



# MCP9600/L00/RL00

## Silicon Errata and Data Sheet Clarification

The MCP9600/L00/RL00 parts you have received conform functionally to the Device Data Sheet (DS20005426E), except for the anomalies described below.

All of the issues listed here will be addressed in future revisions of the MCP9600 silicon.

Contact Microchip for the latest silicon fix.

### 1. Module: $T_{H\_ACY}$ , or the $T_H$ Hot-Junction Temperature Accuracy

The Hot-Junction ( $T_H$ ) Temperature Accuracy  $T_{H\_ACY}$  of the MCP9600 devices before Date Code 1723 or Device ID/Revision value of 0x4011, may not meet the specified accuracy in the data sheet, starting from revision C data sheet (DS20005426C) to the latest data sheet. This issue affects the  $T_H$  temperature register only.

The Cold-Junction ( $T_C$ ) and the Junctions Delta ( $T_\Delta$ ) Temperature registers are not affected by this issue. These registers meet the accuracy performance as specified in the data sheet.

#### Work around

Convert the  $T_C$  and the  $T_\Delta$  temperature data from the units of Degree Celsius ( $^{\circ}\text{C}$ ) to millivolt (mV) using the NIST ITS-90 conversion look-up table or polynomial equation. Then sum the two voltages, and convert the summed value from millivolt to Degree Celsius using the NIST ITS-90 conversion table or polynomial equation.

#### Date Codes that pertain to this issue:

All production devices before Date Code 1723 and with Device ID/Revision register value of 0x4011 are affected, as shown in [Table 1](#).

#### Fix

Devices with Date Code of 1723 or later are not affected. These devices have a Device ID/Revision value of 0x4012.

### 2. Module: Intermittent I<sup>2</sup>C Read Command Clock Stretching Failure

During I<sup>2</sup>C Sequential Read communication for two or more bytes, the MCP9600/L00/RL00 may intermittently fail to Clock Stretch,  $t_{\text{STRETCH}}$ , as described in the data sheet, for bus frequencies greater than 85 kHz (typical). When this failure occurs, the MCP9600/L00/RL00 continues to output the previously transmitted data. For example, when reading the two byte  $T_H$  temperature register, if the device fails to clock stretch for the Least Significant Byte, then the device will output the Most Significant Byte.

#### Work around

Since this issue is intermittent, repeat the Sequential Read instruction until the second byte read is different from the Most Significant Byte.

#### Date Codes that pertain to this issue:

All production devices before Data Code 1845 and with Device ID/Revision register value of 0x4012 or lower are affected, as shown in [Table 1](#).

#### Fix

Devices with Date Code of 1845 or later are not affected. These devices have a Device ID/Revision value of 0x4013.

# MCP9600/L00/RL00

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## 3. Module: Input Range bit (Bit 4 of the Status Register)

When Bit 4 of Status Register, Input Range bit, is set to '1',  $T_H$ ,  $T_C$  and  $T_\Delta$  registers are not updated as indicated in the Rev E data sheet bit description (DS20005426E). This characteristic may result in what appears to be unpredictable temperature data, if the temperature register is not updated when the thermocouple temperature is near the upper or the lower temperatures limits for the specified thermocouple range. For example, if the thermocouple EMF is within the specified range, but the sum with the Cold Junction EMF exceeds the specified thermocouple range, then the Input Range bit is set to '1' and the temperature registers are not updated.

### **Work around**

None.

### **Date Codes that pertain to this issue:**

All production devices before Date Code 1845 and with Device ID/Revision register value of 0x4012 or lower are affected, as shown in [Table 1](#).

### **Fix**

Devices with Date Code 1845 or later are not affected. These devices have a Device ID/Revision value of 0x4013.

Devices with the Device ID/Revision value of 0x4013 update the temperature registers as follows, when the Bit 4 of the Status Register, Input Range bit, is set to '1':

- If the thermocouple EMF exceeds the specified range, then  $T_H$  and  $T_\Delta$  Registers are not updated, but  $T_C$  Register is updated with a valid temperature data at the specified interval, or  $t_{CONV}$ .
- If the thermocouple EMF is within the specified range, but the sum with the Cold-Junction EMF exceeds the specified range, then  $T_H$  Register is not updated, but  $T_\Delta$  and  $T_C$  Registers are updated with valid temperature data at the specified interval, or  $t_{CONV}$ . The value of  $T_\Delta$  and  $T_C$  Registers can be used to calculate valid Hot-Junction temperature data using the NIST ITS-90 conversion look-up table or polynomial equation.

## 4. Module: Outputs Extra 0x00 data during Sequential Read

When the MCP9600/L00/RL00 Registers are Sequentially Read, the device outputs 0x00 between the Least Significant Byte of the Alert 4 Register and the Most Significant Byte of the Device ID/Revision Register values.

### **Work around**

Ignore the byte.

### **Date Codes that pertain to this issue:**

All production devices before Date Code 1845 and with Device ID/Revision register value of 0x4012 are affected, as shown in [Table 1](#).

### **Fix**

Devices with Date Code 1845 or later are not affected. These devices have a Device ID/Revision value of 0x4013.

## Data Sheet Clarifications

The following typographic corrections and clarifications are to be noted for the latest version of the device data sheet (DS20005426E):

The Input Range Bit of the Status Register (Bit 4) will be clarified on the next data sheet revision, as described in [Module 3](#).

**TABLE 1: SILICON ISSUE SUMMARY**

Module	Feature	Issue Summary	Affected Device ID/Revision <sup>(1)</sup>			Fixed Date Code
			0x4011	0x4012	0x4013	
1	T <sub>H_LACY</sub>	This parameter may not meet data specification starting from Rev C data sheet DS20005426C (MCP9600 only)	X	—	—	1723
2	t <sub>STRETCH</sub>	This parameter may not meet data specification (MCP9600/L00/RL00)	X	X	—	1845
3	Input Range	Device Characteristics changed from the data sheet description (MCP9600/L00/RL00)	X	X	—	1845
4	Extra Byte	Correction to the Device Characteristics (MCP9600/L00/RL00)	X	X	—	1845

**Note 1:** The Device ID/Revision Register is found in the user register pointer 0x20.

# MCP9600/L00/RL00

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## APPENDIX A: DOCUMENT REVISION HISTORY

### Rev. C Document (5/2019)

- Added Errata Modules 2, 3 and 4.

### Rev. B Document (9/2017)

- Added Fix regarding the devices with Date Code of 1723.
- Added [Note 1](#) to [Table 1](#).

### Rev. A Document (5/2017)

- Initial release of this document.

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