■ Description

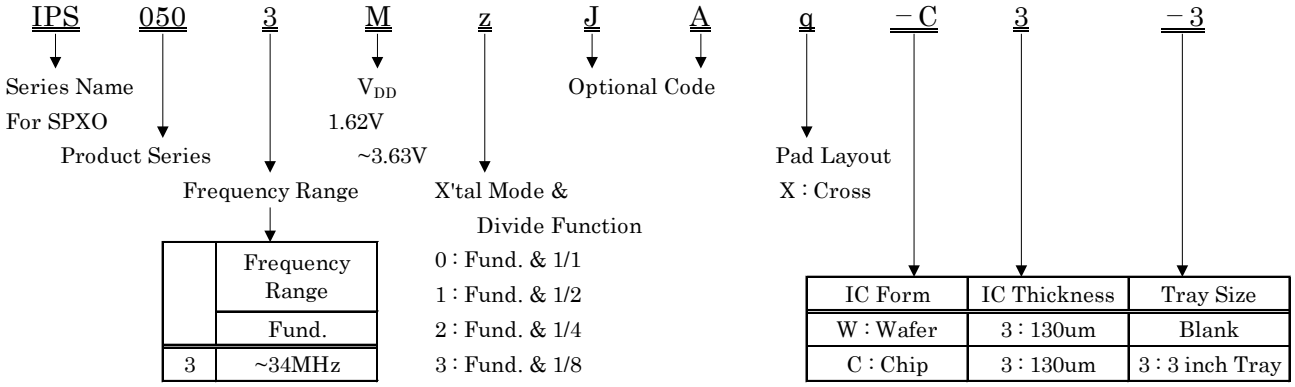
IPS050*JA [MHz] series is the specific SPXO IC for achieving low power MHz range output by divide.

The power consumption of IPS050*JA [MHz] series is quite low, and comparable with tuning fork solution.

■ Features

- Power consumption : TBD
- Divide function : 1/1, 1/2, 1/4 and 1/8
- Output frequency : 1.00 MHz ~ 34.00 MHz
- Operation temperature : -40℃~125℃
- Power supply voltage : 1.62V~3.63V
- Standby function : Oscillation stop
- Output : CMOS
- Small chip size : 0.55mm × 0.54mm
- Frequency stability to V_{DD} : Within ±1.0ppm

1. Part number rule



	Frequency Range
	Fund.
3	~34MHz

IC Form	IC Thickness	Tray Size
W : Wafer	3 : 130um	Blank
C : Chip	3 : 130um	3 : 3 inch Tray

※Please contact us for wafer thickness.

Under Development

2. Series

Part Number	Crystal Frequency f (MHz)		Divide	Output Frequency F0 (MHz)		Pad Layout	Remarks
	Min	Max		Min	Max		
IPS050 3 M 0 J A X	8.00	34.00	1/1	8.00	34.00	Cross	
IPS050 3 M 1 J A X	8.00	34.00	1/2	4.00	17.00		
IPS050 3 M 2 J A X	8.00	34.00	1/4	2.00	8.50		
IPS050 3 M 3 J A X	8.00	34.00	1/8	1.00	4.25		

Please contact us for gray color models.

3. Absolute Maximum Ratings

Unless otherwise stated, V_{SS}=0V, Ta=25℃±2℃

Parameter	Symbol	Condition	Ratings		
			Min	Max	Unit
Supply Voltage	V_{DD}		V_{SS}-0.5	5.0	V
Input Voltage	V_{IN}	Except below	V_{SS}-0.5	V_{DD}+0.5	V
		X1, X2	V_{SS}-0.5	2.0	
Output Voltage	V_{OUT}		V_{SS}-0.5	V_{DD}+0.5	V
Output Current	I_{OUT}			25	mA
Junction Temperature	Tj		-55	150	℃
Storage Temperature	Tstg		-55	125	℃

4. Recommended Operating Condition

Unless otherwise stated, V_{SS}=0V, Ta=-40℃~125℃

Parameter	Symbol	Condition	Min	Typ	Max	Unit	Note
Supply Voltage	V_{DD}		1.62		3.63	V	V_{DD}
Input Voltage	V_{IN}		V_{SS}		V_{DD}	V	CE
Output Load Capacitance	CL	CMOS			15	pF	OUT
Ambient Temperature	Topt		-40		125	℃	

5. Electrical Specification

Unless otherwise stated, V_{DD}=1.62V~3.63V, V_{SS}=0V, CL=15pF, Ta=-40℃~125℃

Parameter	Symbol	Condition		Specification			Unit
				Min	Typ	Max	
Output leak current	Iz	CE=0V, X1=2.0V or V_{SS} Vout=V_{SS}~V_{DD}				20	μA
"H" input voltage	V_{IH}	CE Pad		0.8V_{DD}			V
"L" input voltage	V_{IL}	CE Pad				0.2V_{DD}	V
"L" input current	I_{IL}	CE Pad, V_{IL}=0V			-10		μA
Oscillation Disable Time	Tplz	OUT Pad				0.2	μs
Oscillation Enable Time	Tpzl	OUT Pad				2.0	ms
Oscillation Start up Time	Tstart					2.0	ms
"H" output voltage	V_{OH}	OUT Pad, I_{OH}=-1.0mA, V_{DD}=3.3V		0.9V_{DD}			V
"L" output voltage	V_{OL}	OUT Pad, I_{OL}=1.0mA, V_{DD}=3.3V				0.1V_{DD}	V
Current consumption	I_{DD}	V_{DD}=1.8V No Load	IPS0503M0JAX		TBD		μA
			IPS0503M1JAX		TBD		
			IPS0503M2JAX		TBD		
			IPS0503M3JAX		TBD		
		V_{DD}=3.3V No Load	IPS0503M0JAX		TBD		
			IPS0503M1JAX		TBD		
			IPS0503M2JAX		TBD		
			IPS0503M3JAX		TBD		
Current consumption at oscillation disable	I_{DDD}	V_{DD}=3.3V, CE=GND			0.6	3.0	μA
Freq. V_{DD} deviation	F_{VST}	V_{DD}±10% (V_{DD}=1.8V, 2.5V, 3.3V)				±1.0	ppm
Output Duty Ratio	Duty	CL=15pF, 1/2V_{DD} point		45		55	%
Rise time/Fall time	Tr/Tf	CL=15pF 10%⇔90%V_{DD}	V_{DD}=1.8V			TBD	ns
			V_{DD}=3.3V			TBD	

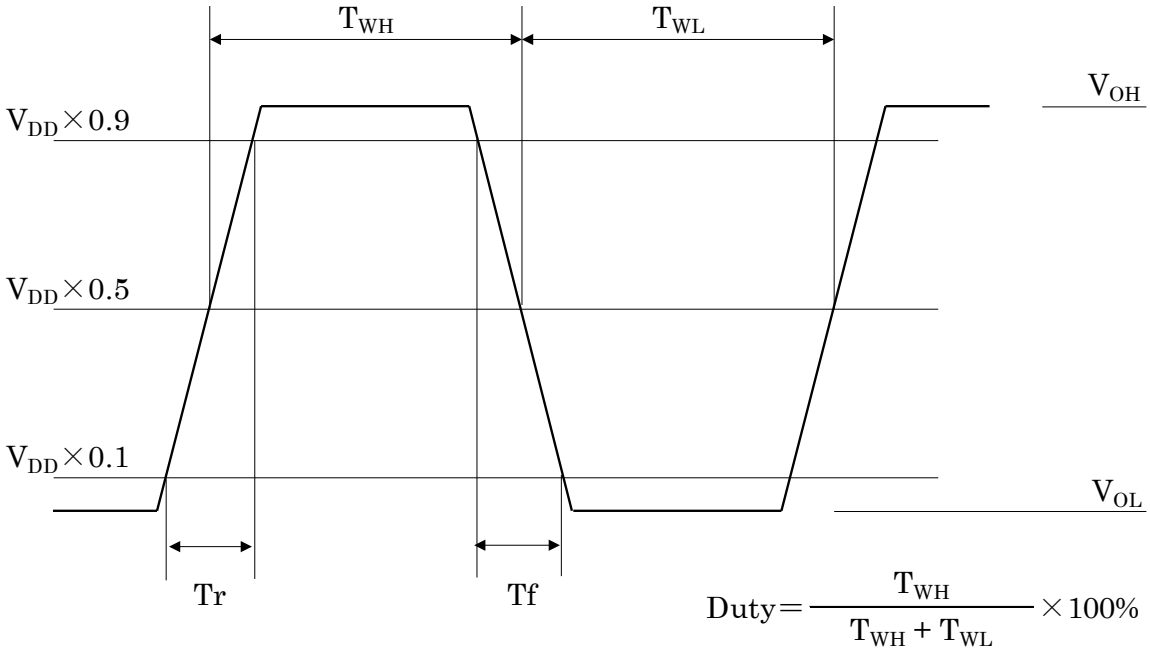
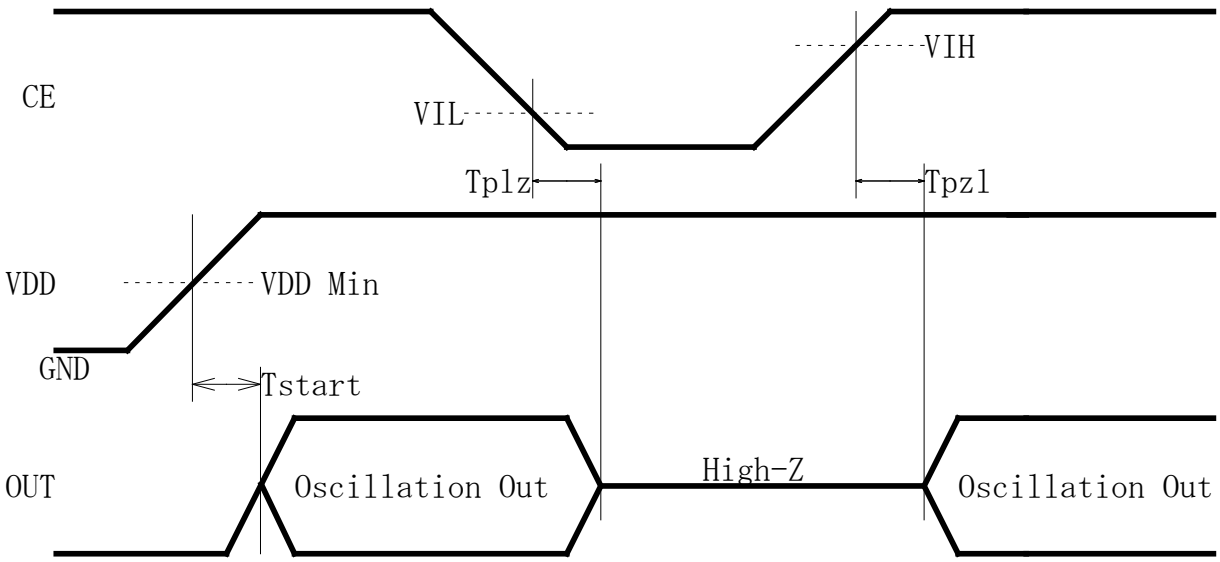


Fig. 5-1 Output wave form (Duty, Tr, Tf, V_{OH}, V_{OL})



V_{IH} : Threshold voltage for Oscillation Start
V_{IL} : Threshold voltage for Oscillation Stop

Fig. 5-2 Input output signal timing

6. Circuit Parameters of Oscillator (Reference Data for Circuit Design)

Ta=25℃

Parameter	Symbol	Condition	Typical value	Unit
Regulated Voltage	Vreg		0.8	V
Feedback Resistor	Rf		570	kΩ
Driving Resistor	Rd		1000	Ω
Oscillation Capacitor	Cg	Gate side	3.0	pF
	Cd	Drain side	1.0	pF

* The above values are the design values and are not guaranteed by test.

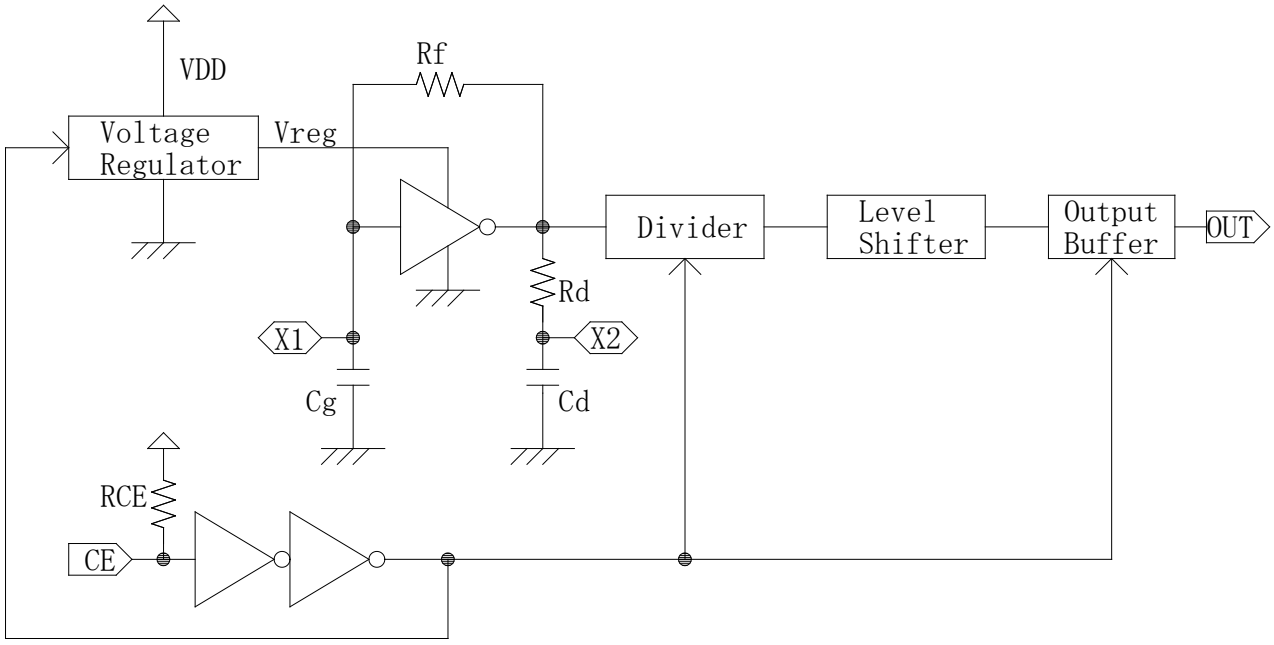
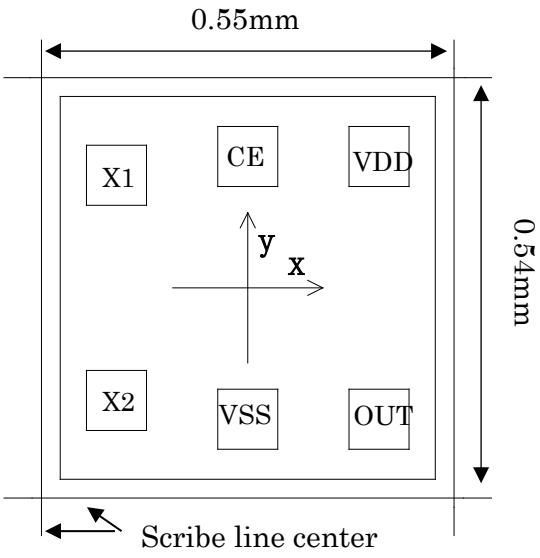


Fig. 6-1 Block Diagram

7. Pad Layout

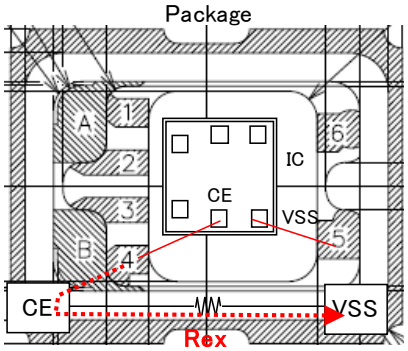
7-1 Cross Type



- Die Size : 0.55mm × 0.54mm
- Pad Size : 80um □
- Thickness : 130um±10um
- Scribe Line : 60um
- IC Backside : Gnd or Open

Pad Name	Function	Location (μm)	
		x	y
VDD	(+) Power Supply	180	175
OUT(Q)	Frequency Output	180	-175
VSS	(−) Ground	0	-175
X2	Crystal Drive	-180	-150
X1	Crystal Feedback	-180	150
CE	Oscillation stop "L": High-Impedance	0	175
Chip Center		0	0

Fig. 7-1 Pad Layout of IPS0503MzJAX



IMPORTANT Notice for CE function

※ Oscillation will not be activated when CE=Open after CE=Low if Rex is not large.

※ Reference value of Rex is over 10MΩ with CE=Open usage.

※ There is no such issue with CE=VDD usage.

Rex： Resistance value between CE and VSS of package

8. Revision History

Revision No.	Revision Date	Revised items	Before Revision	After Revision
SC-8.1	2025/11/04	1st edition	-	-