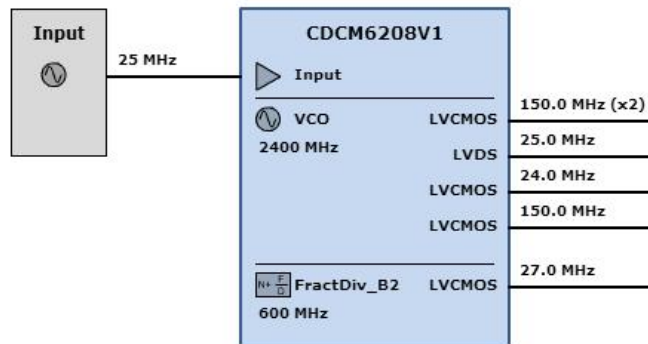


# WEBENCH<sup>®</sup> Clock Architect

## Project Report

Project: 4331192/1 Project 1 - [CDCM6208V1]

Created: 7/24/15 7:08:06 PM



Block Diagram

## System Specification and Parameters

### Fixed Outputs

Name	Freq (MHz)	Format	Count
fixed0	24	Any	1
fixed1	27	Any	1
fixed2	25	Any	1
fixed_0	150	Any	1
fixed_1	150	Any	1
fixed_2	150	Any	1

### Options

Name	Design Value
Automatically Select Input Frequencies	No

### Properties

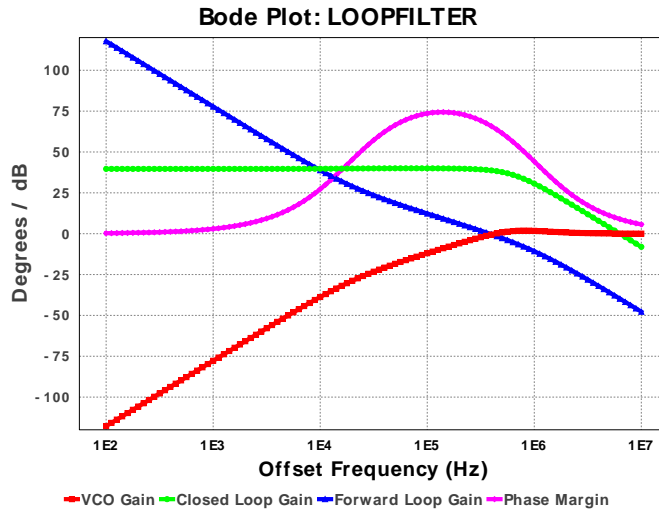
Name	Design Value
External Sources	none
Total BOM Cost	\$5.2
Total Current	176.7 mA
Total Footprint	49.0 mm <sup>2</sup>



User ID = 4331192  
 Design Id = 9  
 Device = CDCM6208V1  
 Created = 7/24/15 7:08:06 PM

## WEBENCH® Clock Design Report

Loop Filter: CDCM6208V1 LOOPFILTER



### Preferences

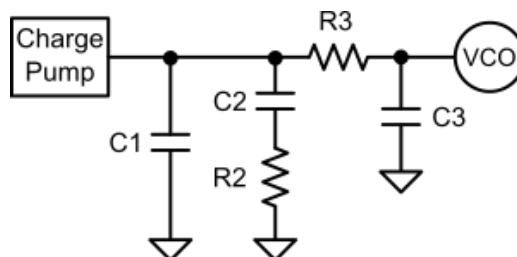
Name	Design Value
Filter Type	Passive
Filter Order	3rd Order
Op Amp Gain	1.00
Charge Pump Gain	2.50 mA
VCO Gain	185.00 MHz/V
VCO Input Capacitance	0.00 pF
VCO Frequency	2400.00 MHz
Phase Det. Frequency	25.00 MHz

### Parameters

Name	Design Value	Forced	Actual Value
Loop Bandwidth	423.625 kHz	N	382.114 kHz
Phase Margin	65.00 deg	N	66.447 deg
T3/T1Ratio	50.00 %	N	0.00 %
T4/T3Ratio	0.00 %	N	0.00 %
Gamma	9.50	N	7.626

### Loop Filter Components

Name	Target Value	Fixed	Forced
C1	Open	N	N
C2	15.00 nF	N	N
C3	0.242 nF	Y	N
C4	Open	Y	N
R2	0.56 kohms	N	N
R3	0.10 kohms	Y	N



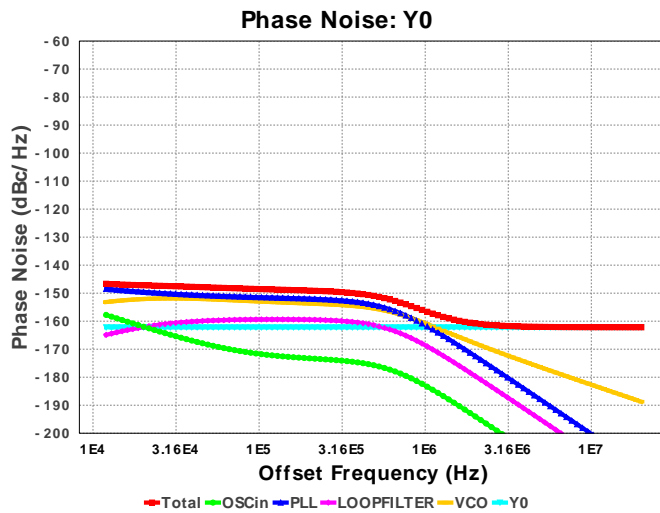
Output Block: CDCM6208V1 Y0 as LVDS output, 25.0 MHz

Integrated Noise Info 12000.0 Hz - 2.0E7 Hz

Name	Design Value
Calculated Area	0.00
Equivalent Flat Noise	-159.896 dBc/Hz
RMS Jitter	407.37 fs
RMS Phase Error (deg)	0.004 deg
RMS Phase Error	0.064 mrad
EVM	0.006%
SNR	83.878 dB
Spur	-86.878 dBc
Jitter (Pk-Pk)	2904.75 fs
Jitter (Cycle to Cycle Pk)	5809.50 fs
Jitter (Cycle to Cycle RMS)	576.108 fs
A/D ENOB	13.647 bits
TIE (Time Interval Error)	-0.286
UI (Unit Interval)	0.00
Lower Integration Limit	12.00 kHz
Upper Integration Limit	20.00 MHz

Phase Noise Values (dBc/Hz)

Offset	Total	OSCin	PLL	LOOPFILTER	VCO	Y0
12 kHz	-146.64	-157.76	-148.47	-164.9	-153.17	-162.2
100 kHz	-148.53	-171.67	-151.46	-159.38	-152.96	-162.2
20000 kHz	-162.19	-233.74	-212.26	-219.35	-188.74	-162.2



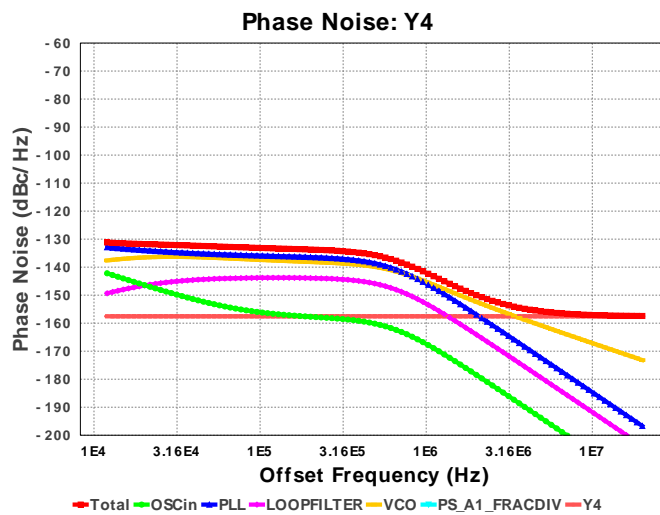
Output Block: CDCM6208V1 Y4 as LVCMOS output, 150.0 MHz

Integrated Noise Info 12000.0 Hz - 2.0E7 Hz

Name	Design Value
Calculated Area	0.00
Equivalent Flat Noise	-147.71 dBc/Hz
RMS Jitter	276.133 fs
RMS Phase Error (deg)	0.015 deg
RMS Phase Error	0.26 mrad
EVM	0.026%
SNR	71.692 dB
Spur	-74.692 dBc
Jitter (Pk-Pk)	1968.967 fs
Jitter (Cycle to Cycle Pk)	3937.935 fs
Jitter (Cycle to Cycle RMS)	390.512 fs
A/D ENOB	11.623 bits
TIE (Time Interval Error)	-0.286
UI (Unit Interval)	0.00
Lower Integration Limit	12.00 kHz
Upper Integration Limit	20.00 MHz

Phase Noise Values (dBc/Hz)

Offset	Total	OSCin	PLL	LOOPFILTER	VCO	PS_A1_FRACDIV4
12 kHz	-131.19	-142.2	-132.91	-149.33	-137.6	-1000
100 kHz	-133.14	-156.11	-135.9	-143.82	-137.4	-1000
20000 kHz	-157.43	-218.18	-196.69	-203.79	-173.17	-1000



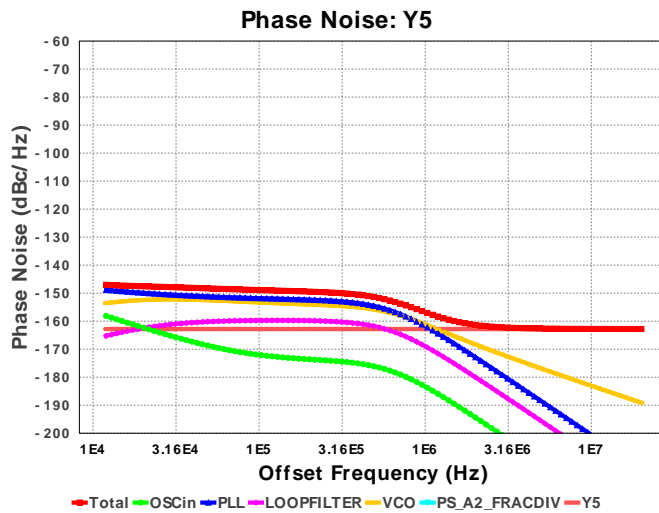
Output Block: CDCM6208V1 Y5 as LVCMOS output, 24.0 MHz

Integrated Noise Info 12000.0 Hz - 2.0E7 Hz

Name	Design Value
Calculated Area	0.00
Equivalent Flat Noise	-160.393 dBc/Hz
RMS Jitter	400.732 fs
RMS Phase Error (deg)	0.003 deg
RMS Phase Error	0.06 mrad
EVM	0.006%
SNR	84.375 dB
Spur	-87.375 dBc
Jitter (Pk-Pk)	2857.421 fs
Jitter (Cycle to Cycle Pk)	5714.841 fs
Jitter (Cycle to Cycle RMS)	566.721 fs
A/D ENOB	13.73 bits
TIE (Time Interval Error)	-0.286
UI (Unit Interval)	0.00
Lower Integration Limit	12.00 kHz
Upper Integration Limit	20.00 MHz

Phase Noise Values (dBc/Hz)

Offset	Total	OSCIin	PLL	LOOPFILTER	VCO	PS_A2_FRACDIW5
12 kHz	-147.01	-158.11	-148.82	-165.25	-153.52	-1000 -162.8
100 kHz	-148.9	-172.02	-151.81	-159.74	-153.32	-1000 -162.8
20000 kHz	-162.79	-234.09	-212.61	-219.7	-189.09	-1000 -162.8



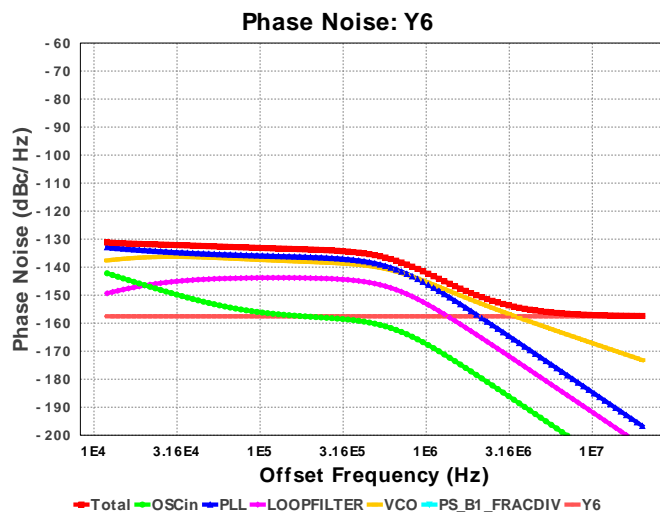
## Output Block: CDCM6208V1 Y6 as LVCMOS output, 150.0 MHz

## Integrated Noise Info 12000.0 Hz - 2.0E7 Hz

Name	Design Value
Calculated Area	0.00
Equivalent Flat Noise	-147.71 dBc/Hz
RMS Jitter	276.133 fs
RMS Phase Error (deg)	0.015 deg
RMS Phase Error	0.26 mrad
EVM	0.026%
SNR	71.692 dB
Spur	-74.692 dBc
Jitter (Pk-Pk)	1968.967 fs
Jitter (Cycle to Cycle Pk)	3937.935 fs
Jitter (Cycle to Cycle RMS)	390.512 fs
A/D ENOB	11.623 bits
TIE (Time Interval Error)	-0.286
UI (Unit Interval)	0.00
Lower Integration Limit	12.00 kHz
Upper Integration Limit	20.00 MHz

## Phase Noise Values (dBc/Hz)

Offset	Total	OSCin	PLL	LOOPFILTER	VCO	PS_B1_FRACDIV6	
12 kHz	-131.19	-142.2	-132.91	-149.33	-137.6	-1000	-157.54
100 kHz	-133.14	-156.11	-135.9	-143.82	-137.4	-1000	-157.54
20000 kHz	-157.43	-218.18	-196.69	-203.79	-173.17	-1000	-157.54



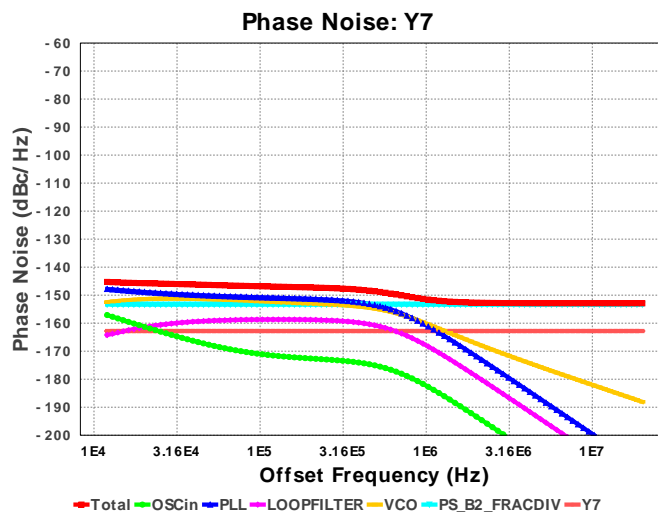
## Output Block: CDCM6208V1 Y7 as LVCMOS output, 26+23301686/23301689 MHz

## Integrated Noise Info 12000.0 Hz - 2.0E7 Hz

Name	Design Value
Calculated Area	0.00
Equivalent Flat Noise	-152.499 dBc/Hz
RMS Jitter	883.868 fs
RMS Phase Error (deg)	0.009 deg
RMS Phase Error	0.15 mrad
EVM	0.015%
SNR	76.481 dB
Spur	-79.481 dBc
Jitter (Pk-Pk)	6302.418 fs
Jitter (Cycle to Cycle Pk)	12604.836 fs
Jitter (Cycle to Cycle RMS)	1249.978 fs
A/D ENOB	12.419 bits
TIE (Time Interval Error)	-0.286
UI (Unit Interval)	0.00
Lower Integration Limit	12.00 kHz
Upper Integration Limit	20.00 MHz

## Phase Noise Values (dBc/Hz)

Offset	Total	OSCin	PLL	LOOPFILTER	VCO	PS_B2_FRACDIW7	
12 kHz	-145.27	-157.09	-147.8	-164.23	-152.5	-153.37	-162.8
100 kHz	-146.82	-171	-150.79	-158.72	-152.29	-153.37	-162.8
20000 kHz	-152.9	-233.07	-211.59	-218.68	-188.07	-153.37	-162.8



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