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# **MAX6683 Evaluation System/Evaluation Kit**

# **General Description**

The MAX6683 evaluation system (EV system) consists of a MAX6683 evaluation kit (EV kit) and a companion Maxim CMODUSB board.

The MAX6683 EV kit is an assembled and tested printed circuit board (PCB) that demonstrates the MAX6683 temperature sensor and system monitor. The MAX6683 monitors temperature, supply voltage, and the voltage of three external supplies. Temperature is converted to 11-bit serial data and voltage to 8-bit data.

The CMODUSB allows a PC to use its USB port to emulate an Intel SMBus. Windows<sup>®</sup> 98SE/2000/XP-compatible software provides a user-friendly interface to exercise the features of the MAX6683. The program is menu driven and offers a graphic interface with control buttons and status display.

Order the EV system (MAX6683EVCMODU) for a complete PC-based evaluation of the MAX6683. Order just the EV kit (MAX6683EVKIT) if you already have an SMBus interface.

To evaluate the MAX6652, order a free sample of the MAX6652AUB.

# \_Features

- ♦ Measure and Display the MAX6683 Temperature
- Monitor Four Voltage Channels
   Three External (1.8V, 2.5V, and 5V Nominal)
   V<sub>CC</sub> Pin (3.3V Nominal)
- Programmable Alarms and Configuration
- SMBus/I<sup>2</sup>C Compatible
- ♦ Easy-to-Use Menu-Driven Software
- Fully Assembled and Tested
- Include Windows 98SE/2000/XP-Compatible Software and Demo PCB
- EV System Includes USB Connectivity

# **Ordering Information**

PART	TEMP RANGE	INTERFACE TYPE
MAX6683EVKIT	0°C to +70°C	Not included
MAX6683EVCMODU	0°C to +70°C	CMODUSB

**Note:** The MAX6683 EV kit software is provided with the MAX6683EVKIT. However, the CMODUSB board is required to interface the EV kit to the computer when using the software.

# Component Lists

DESIGNATION	QTY	DESCRIPTION	
C1, C2	2	0.1µF, 16V X7R ceramic capacitors Taiyo Yuden EMK107BJ104KA Murata GRM188R71C104KA01 TDK C1608X7R1C104K	
СЗ	1	2.2µF, 16V X7R ceramic capacitor Taiyo Yuden EMK316BJ225ML Murata GRM42-6X7R225K016 TDK C3216X7R1C225M	
J1	1	$2 \times 10$ right-angle female	
JU1	1	$2 \times 4$ straight header	
JU2	0	Not installed	
R1, R2, R3	3	10k $\Omega$ ±5% resistors	
R4	1	470k $\Omega$ ±5% resistor	
SW1	1	Slide switch	
U1	1	MAX6683AUB	
U2	1	MAX1615EUK	
	1	Shunt for JU1	
	1	PCB: MAX6683 Evaluation Kit	

### MAX6683 EV System

PART	QTY	DESCRIPTION
MAX6683EVKIT	1	MAX6683 evaluation kit
CMODUSB+	1	Serial interface board

+Denotes lead-free and RoHS compliance.

SMBus is a trademark of Intel Corp.

Windows is a registered trademark of Microsoft Corp.

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For pricing, delivery, and ordering information, please contact Maxim/Dallas Direct! at 1-888-629-4642, or visit Maxim's website at www.maxim-ic.com.

# valuate: MAX6652/MAX6683

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SUPPLIER	PHONE	FAX	WEBSITE
Murata Mfg. Co., Ltd.	770-436-1300	770-436-3030	www.murata.com
Taiyo Yuden	800-348-2496	847-925-0899	www.t-yuden.com
TDK Corp	847-803-6100	847-390-4405	www.component.tdk.com

Note: Indicate that you are using the MAX6683 when contacting these component suppliers.

### \_\_\_Quick Start

### **Recommended Equipment**

 MAX6683 EV system MAX6683 EV kit

Maxim CMODUSB interface board

USB cable (included with the CMODUSB)

- A user-supplied Windows 98SE/2000/XP PC with spare USB port
- 3.3V power supply for VCC
- 1.8V power supply\*
- 2.5V power supply\*
- 5V power supply\*

**Note:** In the following sections, software-related items are identified by bolding. Text in **bold** refers to items directly from the EV kit software. Text in **bold and under**<u>**lined**</u> refers to items from the Windows 98SE/2000/XP operating system.

### Procedure

The MAX6683 EV kit is fully assembled and tested. Follow the steps below to verify board operation. **Caution: Do not turn on the power supplies until all connections are completed.** 

- 1) Visit the Maxim website (www.maxim-ic.com/evkitsoftware) to download the latest version of the EV kit software, 6683Rxx.ZIP.
- Install the MAX6683 EV kit software on your computer by running the INSTALL.EXE program. The program files are copied and icons are created in the Windows <u>Start</u> menu.
- Carefully connect the boards by aligning the 20-pin connector of the MAX6683 EV kit with the 20-pin header of the CMODUSB interface board. Gently press them together.
- Ensure that a shunt is on pins 1-2 of jumper JU4. Do not turn on the power until all connections are made.

5) Connect the 3.3V power supply to the VCC and GND pads.

**Component Suppliers** 

- Connect the 1.8V nominal power supply to the 1.8 VIN and GND pads.
- 7) Connect the 2.5V nominal power supply to the 2.5 VIN and GND pads.
- 8) Connect the 5V nominal power supply to the 5 VIN and GND pads.
- 9) Connect the USB cable from the PC to the CMODUSB board. A Building Driver Database window pops up in addition to a <u>New Hardware</u> Found message. If you do not see a window that is similar to the one described above after 30 seconds, remove the USB cable from the CMODUSB and reconnect it. Administrator privileges are required to install the USB device driver on Windows 98SE/2000/XP. Refer to the TROUBLESHOOTING\_USB.PDF document included with the software if you have any problems during this step.
- 10) Follow the directions of the <u>Add New Hardware</u> <u>Wizard</u> to install the USB device driver. Choose the <u>Search for the best driver for your device</u> option. Specify the location of the device driver to be <u>C:\Program Files\MAX6683</u> (or the directory chosen during installation) using the <u>Browse</u> button.
- 11) Turn on the power supplies.
- 12) Turn on the EV kit by moving SW1 to the ON position.
- 13) Start the MAX6683 EV kit software by clicking on its icon in the **<u>Start</u>** menu.
- 14) Wait until the program automatically detects the address of the MAX6683 and displays the userinterface panel (Figure 1).
- 15) Select the **Configuration** tab on the panel (Figure 2). Uncheck the **Interrupt Clear** checkbox.
- 16) Check the START checkbox.
- 17) Verify that the internal temperature displayed on the user-interface panel is not 0.000°C.

\*These supplies are optional; however, if different nominal supplies are used, appropriate threshold values should be programmed.



MAX6683 Evaluation Kit MAXSMBUS hardware found. Device Address = 0x2A	_ □ × ▼ Automatic Read   □ Data Logging
Temperature Voltage Configuration Interrupt Address	Internal Temperature = 0.000C ( 32.000F)
Internal Sensor Read Hot 80 Read Hyster 65 Read Temp 0.000C 32.000F	VCC = 0.000V (0) VIN1 = 0.000V (0) VIN2 = 0.000V (0) VIN3 = 0.000V (0) Command Sent = 0x41
	Interrupt Status
Read All         MAXSMBus.         About         No Alert	
<u>R</u> eset E <u>x</u> it Read Alert	Read Status

Figure 1. MAX6683 EV Kit User-Interface Panel

MAX6683 Evaluation Kit	_ 🗆 ×
MAXSMBUS hardware found. Device Address = 0x2A	🔽 Automatic Read 🛛 🗖 Data Logging
Temperature Voltage Configuration Interrupt Address	Internal Temperature = 22.875C (73.175F)
Configuration RESET Freserved Short Cycle Line Frequency Interrupt Clear Reserved	VCC = 3.300V (192) VIN1 = 2.500V (192) VIN2 = 1.800V (192) VIN3 = 5.000V (192) Command Sent = 0x41 Data Sent/Received = 0x00
Interrupt Enable START Read Configuration	Interrupt Status
Read All     MAXSMBus     About     No Alert       Reset     Exit     Read Alert	Read Status

Figure 2. MAX6683 EV Kit Configuration Display

# **Detailed Description**

### **User-Interface Panel**

The user interface is easy to operate using the mouse, or by using the tab key to navigate with the arrow keys. The checkboxes, edit fields, and radio buttons correspond to bits in the internal registers. By clicking on them, the correct SMBus write operation is generated to update the registers.

The program monitors for an alert interrupt and continually polls the device for new temperature, voltage, and status data. To disable the continuous polling of data, uncheck the **Automatic Read** checkbox. To change the temperature or voltage threshold comparison registers, select the appropriate data field and type in the new value. Pressing Enter, after typing in the new values, updates the internal registers.

The message **ALERT** appears whenever an interrupt condition occurs. To clear the interrupt, first eliminate the condition that caused it and then click on **Read Status**.

### Simple SMBus Commands

There are two methods for communicating with the MAX6683: through the normal user-interface panel or through the SMBus commands available from pressing the **MAXSMBus.** button. A display appears that allows the SMBus protocols, such as Read Byte and Write Byte, to be executed. To stop normal user-interface execution so that it does not override the manually set values, turn off the update timer that slaves the program to the conversion rate by unchecking the **Automatic Read** checkbox.

The SMBus dialog boxes accept numeric data in binary, decimal, or hexadecimal. Hexadecimal numbers should be prefixed by \$ or 0x. Binary numbers must be exactly eight digits.

**Note:** In places where the slave address asks for an 8bit value, it must be the 7-bit slave address of the MAX6683 as determined by the address pin (ADD) with the last bit set to 1 for a read operation and 0 for a write.

### **Data Logging**

Check the **Data Logging** checkbox to activate data logging. Data logging saves temperature, voltage, and status data to a text file that includes a time/date stamp next to each data point. If **Automatic Read** is enabled, data is sampled at 2Hz; however, the data is logged to the file only if the temperature, voltage, or status change. This slows the growth of the data-logging file. When **Automatic Read** is disabled, the data is logged each time the **Read All** button is clicked. To stop data logging, uncheck the **Data Logging** checkbox.

## **Jumper and Switch Settings**

Jumper 1 (JU1) sets the MAX6683 slave address. The default address is 0010 101 (ADD = VCC); see Table 1 for a complete list of addresses. The slide switch, SW1, provides a means to force a reset. This switch disables power to the device.

### Table 1. JU1 Shunt Settings for SMBus Address

SHUNT LOCATION	ADD CONNECTION	MAX6683 ADDRESS
0x28	To GND	0010 100Y
0x2A	To VCC	0010 101Y
0x2C	To SDA	0010 110Y
0x2E	To SCL	0010 111Y

**Note:** The first 7 bits shown are the address. Y (bit 0) is the SMBus read/write bit. This bit is a 1 for a read operation and zero for a write.

# **Evaluating the MAX6652**

The MAX6683 EV kit can also evaluate the MAX6652. Remove the MAX6683 from the board and install the MAX6652.

The MAX6652 and MAX6683 monitor different voltages. See Table 2.

When evaluating the MAX6652 with the MAX6683 software, the voltages displayed for the supply voltage (V<sub>CC</sub>), the 1.8V nominal voltage, and the 5V nominal voltage are incorrect. However, the ADC output code, shown in parentheses next to the voltage, is correct. Use the equations shown below to calculate the actual voltages:

	5V×ADC output code
vCC -	192
Voltago on nin 1-	12V×ADC output code
voltage on pinn –	192
Voltago on pin 3 -	3.3V×ADC output code
voltage on pin 5 –	192

# Table 2. Voltage Monitor DifferencesBetween MAX6652 and MAX6683

PIN	MAX6652 (V)	MAX6683 (V)
10 (V <sub>CC</sub> )	5	3.3
1	12	1.8
3	3.3	5



Figure 3. MAX6683 EV Kit Schematic



Figure 4. MAX6683 EV Kit Component Placement Guide— Component Side



Figure 5. MAX6683 EV Kit PCB Layout—Component Side



Figure 6. MAX6683 EV Kit PCB Layout—Solder Side

# **Revision History**

Pages changed at Rev 1: 1-5, 7, 8

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Evaluate: MAX6652/MAX6683

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