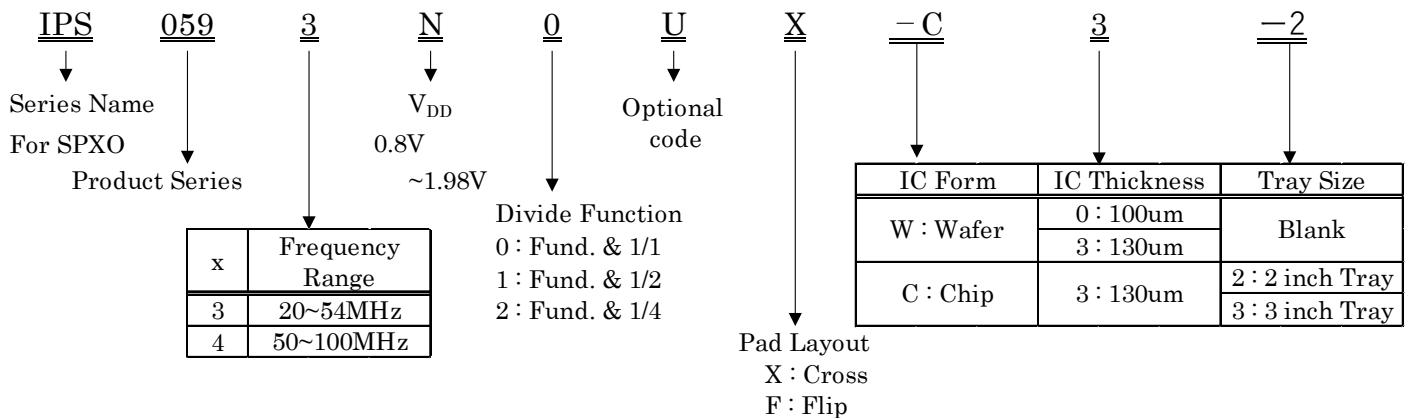


**■ Description**

IPS059xNyUX is successor of IPS0593N0X and IPS029xN series. IPS059xNyUX is the Low operation voltage (0.8V~1.98V) CMOS output SPXO IC.

**■ Features**

- Operating Voltage : 0.8V~1.98V
- Output frequency : 20MHz~100MHz
- Crystal mode : Fundamental
- Chip size : 0.55mm × 0.56mm
- Operation temperature : -40°C~125°C
- Standby function : Oscillation stop
- Output : CMOS
- Divider function : 1/2, 1/4

**1. Part number rule**


**IPS059\*U series is currently under development.**

**Please contact us for details on each model.**

## 2. Series

Part Number	Crystal Frequency f (MHz)		Divide	Output Frequency F0 (MHz)		Pad Layout	Remarks
	Min.	Max.		Min.	Max.		
IPS059 3 N 0 U q	20.00	54.00	1/1	20.00	54.00	Cross / Flip	
IPS059 3 N 1 U q	20.00	54.00	1/2	10.00	27.00	Cross / Flip	under development
IPS059 3 N 2 U q	20.00	54.00	1/4	5.00	13.50	Cross / Flip	under development
IPS059 4 N 0 U q	50.00	100.00	1/1	50.00	100.00	Cross / Flip	under development
IPS059 4 N 1 U q	50.00	100.00	1/2	25.00	50.00	Cross / Flip	under development
IPS059 4 N 2 U q	50.00	100.00	1/4	12.50	25.00	Cross / Flip	under development

## 3. Absolute Maximum Ratings

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

Parameter	Symbol	Condition	Ratings		
			Min	Max	Unit
Supply Voltage	$V_{DD}$		$V_{SS}-0.5$	3.5	V
Input Voltage	$V_{IN}$	All Input Pin	$V_{SS}-0.5$	$V_{DD}+0.5$	V
Output Voltage	$V_{OUT}$		$V_{SS}-0.5$	$V_{DD}+0.5$	V
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

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

Parameter	Symbol	Condition	Min	Typ	Max	Unit	Note
Supply Voltage	$V_{DD}$		0.80		1.98	V	$V_{DD}$
Input Voltage	$V_{IN}$		$V_{SS}$		$V_{DD}$	V	CE
Output Load Capacitance	CL	CMOS			15	pF	OUT
Ambient Temperature	$T_{opt}$		-40		125	$^{\circ}C$	

**5. Electrical Specification**
**5-1. IPS0593N0UX**

 Unless otherwise stated,  $V_{DD}=0.8V\sim 1.98V$ ,  $V_{SS}=0V$ ,  $CL=15pF$ ,  $T_a=-40^{\circ}C\sim 125^{\circ}C$ 

Parameter	Symbol	Condition	Specification			Unit
			Min	Typ	Max	
Output leak current	$I_z$	CE=Low, $V_{DD}=1.05V$			20	$\mu A$
“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		$\mu A$
Oscillation Disable Time	$T_{plz}$	OUT Pad			0.1	$\mu s$
Oscillation Enable Time	$T_{pzl}$	OUT Pad			5.0	ms
Oscillation Start up Time	$T_{start}$				5.0	ms
“H” output voltage	$V_{OH}$	OUT Pad, $I_{OH}=-1.0mA$ , $V_{DD}=0.9V$	$0.9V_{DD}$			V
“L” output voltage	$V_{OL}$	OUT Pad, $I_{OL}=1.0mA$ , $V_{DD}=0.9V$			$0.1V_{DD}$	V
Current consumption	$I_{DD}$	$CL=15pF$ , $V_{DD}=0.9V$ , $F_0=54MHz$			1.8	mA
Current consumption at oscillation disable	$I_{DDD}$	CE=0V			20.0	$\mu A$
Freq. $V_{DD}$ deviation	$F_{VST}$	$V_{DD}\pm 10\%$			$\pm 2.0$	ppm
Output Duty Ratio	Duty		45		55	%
Rise time/Fall time	$T_r/T_f$				5.2	ns

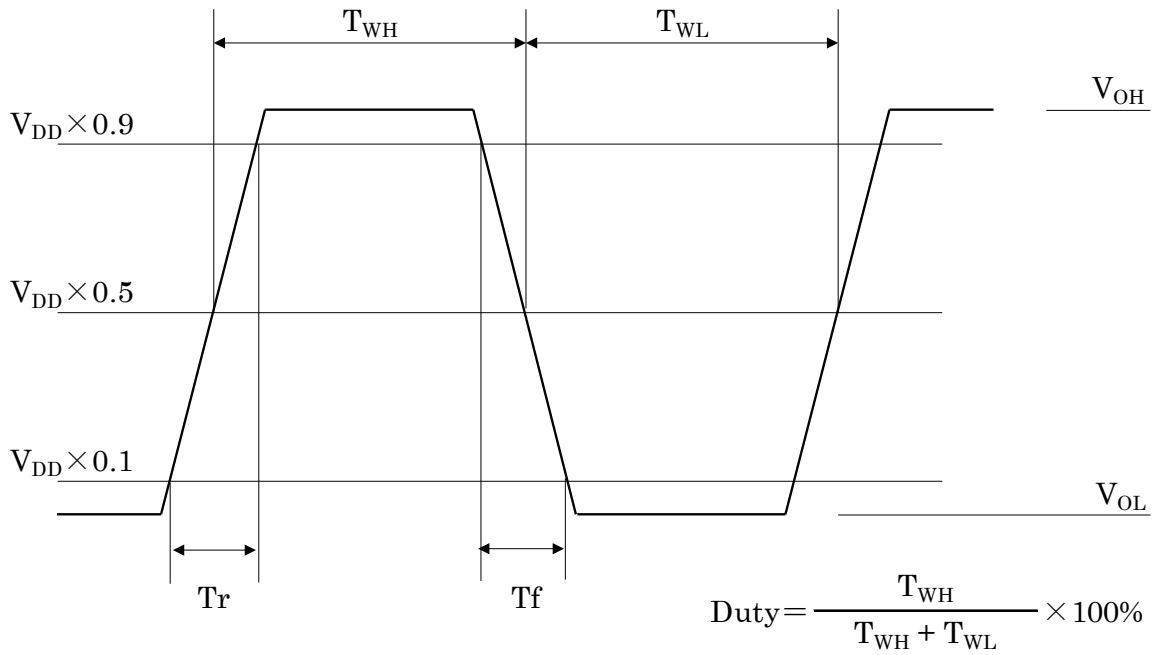
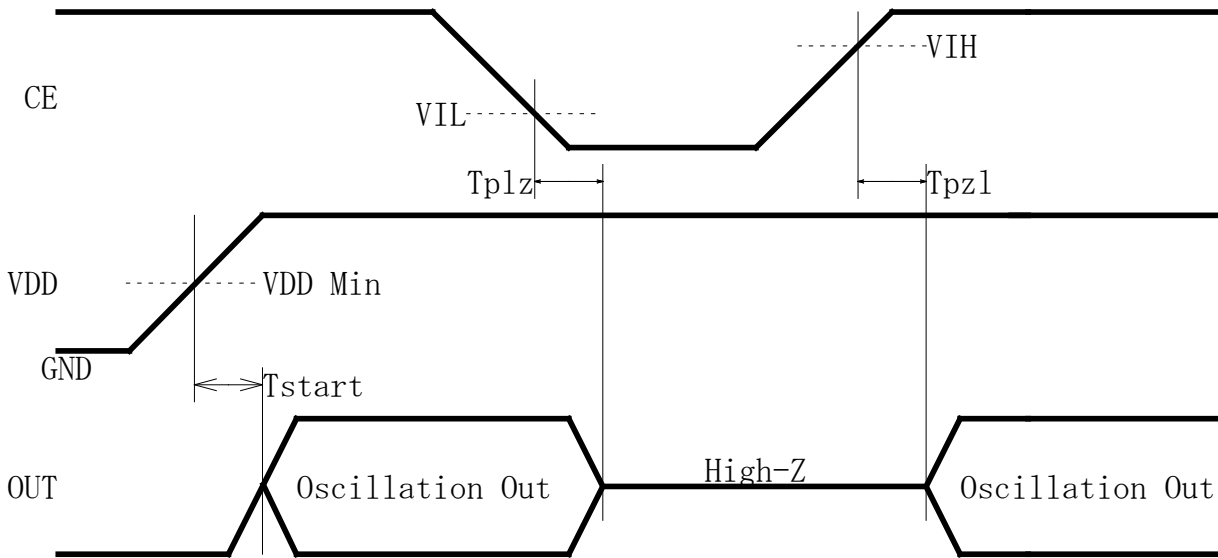


Fig. 5-1 Output wave form (Duty, Tr, Tf, VOH, VOL)



$V_{IH}$  : 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)**
 $T_a=25^{\circ}\text{C}$ 

Parameter	Symbol	Condition	Typical value	Unit
Feedback Resistor	$R_f$		300	$\text{k}\Omega$
Driving Resistor	$R_d$		500	$\Omega$
Oscillation Capacitor	$C_g$	Gate side	7.2	$\text{pF}$
	$C_d$	Drain side	7.2	$\text{pF}$

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

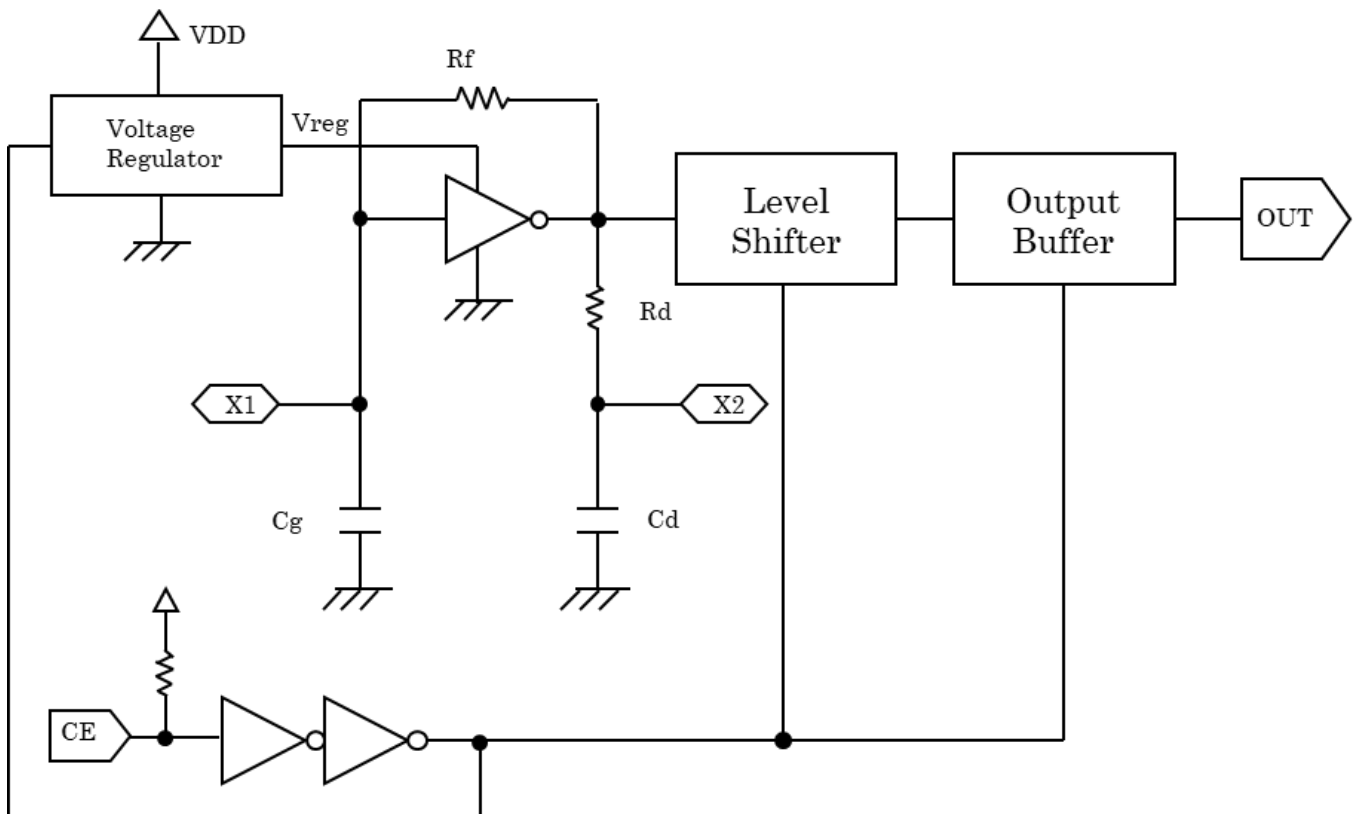
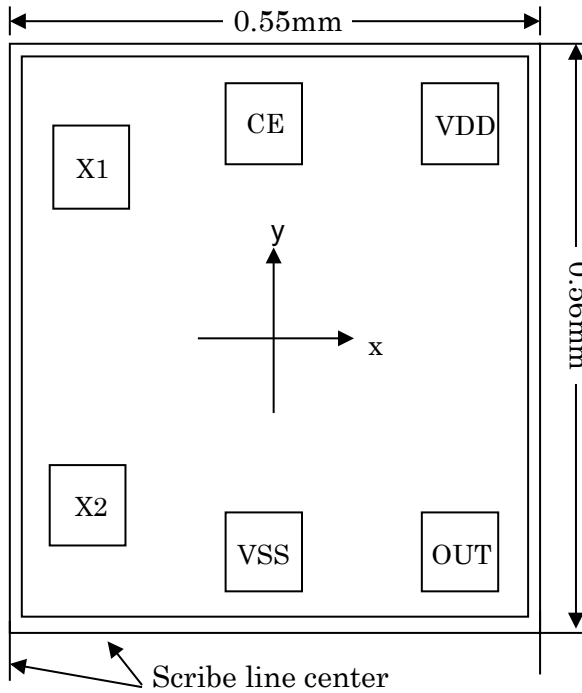
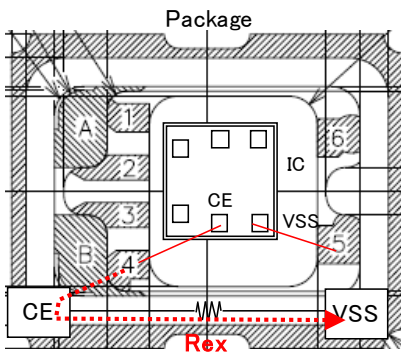


Fig. 6-1 Block Diagram

**7. Pad Layout**  
**7-1 Cross Type**


- Die Size: 0.55mm × 0.56mm
- Pad Size: 80um □
- Thickness: 100μm or 130μm ± 10um
- IC Backside: Gnd or Open
- Scribe Line: 80um

Pad Name	Function	Location (μm)	
		x	y
X2	Crystal Drive	-175.55	-143.15
VSS	(-)Ground	0	-180.55
OUT(Q)	Frequency Output	175.55	-180.55
VDD	(+)Power Supply	175.55	180.55
CE	Oscillation stop, "L": High-Impedance	0	180.55
X1	Crystal Feedback	-175.55	143.15
Chip Center		0	0

**Fig. 7-1 Pad Layout of IPS0593N0UX**

**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