



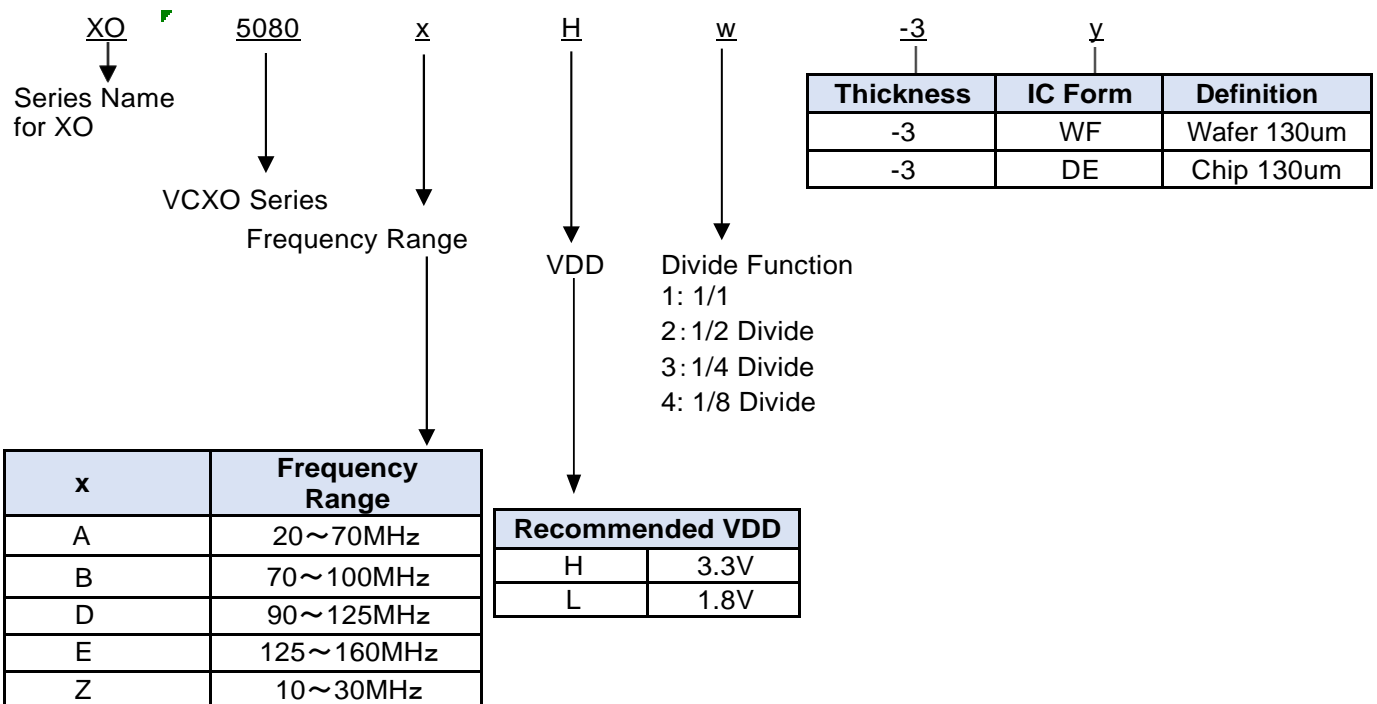
Function Description

The 5080x series are CMOS output VCXO ICs that provide a wide frequency pulling range. They employ BiCMOS oscillator circuit and special varicap diode fabrication process that provides a low phase noise characteristic and a wide frequency pulling range without any external components. The 5080 series are ideal for wide pulling range, low phase noise, VCXO modules.

Features

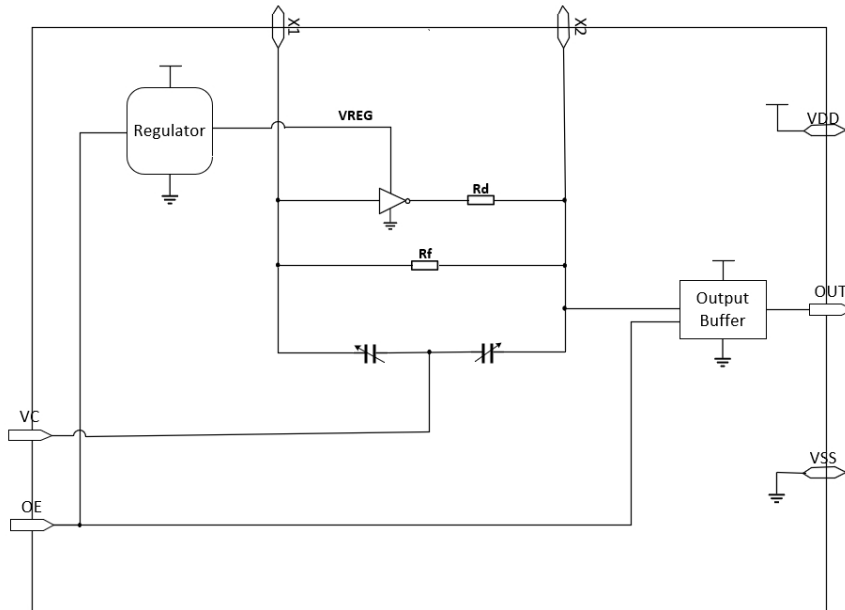
- Operation temperature range : -40~105°C
- Power supply voltage : 3.3V
- Vc Input impedance : 5MΩ
- Standby function : Oscillation stop
- Crystal frequency : 10~160MHz
- Output : CMOS
- Divide function : 1/2, 1/4 ,1/8
- Small chip size : 0.65mm × 0.70mm
- Pull ability : ±100ppm minimum / Vc=1.65±1.65V
- Duty cycle : Within 50±5%

Order Information

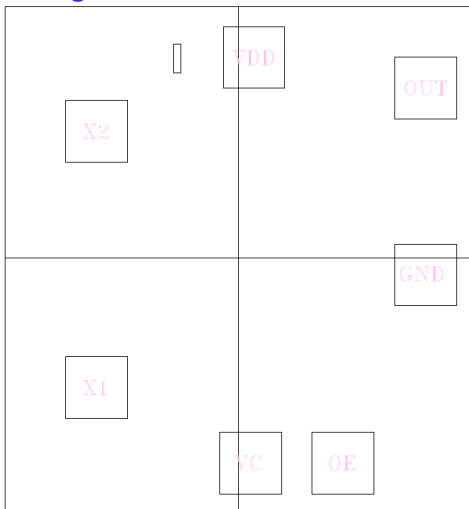




Function Block Diagram



Pad Configuration



Pad Location					
Pad Name	X Coordinate	Y Coordinate	Pad Name	X Coordinate	Y Coordinate
X2	-197.490	176.550	GND	260.375	-23.115
X1	-197.490	-179.660	OUT	260.375	237.365
VC	16.980	-285.350	VDD	21.620	279.470
OE	145.240	-285.350			

Note:
Die Size: 650 μm * 700 μm , No include Scribe Line (60 μm)
Pad Size: 80 μm * 80 μm



Pad Definition

Pad Name	Function	Location (μm)	
		x	y
VDD	Power Supply(P)	21.62	279.47
X1	Crystal Feedback(I)	-197.49	-179.66
X2	Crystal Drive(O)	-197.49	176.55
VC	Frequency Control Input	16.98	-285.35
OE	OSC Enable/Disable(I)	145.24	-285.35
GND	Ground(P)	260.375	-23.115
OUT	Frequency Output(O)	260.37	237.365
Chip Center		0	0

Selection Table

Part Number	Output Frequency (MHz)		Divide	Remarks
	Min.	Max.		
XO5080AH1	20.0	70.0	1/1	3.3V Operation
XO5080AH2	10.0	35.0	1/2	
XO5080AH3	5.0	17.5	1/4	
XO5080AH4	2.5	8.75	1/8	
XO5080BH1	70	90.0	1/1	
XO5080DH1	90.0	125.0	1/1	
XO5080EH1	125.0	160.0	1/1	
XO5080ZH1	10.0	30.0	1/1	
XO5080ZH2	5.0	15.0	1/2	
XO5080ZH3	2.5	7.5	1/4	
XO5080ZH4	1.25	3.25	1/8	



Absolute Maximum Ratings

VSS=0V, Ta=+ 25°C± 2°C

Parameter	Symbol	Condition	Ratings		Unit
			Min	Max	
Supply Voltage	VDD		VSS-0.5	5	V
Input Voltage	VIN	All Input Pin	VSS-0.5	VDD+0.5	V
Output Voltage	VOUT		VSS-0.5	VDD+0.5	V
Output Current	IOUT			25	mA
Junction Temperature	Tj		-55	150	°C
Storage Temperature	Tstg		-55	125	°C

Recommended Operating Condition

VSS=0V, Ta= -40°C~+105°C

Parameter	Symbol	Condition	Datasheet			Unit
			Min	Typ.	Max	
Supply Voltage	VDD		2.97	3.3	3.63	V
"H" Input Voltage	VIH	OE pin	VDD×0.7			V
"L" Input Voltage	VIL	OE pin			VDD×0.3	V
Input Voltage	VIN	OE pin	VSS		VDD	V
Control Voltage	VC	VC pin	0		VDD	V
Output Load Capacitance	CL	CMOS			15	pF
Ambient Temperature	Topt		-40		105	°C



Electrical Specification

Unless otherwise stated, $V_{DD} = 2.97 \sim 3.63V$, $V_{SS} = 0V$, $T_a = -40 \sim 105^\circ C$

XO5080AH1
(20~70MHz)

Parameter	Symbol	Condition	Datasheet			Unit
			Min	Typ.	Max	
"H" input current	I_{IH}	$V_{IN} = V_{DD}$			10	μA
"L" input current	I_{IL}	$V_{IN} = V_{SS}$			1	μA
"H" output voltage	V_{OH}	$I_{OH} = -5mA$	$V_{DD} - 0.4$			V
"L" output voltage	V_{OL}	$I_{OL} = 5mA$			$V_{SS} + 0.4$	V
Current consumption	I_{DD}	$C_L = 15pF$, $V_{DD} = 3.63V$, $OE \geq V_{DD} - 0.3V$, $F_0 = 27MHz$			10	mA
Output off leak at osc. stop	I_z	$OE \leq 0.3V$			10	μA
Output Duty Ratio	Duty	$C_L = 15pF$, $V_C = 1/2V_{DD}$	45		55	%
Pull Range	Fcntr	$V_C = 1.65 \pm 1.65V$ 27MHz, Crystal *1	± 100	± 150		ppm
Rise time	T_r	$C_L = 15pF$, 10~90% V_{DD}			5.0	ns
Fall time	T_f	$C_L = 15pF$, 10~90% V_{DD}			5.0	ns
Output Enable Time	T_{pe}				2	ms
Output Disable Time	T_{pd}				100	ns
Modulation Band Width	F_C	$V_C = 1.35\sin\omega t + 1.65V$, -3dB	15	20		KHz

Note:

1. Equivalent Parameter of Crystal is $\gamma = C_0/C_1 < 250$

Phase Noise: Frequency = 27MHz, $V_{DD} = 3.3V$, $V_C = 1.65V$

Phase Jitter [12KHz~5MHz] < 0.5ps

Offset	Phase Noise (dBc)
1KHz	-130
10KHz	-150
100KHz	-158



Unless otherwise stated, $V_{DD} = 2.97 \sim 3.63V$, $V_{SS} = 0V$, $T_a = -40 \sim 105^\circ C$

XO5080AHx 【x=2, 3】
(10~35MHz, 5~17.5MHz)

Parameter	Symbol	Condition	Datasheet			Unit
			Min	Typ.	Max	
“H” input current	I _{IH}	V _{IN} =V _{DD}			10	μA
“L” input current	I _{IL}	V _{IN} =V _{SS}			1	μA
“H” output voltage	V _{OH}	I _{OH} =-5mA	V _{DD} -0.4			V
“L” output voltage	V _{OL}	I _{OL} =5mA			V _{SS} +0.4	V
Current consump.	XO5080AH2	C _L =15pF, V _{DD} =3.63V, OE ≧ V _{DD} -0.3V, Crystal f=27MHz			8	mA
	XO5080AH3				6	
Output off leak at osc. stop	I _z	OE ≧ 0.3V			10	μA
Output Duty Ratio	Duty	C _L =15pF, V _C =1/2V _{DD}	45		55	%
Pull Range	F _{cntr}	V _C =+1.65±1.65V 27MHz Crystal *1	±100	±150		ppm
Rise time	T _r	C _L =15pF, 10~90% V _{DD}			5.0	ns
Fall time	T _f	C _L =15pF, 90~10% V _{DD}			5.0	ns
Output Enable Time	T _{pe}				2	ms
Output Disable Time	T _{pd}				100	ns
Modulation Band Width	F _c	V _C =1.35sinωt+1.65V, -3dB	15	20		KHz

Note:

1. Equivalent Parameter of Crystal is $\gamma = C_0/C_1 < 300$

Phase Noise: XO5080AH2, Crystal Frequency =27MHz, V_{DD} = 3.3V, V_C=1.65V

Phase Jitter【12KHz~5MHz】< 0.8ps

Offset	Phase Noise (dBc)
1KHz	-135
10KHz	-145
100KHz	-150



Unless otherwise stated, $V_{DD} = 2.97 \sim 3.63V$, $V_{SS} = 0V$, $T_a = -40 \sim 105^\circ C$

XO5080BH1
(70~100MHz)

Parameter	Symbol	Condition	Datasheet			Unit
			Min	Typ.	Max	
"H" input current	I _{IH}	V _{IN} = V _{DD}			10	μA
"L" input current	I _{IL}	V _{IN} = V _{SS}			1	μA
"H" output voltage	V _{OH}	I _{OH} = -5mA	V _{DD} -0.4			V
"L" output voltage	V _{OL}	I _{OL} = 5mA			V _{SS} +0.4	V
Current consumption	I _{DD}	C _L = 15pF, V _{DD} = 3.63V, OE ≧ V _{DD} - 0.3V, F ₀ = 80MHz			14	mA
Output off leak at osc. stop	I _z	OE ≦ 0.3V			10	μA
Output Duty Ratio	Duty	C _L = 15pF, V _C = 1/2 V _{DD}	45		55	%
Pull Range	F _{cntr}	V _C = 1.65 ± 1.65V 80MHz Crystal *1	±110			ppm
Rise time	T _r	C _L = 15pF, 10~90% V _{DD}			5.0	ns
Fall time	T _f	C _L = 15pF, 90~10% V _{DD}			5.0	ns
Output Enable Time	T _{pe}				2	ms
Output Disable Time	T _{pd}				100	ns
Modulation Band Width	F _c	V _C = 1.35sinωt + 1.65V, -3dB	15	20		KHz

Note:

1. Equivalent Parameter of Crystal is $\gamma = C_0/C_1 < 270$

Phase Noise: Frequency = 80MHz, V_{DD} = 3.3V, V_C = 1.65V

Phase Jitter【12KHz~20MHz】< 0.3ps

Offset	Phase Noise (dBc)
1KHz	-130
10KHz	-150
100KHz	-160



Unless otherwise stated, $V_{DD} = 2.97 \sim 3.63V$, $V_{SS} = 0V$, $T_a = -40 \sim 105^\circ C$

XO5080DH1
(90~125MHz)

Parameter	Symbol	Condition	Datasheet			Unit
			Min	Typ.	Max	
"H" input current	I _{IH}	V _{IN} =V _{DD}			10	μA
"L" input current	I _{IL}	V _{IN} =V _{SS}			1	μA
"H" output voltage	V _{OH}	I _{OH} =-5mA	V _{DD} -0.4			V
"L" output voltage	V _{OL}	I _{OL} =5mA			V _{SS} +0.4	V
Current consumption	I _{DD}	C _L =15pF, V _{DD} =3.63V, OE ≧ V _{DD} -0.3V, F ₀ =122.88MHz			24	mA
Current consumption at oscillation stop	I _{DD}	C _L =15pF, V _{DD} =3.63V, OE ≧ 0.3V			3	mA
Output off leak at osc. stop	I _z	OE ≧ 0.3V			10	μA
Output Duty Ratio	Duty	C _L =15pF, V _c =1/2V _{DD}	45		55	%
Pull Range	F _{cntr}	V _c =1.65±1.65V 122.88MHz, Crystal *1	±90	±120		ppm
Rise time	T _r	C _L =15pF, 10~90% V _{DD}			3.0	ns
Fall time	T _f	C _L =15pF, 90~10% V _{DD}			3.0	ns
Output Enable Time	T _{pe}				2	ms
Output Disable Time	T _{pd}				100	ns
Modulation Band Width	F _c	V _c =1.35sinωt+1.65V, -3dB	15	20		KHz

Note:

1. Equivalent Parameter of Crystal is $\gamma = C_0/C_1 < 300$

Phase Noise: Frequency =122.88MHz, V_{DD} = 3.3V, V_c=1.65V

Phase Jitter 【12KHz~20MHz】< 0.12ps

Offset	Phase Noise (dBc)
1KHz	-123
10KHz	-145
100KHz	-159



Unless otherwise stated, $V_{DD} = 2.97 \sim 3.63V$, $V_{SS} = 0V$, $T_a = -40 \sim 105^\circ C$

XO5080EH1
(125~160MHz)

Parameter	Symbol	Condition	Datasheet			Unit
			Min	Typ.	Max	
"H" input current	I _{IH}	V _{IN} =V _{DD}			10	μA
"L" input current	I _{IL}	V _{IN} =V _{SS}			1	μA
"H" output voltage	V _{OH}	I _{OH} =-5mA	V _{DD} -0.4			V
"L" output voltage	V _{OL}	I _{OL} =5mA			V _{SS} +0.4	V
Current consumption	I _{DD}	C _L =15pF, V _{DD} =3.63V, OE ≧ V _{DD} -0.3V, F ₀ =125MHz			24	mA
Current consumption at oscillation stop	I _{DDD}	C _L =15pF, V _{DD} =3.63V, OE ≧ 0.3V			3	mA
Output off leak at osc. stop	I _z	OE ≧ 0.3V			10	μA
Output Duty Ratio	Duty	C _L =15pF, V _c =1/2V _{DD}	45		55	%
Pull Range	F _{cntr}	V _c =1.65±1.65V 125MHz Crystal *1	±90	±120		ppm
Rise time	T _r	C _L =15pF, 10~90% V _{DD}			3.0	ns
Fall time	T _f	C _L =15pF, 90~10% V _{DD}			3.0	ns
Output Enable Time	T _{pe}				2	ms
Output Disable Time	T _{pd}				100	ns
Modulation Band Width	F _c	V _c =1.35sinωt+1.65V, -3dB	15	20		KHz

Note:

1. Equivalent Parameter of Crystal is $\gamma = C_0/C_1 < 300$

Phase Noise: Frequency =125MHz, V_{DD} = 3.3V, V_c=1.65V

Phase Jitter 【12KHz~20MHz】< 0.12ps

Offset	Phase Noise (dBc)
1KHz	-123
10KHz	-145
100KHz	-159



Unless otherwise stated, $V_{DD} = 2.97 \sim 3.63V$, $V_{SS} = 0V$, $T_a = -40 \sim 105^\circ C$

XO5080ZH1
(10~30MHz)

Parameter	Symbol	Condition	Datasheet			Unit
			Min	Typ.	Max	
"H" input current	I_{IH}	$V_{IN} = V_{DD}$			10	μA
"L" input current	I_{IL}	$V_{IN} = V_{SS}$			1	μA
"H" output voltage	V_{OH}	$I_{OH} = -5mA$	$V_{DD} - 0.4$			V
"L" output voltage	V_{OL}	$I_{OL} = 5mA$			$V_{SS} + 0.4$	V
Current consumption	I_{DD}	$C_L = 15pF$, $V_{DD} = 3.63V$, $OE \cong V_{DD} - 0.3V$, $F_0 = 27MHz$			8	mA
Output off leak at osc. stop	I_z	$OE \cong 0.3V$			10	μA
Output Duty Ratio	Duty	$C_L = 15pF$, $V_C = 1/2V_{DD}$	45		55	%
Pull Range	Fcntr	$V_C = 1.65 \pm 1.65V$ 27MHz Crystal *1	± 100	± 150		ppm
Rise time	T_r	$C_L = 15pF$, 10~90% V_{DD}			5.0	ns
Fall time	T_f	$C_L = 15pF$, 10~90% V_{DD}			5.0	ns
Output Enable Time	T_{pe}				2	ms
Output Disable Time	T_{pd}				100	ns
Modulation Band Width	F_c	$V_C = 1.35\sin\omega t + 1.65V$, -3dB	15	20		KHz

Note:

1. Equivalent Parameter of Crystal is $\gamma = C_0/C_1 < 250$

Phase Noise: Frequency = 27MHz, $V_{DD} = 3.3V$, $V_C = 1.65V$

Phase Jitter [12KHz~5MHz] < 0.5ps

Offset	Phase Noise (dBc)
1KHz	-137
10KHz	-154
100KHz	-158



Unless otherwise stated, $V_{DD} = 2.97\sim 3.63V$, $V_{SS} = 0V$, $T_a = -40\sim 105^\circ C$

XO5080ZHx 【x=2, 3, 4】

(5~15MHz, 2.5~7.5MHz, 1.25MHz~3.75MHz)

Parameter	Symbol	Condition	Datasheet			Unit
			Min	Typ.	Max	
“H” input current	I _{IH}	V _{IN} =V _{DD}			10	μA
“L” input current	I _{IL}	V _{IN} =V _{SS}			1	μA
“H” output voltage	V _{OH}	I _{OH} =-5mA	V _{DD} -0.4			V
“L” output voltage	V _{OL}	I _{OL} =5mA			V _{SS} +0.4	V
Current consump.	XO5080AH2	C _L =15pF, V _{DD} =3.63V, OE ≧ V _{DD} -0.3V, Crystal f=27MHz			7	mA
	XO5080AH3				7	
	XO5080AH4				6	
Output off leak at osc. stop	I _z	OE ≧ 0.3V			10	μA
Output Duty Ratio	Duty	C _L =15pF, V _c =1/2V _{DD}	45		55	%
Pull Range	F _{cntr}	V _c =+1.65±1.65V 27MHz Crystal *1	±100	±150		ppm
Rise time	T _r	C _L =15pF, 10~90% V _{DD}			5.0	ns
Fall time	T _f	C _L =15pF, 90~10% V _{DD}			5.0	ns
Output Enable Time	T _{pe}				2	ms
Output Disable Time	T _{pd}				100	ns
Modulation Band Width	F _c	V _c =1.35sinωt+1.65V, -3dB	15	20		KHz

Note:

1. Equivalent Parameter of Crystal is $\gamma = C_0/C_1 < 300$

Phase Noise: XO5080ZH2, Crystal Frequency =27MHz, V_{DD} = 3.3V, V_c=1.65V

Phase Jitter【12KHz~5MHz】< 0.8ps

Offset	Phase Noise (dBc)
1KHz	-135
10KHz	-145
100KHz	-150



Circuit Parameters of Oscillator (Reference Data for Circuit Design)

Parameter	Symbol	Condition	Min	Typ.	Max	Unit
Feedback Resistor	Rf	XO5080ZHx		100		KΩ
		XO5080A/BHx		62.5		
		XO5080D/EH1		50		
Driving Resistor	Rd	XO5080A/B/ZHx		500		Ω
		XO5080D/EH1		340		
Frequency deviation by IC	$\Delta fc/fc$	Crystal fixed			25	ppm

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

Output Waveform

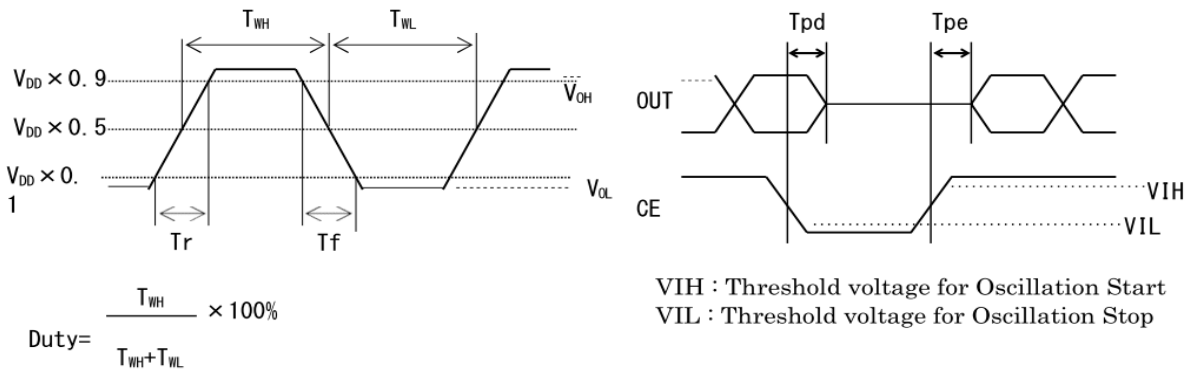
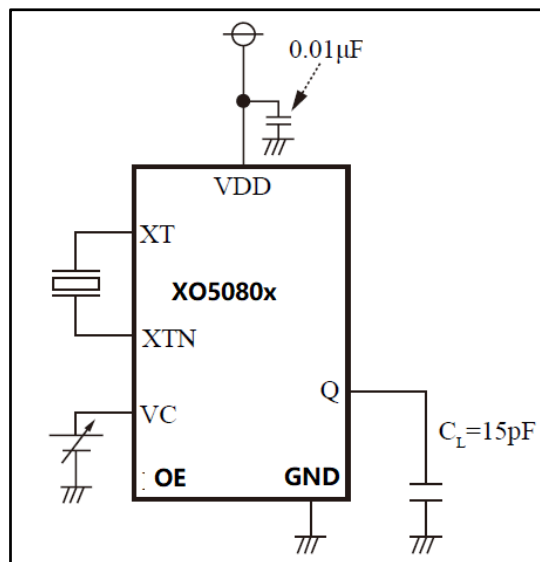
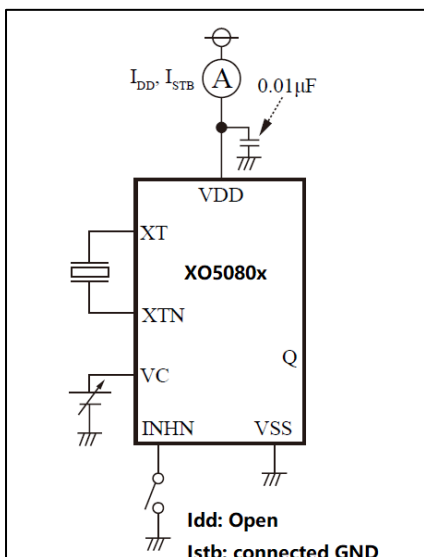


Fig. Output Wave Form (Duty, Tr, Tf, Tpd, Tpe)

Measurement Circuits





History log:

Revision	Description	Date
V2.3	1. Change datasheet format	2023/1/16
V2.4	1. Updated IDD meet actual result; 2. Updated Function Block Diagram meet designing.	2023/5/11
V2.5	1. Update some typo error	2023/10/31