

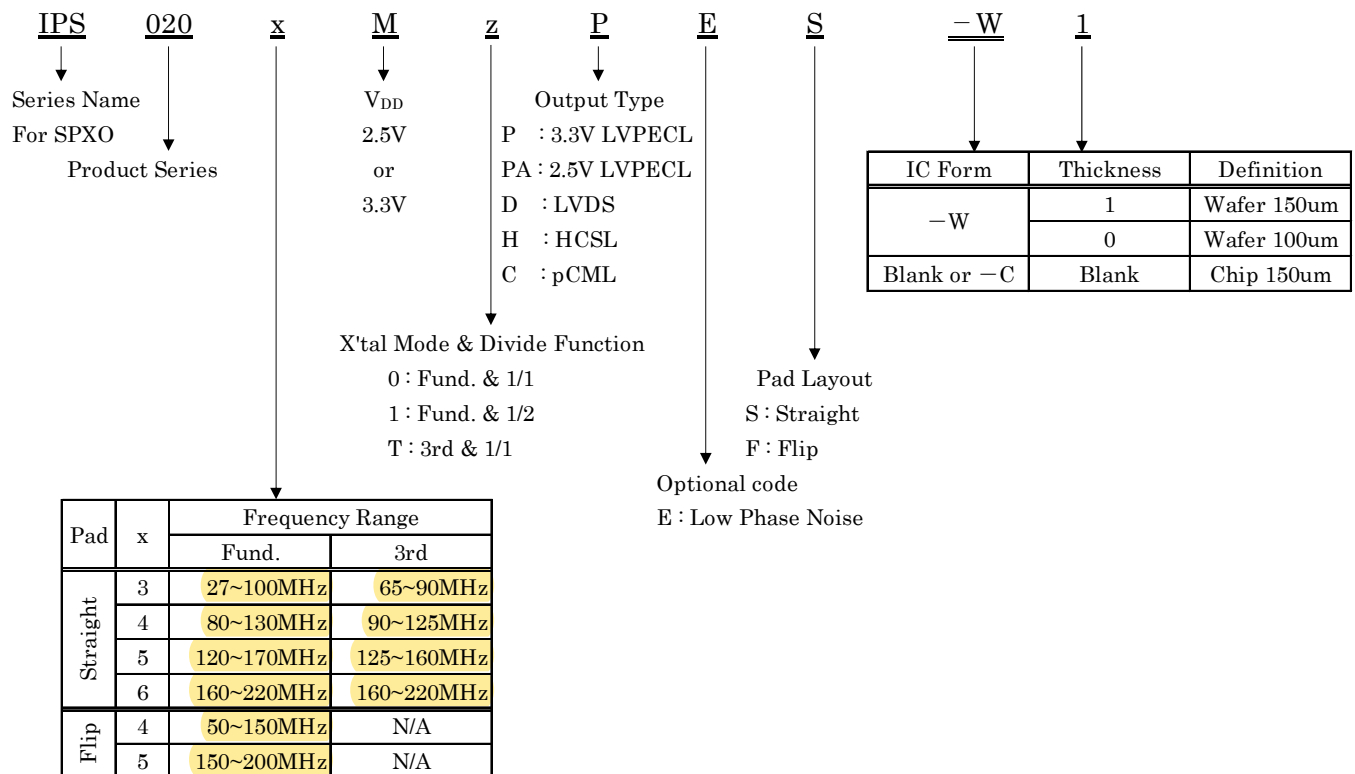
■ Description

IPS020*E is the IC for differential output SPXO whose Phase Noise is quite low. This IC suites for telecommunication applications. This IC also supports pCML (Pseudo CML) output.

We also offer models with the best pad layout for flip chip bonding.

■ Features

- Operation temperature : -40°C~125°C
- Power supply voltage : 2.375V~3.63V (LVDS & HCSL)
2.375V~2.625V (2.5V LVPECL)
2.97V~3.63V (3.3V LVPECL & pCML)
- Standby function : Oscillation stop
- Crystal frequency : 220MHz maximum
- Output : LVPECL / LVDS / HCSL / Pseudo CML (HDLVDS : High Drive LVDS)
- Crystal mode : Fundamental & 3rd overtone
- Small chip size : 0.65mm × 0.75mm
- Pad layout : Straight type & Flip type
- Duty cycle : Within 50%±5%
- Phase jitter : ~57fsec (12kHz to 20MHz at 156.25MHz)

1. Part number rule


The contents of this sheet are subject to change without notice.

2. Series

Part Number	Output	Crystal Frequency (MHz)			Divide	Output Frequency (MHz)		Remarks
		Mode	Min.	Max.		Min.	Max.	
IPS020 3 M 0 P E S	LVPECL (V _{DD} = 3.3V ±10%)	Fund.	27	100	1/1	27	100	Straight type
IPS020 4 M 0 P E S			80	130		80	130	
IPS020 5 M 0 P E S			120	170		120	170	
IPS020 6 M 0 P E S			160	220		160	220	
IPS020 3 M 1 P E S			27	100	1/2	13.5	50	
IPS020 3 M T P E S		3rd	65	90	1/1	65	90	
IPS020 4 M T P E S			90	125		90	125	
IPS020 5 M T P E S			125	160		125	160	
IPS020 6 M T P E S			160	220		160	220	
IPS020 4 M 0 P E F		Fund.	50	150	1/1	50	150	
IPS020 5 M 0 P E F	100		200	100		200		
IPS020 3 M 0 P A E S	LVPECL (V _{DD} = 2.5V ±5%)	Fund.	27	100	1/1	27	100	Straight type
IPS020 4 M 0 P A E S			80	130		80	130	
IPS020 5 M 0 P A E S			120	170		120	170	
IPS020 6 M 0 P A E S			160	220		160	220	
IPS020 3 M 1 P A E S			27	100	1/2	13.5	50	
IPS020 3 M T P A E S		3rd	65	90	1/1	65	90	
IPS020 4 M T P A E S			90	125		90	125	
IPS020 5 M T P A E S			125	160		125	160	
IPS020 6 M T P A E S			160	220		160	220	
IPS020 4 M 0 P A E F		Fund.	50	150	1/1	50	150	
IPS020 5 M 0 P A E F	100		200	100		200		
IPS020 3 M 0 D E S	LVDS	Fund.	27	100	1/1	27	100	Straight type
IPS020 4 M 0 D E S			80	130		80	130	
IPS020 5 M 0 D E S			120	170		120	170	
IPS020 6 M 0 D E S			160	220		160	220	
IPS020 3 M 1 D E S			27	100	1/2	13.5	50	
IPS020 3 M T D E S		3rd	65	90	1/1	65	90	
IPS020 4 M T D E S			90	125		90	125	
IPS020 5 M T D E S			125	160		125	160	
IPS020 6 M T D E S			160	220		160	220	
IPS020 4 M 0 D E F		Fund.	50	150	1/1	50	150	
IPS020 5 M 0 D E F	100		200	100		200		

Please contact us for gray color models.

Part Number	Output	Crystal Frequency (MHz)			Divide	Output Frequency (MHz)		Remarks	
		Mode	Min.	Max.		Min.	Max.		
IPS020 3 M 0 H E S	HCSL	Fund.	27	100	1/1	27	100	Straight type	
IPS020 4 M 0 H E S			80	130		80	130		
IPS020 5 M 0 H E S			120	170		120	170		
IPS020 6 M 0 H E S			160	220		160	220		
IPS020 3 M 1 H E S		3rd	1/1	27	100	1/2	13.5		50
IPS020 3 M T H E S				65	90	65	90		
IPS020 4 M T H E S				90	125	90	125		
IPS020 5 M T H E S				125	160	125	160		
IPS020 6 M T H E S				160	220	160	220		
IPS020 5 M 0 C E F	pCML	Fund.	100	200	1/1	100	200	Flip type	
IPS020 4 M T C E S		3rd	1/1	90	125	90	125	Straight type	
IPS020 5 M T C E S				125	160	125	160		

Please contact us for gray color 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}		$V_{SS}-0.5$	$V_{DD}+0.5$	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

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

Parameter	Symbol	Condition	Min	Typ	Max	Unit	Note
Supply Voltage	V_{DD}	2.5V LVPECL	2.375	2.50	2.625	V	V_{DD}
		LVDS, HCSL	2.375	3.30	3.63		
		3.3V LVPECL, pCML	2.97	3.30	3.63		
“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	RL	LVPECL ※1	49.5	50.0	50.5	Ω	OUT
		LVDS ※2	99	100	101		
		HCSL ※3	49.5	50.0	50.5		
		pCML ※4	80	100	120		
Ambient Temperature	T_{opt}		-40		125	$^{\circ}C$	

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

- ※1 Terminate to $V_{DD}-2.0V$
- ※2 Between OUT and OUTN
- ※3 To GND and $R_s=33\Omega$ or 0Ω
- ※4 Refer to Fig.4-1

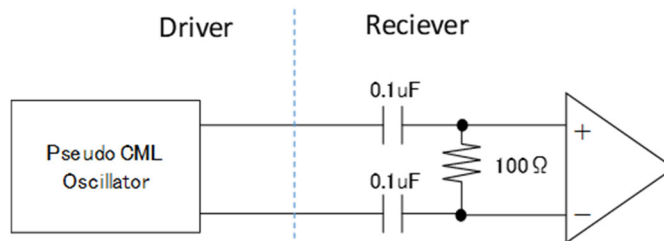


Fig. 4-1 pCML RL condition

5. Electrical Specification
5-1 LVPECL Output ($V_{DD}=3.3V$ Operation)
5-1-1 DC Characteristics

 Unless otherwise stated, $V_{DD}=2.97V\sim 3.63V$, $V_{SS}=0V$, $T_a=-40^{\circ}C\sim 125^{\circ}C$

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}	$RL=50\Omega$ (Terminated to $V_{DD}-2.0V$) $CE=Open$, $OUT/OUTN$	V_{DD} -1.025	V_{DD} -0.950	V_{DD} -0.880	V	
“L” output voltage	V_{OL}		V_{DD} -1.810	V_{DD} -1.700	V_{DD} -1.620	V	
Current consumption※	I_{DD}	IPS0203M0PES, $F_0=100MHz$			34.0	51.0	mA
		IPS0204M0PEq, $F_0=122.88MHz$			36.0	54.0	
		IPS0205M0PEq, $F_0=170MHz$			38.0	57.0	
		IPS0206M0PES, $F_0=212.5MHz$			38.0	57.0	
		IPS0203MTPES, $F_0=90MHz$			35.0	52.0	
		IPS0204MTPES, $F_0=125MHz$			37.0	55.0	
		IPS0205MTPES, $F_0=156.25MHz$			38.0	57.0	
		IPS0206MTPES, $F_0=200MHz$			40.0	60.0	
Current consumption at oscillation stop	I_{DDD}	$CE \leq 0.3V$	Straight type			10	μA
			Flip type			60	

 ※Condition : $V_{DD}=3.3V$, $CE=Open$, $RL=50\Omega$ (Terminated to $V_{DD}-2.0V$)

5-1-2 Switching Characteristics

 Unless otherwise stated, $V_{DD}=2.97V\sim 3.63V$, $V_{SS}=0V$, $T_a=-40^{\circ}C\sim 125^{\circ}C$

Parameter	Symbol	Condition	Specification			Unit	
			Min	Typ	Max		
Oscillation start up time	T_{start}	IPS020xM0				2.0	ms
		IPS020xMT				10.0	
Output Disable Time	T_{plz}					200	ns
Output Enable Time	T_{pzl}	IPS020xM0				2.0	ms
		IPS020xMT				10.0	
Rise time / Fall time	T_r / T_f	20%~80% V_{opp}			0.25	0.40	ns
Output Duty Ratio	Duty	1/2 V_{opp} point		45		55	%
		Only IPS0206MT 1/2 V_{opp} point	$T_a=-40^{\circ}C\sim 85^{\circ}C$	45		55	
			$T_a=85^{\circ}C\sim 125^{\circ}C$	40		60	
Output Swing	V_{opp}			0.4			V
Freq. V_{DD} deviation	F_{vst}	$V_{DD}=3.3V \pm 10\%$				± 2.0	ppm

5-2 LVPECL Output ($V_{DD}=2.5V$ Operation)
5-2-1 DC Characteristics

 Unless otherwise stated, $V_{DD}=2.375V\sim 2.625V$, $V_{SS}=0V$, $T_a=-40^{\circ}C\sim 125^{\circ}C$

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}	RL=50 Ω (Terminated to $V_{DD}-2.0V$) CE=Open, OUT/OUTN	V_{DD} -1.105	V_{DD} -0.950	V_{DD} -0.880	V
“L” output voltage	V_{OL}		V_{DD} -1.810	V_{DD} -1.700	V_{DD} -1.620	V
Current consumption※	I_{DD}	IPS0203M0PAES, F0=100MHz		TBD		mA
		IPS0204M0PAEq, F0=122.88MHz		TBD		
		IPS0205M0PAEq, F0=170MHz		33	50	
		IPS0206M0PAES, F0=212.5MHz		TBD		
		IPS0203MTPAES, F0=90MHz		32	48	
		IPS0204MTPAES, F0=125MHz		34	51	
		IPS0205MTPAES, F0=156.25MHz		35	53	
		IPS0206MTPAES, F0=200MHz		37	56	
Current consumption at oscillation stop	I_{DDD}	CE \leq 0.3V	Straight type		10	μA
			Flip type		60	

 ※Condition : $V_{DD}=2.5V$, CE=Open, RL=50 Ω (Terminated to $V_{DD}-2.0V$)

5-2-2 Switching Characteristics

 Unless otherwise stated, $V_{DD}=2.375V\sim 2.625V$, $V_{SS}=0V$, $T_a=-40^{\circ}C\sim 125^{\circ}C$

Parameter	Symbol	Condition	Specification			Unit
			Min	Typ	Max	
Oscillation start up time	T_{start}	IPS020xM0			2.0	ms
		IPS020xMT			10	
Output Disable Time	T_{plz}				200	ns
Output Enable Time	T_{pzl}	IPS020xM0			2.0	ms
		IPS020xMT			10	
Rise time / Fall time	T_r / T_f	20%~80% V_{opp}		0.25	0.40	ns
Output Duty Ratio	Duty	1/2 V_{opp} point		45	55	%
		Only IPS0206MT 1/2 V_{opp} point	$T_a=-40^{\circ}C\sim 85^{\circ}C$	45	55	
			$T_a=85^{\circ}C\sim 125^{\circ}C$	40	60	
Output Swing	V_{opp}		0.4			V
Freq. V_{DD} deviation	F_{vst}	$V_{DD}=2.5V\pm 5\%$			± 2.0	ppm

5-3 LVDS Output
5-3-1 DC Characteristics

 Unless otherwise stated, $V_{DD}=2.375V\sim 3.63V$, $V_{SS}=0V$, $T_a=-40^{\circ}C\sim 125^{\circ}C$

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}	$R_L=100\Omega$ (Between OUT & OUTN) CE=Open, OUT/OUTN		1.43	1.60	V	
“L” output voltage	V_{OL}		0.90	1.10		V	
Differential voltage	V_{OD}		247	330	454	mV	
Differential voltage deviation	ΔV_{OD}				50	mV	
Offset voltage	V_{OS}		1.125	1.250	1.375	V	
Offset voltage deviation	ΔV_{OS}				50	mV	
Current consumption※	I_{DD}		IPS0203M0DES, F0=100MHz		8.5	17.0	mA
			IPS0204M0DES, F0=122.88MHz		10.5	21.0	
		IPS0205M0DES, F0=170MHz		12.5	25.0		
		IPS0206M0DES, F0=212.5MHz		12.5	25.0		
		IPS0203MTDES, F0=90MHz		10.5	21.0		
		IPS0204MTDES, F0=125MHz		14.0	28.0		
		IPS0205MTDES, F0=156.25MHz		15.0	30.0		
		IPS0206MTDES, F0=200MHz		17.0	34.0		
		IPS0204M0DEF, F0=122.88MHz		12.0	24.0		
		IPS0205M0DEF, F0=170MHz		13.0	26.0		
Current consumption at oscillation stop	I_{DDD}	CE \leq 0.3V	Straight type		10	μA	
			Flip type		60		300

 ※Condition : $V_{DD}=3.3V$, CE=Open, $R_L=100\Omega$ (Between OUT & OUTN)

5-3-2 Switching Characteristics

 Unless otherwise stated, $V_{DD}=2.375V\sim 3.63V$, $V_{SS}=0V$, $T_a=-40^{\circ}C\sim 125^{\circ}C$

Parameter	Symbol	Condition	Specification			Unit	
			Min	Typ	Max		
Oscillation start up time	Tstart	IPS020xM0, IPS0203M1			2.0	ms	
		IPS020xMT			10		
Output Disable Time	Tplz				200	ns	
Output Enable Time	Tpzl	IPS020xM0, IPS0203M1			2.0	ms	
		IPS020xMT			10		
Rise time / Fall time	Tr / Tf	20%~80% Vopp			0.40	ns	
Output Duty Ratio	Duty	1/2Vopp point	45		55	%	
		Only IPS0206MT 1/2Vopp point	Ta=-40°C~85°C	45			55
			Ta=85°C~125°C	40			60
Output Swing	Vopp		0.25			V	
Freq. VDD deviation	Fvst	VDD=3.3V±10%			±2.0	ppm	
		VDD=2.5V±5%			±2.0		

5-4 HCSL Output
5-4-1 DC Characteristics

 Unless otherwise stated, $V_{DD}=2.375V\sim 3.63V$, $V_{SS}=0V$, $T_a=-40^{\circ}C\sim 125^{\circ}C$

Parameter	Symbol	Condition	Specification			Unit
			Min	Typ	Max	
Output leak current	Iz	CE=0.3V			10	μA
“L” input current	IIL	VIN=VSS		-10		μA
“H” output voltage	VOH	RL=50Ω(To GND), Rs=0Ω	550		900	mV
“L” output voltage	VOL	CE=Open, OUT/OUTN	-150		150	mV
Current consumption※	IDD	IPS0203M0HES, F0=100MHz		20.0	30.0	mA
		IPS0204M0HES, F0=122.88MHz		22.0	33.0	
		IPS0205M0HES, F0=170MHz		23.0	35.0	
		IPS0206M0HES, F0=212.5MHz		23.0	35.0	
		IPS0203MTHES, F0=90MHz		22.0	33.0	
		IPS0204MTHES, F0=125MHz		24.0	36.0	
		IPS0205MTHES, F0=156.25MHz		24.0	36.0	
IPS0206MTHES, F0=200MHz		27.0	38.0			
Current consumption at oscillation stop	IDDD	CE≤0.3V			10	uA

 ※Condition : $V_{DD}=3.3V$, CE=Open, $RL=50\Omega$ (To GND), $Rs=0\Omega$

5-4-2 Switching Characteristics

 Unless otherwise stated, $V_{DD}=2.375V\sim 3.63V$, $V_{SS}=0V$, $T_a=-40^{\circ}C\sim 125^{\circ}C$

Parameter	Symbol	Condition	Specification			Unit	
			Min	Typ	Max		
Oscillation start up time	Tstart	IPS020xM0			2.0	ms	
		IPS020xMT			10		
Output Disable Time	Tplz				200	ns	
Output Enable Time	Tpzl	IPS020xM0			2.0	ms	
		IPS020xMT			10		
Rise time / Fall time	Tr / Tf	20%~80% Vopp, Rs=0Ω		0.30	0.50	ns	
Output Duty Ratio	Duty	1/2Vopp point	45		55	%	
		Only IPS0206MT 1/2Vopp point	Ta=-40°C~85°C	45			55
			Ta=85°C~125°C	40			60
Output Swing	Vopp	Rs=0Ω	0.55			V	
Freq. VDD deviation	Fvst	VDD=3.3V±10%			±2.0	ppm	
		VDD=2.5V±5%			±2.0		

5-5 pCML Output
5-5-1 DC Characteristics

 Unless otherwise stated, $V_{DD}=2.97V\sim 3.63V$, $V_{SS}=0V$, $T_a=-40^{\circ}C\sim 125^{\circ}C$

Parameter	Symbol	Condition	Specification			Unit
			Min	Typ	Max	
Output leak current	Iz	CE=0.3V			10	μA
“L” input current	IIL	VIN=VSS		-10		μA
Current consumption※	IDD	IPS0205M0CEF, F0=170MHz		16.5	33.0	mA
		IPS0204MTCES, F0=125MHz		17.5	35.0	
		IPS0205MTCES, F0=156.25MHz		18.0	36.0	
Current consumption at oscillation stop	IDDD	CE ≤ 0.3V		100	300	uA

 ※Condition : $V_{DD}=3.3V$, CE=Open, $R_L=100\Omega$ (AC coupling)

5-5-2 Switching Characteristics

 Unless otherwise stated, $V_{DD}=2.97V\sim 3.63V$, $V_{SS}=0V$, $T_a=-40^{\circ}C\sim 125^{\circ}C$

Parameter	Symbol	Condition	Specification			Unit
			Min	Typ	Max	
Oscillation start up time	Tstart	IPS020xM0			2.0	ms
		IPS020xMT			10	
Output Disable Time	Tplz				200	ns
Output Enable Time	Tpzl	IPS020xM0			2.0	ms
		IPS020xMT			10	
Rise time / Fall time	Tr / Tf	20%~80% Vopp, Rs=0Ω		0.25	0.35	ns
Output Duty Ratio	Duty	1/2Vopp point	45		55	%
Output Swing	Vopp		0.6			V
Freq. VDD deviation	Fvst	VDD=3.3V±10%			±2.0	ppm

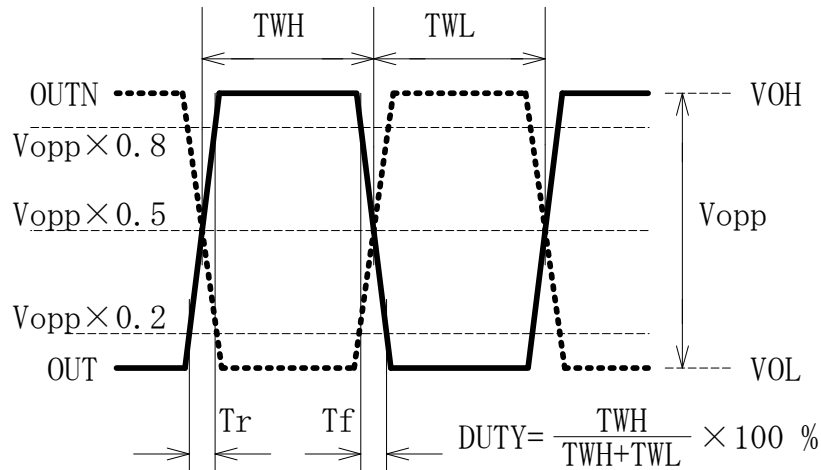


Fig. 5-1 Output Wave Form (Duty, Tr, Tf, VOH, VOL, Vopp) of LVPEL & HCSSL

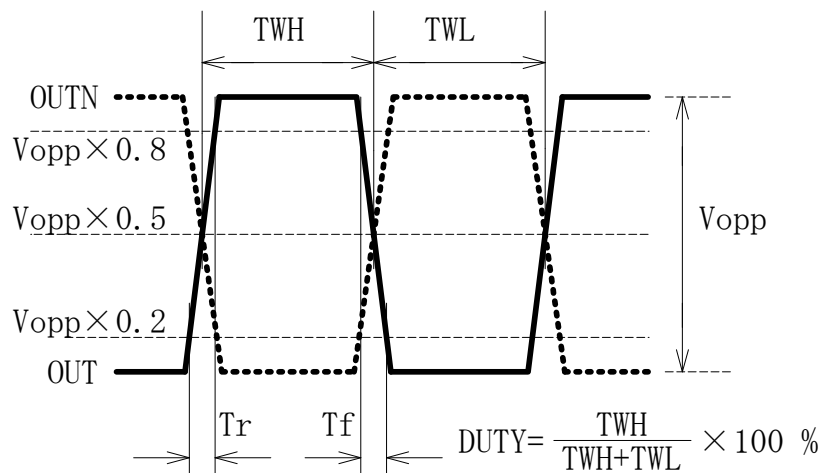


Fig. 5-2 Output Wave Form (Duty, Tr, Tf, Vopp) of pCML

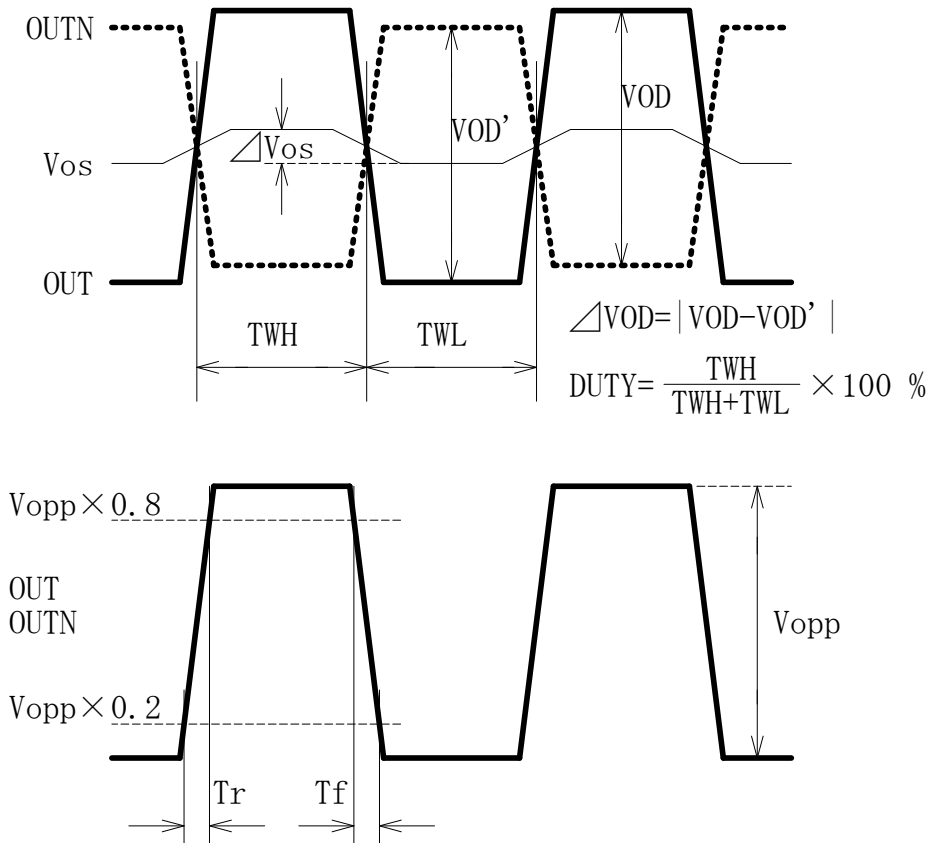
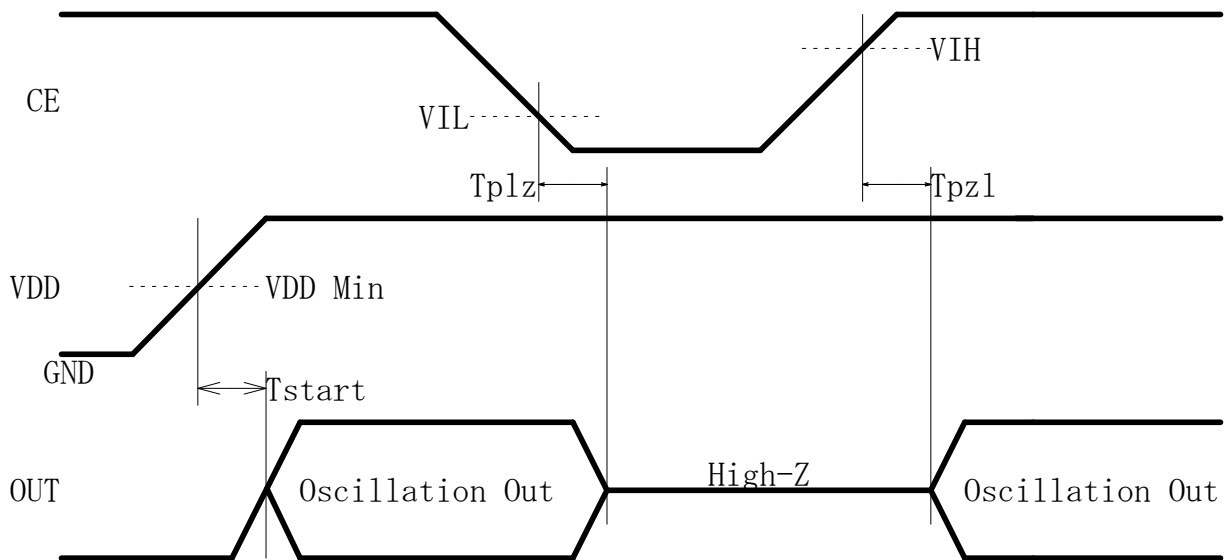


Fig. 5-3 Output Wave Form (Duty, Tr, Tf, VOH, VOL, VOD, Vos, Vopp) of LVDS



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

Fig. 5-4 Input output signal timing

6. Circuit Parameters of Oscillator (Reference Data for Circuit Design)
6-1 Feedback Resister

Ta=25°C

Parameter	Symbol	Condition	Min	Typ	Max	Unit
IPS020xM0, IPS0203M1	Rf			200		kΩ
IPS0203MT				4.00		
IPS0204MT				3.00		
IPS0205MT		Only pCML		2.00		
		Others		1.75		
IPS0206MT				0.75		

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

6-2 Driving Resister

Ta=25°C

Parameter	Symbol	Condition	Min	Typ	Max	Unit
IPS0203M0, IPS0203M1	Rd			1000		Ω
IPS0204M0		Flip type		757		
		Straight type		800		
IPS0205M0		Flip type		400		
		Straight type		500		
IPS0206M0				300		
IPS0203MT				500		
IPS0204MT		Only pCML		600		
		Others		400		
IPS0205MT		Only pCML		400		
		Others		200		
IPS0206MT				200		

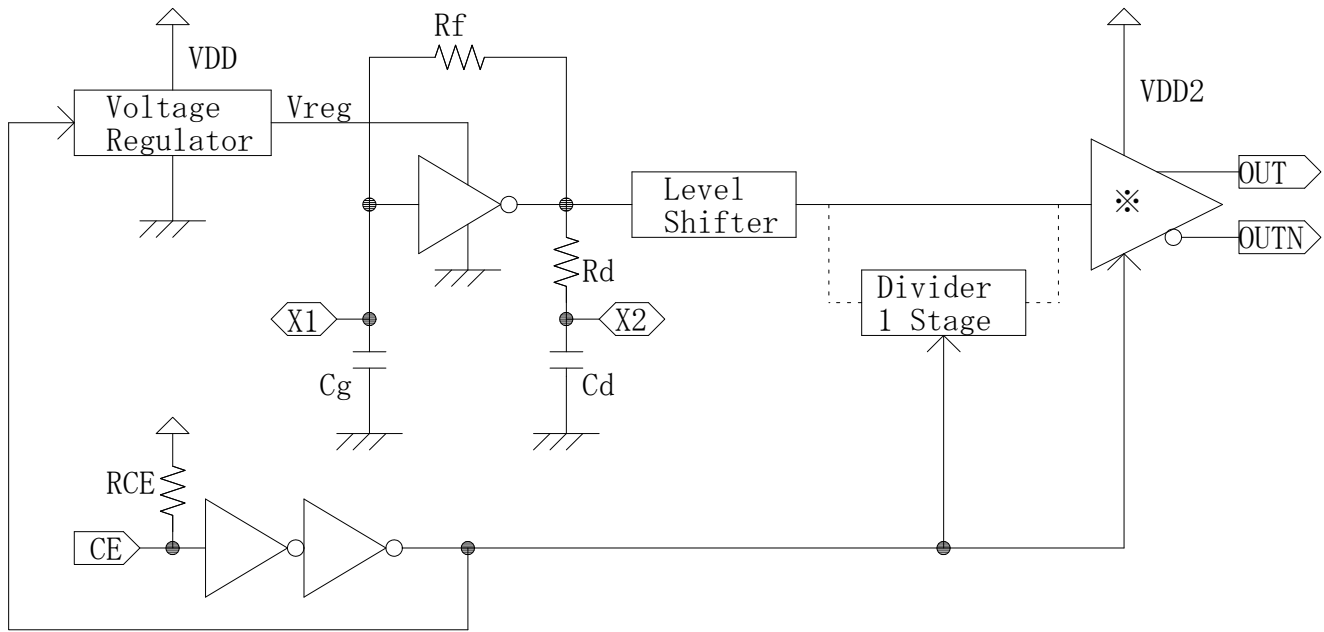
*The above values are the design values and are not guaranteed by test.

6-3 Oscillation Capacitor

Ta=25°C

Parameter	Symbol	Condition	Min	Typ	Max	Unit
IPS0203M0 IPS0203M1	Cg			6.0		pF
	Cd			9.0		
IPS0204M0	Cg	Flip type		10.0		
		Straight type		5.0		
	Cd	Flip type		10.0		
		Straight type		8.0		
IPS0205M0	Cg	Flip type		10.0		
		Straight type		5.0		
	Cd	Flip type		10.0		
		Straight type		7.0		
IPS0206M0	Cg			4.0		
	Cd			6.0		
IPS0203MT	Cg			7.0		
	Cd			9.0		
IPS0204MT	Cg	Only pCML		8.0		
		Others		6.0		
	Cd	Only pCML		10.0		
		Others		8.0		
IPS0205MT	Cg	Only pCML		8.0		
		Others		6.0		
	Cd	Only pCML		10.0		
		Others		8.0		
IPS0206MT	Cg			3.0		
	Cd			8.0		

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

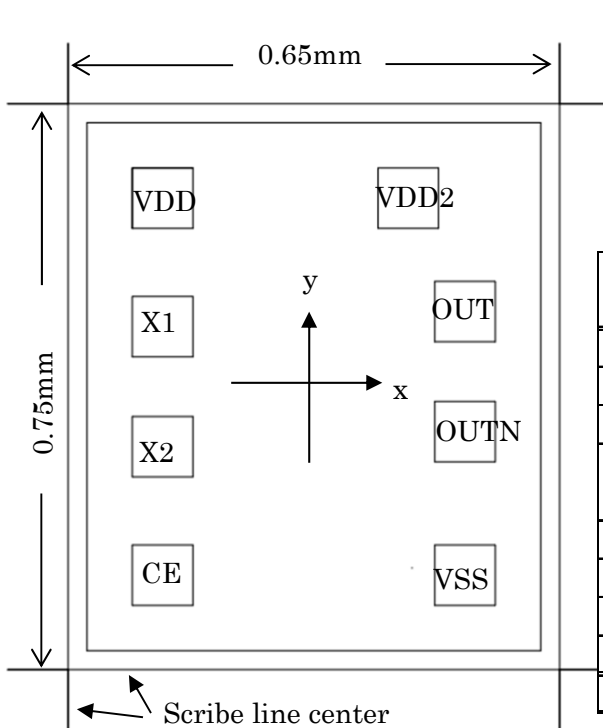


※ Output buffer according to each output waveform format

Fig. 6-1 Block Diagram

7. Pad Layout

7-1 Straight Type



•Die Size: 0.65mm × 0.75mm

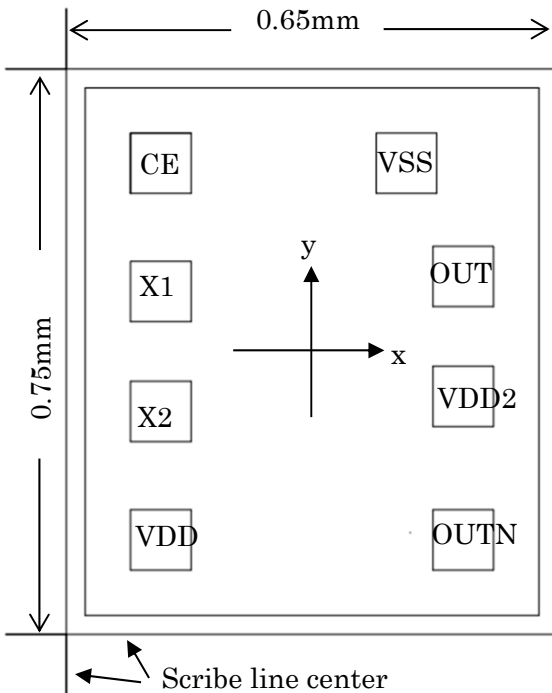
•Pad Size: 80um □

•Thickness: 150um ± 20um

•IC Backside: Gnd or Open

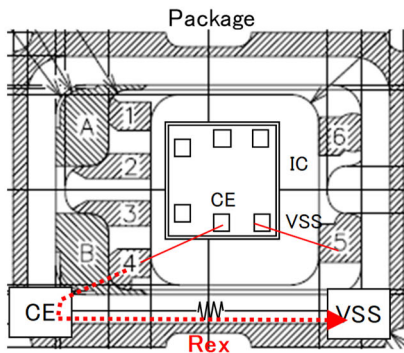
•Swapping of OUT/OUTN with wire bond is acceptable

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

7-2 Flip Type


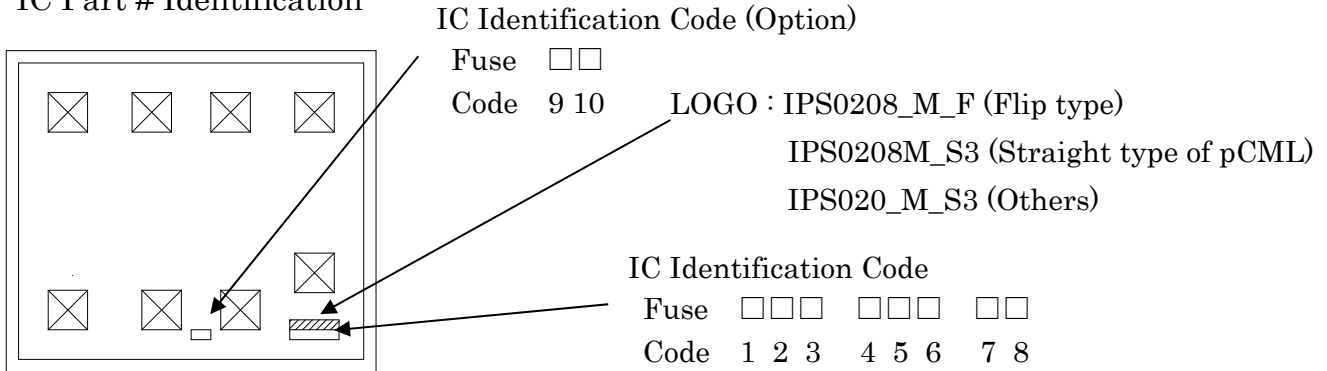
- Die Size: 0.65mm × 0.75mm
- Pad Size: 80um □
- Thickness: 150um ± 20um
- IC Backside: Gnd or Open
- Swapping of OUT/OUTN with wire bond is acceptable

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


□ : Fuse no cut ■ : Fuse cut

Part #	Code 1~8	Code 9, 10
IPS0203M0PES	□ ■ ■ □ □ □ □ □	□ □
IPS0204M0PES	■ □ □ □ □ □ □ □	□ □
IPS0205M0PES	■ □ ■ □ □ □ □ □	□ □
IPS0206M0PES	■ ■ □ □ □ □ □ □	□ □
IPS0203M1PES	□ ■ ■ □ □ ■ □ □	□ □
IPS0203MTPES	□ ■ ■ ■ □ □ □ □	□ □
IPS0204MTPES	■ □ □ ■ □ □ □ □	□ □
IPS0205MTPES	■ □ ■ ■ □ □ □ □	□ □
IPS0206MTPES	■ ■ □ ■ □ □ □ □	□ □
IPS0203M0PAES	□ ■ ■ □ □ □ □ □	□ ■
IPS0204M0PAES	■ □ □ □ □ □ □ □	□ ■
IPS0205M0PAES	■ □ ■ □ □ □ □ □	□ ■
IPS0206M0PAES	■ ■ □ □ □ □ □ □	□ ■
IPS0203M1PAES	□ ■ ■ □ □ ■ □ □	□ ■
IPS0203MTPAES	□ ■ ■ ■ □ □ □ □	□ ■
IPS0204MTPAES	■ □ □ ■ □ □ □ □	□ ■
IPS0205MTPAES	■ □ ■ ■ □ □ □ □	□ ■
IPS0206MTPAES	■ ■ □ ■ □ □ □ □	□ ■

Part #	Code 1~8	Code 9, 10
IPS0203M0DES	□ ■ ■ □ □ □ □ ■	□ □
IPS0204M0DES	■ □ □ □ □ □ □ ■	□ □
IPS0205M0DES	■ □ ■ □ □ □ □ ■	□ □
IPS0206M0DES	■ ■ □ □ □ □ □ ■	□ □
IPS0203M1DES	□ ■ ■ □ □ ■ □ ■	□ □
IPS0203MTDES	□ ■ ■ ■ □ □ □ ■	□ □
IPS0204MTDES	■ □ □ ■ □ □ □ ■	□ □
IPS0205MTDES	■ □ ■ ■ □ □ □ ■	□ □
IPS0206MTDES	■ ■ □ ■ □ □ □ ■	□ □
IPS0203M0HES	□ ■ ■ □ □ □ ■ □	□ □
IPS0204M0HES	■ □ □ □ □ □ ■ □	□ □
IPS0205M0HES	■ □ ■ □ □ □ ■ □	□ □
IPS0206M0HES	■ ■ □ □ □ □ ■ □	□ □
IPS0203M1HES	□ ■ ■ □ □ ■ ■ □	□ □
IPS0203MTHES	□ ■ ■ ■ □ □ ■ □	□ □
IPS0204MTHES	■ □ □ ■ □ □ ■ □	□ □
IPS0205MTHES	■ □ ■ ■ □ □ ■ □	□ □
IPS0206MTHES	■ ■ □ ■ □ □ ■ □	□ □

Part #	Code 1~8	Code 9, 10
IPS0204M0PEF	■ □ □ □ □ □ □ □	□ □
IPS0205M0PEF	■ □ ■ □ □ □ □ □	□ □
IPS0204M0DEF	■ □ □ □ □ □ □ ■	□ □
IPS0205M0DEF	■ □ ■ □ □ □ □ ■	□ □

Part #	Code 1~8	Code 9, 10
IPS0205M0CEF	■ □ ■ □ □ □ ■ ■	□ □
IPS0204MTCES	■ □ □ ■ □ □ ■ ■	□ □
IPS0205MTCES	■ □ ■ ■ □ □ ■ ■	□ □