



- Supports MOT700x-xx and MOT3000-25 TEC Controller modules
- 3.3V to 5V operation
- Standalone or host-controlled
- Complete evaluation and verification solution
- Ready to be used in your system
- Fully RoHs compliant.



Introduction

The MOT701_OEM is designed to allow the user to quickly evaluate and implement a Thermoelectric Cooler (TEC) design based on the MOT700x and MOT3000-25 series TEC controller modules. The board contains all required components other than the Thermoelectric cooler (TEC) itself.

The OEM can be used standalone utilizing on-board potentiometers to set target temperature or Host controlled using external DACs. Connection points are provided which can be used for monitoring object temperature, output current and temperature alarm status, as well as providing external control of temperature and module enable functions.

This User's Guide describes the various functions of the board, how to set it up and how to use it up in your system.

Please also refer to the MOT700x series datasheet for further description of the module functionality.



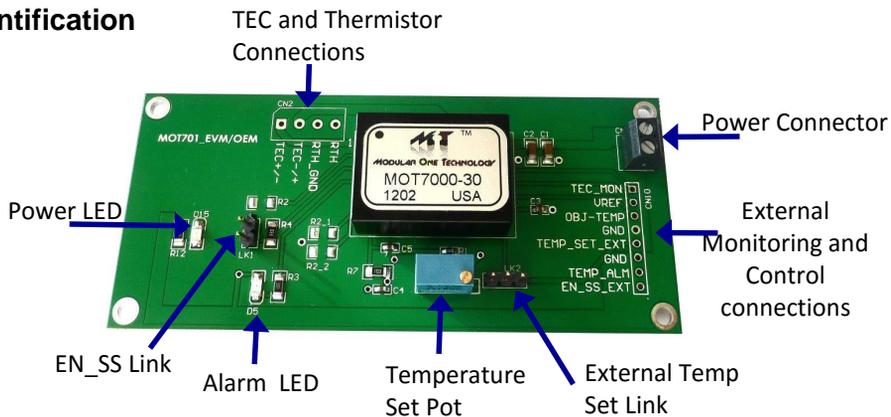
Before applying power to the OEM please ensure that a module is in place, jumpers are set and that VMAX, and IMAX is limited if required for your TEC. (see following pages)



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Component Identification



Quick Start

1. Verify the jumper settings:
 - LK1: Leave open to enable the module
 - LK2: In the default position uses VR2 to set temperature. Only move to the optional position if an external control voltage to be used.
3. Add R2 if necessary (default is open for maximum output voltage).
4. Add R2_1 if necessary (default is open for maximum negative current).
5. Add R2_2 if necessary (default is open for maximum positive current).
6. Connect the TEC and thermistor and/or Object Board.
7. Attach the power supplies (*be sure to observe correct polarity – see below*) and GO!

Note: The Alarm LED will light until the object temperature reaches the set value at which time the LED will go out – typically within 30 seconds

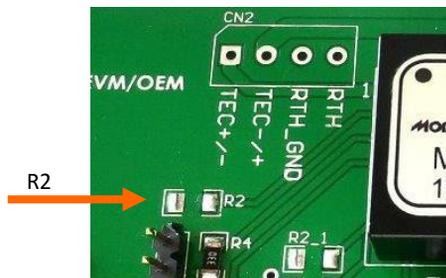


Be sure to observe the correct polarity for connections to the TEC on the MOTEVM-OBJ board.

To verify TEC polarity monitor the voltage on the RTH terminal and the center pin on LK2 (V_{TEMP_SET}). The voltage at RTH should be moving towards V_{TEMP_SET} . If it is moving away, towards 0V or 1.5V, then the connections are reversed.

Maximum Output Voltage

By default the MOT701_OEM ships with the VMAX_SET pin open, resulting in maximum output voltage swing. In some applications it may be desired to reduce the maximum voltage and this can be accomplished by the addition of a single resistor, R2.



See the MOT700x data sheet for calculating values for R2.

Maximum Output positive & negative currents

By default the MOT701_OEM ships with the IMAXP_SET & IMAXN_SET pin open, resulting in maximum output currents. In some applications it may be desired to reduce the maximum currents and this can be accomplished by the addition of a resistors, R2_1 and R2_2.

Module Enable

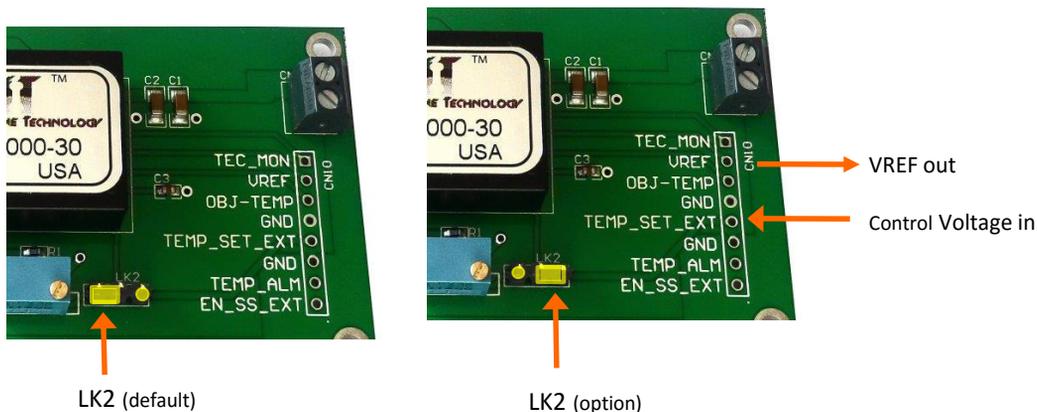
By default the module will power up when a supply voltage is applied (an internal pull-up means the pin may be left open for normal operation). If it is desired to disable the module the EN_SS pin should be connected to GND, which can be accomplished by closing LK1. When the link is removed the module will perform a soft start and resume operation.

The EN_SS signal line is also available on CN10 if external control is required (LK1 must be open in this case).



Temperature Setting

The required object temperature can be adjusted by means of VR2. LK2 should be set to the default position for this mode.



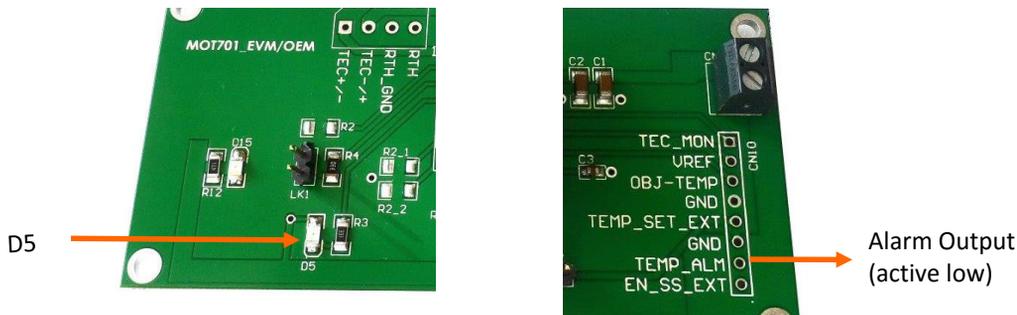
Alternatively the object temperature can be set by an external voltage applied to TEMP_SET_EXT on CN10. The reference voltage, VREF, is also available on CN10 and can be used as a reference for an external DAC. In this mode LK2 should be altered to the optional position.

Notes: Refer to the MOT700x data sheet for relationship between control voltage and object temperature. If no control voltage is applied to TEMP_SET_EXT internal biasing will set the temperature to approximately 25°C.

Temperature Alarm

Internal circuitry monitors the object temperature and will set an alarm flag when the temperature deviates by more than +/- 1.5° C. D5 will illuminate red when the alarm is set. The alarm status can also be monitored via TEMP_ALM at CN10.

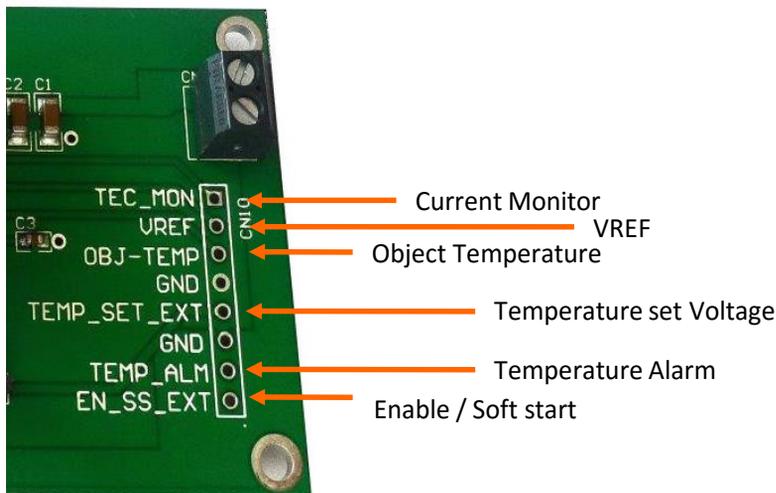
Once the temperature returns to within limits the flag will automatically reset (D5 will go off).





External Monitoring and Control

A number of system parameters are available for monitoring, along with several control signal inputs, which would be used when the TEC controller module is connected to a host controller. For convenience these are grouped together on CN10.



Current Monitor

An analog voltage representing the output current to the TEC.

VREF

Reference voltage output (1.5V).

Object Temperature

An analog voltage representing the temperature of the object being monitored.

Temperature Set Voltage

An analog voltage to set the object temperature. Values from 0 – 1.1V may be applied.

Note: The actual “usable” range of voltage will be somewhat less according to the desired set temperature and module characteristics – see MOT700x data sheet.

Temperature Alarm

This pin is pulled low when the temperature falls outside a +/-1.5° C window.

Enable / Softstart

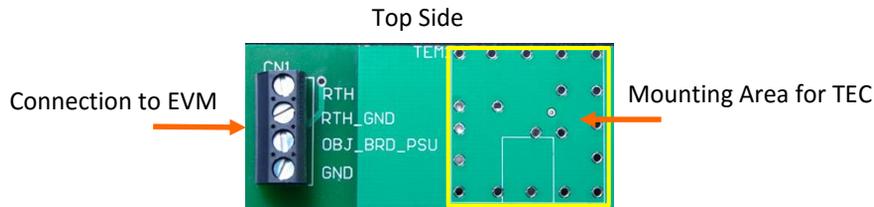
A low level voltage puts the module in standby. When releases the module resumes normal operation.



MOTEVM_OBJ Object Board

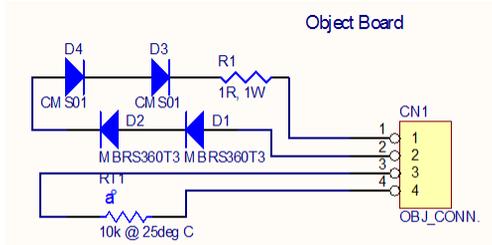
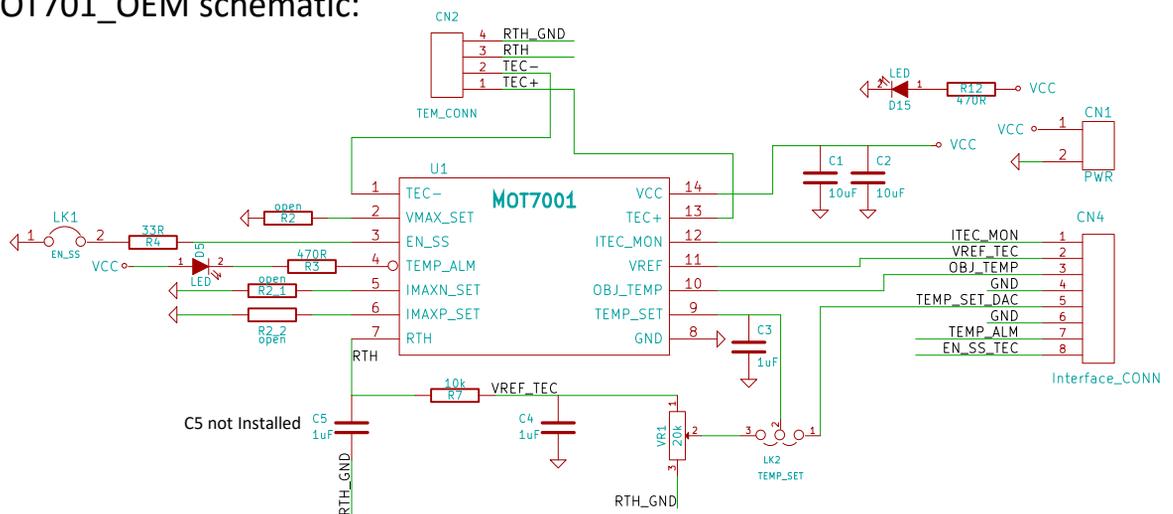
This board is provided as a convenient way to evaluate system characteristics when using a MOT700x TEC Controller module with an appropriate Thermoelectric cooler (TEC).

The board includes an area for mounting a TEC, and immediately underneath a 10K thermistor for temperature sensing. To simplify evaluation of system performance under various temperature.



Note: For further information on using the Object Board please refer to application brief MOT7000ABr7, "Thermal Considerations when using the MOTEVM_OBJ Object Board"

MOT701_OEM schematic:



MOTEVM_OBJ



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