Application Note

SLG46140 RC OSC Current Source Feature

AN-CM-288

Abstract

This application note describes how enabling and disabling the RC OSC current source to always be turned on in the SLG46140 chip affects the delay block functionality.

This application note comes complete with design files which can be found in the References section.

Contents

Figures

1 Terms and Definitions

RC OSC   RC Oscillator

2 References

For related documents and software, please visit:

https://www.dialog-semiconductor.com/configurable-mixed-signal.

Download our free GreenPAK™ Designer software [1] to open the .gp files [2] and view the proposed circuit design. Use the GreenPAK development tools [3] to freeze the design into your own customized IC in a matter of minutes. Dialog Semiconductor provides a complete library of application notes [4] featuring design examples as well as explanations of features and blocks within the Dialog IC.

[1]   GreenPAK Designer Software, Software Download and User Guide, Dialog Semiconductor

[2]   AN-CM-288 SLG46140 RC OSC.gp, GreenPAK Design File, Dialog Semiconductor

[3]   GreenPAK Development Tools, GreenPAK Development Tools Webpage, Dialog Semiconductor

[4]   GreenPAK Application Notes, GreenPAK Application Notes Webpage, Dialog Semiconductor

[5]   SLG46140, Datasheet, Dialog Semiconductor.

Author: Gino Castillo

3   Introduction

The SLG46140 has a feature to control whether the RC OSC current source is always turned on or not while in the auto power on power mode. Disabling the RC OSC current source always turned on setting allows for the device to reduce its power consumption but can also cause functionality issues if not handled properly. This app note discusses how enabling and disabling this feature affects the delay block functionality.

4   Current Source Option in RC OSC

Setting the current source in RC OSC to always be turned on shortens the RC OSC startup time but introduces a 200nA on current. This option is disabled by default to achieve the lowest possible quiescent current. If a delay block is clocked by the RC OSC while the current source is disabled from always being turned on, there will be a noticeable 260ms start time that will prolong the delay. A square waveform generator as shown in Figure 1 was used to demonstrate this longer delay time. Refer to Figure 2 and Figure 3 for the RC OSC and delay block settings respectively. Setting the RC OSC power mode to force power on will override not always turning on the current source, so this option only applies to when it is set to auto power on.
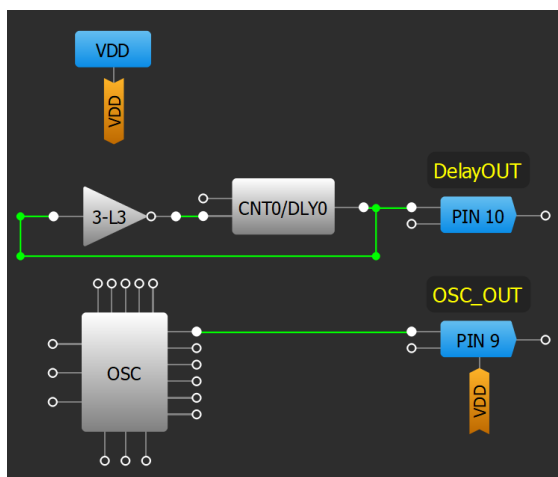

Figure 1: Delay Based Square Wave Generator

Figure 2: RC OSC Block Properties
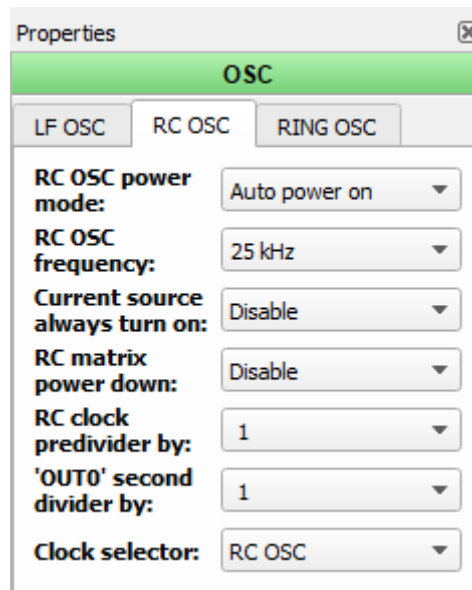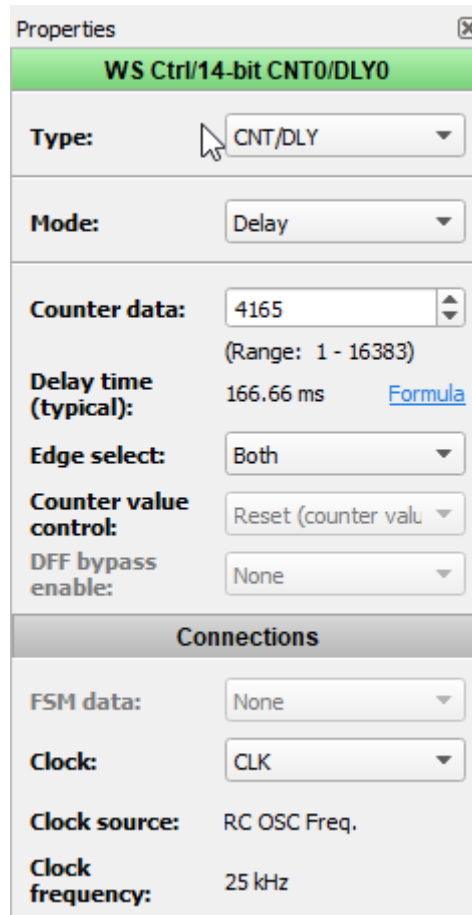

Figure 3: Delay Block Properties

Application Note

Revision 1.0

09-Oct-2019

CFR0014

5 of 9

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5   Results

Channel 1 (yellow/top line) - PIN#9 (OSC_OUT)

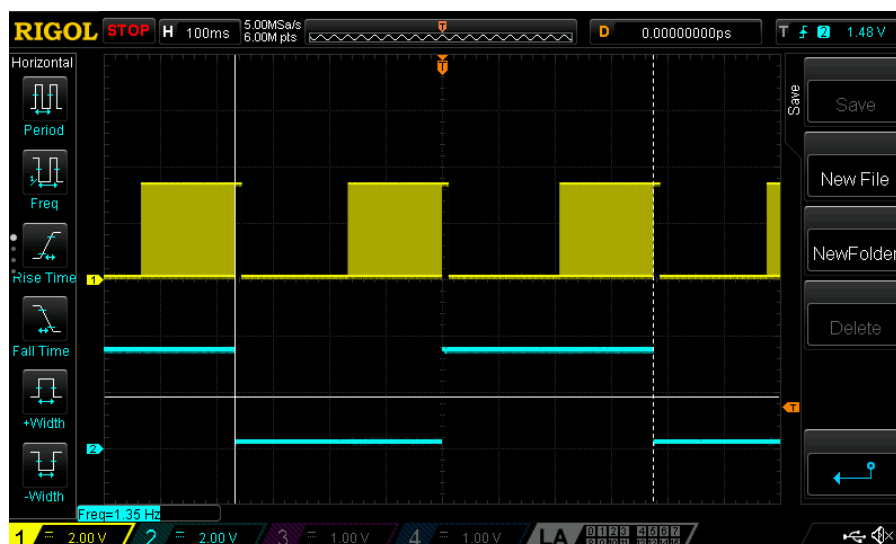Channel 2 (light blue/2nd line) - PIN#10 (DelayOUT)

Figure 4: Square Wave while Constant Current Source is Disabled

Figure 5: Square Wave while Constant Current Source is Enabled

Figure 4 shows that if the current source is not always turned on, the square wave will have an elongated period since the RC OSC needs to restart every time the delay is activated. If the feature is enabled, the square wave generator will operate properly without this start up time and run seamlessly as shown in Figure 5.

6   Conclusions

Choosing to not always turn on the current source of the RC OSC reduces the quiescent current of the SLG46140. If the delay block isn't used or isn't clocked by the RC OSC in the design this feature can be useful to reduce power consumption. If the design requires a delay that is clocked by the RC OSC, however, the current source will need to always be turned on for the delay to properly work. This setting only applies for the delay using the CNT/DLY block as a delay. A counter will require the RC OSC to force power on to properly work anyways and an edge detect doesn't require a clock to function.

Revision History

Revision	Date	Description
1.0	09-Oct-2019	Initial version

Status Definitions

Status	Definition
DRAFT	The content of this document is under review and subject to formal approval, which may result in modifications or additions.
APPROVED or unmarked	The content of this document has been approved for publication.

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Application Note   **Revision 1.0**   **09-Oct-2019**