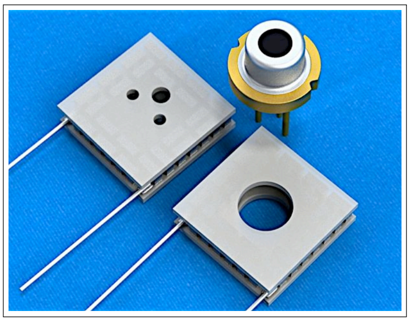
Performance Parameters

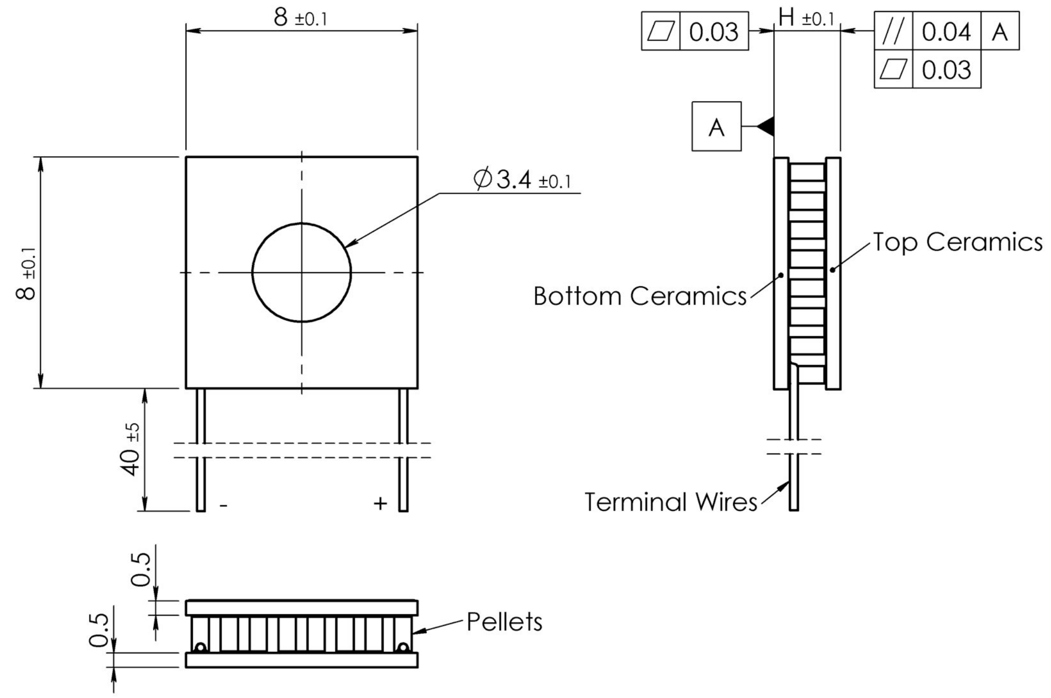
1MC06-024-xxH

Type	ΔT_{max} K	Q_{max} W	I_{max} A	U_{max} V	AC R Ohm	H mm
1MC06-024-xxH (N=24)						
1MC06-024-05H	70	5.82	3.2	3.0	0.69	1.6
1MC06-024-08H	72	3.80	2.1		1.08	1.9
1MC06-024-10H	72	3.08	1.7		1.34	2.1
1MC06-024-12H	72	2.59	1.4		1.61	2.3
1MC06-024-15H	73	2.10	1.1		2.00	2.6

Performance data are given for 300K, vacuum



Dimensions



Manufacturing options

A. TEC Assembly:

* 1. Solder SnSb (T_{melt}=230°C)
2. Solder AuSn (T_{melt}=280°C)

B. Ceramics:

* 1.Pure Al_2O_3(100%)
2.Alumina (Al_2O_3- 96%)
3.Aluminum Nitride (AlN)

** - used by default*

C. Ceramics Surface Options:

1. Blank ceramics (not metallized)
2. Metallized (Au plating)
3. Metallized and pre-tinned with:
    3.1 Solder 117 (In-Sn, T_{melt} =117°C)
    3.2 Solder 138 (Sn-Bi, T_{melt} = 138°C)
    3.3 Solder 143 (In-Ag, T_{melt} = 143°C)
    3.4 Solder 157 (In, T_{melt} = 157°C)
    3.5 Solder 183 (Pb-Sn, T_{melt} =183°C)
    3.6 Optional (specified by Customer)

D. Thermistor (optional)

Can be mounted to cold side ceramics edge. Calibration is available by request.

E. Terminal contacts

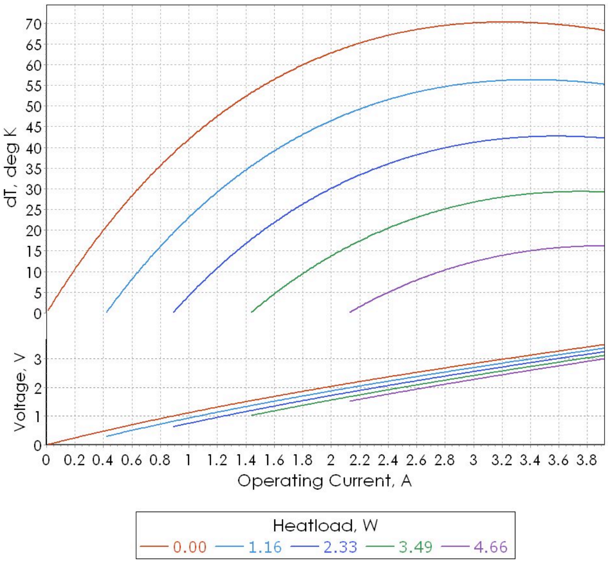
1. Blank, tinned Copper
2. Insulated Wires
3. Insulated, color coded

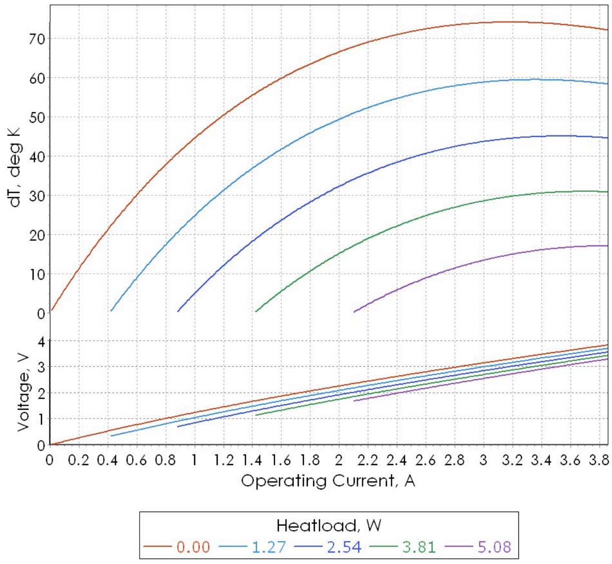
Performance Data

1MC06-024-05H

@ 27°C, Vacuum	ΔTmax K	Qmax W	Imax A	Umax V
1MC06-024-05H	70	5.82	3.2	3.0

@50°C, N2	ΔTmax K	Qmax W	Imax A	Umax V
1MC06-024-05H	74	6.35	3.2	3.3





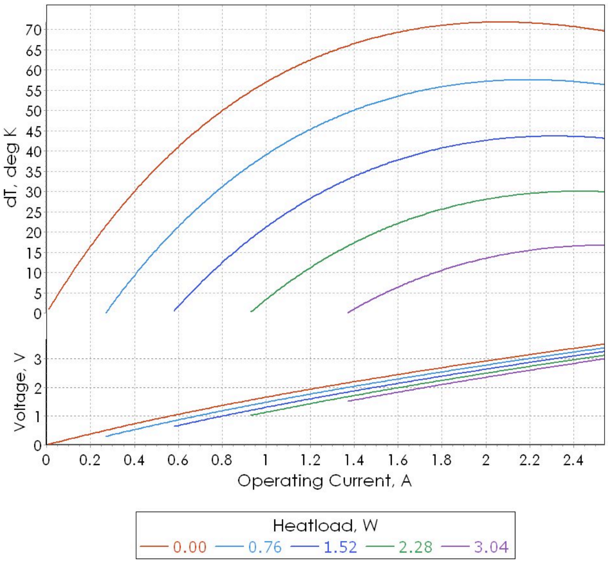
Note: Performance data is specified for optimal optimal conditions (TEC hot side is stabilized at ambient temperature). Heatsink thermal resistance is not included into estimations. Use TECCad Software for estimations under different conditions.

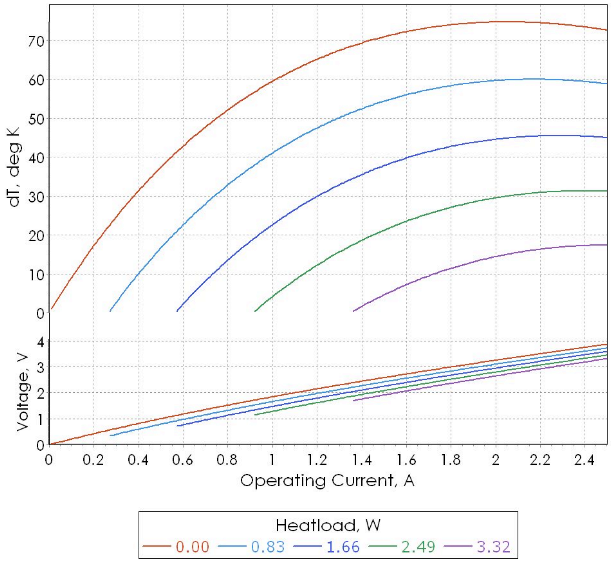
Performance Data

1MC06-024-08H

@ 27°C, Vacuum	ΔTmax K	Qmax W	Imax A	Umax V
1MC06-024-08H	72	3.80	2.1	3.0

@50°C, N2	ΔTmax K	Qmax W	Imax A	Umax V
1MC06-024-08H	75	4.15	2.1	3.3



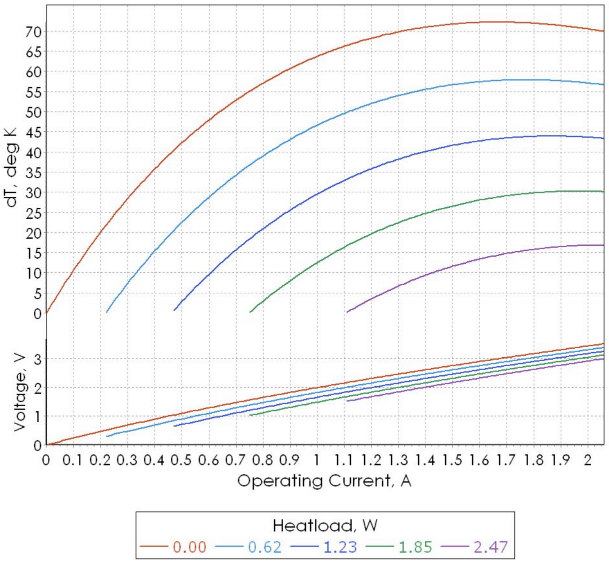


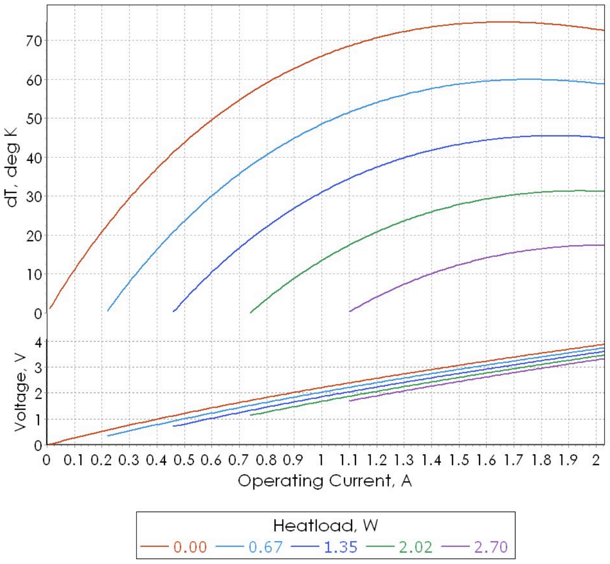
Note: Performance data is specified at optimal optimal conditions (TEC hot side is stabilized at ambient temperature). Any heatsink thermal resistance is not included into estimations. Use TECCad Software for estimations under different conditions.

Performance Data 1MC06-024-10H

@ 27°C, Vacuum	ΔTmax K	Qmax W	Imax A	Umax V
1MC06-024-10H	72	3.08	1.7	3.0

@50°C, N2	ΔTmax K	Qmax W	Imax A	Umax V
1MC06-024-10H	75	3.37	1.7	3.3



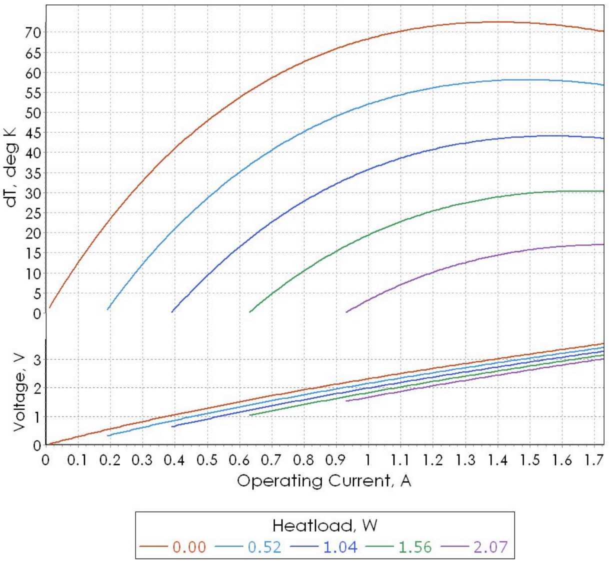


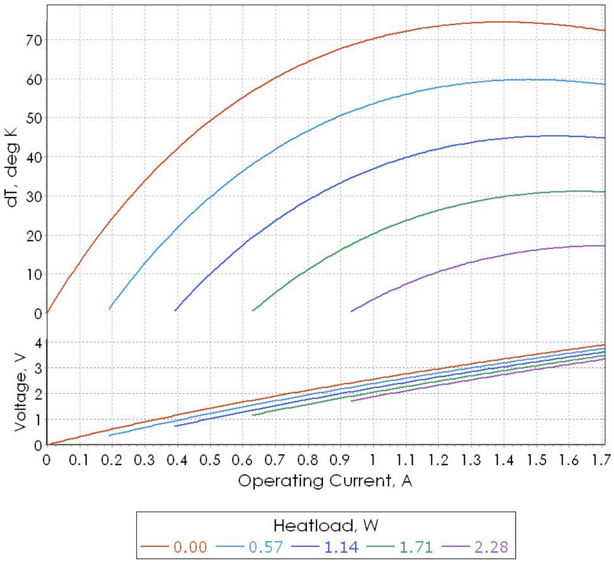
Note: Performance data is specified for optimal optimal conditions (TEC hot side is stabilized at ambient temperature). Heatsink thermal resistance is not included into estimations. Use TECCad Software for estimations under different conditions.

Performance Data 1MC06-024-12H

@ 27°C, Vacuum	ΔTmax K	Qmax W	Imax A	Umax V
1MC06-024-12H	72	2.59	1.4	3.0

@50°C, N2	ΔTmax K	Qmax W	Imax A	Umax V
1MC06-024-12H	74	2.85	1.4	3.3



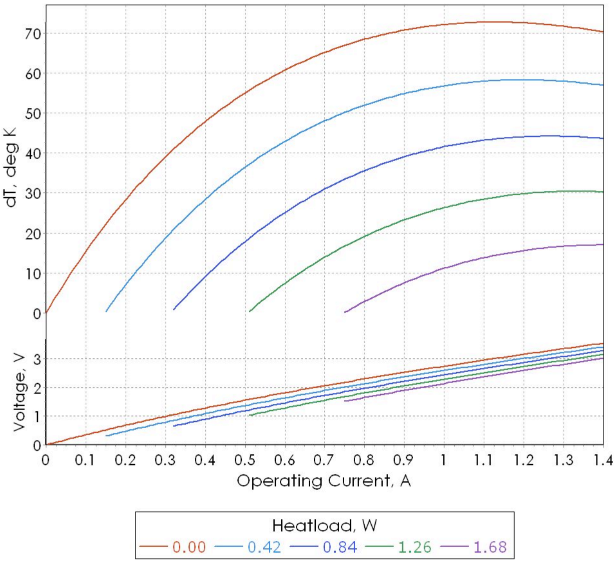


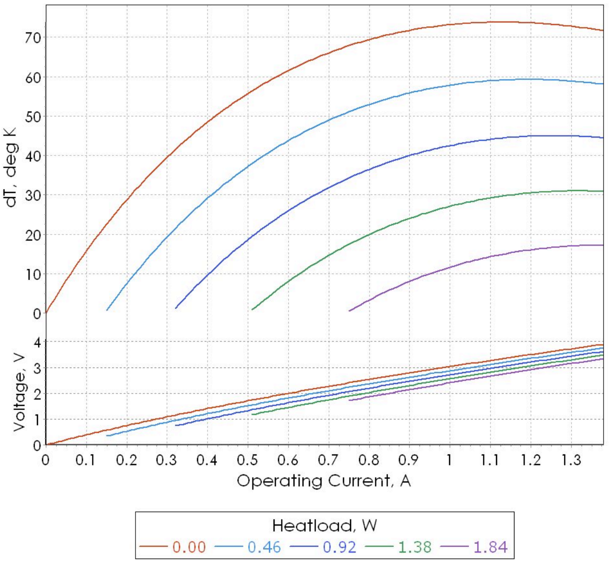
Note: Performance data is specified for optimal optimal conditions (TEC hot side is stabilized at ambient temperature). Heatsink thermal resistance is not included into estimations. Use TECCad Software for estimations under different conditions.

Performance Data — 1MC06-024-15H

@ 27ºC, Vacuum	ΔTmax K	Qmax W	Imax A	Umax V
1MC06-024-15H	73	2.10	1.1	3.0

@50ºC, N2	ΔTmax K	Qmax W	Imax A	Umax V
1MC06-024-15H	74	2.30	1.1	3.3





Note: Performance data is specified for optimal optimal conditions (TEC hot side is stabilized at ambient temperature). Heatsink thermal resistance is not included into estimations. Use TECCad Software for estimations under different conditions.

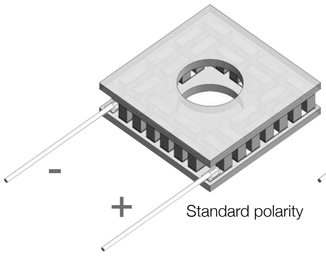
Important notes

1. TEC Performance in this datasheet is specified in two standard ambient condition modes (vacuum, +27ºC and dry nitrogen (N2), +50ºC). The performance may differ under other conditions. Please, use TECCad software from RMT Ltd web site or contact RMT or its branch specialists directly for additional TEC performance info.
2. TEC ACR and Umax values are sensitive to ambient temperature. These values can be different from those specified in the datasheet at other ambient conditions. ACR and Umax raise with ambient temperature increasing.
3. TEC cooling capacity (Qmax) raises with ambient temperature. Please, use TECCad software for additional info or contact RMT specialists directly.
4. Thermoelectric coolers have the best performance in the temperature range from near room up to +80..90ºC. The performance is lower at temperatures below 0ºC. TEC is not suitable to work at cryogenic temperatures.
5. Driving a TEC at Imax or Umax doesn't mean max performance mode. The real optimal mode may depend on operating conditions and heatload. In fact a better performance can be reached at operating current and voltage lower than Imax and Umax values specified in the datasheet.
6. It is strongly recommended to avoid a direct mounting of thermoelectric cooler to pure Copper, Aluminum or Nickel materials as well as a mounting of objects from these materials on TEC cold side. Any material with high CTE may affect TEC lifetime and/or damage it in case of improper mounting, thermal shock or temperature cycling. In case of above mentioned materials necessity, it is recommended to use soft solders or glues with large modulus of elasticity (Indium-based solders or silicon-based thermoconductive glues).
7. RMT Ltd confirms that all thermoelectric coolers meet the requirements of Telcordia GR-468 standard. The up-to-date Reliability Report is available by request. RMT Ltd warranties thermoelectric coolers lifetime no less than 250K-300K operating hours under normal application conditions.

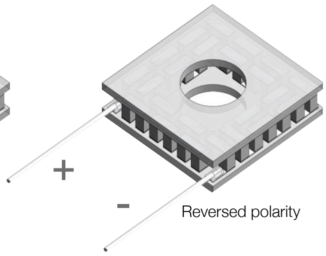
Additional Options

TEC Polarity

TEC Polarity can be modified by request. The specified polarity in this datasheet is typical.
It can be reversed in accordance to Customer application requirements.



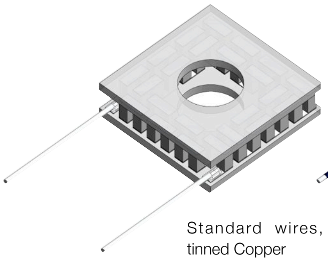
Standard polarity



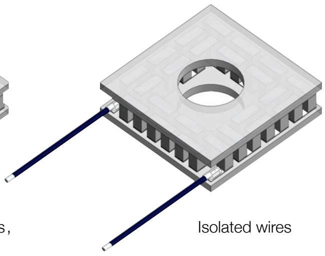
Reversed polarity

Terminal Wires Options

The wires are of tinned Copper, blank (not isolated) by default. Various options for isolated wires are available by request. The available solutions include isolated wires, isolated color-coded wires, flexible multicore wires and more.



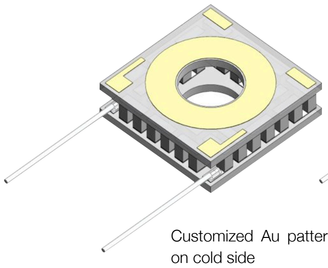
Standard wires, tinned Copper



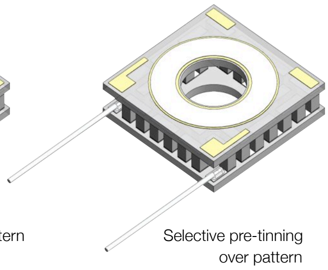
Isolated wires

Customized Au Patterns

Customized Au patterns on thermoelectric cooler cold side are available by request. Selective Pre-tinning over pattern is also available. Please, contact RMT Ltd for additional information about customized Au patterns requirements.



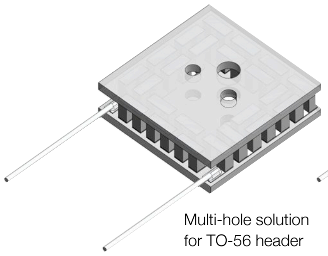
Customized Au pattern on cold side



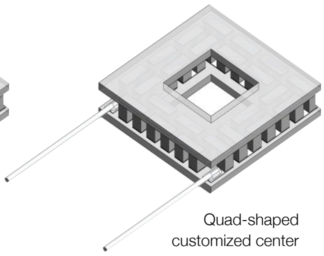
Selective pre-tinning over pattern

Hole Modifications

TEC center hole can be modified by request. Wide range of options is available - different hole shape sand dimensions and multi-hole configurations. RMT Ltd has the full-featured flexibility with ceramics cutting process.



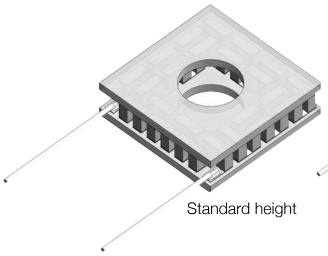
Multi-hole solution for TO-56 header layout



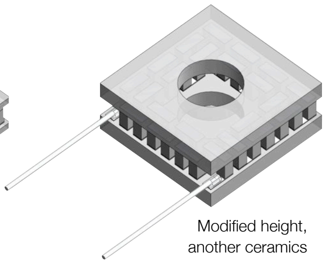
Quad-shaped customized center hole

TEC Height modification

Standard TEC height can be modified without performance changes by using ceramics of different thickness. Standard thermoelectric cooler height (specified in this datasheet) may be modified (reduced or increased) in a range -0.5..+1.0 mm by request.

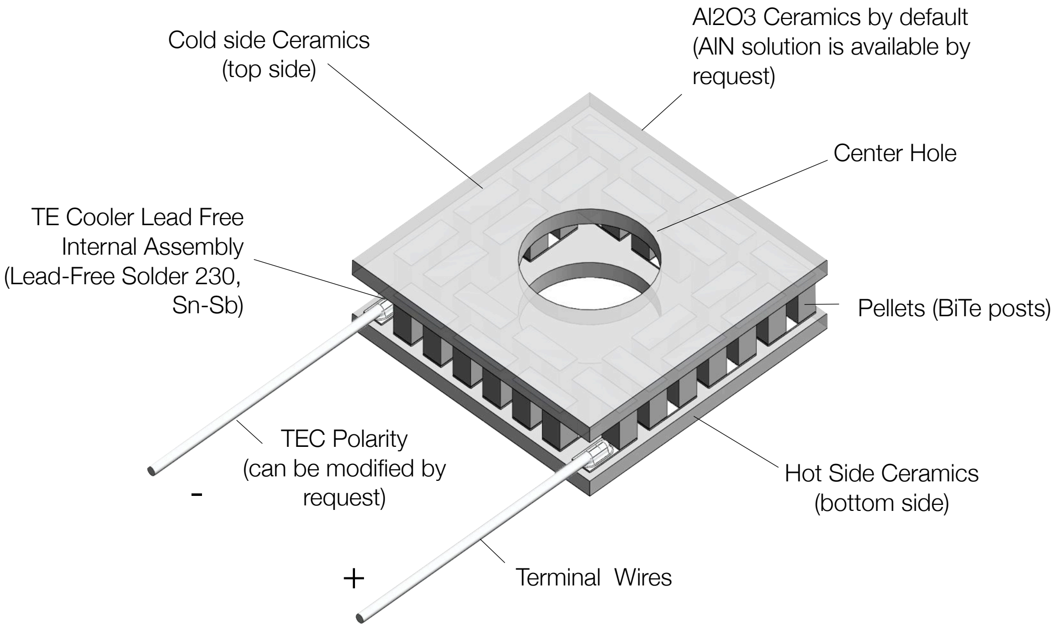


Standard height



Modified height, another ceramics thickness

Thermoelectric Cooler Overview



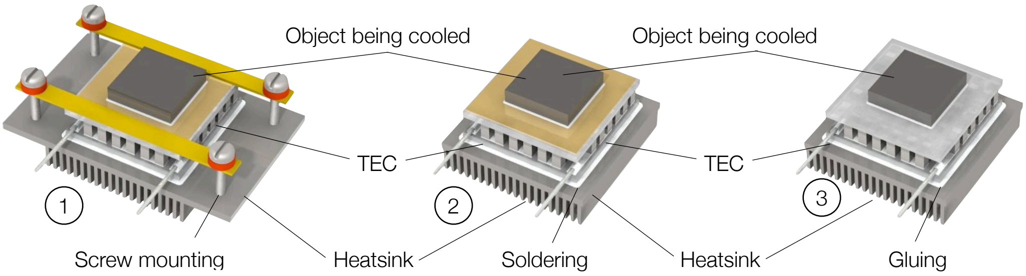
Application Tips

1. Never heat TE module more than 200°C (TEC assembled at 230°C).
2. Never use TE module without an attached heat sink at hot (bottom) side.

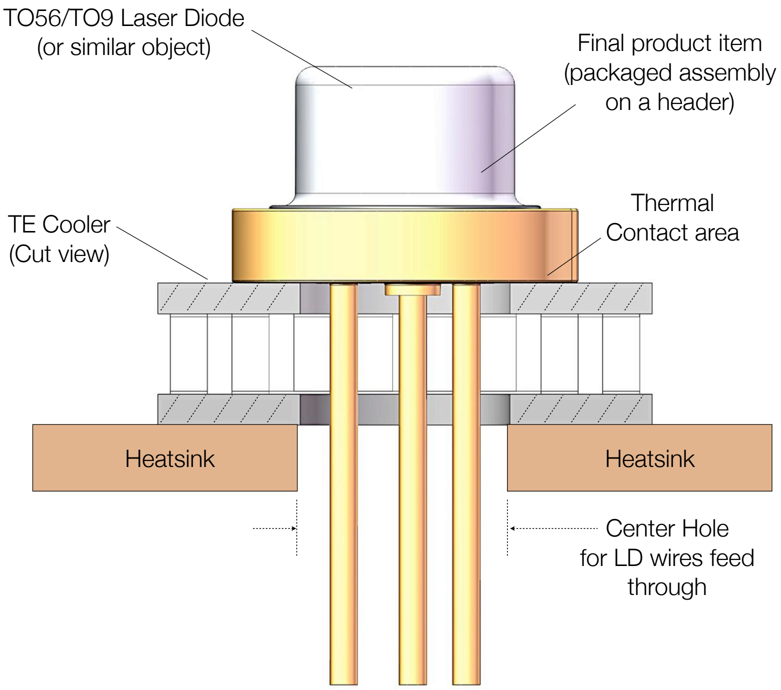
1. Connect TE module to DC power supply according to polarity.
2. Do not apply DC current higher than Imax.

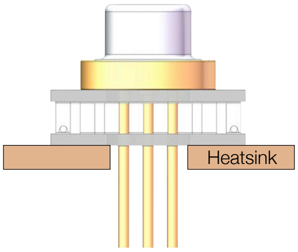
Installation

1. Mechanical Mounting. TEC is placed between two heat exchangers . This construction is fixed by screws or in another mechanical way. It is suitable for large modules (with dimensions 30x30mm and larger). Miniature types require other assembling methods in most cases.
1. Soldering. This method is suitable for a TE module with metallized outside surfaces. RMT provides this option and also makes pre-tinning for TE modules.
2. Glueing. It is an up-to-date method that is used by many customers due to availability of glues with good thermoconductive properties. A glue is usually based on some epoxy compound filled with some thermoconductive material such as graphite or diamond powders, silver, SiN and others. The application of a specific type depends on application features and the type of a TE module.

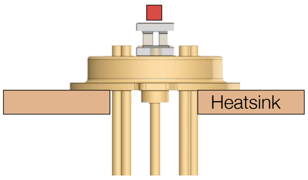


External Cooling Concept





“External” TE Cooling
TEC cools the entire
assembly



“Internal” TE Cooling
TEC on a header, cools the
heat-generating object directly

Description

“External cooling” with center-hole thermoelectric coolers is the solution for objects without a possibility to integrate TEC inside (or where a built-in TEC is not sufficient enough because of large heatload). For example there is a wide range of uncooled LD types that use industrial standard TO-56 or TO-9 headers. The typical design and pins layout for such headers assume uncooled solution with no space to integrate a thermoelectric cooler directly on a header. In the same time thermal stabilisation can improve LD performance and lifetime and give additional features in final application. In such cases the “external” thermoelectric cooling can be an optimal choice. TEC has a center hole (or multiple holes) to feed LD pins through and provide a thermal contact between header and cold side surface. Center-hole TECs and “external” cooling are optimal for creating environmental testing setups for LD manufacturers, laboratory researches and temperature sensitive experiments.

Application Tips

1. An appropriate heatsink is required to be attached to TE cooler hot side. TEC operates as a heatpumt. The heat pumped from TEC cold side has to be spreaded from a hot side with a heatsink.
2. TEC built it on a header (internal cooling) is more optimal solution by power consumption comparing with “external” one (TEC under the header). The external cooling is good if there is no way to intergrate a suitable TE cooler on a header. The external cooling can be an extension for standard un-cooled packaged devices.
3. With the external cooling the temperature on TEC cold side may differ from temperature of the object inside a packaged assembly. This is a result of header thermal resistance availability.
4. Recommended methods of mounting: thermal grease or gluing. In case of Copper or Aluminium heatsink materials it is strongly recommended to use a thermal grease or elastic silicon-based thermoconductive glues. Copper and Aluminium heatsink materials have high thermal expansion coefficient (CTE), different to TEC materials.

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