Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!

Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832
Email & Skype: info@chipsmall.com Web: www.chipsmall.com
Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China

Thermostat click

PID: MIKROE-2273

Weight: 30 g

Condition: New product

Thermostat click carries the MAX7502 IC digital temperature sensor, that also provides an overtemperature alarm/interrupt/shutdown output, and an SN74LVC1G126 single bus buffer from Texas Instruments. MAX7502 IC can measure temperatures from -25°C to +100°C, within the accuracy of ±1.5°C.

The G6D PCB power relay can control up to **5A, 250V AC/30V DC** loads.

Table of contents

If you need a temperature sensor and relay in one device, you should look no further than **Thermostat click**. It can be used to measure environmental temperature and to directly switch ON/OFF cooling and heating devices, performing all the functions of a thermostat.

Thermostat click carries the MAX7502 IC digital temperature sensor, that also provides an overtemperature alarm/interrupt/shutdown output, and an SN74LVC1G126 single bus buffer from Texas Instruments. MAX7502 IC can measure temperatures from -25°C to +100°C, within the accuracy of ±1.5°C.

The G6D PCB power relay can control up to **5A, 250V AC/30V DC** loads.

The click runs on either 3.3V or 5V power supply and communicates with the target MCU over I2C interface.

Temperature range

The IC can measure temperatures from **-25°C to +100°C**, within the accuracy of **±1.5°C**.

MAX7502 temperature sensor

MAX7502 temperature sensor measures temperature, converts the data into digital form using a sigma-delta ADC, and communicates the conversion results through an I2C-compatible 2-wire serial interface.

It accepts standard I2C commands to read the data, set the overtemperature alarm trip thresholds, and configure other characteristics.

Low power consumption

The MAX7502 temperature sensor typically uses only around 250 µA, and in shutdown mode around 3 µA. With such low power consumption, it is very suitable for home automation devices.

Enable/disable thermostat functionality

There is also the TE (thermostat enable) pin on the mikroBUS™ pin socket for enabling (high level) or disabling (low) of the thermostat functionality. This is accomplished via the SN74LVC1G126 single bus buffer with 3-state output IC, which serves as an electronic switch between temperature sensor IC output pin and the relay driver circuit.

This way the relay can be permanently disconnected from the sensor IC output. A feature like this can be useful when the sensor IC is only used as an measuring device, or if the thermostat needs to be temporarily disabled.

Application

HVAC systems, heating systems, cooling systems, simple interrupt ON/OFF temp control, hysteresis controller, etc.

Key features

- MAX7502 temperature sensor
  - ±1.5°C (max) temperature accuracy
  - 3µA (typ) shutdown supply current
  - Overtemperature alarm output
- SN74LVC1G126 single bus buffer
  - Designed for 1.65-V to 3.6-V VCC operation
  - Low Power Consumption, 10-µA Max ICC
- Onboard screw terminal
- I2C interface
- Either 3.3V or 5V power supply

SPECIFICATION

Product Type	Temperature / Humidity
Applications	HVAC systems, heating systems, cooling systems, simple interrupt ON/OFF temp control, hysteresis controller, etc.
On-board modules	MAX7502 IC digital temperature sensor
Key Features	MAX7502 temperature sensor, SN74LVC1G126 single bus buffer, G6D PCB power relay, I2C interface, either 3.3V or 5V power supply,
Key Benefits	Temperature sensor and relay in one device, it can measure environmental temperature and directly switch ON/OFF cooling and heating devices
Interface	I2C
Power Supply	3.3V or 5V
Compatibility	mikroBUS
Click board size	L (57.15 x 25.4 mm)

Pinout diagram

This table shows how the pinout on **Thermostat click** corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin	mikroBUS™				Pin	Notes
Not connected	NC	1	AN	PWM	16	NC	Not connected
Hardware Reset for MAX7502	RST#	2	RST	INT	15	NC	Not connected
Thermostat enable	TE	3	CS	TX	14	NC	Not connected
Not connected	NC	4	SCK	RX	13	NC	Not connected
Not connected	NC	5	MISO	SCL	12	SCL	Serial Data Input/Output Line
Not connected	NC	6	MOSI	SDA	11	SDA	Serial Data Clock Input
Power supply	+3.3V	7	+3.3V	+5V	10	+5V	Power supply
Ground	GND	8	GND	GND	9	GND	Ground

Programming

This code snipped for EasyMx PRO v7 for STM32F107VC MCU initializes the temperature sensor by writing into its registers and, then it reads the temperature in an endless loop. If the measured temperature gets below the hysteresis temperature, the output relay is ON.

The sensor is configured for heating, without fault queue bits, when OS output is active low, with comparator logic and in normal operation.

```
1     // Main program
2    void main()
3    {
4
//*****************************************************************************
5     // MAX7502 temperature controller IC
6
7     // MAX7502 Initialization
```

```
 8    TEMP = 0;                  // Thermostat function disabled - Output
Relay disconnected
 9    TRES = 0;                  // Apply Reset procedure
10    delay_ms(150);
11    TRES = 1;                  // Temperature controller is in default
state and ready for work
12
13    // MAX7502 Configuration
14    Set_CONFIG(0);             // Set parameters in configuration register
15                               // refer to MAX7502 datasheet and click
board schematic in order to
16                               // set right parameters for intended
application:
17                               // e.g. set OS output pin polarity for using
the chip sensor in
18                               // processes of Heating (bit1=0) or Cooling
(bit1=1)
19                               // or set the output function of the same
pin to be Comparator (bit2=0)
20                               // or Interrupt logic (bit2=1) in order to
use the sensor for hysterezis
21                               // temp ON/OFF control (real process) or
trivial ON/OFF control
22                               // In this example the chip is configured
for heating
23    Set_TEMP_REF(REF_TEMP);    // Set referent temperature T = 22 C (Output
relay is ON until the environment
24                               // temperature has reach that value)
25    Set_TEMP_HYST(HYST_TEMP);  // Output Relay is OFF until the temperature
falls below HYST value
26
27    TEMP = 1;                  // Thermostat enabled - Output Relay
connected to OS output pin of MAX7502
28
29
//*************************************************************************
30
31    current_temp = REF_TEMP;
32    old_MSB = 0;
33    temp_MSB = 0;
34    temp_changed = false;
35
36
//*************************************************************************
37    // Temperature read loop  -  temperature controlling process
```

```
38     while (1)
39     {
40           Temp_read();          // Read 9-bit temperature value from
MAX7502's register space
41           delay_ms(200);        // +-0.5 C fraction neglected in this
example
42     }
43
//*************************************************************************
44 }
```

Jumpers and settings

The table below gives information about the onboard jumpers.

Designator	Name	Default Position	Default Option	Description
JP1	PWR.SEL.	Left	3.3V	Power Supply Voltage Selection 3.3V/5V, left position 3.3V, right position 5V

LEDs, buttons and switches

The following table gives information about onboard LEDs, buttons and switches.

Designator	Name	Type (LED, BUTTON…)	Description
LD1	PWR	Power LED	
CN1		2-pole PCB terminal block 5.08mm	For output device connection (heater/fan…)