

# MAXIM

## HS I<sup>2</sup>C-Compatible Module

### General Description

The HS I<sup>2</sup>C™-compatible module is a reference solution for implementing an interface that is compatible with the high-speed (HS) mode (3.4MHz, 1.7MHz), fast mode (400kHz), and standard mode (100kHz) of the I<sup>2</sup>C standard. The module consists primarily of an Altera EPM3256AQC208-10 programmable logic device (PLD) containing the DI2CM core available from Digital Core Design. The module allows microcontrollers (μCs) with a compatible 8-bit-memory-mapped parallel interface to communicate with I<sup>2</sup>C-compatible slave devices.

The HS I<sup>2</sup>C-compatible module is provided as part of selected Maxim evaluation systems. The main purpose of the HS I<sup>2</sup>C-compatible module is the evaluation of Maxim products. The use of the HS I<sup>2</sup>C-compatible module as a development board or any other use not described in selected Maxim evaluation kit (EV kit)/evaluation system (EV system) data sheets is not supported by Maxim.

### Features

- ◆ HS-Mode I<sup>2</sup>C-Compatible Interface (3.4MHz, 1.7MHz)
- ◆ Fast-Mode I<sup>2</sup>C-Compatible Interface (400kHz)
- ◆ Standard-Mode I<sup>2</sup>C-Compatible Interface (100kHz)
- ◆ Proven Design
- ◆ Proven PC Board Layout
- ◆ On-Board 40MHz Crystal Oscillator
- ◆ On-Board Regulated +3.3V

### Ordering Information

PART NUMBER	INTERFACE TYPE
HSI2CMOD	HS/Fast/Standard-Mode I <sup>2</sup> C-Compatible

### Component List

DESIGNATION	QTY	DESCRIPTION
C1-C15, C19, C20, C21	18	0.1μF ±10%, 16V X7R ceramic capacitors (0603) TDK C1608X7R1C104KT
C16	1	1μF ±20%, 10V X5R ceramic capacitor (0805) TDK C2012X5R1A105M
C17	1	10μF ±20%, 25V X5R ceramic capacitor (1210) TDK C3225X5R1E106M
C18	1	100μF, 6.3V, 45mΩ low-ESR POSCAP (D2) Sanyo 6TPC100M
D1	1	1A, 30V Schottky diode Nihon EP10QY03
FB1, FB2	2	Surface-mount ferrite beads (0603) TDK MMZ1608B601C
J1	1	Not installed, 10-pin, 2 x 5 header
J2	1	20-pin, 2 x 10 male right-angle connector
J3	1	2 x 20 right-angle female connector
JU1, JU2, JU5	3	3-pin headers
JU3, JU4, JU6, JU7, JU8	5	2-pin headers
L1	1	10μH inductor Sumida CDRH6D28-100NC

DESIGNATION	QTY	DESCRIPTION
R1, R2	2	1.5kΩ ±5% resistors (1206) (suitable for a 2-wire bus capacitance of ≤ 200pF)
R3, R4, R7	3	0Ω ±5% resistors (1206)
R5	1	165kΩ ±1% resistor (0603)
R6	1	100kΩ ±1% resistor (0603)
SW1	1	DIP switch default: SW: 1-4 (ON) SW: 2-3 (ON)
U1	1	Altera EPM3256AQC208-10 (208-pin PQFP)
U2	1	Step-down regulator (8-pin μMAX) Maxim MAX1776EUA
U3	1	40MHz crystal oscillator (half-size DIP) Oscilent 320-40.0M-5E-TTS
U4	1	Tri-state logic buffer (5-pin SOT23) Fairchild Semiconductor NC7SZ126M5X
U5, U6, U7	3	Schmitt trigger input-logic inverters (5-pin SOT23) Fairchild Semiconductor NC7SZ14M5X
None	5	Shunts

Purchase of I<sup>2</sup>C components of Maxim Integrated Products, Inc. or one of its sublicensed Associated Companies, conveys a license under the Phillips I<sup>2</sup>C Patent Rights to use these components in an I<sup>2</sup>C system, provided that the system conforms to the I<sup>2</sup>C Standard Specification as defined by Phillips.

# HS I<sup>2</sup>C-Compatible Module

## Component Suppliers

SUPPLIER	PHONE	WEBSITE
Altera Corporation	1-800-800-3753	www.altera.com
Digital Core Design	48-32282-8266	www.digitalcoredesign.com
Fairchild Semiconductor	1-888-522-5372	www.fairchildsemi.com
Nihon	81-33343-3411	www.niec.co.jp
Oscilent	1-949-252-0522	www.oscilent.com
Sanyo	1-619-661-6322	www.sanyo.com
Sumida	1-847-545-6700	www.sumida.com
TDK	1-847-803-6100	www.component.tdk.com

**Note:** Please indicate that you are using a Maxim part when contacting these component suppliers.

## Description of Hardware

### HS I<sup>2</sup>C-Compatible Module Supplies

The HS I<sup>2</sup>C-compatible module requires two supplies. The on-board 3.3V regulator requires an input voltage at VIN of 4.5V to 24V (J3-5, J3-6). The module also requires a regulated 5V logic supply (J3-7, J3-8). A Maxim  $\mu$ C module normally provides both of these supplies.

### EPM3256AQC208-10 PLD (Altera)

The EPM3256AQC208-10 is from Altera's MAX3000A family of PLDs. This 256 product-term device accepts 3.3V or 5V logic even when powered from a 3.3V supply. Contact Altera for any questions relating to the PLD. See the *Component Suppliers* section for contact information.

### HS I<sup>2</sup>C-Compatible Module Jumpers

\*The asterisks in the tables below indicate the default configuration.

**Table 1. I<sup>2</sup>C-Compatible Logic-Supply Selection**

JUMPER	SHUNT POSITION	DESCRIPTION
JU1	1-2	3.3V I <sup>2</sup> C-compatible interface
	2-3*	5V I <sup>2</sup> C-compatible interface

**Table 2. Crystal Oscillator Enable**

JUMPER	SHUNT POSITION	DESCRIPTION
JU2	1-2*	Enable the crystal oscillator
	2-3	Disable the crystal oscillator

**Table 3. GPIOA**

JUMPER	SHUNT POSITION	DESCRIPTION
JU3	ON	Do not use
	OFF*	Disconnect GPIOA

**Table 4. GPIOB**

JUMPER	SHUNT POSITION	DESCRIPTION
JU4	ON	Do not use
	OFF*	Disconnect GPIOB

**Table 5. Global PLD Clear (GCLR)**

JUMPER	SHUNT POSITION	DESCRIPTION
JU5	1-2	Reset the PLD
	2-3*	Normal operation mode

**Table 6. Active-High RD-Line Option**

JUMPER	SHUNT POSITION	DESCRIPTION
JU6	ON	The RD line to connector J3 pin 9 (J3-9) is active high; remove U5
	OFF*	The $\overline{\text{RD}}$ line to connector J3 pin 9 (J3-9) is active low; U5 must be present for proper operation

**Table 7. Active-High CS-Line Option**

JUMPER	SHUNT POSITION	DESCRIPTION
JU7	ON	The CS line to connector J3 pin 11 (J3-11) is active high; remove U6
	OFF*	The $\overline{\text{CS}}$ line to connector J3 pin 11 (J3-11) is active low; U6 must be present for proper operation

**Table 8. Active-High WR-Line Option**

JUMPER	SHUNT POSITION	DESCRIPTION
JU8	ON	The WR line to connector J3 pin 10 (J3-10) is active high; remove U7
	OFF*	The $\overline{\text{WR}}$ line to connector J3 pin 10 (J3-10) is active low; U7 must be present for proper operation

# HS I<sup>2</sup>C-Compatible Module

Evaluates: HS I<sup>2</sup>C-Compatible Parts

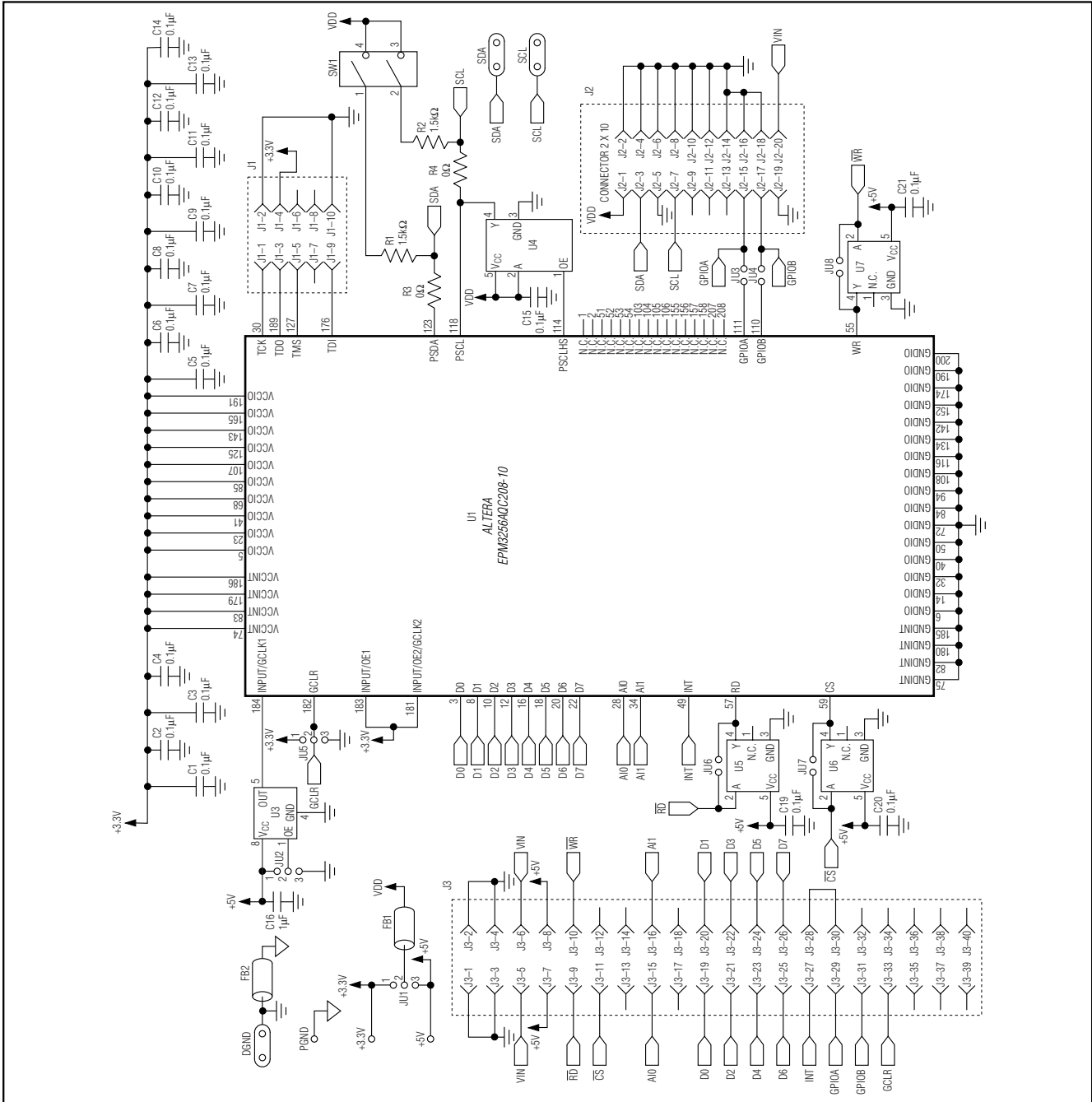


Figure 1. HS I<sup>2</sup>C-Compatible Module Schematic

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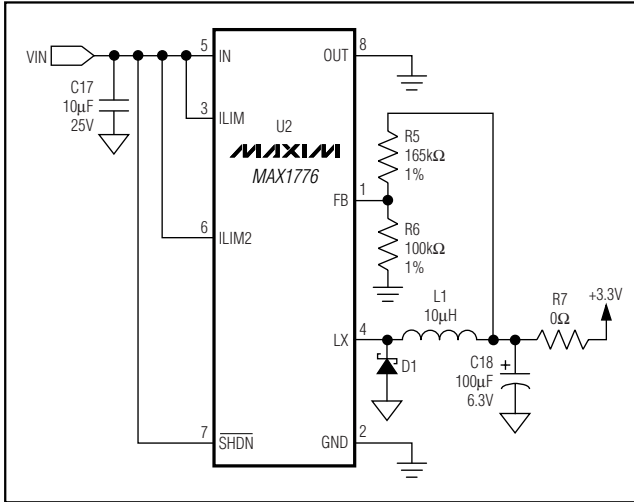


Figure 2. HS I<sup>2</sup>C-Compatible Module Schematic (Continued)

## Description of PLD Core

### DI2CM Core (Digital Core Design)

The DI2CM is an I<sup>2</sup>C-compatible master-IP core from Digital Core Design. Please contact Digital Core Design for any questions relating to the DI2CM IP core. See the *Component Suppliers* section for contact information or email Digital Core Design at [info@dcd.pl](mailto:info@dcd.pl) for more information.

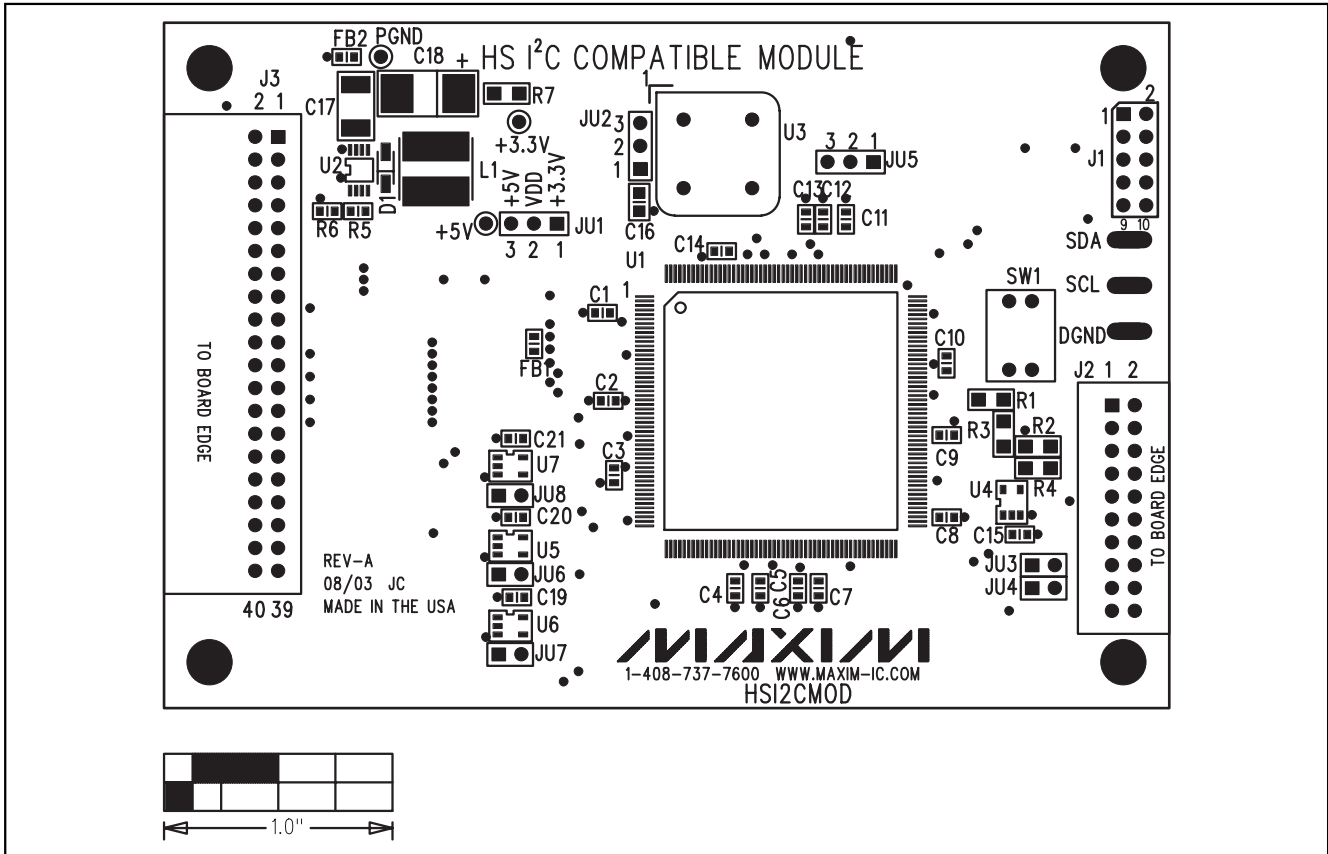


Figure 3. HS I<sup>2</sup>C-Compatible Module Component Placement Guide—Component Side

# HS I<sup>2</sup>C-Compatible Module

**Evaluates: HS I<sup>2</sup>C-Compatible Parts**

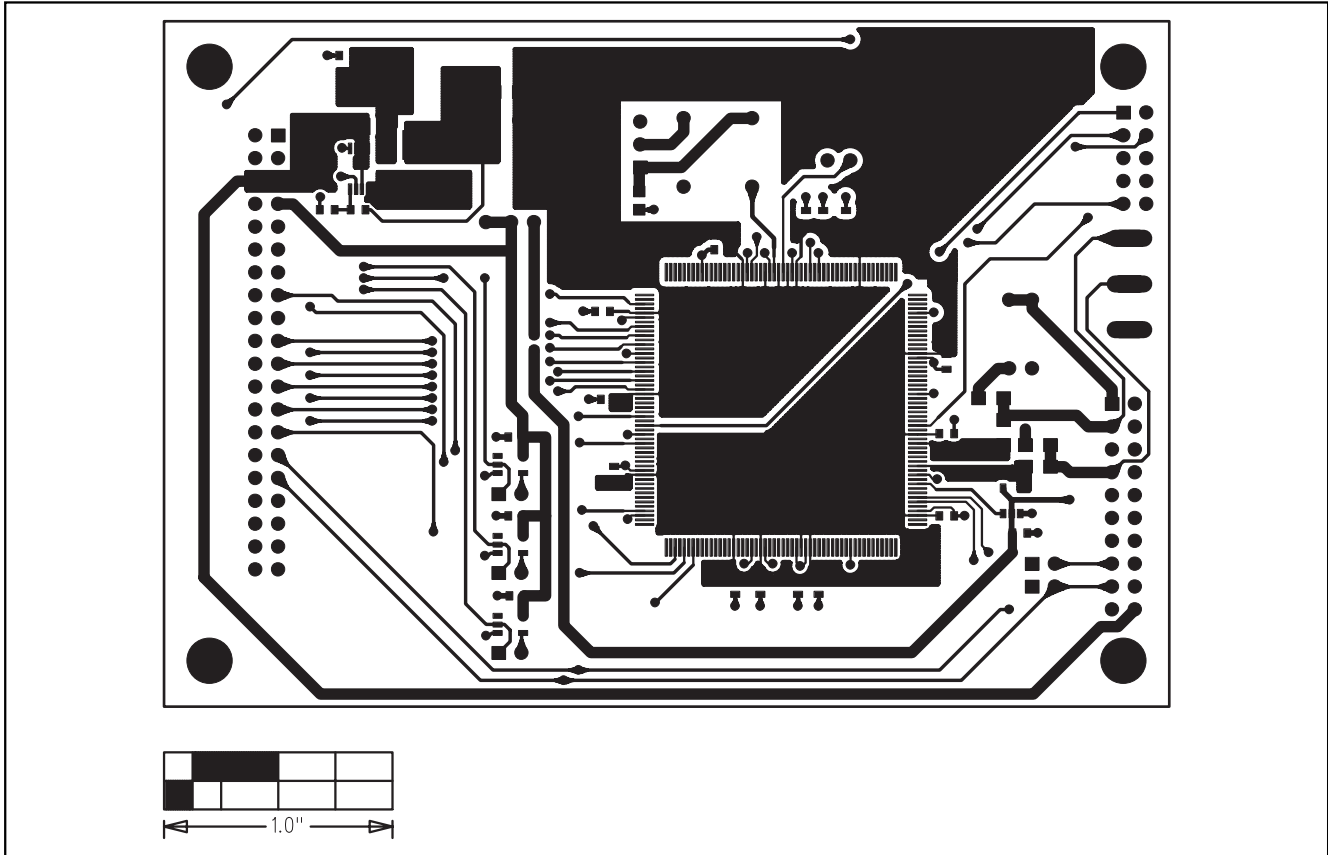


Figure 4. HS I<sup>2</sup>C-Compatible Module PC Board Layout—Component Side

## **HS I<sup>2</sup>C-Compatible Module**

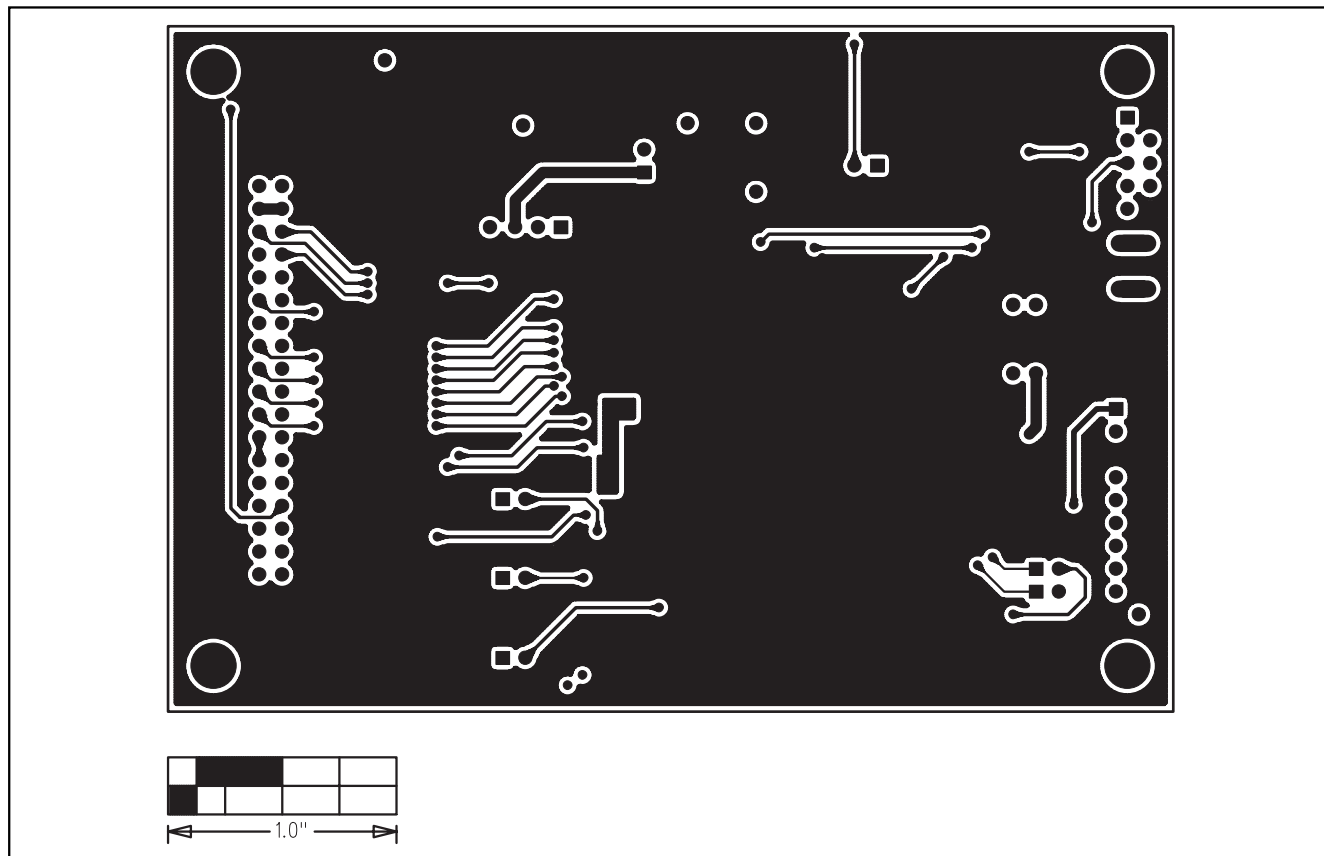


Figure 5. HS I<sup>2</sup>C-Compatible Module PC Board Layout—Solder Side

Maxim cannot assume responsibility for use of any circuitry other than circuitry entirely embodied in a Maxim product. No circuit patent licenses are implied. Maxim reserves the right to change the circuitry and specifications without notice at any time.

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