

# OW-U Type Ultra low noise Crystal Oscillator

## 5.0 x 3.2 x 1.25 mm SMD package (RMS jitter : 50fs typical) Low Phase

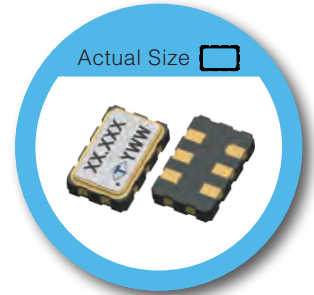
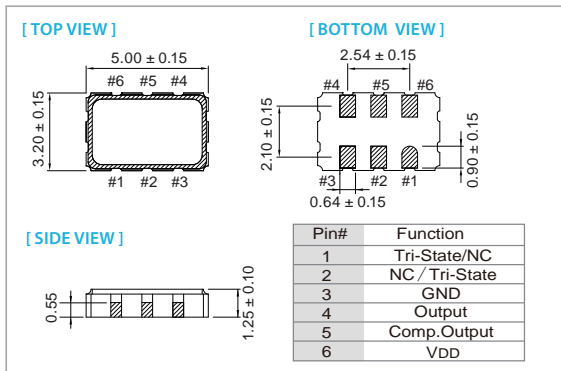
### FEATURE

- Typical 5.0 x 3.2 x 1.25mm ceramic SMD package.
- Ultra low integrated phase jitter < 100fs, 12kHz to 20MHz
- Typical phase jitter 50fs @ 156.25MHz
- Differential output level : LVPECL /LVDS/HCSL
- Operation supply voltage: 1.8V, 2.5V and 3.3V
- Pb-free/RoHS compliant

### TYPICAL APPLICATION

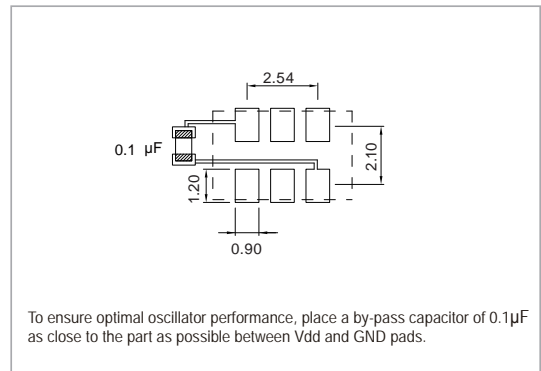
- 40Gbit/100Gbit Ethernet, MAN, SONET
- Fiber Channel
- Test Instrumentation

### DIMENSION (mm)



**RoHS Compliant**

### SOLDER PAD LAYOUT (mm)



### ELECTRICAL SPECIFICATION

Parameter	LVPECL				Unit	
	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	100	220	100	220	MHz	
Standard frequency	100, 125, 156.25				MHz	
Power current consumption:	-	65	-	65	mA	
Output Level						
Output High	2.215	2.42	1.415	1.64	V	
Output Low	1.49	1.68	0.69	1.88	V	
Transition Time	Rise Time	-	0.4	-	0.4	nSec
	Fall Time	-	0.4	-	0.4	nSec
Duty Cycle	45	55	45	55	%	
Start-up Time	-	5	-	5	mSec	
Tri-State	Output Enable	0.7 x V <sub>DD</sub>	-	0.7 x V <sub>DD</sub>	-	V
	Output Disable	-	0.3 x V <sub>DD</sub>	-	0.3 x V <sub>DD</sub>	
Stand by Current	-	30	-	30	µA	
Output Loading	50Ω, V <sub>DD</sub> -2V					
Phase Noise						
@ V <sub>DD</sub> =3.3V 156.25MHz	offset 10kHz	Typ.: -150		Typ.: -150		dBc/Hz
	offset 100kHz	Typ.: -155		Typ.: -155		dBc/Hz
	offset 1MHz	Typ.: -160		Typ.: -160		dBc/Hz
RMS Phase Jitter Integrated 12KHz to 20MHz @156.25MHz	-	0.1	-	0.1	pSec	
Aging (@ 25°C, First Year)	±3		±3		°C	
Storage Temp. Range	-55	125	-55	125	°C	

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

Parameters	LVDS						Unit	
	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	175	100	175	100	175	MHz	
Standard frequency	100, 125, 156.25						MHz	
Power current consumption:	-	35	-	35	-	25	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	-	0.4	nSec
	Fall Time	-	0.3	-	0.3	-	0.4	nSec
Duty Cycle	45	55	45	55	45	55	%	
Start-up Time	-	5	-	5	-	5	mSec	
Tri-State	Output Enable	0.7 x V <sub>DD</sub>	-	0.7 x V <sub>DD</sub>	-	0.7 x V <sub>DD</sub>	-	V
	Output Disable	-	0.3 x V <sub>DD</sub>	-	0.3 x V <sub>DD</sub>	-	0.3 x V <sub>DD</sub>	
Stand by Current	-	30	-	30	-	30	uA	
Output Loading	100						Ω	
Phase Noise								
@ V <sub>DD</sub> =3.3V 156.25MHz	offset 10kHz	Typ.: -150		Typ.: -150		Typ.: -150		dBc/Hz
	offset 100kHz	Typ.: -155		Typ.: -155		Typ.: -155		dBc/Hz
	offset 1MHz	Typ.: -160		Typ.: -160		Typ.: -160		dBc/Hz
RMS Phase Jitter Integrated 12KHz to 20MHz @156.25MHz	-	0.1	-	0.1	-	0.1	pSec	
Aging (@ 25°C, First Year)	±3		±3		±3		ppm	
Storage Temp. Range	-55	125	-55	125	-55	125	°C	

Parameter	HCSL						Unit	
	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	
Power current consumption:	-	46	-	46	-	46	mA	
Output Level								
Output High	0.6	0.9	0.6	0.9	0.5	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
	Fall Time	-	0.6	-	0.6	-	0.6	nSec
Duty Cycle	45	55	45	55	45	55	%	
Start-up Time	-	5	-	5	-	5	mSec	
Tri-State	Output Enable	0.7 x V <sub>DD</sub>	-	0.7 x V <sub>DD</sub>	-	0.7 x V <sub>DD</sub>	-	V
	Output Disable	-	0.3 x V <sub>DD</sub>	-	0.3 x V <sub>DD</sub>	-	0.3 x V <sub>DD</sub>	
Stand by Current	-	30	-	30	-	30	uA	
Output Loading	50 (To GND)						Ω	
Phase Noise								
offset 10kHz	Typ.: -150		Typ.: -150		Typ.: -150		dBc/Hz	
offset 100kHz	Typ.: -155		Typ.: -155		Typ.: -155		dBc/Hz	
offset 1MHz	Typ.: -160		Typ.: -160		Typ.: -160		dBc/Hz	
RMS Phase Jitter Integrated 12KHz to 20MHz @156.25MHz	-	0.1	-	0.1	-	0.1	pSec	
Aging (@ 25°C, First Year)	±3		±3		±3		ppm	
Storage Temp. Range	-55	125	-55	125	-55	125	°C	

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

Specifications subject to change without notice.

### FREQ. STABILITY vs. TEMP. RANGE

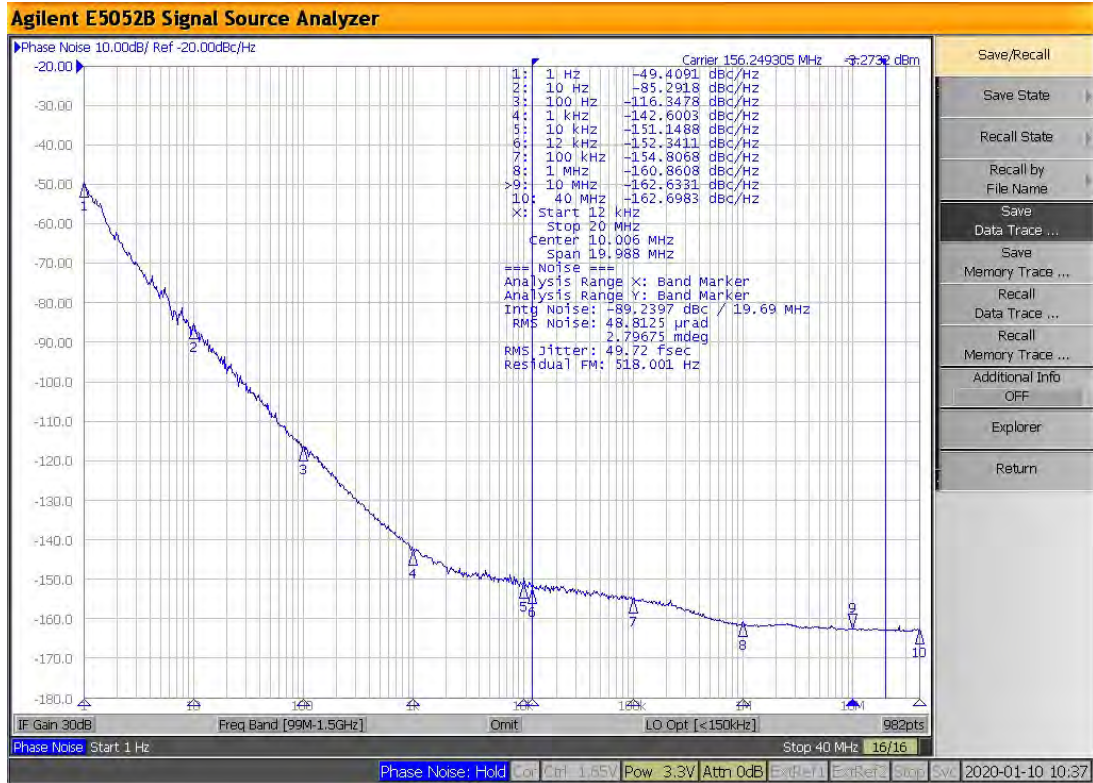
Temp. (°C)	ppm		
	± 20	± 25	± 50
-10 ~ +60	○	○	○
-20~+70	○	○	○
-40~+85	△	○	○
-40~+105	X	X	○
-40~+125	X	X	△

\* ○ : 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

### Phase Noise Test Data

**Output level: LVPECL, Fout=156.25MHz, VDD=3.3V, Ta=25°C**



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