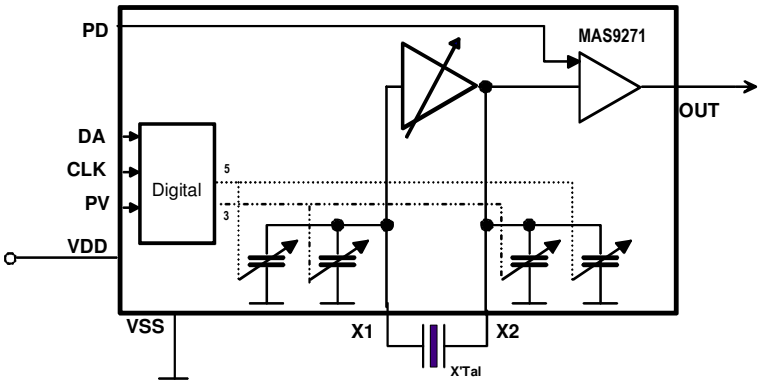
FEATURES

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

APPLICATIONS

- PXO for data terminals
- PXO for telecommunication applications
- PXO for computer application

BLOCK DIAGRAM



PIN DESCRIPTION

Pin Description	Symbol	x-coordinate	y-coordinate	Note
Power Supply Voltage	VDD	177	172	
Crystal Oscillator Output	X1	374	158	
Crystal/Varactor Oscillator Input	X2	817	158	
Tri State	PD	1012	158	
Serial Bus Clock Input	CLK	201	1015	
Serial Bus Data Input	DA	435	1015	
Buffer Output	OUT	665	1015	
Power Supply Ground	VSS	830	1008	
Programming Input	PV	1042	1015	

Note: Also available in AK2140 pin order.
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.
Note: Pad coordinates 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	
Storage Temperature	T_{ST}	-55	150	°C	

Note: Not valid for programming pin PV

RECOMMENDED OPERATION CONDITIONS

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Supply Voltage	V_{DD}		2.5	2.8	5.5	V
Supply Current	I_{CC}	Vdd = 2.8 Volt		2.3		mA
Operating Temperature	T_C		-40		+85	°C
Crystal Load Capacitance	C_L			8.0		pF

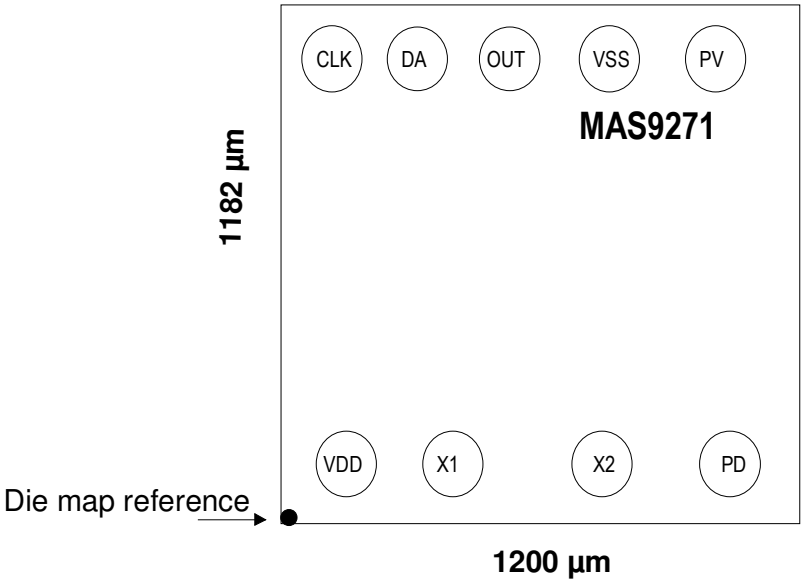
ELECTRICAL CHARACTERISTICS

(recommended operation conditions)

Parameter	Symbol	Min	Typ	Max	Unit	Note
Frequency Range	f_o	10.00		40.00	MHz	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		45		55	%	
Crystal Load	C_G	5.1		11.5	pF	2)
Startup Time	T_{START}		2		ms	
Negative Resistance in Maximum CDAC Load at 32 MHz	NegR	85			Ω	
Negative Resistance in Maximum CDAC Load at 40 MHz	NegR	40			Ω	
Tri State Output Buffer ON State OFF State	PD	 1.6 0		 VDD 0.55	V	3)

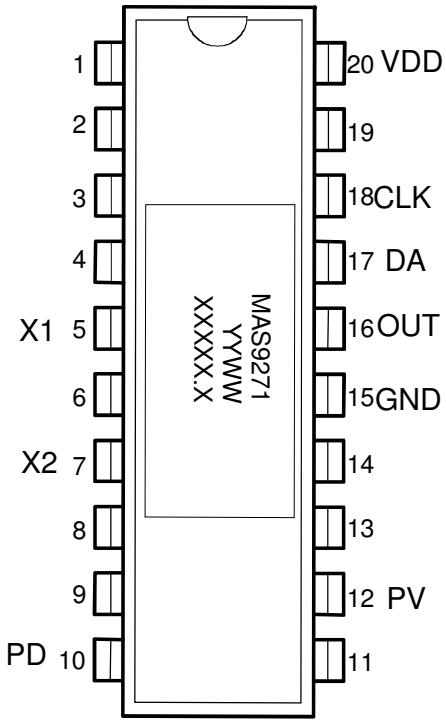
Note 1: Rs < 10 Ω crystal provides typically a maximum frequency of 40 MHz and Rs<30 Ω a maximum frequency of 32 MHz. With Rs = 50 Ω crystal the maximum frequency is typically 26 MHz.
Note 2: Crystal Load is at minimum when all CDAC bits are 0s, and at maximum when all CDAC bits are 1s
Note 3: If the Tri State Output Buffer pin is floating (i.e. PD pin is not connected), the Oscillator is in ON state.

IC OUTLINES



Note 1: Also available in AK2140 pin order.
Note 2: MAS9271 pads are round with 80 µm diameter at opening.
Note 3: Pins PV, CLK and DA must not be connected in PXO module end-user application.

SAMPLES IN SB20 DIL PACKAGE



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

ORDERING INFORMATION

Product Code	Product	Package	Comments
MAS9271A1TG00	IC FOR PXO	Tested wafers 215 µm	Die size 1200 x 1182 µm

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

LOCAL DISTRIBUTOR

MICRO ANALOG SYSTEMS OY CONTACTS

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