

Evaluation Board for ATW3A313D

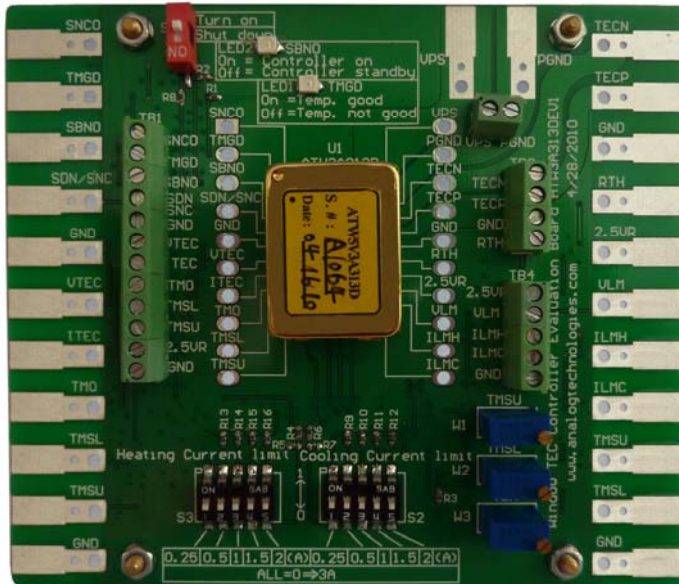


Figure 1. Physical Photo of ATW3A313DEV1

APPLICATION

Evaluate the DIP packaged window TEC controller ATW3A313D.

INTRODUCTION

The ATW3A313D is a compact electronic module designed to control TECs (Thermo-Electric Coolers) for regulating the temperature of the target object within a pre-set window at high energy efficiency. When the temperature of the target object is within the pre-set temperature window range, the controller puts itself into a standby mode, decreasing energy consumption to a minimum level, <20mW. When the temperature of the target object reaches the upper bound of the temperature window, the controller cools down the target object; as the temperature of the target object reaches the lower bound of the window, the controller heats up the target object.

This evaluation board, ATW3A313DEV1, is designed for evaluating the above mention TEC controller module, ATW3A313D, conveniently. To benefit your experiment, it is highly recommended to read this application note with the ATW3A313D datasheet at here:

<http://www.analogtechnologies.com/document/ATW3A313.pdf>

which provides more detailed information about the specifications and application guidance for the window TEC controller module.

When used in conjunction with the ATW3A313D datasheet, this application note describes how to configure

the ATW3A313DEV1, and how to develop a practical TEC control circuit with the ATW3A313D.

BOARD DESCRIPTION

The ATW3A313DEV1 Evaluation Board is consisted of a complete application circuit for driving a TEC controller. It can set the output current, the output current limits, and has 2 LEDs for indicating the working mode of the controller, standby mode or working mode, and if the temperature is within the pre-set temperature window, temperature good, respectively. The board has numerous connection/soldering pads and terminal connectors for making connections with external components and instruments. Its physical photo is shown in Figure 1.

Programming the operating parameters of the ATW3A313DEV1 evaluation board, such as the maximum output voltage, current limits, set-point temperature range, etc., allows using the board with various TECs and thermistors for different applications, where the ATW3A313D delivers and controls a bidirectional TEC current by using two pairs of complementary MOSFETs in an H-bridge configuration inside the controller module.

The temperature set-point range (factory default) circuit is optimized to work with a 10kΩ negative temperature coefficient thermistor, it can also work with other types of temperature sensors, such RTD or an IC based temperature sensor, contact us for details.

When the temperature of the object is within the pre-set temperature window, LED1 is lit.

When the controller is under working mode, LED2 is lit.

When LED1 is lit but LED2 is off, the controller is under standby mode.

When layout the PCB for using the window TEC controller ATW3A313D or ATW3A313S, these are the main guidelines:

1. Connect the power supply return node directly to the PGND pin of the controller before connecting it to any other points. For thermal management purpose, this was not done on the evaluation board.
2. Use as large copper areas as possible for the PCB traces of the solder pads of all the pins so that these copper areas become heat-sinks and help dissipate the heat generated by the controller.

GETTING STARTED

1. Before turning on the power supply, connect TEC's positive terminal to the TECP pad on the board, and negative terminal to TECN pad. The RTH pad is to be used for connecting the terminal resistors.



2. Plug in the ATW3A313D controller onto the evaluation board as shown in Figure 1.
3. Turn W3 to adjust the voltage of VLM to set the maximum voltage across the TEC, the relationship is: $V_{VLM} = V_{max}/5$.
4. Select the switch positions of S2 and S3, to set the current limits for cooling and heating respectively, the values are shown by the screen legend on the board.
5. Turn W1 and W2 to adjust the voltages on TMSU and TMSL pins respectively, to set the upper and lower bounds of the temperature window respectively. The voltage value vs. the temperature is given in the ATW3A313D datasheet.
6. The S1, on the upper left corner of the board, can turn on or shuts off the controller.
7. The functions of the other nodes, SNCO, TMGO, SBNO, SND/SNC, VTEC, ITEC..., are made available in the connection pad format, it the window controller datasheet,
<http://www.analogtechnologies.com/document/ATW3A313.pdf>
for details.
8. The ATW3A313 is the world's only window based TEC controller, let us know if there are any questions and/or suggestions for using it, to help us making it more perfect.

ORDERING INFORMATION

Table 2. Unit Price

Part Number	Description	1 – 9	≥10
ATW3A313DEV1	Windows TEC controller ATW3A313D evaluation board Rev. 1.0	\$25	\$22

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