



## Product Change Notification / SYST-19QYCB443

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**Date:**

21-Oct-2020

**Product Category:**

32-bit Microcontrollers

**PCN Type:**

Document Change

**Notification Subject:**

ERRATA - SAM 4S Series Family Silicon Errata and Data Sheet Clarification

**Affected CPNs:**

[SYST-19QYCB443\\_Affected\\_CPN\\_10212020.pdf](#)

[SYST-19QYCB443\\_Affected\\_CPN\\_10212020.csv](#)

**Notification Text:**

SYST-19QYCB443

Microchip has released a new Product Documents for the SAM 4S Series Family Silicon Errata and Data Sheet Clarification of devices. If you are using one of these devices please read the document located at [SAM 4S Series Family Silicon Errata and Data Sheet Clarification](#).

**Notification Status:** Final

**Description of Change:** 1) The packages for the following Ordering Codes were updated in TABLE 47-1: "SAM4S Ordering Codes Table": ATSAM4S4AA-MU and ATSAM4S4AB-MN

**Impacts to Data Sheet:** None

**Reason for Change:** To Improve Productivity

**Change Implementation Status:** Complete

**Date Document Changes Effective:** 21 Oct 2020

**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:**

[SAM 4S Series Family Silicon Errata and Data Sheet Clarification](#)

Please contact your local [Microchip sales office](#) with questions or concerns regarding this notification.

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Affected Catalog Part Numbers (CPN)

ATSAM4S16BA-AU  
ATSAM4S16BA-AUR  
ATSAM4S16BA-MU  
ATSAM4S16BA-MUR  
ATSAM4S16BA-UUR  
ATSAM4S16BB-AN  
ATSAM4S16BB-ANR  
ATSAM4S16BB-MN  
ATSAM4S16BB-MNR  
ATSAM4S16BB-UUR  
ATSAM4S16CA-AU  
ATSAM4S16CA-AUR  
ATSAM4S16CA-CFU  
ATSAM4S16CA-CFUR  
ATSAM4S16CA-CU  
ATSAM4S16CA-CUR  
ATSAM4S16CB-AN  
ATSAM4S16CB-ANR  
ATSAM4S16CB-CFN  
ATSAM4S16CB-CFNR  
ATSAM4S16CB-CN  
ATSAM4S16CB-CNR  
ATSAM4S2AA-AU  
ATSAM4S2AA-MU  
ATSAM4S2AB-AN  
ATSAM4S2AB-ANR  
ATSAM4S2AB-MN  
ATSAM4S2AB-MNR  
ATSAM4S2BA-AU  
ATSAM4S2BA-AUR  
ATSAM4S2BA-MU  
ATSAM4S2BA-UUR  
ATSAM4S2BB-AN  
ATSAM4S2BB-ANR  
ATSAM4S2BB-MN  
ATSAM4S2BB-MNR  
ATSAM4S2BB-UUR  
ATSAM4S2CA-AU  
ATSAM4S2CA-CFU  
ATSAM4S2CA-CU  
ATSAM4S2CB-AN  
ATSAM4S2CB-ANR  
ATSAM4S2CB-CFN  
ATSAM4S2CB-CFNR  
ATSAM4S2CB-CN  
ATSAM4S2CB-CNR

ATSAM4S4AA-AU  
ATSAM4S4AA-MU  
ATSAM4S4AB-AN  
ATSAM4S4AB-ANR  
ATSAM4S4AB-MN  
ATSAM4S4AB-MNR  
ATSAM4S4BA-AU  
ATSAM4S4BA-AUR  
ATSAM4S4BA-MU  
ATSAM4S4BA-MURN01  
ATSAM4S4BA-UUR  
ATSAM4S4BB-AN  
ATSAM4S4BB-ANR  
ATSAM4S4BB-MN  
ATSAM4S4BB-MNR  
ATSAM4S4BB-UUR  
ATSAM4S4CA-AU  
ATSAM4S4CA-AUR  
ATSAM4S4CA-CFU  
ATSAM4S4CA-CU  
ATSAM4S4CA-CUR  
ATSAM4S4CB-AN  
ATSAM4S4CB-ANR  
ATSAM4S4CB-CFN  
ATSAM4S4CB-CFNR  
ATSAM4S4CB-CN  
ATSAM4S4CB-CNR  
ATSAM4S8BA-AU  
ATSAM4S8BA-AUR  
ATSAM4S8BA-MU  
ATSAM4S8BA-MUR  
ATSAM4S8BA-UUR  
ATSAM4S8BB-AN  
ATSAM4S8BB-ANR  
ATSAM4S8BB-MN  
ATSAM4S8BB-MNR  
ATSAM4S8BB-UUR  
ATSAM4S8CA-AU  
ATSAM4S8CA-AUR  
ATSAM4S8CA-CFU  
ATSAM4S8CA-CFUR  
ATSAM4S8CA-CU  
ATSAM4S8CA-CUR  
ATSAM4S8CB-AN  
ATSAM4S8CB-ANR  
ATSAM4S8CB-CFN  
ATSAM4S8CB-CFNR  
ATSAM4S8CB-CN  
ATSAM4S8CB-CNR

ATSAM4SA16BA-AU  
ATSAM4SA16BA-AUR  
ATSAM4SA16BA-MU  
ATSAM4SA16BA-MUR  
ATSAM4SA16BB-AN  
ATSAM4SA16BB-ANR  
ATSAM4SA16BB-MN  
ATSAM4SA16BB-MNR  
ATSAM4SA16CA-AU  
ATSAM4SA16CA-AUR  
ATSAM4SA16CA-CFU  
ATSAM4SA16CA-CFUR  
ATSAM4SA16CA-CU  
ATSAM4SA16CA-CUR  
ATSAM4SA16CB-AN  
ATSAM4SA16CB-ANR  
ATSAM4SA16CB-CFN  
ATSAM4SA16CB-CFNR  
ATSAM4SA16CB-CN  
ATSAM4SA16CB-CNR  
ATSAM4SD16BA-AU  
ATSAM4SD16BA-AUR  
ATSAM4SD16BA-MU  
ATSAM4SD16BA-MUR  
ATSAM4SD16BA-UUR  
ATSAM4SD16BB-AN  
ATSAM4SD16BB-ANR  
ATSAM4SD16BB-MN  
ATSAM4SD16BB-MNR  
ATSAM4SD16BB-UUR  
ATSAM4SD16CA-AU  
ATSAM4SD16CA-AUR  
ATSAM4SD16CA-CFU  
ATSAM4SD16CA-CFUR  
ATSAM4SD16CA-CU  
ATSAM4SD16CA-CUR  
ATSAM4SD16CB-AN  
ATSAM4SD16CB-ANR  
ATSAM4SD16CB-CFN  
ATSAM4SD16CB-CFNR  
ATSAM4SD16CB-CN  
ATSAM4SD16CB-CNR  
ATSAM4SD32BA-AU  
ATSAM4SD32BA-AUR  
ATSAM4SD32BA-MU  
ATSAM4SD32BA-MUR  
ATSAM4SD32BA-UUR  
ATSAM4SD32BB-AN  
ATSAM4SD32BB-ANR

ATSAM4SD32BB-MN  
ATSAM4SD32BB-MNR  
ATSAM4SD32BB-UUR  
ATSAM4SD32CA-AU  
ATSAM4SD32CA-AUR  
ATSAM4SD32CA-CFU  
ATSAM4SD32CA-CFUR  
ATSAM4SD32CA-CU  
ATSAM4SD32CA-CUR  
ATSAM4SD32CB-AN  
ATSAM4SD32CB-ANR  
ATSAM4SD32CB-CFN  
ATSAM4SD32CB-CFNR  
ATSAM4SD32CB-CN  
ATSAM4SD32CB-CNR

## SAM 4S Series Family Silicon Errata and Data Sheet Clarification

The SAM 4S Series family of devices that you have received conform functionally to the current Device Data Sheet (11100K-ATARM-SAM4S-Datasheet\_09-Jun-15), except for the anomalies described in this document.

### New Silicon Errata Issues

**Note:** This document provides information on new errata issues for the SAM 4S Series of devices. Please refer to the current device data sheet for all pre-existing silicon errata issues.

#### 1. Module: Voltage Regulator

The embedded voltage regulator does not work under the temperature below +25°C when VDDIN is supplied below 2.8V.

##### Work around

VDDIN must be supplied at 2.8V minimum to guarantee embedded voltage regulator start-up down to -40°C.

##### Affected Silicon Revisions

A	B						
X							

**Note:** The voltage regulator errata is not applicable to ATSAM4S2 and ATSAM4S4 derivatives.

#### 2. Module: ADC

The ADC does not start when using under these conditions: VDDANA < 2.4V or ADVREF < 2.4V, and temperature T° < 0°C.

##### Work around

Use reserved value of the IBCTL field in the ADC Analog Control Register (ADC\_ACR) IBCTL= 11b to ensure a correct startup of the ADC with a higher bias current (Typically, +50% higher than the standard configuration). This setup can be kept for standard analog conversions. If current consumption is critical, the IBCTL field setting must be kept to 11b at least during 20 µs before being changed to its nominal value.

##### Affected Silicon Revisions

A	B						
X	X						

# SAM 4S SERIES

## Data Sheet Clarifications

### 1. Module: Ordering Information

In the current device data sheet, the SAM4S Ordering Codes table (Table 47-1) is incorrect. The correct information is provided in the following table.

**TABLE 47-1: SAM4S ORDERING CODES TABLE**

Ordering Code	MRL	Flash (Kbytes)	SRAM (Kbytes)	Package	Carrier Type	Operating Temperature Range
ATSAM4SD32CA-CU	A	2*1024	160	TFBGA100	Tray, Tape and Reel (add R to ordering code)	Industrial (-40°C to +85°C)
ATSAM4SD32CB-CN	B					Industrial (-40°C to +105°C)
ATSAM4SD32CA-CFU	A	2*1024	160	VFBGA100	Tray, Tape and Reel (add R to ordering code)	Industrial (-40°C to +85°C)
ATSAM4SD32CB-CFN	B					Industrial (-40°C to +105°C)
ATSAM4SD32CA-AU	A	2*1024	160	LQFP100	Tray, Tape and Reel (add R to ordering code)	Industrial (-40°C to +85°C)
ATSAM4SD32CB-AN	B					Industrial (-40°C to +105°C)
ATSAM4SD32BA-MU	A	2*1024	160	QFN64	Tray, Tape and Reel (add R to ordering code)	Industrial (-40°C to +85°C)
ATSAM4SD32BB-MN	B					Industrial (-40°C to +105°C)
ATSAM4SD32BA-AU	A	2*1024	160	LQFP64	Tray, Tape and Reel (add R to ordering code)	Industrial (-40°C to +85°C)
ATSAM4SD32BB-AN	B					Industrial (-40°C to +105°C)
ATSAM4SD32BA-UUR	A	2*1024	160	WLCSP64	Tape and Reel	Industrial (-40°C to +85°C)
ATSAM4SD32BB-UUR	B					
ATSAM4SD16CA-CU	A	2*1024	160	TFBGA100	Tray, Tape and Reel (add R to ordering code)	Industrial (-40°C to +85°C)
ATSAM4SD16CB-CN	B					Industrial (-40°C to +105°C)
ATSAM4SD16CA-CFU	A	2*512	160	VFBGA100	Tray, Tape and Reel (add R to ordering code)	Industrial (-40°C to +85°C)
ATSAM4SD16CB-CFN	B					Industrial (-40°C to +105°C)
ATSAM4SD16CA-AU	A	2*512	160	LQFP100	Tray, Tape and Reel (add R to ordering code)	Industrial (-40°C to +85°C)
ATSAM4SD16CB-AN	B					Industrial (-40°C to +105°C)
ATSAM4SD16BA-MU	A	2*512	160	QFN64	Tray, Tape and Reel (add R to ordering code)	Industrial (-40°C to +85°C)
ATSAM4SD16BB-MN	B					Industrial (-40°C to +105°C)
ATSAM4SD16BA-AU	A	2*512	160	LQFP64	Tray, Tape and Reel (add R to ordering code)	Industrial (-40°C to +85°C)
ATSAM4SD16BB-AN	B					Industrial (-40°C to +105°C)
ATSAM4SD16BA-UUR	A	2*512	160	WLCSP64	Tape and Reel	Industrial (-40°C to +85°C)
ATSAM4SD16BB-UUR	B					
ATSAM4SA16CA-CU	A	1024	160	TFBGA100	Tray, Tape and Reel (add R to ordering code)	Industrial (-40°C to +85°C)
ATSAM4SA16CB-CN	B					Industrial (-40°C to +105°C)
ATSAM4SA16CA-CFU	A	1024	160	VFBGA100	Tray, Tape and Reel (add R to ordering code)	Industrial (-40°C to +85°C)
ATSAM4SA16CB-CFN	B					Industrial (-40°C to +105°C)
ATSAM4SA16CA-AU	A	1024	160	LQFP100	Tray, Tape and Reel (add R to ordering code)	Industrial (-40°C to +85°C)
ATSAM4SA16CB-AN	B					Industrial (-40°C to +105°C)
ATSAM4SA16BA-MU	A	1024	160	QFN64	Tray, Tape and Reel (add R to ordering code)	Industrial (-40°C to +85°C)
ATSAM4SA16BB-MN	B					Industrial (-40°C to +105°C)
ATSAM4SA16BA-AU	A	1024	160	LQFP64	Tray, Tape and Reel (add R to ordering code)	Industrial (-40°C to +85°C)
ATSAM4SA16BB-AN	B					Industrial (-40°C to +105°C)
ATSAM4S16CA-CU	A	1024	128	TFBGA100	Tray, Tape and Reel (add R to ordering code)	Industrial (-40°C to +85°C)
ATSAM4S16CB-CN	B					Industrial (-40°C to +105°C)
ATSAM4S16CA-AU	A	1024	128	LQFP100	Tray, Tape and Reel (add R to ordering code)	Industrial (-40°C to +85°C)
ATSAM4S16CB-AN	B					Industrial (-40°C to +105°C)



# SAM 4S SERIES

Ordering Code	MRL	Flash (Kbytes)	SRAM (Kbytes)	Package	Carrier Type	Operating Temperature Range
ATSAM4S16CA-CFU	A	1024	128	VFPGA100	Tray, Tape and Reel (add R to ordering code)	Industrial (-40°C to +85°C)
ATSAM4S16CB-CFN	B					Industrial (-40°C to +105°C)
ATSAM4S16BA-AU	A	1024	128	LQFP64	Tray, Tape and Reel (add R to ordering code)	Industrial (-40°C to +85°C)
ATSAM4S16BB-AN	B					Industrial (-40°C to +105°C)
ATSAM4S16BA-MU	A	1024	128	LQFP64	Tray, Tape and Reel (add R to ordering code)	Industrial (-40°C to +85°C)
ATSAM4S16BB-MN	B					Industrial (-40°C to +105°C)
ATSAM4S16BA-UUR	A	1024	128	WLCSP64	Tape and Reel	Industrial (-40°C to +85°C)
ATSAM4S16BB-UUR	B					
ATSAM4S8CA-CU	A	512	128	TFBGA100	Tray, Tape and Reel (add R to ordering code)	Industrial (-40°C to +85°C)
ATSAM4S8CB-CN	B					Industrial (-40°C to +105°C)
ATSAM4S8CA-CFU	A	1024	128	VFPGA100	Tray, Tape and Reel (add R to ordering code)	Industrial (-40°C to +85°C)
ATSAM4S8CB-CFN	B					Industrial (-40°C to +105°C)
ATSAM4S8CA-AU	A	1024	128	LQFP100	Tray, Tape and Reel (add R to ordering code)	Industrial (-40°C to +85°C)
ATSAM4S8CB-AN	B					Industrial (-40°C to +105°C)
ATSAM4S8BA-MU	A	1024	128	QFN64	Tray, Tape and Reel (add R to ordering code)	Industrial (-40°C to +85°C)
ATSAM4S8BB-MN	B					Industrial (-40°C to +105°C)
ATSAM4S8BA-UUR	A	512	128	WLCSP64	Tape and Reel	Industrial (-40°C to +85°C)
ATSAM4S8BB-UUR	B					
ATSAM4S8BA-AU	A	512	128	LQFP64	Tray, Tape and Reel (add R to ordering code)	Industrial (-40°C to +85°C)
ATSAM4S8BB-AN	B					Industrial (-40°C to +105°C)
ATSAM4S4CA-CU	A	256	64	TFBGA100	Tray, Tape and Reel (add R to ordering code)	Industrial (-40°C to +85°C)
ATSAM4S4CB-CN	B					Industrial (-40°C to +105°C)
ATSAM4S4CA-CFU	A	256	64	VFPGA100	Tray, Tape and Reel (add R to ordering code)	Industrial (-40°C to +85°C)
ATSAM4S4CB-CFN	B					Industrial (-40°C to +105°C)
ATSAM4S4CA-AU	A	256	64	LQFP100	Tray, Tape and Reel (add R to ordering code)	Industrial (-40°C to +85°C)
ATSAM4S4CB-AN	B					Industrial (-40°C to +105°C)
ATSAM4S4BA-MU	A	256	64	QFN64	Tray, Tape and Reel (add R to ordering code)	Industrial (-40°C to +85°C)
ATSAM4S4BB-MN	B					Industrial (-40°C to +105°C)
ATSAM4S4BA-UUR	A	256	64	WLCSP64	Tape and Reel	Industrial (-40°C to +85°C)
ATSAM4S4BB-UUR	B					
ATSAM4S4BA-AU	A	256	64	LQFP64	Tray, Tape and Reel (add R to ordering code)	Industrial (-40°C to +85°C)
ATSAM4S4BB-AN	B					Industrial (-40°C to +105°C)
ATSAM4S4AA-MU	A	256	64	QFN48	Tray, Tape and Reel (add R to ordering code)	Industrial (-40°C to +85°C)
ATSAM4S4AB-MN	B					Industrial (-40°C to +105°C)
ATSAM4S4AA-AU	A	256	64	LQFP48	Tray, Tape and Reel (add R to ordering code)	Industrial (-40°C to +85°C)
ATSAM4S4AB-AN	B					Industrial (-40°C to +105°C)
ATSAM4S2CA-CU	A	256	64	TFBGA100	Tray, Tape and Reel (add R to ordering code)	Industrial (-40°C to +85°C)
ATSAM4S2CB-CN	B					Industrial (-40°C to +105°C)
ATSAM4S2CA-CFU	A	256	64	VFPGA100	Tray, Tape and Reel (add R to ordering code)	Industrial (-40°C to +85°C)
ATSAM4S2CB-CFN	B					Industrial (-40°C to +105°C)
ATSAM4S2CA-AU	A	256	64	LQFP100	Tray, Tape and Reel (add R to ordering code)	Industrial (-40°C to +85°C)
ATSAM4S2CB-AN	B					Industrial (-40°C to +105°C)
ATSAM4S2BA-MU	A	256	64	QFN64	Tray, Tape and Reel (add R to ordering code)	Industrial (-40°C to +85°C)
ATSAM4S2BB-MN	B					Industrial (-40°C to +105°C)

# SAM 4S SERIES

Ordering Code	MRL	Flash (Kbytes)	SRAM (Kbytes)	Package	Carrier Type	Operating Temperature Range
ATSAM4S2BA-UUR	A	128	64	WLCSP64	Tape and Reel	Industrial (-40°C to +85°C)
ATSAM4S2BB-UUR	B					
ATSAM4S2BA-AU	A	128	64	LQFP64	Tray, Tape and reel (add R to ordering code)	Industrial (-40°C to +85°C)
ATSAM4S2BB-AN	B					Industrial (-40°C to +105°C)
ATSAM4S2AA-MU	A	256	64	QFN48	Tray, Tape and reel (add R to ordering code)	Industrial (-40°C to +85°C)
ATSAM4S2AB-MN	B					Industrial (-40°C to +105°C)
ATSAM4S2AA-AU	A	256	64	LQFP48	Tray, Tape and reel (add R to ordering code)	Industrial (-40°C to +85°C)
ATSAM4S2AB-AN	B					Industrial (-40°C to +105°C)

## 2. Module: CHIP ID

Table 30-1. "SAM 4S Chip ID Registers" is updated with Chip ID information. The newly added information is shown in **BOLD**.

**TABLE 30-1: SAM 4S CHIP ID REGISTERS**

Chip Name	CHIPID_CIDR	CHIPID_EXID
SAM4SD32C (Rev A)	0x29A7_0EE0	0x0
SAM4SD32C (Rev B)	0x29A7_0EE1	0x0
SAM4SD32B (Rev A)	0x2997_0EE0	0x0
SAM4SD32B (Rev B)	0x2997_0EE1	0x0
SAM4SD16C (Rev A)	0x29A7_0CE0	0x0
SAM4SD16C (Rev B)	0x29A7_0CE1	0x0
SAM4SD16B (Rev A)	0x2997_0CE0	0x0
SAM4SD16B (Rev B)	0x2997_0CE1	0x0
SAM4SA16C (Rev A)	0x28A7_0CE0	0x0
SAM4SA16C (Rev B)	0x28A7_0CE1	0x0
SAM4SA16B (Rev A)	0x2897_0CE0	0x0
SAM4SA16B (Rev B)	0x2897_0CE1	0x0
SAM4S16B (Rev A)	0x289C_0CE0	0x0
SAM4S16B (Rev B)	0x289C_0CE1	0x0
SAM4S16C (Rev A)	0x28AC_0CE0	0x0
SAM4S16C (Rev B)	0x28AC_0CE1	0x0
SAM4S8B (Rev A)	0x289C_0AE0	0x0
SAM4S8B (Rev B)	0x289C_0AE1	0x0
SAM4S8C (Rev A)	0x28AC_0AE0	0x0
SAM4S8C (Rev B)	0x28AC_0AE1	0x0
SAM4S4C (Rev A)	0x28AB_09E0/ <b>0x28AB_09E1</b>	0x0
SAM4S4C (Rev B)	0x28AB_09E1	0x0

# SAM 4S SERIES

**TABLE 30-1: SAM 4S CHIP ID REGISTERS**

SAM4S4B (Rev A)	0x289B_09E0/ <b>0x289B_09E1</b>	0x0
SAM4S4B (Rev B)	0x289B_09E1	0x0
SAM4S4A (Rev A)	0x288B_09E0/ <b>0x288B_09E1</b>	0x0
SAM4S4A (Rev B)	0x288B_09E1	0x0
SAM4S2C (Rev A)	0x28AB_07E0/ <b>0x28AB_07E1</b>	0x0
SAM4S2C (Rev B)	0x28AB_07E1	0x0
SAM4S2B (Rev A)	0x289B_07E0/ <b>0x289B_07E1</b>	0x0
SAM4S2B (Rev B)	0x289B_07E1	0x0
SAM4S2A (Rev A)	0x288B_07E0/ <b>0x288B_07E1</b>	0x0
SAM4S2A (Rev B)	0x288B_07E1	0x0

### 3. Module: Errata

Table 48-3. “Errata SAM 4S4/S2 Rev A Parts” is updated with Chip ID information. The newly added information is shown in **BOLD**.

**TABLE 48-3: ERRATA SAM 4S4/S2 REV A PARTS**

Device Name	Revision	Chip ID
SAM4S4C	A	0x28AB_09E0/ <b>0x28AB_09E1</b>
SAM4S4B	A	0x289B_09E0/ <b>0x289B_09E1</b>
SAM4S4A	A	0x288B_09E0/ <b>0x288B_09E1</b>
SAM4S2C	A	0x28AB_07E0/ <b>0x28AB_07E1</b>
SAM4S2B	A	0x289B_07E0/ <b>0x289B_07E1</b>
SAM4S2A	A	0x288B_07E0/ <b>0x288B_07E1</b>

# SAM 4S SERIES

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## APPENDIX A: REVISION HISTORY

### Rev A Document (3/2018)

This is the initial released version of this document.

### Rev B Document (5/2019)

The following Data Sheet Clarifications were added:

- **2. Module: “CHIP ID”**
- **3. Module: “Errata”**

### Rev C Document 10/2020

The packages for the following Ordering Codes were updated in **TABLE 47-1: “SAM4S Ordering Codes Table”**:

- ATSAM4S4AA-MU
- ATSAM4S4AB-MN

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**Note the following details of the code protection feature on Microchip devices:**

- 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 and under normal conditions.
- There are dishonest and possibly illegal methods being used in attempts to breach the code protection features of the Microchip devices. We believe that these methods require using the Microchip products in a manner outside the operating specifications contained in Microchip's Data Sheets. Attempts to breach these code protection features, most likely, cannot be accomplished without violating Microchip's intellectual property rights.
- Microchip is willing to work with any customer who is concerned about the integrity of its code.
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