

## CMP502-SERIES



- 0.6 ps RMS Phase Jitter over 12 kHz to 20 MHz bandwidth
- 31 Standard frequencies from 25 MHz to 212.5 MHz
- LVPECL and LVDS Output types
- SMD package 5.0 x 3.2 mm

### ELECTRICAL SPECIFICATIONS

PARAMETER	SYMBOL	CONDITION	VALUE			UNIT
			Min.	Typ.	Max.	
Frequency Range	$f_0$	31 standard frequencies, see table 1	25		212.5	MHz
Supply Voltage	$V_s$	$V_s \pm 5\%$	2.25	-	3.63	V
		$V_s \pm 5\%$	2.25	2.5	2.75	V
		$V_s \pm 5\%$	2.97	3.3	3.63	V
Operating Temperature	$T_a$		-20		+70	°C
			-40		+85	°C
Frequency Stability	$\Delta f/f_0$	Including First Year aging, initial frequency tolerance at 25°C, Frequency stability over temperature range, supply variation, load variation	-10		+10	ppm
			-20		+20	ppm
			-25		+25	ppm
			-50		+50	ppm
Long Term stability ( Aging )	$\Delta f/\Delta t_y$	First Year @ 25°C 10 Years @ 25°C	-2		+2	ppm
			-5		+5	ppm
Input Voltage High	$V_{IH}$	Pin 1 , E/D or STBY	70% $V_s$			V
Input Voltage Low	$V_{IL}$	Pin 1 , E/D or STBY			30% $V_s$	V
Input Pull-up Impedance	$Z_{in}$	Pin 1 , E/D=High or Low or STBY=High Pin 1, STBY = Low	2	100	250	kΩ
						MΩ
Start-up Time	$T_{st}$	Measured from the time $V_s$ reaches its rated minimum value		6	10	ms
Resume Time	$T_{res}$	Measured from the time STBY pin crosses 50% threshold		6	10	ms
Duty Cycle	DC		45		55	%

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### OUTPUT CHARACTERISTICS

	PARAMETER	SYMBOL	CONDITION	VALUE			UNIT
				Min	Typ.	Max	
LVPECL	Output Levels	$V_{OH}$	Output termination load 50Ω connected to $V_S -2.0V$ , $V_S \pm 5\%$	$V_S -1.1$		$V_S -0.7$	V
		$V_{OL}$	Output termination load 50Ω connected to $V_S -2.0V$ , $V_S \pm 5\%$	$V_S -1.9$		$V_S -1.5$	V
	Output differential voltage swing	$V_{SWING}$		1.2	1.6	2.0	V
	Current consumption	$I_S$	Excluding Load termination, $V_S=2.5V$ or 3.3V		61	69	mA
	E/D current consumption	$I_{E/D}$	E/D = Low			35	mA
	Output Disable Supply leakage	$I_{LEAK}$	E/D = Low			1	μA
	STBY current	$I_{STBY}$	STBY= Low, for all $V_S$			100	μA
	Maximum Output Current	$I_{driver}$	Maximum average current drawn from Out + or Out -			30	mA
	Rise / Fall Time	$T_r / T_f$	20% to 80%		300	500	ps
	E/D time	$T_{E/D}$	$f_0=212.5$ MHz, for other frequencies $T_{E/D}=100$ ns + 3 period			115	ns
	RMS Period Jitter	$J_P$	$f_0=100$ MHz, $V_S= 3.3v$ or 2.5V $f_0=156.25$ MHz, $V_S= 3.3v$ or 2.5V $f_0=212.5$ MHz, $V_S= 3.3v$ or 2.5V		1.2 1.2 1.2	1.7 1.7 1.7	ps ps ps
	RMS Phase Jitter	$J_{PH}$	$f_0=156.25$ MHz, integrated bandwidth, 12 KHz to 20 MHz, all $V_S$		0.6	0.85	ps

	PARAMETER	SYMBOL	CONDITION	VALUE			UNIT
				Min	Typ.	Max	
LVDS	Output differential voltage	$V_{OD}$	Output termination load 100Ω connected between OUT+ and OUT- , $V_S \pm 5\%$	250	350	450	mV
	Output differential voltage Magnitude change	$\Delta V_{OD}$				50	mV
	Offset Output Voltage	$V_{OOFF}$	Output termination load 100Ω connected between OUT+ and OUT- , $V_S \pm 5\%$	1.125	1.2	1.375	V
	Offset Output Voltage Magnitude change	$\Delta V_{OOFF}$				50	mV
	Current consumption	$I_S$	Excluding Load termination, $V_S=2.5V$ or 3.3V		47	55	mA
	E/D current consumption	$I_{E/D}$	E/D = Low			35	mA
	Output Disable Supply leakage	$I_{LEAK}$	E/D = Low			1	μA
	STBY current	$I_{STBY}$	STBY= Low, for all $V_S$			100	μA
	Rise / Fall Time	$T_r / T_f$	20% to 80%		495	600	ps
	E/D time	$T_{E/D}$	$f_0=212.5$ MHz, for other frequencies $T_{E/D}=100$ ns + 3 period			115	ns
	RMS Period Jitter	$J_P$	$f_0=100$ MHz, $V_S= 3.3v$ or 2.5V $f_0=156.25$ MHz, $V_S= 3.3v$ or 2.5V $f_0=212.5$ MHz, $V_S= 3.3v$ or 2.5V		1.2 1.2 1.2	1.7 1.7 1.7	ps ps ps
	RMS Phase Jitter	$J_{PH}$	$f_0=156.25$ MHz, integrated bandwidth, 12 KHz to 20 MHz, all $V_S$		0.6	0.85	ps

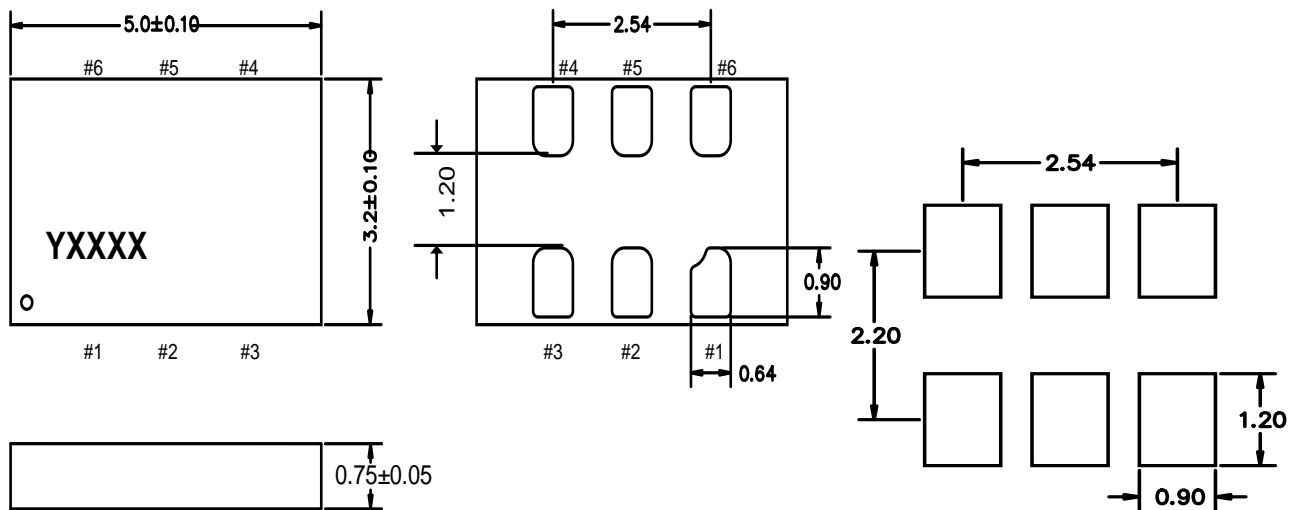
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Table 1. List of Supported Frequencies

25 MHz	50 MHz	74.175824 MHz	74.250 MHz	75 MHz	98.304 MHz	100 MHz	106.250MHz
125 MHz	133 MHz	133.3 MHz	133.33 MHz	133.333 MHz	133.3333 MHz	133.33333MHz	133.333333 MHz
148.351648 MHz	148.5 MHz	150 MHz	155.520 MHz	156.250 MHz	161.13280 MHz	166 MHz	166.6 MHz
166.66 MHz	166.666 MHz	166.6666 MHz	166.66666 MHz	166.666666MHz	200 MHz	212.5MHz	

**MECHANICAL DIMENSIONS AND PIN FUNCTIONING**

Recommended land pattern



PIN	SYMBOL	FUNCTION
1	E/D	H or Open: Oscillator frequency output L: Output is high impedance
	STBY	H or Open: Oscillator frequency output L: Device goes to sleep mode. Supply current reduces to I <sub>STBY</sub>
2	GND	Electrical Ground
3	NC	No connect, leave it floating or connect to GND for better heat dissipation
4	OUT+	Oscillator Output Signal
5	OUT-	Complementary Oscillator Output signal
6	Vs	Supply Voltage

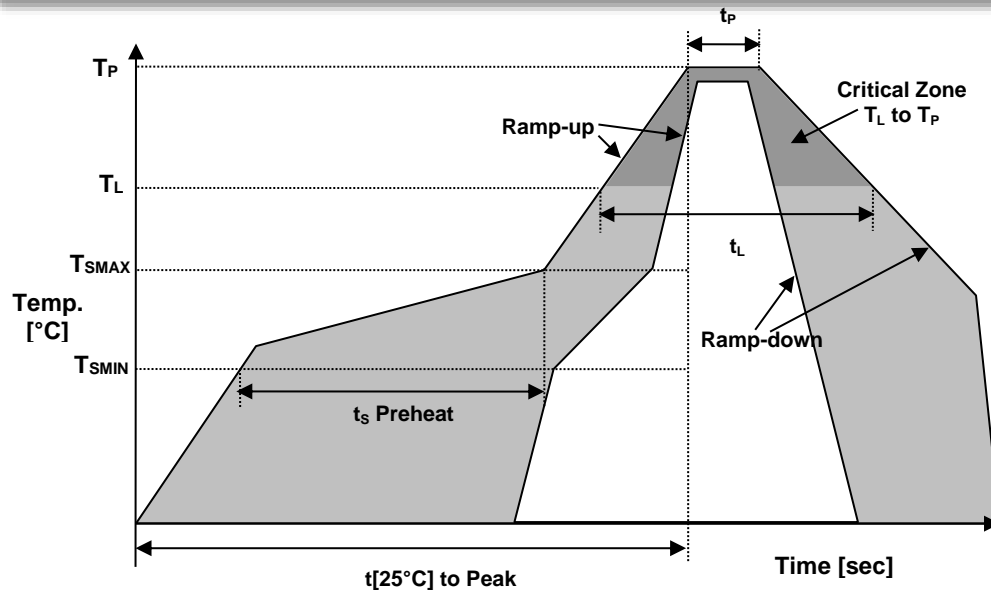
Note: Connect a capacitor of 0.1µF or higher value between Vs and GND

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**ENVIRONMENTAL**

Soldering	MIL-STD-883F, Method 2003
Moisture Sensitivity Level	MSL 1 at 260°C
Temperature Cycle	JESD22, Method A104
Vibration	MIL-STD-883F, Method 2007
Mechanical Shock	MIL-STD-883F, Method 2002
Storage Temperature	-65° ..... +150°C

**REFLOW PROFILE**



**Recommended Solder Reflow Profile**

Temperature Min Preheat	$T_{SMIN}$	150°C
Temperature Max Preheat	$T_{SMAX}$	200°C
Time ( $T_{SMIN}$ to $T_{SMAX}$ )	$t_s$	60-180 sec.
Temperature	$T_L$	217°C
Peak Temperature	$T_P$	260°C
Ramp-up rate	$R_{UP}$	3°C/sec max.
Ramp-down rate	$R_{DOWN}$	6°C/sec max.
Time within 5°C of Peak Temperature	$t_p$	10 sec.
Time t[25°C] to Peak Temperature	t[25°C] to Peak	480 sec.
Time	$t_L$	60-150 sec.

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**ORDERING INFORMATION**

SERIES	SUPPLY VOLTAGE (V)	Frequency Stability	TEMP RANGE (°C)	Output Type	Enable/Disable Function	-	OUTPUT FREQUENCY (MHz)
CMP502	25: Vs=2.5V 33: Vs=3.3V XX: Vs=2.25V to 3.63V	A:±10ppm B:±20ppm C:±25ppm D:±50ppm	U: -20~70 V: -40~85	1:LVPECL 2:LVDS	E: E/D output S:Standby	-	See table 1

**APPROVALS**

Eng. approval, date: SP, 07/19/2016

Created by, date: SP, 07/19/2016

Revision: A