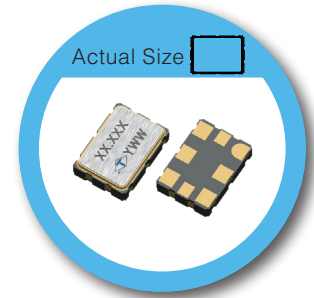




OD-M Type High Frequency and Ultra Low Noise 7.0 x 5.0mm SMD Crystal Oscillator

FEATURE

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

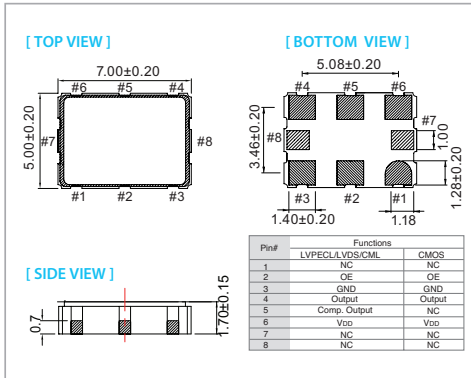


RoHS Compliant

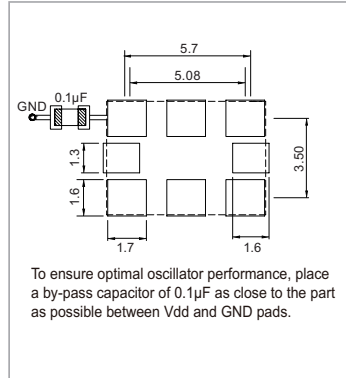
TYPICAL APPLICATION

- SONET/SDH, Gigabit Ethernet
- Storage Area Networking (SAN)
- SD/HD Video
- FPGA Clock Generation

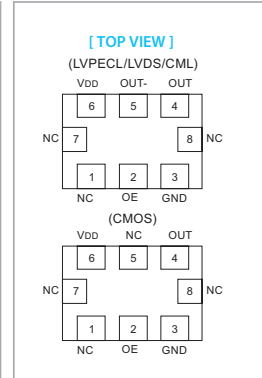
DIMENSION (mm)



SOLDER PAD LAYOUT(mm)



PIN ASSIGNMENTS



ELECTRICAL SPECIFICATION

Parameter	LVPECL				unit	
	3.3V		2.5V			
	Min.	Max.	Min.	Max.		
Supply Voltage Variation (VDD) ±10%	VDD-10%	VDD+10%	VDD-10%	VDD+10%	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					
Supply Current	–	110	–	95	mA	
Output Level	Output High	VDD-1.165	VDD-0.8	VDD-1.165	VDD-0.8	V
	Output Low	VDD-2.0	VDD-1.55	VDD-2.0	VDD-1.55	
Transition Time (20%-80%)	Rise Time / 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 VDD	–	0.7 x VDD	–	V
	Disable	–	0.3 x VDD	–	0.3 x VDD	
Standby Current	–	110	–	95	mA	
Phase Noise		Typ.	Max.	Typ.	Max.	dBc/Hz
	At VDD=3.3V, Fout=873.515MHz	1kHz offset	-106	–	-106	
10kHz offset		-115	–	-115	–	
100kHz offset		-123	–	-123	–	
1MHz offset		-133	–	-133	–	
	20MHz offset	-150	–	-150	–	
RMS Phase Jitter (12kHz to 20MHz)		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.

Parameter	LVDS						unit		
	3.3V		2.5V		1.8V				
	Min.	Max.	Min.	Max.	Min.	Max.			
Supply Voltage Variation (V _{DD}) ±5%	-	-	-	-	1.71	1.89	V		
Supply Voltage Variation (V _{DD}) ±10%	3.63	2.97	2.25	2.75	-	-			
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								
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	-		
Transition Time (20%-80%)	Rise Time / Fall Time		-	0.35	-	0.35	-	0.35	nSec
Duty Cycle	45	55	45	55	45	55	%		
Startup Time	-	8	-	8	-	8	mSec		
Tri-State Mode (Input to Pin 2)	Enable	0.7 x V _{DD}	-	0.7 x V _{DD}	-	0.7 x V _{DD}	-	V	
	Disable	-	0.3 x V _{DD}	-	0.3 x V _{DD}	-	0.3 x V _{DD}		
Standby Current	-	90	-	80	-	70	mA		
Phase Noise		Typ.	Max.	Typ.	Max.	Typ.	Max.		
At V _{DD} =3.3V, F _{out} =873.515MHz	1kHz offset	-106	-	-106	-	-106	-	dBc/Hz	
	10kHz offset	-115	-	-115	-	-115	-		
	100kHz offset	-123	-	-123	-	-123	-		
	1MHz offset	-133	-	-133	-	-133	-		
	10MHz offset	-150	-	-150	-	-150	-		
RMS Phase Jitter (12kHz to 20MHz)	150	300	150	300	150	300	fs		
Period Jitter	-	50	-	50	-	50	ps		

Parameter	CML						unit		
	3.3V		2.5V		1.8V				
	Min.	Max.	Min.	Max.	Min.	Max.			
Supply Voltage Variation (V _{DD}) ±5%	-	-	-	-	1.71	1.89	V		
Supply Voltage Variation (V _{DD}) ±10%	3.63	2.97	2.25	2.75	-	-			
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								
Supply Current	-	90	-	80	-	70	mA		
Output Level	Output High	V _{DD} -0.085	V _{DD}	V _{DD} -0.085	V _{DD}	V _{DD} -0.085	V _{DD}	V	
	Output Low	V _{DD} -0.6	V _{DD} -0.32	V _{DD} -0.6	V _{DD} -0.32	V _{DD} -0.6	V _{DD} -0.32		
Transition Time (20%-80%)	Rise Time / Fall Time		-	0.35	-	0.35	-	0.35	nSec
Duty Cycle	45	55	45	55	45	55	%		
Startup Time	-	8	-	8	-	8	mSec		
Tri-State Mode (Input to Pin 2)	Enable	0.7 x V _{DD}	-	0.7 x V _{DD}	-	0.7 x V _{DD}	-	V	
	Disable	-	0.3 x V _{DD}	-	0.3 x V _{DD}	-	0.3 x V _{DD}		
Standby Current	-	90	-	80	-	70	mA		
Phase Noise		Typ.	Max.	Typ.	Max.	Typ.	Max.		
At V _{DD} =3.3V, F _{out} =873.515MHz	1kHz offset	-107	-	-107	-	-107	-	dBc/Hz	
	10kHz offset	-117	-	-117	-	-117	-		
	100kHz offset	-125	-	-125	-	-125	-		
	1MHz offset	-135	-	-135	-	-135	-		
	10MHz offset	-150	-	-150	-	-150	-		
RMS Phase Jitter (12kHz to 20MHz)	150	300	150	300	150	300	fs		
Period Jitter	-	50	-	50	-	50	ps		

Parameter	HCSL						Unit	
	3.3V		2.5V		1.8V			
	Min.	Max.	Min.	Max.	Min.	Max.		
Supply Voltage Variation (V _{DD})±10%	3.63	2.97	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	55	45	55	45	55	%	
Startup Time	-	8	-	8	-	8	mSec	
Tri-State mode (Input to Pin 2)	Enable	0.7 x V _{DD}	-	0.7x V _{DD}	-	0.7xV _{DD}	-	V
	Disable	-	0.3 x V _{DD}	-	0.3 x V _{DD}	-	0.3 x V _{DD}	V
Stand by Current	Disable	-	115	-	100	-	94	mA
Output Load	50 ohms to GND							
Phase Noise		Typ.	Max.	Typ.	Max.	Typ.	Max.	
At V _{DD} =3.3V, f _{out} =873.515MHz	1kHz offset	-87	-	-87	-	-87	-	dBc/Hz
	10kHz offset	-110	-	-110	-	-110	-	
	100kHz offset	-127	-	-127	-	-127	-	
	1MHz offset	-138	-	-138	-	-138	-	
	10MHz offset	-153	-	-153	-	-153	-	
RMS Phase Jitter (12KHz to 20MHz)	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.

Specifications subject to change without notice.

Parameter	CMOS						unit		
	3.3V		2.5V		1.8V				
	Min.	Max.	Min.	Max.	Min.	Max.			
Supply Voltage Variation (V _{DD}) ±5%	–	–	–	–	1.71	1.89	V		
Supply Voltage Variation (V _{DD}) ±10%	3.63	2.97	2.25	2.75	–	–			
Frequency Range	15	250	15	250	15	250	MHz		
Supply Current	–	90	–	80	–	70	mA		
Output Level	Output High	0.9 x V _{DD}	–	0.9 x V _{DD}	–	0.9 x V _{DD}	–		
	Output Low	–	0.1 x V _{DD}	–	0.1 x V _{DD}	–	0.1 x V _{DD}		
Transition Time (20%-80%)	Rise Time / Fall Time		–	1.2	–	1.5	–	2	nSec
Duty Cycle	F _{out} <100MHZ	45	55	45	55	45	55	%	
	F _{out} >100MHZ	40	60	40	60	40	60		
Startup Time	–	8	–	8	–	8	–	mSec	
Tri-State Mode (Input to Pin 2)	Enable	0.7 x V _{DD}	–	0.7 x V _{DD}	–	0.7 x V _{DD}	–	V	
	Disable	–	0.3 x V _{DD}	–	0.3 x V _{DD}	–	0.3 x V _{DD}		
Period Jitter	–	100	–	100	–	100	–	mA	

FREQ. STABILITY vs. TEMP. RANGE

Temp. (°C)	ppm	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 (1st year), shock, and vibration

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