

2. Series

2-1 IPS029xMzBq Basic Series

Part Number	Crystal Frequency f (MHz)		Crystal Mode	Divide	Output Frequency F0 (MHz)		Remarks
	Min.	Max.			Min.	Max.	
IPS029 3 M 0 B X	20.00	54.00	Fund	1/1	20.00	54.00	Basic series Fundamental
IPS029 3 M 0 B F							
IPS029 3 M 1 B X				1/2	10.00	27.00	
IPS029 3 M 1 B F							
IPS029 3 M 2 B X				1/4	5.00	13.50	
IPS029 3 M 2 B F							
IPS029 3 M 3 B X				1/8	2.50	6.75	
IPS029 3 M 3 B F							
IPS029 3 M 4 B X				1/16	1.25	3.38	
IPS029 3 M 4 B F							
IPS029 4 M 0 B X	50.00	100.00	Fund	1/1	50.00	100.00	
IPS029 4 M 0 B F							
IPS029 5 M 0 B X	100.00	160.00		1/1	100.00	160.00	
IPS029 5 M 0 B F							
IPS029 3 M T B X	50.00	70.00	3rd	1/1	50.00	70.00	Basic series 3rd Overtone
IPS029 3 M T B F							
IPS029 4 M T B X	70.00	100.00		1/1	70.00	100.00	
IPS029 4 M T B F							
IPS029 5 M T B X	100.00	130.00		1/1	100.00	130.00	
IPS029 5 M T B F							
IPS029 6 M T B X	130.00	160.00		1/1	130.00	160.00	
IPS029 6 M T B F							

Please contact us for gray color models.

2-2 IPS029xMzBAq Low Power Consumption Series

Part Number	Crystal Frequency f (MHz)		Crystal Mode	Divide	Output Frequency F0 (MHz)		Remarks
	Min.	Max.			Min.	Max.	
IPS029 3 M 0 B A X	20.00	54.00	Fund	1/1	20.00	54.00	Low Power Consumption
IPS029 3 M 0 B A F				1/2	10.00	27.00	
IPS029 3 M 1 B A X				1/4	5.00	13.50	
IPS029 3 M 1 B A F				1/8	2.50	6.75	
IPS029 3 M 2 B A X				1/16	1.25	3.38	
IPS029 3 M 2 B A F				1/32	0.62	1.69	
IPS029 3 M 3 B A X				1/64	0.31	0.84	
IPS029 3 M 3 B A F				1/1	100.00	150.00	
IPS029 3 M 4 B A X				1/2	50.00	75.00	
IPS029 3 M 4 B A F				1/4	25.00	37.50	
IPS029 3 M 5 B A X				1/8	12.50	18.75	
IPS029 3 M 5 B A F				1/1	50.00	70.00	
IPS029 3 M 6 B A X				1/1	70.00	100.00	
IPS029 3 M 6 B A F				1/1	100.00	130.00	
IPS029 5 M 0 B A X	100.00	150.00	Fund	1/1	100.00	150.00	
IPS029 5 M 0 B A F				1/2	50.00	75.00	
IPS029 5 M 1 B A F				1/4	25.00	37.50	
IPS029 5 M 2 B A F				1/8	12.50	18.75	
IPS029 5 M 3 B A F				1/1	50.00	70.00	
IPS029 3 M T B A F	50.00	70.00	3rd	1/1	50.00	70.00	
IPS029 4 M T B A F	70.00	100.00		1/1	70.00	100.00	
IPS029 5 M T B A F	100.00	130.00		1/1	100.00	130.00	
IPS029 6 M T B A F	130.00	160.00		1/1	130.00	160.00	

Please contact us for gray color models.

2-3 IPS029xMzBBq OE Series

Part Number	Crystal Frequency f (MHz)		Crystal Mode	Divide	Output Frequency F0 (MHz)		Remarks
	Min.	Max.			Min.	Max.	
IPS029 3 M 0 B B X	20.00	54.00	Fund	1/1	20.00	54.00	OE function
IPS029 3 M 0 B B F							
IPS029 3 M 1 B B X				1/2	10.00	27.00	
IPS029 3 M 1 B B F							
IPS029 3 M 2 B B X				1/4	5.00	13.50	
IPS029 3 M 2 B B F							
IPS029 4 M 0 B B X	50.00	100.00		1/1	50.00	100.00	
IPS029 4 M 0 B B F							
IPS029 4 M 1 B B X				1/2	25	50	
IPS029 4 M 1 B B F							
IPS029 4 M 2 B B X				1/4	12.5	25	
IPS029 4 M 2 B B F							
IPS029 5 M 0 B B X	100.00	160.00		1/1	100.00	160.00	
IPS029 5 M 0 B B F							

Please contact us for gray color models.

2-4 IPS0293MTBEX high Tr/Tf Series

Part Number	Crystal Frequency f (MHz)		Crystal Mode	Divide	Output Frequency F0 (MHz)		Remarks
	Min.	Max.			Min.	Max.	
IPS029 3 M T B E X	50.00	70.00	3rd	1/1	50.00	70.00	high Tr/Tf output

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}	Except below	$V_{SS}-0.5$	$V_{DD}+0.5$	V
		IPS029xMzBAq 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	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}		1.62		3.63	V	V_{DD}
“H” Input Voltage	V_{IH}		$V_{DD} \times 0.8$			V	CE(OE)
“L” Input Voltage	V_{IL}				$V_{DD} \times 0.2$	V	CE(OE)
Input Voltage	V_{IN}		V_{SS}		V_{DD}	V	CE(OE)
Output Load Capacitance	CL	CMOS			15	pF	OUT
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 IPS029xM0Bq

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

Parameter	Symbol	Condition	Specification			Unit
			Min	Typ	Max	
Output leak current	I _Z	CE=0V, X1=V _{DD} or V _{SS} V _{out} =V _{SS} ~V _{DD}			10	μA
“H” output voltage	V _{OH}	I _{OH} =-1.0mA	0.9V _{DD}			V
“L” output voltage	V _{OL}	I _{OL} =1.0mA			0.1V _{DD}	V
Output Disable Time	T _{plz}				100	ns
Output Enable Time	T _{pzl}				2.0	ms
Oscillation start up time	T _{start}	V _{DD} ≥ 1.62V			2.0	ms
Current consumption i=2,3,4 j=2,3,4,5,6	I _{DD}	IPS0293M0B, f=27MHz, V _{DD} =1.8V			2.3	mA
		IPS0293M0B, f=27MHz, V _{DD} =3.3V			4.2	
		IPS0293M1B, f=27MHz, V _{DD} =1.8V			2.0	
		IPS0293M1B, f=27MHz, V _{DD} =3.3V			3.5	
		IPS0293MiB, f=27MHz, V _{DD} =1.8V			1.5	
		IPS0293MiB, f=27MHz, V _{DD} =3.3V			3.0	
		IPS0294M0B, f=100MHz, V _{DD} =1.8V			6.0	
		IPS0294M0B, f=100MHz, V _{DD} =3.3V			12.0	
		IPS0295M0B, f=150MHz, V _{DD} =1.8V			14.0	
		IPS0295M0B, f=150MHz, V _{DD} =3.3V			20.0	
Current consumption at oscillation stop	I _{DD}	V _{DD} =3.3V, CE=GND			5.0	uA
Freq. V _{DD} deviation	F _{vst}	V _{DD} =1.8V±10%	IPS0293MzB IPS0294M0B		±1.0	ppm
			IPS0295M0B		±3.0	
		V _{DD} =3.3V±10%	IPS0293MzB IPS0294M0B		±1.0	
			IPS0295M0B		±2.0	
Output Duty Ratio	Duty	1/2V _{DD} point	45		55	%
Rise time / Fall time	T _r / T _f	V _{DD} =1.62V~2.25V 10%~90%V _{DD}	IPS0293MzB		6.5	ns
			IPS0294M0B		5.0	
			IPS0295M0B		3.5	
		V _{DD} =2.25V~3.63V 10%~90%V _{DD}	IPS0293MzB		4.0	
			IPS0294M0B		3.0	
			IPS0295M0B		2.0	

5-2 IPS029xMzBAq

 Unless otherwise stated, $CL=15pF$, $V_{DD}=1.62V\sim3.63V$, $V_{SS}=0V$, $T_a=-40^{\circ}C\sim125^{\circ}C$

Parameter	Symbol	Condition		Specification			Unit
				Min	Typ	Max	
Output leak current	I_Z	$CE=0V$, $X1=V_{DD}$ or V_{SS} $V_{out}=V_{SS}\sim V_{DD}$				10	μA
“H” output voltage	V_{OH}	$I_{OH}=-1.0mA$		$0.9V_{DD}$			V
“L” output voltage	V_{OL}	$I_{OL}=1.0mA$				$0.1V_{DD}$	V
Output Disable Time	T_{plz}					100	ns
Output Enable Time	T_{pzl}					2.0	ms
Oscillation start up time	T_{start}	$V_{DD}\geq 1.62V$				2.0	ms
Current consumption $i=2,3,4$ $j=2,3,4,5,6$	I_{DD}	IPS0293M0BA, $f=27MHz$, $V_{DD}=1.8V$				2.0	mA
		IPS0293M0BA, $f=27MHz$, $V_{DD}=3.3V$				3.5	
		IPS0293M1BA, $f=27MHz$, $V_{DD}=1.8V$				1.5	
		IPS0293M1BA, $f=27MHz$, $V_{DD}=3.3V$				2.5	
		IPS0293MjBA, $f=27MHz$, $V_{DD}=1.8V$				1.0	
		IPS0293MjBA, $f=27MHz$, $V_{DD}=3.3V$				1.5	
		IPS0295M0BA, $f=150MHz$, $V_{DD}=1.8V$				12.0	
		IPS0295M0BA, $f=150MHz$, $V_{DD}=3.3V$				17.0	
Current consumption at oscillation stop	I_{DDD}	$V_{DD}=3.3V$, $CE=GND$				5.0	μA
Freq. V_{DD} deviation	F_{vst}	$V_{DD}=1.8V\pm10\%$	IPS0293MzBA			±1.0	ppm
			IPS0295M0BA			±10.0	
		$V_{DD}=3.3V\pm10\%$	IPS0293MzBA			±1.0	
			IPS0295M0BA			±3.0	
Output Duty Ratio	Duty	$1/2V_{DD}$ point	Except below	45		55	%
		$V_{DD}=1.62V\sim2.25V$	IPS0295M0BAF	40		60	
Rise time / Fall time	T_r / T_f	$V_{DD}=1.62V\sim2.25V$ $10\%\sim90\%V_{DD}$	IPS0293MzB(A)			6.5	ns
			IPS0294M0B			5.0	
			IPS0295M0B(A)			3.5	
		$V_{DD}=2.25V\sim3.63V$ $10\%\sim90\%V_{DD}$	IPS0293MzB(A)			4.0	
			IPS0294M0B			3.0	
			IPS0295M0B(A)			2.0	

5-3 IPS029xMzBB

 Unless otherwise stated, $CL=15pF$, $V_{DD}=1.62V\sim 3.63V$, $V_{SS}=0V$, $T_a=-40^{\circ}C\sim 125^{\circ}C$

Parameter	Symbol	Condition		Specification			Unit
				Min	Typ	Max	
Output leak current	I _Z	OE=0V, X1=V _{DD} or V _{SS} V _{out} =V _{SS} ~V _{DD}				10	μA
“H” output voltage	V _{OH}	I _{OH} =-1.0mA		0.9V _{DD}			V
“L” output voltage	V _{OL}	I _{OL} =1.0mA				0.1V _{DD}	V
Output Disable Time	T _{plz}					100	ns
Output Enable Time	T _{pzl}					200	ns
Oscillation start up time	T _{start}	V _{DD} ≥1.62V				2.0	ms
Current consumption	I _{DD}	IPS0293MzBB, f=27MHz, V _{DD} =1.8V				2.3	mA
		IPS0293MzBB, f=27MHz, V _{DD} =3.3V				4.2	
		IPS0294MzBB, f=100MHz, V _{DD} =1.8V				6.0	
		IPS0294MzBB, f=100MHz, V _{DD} =3.3V				12.0	
		IPS0295M0BB, f=150MHz, V _{DD} =1.8V				TBD	
		IPS0295M0BB, f=150MHz, V _{DD} =3.3V				TBD	
Current consumption at oscillation stop	I _{DDD}	f=54MHz, OE=GND				3.8	mA
		f=100MHz, OE=GND				5.0	
		f=150MHz, OE=GND				TBD	
Freq. V _{DD} deviation	F _{vst}	V _{DD} =1.8V±10%	IPS0293MzBB			±1.0	ppm
			IPS0294MzBB			TBD	
		V _{DD} =3.3V±10%	IPS0293MzBB			±1.0	
			IPS0294MzBB			TBD	
Output Duty Ratio	Duty	1/2V _{DD} point		45		55	%
Rise time / Fall time	Tr / Tf	V _{DD} =1.62V~2.25V 10%~90%V _{DD}	IPS0293MzBB			6.5	ns
			IPS0294MzBB			5.0	
			IPS0295M0BB			TBD	
		V _{DD} =2.25V~3.63V 10%~90%V _{DD}	IPS0293MzBB			4.0	
			IPS0294MzBB			3.0	
			IPS0295M0BB			TBD	

5-4 IPS029xMTB / IPS0293MTBE

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

Parameter	Symbol	Condition		Specification			Unit
				Min	Typ	Max	
Output leak current	I _Z	CE=0V, X1=V _{DD} or V _{SS} Vout=V _{SS} ~V _{DD}				10	μA
“H” output voltage	V _{OH}	I _{OH} =-1.0mA		0.9V _{DD}			V
“L” output voltage	V _{OL}	I _{OL} =1.0mA				0.1V _{DD}	V
Output Disable Time	T _{plz}					100	ns
Output Enable Time	T _{pzl}					10.0	ms
Oscillation start up time	T _{start}	V _{DD} ≥1.62V				10.0	ms
Current consumption	I _{DD}	IPS0293MTB, f=65MHz, V _{DD} =1.8V				13.5	mA
		IPS0293MTB, f=65MHz, V _{DD} =3.3V				30.0	
		IPS0293MTBE, f=65MHz, V _{DD} =1.8V				15.0	
		IPS0293MTBE, f=65MHz, V _{DD} =3.3V				30.0	
		IPS0294MTB, f=100MHz, V _{DD} =1.8V				15.0	
		IPS0294MTB, f=100MHz, V _{DD} =3.3V				32.5	
		IPS0295MTB, f=130MHz, V _{DD} =1.8V				19.0	
		IPS0295MTB, f=130MHz, V _{DD} =3.3V				40.0	
		IPS0296MTB, f=160MHz, V _{DD} =1.8V				24.5	
		IPS0296MTB, f=160MHz, V _{DD} =3.3V				47.0	
Current consumption at oscillation stop	I _{DDD}	V _{DD} =3.3V, CE=GND				5.0	uA
Freq. V _{DD} deviation	F _{vst}	V _{DD} =1.8V±10%	IPS0293MTB(E) IPS0294MTB			±1.0	ppm
			IPS0295MTB IPS0296MTB			±2.0	
		V _{DD} =3.3V±10%	All Models			±1.0	
Output Duty Ratio	Duty	1/2V _{DD} point -40°C~125°C	IPS0293MTB(E) IPS0294MTB	45		55	%
		1/2V _{DD} point -40°C~85°C	IPS0295MTB IPS0296MTB	45		55	
		1/2V _{DD} point 85°C~125°C	IPS0295MTB IPS0296MTB	40		60	
Rise time / Fall time	Tr / Tf	V _{DD} =1.62V~2.25V 10%~90%V _{DD}	IPS0293MTB			6.5	ns
			IPS0293MTBE			3.5	
			IPS0294MTB			5.0	
			IPS0295MTB			3.5	
			IPS0296MTB			3.5	
		V _{DD} =2.25V~3.63V 10%~90%V _{DD}	IPS0293MTB			4.0	
			IPS0293MTBE			2.0	
			IPS0294MTB			3.0	
			IPS0295MTB			2.0	
			IPS0296MTB			2.0	

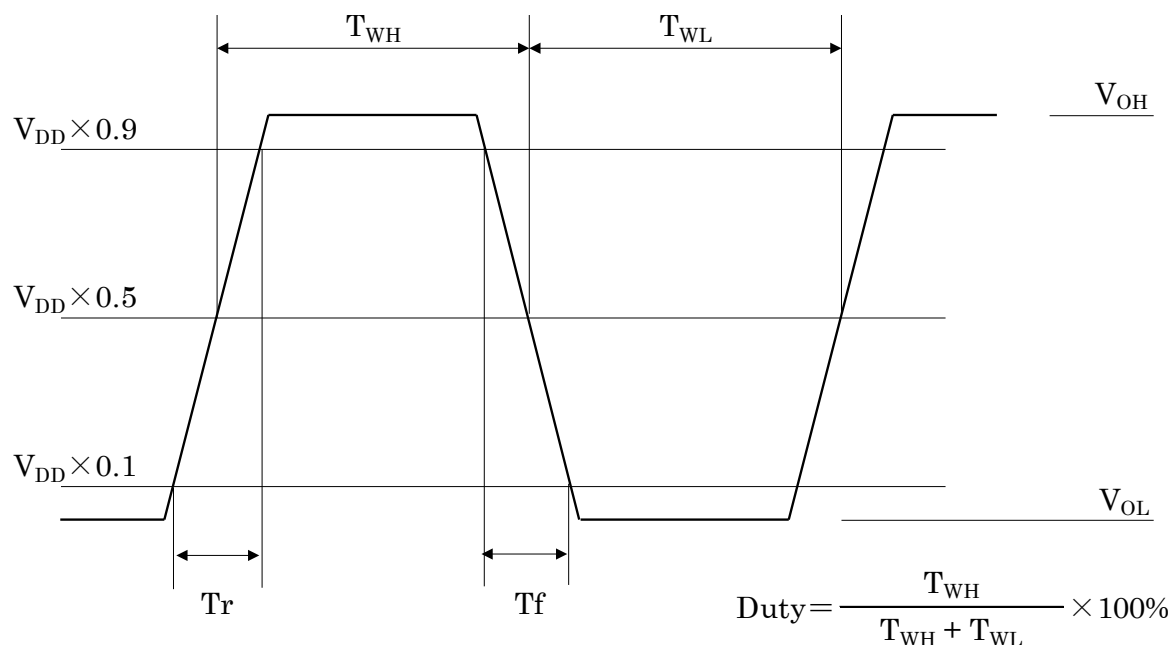
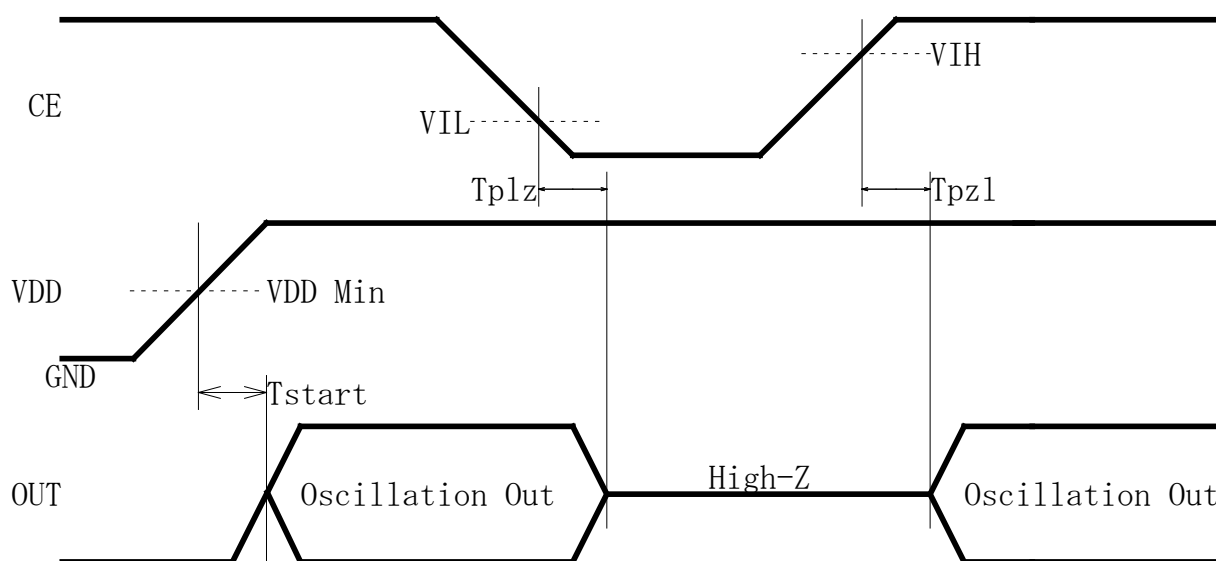


Fig. 5-1 Output Wave Form (Duty, T_r , T_f , V_{OH} , V_{OL})



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

Fig. 5-2 Input output signal timing

* IPS029xMzBBq series are OE pins instead of CE pins.

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

6-1 IPS029xMzB Series

 $T_a=25^{\circ}\text{C}$

Parameter		Symbol	Condition	Min	Typ	Max	Unit
Feedback Resistor	All Models	Rf	Refer to Fig. 6-1		300		k Ω
Driving Resistor	IPS0293MzB (z=0, 1, 2, 3, 4)	Rd	Refer to Fig. 6-1		1000		Ω
	IPS0294M0B				750		
	IPS0295M0B				250		
Oscillation Capacitor	IPS0293MzB (z=0, 1, 2, 3, 4)	Cg	Refer to Fig. 6-1		5.0		pF
		Cd			12.0		
	IPS0294M0B	Cg			3.0		
		Cd			5.0		
	IPS0295M0B	Cg			4.0		
		Cd			6.0		

6-2 IPS029xMzBA Series

 $T_a=25^{\circ}\text{C}$

Parameter		Symbol	Condition	Min	Typ	Max	Unit
Feedback Resistor	All Models	Rf	Refer to Fig. 6-1		200		k Ω
Driving Resistor	IPS0293MzBA (z=0,1,2,3,4,5,6)	Rd	Refer to Fig. 6-1		1000		Ω
	IPS0295M0BA				300		
Oscillation Capacitor	IPS0293MzBA (z=0,1,2,3,4,5,6)	Cg	Refer to Fig. 6-1		4.8		pF
		Cd			12.0		
	IPS0295M0BA	Cg			4.8		
		Cd			4.8		

6-3 IPS029xMzBB Series

Ta=25°C

Parameter		Symbol	Condition	Min	Typ	Max	Unit
Feedback Resistor	All Models	Rf	Refer to Fig. 6-2		300		kΩ
Driving Resistor	IPS0293MzBB (z=0, 1, 2)	Rd	Refer to Fig. 6-2		1000		Ω
	IPS0294MzBB (z=0, 1, 2)				750		
	IPS0295M0BB				250		
Oscillation Capacitor	IPS0293MzBB (z=0, 1, 2)	Cg	Refer to Fig. 6-2		5.0		pF
		Cd			12.0		
	IPS0294MzBB (z=0, 1, 2)	Cg			3.0		
		Cd			5.0		
	IPS0295M0BB	Cg			4.0		
		Cd			6.0		

6-4 IPS029xMTB Series / IPS0293MTBE

Ta=25°C

Parameter		Symbol	Condition	Min	Typ	Max	Unit
Feedback Resistor	IPS0293MTB	Rf	Refer to Fig. 6-1		4.0		kΩ
	IPS0293MTBE				3.25		
	IPS0294MTB				3.0		
	IPS0295MTB				2.5		
	IPS0296MTB				1.96		
Driving Resistor	IPS0293MTB	Rd	Refer to Fig. 6-1		500		Ω
	IPS0293MTBE				500		
	IPS0294MTB				250		
	IPS0295MTB				250		
	IPS0296MTB				125		
Oscillation Capacitor	IPS0293MTB	Cg	Refer to Fig. 6-1		8.0		pF
		Cd			10.0		
	IPS0293MTBE	Cg			8.0		
		Cd			10.0		
	IPS0294MTB	Cg			5.0		
		Cd			9.0		
	IPS0295MTB	Cg			4.0		
		Cd			8.0		
	IPS0296MTB	Cg			3.0		
		Cd			8.0		

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

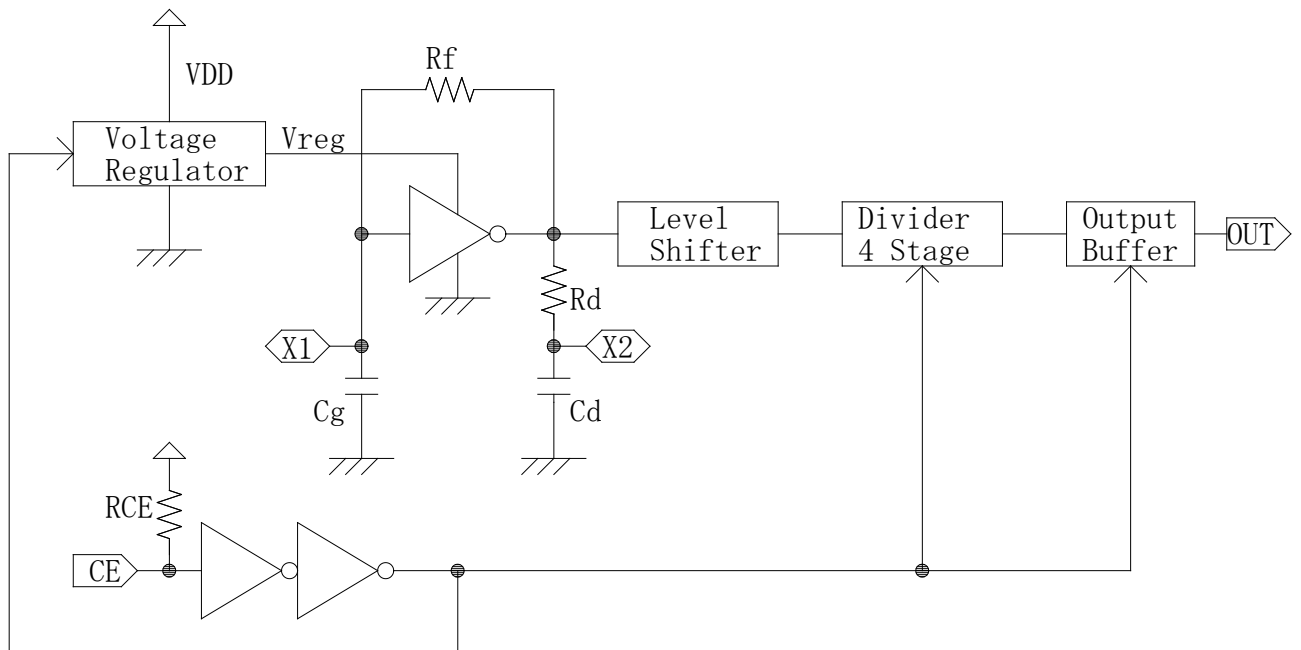


Fig. 6-1 Block Diagram (except for IPS029xMzBBq)

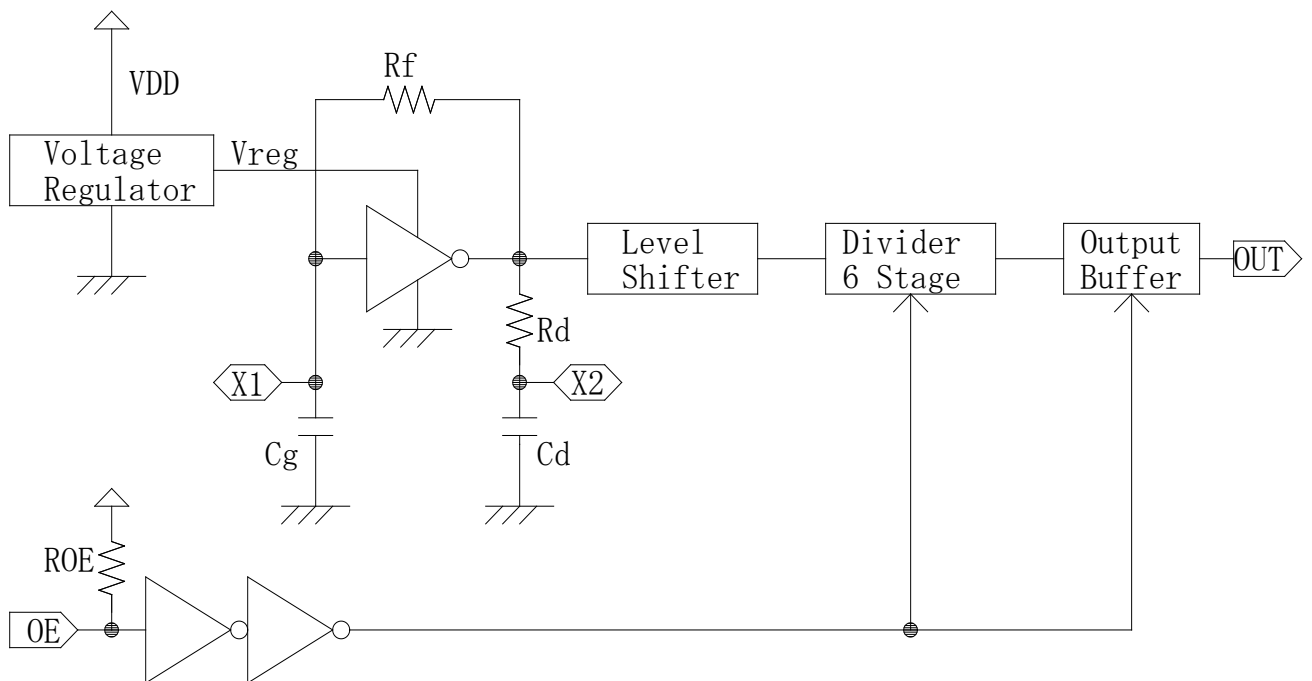
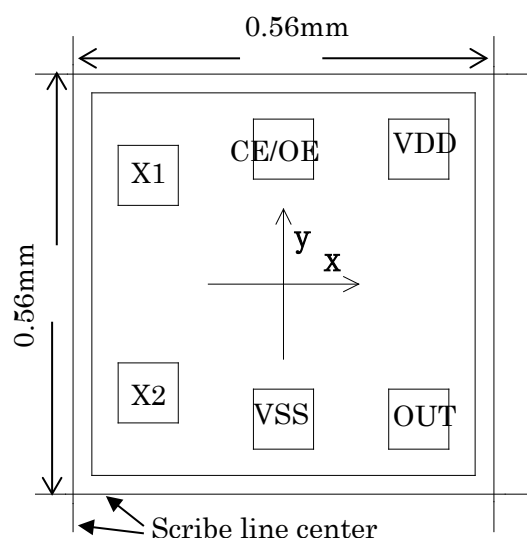


Fig. 6-2 Block Diagram (IPS029xMzBBq)

7. Pad Layout

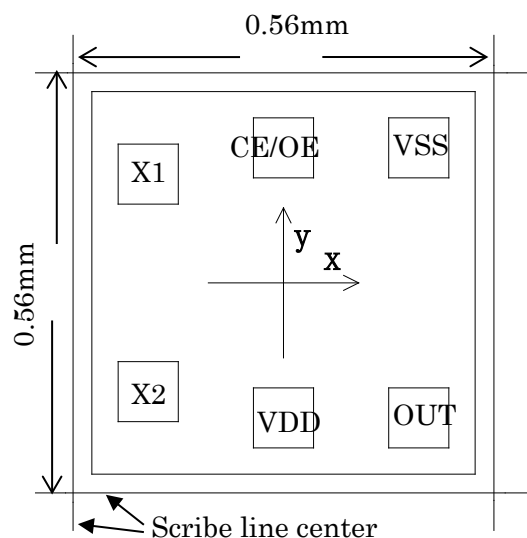
7-1 Cross Type



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

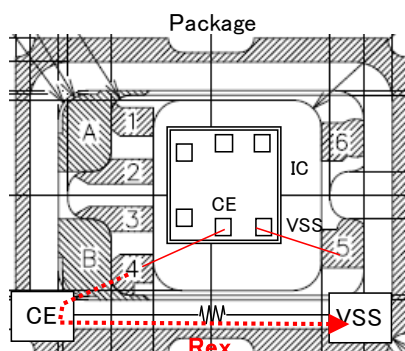
Pad Name	Function	Location (μm)	
		x	y
X2	Crystal Drive	-181.00	-143.15
VSS	(-) Ground	0.00	-180.55
OUT(Q)	Frequency Output	181.00	-180.55
VDD	(+) Power Supply	181.00	180.55
CE/OE	Oscillation stop (CE) "L": High-Impedance	0.00	180.55
X1	Crystal Feedback	-181.00	143.15
Chip Center		0	0

7-2 Flip Type



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

Pad Name	Function	Location (μm)	
		x	y
X2	Crystal Drive	-181.00	-143.15
VDD	(+) Power Supply	0.00	-180.55
OUT(Q)	Frequency Output	181.00	-180.55
VSS	(-) Ground	181.00	180.55
CE/OE	Oscillation stop "L": High-Impedance	0.00	180.55
X1	Crystal Feedback	-181.00	143.15
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

* IPS029xMzBBq series are OE pins instead of CE pins.

8. Revision History

Revision No.	Revision Date	Revised items	Before Revision	After Revision
SC-4.4	2025/11/04	Wafer thickness 100um (Flip)	Listed	As requested
		IPS0293M4BAX	Under Development	Listed
		IPS0293M6BAX	Under Development	Listed
		IPS0293M0BBX	Under Development	Listed
		IPS0295M0BBX	Under Development	Listed
		I _{DDD} Condition (CE)	CE≤0.3V	CE=GND
		I _{DDD} Condition (OE)	OE=Low	OE=GND
		Fig. 6-2 Block Diagram	None	Added
SC-4.5	2026/02/24	Pad Layout - Flip Type Location	Straight Type	Flip Type
SC-4.6	2026/07/08	3. Absolute Maximum Ratings Input Voltage (V _{IN}) / Ratings-Max (IPS029xMzBA _q / X1, X2)	V _{DD} +0.5 V	2.0 V
		Divide Function Correction of typos	(y=0, 1, 2...	(z=0, 1, 2...
		I _{DDD} Parameter Removed duplication	*CL=15pF	Removed
		Fvst Specification Max V _{DD} =1.8V±10% / IPS0295M0BA	±3.0ppm	±10.0ppm
		Fvst Specification Max V _{DD} =3.3V±10% / IPS0295M0BA	±2.0ppm	±3.0ppm
		Duty Specification Min / Max IPS0295M0BAF	45% / 55%	40% / 60%

