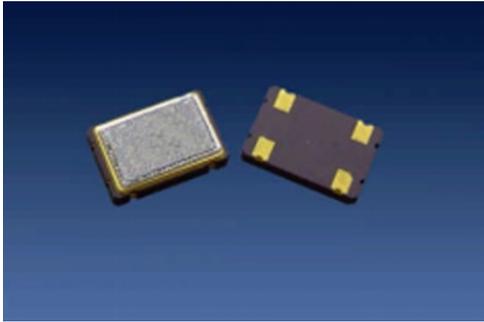
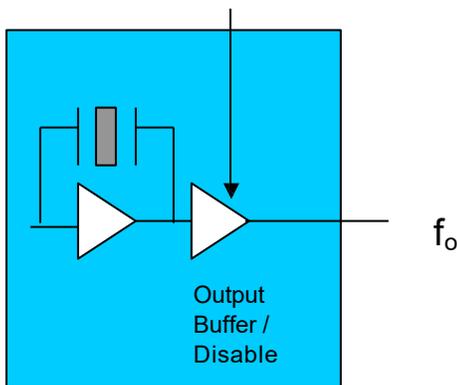


GXL GSV1 series

1.8, 2.5, 3.3, 5.0 volt CMOS Oscillator



The GSV1 Crystal Oscillator



Features

- CMOS output
- Output frequencies to 125 MHz
- Low jitter, Fundamental or 3rd OT Crystal
- Tristate output for board test and debug
- -55/125 or -40/85 °C operating temperature
- Gold over nickel contact pads
- Hermetically sealed ceramic SMD package
- Product is compliant to RoHS directive  and fully compatible with lead free assembly

Applications

- SONET/SDH/DWDM
- Ethernet, Gigabit Ethernet
- Storage Area Network
- Digital Video
- Broadband Access
- Microprocessors/DSP/FPGA

Description

GXL's GSV1 Crystal Oscillator (XO) is quartz stabilized square wave generator with a CMOS output, operating off either 1.8, 2.5, 3.3 or 5.0 volt supply.

The GSV1 uses fundamental or 3rd overtone crystals for output frequencies >50MHz resulting in low jitter performance. Also a monolithic IC, which improves reliability and reduces cost, is hermetically sealed.

Performance Characteristics

Table 1. Electrical Performance, 5V option					
Parameter	Symbol	Min	Typical	Maximum	Units
Frequency	f_0	1.544		75.000	MHz
Operating Supply Voltage ¹	V_{DD}	4.5		5.5	V
Absolute Maximum Supply Voltage		-0.7		7.0	V
Supply Current, Output Enabled	I_{DD}				mA
< 1.50 MHz				7	
1.500 to 20MHz				10	
20.01 to 50 MHz				30	
50.01 to 75 MHz				40	
Supply Current, Out disabled	I_{DD}			30	uA
Output Logic Levels					
Output Logic High ²	V_{OH}	$0.9 \cdot V_{DD}$			V
Output Logic Low ²	V_{OL}			$0.1 \cdot V_{DD}$	V
Output Logic High Drive	I_{OH}	16			mA
Output Logic Low Drive	I_{OL}	16			mA
Output Rise/Fall Time ²	t_R/t_F				ns
< 20.00 MHz				8	
20.01 to 50.00 MHz				5	
50.01 to 75.00MHz				2	
Duty Cycle ³ (ordering option)	SYM		45/55		%
Operating temperature (ordering option)			-55/125 or -40/85		°C
Stability ⁴ (ordering option)			$\pm 50, \pm 100$		ppm
RMS Jitter, 12kHz to 20 MHz			0.5	1	ps
Period Jitter					ps
RMS			3.0		
Peak to Peak			21		
Output Enable/Disable ⁵					V
Output Enabled		4.0			
Output Disabled				0.8	
Internal Enable Pull-Up resistor ⁵			100		Kohm
Start-up time				8	ms

1. A 0.01uF and a 0.1uF capacitor should be located as close to the supply as possible (to ground) is recommended.
2. Figure 1 defines these parameters. Figure 2 illustrates the operating conditions under which these parameters are tested and specified.
3. Symmetry is measured defined as On Time/Period.
4. Includes calibration tolerance, operating temperature, supply voltage variations, and shock and vibration (not under operation). 50 and 100ppm options include aging.
5. Output will be enabled if enable/disable is left open.

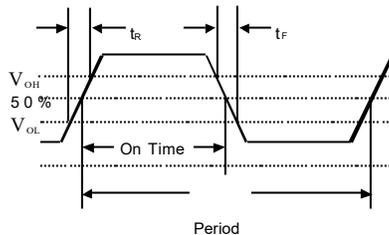


Figure 1. Output Waveform

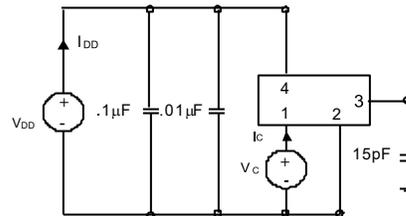


Figure 2. Typical Output Test Conditions ($25 \pm 5^\circ C$)

GSV1 Data sheet

Table 2. Electrical Performance, 3.3V option					
Parameter	Symbol	Min	Typical	Maximum	Units
Frequency	f_O	1.544		125.000	MHz
Operating Supply Voltage ¹	V_{DD}	2.97	3.3	3.63	V
Absolute Maximum Operating Voltage		-0.5		5.0	V
Supply Current, Output Enabled	I_{DD}				mA
< 1.500 MHz				5	
1.5 to 20 MHz				7	
20.01 to 50 MHz				20	
50.01 to 75 MHz				30	
75.01 to 100 MHz				40	
100.01 to 125 MHz				46	
Supply Current, Output disabled	I_{DD}			30	uA
Output Logic Levels					
Output Logic High ²	V_{OH}	$0.9 \cdot V_{DD}$		$0.1 \cdot V_{DD}$	V
Output Logic Low ²	V_{OL}				V
Output Logic High Drive	I_{OH}	8			mA
Output Logic Low Drive	I_{OL}	8			mA
Output Rise/Fall Time ²	t_R/t_F				ns
< 20.00 MHz				10	
20.01 to 50.00 MHz				6	
50.01 to 125.00 MHz				3	
Duty Cycle ³ (ordering option)	SYM		45/55		%
Operating temperature (ordering option)			-55/125 or -40/85		°C
Stability ⁴ (ordering option)			$\pm 50, \pm 100$		ppm
RMS Jitter, 12kHz to 20 MHz			0.5	1	ps
Period Jitter					ps
RMS			3.0		
Peak to Peak			21		
Output Enable/Disable ⁵					V
Output Enabled		2.0			
Output Disabled				0.5	
Internal Enable Pull-Up resistor ⁵			100		Kohm
Start-up time				8	ms

1. A 0.01uF and a 0.1uF capacitor should be located as close to the supply as possible (to ground) is recommended.
2. Figure 3 defines these parameters. Figure 4 illustrates the operating conditions under which these parameters are tested and specified. For $f_O > 90\text{MHz}$, rise and fall time is measured 20 to 80%.
3. Symmetry is measured defined as OnTime/Period.
4. Includes calibration tolerance, operating temperature, supply voltage variations, and shock and vibration (not under operation). 50 and 100ppm options include aging.
5. Output will be enabled if enable/disable is left open.

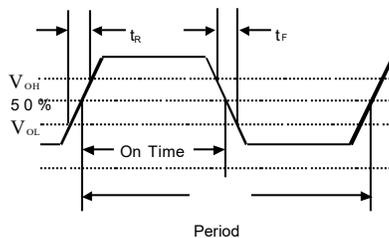


Figure 3. Output Waveform

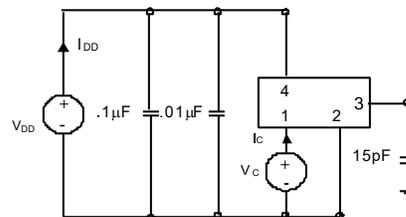


Figure 4. Typical Output Test Conditions ($25 \pm 5^\circ\text{C}$)

GSV1 Data sheet

Table 3. Electrical Performance, 2.5V option					
Parameter	Symbol	Min	Typical	Maximum	Units
Frequency	f_O	1.544		125.000	MHz
Operating Supply Voltage ¹	V_{DD}	2.25	2.5	2.75	V
Absolute Maximum Voltage		-0.5		5.0	V
Supply Current, Output Enabled < 1.5 MHz 1.500 to 20 MHz 20.01 to 50 MHz 50.01 to 75 MHz 75.01 to 100 MHz 100.01 to 125 MHz	I_{DD}			5.0 7.0 15.0 20.0 26.0 36.0	mA
Supply Current, Out disabled	I_{DD}			30	uA
Output Logic Levels Output Logic High ² Output Logic Low ² Output Logic High Drive Output Logic Low Drive Output Logic High Drive ³ Output Logic Low Drive ³	V_{OH} V_{OL} I_{OH} I_{OL} I_{OH} I_{OL}	0.9* V_{DD} 4 4 8 8		0.1* V_{DD}	V V mA mA mA mA
Output Rise/Fall Time ² < 20.000 MHz 20.01 to 50.00 MHz 50.01 to 125.00 MHz	t_R/t_F			10 6 3	ns
Duty Cycle ⁴ (ordering option)	SYM		45/55		%
Operating temperature (ordering option)			-55/125 or -40/85		°C
Stability ⁵ (ordering option)			±50, ±100		ppm
RMS Jitter, 12kHz to 20 MHz			0.5	1	ps
Period Jitter RMS Peak to Peak			3.0 21		ps
Output Enable/Disable ⁶ Output Enabled Output Disabled		1.75		0.5	V
Internal Enable Pull-Up resistor ⁶			100		Kohm
Start-up time				8	ms

1. A 0.01uF and a 0.1uF capacitor should be located as close to the supply as possible (to ground) is recommended.
2. Figure 5 defines these parameters. Figure 6 illustrates the operating conditions under which these parameters are tested and specified.
3. Overtone designs, output frequencies > 35MHz.
4. Symmetry is measured defined as On Time/Period.
5. Includes calibration tolerance, operating temperature, supply voltage variations, and shock and vibration (not under operation). 50 and 100ppm options include aging.
6. Output will be enabled if enable/disable is left open.

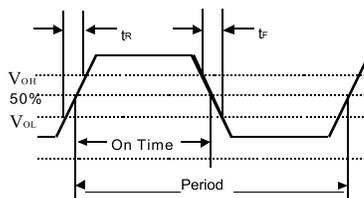


Figure 5. Output Waveform

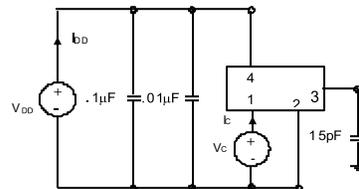


Figure 6. Typical Output Test Conditions (25 ± 5°C)

GSV1 Data sheet

Table 4. Electrical Performance, 1.8V option					
Parameter	Symbol	Min	Typical	Maximum	Units
Frequency	f_O	1.544		75.000	MHz
Operating Supply Voltage ¹	V_{DD}	1.71	1.8	1.89	V
Absolute Maximum Voltage		-0.5		3.6	V
Supply Current, Output Enabled < 20 MHz 20.01 to 70 MHz	I_{DD}			5 15	mA
Supply Current, Out disabled	I_{DD}			30	uA
Output Logic Levels					
Output Logic High ²	V_{OH}	0.9* V_{DD}		0.1* V_{DD}	V
Output Logic Low ²	V_{OL}				V
Output Logic High Drive	I_{OH}	2.8			mA
Output Logic Low Drive	I_{OL}	2.8			mA
Output Logic High Drive ³	I_{OH}	8			mA
Output Logic Low Drive ³	I_{OL}	8			mA
Output Rise/Fall Time ² < 20.000 MHz 20.01 to 50.00 MHz 50.01 to 70.00 MHz	t_R/t_F			10 6 3	ns
Duty Cycle ⁴ (ordering option)	SYM		45/55		%
Operating temperature (ordering option)			-55/125 or -40/85		°C
Stability ⁵ (ordering option)			±50, ±100		ppm
RMS Jitter, 12kHz to 20 MHz			0.5	1	ps
Period Jitter RMS Peak to Peak			3.0 21		ps
Output Enable/Disable ⁶ Output Enabled Output Disabled		1.26		0.5	V
Internal Enable Pull-Up resistor ⁶			1		Mohm
Start-up time				8	ms

1. A 0.01uF and a 0.1uF capacitor should be located as close to the supply as possible (to ground) is recommended.
2. Figure 7 defines these parameters. Figure 8 illustrates the operating conditions under which these parameters are tested and specified.
3. Overtone designs, output frequencies > 50MHz.
4. Symmetry is measured defined as On Time/Period.
5. Includes calibration tolerance, operating temperature, supply voltage variations, and shock and vibration (not under operation). 50 and 100 ppm options include aging.
6. Output will be enabled if enable/disable is left open.

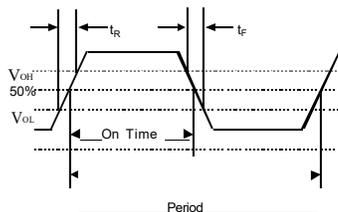


Figure 7. Output Waveform

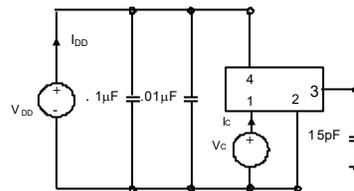


Figure 8. Typical Output Test Conditions (25 ± 5°C)

Enable/Disable Functional Description

Under normal operation the Enable/Disable is left open, or set to a logic high state, and the GSV1 is oscillating. When the E/D is set to a logic low, the oscillator stops and the output is in a high impedance state. This helps reduce power consumption as well as facilitating board testing and troubleshooting.

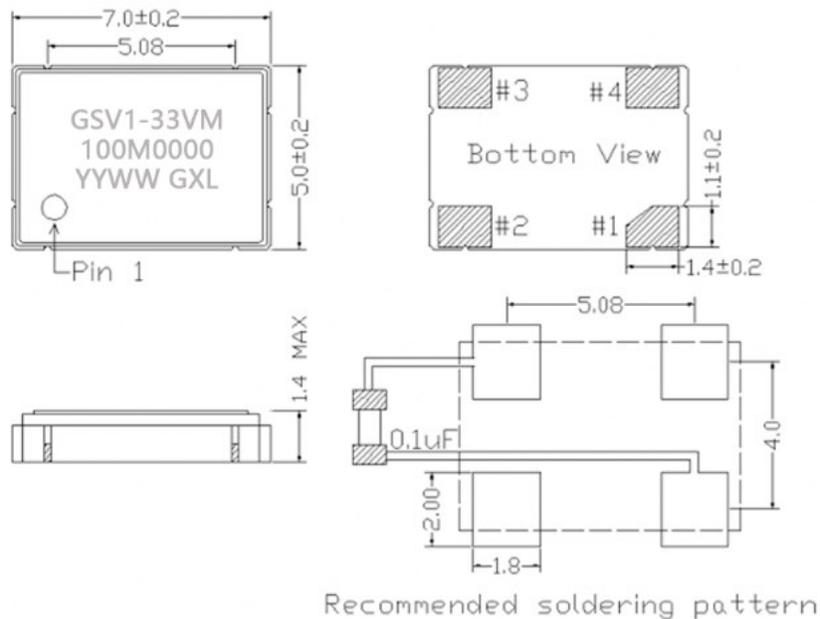
TriState Functional Description

Under normal operation the Tristate is left open or set to a logic high state. When the Tri-State is set to a logic low, the oscillator remains active but the output buffer is in a high impedance state. This helps facilitate board testing and troubleshooting.

Outline Diagrams, Pad Layout and Pin Out

Table 5. Pinout

Pin #	Symbol	Function
1	E/D or NC	Tristate, Enable/Disable or NC
2	GND	Electrical and Case Ground
3	f_o	Output Frequency
4	V_{DD}	Supply Voltage



Contact Pads are gold over nickel

Figure 9, Package drawing

GSV1 Data sheet

Absolute Maximum Ratings

Stresses in excess of the absolute maximum ratings can permanently damage the device. Functional operation is not implied at these or any other conditions in excess of conditions represented in the operational sections of this data sheet. Exposure to absolute maximum ratings for extended periods may adversely affect device reliability.

Table 6. Absolute Maximum Ratings

Parameter	Symbol	Ratings	Unit
Storage Temperature	T _{storage}	-55/125	°C

Ordering Information

GSV1 - 33V - M - 125M0000

Product Family

Crystal Oscillator

Output Frequency

Voltage Options

50V: +5.0 Vdc +/-10% , 15pF

33V: +3.3 Vdc +/-10%, 15pF

25V: +2.5 Vdc +/-10%, 15pF

18V: +1. 8Vdc +/-10%, 15pF

Stability Options

F: ±50ppm, -40 to 85°C

H: ±50ppm, -55 to 85°C

M: ±100ppm, -55 to 125°C