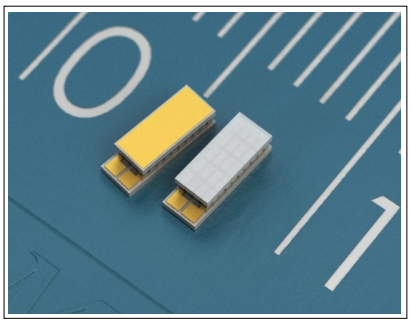
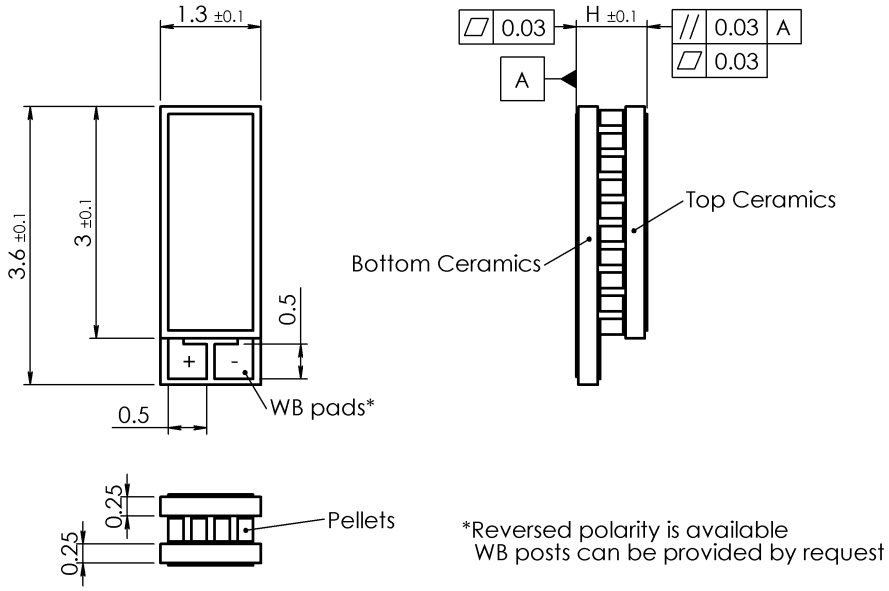
Performance Parameters — 1MD02-020-xx/Z2/RP/PA

TE Cooler Type	ΔTmax K	Qmax W	Imax A	Umax V	ACR Ohm	H mm
1MD02-020-xx/Z2/RP/PA (N=20)						
1MD02-020-03/Z2/RP/PA	71	1.1	0.7	2.6	2.87	0.9
1MD02-020-04/Z2/RP/PA	73	0.8	0.5		3.82	1.0
1MD02-020-05/Z2/RP/PA	73	0.7	0.4		4.77	1.1

Performance values are specified at 300K ambient temperature, Vacuum.



Dimensions (mm)



Manufacturing options

A. TEC Assembly:

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

B. Ceramics:

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

* - *used by default*

C. Ceramics Surface Options

1. Blank ceramics
2. Metallized (Au plating)
3. Metallized and pre-tinned with:
   - 3.1. In-Sn, T_{melt} =117°C
   - 3.2. Sn-Bi, T_{melt} = 138°C
   - 3.3. In-Ag, T_{melt} = 143°C
   - 3.4. In, T_{melt} = 157°C
   - 3.5. Pb-Sn, T_{melt} =183°C
   - 3.6. Optional type (can be specified by Customer)

D. Thermistor (optional)

Can be mounted to TEC cold side. Calibration is available by request. Various thermistor solutions are available

E. TEC Terminal Wires

1. Blank, tinned Copper
2. Insulated Wires
3. Insulated, color-coded Wires
4. WB pads or WB posts
5. Flip-Chip Terminal Solution

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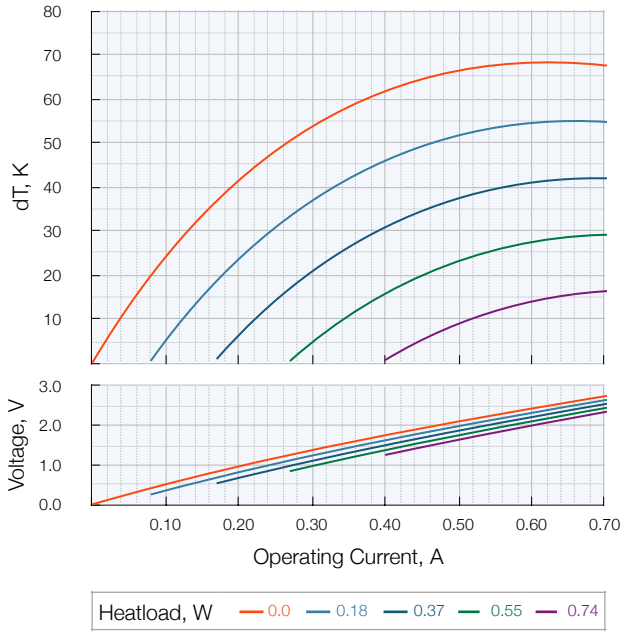
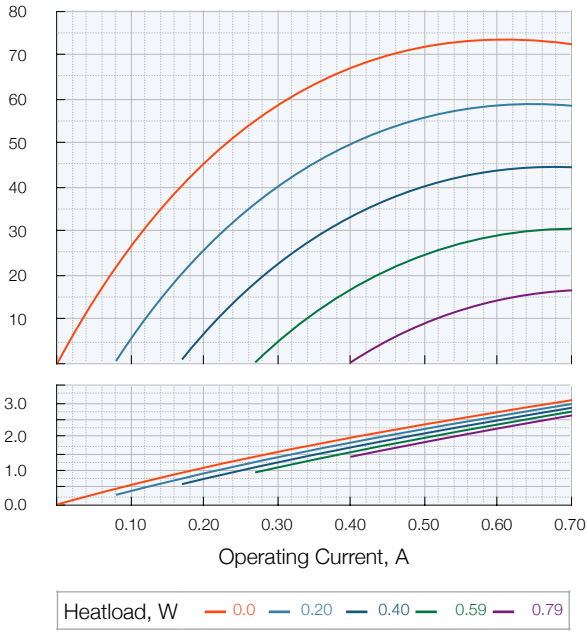
Performance Data — 1MD02-020-03/Z2/RP/PA

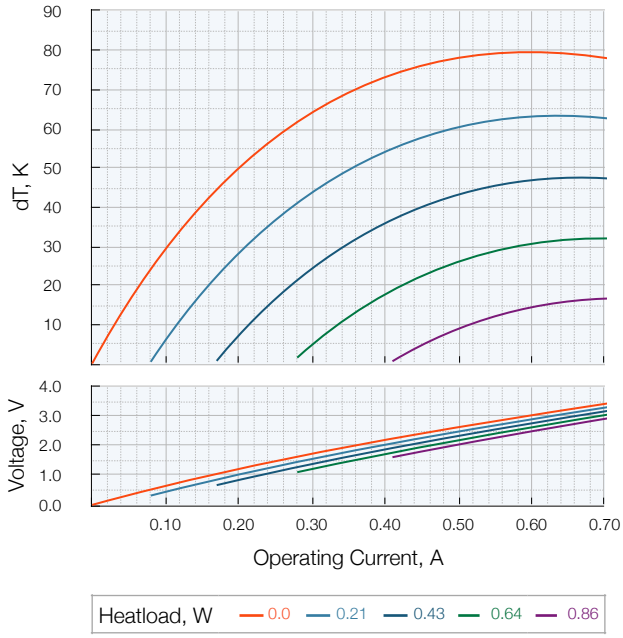
@27°C, Vacuum	ΔTmax K	Qmax W	Imax A	Umax V
1MD02-020-03/Z2/RP/PA	71	1.1	0.7	2.6



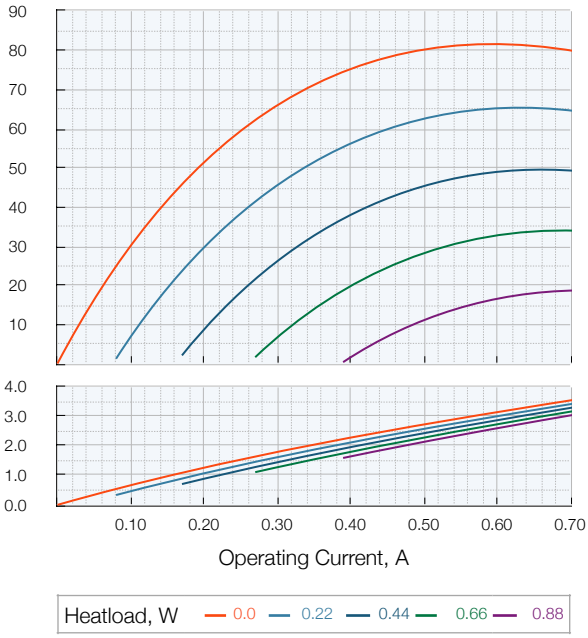
@50°C, Dry N2	ΔTmax K	Qmax W	Imax A	Umax V
1MD02-020-03/Z2/RP/PA	76	1.2	0.7	2.8



@75°C, Dry N2	ΔTmax K	Qmax W	Imax A	Umax V
1MD02-020-03/Z2/RP/PA	83	1.3	0.7	3.2



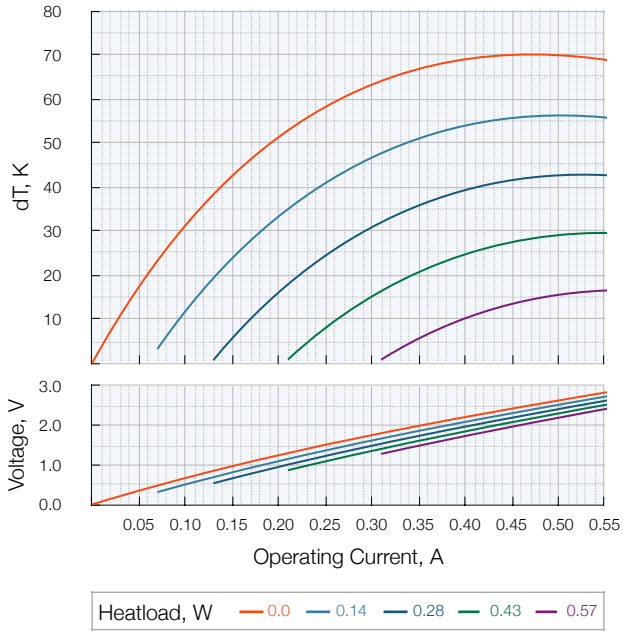
@85°C, Dry N2	ΔTmax K	Qmax W	Imax A	Umax V
1MD02-020-03/Z2/RP/PA	85	1.3	0.7	3.3



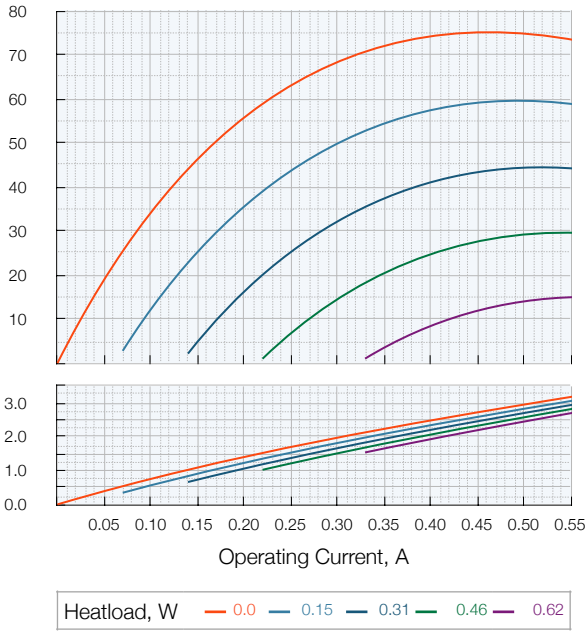
Note: TEC performance data is specified at optimal conditions, Thot=Tamb. Please, use TECCad Software or iTECPad app for estimations under different conditions, or contact RMT Ltd or it's branches directly.

Performance Data — 1MD02-020-04/Z2/RP/PA

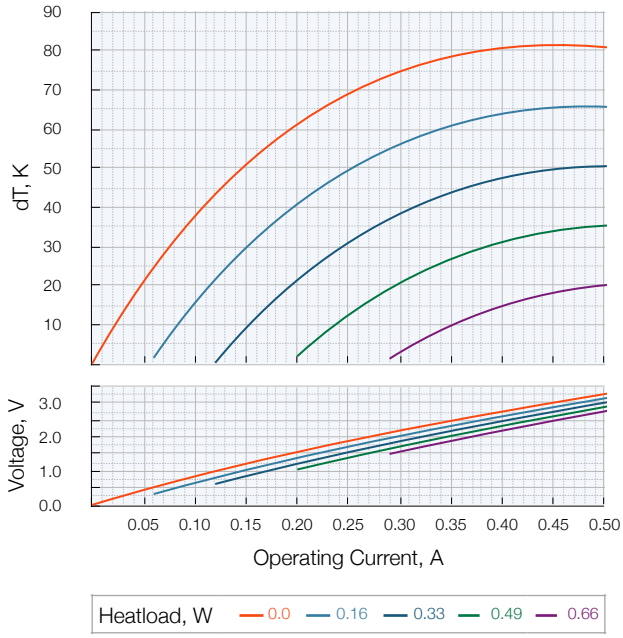
@27°C, Vacuum	ΔTmax K	Qmax W	Imax A	Umax V
1MD02-020-04/Z2/RP/PA	73	0.8	0.5	2.6



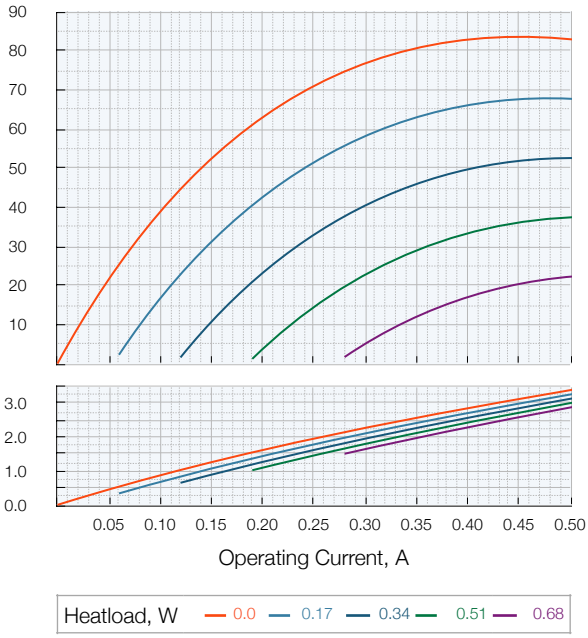
@50°C, Dry N2	ΔTmax K	Qmax W	Imax A	Umax V
1MD02-020-04/Z2/RP/PA	78	0.9	0.5	2.9



@75°C, Dry N2	ΔTmax K	Qmax W	Imax A	Umax V
1MD02-020-04/Z2/RP/PA	84	1.0	0.5	3.1



@85°C, Dry N2	ΔTmax K	Qmax W	Imax A	Umax V
1MD02-020-04/Z2/RP/PA	86	1.0	0.5	3.3

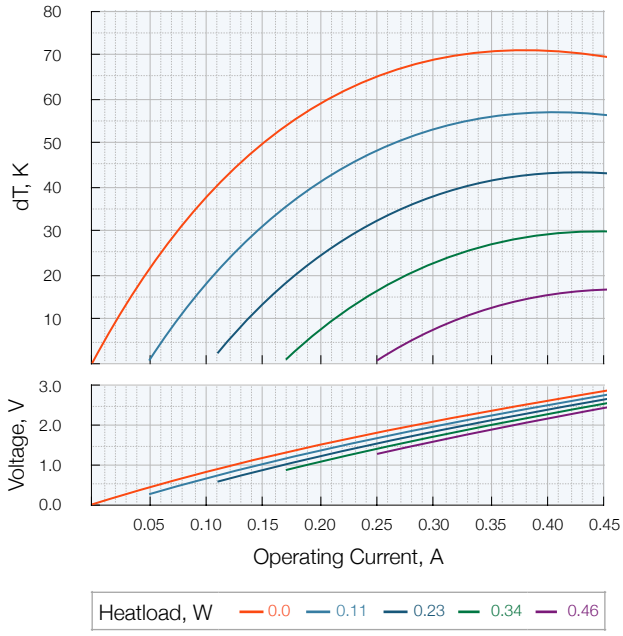


Note: TEC performance data is specified at optimal conditions, Thot=Tamb. Please, use TECCad Software or iTECPad app for estimations under different conditions, or contact RMT Ltd or it's branches directly.

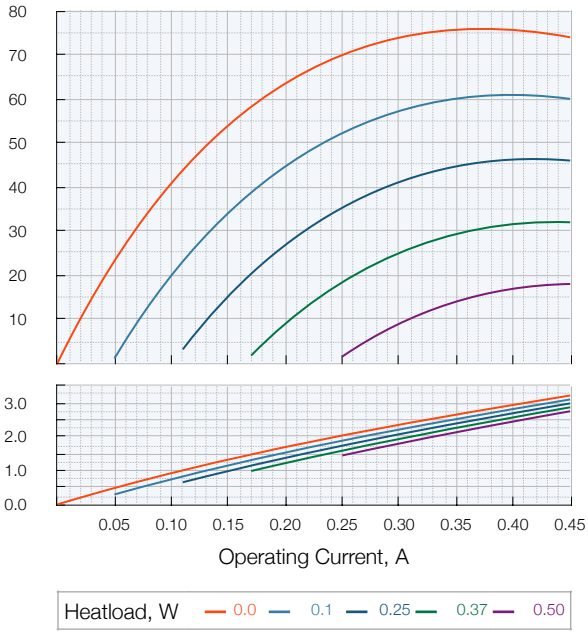
Performance Data

1MD02-020-05/Z2/RP/PA

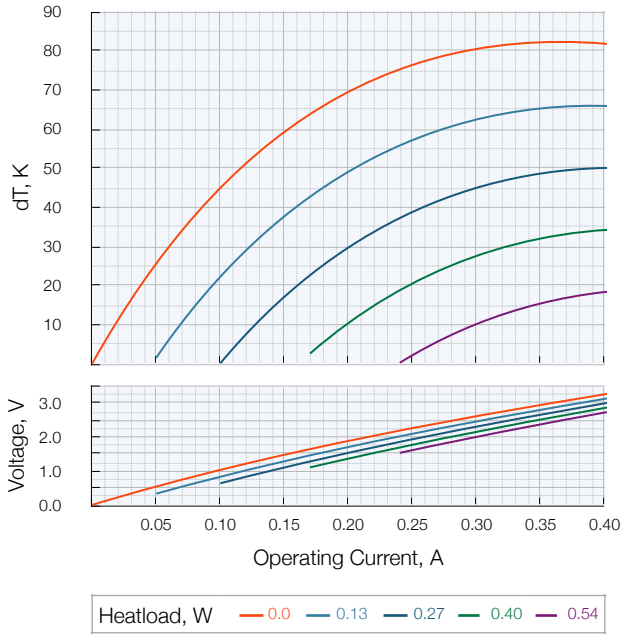
@27°C, Vacuum	ΔTmax K	Qmax W	Imax A	Umax V
1MD02-020-05/Z2/RP/PA	73	0.7	0.4	2.6



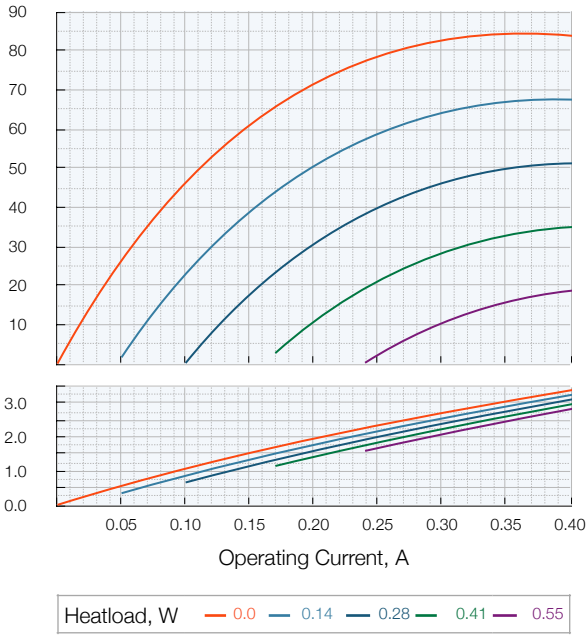
@50°C, Dry N2	ΔTmax K	Qmax W	Imax A	Umax V
1MD02-020-05/Z2/RP/PA	78	0.7	0.4	2.9



@75°C, Dry N2	ΔTmax K	Qmax W	Imax A	Umax V
1MD02-020-05/Z2/RP/PA	85	0.8	0.4	3.2

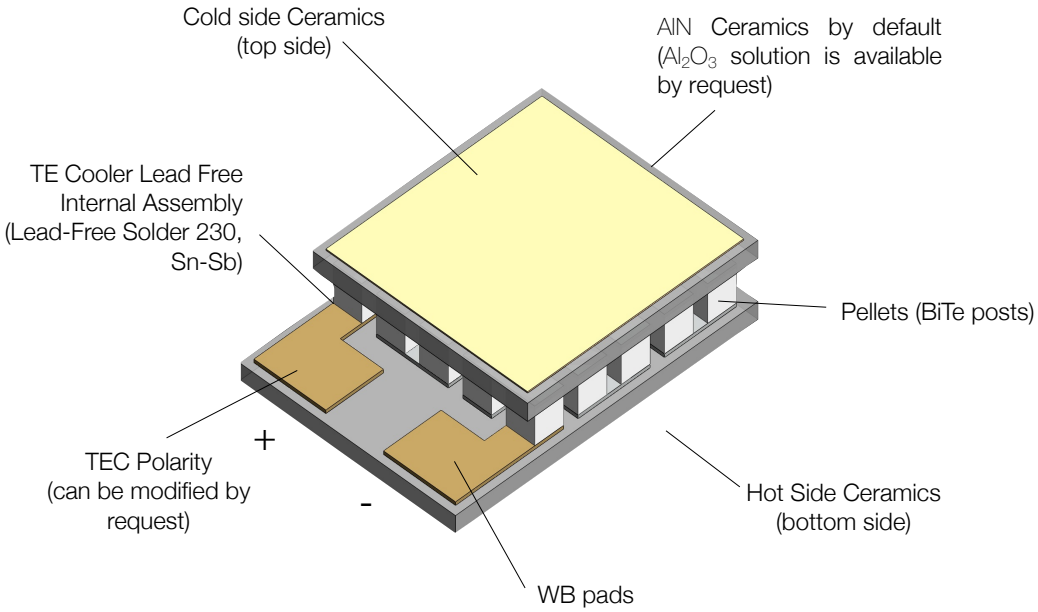


@85°C, Dry N2	ΔTmax K	Qmax W	Imax A	Umax V
1MD02-020-05/Z2/RP/PA	87	0.8	0.4	3.3



Note: TEC performance data is specified at optimal conditions, Thot=Tamb. Please, use TECCad Software or iTECPad app for estimations under different conditions, or contact RMT Ltd or it's branches directly.

Thermoelectric Cooler Overview

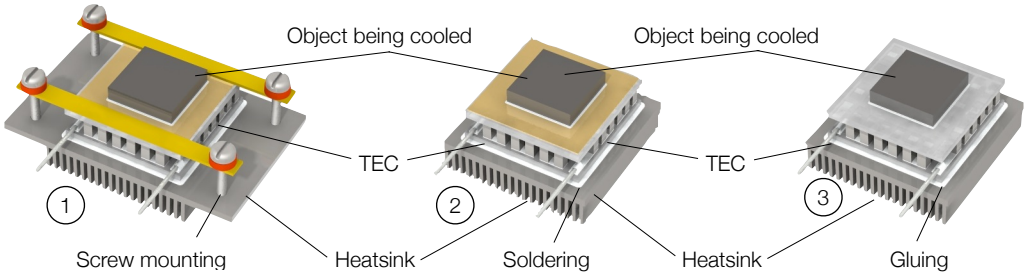


Application Tips

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

Installation

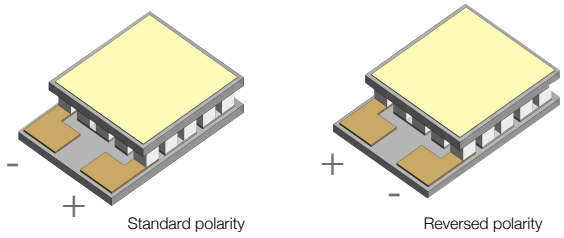
1. Mechanical Mounting. TEC is placed between two heat exchangers . This construction is fixed by screws or in another mechanical way. It is suitable for large modules (with dimensions 30x30mm and larger). Miniature types require other assembling methods in most cases.
1. Soldering. This method is suitable 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.



Additional Options

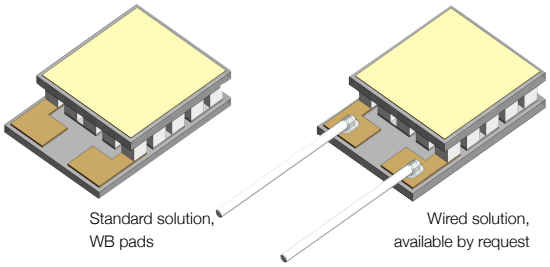
TEC Polarity

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.



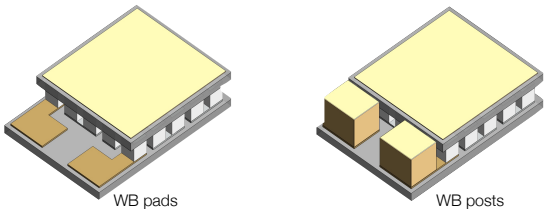
Terminal Wires Options

The standard solution is based on WB pads. Terminal Wires can be attached by request. Various options for terminal wires are available. (blank, insulated wires, insulated color-coded wires, flexible multicore wires and etc).



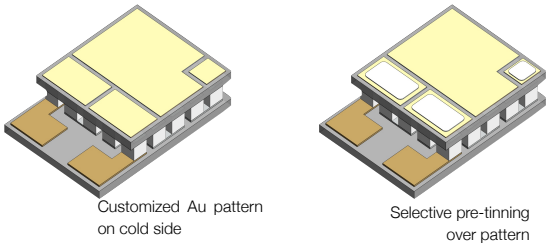
Optimization for WB process

The solution with WB pads (no posts) is provided by default. WB posts are available by request. The dimensions of WB posts can be modified and optimized for Customers application. WB posts are made of Copper, Au plated.



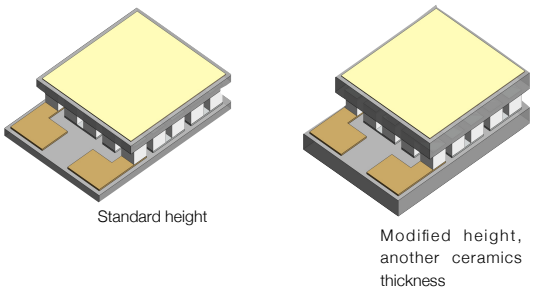
Customized Au Patterns

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.



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) can be increased in a range +0.25..+1.5 mm by request.



Important notes

1. TEC Performance in this datasheet is specified in typical ambient condition modes (Vacuum, +27ºC; Dry N2, +50ºC; Dry N2, +75ºC; and Dry N2, +85ºC). The performance may differ under other conditions. Please, use RMT TECCad software or iTECPad for iPad for detailed analysis, or contact RMT specialists 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 dTmax is specified at zero heatload, while Qmax is specified at zero dT (check Fig.1 for example). TEC dTmax and Qmax values raise with ambient temperature (check Fig. 2 for example). Please, use RMT TECCad software or iPad app 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. TEC cooling performance is less at ambient temperatures below 0ºC. TECs are not suitable to operate 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, required dT level and application heatload. In fact a better performance can be reached at operating current and voltage lower than Imax and Umax values specified in datasheet.

6. It is strongly recommended to avoid a direct mounting of thermoelectric cooler to pure Copper, Aluminium or Nickel materials as well as a mounting of objects from these materials on TEC cold side. Any material with high CTE (Coefficient of Thermal Expansion) may affect on TEC lifetime and even damage TEC in case of improper mounting, thermal shock and/or temperature cycling. In case of above mentioned materials necessity, it is recommended to use elastic "soft" solders or glues with large modulus of elasticity (Indium-based solders or silicon-based thermoconductive glues).

7. RMT Ltd confirms that all RMT thermoelectric coolers are qualified and 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.

Fig. 1 - Understanding dT_{max} and Q_{max}

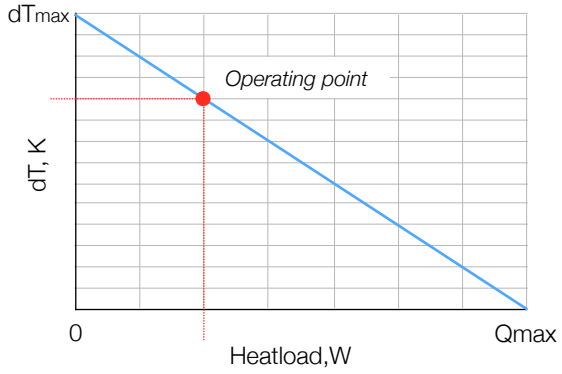
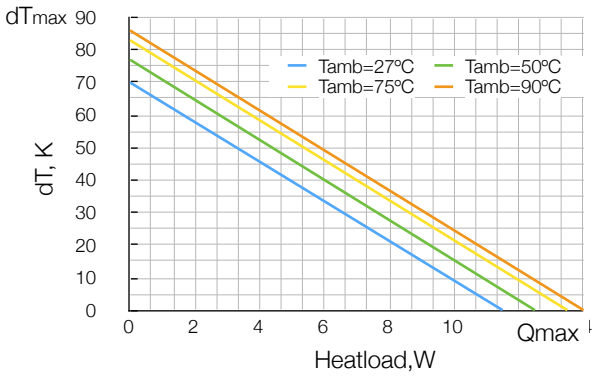


Fig. 2 - Single-stage TEC dTmax and Qmax example parameters at different ambient temperatures



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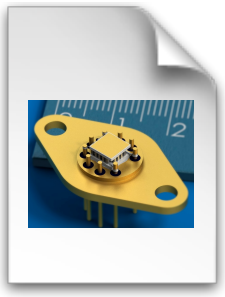

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