



CSS ALib

100 KHz Crystal Oscillator Macro

CSS Analog Library

General Description

This analog macro cell is a 100KHz crystal oscillator circuit. It includes an integrated resistor and capacitor network (CG, CD & RA) so no external components are required. Each internal component may be adjusted to optimize the oscillator for various crystal parameters and lowest possible power and/or lowest operating voltage. The gm of the linear amplifier is also adjustable. This circuit includes a low power buffer with hysteresis to provide glitch free edges, suitable for digital clock signals. A “Disable” input is provided to halt the oscillator and place it in a low power state.

Features / Specifications

Process: AMI C5L (Double Poly & Double Metal)

Temperature range: 0°C to +50°C

Supply Voltage: 2.2V to 3.0V

Supply Current:

Disable current < 10nA

Active current ~ 1.0µA

Crystal Parameters:

Frequency = 100 KHz

Rs = 19KΩ, C0 = 0.84pF, C1 = 1.0fF

Trim Bits:

2 bits for gm (3 settings: 1X, 2X & 4X)

2 bits for CG (4 settings: 3.5pF, 4.5pF, 5.5pF & 6.5pF)

2 bits for CD (4 settings: 10.5pF, 13.5pF, 16.5pF & 19.5pF)

2 bits for RA (4 settings: 200KΩ, 300KΩ, 400KΩ & 500KΩ)

Buffer Hysteresis:

~200mV

Physical Layout Size:

530 x 150 microns (21 x 6 mils)

Trim Bit Summary

gm Adjust Bits (XTO_ADJ[1:0])

Adjust Bits 1, 0	Setting	gm (VDD = 2.2V)	gm (VDD = 2.4V)	gm (VDD = 2.75V)
0, 0	1X	1.6u mho	3.0 u mho	5.3 u mho
0, 1	2X	3.2 u mho	5.4 u mho	9.1 u mho
1, 0	4X	5.6 u mho	9.5 u mho	15.6 u mho

Table 1

CG Adjust Bits (XTO_ADJ[3:2])

Adjust Bits 3, 2	Setting
0, 0	3.5pF
0, 1	4.5pF
1, 0	5.5pF
1, 1	6.5pF

Table 2

CD Adjust Bits (XTO_ADJ[5:4])

Adjust Bits 5, 4	Setting
0, 0	10.5pF
0, 1	13.5pF
1, 0	16.5pF
1, 1	19.5pF

Table 3

RA Adjust Bits (XTO_ADJ[7:6])

Adjust Bits 7, 6	Setting
0, 0	200KΩ
0, 1	300KΩ
1, 0	400KΩ
1, 1	500KΩ

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Pin Description

Power Pins

VPOS Positive supply voltage.
VSS Ground.

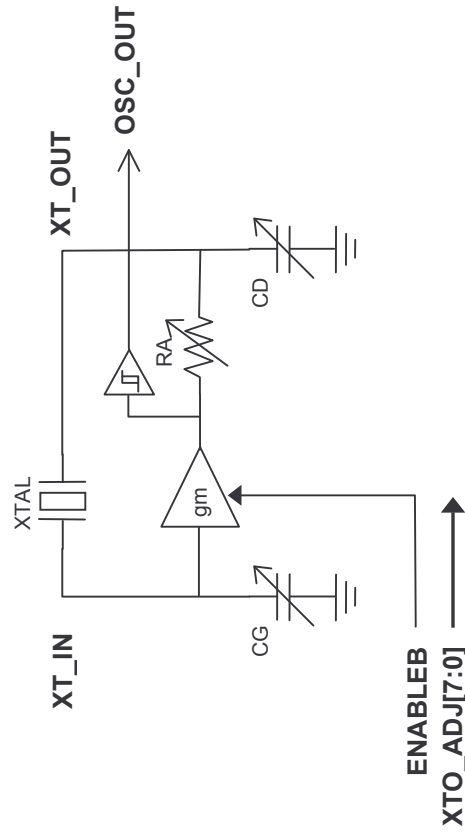
Control Pins

ENABLEB Enables oscillator when low.
XTO_ADJ[7:0] Trim signals. (Selects gm, CG, CD and RA values)

Signal Pins

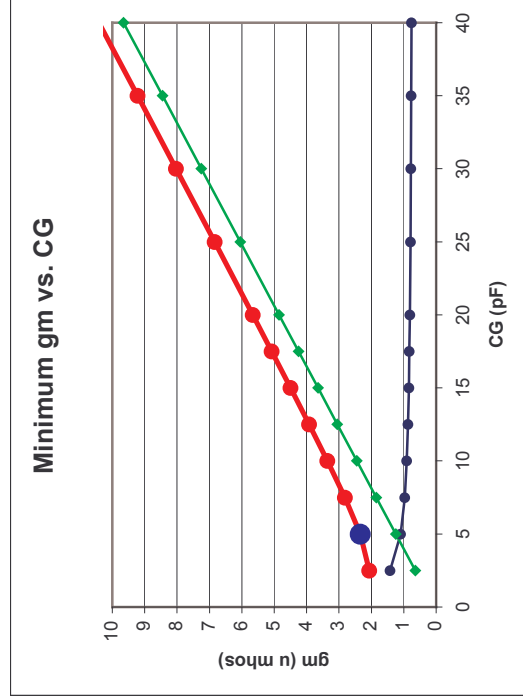
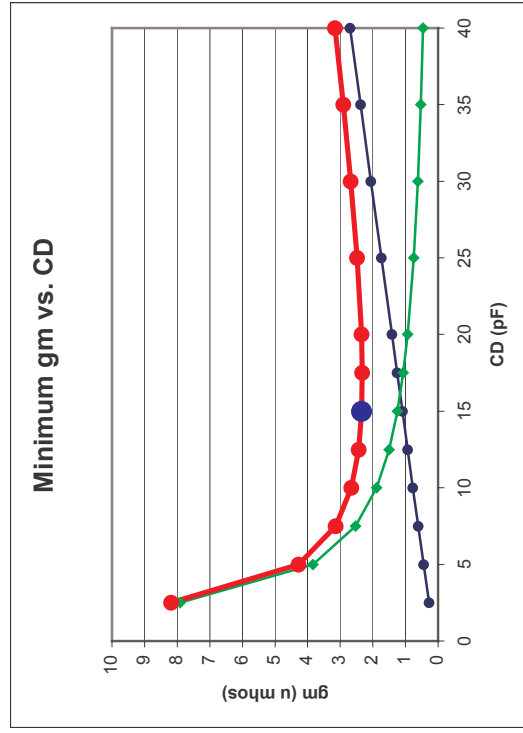
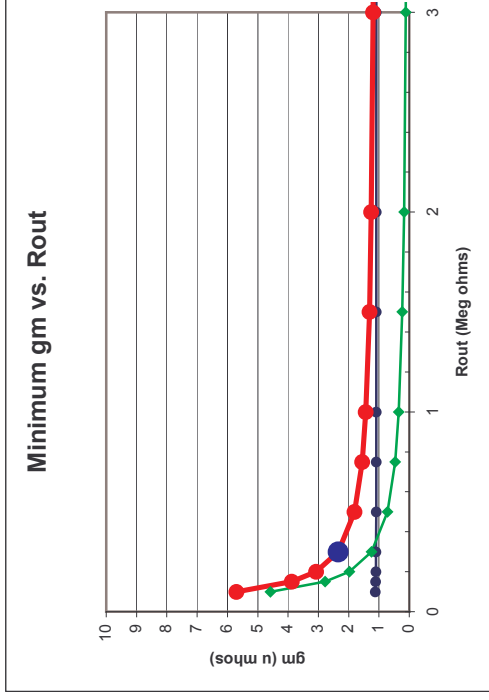
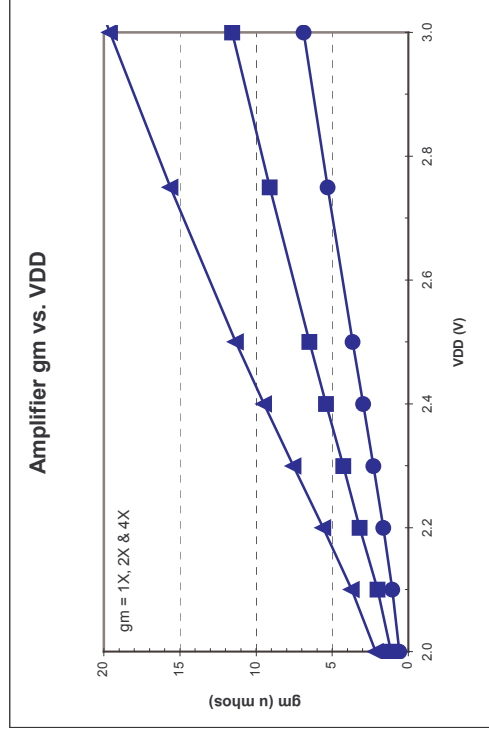
XT_IN Xtal In pin. (Input to amplifier)
XT_OUT Xtal Out pin. (Output from amplifier)
OSC_OUT Buffered digital output.

Block Diagram



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Electrical Characteristics (Typical)



Electrical Characteristics (Typical)

