

# OT Type

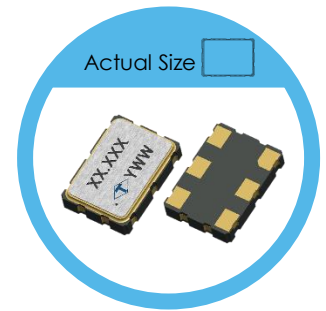
## 7.0 x 5.0 mm SMD Differential Output Crystal Oscillator

### FEATURES

- Conforms to AEC-Q200
- Industry Standard 7.0 x 5.0 x 1.45mm Hermetically Sealed Ceramic Package
- Ultra Low Jitter Performance: Typical 0.15pS RMS from 12kHz - 20MHz
- Fundamental/3rd Overtone Crystal Design
- Output Frequency up to 220MHz
- Operating Temperature up to 125°C

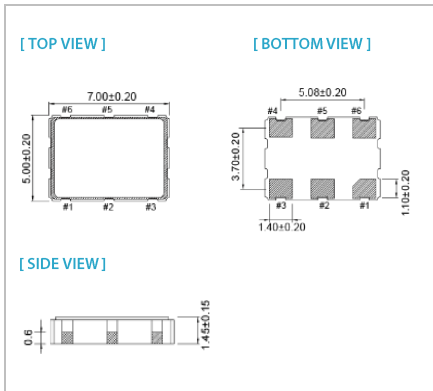
### TYPICAL APPLICATION

- 10Gbit Ethernet, Fiber Channel, Storage Area Network, SONET
- Enterprise Servers, Reference Clocks for ADC and DAC, Telecom

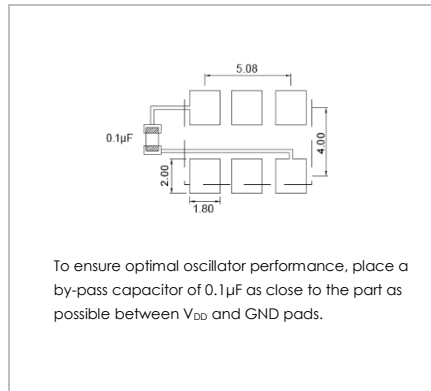


RoHS Compliant

### DIMENSION (mm)



### SOLDER PAD LAYOUT (mm)



To ensure optimal oscillator performance, place a by-pass capacitor of 0.1µF as close to the part as possible between V<sub>DD</sub> and GND pads.

### PIN FUNCTION (mm)

PIN#	FUNCTION
1	NC/Tri-State
2	Tri-State/NC
3	GND
4	Output
5	Comp. Output
6	V <sub>DD</sub>

### ELECTRICAL SPECIFICATION

Parameter	LVPECL				Unit	Test Condition	
	3.3V		2.5V				
	Min.	Max.	Min.	Max.			
Supply Voltage Variation (V <sub>DD</sub> )	V <sub>DD</sub> - 10%	V <sub>DD</sub> + 10%	V <sub>DD</sub> - 5%	V <sub>DD</sub> + 5%	V		
Frequency Range	13.5	220	13.5	220	MHz		
Standard Frequency	100, 125, 156.25				MHz	Standard frequencies are frequencies which the crystal has been designed and does not imply a stock position.	
Power Current Consumption		55		55	mA		
Output Level	Output High	2.215	2.42	1.415	1.64	V	
	Output Low	1.49	1.68	0.69	0.88	V	
Transition Time	Rise Time		0.6		0.6	nSec	Transition times are measured between 20% and 80%
	Fall Time		0.6		0.6	nSec	
Duty Cycle	45	55	45	55	%		
Startup Time		10		10	mSec		
Tri-State	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		10		10	µA		
Output Loading	50Ω, V <sub>DD</sub> - 2V						
RMS Phase Jitter Integrated 12 kHz~20 MHz @ 3.3V	13.5MHz~80MHz		1		1	pSec	
	80MHz~220MHz		0.3		0.3	pSec	
Aging (@ 25°C, First Year)		±3		±3	ppm		
Storage Temp. Range	-55	125	-55	125	°C		
Phase Noise	Typ.	Max.	Typ.	Max.			
At V <sub>DD</sub> =3.3V, f <sub>out</sub> =156.25MHz	10kHz offset	-143		-145		dBc/Hz	
	100kHz offset	-151		-154		dBc/Hz	
	1MHz offset	-155		-155		dBc/Hz	

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> )	V <sub>DD</sub> - 10%	V <sub>DD</sub> + 10%	V <sub>DD</sub> - 5%	V <sub>DD</sub> + 5%	V <sub>DD</sub> - 5%	V <sub>DD</sub> + 5%	V		
Frequency Range	13.5	220	13.5	220	13.5	220	MHz		
Standard Frequency	100, 125, 156.25						MHz	Standard frequencies are frequencies which the crystal has been designed and does not imply a stock position.	
Power Current Consumption		35		30		20	mA		
Output Level	Differential Output (V <sub>OD</sub> , OUT-OUTN)	0.24	0.45	0.24	0.45	0.24	0.45	V	
	Output High		1.6		1.6		1.6	V	
	Output Low	0.9		0.9		0.9		V	
Transition Time	Rise Time		0.3		0.3		0.5	nSec	Transition times are measured between 20% and 80%
	Fall Time		0.3		0.3		0.5	nSec	
Duty Cycle		45	55	45	55	45	55	%	
Startup Time			5		5		10	mSec	
Tri-State	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		10		10		10	μA		
Output Loading	100Ω (Between OUT & OUTN)						Ω		
RMS Phase Jitter Integrated 12 kHz~20 MHz @ 3.3V		0.3		0.3		0.3	pSec		
Aging (@ 25°C, First Year)		±3		±3		±3	ppm		
Storage Temp. Range		-55	125	-55	125	-55	125	°C	
Phase Noise		Typ.	Max.	Typ.	Max.	Typ.	Max.		
At V <sub>DD</sub> =3.3V, f <sub>out</sub> =156.25MHz	10kHz offset	-145		-145		-142		dBc/Hz	
	100kHz offset	-153		-153		-150		dBc/Hz	
	1MHz offset	-155		-155		-153		dBc/Hz	

Parameter	HCSL						Unit	Test Condition	
	3.3V		2.5V		1.8V				
	Min.	Max.	Min.	Max.	Min.	Max.			
Supply Voltage Variation (V <sub>DD</sub> )	V <sub>DD</sub> - 10%	V <sub>DD</sub> + 10%	V <sub>DD</sub> - 5%	V <sub>DD</sub> + 5%	V <sub>DD</sub> - 5%	V <sub>DD</sub> + 5%	V		
Frequency Range	100	135	100	135	100	135	MHz		
Standard Frequency	100, 125, 156.25						MHz	Standard frequencies are frequencies which the crystal has been designed and does not imply a stock position.	
Power Current Consumption		42		42		30	mA		
Output Level	Output High	0.6	0.9	0.6	0.9	0.55	1.0	V	
	Output Low	-0.15	0.15	-0.15	0.15	-0.15	0.15	V	
Transition Time	Rise Time		0.6		0.6		0.6	nSec	Transition times are measured between 20% and 80%
	Fall Time		0.6		0.6		0.6	nSec	
Duty Cycle		45	55	45	55	45	55	%	
Startup Time			10		10		10	mSec	
Tri-State	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		10		10		10	μA		
Output Loading	50 to GND						Ω		
RMS Phase Jitter Integrated 12 kHz~20 MHz @ 3.3V		0.3		0.3		0.3	pSec		
Aging (@ 25°C, First Year)		±3		±3		±3	ppm		
Storage Temp. Range		-55	125	-55	125	-55	125	°C	
Phase Noise		Typ.	Max.	Typ.	Max.	Typ.	Max.		
At V <sub>DD</sub> =3.3V, f <sub>out</sub> =156.25MHz	10kHz offset	-145		-145		-142		dBc/Hz	
	100kHz offset	-153		-153		-150		dBc/Hz	
	1MHz offset	-155		-155		-153		dBc/Hz	

## FREQ. STABILITY vs. TEMP. RANGE

Temp.(°C)	ppm	±25	±50
		-20 ~ +70	○
-40 ~ +85		○	○
-40 ~ +105		X	○
-40 ~ +125		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

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

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