



# PIC12C508/509

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## PIC12C508/509 Data Sheet Errata

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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 11: Corrections for the DC Characteristics, Section 11.2 are shown.

Corrections for the GPIO pull-up resistor ranges are shown in Table 11-1.

For the section titled "RESET", additional information is provided on OSC1/CLKIN and OSC2/CLKOUT pin states during a MCLR.

# PIC12C508/509

## 11.2 DC CHARACTERISTICS: PIC12C508/509 (Commercial, Industrial, Extended)

DC CHARACTERISTICS		Standard Operating Conditions (unless otherwise specified)					
		Operating temperature $0^{\circ}\text{C} \leq T_A \leq +70^{\circ}\text{C}$ (commercial) $-40^{\circ}\text{C} \leq T_A \leq +85^{\circ}\text{C}$ (industrial) $-40^{\circ}\text{C} \leq T_A \leq +125^{\circ}\text{C}$ (extended)					
		Operating voltage $V_{DD}$ range as described in DC spec Section 11.1 and Section 11.2.					
Param No.	Characteristic	Sym	Min	Typ†	Max	Units	Conditions
<b>Input High Voltage</b>							
D040 D040A	I/O ports	$V_{IH}$	2.0V	—	$V_{DD}$	V	$4.5 \leq V_{DD} \leq 5.5V$ otherwise
	with TTL buffer		$0.25V_{DD} + 0.8V$	—	$V_{DD}$	V	
D070	GPIO weak pull-up current <sup>(7)</sup>	$I_{PUR}$	50	250	400	$\mu\text{A}$	$V_{DD} = 5V, V_{PIN} = V_{SS}$
<b>Input Leakage Current</b> <sup>(2), (3)</sup>							For $V_{DD} \leq 5.5V$
D061	$\overline{\text{GP3/MCLR}}^{(5)}$	$I_{IL}$	8	130	250	$\mu\text{A}$	$V_{SS} \leq V_{PIN} \leq V_{DD}$
D061A	$\overline{\text{GP3/MCLR}}^{(6)}$		—	—	$\pm 5$	$\mu\text{A}$	$V_{SS} \leq V_{PIN} \leq V_{DD}$

† 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 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:** Extended operating range is Advanced Information for this device.
- 5:** This specification applies to  $\overline{\text{GP3/MCLR}}$  configured as external  $\overline{\text{MCLR}}$  and  $\overline{\text{GP3/MCLR}}$  configured as input with internal pull-up enabled.
- 6:** This specification applies when  $\overline{\text{GP3/MCLR}}$  is configured as an input with pull-up disabled. The leakage current of the MCLR circuit is higher than the standard I/O logic.
- 7:** Does not include GP3. For GP3 see parameters D0061 and D0061A.

**TABLE 11-1: PULL-UP RESISTOR RANGES - PIC12C508/C509**

VDD (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 <sup>(1)</sup>					
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/MCLR pin is non-linear when the respective pin voltage is less than VDD - 1.0V. See parameter D061 for GP3/MCLR pin current specifications.

## 1. Module: RESET

When MCLR is asserted, the state of the OSC1/CLKIN and CLKOUT/OSC2 pins are as follows:

### CLKIN/CLKOUT PIN STATES WHEN MCLR ASSERTED

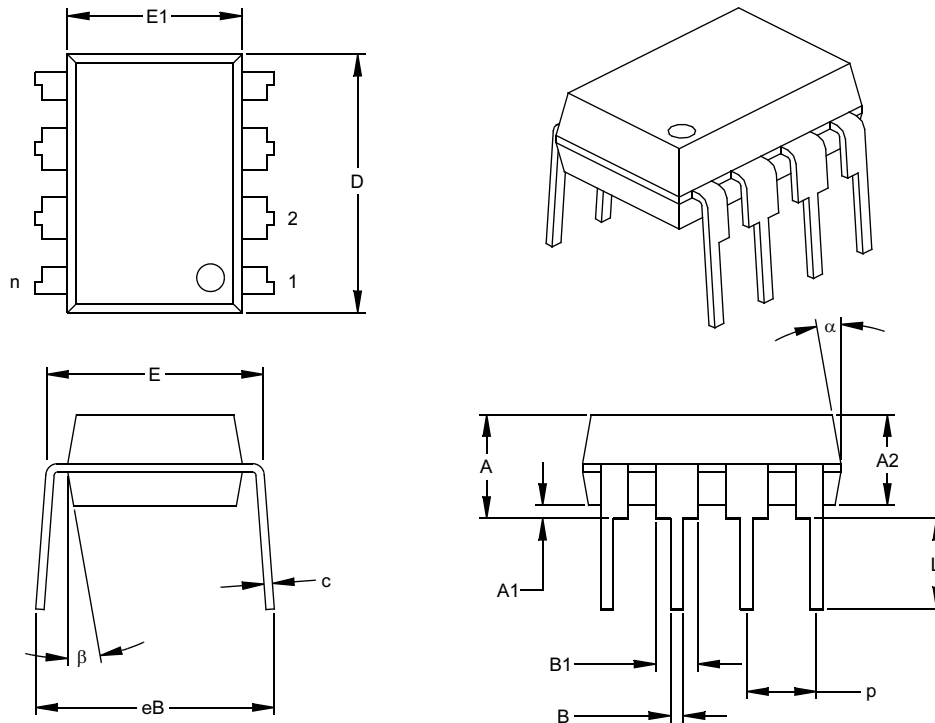
Oscillator Mode	OSC1/CLKIN Pin	OSC2/CLKOUT Pin
EXTRC, CLKOUT on OSC2	OSC1 pin is tristated and driven by external circuit	OSC2 pin is driven low
EXTRC, OSC2 is I/O	OSC1 pin is tristated and driven by external circuit	OSC2 pin is tristate input
INTRC, CLKOUT on OSC2	OSC1 pin is tristate input	OSC2 pin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

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## 2. Module: Packaging

The package information contained in the data sheet is incorrect. Please refer to the following tables for correct package data.

### 8-Lead Plastic Dual In-line (P) – 300 mil (PDIP)



Units		INCHES*			MILLIMETERS		
Dimension	Limits	MIN	NOM	MAX	MIN	NOM	MAX
Number of Pins	n		8			8	
Pitch	p		.100			2.54	
Top to Seating Plane	A	.140	.155	.170	3.56	3.94	4.32
Molded Package Thickness	A2	.115	.130	.145	2.92	3.30	3.68
Base to Seating Plane	A1	.015			0.38		
Shoulder to Shoulder Width	E	.300	.313	.325	7.62	7.94	8.26
Molded Package Width	E1	.240	.250	.260	6.10	6.35	6.60
Overall Length	D	.360	.373	.385	9.14	9.46	9.78
Tip to Seating Plane	L	.125	.130	.135	3.18	3.30	3.43
Lead Thickness	c	.008	.012	.015	0.20	0.29	0.38
Upper Lead Width	B1	.045	.058	.070	1.14	1.46	1.78
Lower Lead Width	B	.014	.018	.022	0.36	0.46	0.56
Overall Row Spacing	§ eB	.310	.370	.430	7.87	9.40	10.92
Mold Draft Angle Top	α	5	10	15	5	10	15
Mold Draft Angle Bottom	β	5	10	15	5	10	15

\* Controlling Parameter

§ Significant Characteristic

Notes:

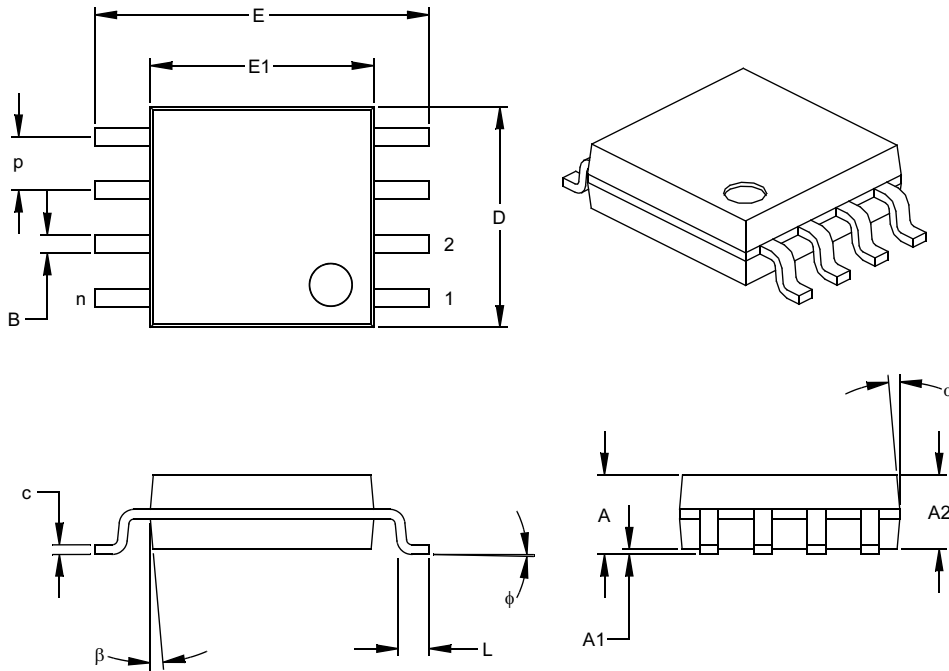
Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed

.010" (0.254mm) per side.

JEDEC Equivalent: MS-001

Drawing No. C04-018

## 8-Lead Plastic Small Outline (SM) – Medium, 208 mil (SOIC)



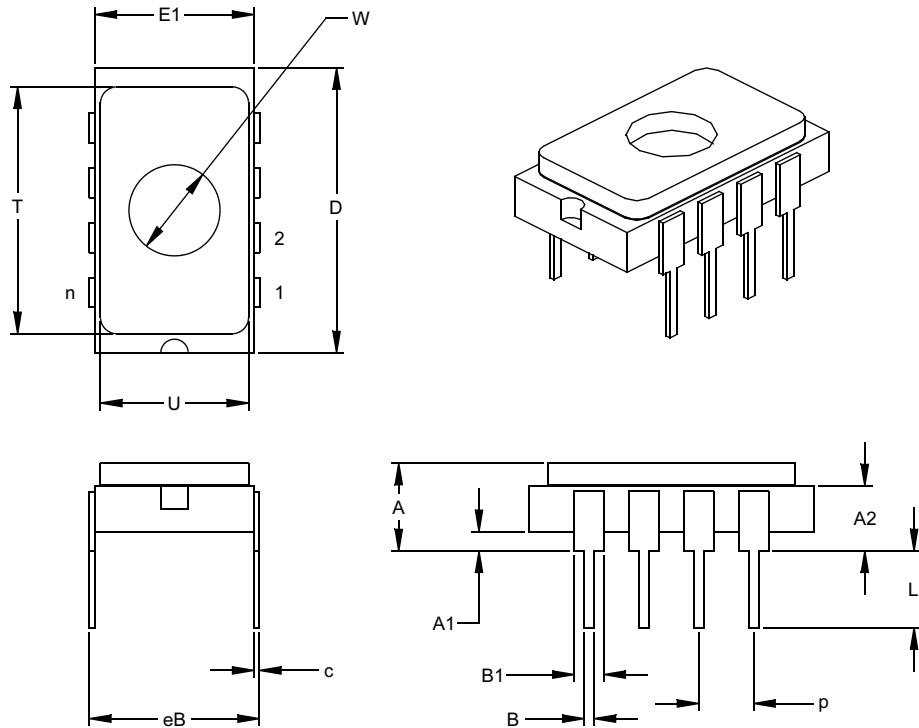
Units		INCHES*			MILLIMETERS		
Dimension Limits		MIN	NOM	MAX	MIN	NOM	MAX
Number of Pins	n		8			8	
Pitch	p		.050			1.27	
Overall Height	A	.070	.075	.080	1.78	1.97	2.03
Molded Package Thickness	A2	.069	.074	.078	1.75	1.88	1.98
Standoff §	A1	.002	.005	.010	0.05	0.13	0.25
Overall Width	E	.300	.313	.325	7.62	7.95	8.26
Molded Package Width	E1	.201	.208	.212	5.11	5.28	5.38
Overall Length	D	.202	.205	.210	5.13	5.21	5.33
Foot Length	L	.020	.025	.030	0.51	0.64	0.76
Foot Angle	φ	0	4	8	0	4	8
Lead Thickness	c	.008	.009	.010	0.20	0.23	0.25
Lead Width	B	.014	.017	.020	0.36	0.43	0.51
Mold Draft Angle Top	α	0	12	15	0	12	15
Mold Draft Angle Bottom	β	0	12	15	0	12	15

\* Controlling Parameter  
 § Significant Characteristic

Notes:  
 Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" (0.254mm) per side.  
 Drawing No. C04-056

# PIC12C508/509

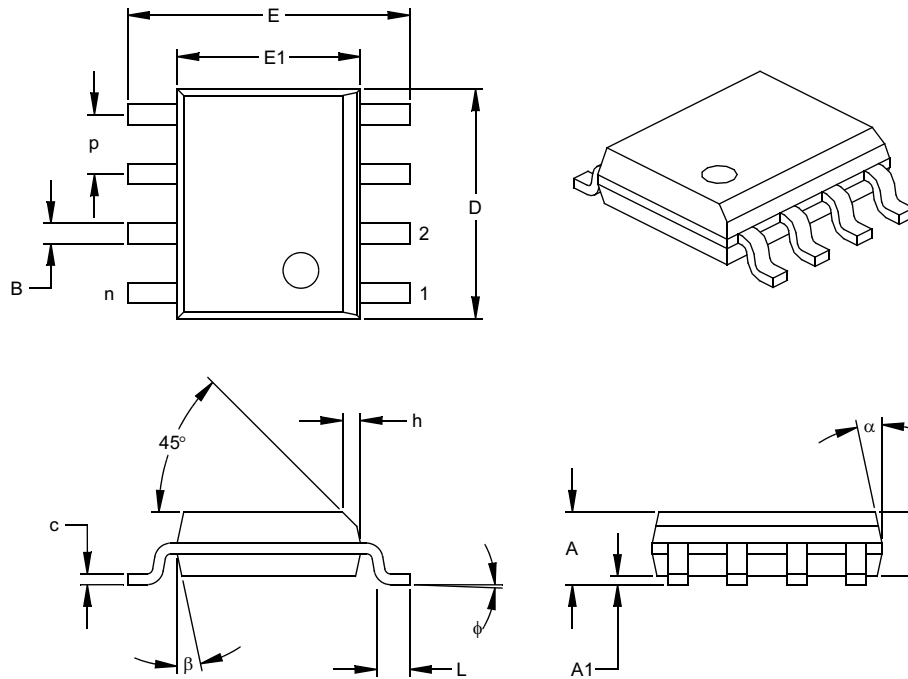
## 8-Lead Ceramic Side Brazed Dual In-line with Window (JW) – 300 mil



Dimension Limits	Units	INCHES*			MILLIMETERS		
		MIN	NOM	MAX	MIN	NOM	MAX
Number of Pins	n		8			8	
Pitch	p		.100			2.54	
Top to Seating Plane	A	.145	.165	.185	3.68	4.19	4.70
Top of Body to Seating Plane	A2	.103	.123	.143	2.62	3.12	3.63
Standoff	A1	.025	.035	.045	0.64	0.89	1.14
Package Width	E1	.280	.290	.300	7.11	7.37	7.62
Overall Length	D	.510	.520	.530	12.95	13.21	13.46
Tip to Seating Plane	L	.130	.140	.150	3.30	3.56	3.81
Lead Thickness	c	.008	.010	.012	0.20	0.25	0.30
Upper Lead Width	B1	.050	.055	.060	1.27	1.40	1.52
Lower Lead Width	B	.016	.018	.020	0.41	0.46	0.51
Overall Row Spacing §	eB	.296	.310	.324	7.52	7.87	8.23
Window Diameter	W	.161	.166	.171	4.09	4.22	4.34
Lid Length	T	.440	.450	.460	11.18	11.43	11.68
Lid Width	U	.260	.270	.280	6.60	6.86	7.11

\* Controlling Parameter  
 § Significant Characteristic  
 JEDEC Equivalent: MS-015  
 Drawing No. C04-083

## 8-Lead Plastic Small Outline (SN) – Narrow, 150 mil (SOIC)



Dimension Limits	Units	INCHES*			MILLIMETERS		
		MIN	NOM	MAX	MIN	NOM	MAX
Number of Pins	n		8			8	
Pitch	p		.050			1.27	
Overall Height	A	.053	.061	.069	1.35	1.55	1.75
Molded Package Thickness	A2	.052	.056	.061	1.32	1.42	1.55
Standoff §	A1	.004	.007	.010	0.10	0.18	0.25
Overall Width	E	.228	.237	.244	5.79	6.02	6.20
Molded Package Width	E1	.146	.154	.157	3.71	3.91	3.99
Overall Length	D	.189	.193	.197	4.80	4.90	5.00
Chamfer Distance	h	.010	.015	.020	0.25	0.38	0.51
Foot Length	L	.019	.025	.030	0.48	0.62	0.76
Foot Angle	φ	0	4	8	0	4	8
Lead Thickness	c	.008	.009	.010	0.20	0.23	0.25
Lead Width	B	.013	.017	.020	0.33	0.42	0.51
Mold Draft Angle Top	α	0	12	15	0	12	15
Mold Draft Angle Bottom	β	0	12	15	0	12	15

\* Controlling Parameter  
 § Significant Characteristic

**Notes:**

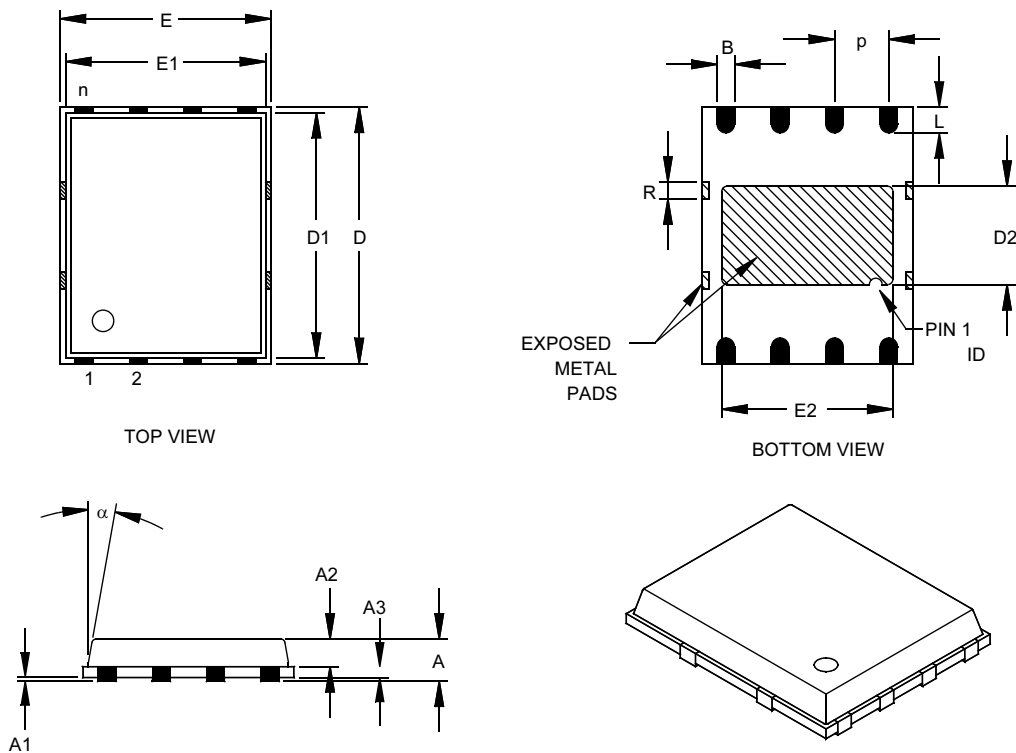
Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" (0.254mm) per side.

JEDEC Equivalent: MS-012

Drawing No. C04-057

# PIC12C508/509

## 8-Lead Plastic Dual Flat No Lead Package (MF) 6x5 mm Body (DFN-S)



Dimension Limits	Units	INCHES			MILLIMETERS*		
		MIN	NOM	MAX	MIN	NOM	MAX
Number of Pins	n		8			8	
Pitch	p	.050 BSC			1.27 BSC		
Overall Height	A		.033	.039		0.85	1.00
Molded Package Thickness	A2		.026	.031		0.65	0.80
Standoff	A1	.000	.0004	.002	0.00	0.01	0.05
Base Thickness	A3	.008 REF.			0.20 REF.		
Overall Length	E	.194 BSC			4.92 BSC		
Molded Package Length	E1	.184 BSC			4.67 BSC		
Exposed Pad Length	E2	.152	.158	.163	3.85	4.00	4.15
Overall Width	D	.236 BSC			5.99 BSC		
Molded Package Width	D1	.226 BSC			5.74 BSC		
Exposed Pad Width	D2	.085	.091	.097	2.16	2.31	2.46
Lead Width	B	.014	.016	.019	0.35	0.40	0.47
Lead Length	L	.020	.024	.030	0.50	0.60	0.75
Tie Bar Width	R		.014			.356	
Mold Draft Angle Top	$\alpha$			12°			12°

\*Controlling Parameter

Notes:

Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" (0.254mm) per side.

JEDEC equivalent: pending

Drawing No. C04-113



## APPENDIX A: REVISION HISTORY

Rev. C Document (3/2003)

Under Clarifications/Corrections to the Data Sheet,  
Item 2, Packaging: correct package data was added.  
Added Appendix A: Revision History.

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NOTES:

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

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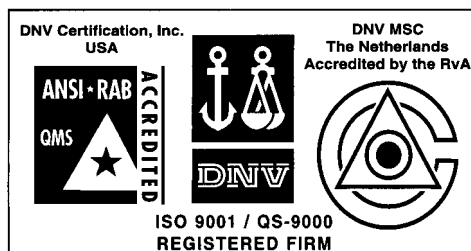
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