CS40L25 I2C Waveform Streaming Testing

Introduction

This document provides haptic latency information of CS40L25 i2c in RAM based operation. For complete information, please refer to the datasheet.

All data in this document is based on a small sample size of tested devices and is for indication only and is not guaranteed by production test or over process and temperature variations.

Table 1 Firmware Used During Testing

Firmware	File Name	Firmware Version	Date	Notes
CS40L2x DF0 CLAB	prince_haptics_ctrl_ram_remap_df0_clab_0A0000.wmfw	10.00.00	14 July 2020	

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1 Measured AoH Standby Mode Haptic Latency and Power Consumption

The latency for the i2c streaming firmware was measured for CS40L25 in standby mode. The latency was measured from the end of the i2c command which initiates the playback of the waveform from the buffer to the beginning of the haptic waveform.

In AOH Standby Mode Global_EN = 1, AMP_EN = 0 and the Boost is enabled in Class H mode.

Figure 1 is an oscilloscope capture of latency measured on 1 device.

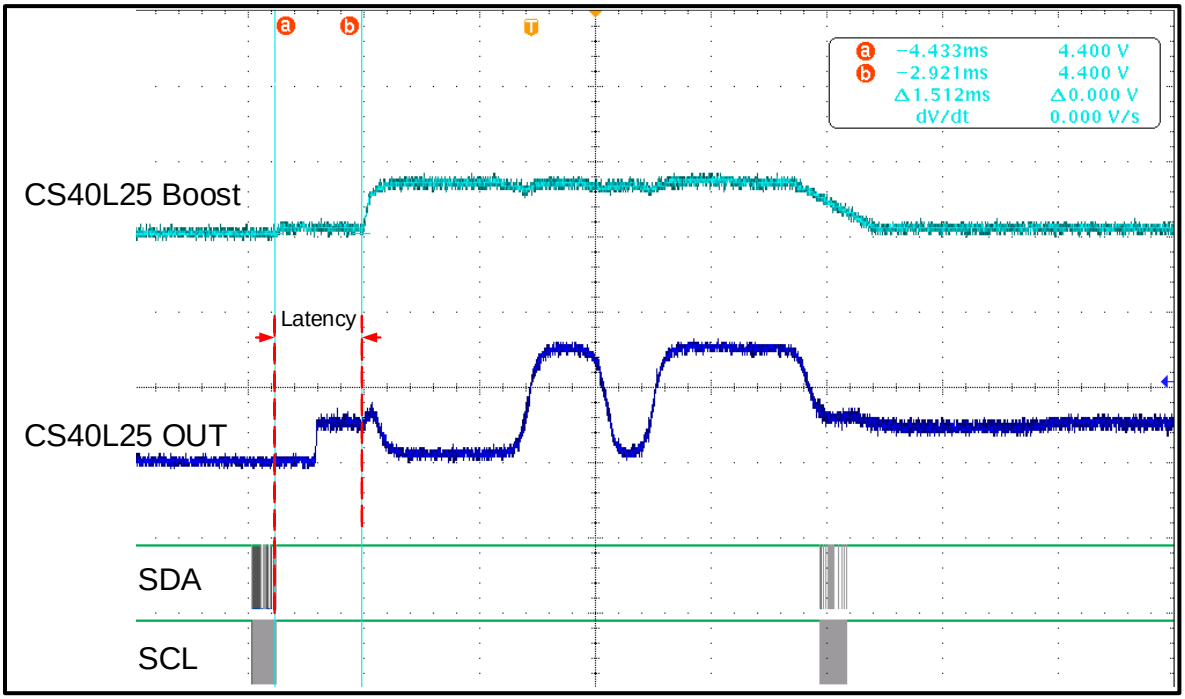

Figure 1: Oscilloscope Capture of Latency Measurement in AoH Standby Mode

Table 2 Measured Hibernate mode Latency and Power Consumption on 1 Board

Parameter		Typical	Unit
Measured Trigger to Haptic Latency	from AoH Standby mode	1.5	ms
Measured VA current in standby mode	I_{VA}	212	µA
Measured VP and SW current in standby mode	I_{VP} + I_{SW}	8	µA

Note: The Latency will vary over temperature and between devices.
Note: VA = 1.8V , VP=VAMP=VBST=3.60V, RESET_B inactive and control port inactive

The latency measurement includes the boost convertor ramping up and the Class D amplifier enabling.

2 Measured AoH Hibernate Mode Haptic Latency and Power Consumption

The latency for the i2c streaming firmware was measured for CS40L25 in hibernate mode. The latency was measured from the beginning of the i2c dumy write to wake up the CS40L25 to the beginning of the haptic waveform.

In AOH Hibernate Global_EN = 0, AMP_EN = 0 and BST_EN = 00

Figure 2 is an oscilloscope capture of latency measured on 1 device.

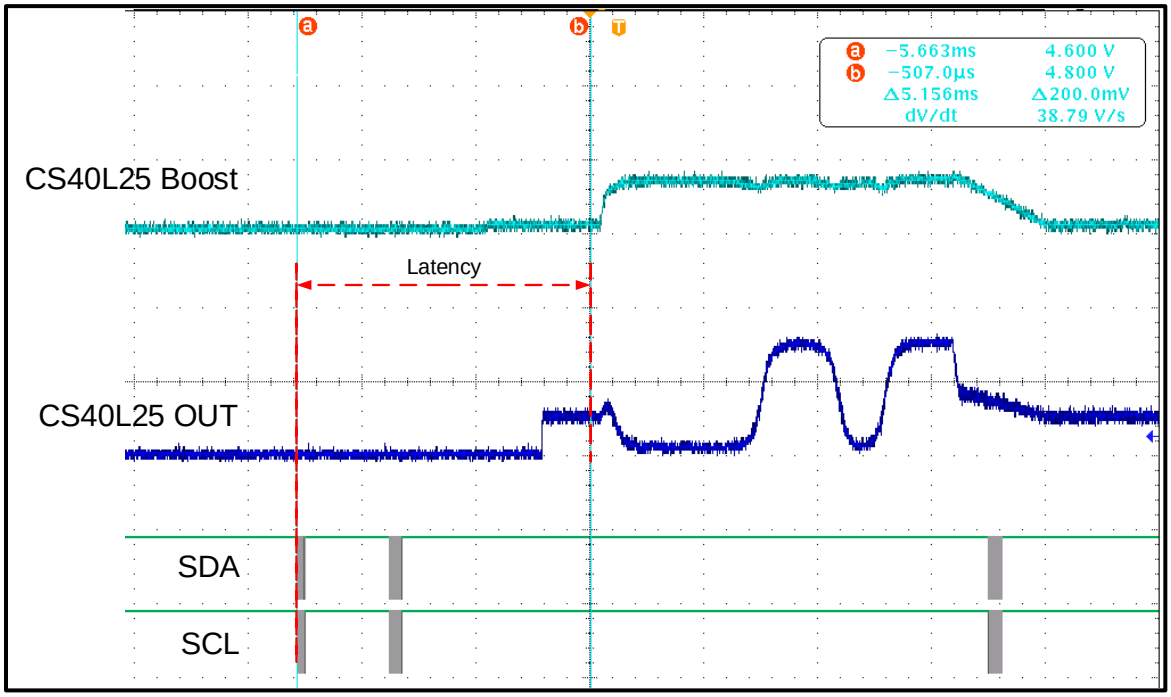

Figure 2: Oscilloscope Capture of Latency Measurement in AoH Hibernate Mode

Table 3 Measured Hibernate mode Latency and Power Consumption on 1 Board

Parameter		Typical	Unit
Measured Trigger to Haptic Latency	from AoH Hibernate mode	5.1	ms
Measured VA current in hibernate mode	I_{VA}	20	µA
Measured VP and SW current in hibernate mode	$I_{VP} + I_{SW}$	8	µA

Note: The Latency will vary over temperature and between devices.
Note: VA = 1.8V , VP=VAMP=VBST=3.60V, RESET_B inactive and control port inactive

The latency measurement includes the boost convertor and Class D amplifier enabling.

3 Revision History

Revision History

Revision	Changes
1.0 JUL 2020	• Initial version.
1.1 JUL 2020	• Information added on AoH standby mode.
1.2 JUL 2020	• Information added on AoH hibernate mode

Contacting Cirrus Logic Support

For all product questions and inquiries, contact a Cirrus Logic Sales Representative.
To find the one nearest you, go to www.cirrus.com.