

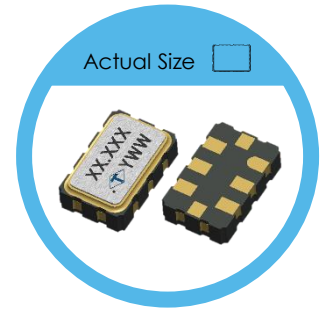
# OJ-M Type High Frequency & Ultra Low Noise 5.0 x 3.2 mm Differential Output Crystal Oscillator

## FEATURES

- Pb-free/RoHS Compliant
- Tri-state Enable / Disable Mode
- Temperature Range: -40 to 85 °C
- Clock Output: LVPECL, LVDS, CML and HCSL
- Output Frequency Support from 15MHz to 2.1GHz
- Low Power Supply Voltage: 3.3, 2.5, and 1.8V Supply Options
- Ultra Low Phase, RMS Jitter <300fs (Typical: 150fs at 12kHz to 20MHz Frequency Offsets)

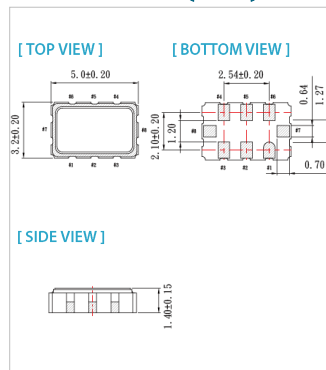
## TYPICAL APPLICATION

- Set-Top Box, HDTV
- xDSL/VoIP, Cable Modem
- Jitter Attenuator, ADC

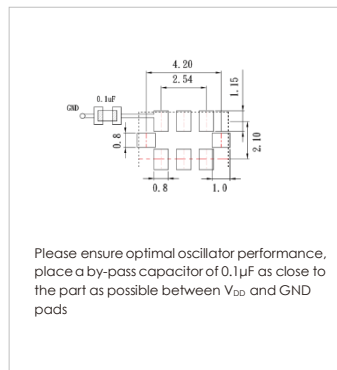


**RoHS Compliant**

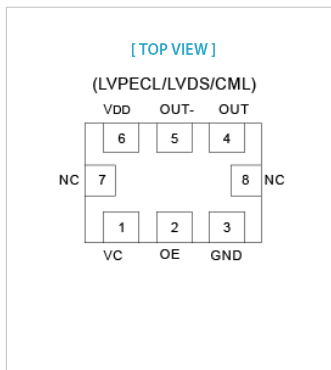
## DIMENSION (mm)



## SOLDER PAD LAYOUT (mm)



## PIN ASSIGNMENTS



## PIN FUNCTION (mm)

PIN#	FUNCTION
1	NC/OE
2	OE/NC
3	GND
4	Output
5	Comp. Output
6	V <sub>DD</sub>
7	NC
8	NC

## ELECTRICAL SPECIFICATION

Parameter	LVPECL				Unit	Test Condition
	3.3V		2.5V			
	Min.	Max.	Min.	Max.		
Supply Voltage Variation (V <sub>DD</sub> ) ±10%	2.97	3.63	2.25	2.75	V	
Frequency Range	15	2100	15	2100	MHz	
Standard Frequency	100, 106.25, 125, 156.25, 187.5, 200, 212.5, 266, 300, 312.5, 400, 491.52, 622.08, 644.531250				MHz	
Supply Current		110		95	mA	
Output Level	Output High	V <sub>DD</sub> - 1.165	V <sub>DD</sub> - 0.8	V <sub>DD</sub> - 1.165	V <sub>DD</sub> - 0.8	V
	Output Low	V <sub>DD</sub> - 2.0	V <sub>DD</sub> - 1.55	V <sub>DD</sub> - 2.0	V <sub>DD</sub> - 1.55	V
Transition Time (20% - 80%)	Rise Time		0.35		0.35	nSec
	Fall Time		0.35		0.35	nSec
Duty Cycle		45	55	45	55	%
Startup Time			8		8	mSec
Tri-State Mode (Input to Pin 2)	Enable	0.7 x V <sub>DD</sub>		0.7 x V <sub>DD</sub>		V
	Disable	0.3 x V <sub>DD</sub>		0.3 x V <sub>DD</sub>		V
Stand by Current		110		95	mA	
Phase Noise		Typ.	Max.	Typ.	Max.	
	At V <sub>DD</sub> =3.3V, f <sub>out</sub> =873.515MHz	1kHz offset	-106		-106	
	10kHz offset	-115		-115		dBc/Hz
	100kHz offset	-123		-123		dBc/Hz
	1MHz offset	-133		-133		dBc/Hz
	20MHz offset	-150		-150		dBc/Hz
RMS Phase Jitter (Integrated 12 kHz-20 MHz)		150	300	150	300	fs
Period Jitter			50		50	ps

**Note: not all combination of options are available. Other specifications may be available upon request.**

Specifications subject to change without notice.

Parameter	LVDS						Unit	Test Condition
	3.3V		2.5V		1.8V			
	Min.	Max.	Min.	Max.	Min.	Max.		
Supply Voltage Variation (V <sub>DD</sub> )	2.97	3.63	2.25	2.75	1.71	1.89	V	
Frequency Range	15	2100	15	2100	15	2100	MHz	
Standard Frequency	100, 106.25, 125, 156.25, 187.5, 200, 212.5, 266, 300, 312.5, 400, 491.52, 622.08, 644.531250						MHz	
Supply Current		90		80		70	mA	
Output Level	Output High		1.6		1.6		1.6	V
	Output Low	0.9		0.9		0.9		V
Transition Time (20% – 80%)	Rise Time		0.35		0.35		0.35	nSec
	Fall Time		0.35		0.35		0.35	nSec
Duty Cycle		45		45		45		%
Startup Time			8		8		8	mSec
Tri-State Mode (Input to Pin 2)	Enable	0.7 x V <sub>DD</sub>		0.7 x V <sub>DD</sub>		0.7 x V <sub>DD</sub>		V
	Disable		0.3 x V <sub>DD</sub>		0.3 x V <sub>DD</sub>		0.3 x V <sub>DD</sub>	V
Stand by Current			90		80		70	mA
Phase Noise		Typ.	Max.	Typ.	Max.	Typ.	Max.	
At V <sub>DD</sub> =3.3V, f <sub>out</sub> =873.515MHz	1kHz offset	-106		-106		-106		dBc/Hz
	10kHz offset	-115		-115		-115		dBc/Hz
	100kHz offset	-123		-123		-123		dBc/Hz
	1MHz offset	-133		-133		-133		dBc/Hz
	10MHz offset	-150		-150		-150		dBc/Hz
RMS Phase Jitter (Integrated 12 kHz~20 MHz)		150	300	150	300	150	300	fs
Period Jitter			50		50		50	ps

Parameter	HCSL						Unit	Test Condition
	3.3V		2.5V		1.8V			
	Min.	Max.	Min.	Max.	Min.	Max.		
Supply Voltage Variation (V <sub>DD</sub> ) ±10%	2.97	3.63	2.25	2.75	1.71	1.89	V	
Frequency Range	15	700	15	700	15	700	MHz	
Supply Current		115		100		94	mA	
Output Level	Output High	0.66	1.15	0.66	1.15	0.66	1.15	V
	Output Low	0	0.15	0	0.15	0	0.15	V
Transition Time (20% – 80%)	Rise Time		0.4		0.4		0.4	nSec
	Fall Time		0.4		0.4		0.4	nSec
Duty Cycle		45		45		45		%
Startup Time			8		8		8	mSec
Tri-State Mode (Input to Pin 2)	Enable	0.7 x V <sub>DD</sub>		0.7 x V <sub>DD</sub>		0.7 x V <sub>DD</sub>		V
	Disable		0.3 x V <sub>DD</sub>		0.3 x V <sub>DD</sub>		0.3 x V <sub>DD</sub>	V
Stand by Current			115		100		94	mA
Output Load	50Ω to GND							
Phase Noise		Typ.	Max.	Typ.	Max.	Typ.	Max.	
At V <sub>DD</sub> =3.3V, f <sub>out</sub> =873.515MHz	1kHz offset	-87		-87		-87		dBc/Hz
	10kHz offset	-110		-110		-110		dBc/Hz
	100kHz offset	-127		-127		-127		dBc/Hz
	1MHz offset	-138		-138		-138		dBc/Hz
	20MHz offset	-153		-153		-153		dBc/Hz
RMS Phase Jitter (Integrated 12 kHz~20 MHz)		150	300	150	300	150	300	fs
Period Jitter			50		50		50	ps

Parameter	CML						Unit	Test Condition
	3.3V		2.5V		1.8V			
	Min.	Max.	Min.	Max.	Min.	Max.		
Supply Voltage Variation (V <sub>DD</sub> )	2.97	3.63	2.25	2.75	1.71	1.89	V	
Frequency Range	15	2100	15	2100	15	2100	MHz	
Standard Frequency	100, 106.25, 125, 156.25, 187.5, 200, 212.5, 266, 300, 312.5, 400, 491.52, 622.08, 644.531250						MHz	
Supply Current		90		80		70	mA	
Output Level	Output High	V <sub>DD</sub> – 0.085	V <sub>DD</sub>	V <sub>DD</sub> – 0.085	V <sub>DD</sub>	V <sub>DD</sub> – 0.085	V <sub>DD</sub>	V
	Output Low	V <sub>DD</sub> – 0.6	V <sub>DD</sub> – 0.32	V <sub>DD</sub> – 0.6	V <sub>DD</sub> – 0.32	V <sub>DD</sub> – 0.6	V <sub>DD</sub> – 0.32	V
Transition Time (20% – 80%)	Rise Time		0.35		0.35		0.35	nSec
	Fall Time		0.35		0.35		0.35	nSec
Duty Cycle		45		45		45		%
Startup Time			8		8		8	mSec
Tri-State Mode (Input to Pin 2)	Enable	0.7 x V <sub>DD</sub>		0.7 x V <sub>DD</sub>		0.7 x V <sub>DD</sub>		V
	Disable		0.3 x V <sub>DD</sub>		0.3 x V <sub>DD</sub>		0.3 x V <sub>DD</sub>	V
Stand by Current			90		80		70	mA
Phase Noise		Typ.	Max.	Typ.	Max.	Typ.	Max.	
At V <sub>DD</sub> =3.3V, f <sub>out</sub> =805.664MHz	1kHz offset	-107		-107		-107		dBc/Hz
	10kHz offset	-117		-117		-117		dBc/Hz
	100kHz offset	-125		-125		-125		dBc/Hz
	1MHz offset	-135		-135		-135		dBc/Hz
	20MHz offset	-150		-150		-150		dBc/Hz
RMS Phase Jitter (Integrated 12 kHz~20 MHz)		150	300	150	300	150	300	fs
Period Jitter			50		50		50	ps

**Note: not all combination of options are available. Other specifications may be available upon request.**

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## FREQ. STABILITY vs. TEMP. RANGE

Temp.(°C)	ppm			
	±20	±25	±30	±50
-20 ~ +70	△	○	○	○
-40 ~ +85	X	△	○	○

○: Available △:Conditional X: Not Available  
 Inclusive of calibration @ 25°C ,operating temperature range,input  
 Voltage variation,load variation,aging (1<sup>st</sup> year),shock,and vibration

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