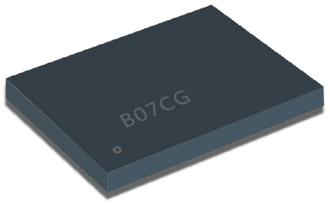


Features

- Any frequency between 1 MHz and 220 MHz accurate to 6 decimal places
- LVPECL and LVDS output signaling types
- 0.6ps RMS phase jitter (random) over 12 kHz to 20 MHz bandwidth
- Frequency stability as low as ±10 ppm
- Industrial and extended commercial temperature ranges
- Industry-standard packages: 3.2x2.5, 5.0x3.2 and 7.0x5.0 mmxmm
- For frequencies higher than 220 MHz, refer to YSO9122MR datasheet

Applications

- 10GB Ethernet, SONET, SATA, SAS, Fibre Channel, PCI-Express
- Telecom, networking, instrumentation, storage, servers

Electrical Characteristics

Parameter and Conditions	Symbol	Min.	Typ.	Max.	Unit	Condition
LVPECL and LVDS, Common Electrical Characteristics						
Supply Voltage	Vdd	2.97	3.3	3.63	V	
		2.25	2.5	2.75	V	
		2.25	–	3.63	V	Termination schemes in Figures 1 and 2 - XX ordering code
		1.71	1.8	1.89	V	Only for LVDS output
Output Frequency Range	f	1	–	220	MHz	
Frequency Stability	F_stab	-10	–	+10	ppm	Inclusive of initial tolerance, operating temperature, rated power supply voltage, and load variations
		-20	–	+20	ppm	
		-25	–	+25	ppm	
		-50	–	+50	ppm	
First Year Aging	F_aging1	-2	–	+2	ppm	25°C
10-year Aging	F_aging10	-5	–	+5	ppm	25°C
Operating Temperature Range	T_use	-40	–	+85	°C	Industrial
		-20	–	+70	°C	Extended Commercial
Input Voltage High	VIH	70%	–	–	Vdd	Pin 1, OE or $\overline{ST}$
Input Voltage Low	VIL	–	–	30%	Vdd	Pin 1, OE or $\overline{ST}$
Input Pull-up Impedance	Z_in	–	100	250	kΩ	Pin 1, OE logic high or logic low, or $\overline{ST}$ logic high
		2	–	–	MΩ	Pin 1, $\overline{ST}$ logic low
Start-up Time	T_start	–	6	10	ms	Measured from the time Vdd reaches its rated minimum value.
Resume Time	T_resume	–	6	10	ms	In Standby mode, measured from the time $\overline{ST}$ pin crosses 50% threshold.
Duty Cycle	DC	45	–	55	%	
LVPECL, DC and AC Characteristics						
Current Consumption	Idd	–	61	69	mA	Excluding Load Termination Current, Vdd = 3.3V or 2.5V
OE Disable Supply Current	I_OE	–	–	35	mA	OE = Low
Output Disable Leakage Current	I_leak	–	–	1	µA	OE = Low
Standby Current	I_std	–	–	100	µA	$\overline{ST}$ = Low, for all Vdds
Maximum Output Current	I_driver	–	–	30	mA	Maximum average current drawn from OUT+ or OUT-
Output High Voltage	VOH	Vdd-1.1	–	Vdd-0.7	V	See Figure 1(a)
Output Low Voltage	VOL	Vdd-1.9	–	Vdd-1.5	V	See Figure 1(a)
Output Differential Voltage Swing	V_Swing	1.2	1.6	2.0	V	See Figure 1(b)
Rise/Fall Time	Tr, Tf	–	300	700	ps	20% to 80%, see Figure 1(a)
OE Enable/Disable Time	T_oe	–	–	115	ns	f = 212.5 MHz - For other frequencies, T_oe = 100ns + 3 period
RMS Period Jitter	T_jitt	–	1.2	1.7	ps	f = 100 MHz, VDD = 3.3V or 2.5V
		–	1.2	1.7	ps	f = 156.25 MHz, VDD = 3.3V or 2.5V
		–	1.2	1.7	ps	f = 212.5 MHz, VDD = 3.3V or 2.5V
RMS Phase Jitter (random)	T_phj	–	0.6	0.85	ps	f = 156.25 MHz, Integration bandwidth = 12 kHz to 20 MHz, all Vdds
LVDS, DC and AC Characteristics						
Current Consumption	Idd	–	47	55	mA	Excluding Load Termination Current, Vdd = 3.3V or 2.5V
OE Disable Supply Current	I_OE	–	–	35	mA	OE = Low
Differential Output Voltage	VOD	250	350	450	mV	See Figure 2

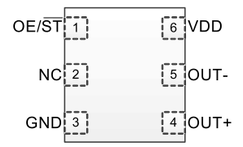
Electrical Characteristics (continued)

Parameter and Conditions	Symbol	Min.	Typ.	Max.	Unit	Condition
LVDS, DC and AC Characteristics (continued)						
Output Disable Leakage Current	I_leak	–	–	1	µA	OE = Low
Standby Current	I_std	–	–	100	µA	$\overline{ST}$ = Low, for all Vdds
VOD Magnitude Change	ΔVOD	–	–	50	mV	See Figure 2
Offset Voltage	VOS	1.125	1.2	1.375	V	See Figure 2
VOS Magnitude Change	ΔVOS	–	–	50	mV	See Figure 2
Rise/Fall Time	Tr, Tf	–	495	700	ps	20% to 80%, see Figure 2
OE Enable/Disable Time	T_oe	–	–	115	ns	f = 212.5 MHz - For other frequencies, T_oe = 100ns + 3 period
RMS Period Jitter	T_jitt	–	1.2	1.7	ps	f = 100 MHz, VDD = 3.3V or 2.5V
		–	1.2	1.7	ps	f = 156.25 MHz, VDD = 3.3V or 2.5V
		–	1.2	1.7	ps	f = 212.5 MHz, VDD = 3.3V or 2.5V
RMS Phase Jitter (random)	T_phj	–	0.6	0.85	ps	f = 156.25 MHz, Integration bandwidth = 12 kHz to 20 MHz, all Vdds

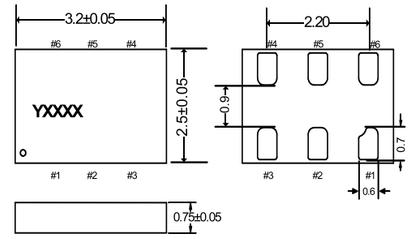
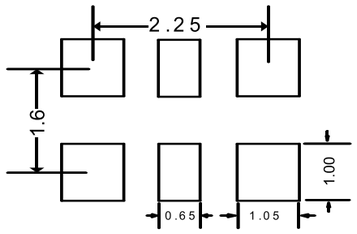
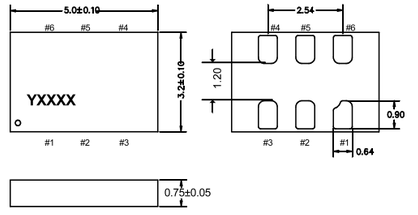
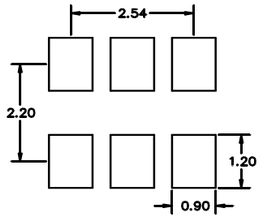
Pin Description

Pin	Map	Functionality	
1	OE	Input	H or Open: specified frequency output L: output is high impedance
	$\overline{ST}$	Input	H or Open: specified frequency output L: Device goes to sleep mode. Supply current reduces to I_std.
2	NC	NA	No Connect; Leave it floating or connect to GND for better heat dissipation
3	GND	Power	VDD Power Supply Ground
4	OUT+	Output	Oscillator output
5	OUT-	Output	Complementary oscillator output
6	VDD	Power	Power supply voltage

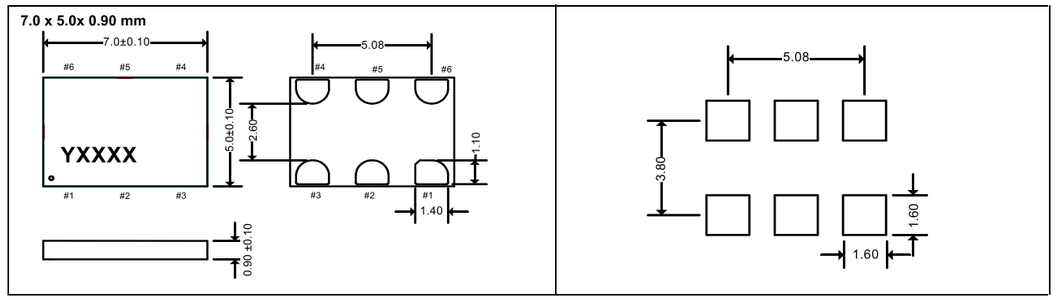
Top View



Dimensions and Patterns

Package Size – Dimensions (Unit: mm)[1]	Recommended Land Pattern (Unit: mm)[2]
3.2 x 2.5x 0.75 mm	
	
5.0 x 3.2 x 0.75 mm	
	

Dimensions and Patterns



Notes:

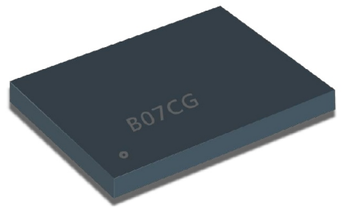
1. Top Marking: Y denotes manufacturing origin and XXXX denotes manufacturing lot number. The value of “Y” will depend on the assembly location of the device.
2. A capacitor of value 0.1 μF between Vdd and GND is recommended.

PART Number Guide

Quartz Crystal Oscillator	Dimensions	Frequency (Hz)	Supply voltage (V)	Frequency Stability Overall (ppm)	Output	Pin	Material	Operating Temp. Range
O	7050	125M	E	D	B	6	M	I

Frequencies Not Supported

Range 1: From 209.000001 MHz to 210.999999 MHz



Features

- Any frequency between 220 MHz and 625 MHz accurate to 6 decimal places
- LVPECL and LVDS output signaling types
- 0.6ps RMS phase jitter (random) over 12 kHz to 20 MHz bandwidth
- Frequency stability as low as ±10 ppm
- Industrial and extended commercial temperature ranges
- Industry-standard packages: 3.2x2.5, 5.0x3.2 and 7.0x5.0 mmxmm
- For frequencies lower than 220 MHz, refer to YSO9121MR datasheet

Applications

- 10GB Ethernet, SONET, SATA, SAS, Fibre Channel, PCI-Express
- Telecom, networking, instrumentation, storage, servers

Electrical Characteristics

Parameter and Conditions	Symbol	Min.	Typ.	Max.	Unit	Condition
LVPECL and LVDS, Common Electrical Characteristics						
Supply Voltage	Vdd	2.97	3.3	3.63	V	
		2.25	2.5	2.75	V	
		2.25	–	3.63	V	Termination schemes in Figures 1 and 2 - XX ordering code
Output Frequency Range	f	220	–	625	MHz	
Frequency Stability	F_stab	-10	–	+10	ppm	Inclusive of initial tolerance, operating temperature, rated power supply voltage, and load variations
		-20	–	+20	ppm	
		-25	–	+25	ppm	
		-50	–	+50	ppm	
First Year Aging	F_aging1	-2	–	+2	ppm	25°C
10-year Aging	F_aging10	-5	–	+5	ppm	25°C
Operating Temperature Range	T_use	-40	–	+85	°C	Industrial
		-20	–	+70	°C	Extended Commercial
Input Voltage High	VIH	70%	–	–	Vdd	Pin 1, OE or $\overline{ST}$
Input Voltage Low	VIL	–	–	30%	Vdd	Pin 1, OE or $\overline{ST}$
Input Pull-up Impedance	Z_in	–	100	250	kΩ	Pin 1, OE logic high or logic low, or $\overline{ST}$ logic high
		2	–	–	MΩ	Pin 1, $\overline{ST}$ logic low
Start-up Time	T_start	–	6	10	ms	Measured from the time Vdd reaches its rated minimum value.
Resume Time	T_resume	–	6	10	ms	In Standby mode, measured from the time $\overline{ST}$ pin crosses 50% threshold.
Duty Cycle	DC	45	–	55	%	
LVPECL, DC and AC Characteristics						
Current Consumption	Idd	–	61	69	mA	Excluding Load Termination Current, Vdd = 3.3V or 2.5V
OE Disable Supply Current	I_OE	–	–	35	mA	OE = Low
Output Disable Leakage Current	I_leak	–	–	1	μA	OE = Low
Standby Current	I_std	–	–	100	μA	$\overline{ST}$ = Low, for all Vdds
Maximum Output Current	I_driver	–	–	30	mA	Maximum average current drawn from OUT+ or OUT-
Output High Voltage	VOH	Vdd-1.1	–	Vdd-0.7	V	See Figure 1(a)
Output Low Voltage	VOL	Vdd-1.9	–	Vdd-1.5	V	See Figure 1(a)
Output Differential Voltage Swing	V_Swing	1.2	1.6	2.0	V	See Figure 1(b)
Rise/Fall Time	Tr, Tf	–	300	500	ps	20% to 80%, see Figure 1(a)
OE Enable/Disable Time	T_oe	–	–	115	ns	f = 220 MHz - For other frequencies, T_oe = 100ns + 3 period
RMS Period Jitter	T_jitt	–	1.2	1.7	ps	f = 266 MHz, VDD = 3.3V or 2.5V
		–	1.2	1.7	ps	f = 312.5 MHz, VDD = 3.3V or 2.5V
		–	1.2	1.7	ps	f = 622.08 MHz, VDD = 3.3V or 2.5V
RMS Phase Jitter (random)	T_phj	–	0.6	0.85	ps	f = 312.5 MHz, Integration bandwidth = 12 kHz to 20 MHz, all Vdds
LVDS, DC and AC Characteristics						
Current Consumption	Idd	–	47	55	mA	Excluding Load Termination Current, Vdd = 3.3V or 2.5V
OE Disable Supply Current	I_OE	–	–	35	mA	OE = Low
Differential Output Voltage	VOD	250	350	450	mV	See Figure 2