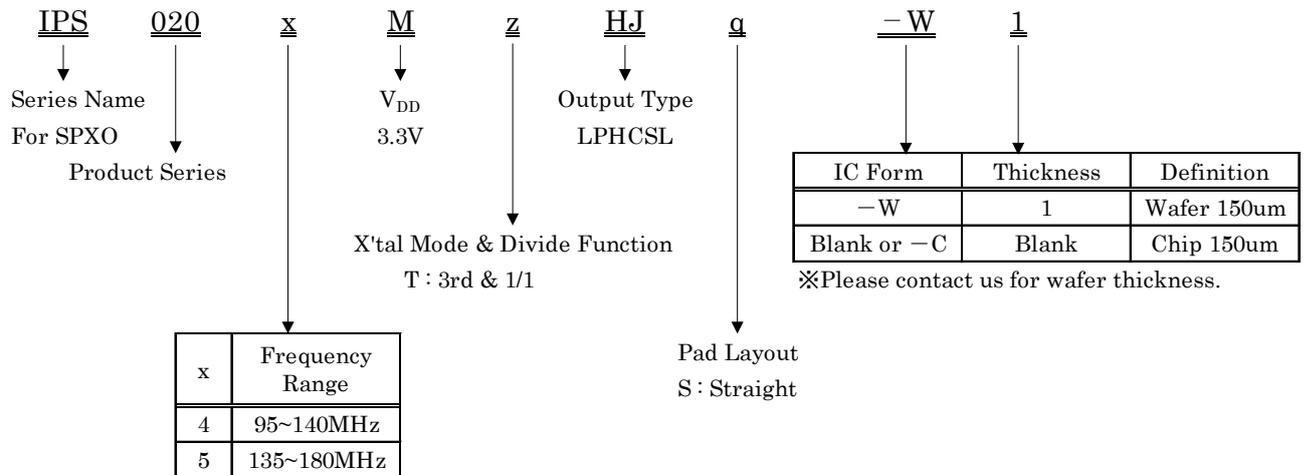


■ Description

IPS020*HJ is the IC for Low Power HCSL output SPXO which covers the frequency from 95MHz to 180MHz.

■ Features

- Operation temperature : -40°C~125°C
- Power supply voltage : 1.71V~3.63V
- Standby function : Oscillation stop
- Crystal frequency : 95MHz~180MHz
- Output : Low Power HCSL
- Crystal mode : 3rd Overtone
- Small chip size : 0.65mm × 0.75mm
- Frequency stability to V_{DD} : Within ±2ppm
- Duty cycle : Within 50%±5%
- Pad layout : Straight type

1. Part number rule


2. Series

Part Number	Output	Crystal Frequency (MHz)			Divide	Output Frequency (MHz)		Remarks
		Mode.	Min.	Max.		Min.	Max.	
IPS020 4 M T H J S	LPHCSL	3rd	95	140	1/1	95	140	
IPS020 5 M T H J S			135	180		135	180	

Please contact us for other models.

3. Absolute Maximum Ratings

$V_{SS}=0V, T_a=25^{\circ}C \pm 2^{\circ}C$

Parameter	Symbol	Condition	Ratings		
			Min	Max	Unit
Supply Voltage	V_{DD}		$V_{SS}-0.5$	5.0	V
Input Voltage	V_{IN}	All Input Pin	$V_{SS}-0.5$	$V_{DD}+0.5$	V
Output Voltage	V_{OUT}	Only OUT and OUTN Pin	$V_{SS}-0.5$	1.8	V
		Excluding the Above		$V_{DD}+0.5$	
Output Current	I_{OUT}			25	mA
Junction Temperature	T_j		-55	150	$^{\circ}C$
Storage Temperature	T_{stg}		-55	125	$^{\circ}C$

4. Recommended Operating Condition

$V_{SS}=0V, T_a=-40^{\circ}C \sim 125^{\circ}C$

Parameter	Symbol	Condition	Min	Typ	Max	Unit	Note
Supply Voltage	V_{DD}		1.71	3.30	3.63	V	V_{DD}
“H” Input Voltage	V_{IH}		$V_{DD} \times 0.7$			V	CE
“L” Input Voltage	V_{IL}				$V_{DD} \times 0.3$	V	CE
Input Voltage	V_{IN}		V_{SS}		V_{DD}	V	CE
Output Load Resistance / Capacitance	RL	50 Ω Trace		None		Ω	OUT
	CL	T_o GND		2.0		pF	
Ambient Temperature	T_{opt}		-40		125	$^{\circ}C$	

This IC has enough immunity against ESD and Latch-up, but handle with care.

5. Electrical Specification
5-1 DC Characteristics

 Unless otherwise stated, $V_{DD}=1.71V\sim 3.63V$, $V_{SS}=0V$, $T_a=-40^{\circ}C\sim 125^{\circ}C$

Parameter	Symbol	Condition	Specification			Unit	
			Min	Typ	Max		
Output leak current	I_z	CE=0.3V			10	μA	
“L” input current	I_{IL}	$V_{IN}=V_{SS}$		-10		μA	
“H” output voltage	V_{OH}		550		900	mV	
“L” output voltage	V_{OL}		-150	0	150	mV	
Current consumption	I_{DD}	$V_{DD}=1.8V$ CE=Open 50 Ω trace CL=2.0pF	IPS0204MTHJS F0=100MHz		10.0	15.0	mA
			IPS0205MTHJS F0=156.25MHz		13.0	20.0	
		$V_{DD}=3.3V$ CE=Open 50 Ω trace CL=2.0pF	IPS0204MTHJS F0=100MHz		12.0	20.0	
			IPS0205MTHJS F0=156.25MHz		15.0	24.0	
Current consumption at oscillation stop	I_{DDD}	CE=GND			10	μA	

5-2 Switching Characteristics

 Unless otherwise stated, $V_{DD}=1.71V\sim 3.63V$, $V_{SS}=0V$, $T_a=-40^{\circ}C\sim 125^{\circ}C$

Parameter	Symbol	Condition	Specification			Unit
			Min	Typ	Max	
Oscillation start up time	T_{start}				10.0	ms
Output Disable Time	T_{plz}				200	ns
Output Enable Time	T_{pzl}				10.0	ms
Rise time / Fall time	T_r / T_f	20%~80% V_{opp}		0.45	0.70	ns
Output Duty Ratio	Duty	1/2 V_{opp} point	45		55	%
Output Swing	V_{opp}		0.55			V
Freq. V_{DD} deviation	F_{vst}	$V_{DD}=1.8V\pm 5\%$			± 2.0	ppm
		$V_{DD}=3.3V\pm 10\%$			± 2.0	

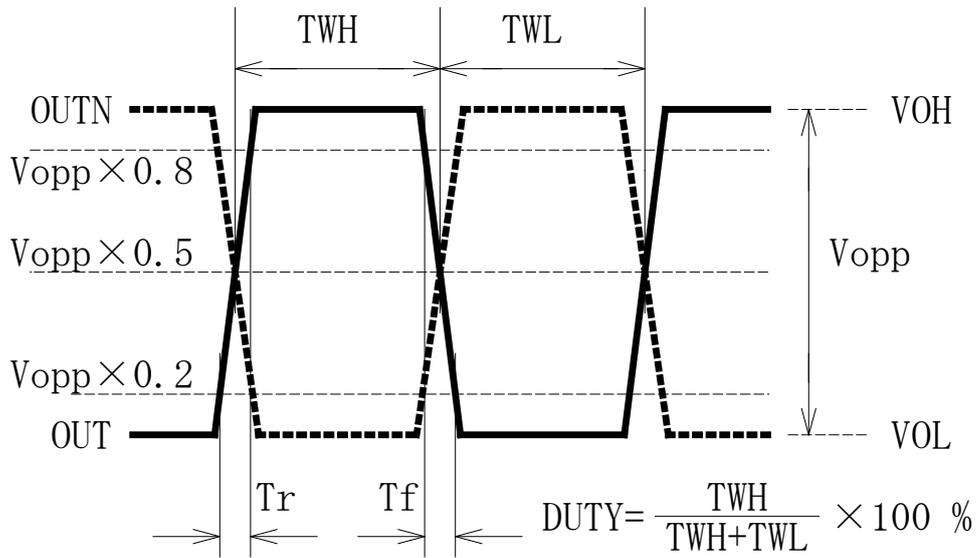
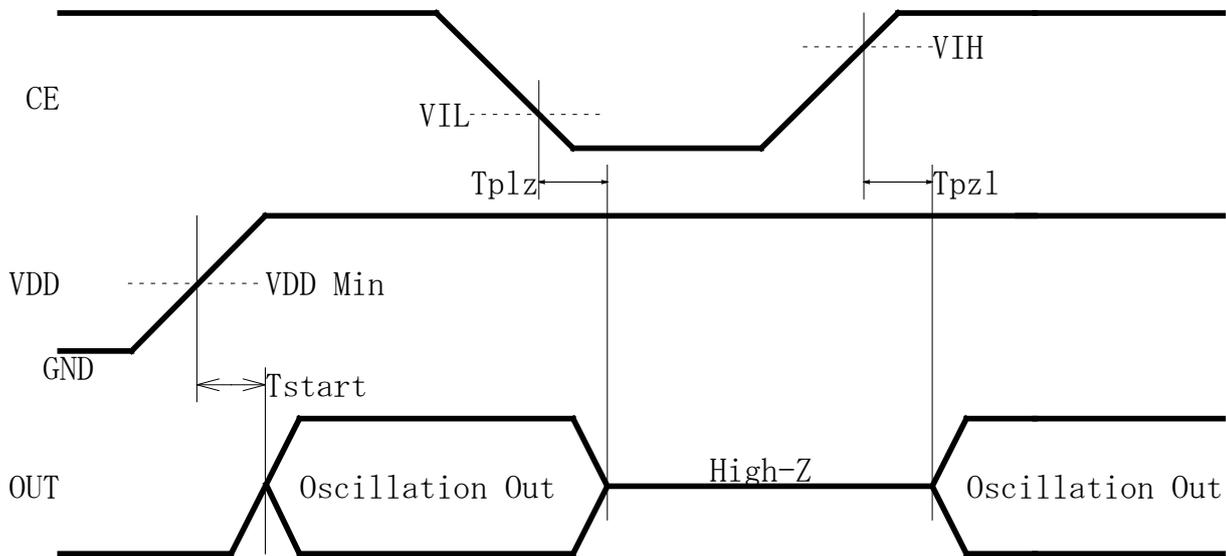


Fig. 5-1 Output Wave Form (Duty, Tr, Tf, VOH, VOL, Vopp)



VIH : Threshold voltage for Oscillation Start
VIL : Threshold voltage for Oscillation Stop

Fig. 5-2 Input output signal timing

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

Ta=25°C

Parameter		Symbol	Condition	Min	Typ	Max	Unit
Feedback Resistor	IPS0204MTHJS	Rf	Refer to Fig. 6-1		1.75		kΩ
	IPS0205MTHJS				0.75		
Driving Resistor	IPS0204MTHJS	Rd	Refer to Fig. 6-1		300		Ω
	IPS0205MTHJS				200		
Oscillation Capacitor	IPS0204MTHJS	Cg	Refer to Fig. 6-1		4.0		pF
		Cd			7.0		
	IPS0205MTHJS	Cg			3.0		
		Cd			7.0		

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

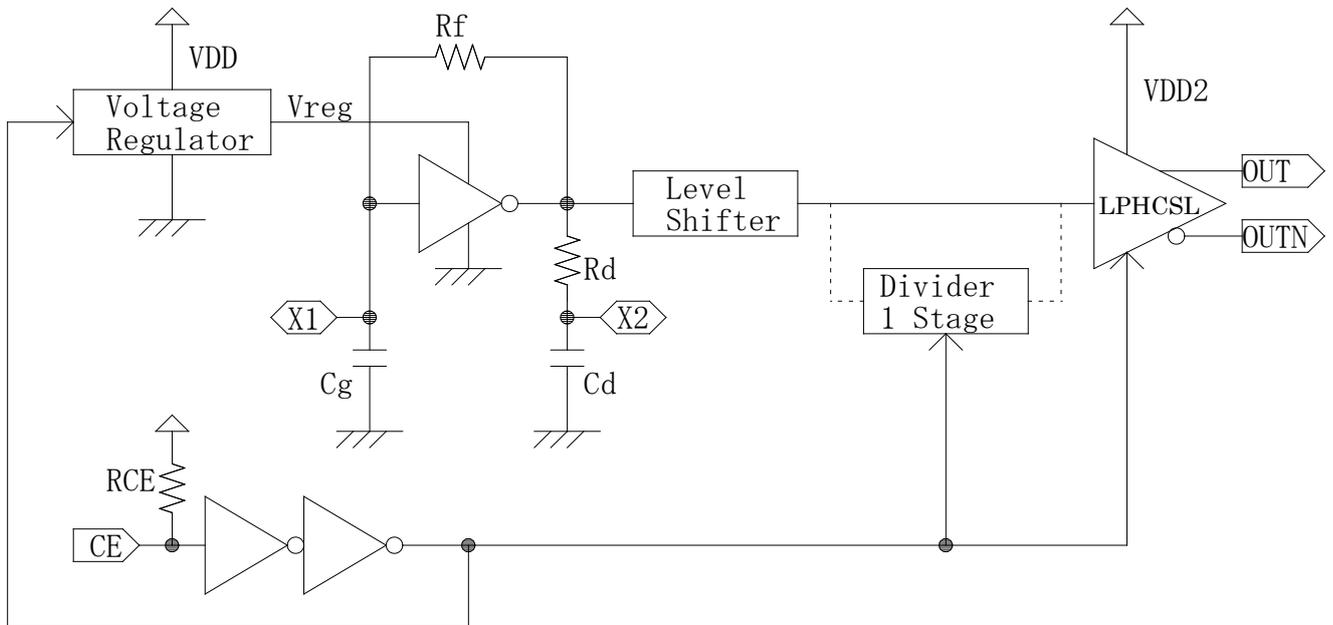
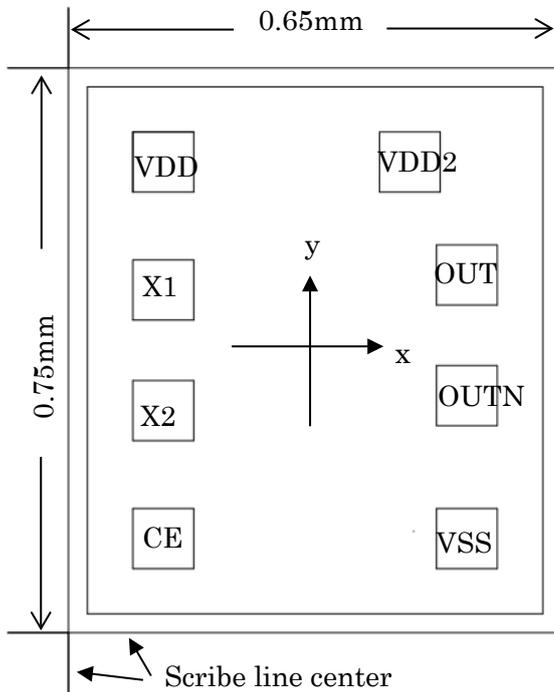
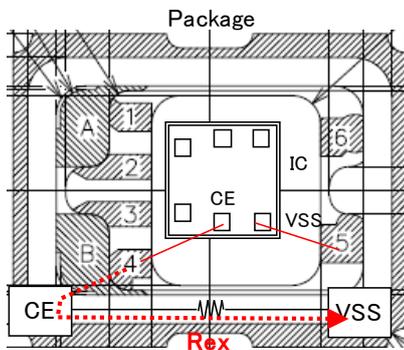


Fig. 6-1 Block Diagram

7. Pad Layout
7-1 Straight Type


- Die Size: 0.65mm × 0.75mm
- Pad Size: 80um □
- Thickness: 150um ± 20um
- IC Backside: Gnd or Open
- Swapping of OUT/OUTN with wire bond is acceptable

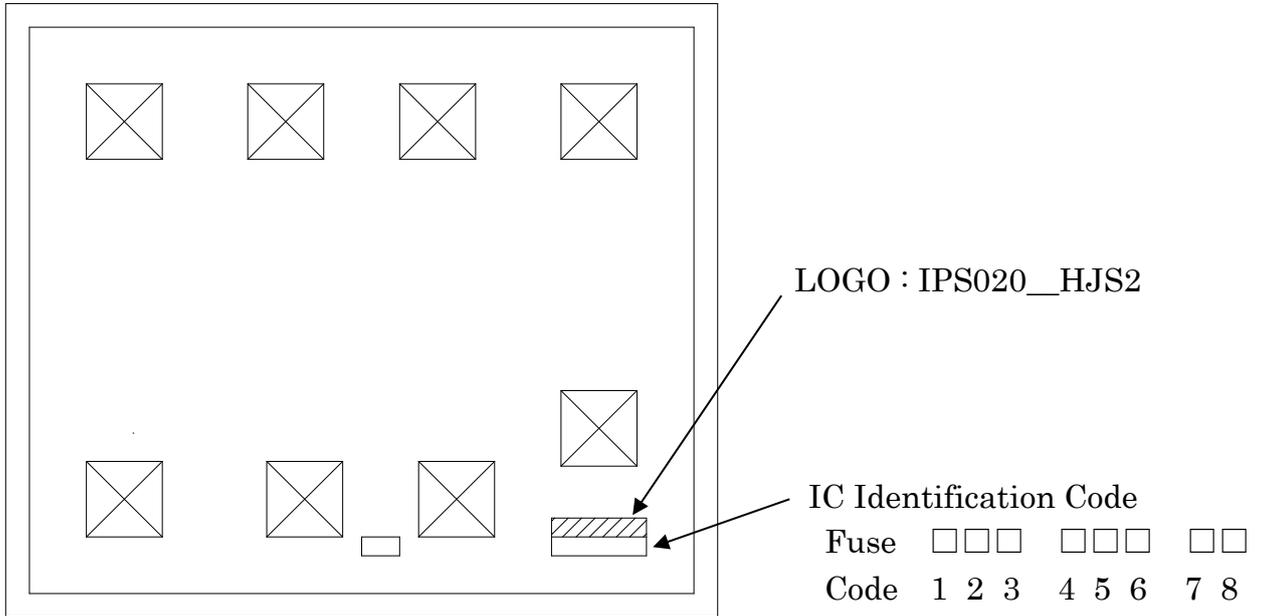
Pad Name	Function	Location (μm)	
		x	y
VDD	(+) Power Supply	-206	256
X1	Crystal Feedback	-206	83
X2	Crystal Drive	-206	-83
CE	Oscillation stop "L": High-Impedance	-206	-256
VSS	(-) Ground	206	-256
OUTN	OUT(Complementary)	206	-65
OUT	OUT(True)	206	108
VDD2	NC is acceptable	113	256
Chip Center		0	0


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. IC Part # Identification



Part #	Code 1~8
IPS0204MTHJq	■ □ □ ■ □ □ □ □
IPS0205MTHJq	■ □ ■ ■ □ □ □ □

□ : Fuse no cut
■ : Fuse cut

9. Revision History

Revision No.	Revision Date	Revised items	Before Revision	After Revision
SD-5.3	2025/11/20	Wafer thickness 100um	Listed	As requested
		I _{DDD} Condition	CE≤0.3V	CE=GND
		3. Absolute Maximum Ratings Out Voltage Max (Condition: Only OUT and OUTN Pin)	None	V _{OUT} Max: 1.8V