Application Note

TRANSITIONING FROM THE CS8405A TO THE CS8406

by Sean Davis

1. Introduction

The CS8406 was designed as a pin and function compatible update for the CS8405A to add 192 kHz sample rate capability and offer over 1/3 less total power consumption than the CS8405A. This document outlines the considerations that need to be accounted for when making the transition. Please refer to the latest revision of each part's datasheet for a detailed description of part operation.

2. Power Supply

The VD+ supply of the CS8405A operates only at 5.0 V ± 10%, while the VD supply of the CS8406 operates at either 3.3 V or 5.0 V ± 5%. However, when the CS8406 is operated with VD = 5.0 V, certain conditions apply:

- V_{IH} (Min) for the CS8406 = 2.75 V. V_{IH} (Min) for the CS8405A = 2.0 V.
- In power down mode, it is recommended that all inputs be driven low to minimize current consumption.

3. Software Mode

Shown in Table 1 on page 2 is a list of pin numbers and their corresponding pin names for both parts when operated in Software mode. The register settings for the CS8405A are compatible with the CS8406.

4. Hardware Mode

Shown in Table 2 on page 3 is a list of pin numbers and their corresponding pin names for both parts when operated in Hardware mode.

5. CS8406 Test Pins

The CS8406 has several pins labeled as TEST. These pins are unused inputs in either Software or Hardware mode. It is recommended that these pins be tied to a supply (VL or GND) to minimize leakage current.

When transitioning from the CS8405A to the CS8406, some of the TEST pins on the CS8406 may be left floating due to corresponding pins on the CS8405A being labeled as no connects. The CS8406 will operate the same if these pins are left floating, however current consumption from VL will increase by 25 µA per pin that is left floating. As the CS8406 consumes much less current than the CS8405A, this should not be a concern to the user.

Pin Number	CS8405A Pin Name	CS8406 Pin Name	Differences
1	SDA / CDOUT	SDA / CDOUT	CS8405A I^2C is only supported at VL+ = 5.0 V. CS8406 allows I^2C operation at VL = 3.3 V or 5.0 V.
5	DGND2	TEST	See "CS8406 Test Pins" on page 1.
6	VD+	VD	See "Power Supply" on page 1.
7	DGND4	TEST	See "CS8406 Test Pins" on page 1.
8	DGND3	TEST	See "CS8406 Test Pins" on page 1.
10	NC1	TEST	See "CS8406 Test Pins" on page 1.
11	NC2	TEST	See "CS8406 Test Pins" on page 1.
16	NC3	TEST	See "CS8406 Test Pins" on page 1.
17	NC4	TEST	See "CS8406 Test Pins" on page 1.
18	NC5	TEST	See "CS8406 Test Pins" on page 1.
21	OMCK	OMCK	CS8405A OMCK clock ratios can be 256*Fs, 384*Fs, or 512*Fs. CS8406 OMCK clock ratios can be 128*Fs, 256*Fs, 384*Fs, or 512*Fs.
23	VL+	VL	For both parts, the VL supply can operate at 3.3 V or 5.0 V.
28	SCL / CCLK	SCL / CCLK	CS8405A I^2C is only supported at VL+ = 5.0 V. CS8406 allows I^2C operation at VL = 3.3 V or 5.0 V.
Pins 2, 3, 4, 9, 12, 13, 14, 15, 19, 20, 22, 24, 25, 26, and 27 have the same functions on both parts.			

Table 1. Software Mode Comparison

Pin Number	CS8405A Pin Name	CS8406 Pin Name	Differences
2	VL2+	TEST	See "CS8406 Test Pins" on page 1.
6	VD+	VD	See "Power Supply" on page 1.
7	DGND4	TEST	See "CS8406 Test Pins" on page 1.
8	DGND3	TEST	See "CS8406 Test Pins" on page 1.
20	VL3+	HWCK0	Pins 20 and 27 set the OMCK clock ratio for the CS8406. Setting both pins to VL (the recommended setting from the CS8405A datasheet) or both pins to GND will cause the clock ratio to be 256*Fs, the only mode available for the CS8405A.
21	OMCK	OMCK	CS8405A OMCK clock ratio is 256*Fs. CS8406 OMCK clock ratios can be 128*Fs, 256*Fs, or 512*Fs, set by HWCK[0:1].
23	VL+	VL	For both parts, the VL supply can operate at 3.3 V or 5.0 V.
27	VL4+	HWCK1	Pins 20 and 27 set the OMCK clock ratio for the CS8406. Setting both pins to VL (the recommended setting from the CS8405A datasheet) or both pins to GND will cause the clock ratio to be 256*Fs, the only mode available for the CS8405A.

Pins 1, 3, 4, 5, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 22, 24, 25, 26, and 28 have the same functions on both parts.

Table 2. Hardware Mode Comparison

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