PIC12C508A/509A

Errata Sheet for PIC12C508A/509A (Rev. A Silicon)

The PIC12C5XX-parts conform functionally to the PIC12C5XX Data Sheet (DS40139E), except for the anomalies described below:

None

Clarifications/Corrections to the Data Sheet:

In the Device Data Sheet (DS40139E), the following clarifications and corrections should be noted.

Section 13: Corrections for the DC Characteristics, Section 13.2, Section 13.3 and Section 13.4 are shown.

Corrections for the GPIO pull-up resistor ranges are shown in Table 13-1.

For the section titled "Reset", additional information is provided on OSC1/CLKIN and OSC2/CLKOUT pin states during a $\overline{\text{MCLR}}$.

PIC12C508A/509A

13.2   DC CHARACTERISTICS: PIC12LC508A/509A (Commercial, Industrial)
PIC12LCE518/519 (Commercial, Industrial)
PIC12LCR509A (Commercial, Industrial)

	DC Characteristics Power Supply Pins	Standard Operating Conditions (unless otherwise specified) Operating Temperature $0°C \leq T_A \leq +70°C$ (commercial) $-40°C \leq T_A \leq +85°C$ (industrial)					
Parm No.	Characteristic	Sym	Min	Typ[1]	Max	Units	Conditions
		ΔI_{WDT}	–	2.0 2.0	4 5	μA μA	V_{DD} = 2.5V, Commercial V_{DD} = 2.5V, Industrial

* These parameters are characterized but not tested.

Note 1: Data in the Typical ("Typ") column is based on characterization results at 25°C. This data is for design guidance only and is not tested.

2: This is the limit to which V_{DD} can be lowered in SLEEP mode without losing RAM data.

3: The supply current is mainly a function of the operating voltage and frequency. Other factors such as bus loading, oscillator type, bus rate, internal code execution pattern, and temperature also have an impact on the current consumption.

   a) The test conditions for all I_{DD} measurements in active operation mode are:
   OSC1 = external square wave, from rail-to-rail; all I/O pins tristated, pulled to Vss,
   T0CKI = V_{DD}, $\overline{MCLR}$ = V_{DD}; WDT enabled/disabled as specified.

   b) For standby current measurements, the conditions are the same, except that the device is in SLEEP mode.

4: Does not include current through Rext. The current through the resistor can be estimated by the formula:
   $I_R = V_{DD}/2R_{ext}$ (mA) with Rext in kOhm.

5: 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 V_{DD} or V_{SS}.

13.3   DC CHARACTERISTICS: PIC12C508A/509A (Commercial, Industrial, Extended)
PIC12CE518/519 (Commercial, Industrial, Extended)
PIC12CR509A (Commercial, Industrial, Extended)

DC CHARACTERISTICS			**Standard Operating Conditions (unless otherwise specified)** Operating temperature 0°C ≤ TA ≤ +70°C (commercial) −40°C ≤ TA ≤ +85°C (industrial) −40°C ≤ TA ≤ +125°C (extended) Operating voltage VDD range as described in DC spec Section 13.1 and Section 13.2.				
Param No.	Characteristic	Sym	Min	Typ†	Max	Units	Conditions
D040 D040A	**Input High Voltage** I/O ports with TTL buffer	VIH	2.0V 0.25VDD + 0.8V	- - -	VDD VDD	V V	4.5V ≤ VDD ≤ 5.5V otherwise
D070	GPIO weak pull-up current (Note 4)	IPUR	30	250	400	µA	VDD = 5V, VPIN = VSS
D061 D061A	**Input Leakage Current** (Notes 2, 3) GP3/$\overline{MCLR}$ (Note 5) GP3/$\overline{MCLR}$ (Note 6)	IIL	8 -	130 -	250 ±5	µA µA	VSS ≤ VPIN ≤ VDD VSS ≤ VPIN ≤ VDD

†   Data in "Typ" column is at 5V, 25°C unless otherwise stated. These parameters are for design guidance only and are not tested.

Note 1: In EXTRC oscillator configuration, the OSC1/CLKIN pin is a Schmitt Trigger input. It is not recommended that the PIC12C5XX be driven with external clock in RC mode.

   2: The leakage current on the $\overline{MCLR}$ pin is strongly dependent on the applied voltage level. The specified levels represent normal operating conditions. Higher leakage current may be measured at different input voltages.

   3: Negative current is defined as coming out of the pin.

   4: Does not include GP3. For GP3 see parameters D0061 and D0061A.

   5: This spec. applies to GP3/$\overline{MCLR}$ configured as external $\overline{MCLR}$ and GP3/$\overline{MCLR}$ configured as input with internal pull-up enabled.

   6: This spec. applies when GP3/$\overline{MCLR}$ is configured as an input with pull-up disabled. The leakage current of the $\overline{MCLR}$ circuit is higher than the standard I/O logic.

13.4   DC CHARACTERISTICS: **PIC12LC508A/509A (Commercial, Industrial)**
PIC12LCE518/519 (Commercial, Industrial)
PIC12LCR509A (Commercial, Industrial)

DC CHARACTERISTICS							Standard Operating Conditions (unless otherwise specified) Operating temperature 0°C ≤ TA ≤ +70°C (commercial) −40°C ≤ TA ≤ +85°C (industrial) Operating voltage VDD range as described in DC spec Section 13.1 and Section 13.2.
Param No.	Characteristic	Sym	Min	Typ†	Max	Units	Conditions
D040 D040A	**Input High Voltage** I/O ports with TTL buffer	VIH	 2.0V 0.25VDD + 0.8V	- - -	 VDD VDD	 V V	 4.5V ≤ VDD ≤ 5.5V otherwise
D070	GPIO weak pull-up current (Note 4)	IPUR	30	250	400	µA	VDD = 5V, VPIN = VSS
D061 D061A	**Input Leakage Current** (Notes 2, 3) GP3/$\overline{\text{MCLR}}$ (Note 5) GP3/$\overline{\text{MCLR}}$ (Note 6)	IIL	 8 -	 130 -	 250 ±5	 µA µA	 VSS ≤ VPIN ≤ VDD VSS ≤ VPIN ≤ VDD

† Data in "Typ" column is at 5V, 25°C unless otherwise stated. These parameters are for design guidance only and are not tested.

Note 1: In EXTRC oscillator configuration, the OSC1/CLKIN pin is a Schmitt Trigger input. It is not recommended that the PIC12C5XX be driven with external clock in RC mode.
  2: The leakage current on the $\overline{\text{MCLR}}$ pin is strongly dependent on the applied voltage level. The specified levels represent normal operating conditions. Higher leakage current may be measured at different input voltages.
  3: Negative current is defined as coming out of the pin.
  4: Does not include GP3. For GP3 see parameters D0061 and D0061A.
  5: This spec. applies to GP3/$\overline{\text{MCLR}}$ configured as external $\overline{\text{MCLR}}$ and GP3/$\overline{\text{MCLR}}$ configured as input with internal pull-up enabled.
  6: This spec. applies when GP3/$\overline{\text{MCLR}}$ is configured as an input with pull-up disabled. The leakage current of the $\overline{\text{MCLR}}$ circuit is higher than the standard I/O logic.

TABLE 13-1:   PULL-UP RESISTOR RANGES* - PIC12C508A, PIC12C509A, PIC12CR509A, PIC12CE518, PIC12CE519, PIC12LC508A, PIC12LC509A, PIC12LCR509A, PIC12LCE518 and PIC12LCE519

V_{DD} (Volts)	Temperature (°C)	Min	Typ	Max	Units
GP0/GP1					
2.5	−40	38K	42K	63K	Ω
	25	42K	48K	63K	Ω
	85	42K	49K	63K	Ω
	125	50K	55K	63K	Ω
5.5	−40	15K	17K	20K	Ω
	25	18K	20K	23K	Ω
	85	19K	22K	25K	Ω
	125	22K	24K	28K	Ω
GP3[1]					
2.5	−40	65K	80K	850K	Ω
	25	80K	100K	1150K	Ω
	85	85K	110K	1300K	Ω
	125	100K	120K	1500K	Ω
5.5	−40	50K	60K	600K	Ω
	25	60K	65K	750K	Ω
	85	65K	80K	900K	Ω
	125	75K	90K	990K	Ω

*   These parameters are characterized but not tested.

Note 1: The weak pull-up resistor and associated current for the GP3/$\overline{MCLR}$ pin is non-linear when the respective pin voltage is less than V_{DD} - 1.0V. See parameter D061 for GP3/$\overline{MCLR}$ pin current specifications.

Reset

When $\overline{MCLR}$ is asserted, the state of the OSC1/CLKIN and CLKOUT/OSC2 pins are as follows:

CLKIN/CLKOUT PIN STATES WHEN $\overline{MCLR}$ ASSERTED

Oscillator Mode	OSC1/CLKIN Pin	OSC2/CLKOUT Pin
EXTRC, CLKOUT on OSC2	OSC1 pin is tristated and driven by external circuit	OSC2 pin is driven low
EXTRC, OSC2 is I/O	OSC1 pin is tristated and driven by external circuit	OSC2 pin is tristate input
INTRC, CLKOUT on OSC2	OSC1 pin is tristate input	OSC2 pin is driven low
INTRC, OSC2 is I/O	OSC1 pin is tristate input	OSC2 pin is tristate input

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2355 West Chandler Blvd.
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Web Address: http://www.microchip.com

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Atlanta, GA 30350
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Miamisburg, OH 45342
Tel: 937-291-1654 Fax: 937-291-9175

Detroit
Microchip Technology Inc.
Tri-Atria Office Building
32255 Northwestern Highway, Suite 190
Farmington Hills, MI 48334
Tel: 248-538-2250 Fax: 248-538-2260

Los Angeles
Microchip Technology Inc.
18201 Von Karman, Suite 1090
Irvine, CA 92612
Tel: 949-263-1888 Fax: 949-263-1338

New York
Microchip Technology Inc.
150 Motor Parkway, Suite 202
Hauppauge, NY 11788
Tel: 631-273-5305 Fax: 631-273-5335

San Jose
Microchip Technology Inc.
2107 North First Street, Suite 590
San Jose, CA 95131
Tel: 408-436-7950 Fax: 408-436-7955

AMERICAS (continued)

Toronto
Microchip Technology Inc.
5925 Airport Road, Suite 200
Mississauga, Ontario L4V 1W1, Canada
Tel: 905-405-6279 Fax: 905-405-6253

ASIA/PACIFIC

China - Beijing
Microchip Technology, Beijing
Unit 915, 6 Chaoyangmen Bei Dajie
Dong Erhuan Road, Dongcheng District
New China Hong Kong Manhattan Building
Beijing, 100027, P.R.C.
Tel: 86-10-85282100 Fax: 86-10-85282104

China - Shanghai
Microchip Technology
Unit B701, Far East International Plaza,
No. 317, Xianxia Road
Shanghai, 200051, P.R.C.
Tel: 86-21-6275-5700 Fax: 86-21-6275-5060

Hong Kong
Microchip Asia Pacific
Unit 2101, Tower 2
Metroplaza
223 Hing Fong Road
Kwai Fong, N.T., Hong Kong
Tel: 852-2-401-1200 Fax: 852-2-401-3431

India
Microchip Technology Inc.
India Liaison Office
No. 6, Legacy, Convent Road
Bangalore, 560 025, India
Tel: 91-80-229-0061 Fax: 91-80-229-0062

Japan
Microchip Technology Intl. Inc.
Benex S-1 6F
3-18-20, Shinyokohama
Kohoku-Ku, Yokohama-shi
Kanagawa, 222-0033, Japan
Tel: 81-45-471- 6166 Fax: 81-45-471-6122

Korea
Microchip Technology Korea
168-1, Youngbo Bldg. 3 Floor
Samsung-Dong, Kangnam-Ku
Seoul, Korea
Tel: 82-2-554-7200 Fax: 82-2-558-5934

ASIA/PACIFIC (continued)

Singapore
Microchip Technology Singapore Pte Ltd.
200 Middle Road
#07-02 Prime Centre
Singapore, 188980
Tel: 65-334-8870 Fax: 65-334-8850

Taiwan
Microchip Technology Taiwan
10F-1C 207
Tung Hua North Road
Taipei, Taiwan
Tel: 886-2-2717-7175 Fax: 886-2-2545-0139

EUROPE

Denmark
Microchip Technology Denmark ApS
Regus Business Centre
Lautrup hoj 1-3
Ballerup DK-2750 Denmark
Tel: 45 4420 9895 Fax: 45 4420 9910

France
Arizona Microchip Technology SARL
Parc d'Activite du Moulin de Massy
43 Rue du Saule Trapu
Batiment A - ler Etage
91300 Massy, France
Tel: 33-1-69-53-63-20 Fax: 33-1-69-30-90-79

Germany
Arizona Microchip Technology GmbH
Gustav-Heinemann-Ring 125
D-81739 München, Germany
Tel: 49-89-627-144 0 Fax: 49-89-627-144-44

Italy
Arizona Microchip Technology SRL
Centro Direzionale Colleoni
Palazzo Taurus 1 V. Le Colleoni 1
20041 Agrate Brianza
Milan, Italy
Tel: 39-039-65791-1 Fax: 39-039-6899883

United Kingdom
Arizona Microchip Technology Ltd.
505 Eskdale Road
Winnersh Triangle
Wokingham
Berkshire, England RG41 5TU
Tel: 44 118 921 5858 Fax: 44-118 921-5835

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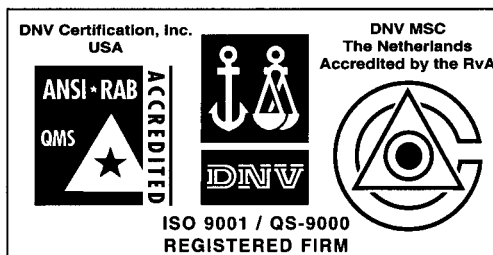
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