Product Document

Published by
ams OSRAM Group

User Guide

UG000440

AS6204

Eval Kit

AS6204-EK

v1-01 • 2019-Apr-17

Content Guide

1 Introduction

The AS6204 adapter board is a small PCB allowing a simple and quick evaluation of the AS6204 digital temperature sensors without the need to design a custom PCB. This small form factor board is fully assembled with the AS6204 temperature sensor and its necessary external components.

1.1 Kit Content

This kit contains following material listed in Figure 1

Figure 1:
Kit Content

Pos.	Item	Comment
1	AS6204-EK-AB	Eval Kit Adapter Board

1.2 Ordering Information

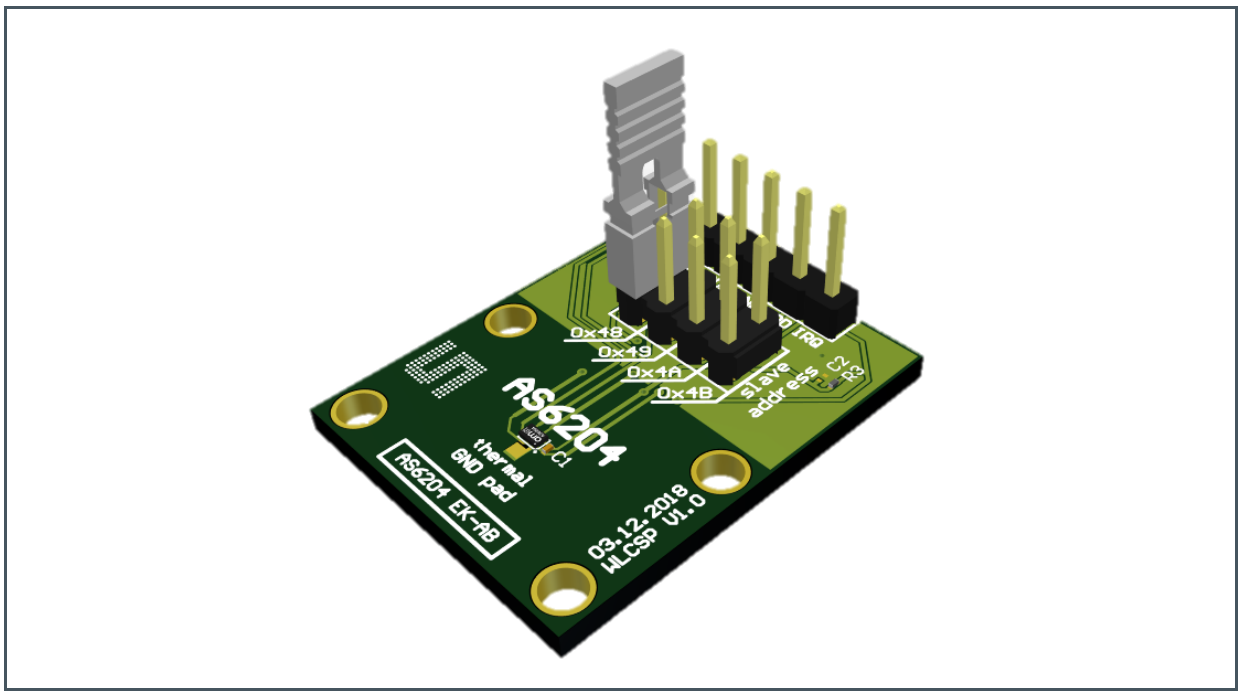
Figure 2:
Ordering Code

Ordering Code	Description
AS6204-EK	AS6204 Eval Kit

2 Getting Started

The AS6204 adapter board is ideal for rapid setup of a digital temperature sensor. To get started connect the board to your microcontroller configuration as described in Figure 4. Add a command in your source code to request two bytes from the selected I²C address. Finally convert the returned data as described in chapter 4.2 to get the actual temperature value.

Figure 3:
Adapter Board



3 Hardware Description

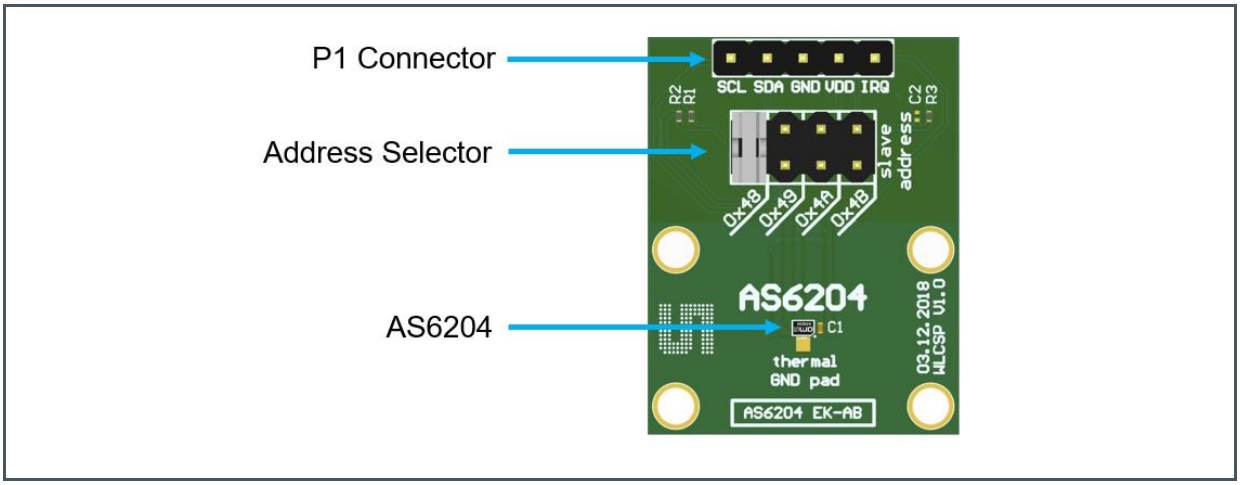
The P1 connector does provide all relevant signals, which can be easily wired to a microcontroller and to the power supply

Figure 4:
Adapter Board Pin-Out

Pin	Symbol	Description	Info
1	SCL	I²C clock	Use R1 if pull-up is required
2	SDA	I²C data	Use R2 if pull-up is required
3	GND	Ground	
4	VDD	Power supply	According datasheet
5	IRQ	Digital output pin	Alert interrupt output

3.1 Hardware Architecture

Figure 5:
AS6204 Adapter Board

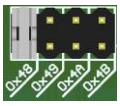
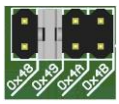
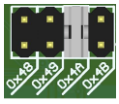
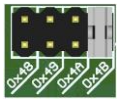


R1, R2 and R3 are pull-up resistors for the I²C interface and the Alert pin. Depending on the application, it is recommended to either populate the decoupling capacitor C1 or C2.

3.2 AS6204 Configuration

With the address selector, it is possible to choose the I²C address of the device. The included jumper is an easy way of setting the I²C address of the sensor. The address selector must not be left open.

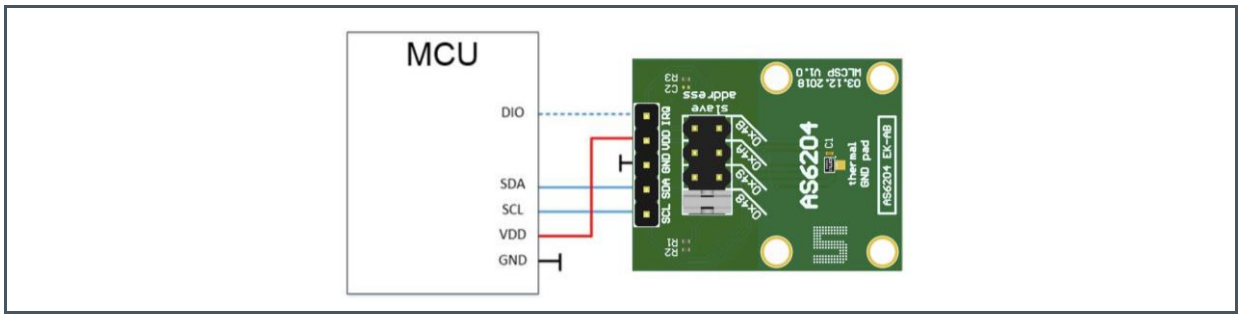
Figure 6:
I²C Address

Jumper Settings	Address Selector	Device Address	
	GND	100 1000	0x48
	VDD	100 1001	0x49
	SDA	100 1010	0x4A
	SCL	100 1011	0x4B

3.3 Power Supply and Connections

The PCB has to be connected to an external microcontroller. P1 is populated with a 1x5 pin header and is required for power supply as well as I²C communication. In addition to that, it can be used to monitor the interrupt status via pin 5 (IRQ).

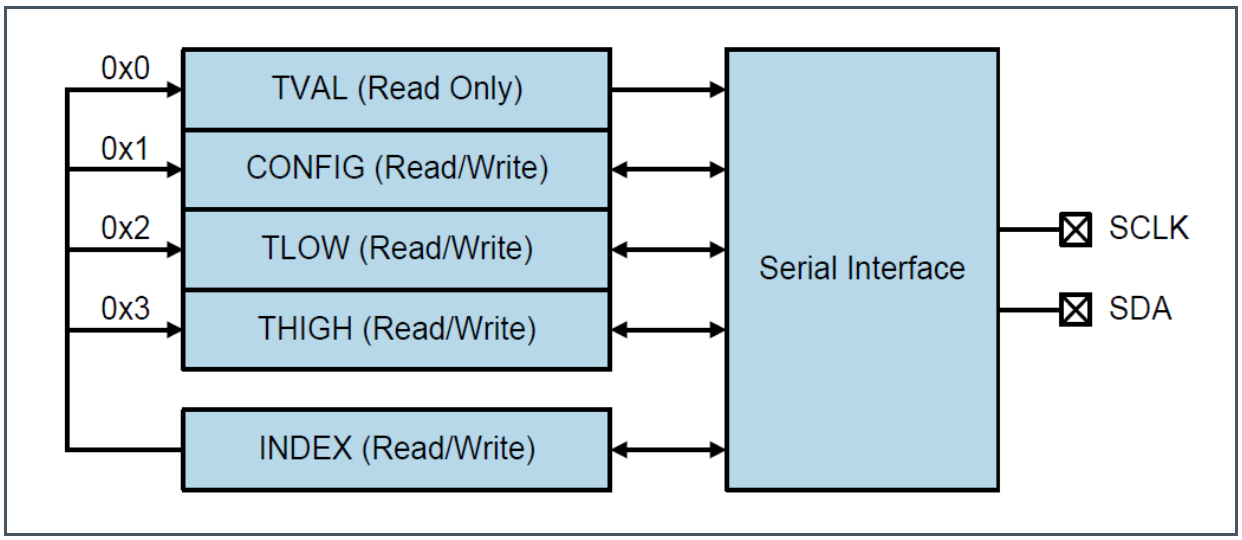
Figure 7:
MCU and AS6204 Connections



4 Software Description

The AS6204 has 4 data registers. With the use of the index register, it is possible to address the specific data register. When powered up the address register is set to 0x0.

Figure 8:
Data Registers



For additional configuration settings, the Config register (0x1) has to be addressed. Please refer the data sheet for details.

Figure 9:
Configuration Register

Address	Symbol	Register	Description
0x0	TVAL		Contains the temperature value
0x1	CONFIG	Configuration Register	Configuration settings of the temperature sensor
0x2	TLOW	T_{LOW} Register	Low temperature threshold value
0x3	THIGH	T_{HIGH} Register	High temperature threshold value

4.1 Index Register

The index register contains 8-bit, but only D0 and D1 are used.

Figure 10:
Index Register

Bit	D7	D6	D5	D4	D3	D2	D1	D0
Value	0	0	0	0	0	0	Address Bits	

4.2 Temperature Register

Figure 11:
Temperature Register

D15	D14	D13	D12	D11	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1	D0
T11	T10	T9	T8	T7	T6	T5	T4	T3	T2	T1	T0	0	0	0	0
MSB Byte								LSB Byte							

The temperature register contains the digitally converted temperature value. It consists of 2 bytes and can be converted according to the following formula:

Positive values= |Value| / LSB
Negative values= Complement(|Value| / LSB) + 1

Example +75°C

$75°C \;/\; 0.0625°C = 1200 = Binary\ 0100\ 1011\ 0000 = Hex\ 4B0$

Example -40°C

$|-40°C| \;/\; 0.0625°C + 1 = 640 + 1 = Binary\ 0010\ 1000\ 0000 + 1 = 1101\ 0111\ 1111 + 1 = 1101\ 10000\ 0000 = Hex\ D80$

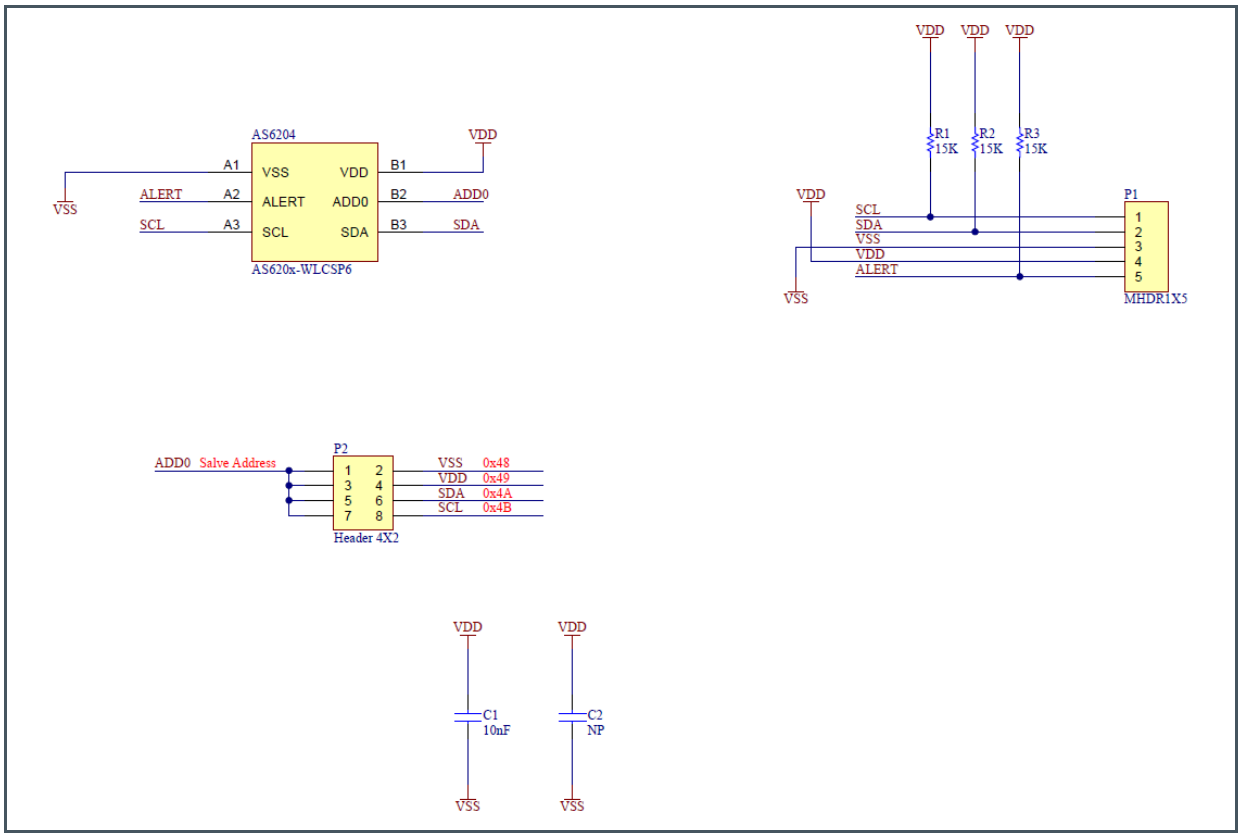
5 Schematics, Layers and BOM

The schematics, layout and BOM of the adapter board are shown below for reference.

5.1 Schematics

The schematics of the board is shown below in Figure 12:

Figure 12:
Schematics



5.2 Layout and Board Dimensions.

The PCB layout is shown below in Figure 13 and Figure 14

Figure 13:
Top Layer

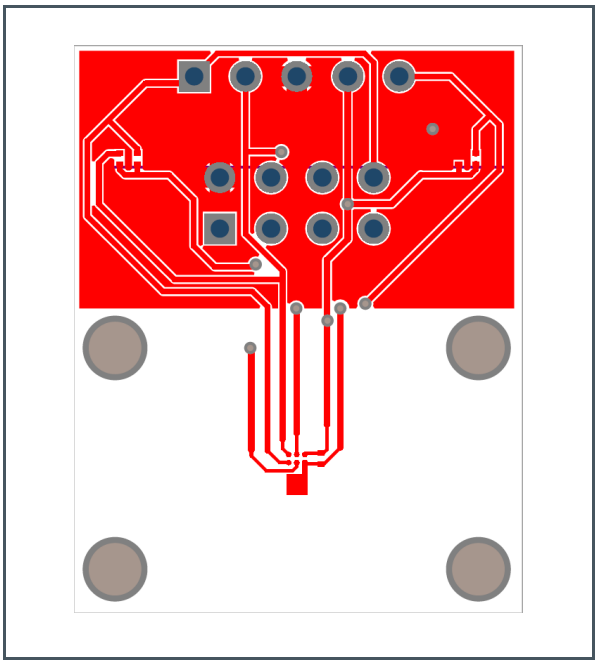
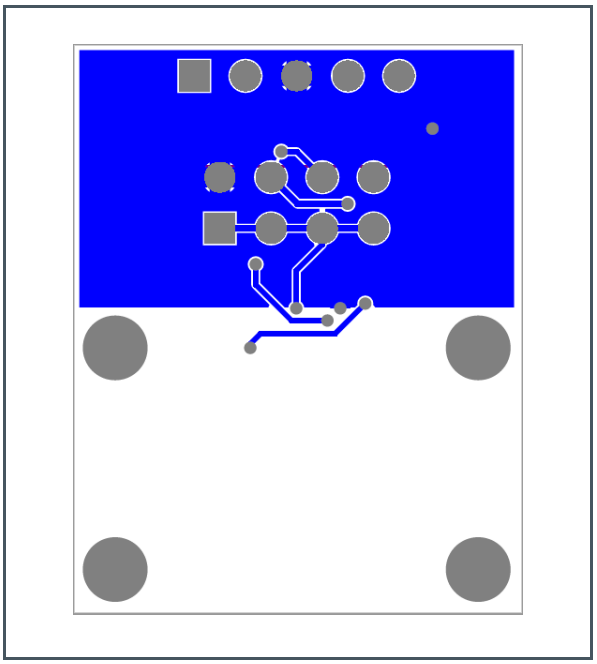
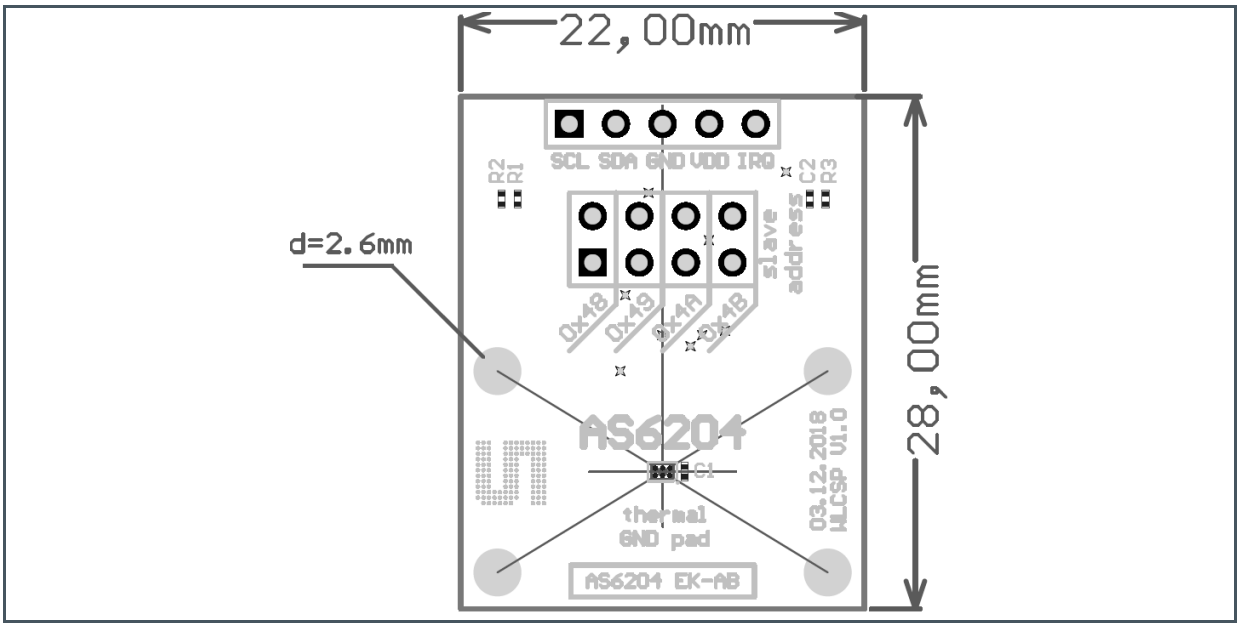


Figure 14:
Bottom Layer



The board dimensions are shown below in Figure 15

Figure 15:
Dimensions



5.3 Bill of Materials

The BOM of the Board is shown below in Figure 16

Figure 16:
BOM

Position	Name	Value
1	R7	NP
2	R6	NP
3	R5	NP
4	R4	NP
5	R3	10 K
6	R2	10 K
7	R1	10 K
8	P1	Header 5
9	C2	NP
10	C1	10 nF
11	AS6204	AS6204 WLCSP

6 Revision Information

Changes from previous version to current revision v1-01	Page
Initial version	

- Page and figure numbers for the previous version may differ from page and figure numbers in the current revision.
- Correction of typographical errors is not explicitly mentioned.

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