

CMP501-SERIES



- 1 to 220 MHz High Performance
- LVPECL/ HCSL / LVDS / CML output
- High frequency stability
- SMD package 5.0 x 3.2 mm

ELECTRICAL SPECIFICATIONS

PARAMETER	SYMBOL	CONDITION	VALUE			UNIT
			Min.	Typ.	Max.	
Frequency Range	f_0		1.0		220	MHz
Supply Voltage	V_s	$V_s=+1.8V\pm 5\%$ is only for CML	1.8		3.3	V
Operating Temperature	T_a		0 -20 -40		+70 +70 +85	°C °C °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 -15 -20 -25 -50		+10 +15 +20 +25 +50	ppm ppm ppm ppm ppm
Enable / Disable/ Standby Function Pin1	E/D/STBY	Enable = High or open (OUT+ and OUT- output signals active) Disable = Low or GND (OUT+ and OUT- outputs high impedance) Standby= High or open (OUT+ and OUT- output signals active) Standby = Low or GND (OUT+ and OUT- output is low, weak pulled down, oscillator stops)				
Input High Voltage	V_{IH}		70% V_s			V
Input Low Voltage	V_{IL}				30% V_s	V
Input High current	I_{IH}	E/D or STBY pin			10	μA
Input Low current	I_{IL}	E/D or STBY pin	-10			μA
Power up Time	T_{PW}	Time from minimum power supply voltage to the first cycle			10	ms
Long Term Stability (Aging)	$\Delta f_0/\Delta t$	$T_a=25^\circ\text{C}$, first year	-1		1	ppm

CMP501-SERIES

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 $V_S -2.0V$, $V_S \pm 5\%$	$V_S -2.0$		$V_S -1.4$	V
	Output differential voltage swing	V_{SWING}		600	800	1000	mV p-p
	Current consumption	I_S	Excluding Load termination, $V_S=2.5V$ $V_S=3.3V$		65 68	71 74	mA mA
	Duty Cycle	DC		45		55	%
	Rise / Fall Time	T_r / T_f	20% to 80%	100	150	300	ps
	RMS Period Jitter	J_P	$f_0=106.25$ MHz $f_0=156.25$ MHz $f_0=200$ MHz		1.8 1.3 1.3		ps ps ps
	RMS Phase Jitter	J_{PH}	$f_0=106.25$ MHz@ BW: 637kHz to 10MHz $f_0=156.25$ MHz@ BW: 1.875 to 10MHz $f_0=200$ MHz@ BW: 1 to 20MHz		1.6 0.5 0.7		ps ps ps

	PARAMETER	SYMBOL	CONDITION	VALUE			UNIT
				Min	Typ.	Max	
HCSL	Output Levels	V_{OH}	Output termination load 50Ω connected OUT+/OUT- to GND, $V_S \pm 5\%$	600		950	mV
		V_{OL}	Output termination load 50Ω connected OUT+/OUT- to GND, $V_S \pm 5\%$	0		50	mV
	Output differential voltage swing	V_{SWING}		600		950	mV p-p
	Current consumption	I_S	Excluding Load termination, $V_S=2.5V$ $V_S=3.3V$		62 65	67 70	mA mA
	Duty Cycle	DC		45		55	%
	Rise / Fall Time	T_r / T_f	20% to 80%	200	280	375	ps
	RMS Period Jitter	J_P	$f_0=100$ MHz $f_0=200$ MHz		1.6 1.5	2.2 1.9	ps ps
	RMS Phase Jitter	J_{PH}	$f_0=100$ MHz@ BW: 1.5 MHz to 22 MHz $f_0=200$ MHz@ BW: 1.5 MHz to 22 MHz		0.8 0.4		ps ps

CMP501-SERIES

	PARAMETER	SYMBOL	CONDITION	VALUE			UNIT
				Min	Typ.	Max	
LVDS	Differential Output Voltage	V _{OD1}	Swing Mode = Normal , Single load termination (100Ω between OUT+ and OUT-)	250	350	450	mV
	V _{OD1} Magnitude change	ΔV _{OD1}	Swing Mode = Normal , Single load termination (100Ω between OUT+ and OUT-)			50	mV
	Offset Voltage	V _{OS1}	Swing Mode = Normal , Single load termination (100Ω between OUT+ and OUT-)		1.2		V
	V _{OS1} Magnitude change	ΔV _{OS1}	Swing Mode = Normal , Single load termination (100Ω between OUT+ and OUT-)			50	mV
	Differential Output Voltage	V _{OD2}	Swing Mode = High , Single load termination (100Ω between OUT+ and OUT-)	500	700	900	mV
	V _{OD2} Magnitude change	ΔV _{OD2}	Swing Mode = High , Single load termination (100Ω between OUT+ and OUT-)			50	mV
	Offset Voltage	V _{OS2}	Swing Mode = High , Single load termination (100Ω between OUT+ and OUT-)		1.2		V
	V _{OS2} Magnitude change	ΔV _{OS2}	Swing Mode = High , Single load termination (100Ω between OUT+ and OUT-)			50	mV
	Differential Output Voltage	V _{OD3}	Swing Mode = High , Double load termination (100Ω between OUT+ and OUT-)	250	350	450	mV
	V _{OD3} Magnitude change	ΔV _{OD3}	Swing Mode = High , Double load termination (100Ω between OUT+ and OUT-)			50	mV
	Offset Voltage	V _{OS3}	Swing Mode = High , Double load termination (100Ω between OUT+ and OUT-)		1.2		V
	V _{OS3} Magnitude change	ΔV _{OS3}	Swing Mode = High , Double load termination (100Ω between OUT+ and OUT-)			50	mV
	Current consumption	I _s	Excluding Load termination, V _s =2.5 V V _s = 3.3V		70 73	76 79	mA mA
	Duty Cycle	DC		45		55	%
	Rise / Fall Time	T _r / T _f	20% to 80%	100	200	325	ps
	RMS Period Jitter	J _P	f ₀ =106.25 MHz f ₀ =156.25 MHz f ₀ =200 MHz		2.0 1.8 1.8		ps ps ps
RMS Phase Jitter	J _{PH}	f ₀ =106.25 MHz@ BW: 637kHz to 10MHz f ₀ =156.25 MHz@ BW:1.875 to 10MHz f ₀ =200 MHz@ BW: 1 to 20MHz		1.7 0.7 0.7		ps ps ps	

CMP501-SERIES

	PARAMETER	SYMBOL	CONDITION	VALUE			UNIT
				Min	Typ.	Max	
CML	Output High Voltage	VOH₁	Swing Mode = Normal , Single load termination (load 50Ω connected OUT+/OUT- to GND)	Vs-0.1		Vs	V
	Output Low Voltage	VOL₁	Swing Mode = Normal , Single load termination (load 50Ω connected OUT+/OUT- to GND)	Vs-0.55	Vs-0.425	Vs-0.3	V
	Output Voltage Swing	V_{SWING1}	Swing Mode = Normal , Single load termination (load 50Ω connected OUT+/OUT- to GND)	300	425	550	mV p-p
	Output High Voltage	VOH₂	Swing Mode = High , Single load termination (load 50Ω connected OUT+/OUT- to GND)	Vs-0.1		Vs	V
	Output Low Voltage	VOL₂	Swing Mode = High , Single load termination (load 50Ω connected OUT+/OUT- to GND)	Vs-1.1	Vs-0.85	Vs-0.6	V
	Output Voltage Swing	V_{SWING2}	Swing Mode = High , Single load termination (load 50Ω connected OUT+/OUT- to GND)	600	850	1100	mV p-p
	Output High Voltage	VOH₃	Swing Mode = High , Doble load termination (load 50Ω connected OUT+/OUT- to GND)	Vs-0.1		Vs	V
	Output Low Voltage	VOL₃	Swing Mode = High , Doble load termination (load 50Ω connected OUT+/OUT- to GND)	Vs-0.55	Vs-0.425	Vs-0.3	V
	Output Voltage Swing	V_{SWING3}	Swing Mode = High , Doble load termination (load 50Ω connected OUT+/OUT- to GND)	300	425	550	mV p-p
	Current consumption	I_s	Excluding Load termination, Vs=1.8V Vs=2.5 V Vs= 3.3V		38 47 48	41 50 51	mA mA mA
	Duty Cycle	DC		45		55	%
	Rise / Fall Time	Tr / Tf	20% to 80%	150	200	325	ps
	RMS Period Jitter	J_P	f ₀ =106.25 MHz f ₀ =156.25 MHz f ₀ =200 MHz		2.3 2.1 2.1		ps ps ps
	RMS Phase Jitter	J_{PH}	f ₀ =106.25 MHz@ BW: 637kHz to 10MHz f ₀ =156.25 MHz@ BW:1.875 to 20MHz f ₀ =200 MHz@ BW: 1 to 20MHz		1.7 0.6 0.8		ps ps ps

CMP501-SERIES

Table 1. Frequency Stability vs. Temperature Range options

Frequency Stability (PPM)	Temperature Range	Supply Voltage (Vs)		
		1.8V	2.5V	3.3V
±10	0°C to °70C		√	√
±15	0°C to °70C -20°C to °70C -40°C to °85C	√	√ √ √	√ √ √
±20	0°C to °70C -20°C to °70C -40°C to °85C	√ √ √	√ √ √	√ √ √
±25	0°C to °70C -20°C to °70C -40°C to °85C	√ √ √	√ √ √	√ √ √
±50	0°C to °70C -20°C to °70C -40°C to °85C	√ √ √	√ √ √	√ √ √

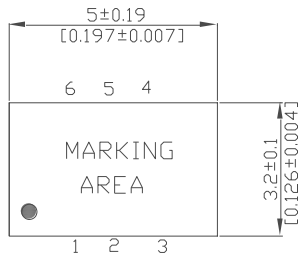
Table 2. Output Signal Type vs. Swing Select options

Output Signal Type	Swing Select	Supply Voltage (Vs)		
		1.8V	2.5V	3.3V
LVPECL	Normal High		√	√
LVDS	Normal High		√ √	√ √
CML	Normal High	√ √	√ √	√ √
HCSL	Normal High		√	√

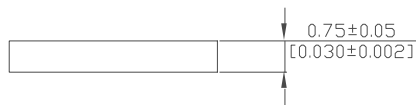
CMP501-SERIES

MECHANICAL DIMENSIONS AND PIN FUNCTIONING

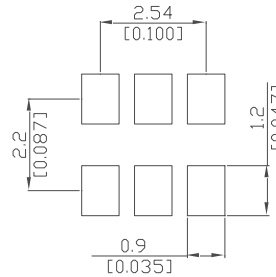
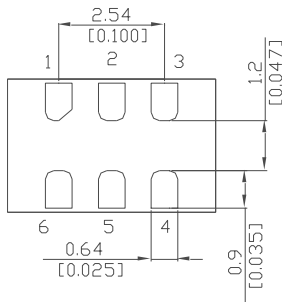
TOP VIEW



RECOMMENDED LAND PATTERN



BOTTOM VIEW



PIN	SYMBOL	FUNCTION
1	E/D/STBY	E/D : High or open, OUT+ and OUT- active Low , OUT+ and OUT- High impedance state STBY: High or open, OUT+ and OUT- active Low , OUT+ and OUT- is low (weak pull down), oscillator stops
2	NC	Do not connect pin, leave it floating
3	GND	Electrical Ground
4	OUT+	Output Signal
5	OUT-	Complementary Output Signal
6	Vs	Supply Voltage

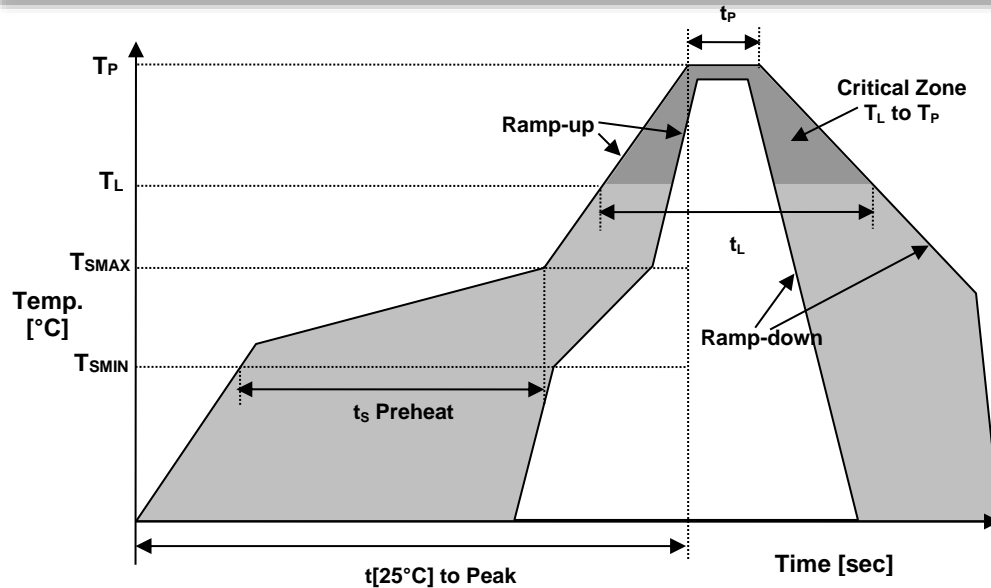
Note: Connect a capacitor of 0.1µF or higher value between Vs and GND

CMP501-SERIES

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.

CMP501-SERIES

ORDERING INFORMATION

SERIES	SUPPLY VOLTAGE (V)	Frequency Stability	TEMP RANGE (°C)	Swing Select	Enable/Disable Function	-	OUTPUT FREQUENCY (MHz)
CMP501	18: Vs=1.8V (CML only) 25: Vs=2.5V 33: Vs=3.3V	A: ±10ppm B: ±15ppm C: ±20ppm D: ±25ppm E: ±50ppm	T: 0 ~ 70 U: -20~70 V: -40~85	1: Normal 2: High (LVDS and CML only) See table 2	E: E/D output S: STBY	-	1 ~ 220

APPROVALS

Eng. approval, date: SP, 07/20/2016

Created by, date: SP, 07/20/2016

Revision: A