PIC18C658/858

PIC18C658/858 Rev. B1 Silicon Errata Sheet

The PIC18C658/858 parts you have received conform functionally to the Device Data Sheet (DS30475**A**), except for the anomalies described below.

All the problems listed here will be addressed in future revisions of the PIC18C658/858 silicon.

1. Module: CAN

The CAN module may send a passive error flag earlier than expected. This will occur at the transition point of error active to error passive, TEC (Transmit Error Count), or REC (Receive Error Count) ≥ 128.

Work around

None for current silicon revision. Use the latest silicon revision when it becomes available.

2. Module: CAN

The CAN module may not synchronize correctly if there is a phase error between nodes that is equal to the Synchronization Jump Width (SJW). As a result, the module may request retransmission of messages from the transmitting node.

Work around

1. Use the longest SJW possible that will work with the application.
2. Use the latest silicon revision when it becomes available.

Date Codes that pertain to this issue:

ALL

Note: When the manufacture date of a newer version of silicon is in production, the last date where this issue may occur will be specified.

3. Module: LVD

The minimum and maximum LVD voltage levels (parameter D420) have changed. The new values are shown in Table 1.

Work around

None

Date Codes that pertain to this issue:

ALL

Note: When the manufacture date of a newer version of silicon is in production, the last date where this issue may occur will be specified.

TABLE 1: LVD MINIMUM VOLTAGES

Param No.	Symbol	Characteristic		Min.	Max.	Units
D420	VLVD	LVD Voltage	LVDL<3:0> = 0100	2.35	2.80	V
			LVDL<3:0> = 0101	2.55	3.02	V
			LVDL<3:0> = 0110	2.64	3.14	V
			LVDL<3:0> = 0111	2.83	3.37	V
			LVDL<3:0> = 1000	3.11	3.71	V
			LVDL<3:0> = 1001	3.29	3.93	V
			LVDL<3:0> = 1010	3.39	4.04	V
			LVDL<3:0> = 1011	3.58	4.26	V
			LVDL<3:0> = 1100	3.77	4.49	V
			LVDL<3:0> = 1101	3.95	4.71	V
			LVDL<3:0> = 1110	4.23	5.05	V

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4. Module: BOR

The minimum and maximum BOR Voltage levels (parameter D005) have changed. The new values are shown in Table 2.

TABLE 2: BOR MAXIMUM VOLTAGES

Param No.	Symbol	Characteristic		Min.	Max.	Units
D005	VBOR	BOR Voltage	BORV<1:0> = 0100	2.35	2.80	V
			BORV<1:0> = 0101	2.55	3.02	V
			BORV<1:0> = 0110	3.95	4.71	V
			BORV<1:0> = 0111	4.23	5.05	V

Work around

None.

Date Codes that pertain to this issue:

ALL

Note: When the manufacture date of a newer version of silicon is in production, the last date where this issue may occur will be specified.

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Clarifications/Corrections to the Data Sheet:

In the Device Data Sheet (DS30475**A**), the following clarifications and corrections should be noted.

1. Module: Timer1

Section 11.1 (Timer1 Operation) is amended with the following clarification:

When Timer1 is configured to operate as an asynchronous counter, care must be taken that there is no incoming pulse while the module is being turned off. If an incoming pulse arrives while Timer1 is being turned off, the value of register TMR1 may become unpredictable.

If an application requires that Timer1 be turned off and if it is possible that Timer1 may receive an incoming pulse while being turned off, synchronize the external clock first, by clearing the T1SYNC bit of register T1CON. Please note that this may cause Timer1 to miss up to one count.

2. Module: LVD

Table 25-1 of the Device Data Sheet is amended to include parameters D421, D422, D423 and D425, related to the performance of the Low Voltage Detect module.

In addition, the minimum and maximum LVD voltage levels (specification D420) are also amended (see Issue 3 of this Errata), and typical voltage levels are provided.

Table 25-1 should read as follows (changes and additions in **bold**):

TABLE 25-1: LOW VOLTAGE DETECT CHARACTERISTICS

			Standard Operating Conditions (unless otherwise stated) Operating temperature -40°C ≤ TA ≤ +85°C for industrial -40°C ≤ TA ≤ +125°C for extended					
Param No.	**Symbol**	**Characteristic/**		**Min.**	**Typ**	**Max.**	**Units**	**Conditions**
D420	VLVD	LVD Voltage	LVDL<3:0> = 0100	**2.35**	**2.58**	2.80	V	
			LVDL<3:0> = 0101	**2.55**	**2.78**	3.02	V	
			LVDL<3:0> = 0110	**2.64**	**2.89**	3.14	V	
			LVDL<3:0> = 0111	**2.83**	**3.1**	3.37	V	
			LVDL<3:0> = 1000	**3.11**	**3.41**	3.71	V	
			LVDL<3:0> = 1001	**3.29**	**3.61**	3.93	V	
			LVDL<3:0> = 1010	**3.39**	**3.72**	4.04	V	
			LVDL<3:0> = 1011	**3.58**	**3.92**	4.26	V	
			LVDL<3:0> = 1100	**3.77**	**4.13**	4.49	V	
			LVDL<3:0> = 1101	**3.95**	**4.33**	4.71	V	
			LVDL<3:0> = 1110	**4.23**	**4.64**	5.05	V	
D421	**ΔILVD**	**Supply Current**		**—**	**35**	**50**	**μA**	
D425	**VBG**	**Internally Generated Reference Voltage**		**TBD**	**1.22**	**TBD**	**V**	

3. Module: BOR

Section 25.1 of the Device Data Sheet is amended to add parameters D006A, D006A and D007, related to the performance of the Brown-out Reset module.

In addition, the minimum and maximum specified values for parameter D005 are amended as noted (see Issue 4 of this Errata).

Also, the typical and maximum values for parameter D022A are amended as noted (see Issue 4 of this Errata).

Section 25.1 in part should read as follows (changes and additions in **bold**):

25.1 DC Characteristics

PIC18LCXX8 (Industrial)				**Standard Operating Conditions (unless otherwise stated)** Operating temperature -40°C ≤ TA ≤ +85°C for industrial				
PIC18CXX8 (Industrial, Extended)				**Standard Operating Conditions (unless otherwise stated)** Operating temperature -40°C ≤ TA ≤ +85°C for industrial -40°C ≤ TA ≤ +125°C for extended				
Param No.	**Symbol**	**Characteristic/ Device**		**Min**	**Typ**	**Max**	**Units**	**Conditions**
D005	VBOR	**Brown-out Reset Voltage**						
		PIC18LCXX8	BORV1:BORV0 = 11	2.35	—	**2.80**	V	
			BORV1:BORV0 = 10	2.55	—	**3.02**	V	
			BORV1:BORV0 = 01	3.95	—	**4.71**	V	
			BORV1:BORV0 = 00	4.23	—	**5.05**	V	
D005		PIC18CXX8	BORV1:BORV0 = 1x	N.A.	N.A.	N.A.	V	Not in operating voltage range of device
			BORV1:BORV0 = 01	4.2	—	**4.45**	V	
			BORV1:BORV0 = 00	4.5	—	**4.85**	V	
D022A	ΔIBOR	PIC18LCXX8		—	**35**	**50**	µA	VDD = 5.5V
		Brown-out Reset		—	**35**	50	µA	VDD = 2.5V, 25°C
D022A		PIC18CXX8		—	**10**	**TBD**	µA	VDD = 5.5V, -40°C to +85°C
		Brown-out Reset		—	**10**	TBD	µA	VDD = 5.5V, -40°C to +125°
				—	**10**	TBD	µA	VDD = 4.2V, 25°C

Legend: Shading added to differentiate characteristics for “LC” devices. Characteristics are assumed to be common for “C” and “LC” devices unless otherwise noted.

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4. Module: Comparator

Section 25.1 of the Device Data Sheet is amended to add parameters D023 related to the Analog Comparator module.

In addition, a new table is added to describe the Analog Comparator specifications.

25.1 DC Characteristics (cont'd)

PIC18LCXX8 (Industrial)			**Standard Operating Conditions (unless otherwise stated)** Operating temperature -40°C≤ TA ≤ +85°C for industrial				
PIC18CXX8 (Industrial, Extended)			**Standard Operating Conditions (unless otherwise stated)** Operating temperature -40°C ≤ TA ≤ +85°C for industrial -40°C ≤ TA ≤ +125°C for extended				
Param No.	**Symbol**	**Characteristic/ Device**	**Min**	**Typ**	**Max**	**Units**	**Conditions**
D020	IPD	**Power-down Current(3)**					
		PIC18LCXX8	—	<2.5	5	µA	VDD = 2.5V, -40°C to +85°C
			—	—	36	µA	VDD = 5.5V, -40°C to +85°C
			—	—	TBD	µA	VDD = 2.5V, 25°C
D020		PIC18CXX8	—	<1	TBD	µA	VDD = 4.2V, -40°C to +85°C
			—	—	36	µA	VDD = 5.5V, -40°C to +85°C
D020A			—	—	TBD	µA	VDD = 4.2V, 25°C
D021B			—	TBD	TBD	µA	VDD = 4.2V, -40°C to +125°C
			—	—	42		VDD = 5.5V, -40°C to +125°C
D022	ΔIWDT	**Module Differential Current**					
		PIC18LCXX8	—	—	12	µA	VDD = 2.5V
		Watchdog Timer	—	—	25	µA	VDD = 5.5V
			—	—	TBD	µA	VDD = 2.5V, 25°C
D022		PIC18CXX8	—	—	25	µA	VDD = 5.5V, -40°C to +85°C
		Watchdog Timer	—	—	TBD	µA	VDD = 5.5V, -40°C to +125°C
			—	—	TBD	µA	VDD = 4.2V, 25°C
D022A	ΔIBOR	PIC18LCXX8	—	—	50	µA	VDD = 5.5V
		Brown-out Reset	—	—	TBD	µA	VDD = 2.5V, 25°C
D022A		PIC18CXX8	—	—	50	µA	VDD = 5.5V, -40°C to +85°C
		Brown-out Reset	—	—	TBD	µA	VDD = 5.5V, -40°C to +125°
			—	—	TBD	µA	VDD = 4.2V, 25°C
D022B	ΔILVD	PIC18LCXX8	—	—	50	µA	VDD = 2.5V
		Low Voltage Detect	—	—	TBD	µA	VDD = 2.5V, 25°C
D022B		PIC18CXX8	—	—	TBD	µA	VDD = 4.2V, -40°C to +85°C
		Low Voltage Detect	—	—	TBD	µA	VDD = 4.2V, -40°C to +125°C
			—	—	TBD	µA	VDD = 4.2V, 25°C
D023	ΔICOMP	PIC18LCXX8 Comparator	—	—	100	µA	VDD = 2.5V
D023		PIC18CXX8 Comparator	—	—	100	µA	VDD = 4.2V

Legend: Rows are shaded for improved readability.

Note 1: This is the limit to which VDD can be lowered in SLEEP mode or during a device RESET without losing RAM data.

2: The supply current is mainly a function of the operating voltage and frequency. Other factors such as I/O pin loading and switching rate, oscillator type, internal code execution pattern, and temperature also have an impact on the current consumption.
The test conditions for all IDD measurements in active operation mode are:
OSC1 = external square wave, from rail to rail; all I/O pins tri-stated, pulled to VDD
MCLR = VDD; WDT enabled/disabled as specified.

3: The power-down current in SLEEP mode does not depend on the oscillator type. Power-down current is measured with the part in SLEEP mode, with all I/O pins in hi-impedance state and tied to VDD and VSS, and all features that add delta current disabled (such as WDT, Timer1 Oscillator, BOR, ...).

4: For RC osc configuration, current through REXT is not included. The current through the resistor can be estimated by the formula Ir = VDD/2REXT (mA) with REXT in kOhm.

PRELIMINARY

25.1 DC Characteristics (cont'd)

PIC18LCXX8 (Industrial)			Standard Operating Conditions (unless otherwise stated) Operating temperature -40°C≤ TA ≤ +85°C for industrial				
PIC18CXX8 (Industrial, Extended)			**Standard Operating Conditions (unless otherwise stated)** Operating temperature -40°C ≤ TA ≤ +85°C for industrial -40°C ≤ TA ≤ +125°C for extended				
Param No.	**Symbol**	**Characteristic/ Device**	**Min**	**Typ**	**Max**	**Units**	**Conditions**
D023A	ΔIVREF	PIC18LCXX8 Voltage Reference	—	—	300	µA	VDD = 2.5V
D023A		PIC18CXX8 Voltage Reference	—	—	300	µA	VDD = 4.2V
D025	ΔIOSCB	PIC18LCXX8 Timer1 Oscillator	— —	— —	3 TBD	µA µA	VDD = 2.5V VDD = 2.5V, 25°C
D025		PIC18CXX8 Timer1 Oscillator	— — —	— — —	TBD TBD TBD	µA µA µA	VDD = 4.2V, -40°C to +85°C VDD = 4.2V, -40°C to +125°C VDD = 4.2V, 25°C

Legend: Rows are shaded for improved readability.

Note 1: This is the limit to which VDD can be lowered in SLEEP mode or during a device RESET without losing RAM data.

2: The supply current is mainly a function of the operating voltage and frequency. Other factors such as I/O pin loading and switching rate, oscillator type, internal code execution pattern, and temperature also have an impact on the current consumption.
The test conditions for all IDD measurements in active operation mode are:
OSC1 = external square wave, from rail to rail; all I/O pins tri-stated, pulled to VDD
MCLR = VDD; WDT enabled/disabled as specified.

3: The power-down current in SLEEP mode does not depend on the oscillator type. Power-down current is measured with the part in SLEEP mode, with all I/O pins in hi-impedance state and tied to VDD and VSS, and all features that add delta current disabled (such as WDT, Timer1 Oscillator, BOR, ...).

4: For RC osc configuration, current through REXT is not included. The current through the resistor can be estimated by the formula Ir = VDD/2REXT (mA) with REXT in kOhm.

PRELIMINARY

TABLE 1: COMPARATOR SPCIFICATIONS

	Operating Conditions: VDD Range as Described in Table 1 Operating temperature -40°C < TA < +125°C Current Consumption is Specified in Table 1				
Characteristics	**Min.**	**Typ**	**Max**	**Units**	**Comments**
Input Offset Voltage		±5.0	±10	mV	
Input Common Mode Voltage	0		VDD - 1.5	V	
CMRR	+55			db	
Response Time(1)		150	400 600	ns ns	PIC18CXX8 PIC18LCXX8
Comparator Mode Change to Output Valid			10	µs	

Note 1: Response time measured with one comparator at (VDD - 1.5)/2, while the other input transitions from VSS to VDD.

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APPENDIX A: REVISION HISTORY

Rev A Document (1/2001)
First revision of this document.

Rev B Document (2/2001)
Added issues 3 and 4 (LVD and BOR modules).

Added sections 2 (LVD), 3 (BOR) and 4 (Comparator) under “Clarifications/Corrections to the Data Sheet”.

NOTES:

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