Product Change Notification / SYST-20XPCD297

Date:

21-Oct-2021

Product Category:

8-bit Microcontrollers

PCN Type:

Document Change

Notification Subject:

ERRATA - PIC16(L)F18326/18346 Family Silicon Errata and Data Sheet Clarification Revision

Affected CPNs:

SYST-20XPCD297_Affected_CPN_10212021.pdf
SYST-20XPCD297_Affected_CPN_10212021.csv

Notification Text:

SYST-20XPCD297

Microchip has released a new Product Documents for the PIC16(L)F18326/18346 Family Silicon Errata and Data Sheet Clarification of devices. If you are using one of these devices please read the document located at PIC16(L)F18326/18346 Family Silicon Errata and Data Sheet Clarification.

Notification Status: Final

Description of Change: Added Silicon issue 3.3 FVR Accuracy

Impacts to Data Sheet: None

Reason for Change: To Improve Productivity

Change Implementation Status: Complete

Date Document Changes Effective: 21 October 2021

NOTE: Please be advised that this is a change to the document only the product has not been changed.

Markings to Distinguish Revised from Unrevised Devices: N/A

Attachments:

PIC16(L)F18326/18346 Family Silicon Errata and Data Sheet Clarification

Please contact your local Microchip sales office with questions or concerns regarding this notification.

Terms and Conditions:

If you wish to <u>receive Microchip PCNs via email</u> please register for our PCN email service at our PCN home page select register then fill in the required fields. You will find instructions about registering for Microchips PCN email service in the PCN FAQ section.

If you wish to <u>change your PCN profile, including opt out,</u> please go to the PCN home page select login and sign into your myMicrochip account. Select a profile option from the left navigation bar and make the applicable selections.

PIC16(L)F18326/18346

PIC16(L)F18326/18346 Family
Silicon Errata and Data Sheet Clarification

The PIC16(L)F18326/18346 family devices that you have received conform functionally to the current Device Data Sheet (DS40001839E), except for the anomalies described in this document.

The silicon issues discussed in the following pages are for silicon revisions with the Device and Revision IDs listed in Table 1. The silicon issues are summarized in Table 2.

The errata described in this document will be addressed in future revisions of the PIC16(L)F18326/18346 silicon.

> **Note:** This document summarizes all silicon errata issues from all revisions of silicon, previous as well as current. Only the issues indicated in the last column of Table 2 apply to the current silicon revision (**A3**).

Data Sheet clarifications and corrections start on page 5, following the discussion of silicon issues.

The silicon revision level can be identified using the current version of MPLAB® IDE and Microchip's programmers, debuggers, and emulation tools, which are available at the Microchip corporate website (www.microchip.com).

For example, to identify the silicon revision level using MPLAB IDE in conjunction with a hardware debugger:

1. Using the appropriate interface, connect the device to the hardware debugger.
2. Open an MPLAB IDE project.
3. Configure the MPLAB IDE project for the appropriate device and hardware debugger.
4. For MPLAB X IDE, select *Window > Dashboard* and click the **Refresh Debug Tool Status** icon ( ).
5. Depending on the development tool used, the part number *and* Device Revision ID value appear in the **Output** window.

> **Note:** If you are unable to extract the silicon revision level, please contact your local Microchip sales office for assistance.

The DEVREV values for the various PIC16(L)F18326/18346 silicon revisions are shown in Table 1.

TABLE 1: SILICON DEVREV VALUES

Part Number	Device ID[1]	Revision ID for Silicon Revision[2]		
		A1	A2	A3
PIC16F18326	30A4h	2001h	2002h	2003h
PIC16LF18326	30A6h	2001h	2002h	2003h
PIC16F18346	30A5h	2001h	2002h	2003h
PIC16LF18346	30A7h	2001h	2002h	2003h

Note 1: The Device IDs (DEVID and DEVREV) are located at addresses 8006h and 8005h, respectively. They are shown in hexadecimal in the format "DEVID DEVREV".

2: Refer to the *"PIC16(L)F183XX Memory Programming Specification"* (DS40001738) for detailed information on Device and Revision IDs for your specific device.

TABLE 2: **SILICON ISSUE SUMMARY**

Module	Feature	Item Number	Issue Summary	Affected Revisions[1]		
				A1	A2	A3
Oscillators	Fail-Safe Clock Monitor (FSCM)	1.1	The FSCM may fail to trigger with 4x PLL enabled.	X		
Host Synchronous Serial Port Module (MSSP2)	I²C Communication	2.1	Acknowledge failure on LF devices only.	X		
Electrical Specifications	V$_{DD}$ Parameter	3.1	VDDMIN specifications are changed for LF devices only.	X	X	X
	ADC Offset Error	3.2	ADC Offset Error specification changed.	X	X	X
	FVR Accuracy	3.3	FVR output voltage may be higher than specified in the data sheet.	X	X	X

Note 1: Only those issues indicated in the last column apply to the current silicon revision.

Silicon Errata Issues

> **Note:** This document summarizes all silicon errata issues from all revisions of silicon, previous as well as current. Only the issues indicated by the shaded column in the following tables apply to the current silicon revision (**A3**).

1. Module: Oscillators

1.1 Fail-Safe Clock Monitor (FSCM)

The Fail-Safe Clock Monitor may fail to trigger with the loss of the external clock signal when the 4x PLL is enabled. This includes all external clock modes, LP, XT, HS, ECL, ECM and ECH.

Work around

None.

Affected Silicon Revisions

A1	A2	A3					
X							

2. Module: Host Synchronous Serial Port Module (MSSP2)

2.1 I^{2}C Communication

When using the MSSP2 to perform I^{2}C communication and the voltage for V$_{DD}$ is above 3.0 volts, the Acknowledge signal (ACK) does not always occur after the second address byte is received, as expected. This issue exhibits itself when the MSSP2 is configured either for 7-bit or 10-bit addressing and in either Host or Client mode.

The issue occurs more frequently when using 10-bit addressing in Client mode and the lower address bits (A7-A0) are transmitted by the Host on the SDA line.

Work around

Do not exceed 3.0 volts on V$_{DD}$ when using LF device.

Affected Silicon Revisions

A1	A2	A3					
X							

3. Module: Electrical Specifications

3.1 VDD Parameter

VDDMIN at -40°C to +25°C = 2.3V.

Work around

None

Affected Silicon Revisions

A1	A2	A3					
X	X	X					

TABLE 3: SUPPLY VOLTAGE

PIC16LF18326/18346			Standard Operating Conditions (Unless Otherwise Stated)				
Param. No.	Sym.	Characteristic	Min.	Typ.†	Max.	Units	Conditions
D002	V_{DD}		1.8	—	3.6	V	$F_{OSC} \leq 16$ MHz, $+25°C < T_A \leq +125°C$
D002	V_{DD}		2.3	—	3.6	V	$F_{OSC} \leq 16$ MHz, $-40°C \leq T_A \leq +25°C$
			2.5	—	3.6	V	$F_{OSC} > 16$ MHz

3.2 ADC Offset Error

The table containing the Offset Error specification (AD04:EOFF) for the Analog-to-Digital Converter is modified. The updated value for Offset Error specification is +/- 3.0 LSb.

Work around

None.

Affected Silicon Revisions

A1	A2	A3					
X	X	X					

3.3 Fixed Voltage Reference (FVR) Accuracy

At temperatures below -20°C, the output voltage for the FVR may be greater than the levels specified in the data sheet. This will apply to all three gain amplifier settings (1X, 2X, 4X). The affected parameter numbers found in the data sheet are:

- FVR01 (1X gain setting)
- FVR02 (2X gain setting)
- FVR03 (4X gain setting)

Work around

None.

Affected Silicon Revisions

A1	A2	A3					
X	X	X					

Data Sheet Clarifications

The following typographic corrections and clarifications are to be noted for the latest version of the device data sheet (DS40001839**E**):

> **Note:** Corrections are shown in **bold**. Where possible, the original bold text formatting has been removed for clarity.

None.

APPENDIX A: DOCUMENT REVISION HISTORY

Rev F Document (09/2021)

Added Silicon issue 3.3 FVR Accuracy.

Rev E Document (11/2020)

Updated Table 2; added Table 3 and Section 3.2 ADC Offset Error.

Rev D Document (01/2020)

Added Silicon rev. A3.

Data Sheet Clarifications:

Removed Modules 1 and 2 (Data Sheet updated).

Rev C Document (01/2017)

Silicon Errata Issues:

Added Silicon rev. A2.

Data Sheet Clarifications:

Changed Module 1 Memory to Analog-to-Digital.

Rev B Document (01/2017)

Data Sheet Clarifications:

Added Module 2: Comparator.

Rev A Document (08/2016)

Initial release of this document.

Note the following details of the code protection feature on Microchip products:

- Microchip products meet the specifications contained in their particular Microchip Data Sheet.

- Microchip believes that its family of products is secure when used in the intended manner, within operating specifications, and under normal conditions.

- Microchip values and aggressively protects its intellectual property rights. Attempts to breach the code protection features of Microchip product is strictly prohibited and may violate the Digital Millennium Copyright Act.

- Neither Microchip nor any other semiconductor manufacturer can guarantee the security of its code. Code protection does not mean that we are guaranteeing the product is "unbreakable". Code protection is constantly evolving. Microchip is committed to continuously improving the code protection features of our products.

Trademarks

Worldwide Sales and Service

AMERICAS

Corporate Office
2355 West Chandler Blvd.
Chandler, AZ 85224-6199
Tel: 480-792-7200
Fax: 480-792-7277
Technical Support:
http://www.microchip.com/support
Web Address:
www.microchip.com

Atlanta
Duluth, GA
Tel: 678-957-9614
Fax: 678-957-1455

Austin, TX
Tel: 512-257-3370

Boston
Westborough, MA
Tel: 774-760-0087
Fax: 774-760-0088

Chicago
Itasca, IL
Tel: 630-285-0071
Fax: 630-285-0075

Dallas
Addison, TX
Tel: 972-818-7423
Fax: 972-818-2924

Detroit
Novi, MI
Tel: 248-848-4000

Houston, TX
Tel: 281-894-5983

Indianapolis
Noblesville, IN
Tel: 317-773-8323
Fax: 317-773-5453
Tel: 317-536-2380

Los Angeles
Mission Viejo, CA
Tel: 949-462-9523
Fax: 949-462-9608
Tel: 951-273-7800

Raleigh, NC
Tel: 919-844-7510

New York, NY
Tel: 631-435-6000

San Jose, CA
Tel: 408-735-9110
Tel: 408-436-4270

Canada - Toronto
Tel: 905-695-1980
Fax: 905-695-2078

ASIA/PACIFIC

Australia - Sydney
Tel: 61-2-9868-6733

China - Beijing
Tel: 86-10-8569-7000

China - Chengdu
Tel: 86-28-8665-5511

China - Chongqing
Tel: 86-23-8980-9588

China - Dongguan
Tel: 86-769-8702-9880

China - Guangzhou
Tel: 86-20-8755-8029

China - Hangzhou
Tel: 86-571-8792-8115

China - Hong Kong SAR
Tel: 852-2943-5100

China - Nanjing
Tel: 86-25-8473-2460

China - Qingdao
Tel: 86-532-8502-7355

China - Shanghai
Tel: 86-21-3326-8000

China - Shenyang
Tel: 86-24-2334-2829

China - Shenzhen
Tel: 86-755-8864-2200

China - Suzhou
Tel: 86-186-6233-1526

China - Wuhan
Tel: 86-27-5980-5300

China - Xian
Tel: 86-29-8833-7252

China - Xiamen
Tel: 86-592-2388138

China - Zhuhai
Tel: 86-756-3210040

ASIA/PACIFIC

India - Bangalore
Tel: 91-80-3090-4444

India - New Delhi
Tel: 91-11-4160-8631

India - Pune
Tel: 91-20-4121-0141

Japan - Osaka
Tel: 81-6-6152-7160

Japan - Tokyo
Tel: 81-3-6880- 3770

Korea - Daegu
Tel: 82-53-744-4301

Korea - Seoul
Tel: 82-2-554-7200

Malaysia - Kuala Lumpur
Tel: 60-3-7651-7906

Malaysia - Penang
Tel: 60-4-227-8870

Philippines - Manila
Tel: 63-2-634-9065

Singapore
Tel: 65-6334-8870

Taiwan - Hsin Chu
Tel: 886-3-577-8366

Taiwan - Kaohsiung
Tel: 886-7-213-7830

Taiwan - Taipei
Tel: 886-2-2508-8600

Thailand - Bangkok
Tel: 66-2-694-1351

Vietnam - Ho Chi Minh
Tel: 84-28-5448-2100

EUROPE

Austria - Wels
Tel: 43-7242-2244-39
Fax: 43-7242-2244-393

Denmark - Copenhagen
Tel: 45-4485-5910
Fax: 45-4485-2829

Finland - Espoo
Tel: 358-9-4520-820

France - Paris
Tel: 33-1-69-53-63-20
Fax: 33-1-69-30-90-79

Germany - Garching
Tel: 49-8931-9700

Germany - Haan
Tel: 49-2129-3766400

Germany - Heilbronn
Tel: 49-7131-72400

Germany - Karlsruhe
Tel: 49-721-625370

Germany - Munich
Tel: 49-89-627-144-0
Fax: 49-89-627-144-44

Germany - Rosenheim
Tel: 49-8031-354-560

Israel - Ra'anana
Tel: 972-9-744-7705

Italy - Milan
Tel: 39-0331-742611
Fax: 39-0331-466781

Italy - Padova
Tel: 39-049-7625286

Netherlands - Drunen
Tel: 31-416-690399
Fax: 31-416-690340

Norway - Trondheim
Tel: 47-7288-4388

Poland - Warsaw
Tel: 48-22-3325737

Romania - Bucharest
Tel: 40-21-407-87-50

Spain - Madrid
Tel: 34-91-708-08-90
Fax: 34-91-708-08-91

Sweden - Gothenberg
Tel: 46-31-704-60-40

Sweden - Stockholm
Tel: 46-8-5090-4654

UK - Wokingham
Tel: 44-118-921-5800
Fax: 44-118-921-5820

09/14/21

Affected Catalog Part Numbers(CPN)

PIC16F18326-E/7NVAO
PIC16F18326-E/P
PIC16F18326-E/SL
PIC16F18326-E/SLVAO
PIC16F18326-E/ST
PIC16F18346-E/SS
PIC16F18346-E/SSVAO
PIC16F18346-E/SO
PIC16F18346-E/P
PIC16F18346-E/GZ
PIC16F18346-E/GZVAO
PIC16F18326-E/JQ
PIC16F18326-E/JQVAO
PIC16F18326-I/P
PIC16F18326-I/SL
PIC16F18326-I/ST
PIC16F18346-I/SSC03
PIC16F18346-I/SS
PIC16F18346-I/SSVAO
PIC16F18346-I/MLC01
PIC16F18346-I/ML
PIC16F18346-I/SO
PIC16F18346-I/P
PIC16F18346-I/PREL
PIC16F18346-I/GZC01
PIC16F18346-I/GZ
PIC16F18326-I/JQ
PIC16F18346T-I/6NXV06
PIC16F18326T-I/7NV02
PIC16F18326T-I/SL
PIC16F18326T-I/ST
PIC16F18346T-I/SSC03
PIC16F18346T-I/SS
PIC16F18346T-I/SSVAO
PIC16F18346T-I/MLC01
PIC16F18346T-I/ML
PIC16F18346T-I/MLV07
PIC16F18346T-I/SO
PIC16F18346T-I/GZC01
PIC16F18346T-I/GZ
PIC16F18346T-I/GZVAO
PIC16F18326T-I/JQ

PIC16F18326T-E/7NV05
PIC16F18326T-E/7NV08
PIC16F18326T-E/7NVAO
PIC16F18326T-E/SLVAO
PIC16F18326T-E/ST
PIC16F18326T-E/STV01
PIC16F18326T-E/STVAO
PIC16F18346T-E/SS
PIC16F18346T-E/SSVAO
PIC16F18346T-E/MLVAO
PIC16F18346T-E/GZ
PIC16F18326T-E/JQVAO
PIC16LF18326-E/P
PIC16LF18326-E/SL
PIC16LF18326-E/ST
PIC16LF18326-E/STVAO
PIC16LF18346-E/SS
PIC16LF18346-E/SSVAO
PIC16LF18346-E/SO
PIC16LF18346-E/P
PIC16LF18346-E/GZ
PIC16LF18326-E/JQ
PIC16LF18326-I/P
PIC16LF18326-I/SL
PIC16LF18326-I/ST
PIC16LF18346-I/SS
PIC16LF18346-I/SO
PIC16LF18346-I/P
PIC16LF18346-I/GZ
PIC16LF18326-I/JQ
PIC16LF18326T-I/7N
PIC16LF18326T-I/7NV03
PIC16LF18326T-I/7NVAO
PIC16LF18326T-I/SL
PIC16LF18326T-I/ST
PIC16LF18346T-I/SS
PIC16LF18346T-I/SO
PIC16LF18346T-I/GZ
PIC16LF18326T-I/JQ
PIC16LF18326T-E/7NVAO
PIC16LF18326T-E/STVAO
PIC16LF18346T-E/SS
PIC16LF18346T-E/SSVAO
PIC16LF18346T-E/MLVAO
PIC16LF18346T-E/GZ
PIC16LF18346T-E/GZVAO