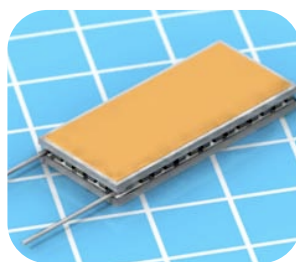


Thermoelectric module type 1ML06-050-xx is available in four different ceramics versions. Cost-effective  $\text{Al}_2\text{O}_3$  ceramics versions or high performance  $\text{AlN}$  ceramics versions are available. Please, select the appropriate type to check the complete datasheet.



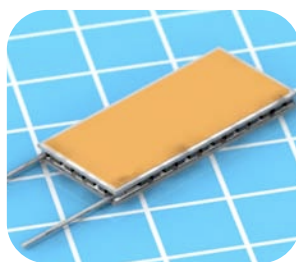
1ML06-050-xx

RMT Standard  $\text{Al}_2\text{O}_3$  0.5mm ceramics version.  
TEC total height from 1.6mm to 2.4mm



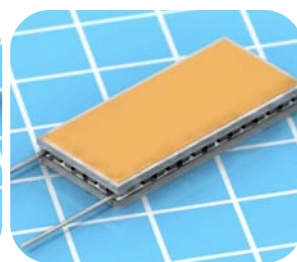
1ML06-050-xxt

RMT Special Thin  $\text{Al}_2\text{O}_3$  0.25mm ceramics version.  
TEC total height from 1.1mm to 1.9mm



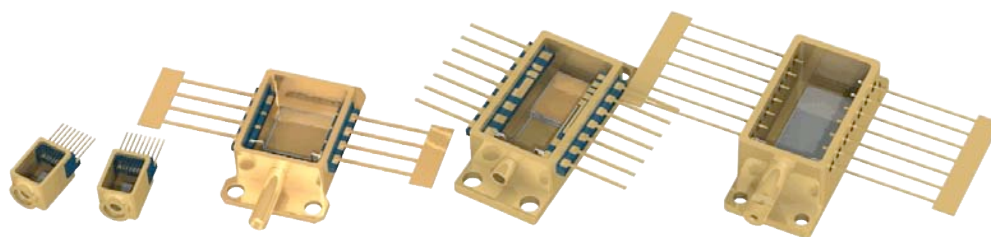
1ML06-050-xxAN025

RMT Standard  $\text{AlN}$  0.25mm ceramics version.  
TEC total height from 1.1mm to 1.9mm



1ML06-050-xxAN05

RMT Special Version with thick  $\text{AlN}$  0.5mm ceramics.  
TEC total height from 1.6mm to 2.4mm

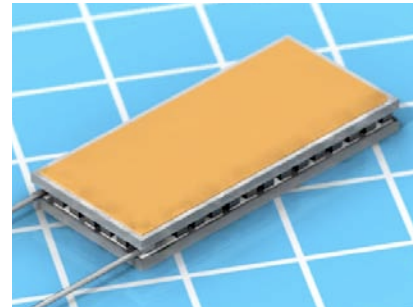


Thermoelectric Sub-Mounts (TEC + Package assembled) are available

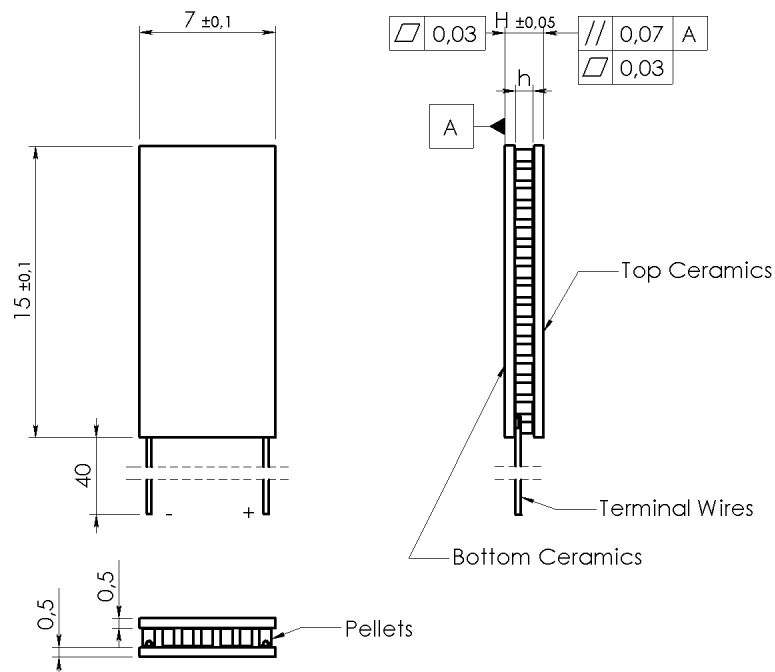
Performance Parameters 1ML06-050-XX

Type	$\Delta T_{max}$ K	$Q_{max}$ W	$I_{max}$ A	$U_{max}$ V	AC R Ohm	H mm	h mm
1ML06-050-xx (N=50) Al <sub>2</sub> O <sub>3</sub> 0.5mm ceramics version							
1ML06-050-05	69	11.3	3.4	6.2	1.45	1.7	0.5
1ML06-050-09	71	6.6	2.0		2.60	2.1	0.9
1ML06-050-12	71	5.1	1.5		3.45	2.4	1.2

Performance data are given at 300K, vacuum



Technical Drawing



Options available

**A. TEC Assembly:**

Solder Sn-Sb (T<sub>melt</sub>=230°C)

**B. Ceramics:**

1. Pure Al<sub>2</sub>O<sub>3</sub> (100%)
2. Alumina (Al<sub>2</sub>O<sub>3</sub> - 96%)
3. Aluminum Nitride (AlN)

100% Al<sub>2</sub>O<sub>3</sub> used as standard

**C. Ceramics Surface Options**

1. Blank ceramics
2. Metallized:
  - 2.1 Ni / Sn (Bi)
  - 2.2 Gold plating
3. Metallized and pre-tinned:
  - 3.1 Solder 94 (Pb-Sn-Bi, T<sub>melt</sub>=94°C)
  - 3.2 Solder 117 (In-Sn, T<sub>melt</sub>=117°C)
  - 3.3 Solder 138 (Sn-Bi, T<sub>melt</sub>=138°C)
  - 3.4 Solder 183 (Pb-Sn, T<sub>melt</sub>=183°C)

**D. Thermistor (optional)**

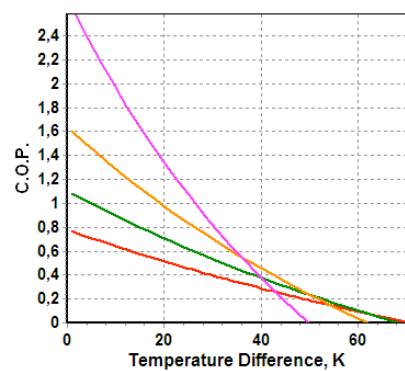
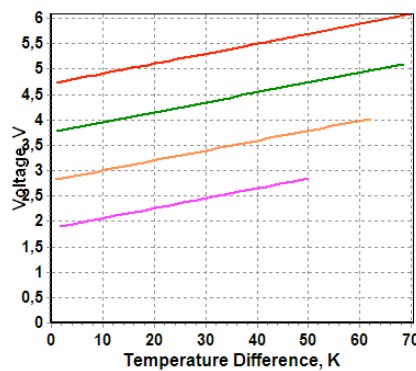
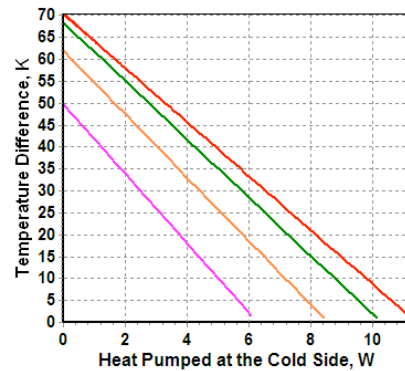
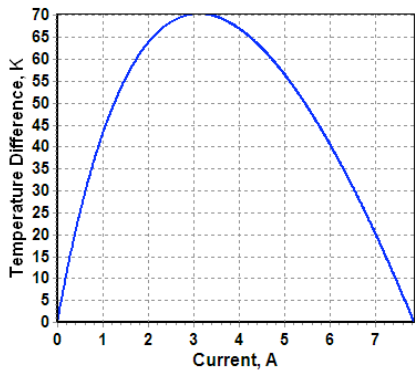
Can be mounted to cold side ceramics edge. Calibration is available.

**E. Terminal wires**

1. Pre-tinned Copper
2. Insulated Wires
3. Insulated Color Coded

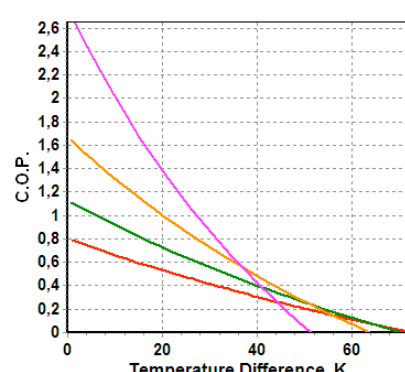
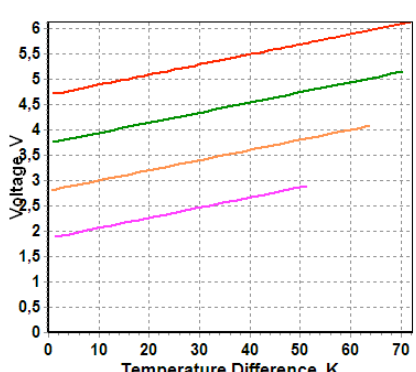
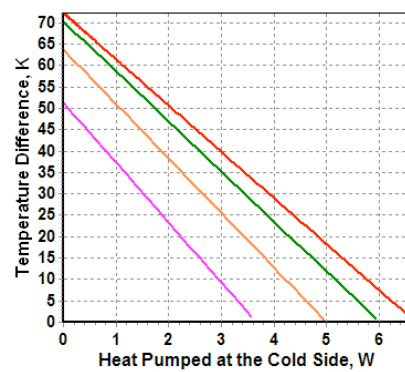
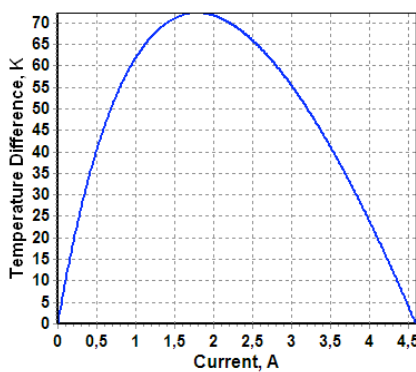
Performance Plots

1ML06-050-05



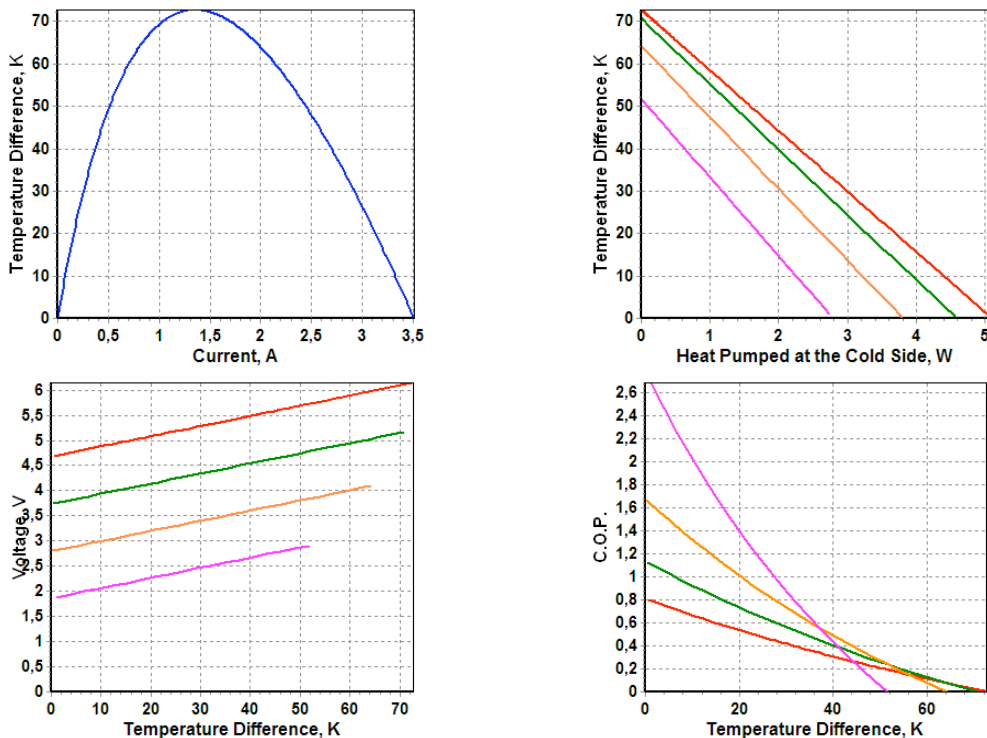
Performance Plots

1ML06-050-09



Color Legend: I<sub>max</sub>, 0.8 I<sub>max</sub>, 0.6 I<sub>max</sub>, 0.4 I<sub>max</sub>

**Performance Plots** 1ML06-050-12



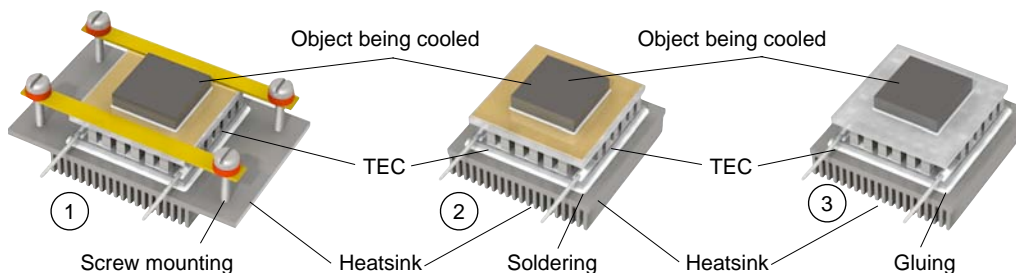
Color Legend: I<sub>max</sub>, 0,8 I<sub>max</sub>, 0,6 I<sub>max</sub>, 0,4 I<sub>max</sub>

**Application Tips**

1. Never heat TE module more than 200°C (TEC assembled at 230°C).
2. Never use TE module without 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 I<sub>max</sub>.

**Installation**

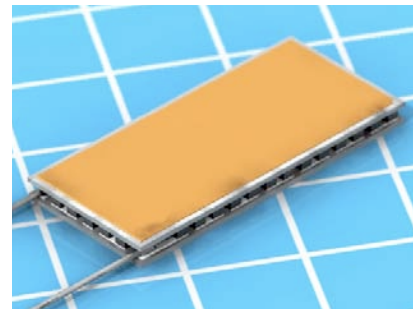
1. **Mechanical Mounting.** TEC is placed between two heat exchangers. This construction is fixed by screws or in another mechanical way. It is suitable for large modules (with dimensions 30x30mm and larger). Miniature types require other assembling methods in most cases.
2. **Soldering.** This method is suitable for a TE module with metallized outside surfaces. RMT provides this option and also makes pre-tinning for TE modules.
3. **Gluing.** 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.



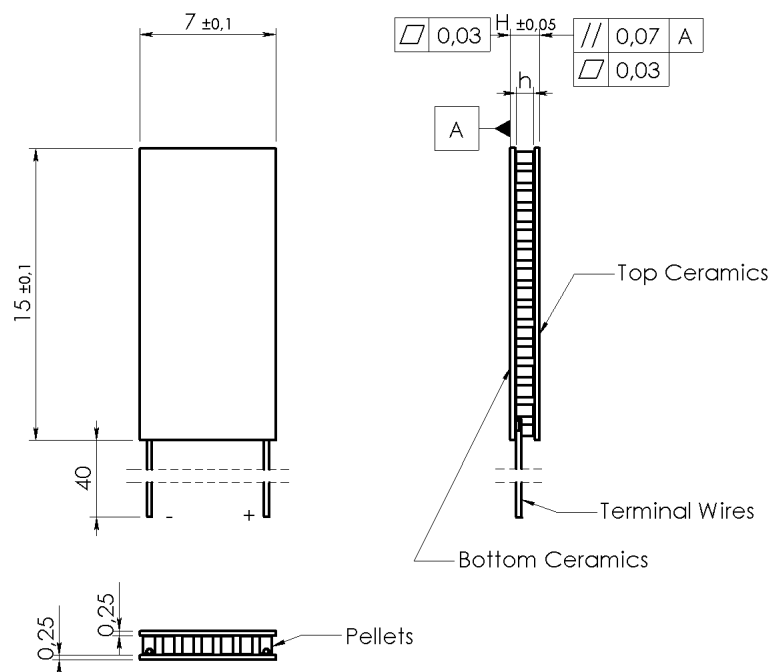
Performance Parameters 1ML06-050-XXt

Type	$\Delta T_{max}$ K	$Q_{max}$ W	$I_{max}$ A	$U_{max}$ V	AC R Ohm	H mm	h mm
1ML06-050-xxt (N=50) Al <sub>2</sub> O <sub>3</sub> 0.25mm ceramics version							
1ML06-050-05t	69	11.3	3.4	6.2	1.45	1.2	0.5
1ML06-050-09t	71	6.6	2.0		2.60	1.6	0.9
1ML06-050-12t	71	5.1	1.5		3.45	1.9	1.2

Performance data are given at 300K, vacuum



Technical Drawing



Options available

**A. TEC Assembly:**

Solder Sn-Sb (T<sub>melt</sub>=230°C)

**B. Ceramics:**

1. Pure Al<sub>2</sub>O<sub>3</sub> (100%)
2. Alumina (Al<sub>2</sub>O<sub>3</sub> - 96%)
3. Aluminum Nitride (AlN)

100% Al<sub>2</sub>O<sub>3</sub> used as standard

**C. Ceramics Surface Options**

1. Blank ceramics
2. Metallized:
  - 2.1 Ni / Sn(Bi)
  - 2.2 Gold plating
3. Metallized and pre-tinned:
  - 3.1 Solder 94 (Pb-Sn-Bi, T<sub>melt</sub>=94°C)
  - 3.2 Solder 117 (In-Sn, T<sub>melt</sub>=117°C)
  - 3.3 Solder 138 (Sn-Bi, T<sub>melt</sub>=138°C)
  - 3.4 Solder 183 (Pb-Sn, T<sub>melt</sub>=183°C)

**D. Thermistor (optional)**

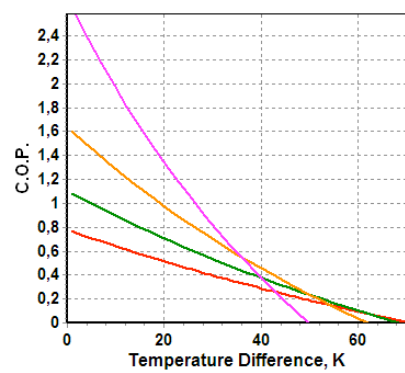
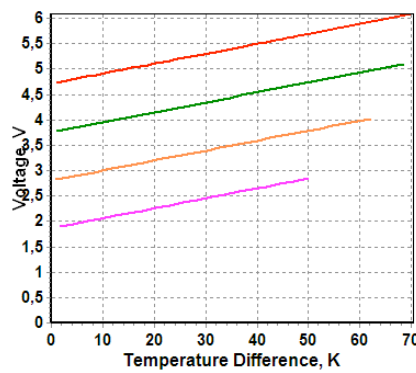
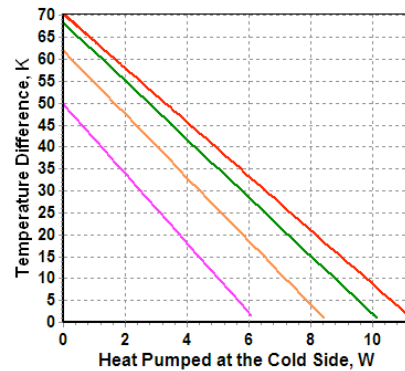
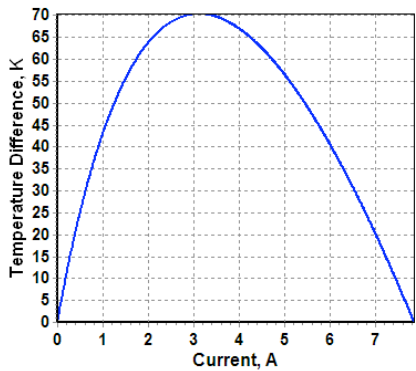
Can be mounted to cold side ceramics edge. Calibration is available.

**E. Terminal wires**

1. Pre-tinned Copper
2. Insulated Wires
3. Insulated Color Coded

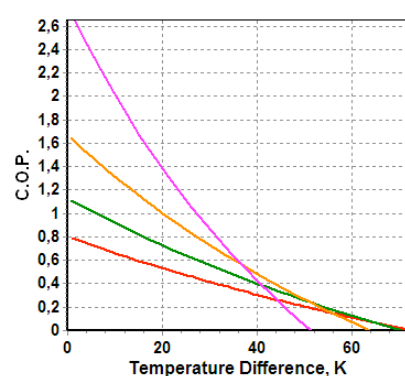
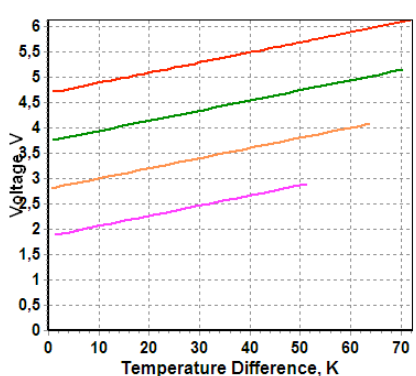
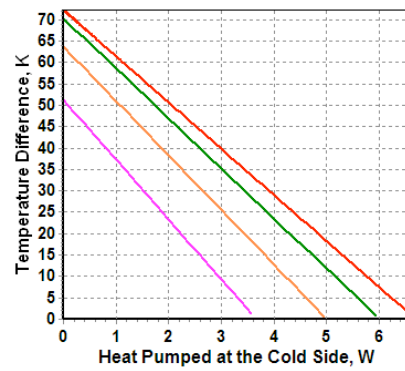
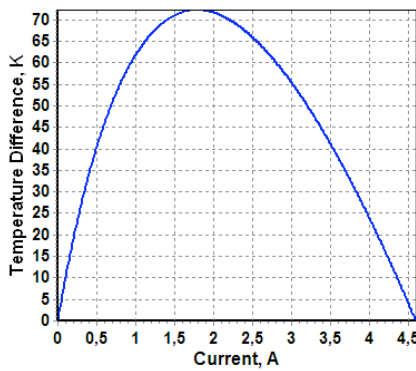
Performance Plots

1ML06-050-05t



Performance Plots

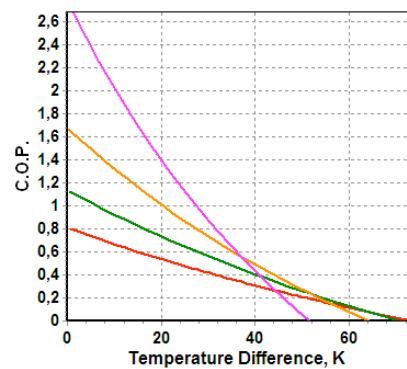
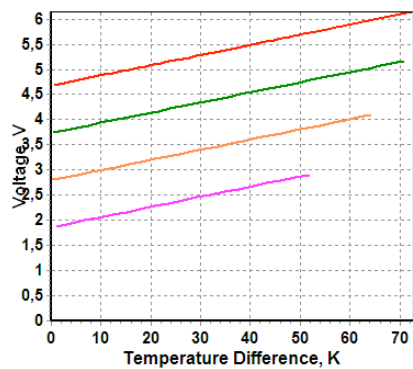
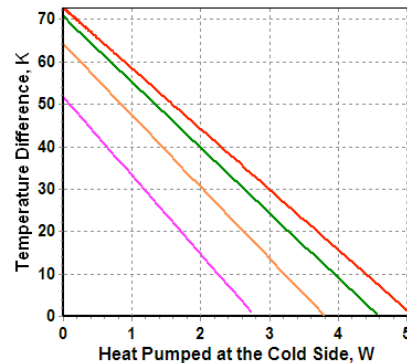
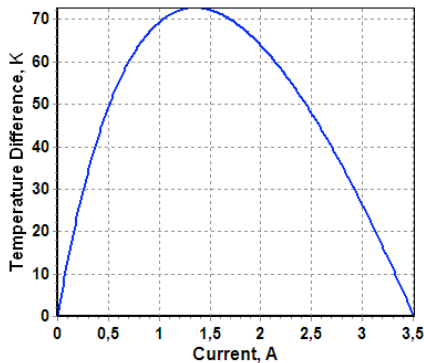
1ML06-050-09t



Color Legend: I<sub>max</sub>, 0.8 I<sub>max</sub>, 0.6 I<sub>max</sub>, 0.4 I<sub>max</sub>



Performance Plots 1ML06-050-12t



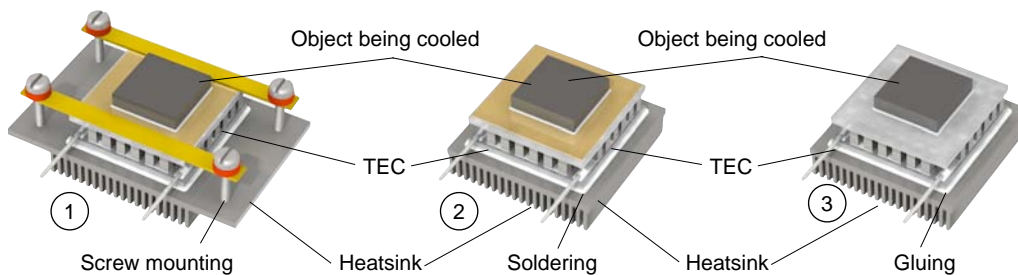
Color Legend:  $I_{max}$ ,  $0.8 I_{max}$ ,  $0.6 I_{max}$ ,  $0.4 I_{max}$

**Application Tips**

1. Never heat TE module more than 200°C (TEC assembled at 230°C).
2. Never use TE module without 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  $I_{max}$ .

**Installation**

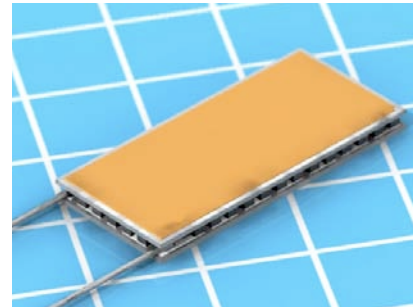
1. Mechanical Mounting. TEC is placed between two heat exchangers. This construction is fixed by screws or in another mechanical way. It is suitable for large modules (with dimensions 30x30mm and larger). Miniature types require other assembling methods in most cases.
2. Soldering. This method is suitable for a TE module with metallized outside surfaces. RMT provides this option and also makes pre-tinning for TE modules.
3. Gluing. 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.



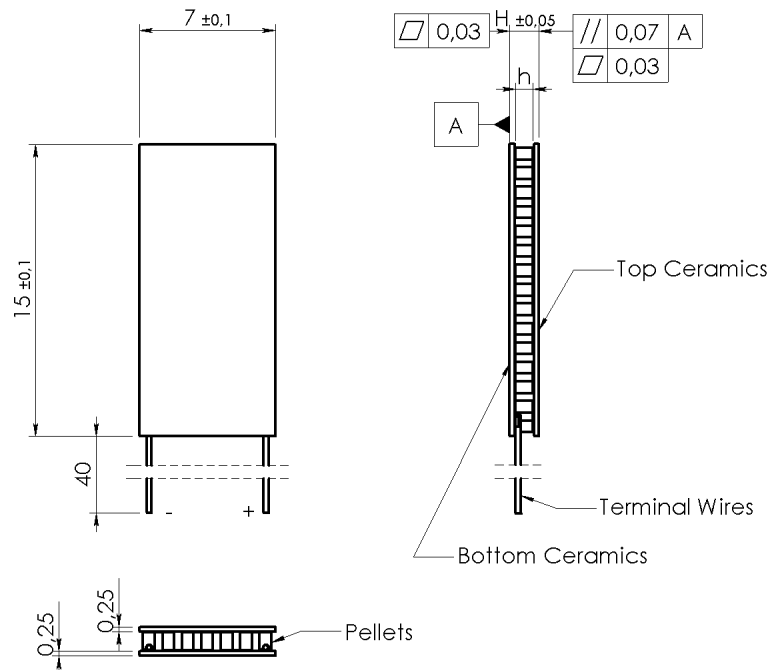
## Performance Parameters 1ML06-050-XXAN

Type	$\Delta T_{\max}$ K	$Q_{\max}$ W	$I_{\max}$ A	$U_{\max}$ V	AC R Ohm	H mm	h mm
1ML06-050-xxAN (N=50) AlN 0.25mm ceramics version							
1ML06-050-05AN	70	12.2	3.5	6.2	1.45	1.2	0.5
1ML06-050-09AN	72	6.9	2.0		2.60	1.6	0.9
1ML06-050-12AN	72	5.2	1.5		3.45	1.9	1.2

Performance data are given at 300K, vacuum



## Technical Drawing



## Options available

### A. TEC Assembly:

Solder Sn-Sb (Tmelt=230°C)

### B. Ceramics:

1. Pure Al<sub>2</sub>O<sub>3</sub> (100%)
2. Alumina (Al<sub>2</sub>O<sub>3</sub> - 96%)
3. Aluminum Nitride (AlN)

100% AlN used as standard

### C. Ceramics Surface Options

1. Blank ceramics
2. Metallized:
  - 2.1 Ni / Sn(Bi)
  - 2.2 Gold plating
3. Metallized and pre-tinned:
  - 3.1 Solder 94 (Pb-Sn-Bi, Tmelt=94°C)
  - 3.2 Solder 117 (In-Sn, Tmelt=117°C)
  - 3.3 Solder 138 (Sn-Bi, Tmelt=138°C)
  - 3.4 Solder 183 (Pb-Sn, Tmelt=183°C)

### D. Thermistor (optional)

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

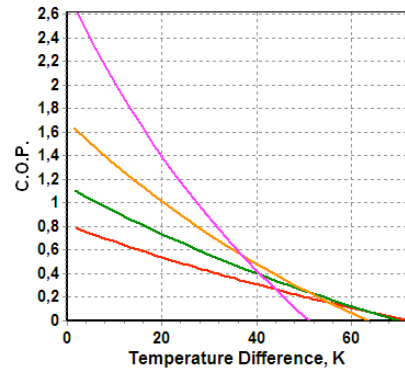
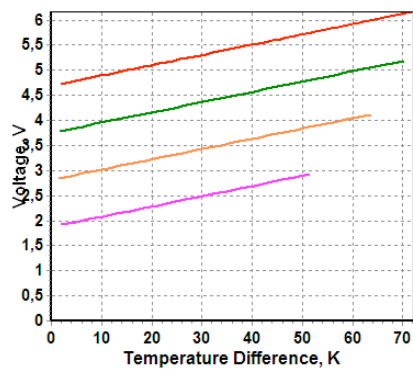
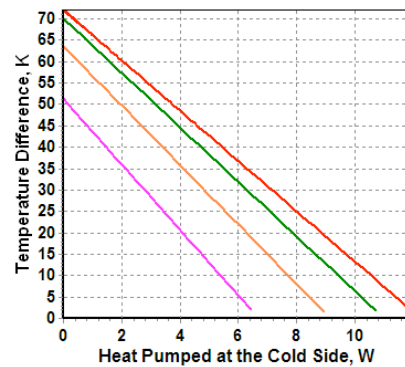
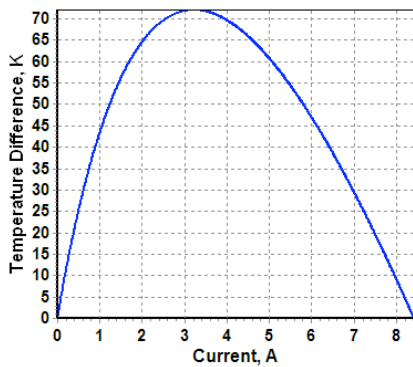
### E. Terminal wires

1. Pre-tinned Copper
2. Insulated Wires
3. Insulated Color Coded



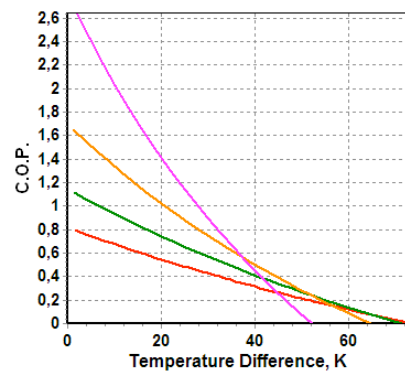
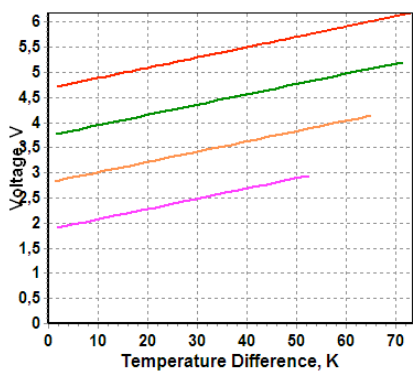
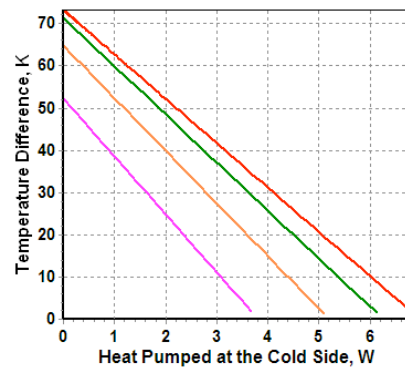
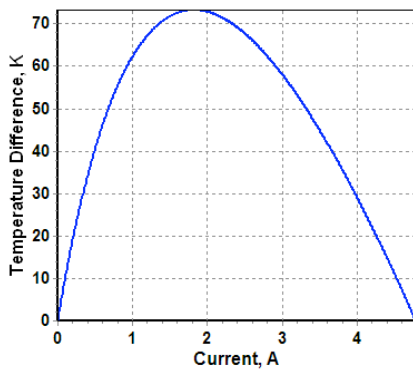
Performance Plots

1ML06-050-05AN



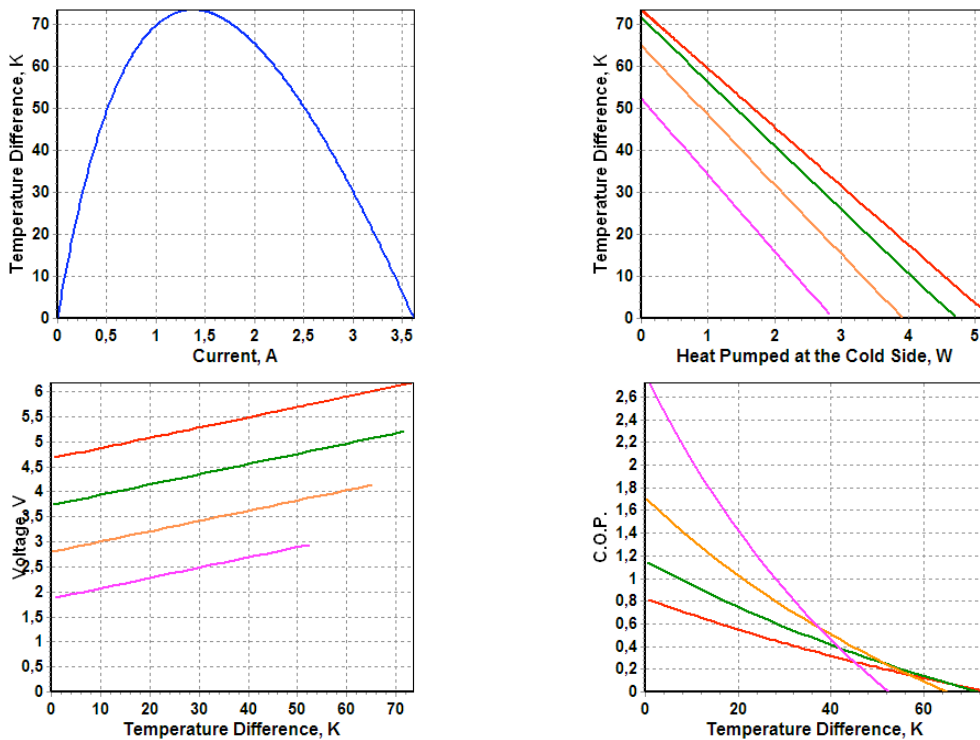
Performance Plots

1ML06-050-09AN



Color Legend: I<sub>max</sub>, 0.8 I<sub>max</sub>, 0.6 I<sub>max</sub>, 0.4 I<sub>max</sub>

**Performance Plots** 1ML06-050-12AN



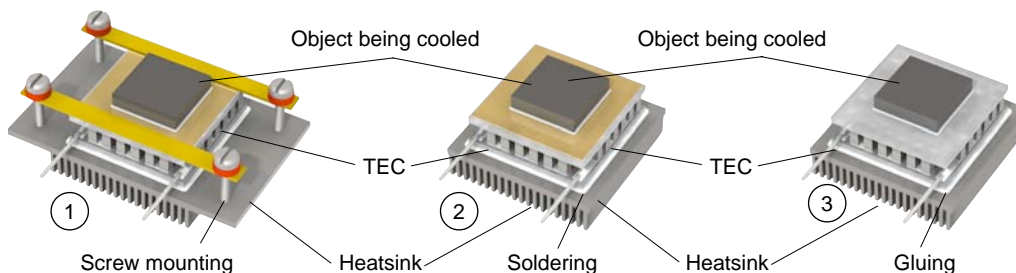
Color Legend: I<sub>max</sub>, 0.8 I<sub>max</sub>, 0.6 I<sub>max</sub>, 0.4 I<sub>max</sub>

**Application Tips**

1. Never heat TE module more than 200°C (TEC assembled at 230°C).
2. Never use TE module without 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 I<sub>max</sub>.

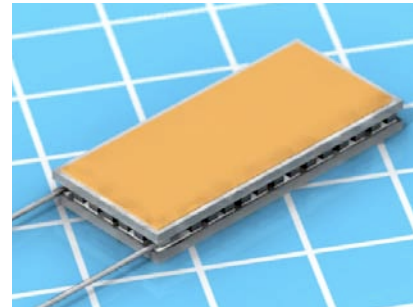
**Installation**

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.
2. **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.
3. **Gluing.** 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.



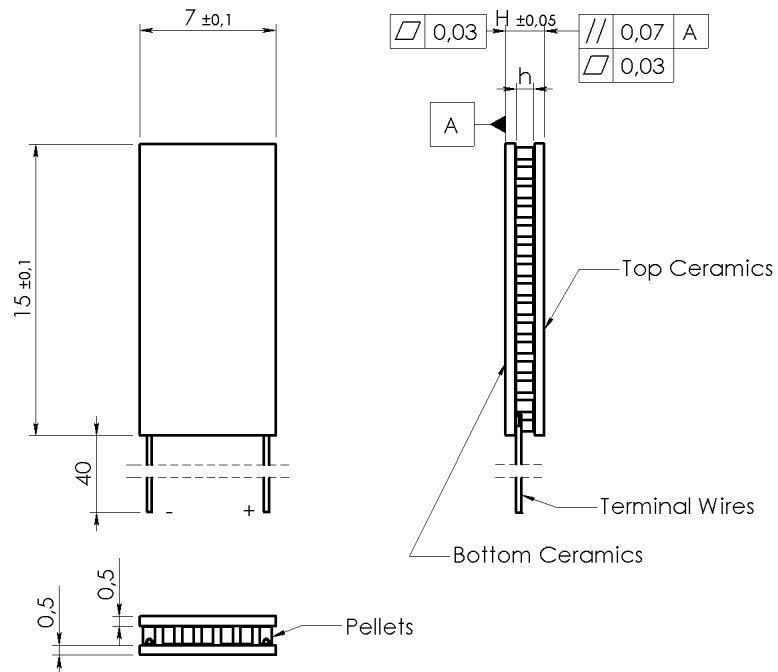
Performance Parameters 1ML06-050-XXAN

Type	$\Delta T_{max}$ K	$Q_{max}$ W	$I_{max}$ A	$U_{max}$ V	AC R Ohm	H mm	h mm
1ML06-050-xxAN (N=50) AlN 0.5mm ceramics version							
1ML06-050-05AN	70	12.2	3.5	6.2	1.45	1.7	0.5
1ML06-050-09AN	72	6.9	2.0		2.60	2.1	0.9
1ML06-050-12AN	72	5.2	1.5		3.45	2.4	1.2



Performance data are given at 300K, vacuum

Technical Drawing



Options available

**A. TEC Assembly:**

Solder Sn-Sb (T<sub>melt</sub>=230°C)

**B. Ceramics:**

1. Pure Al<sub>2</sub>O<sub>3</sub> (100%)
2. Alumina (Al<sub>2</sub>O<sub>3</sub> - 96%)
3. Aluminum Nitride (AlN)

100% AlN used as standard

**C. Ceramics Surface Options**

1. Blank ceramics
2. Metallized:
  - 2.1 Ni / Sn (Bi)
  - 2.2 Gold plating
3. Metallized and pre-tinned:
  - 3.1 Solder 94 (Pb-Sn-Bi, T<sub>melt</sub>=94°C)
  - 3.2 Solder 117 (In-Sn, T<sub>melt</sub>=117°C)
  - 3.3 Solder 138 (Sn-Bi, T<sub>melt</sub>=138°C)
  - 3.4 Solder 183 (Pb-Sn, T<sub>melt</sub>=183°C)

**D. Thermistor (optional)**

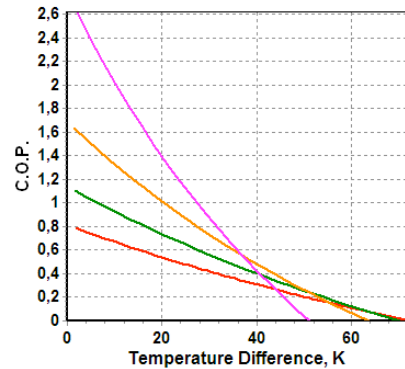
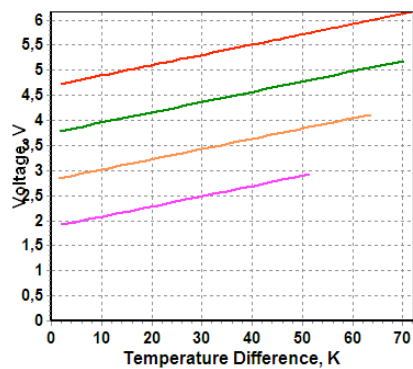
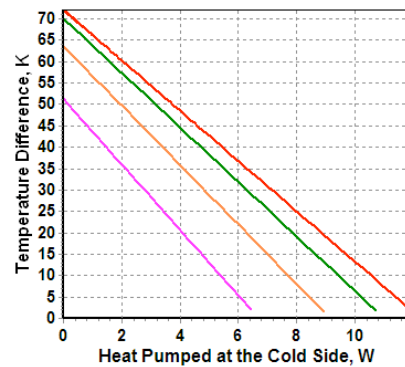
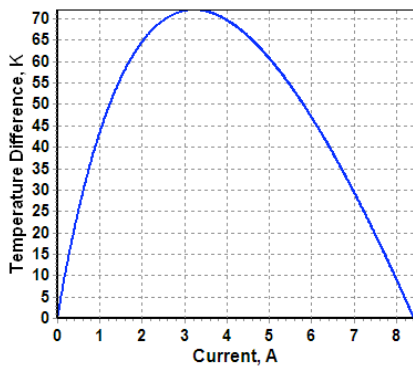
Can be mounted to cold side ceramics edge. Calibration is available.

**E. Terminal wires**

1. Pre-tinned Copper
2. Insulated Wires
3. Insulated Color Coded

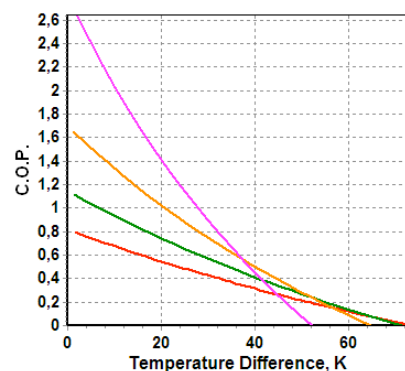
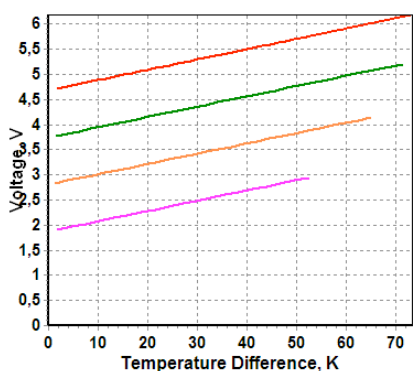
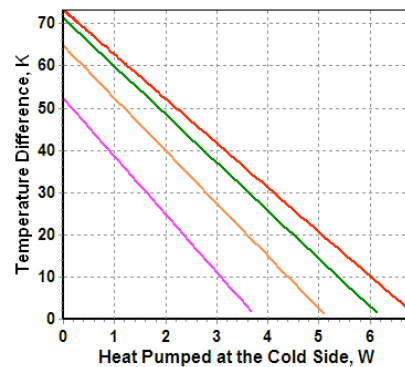
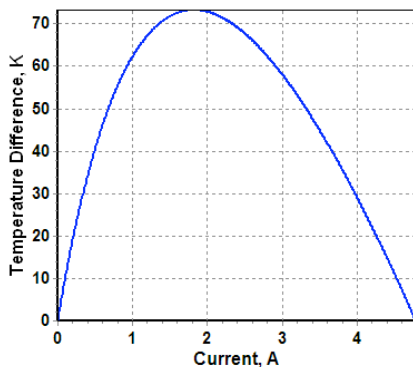
Performance Plots

1ML06-050-05AN



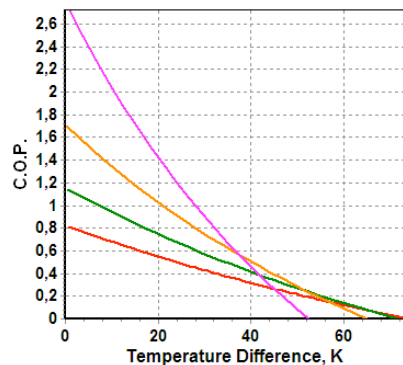
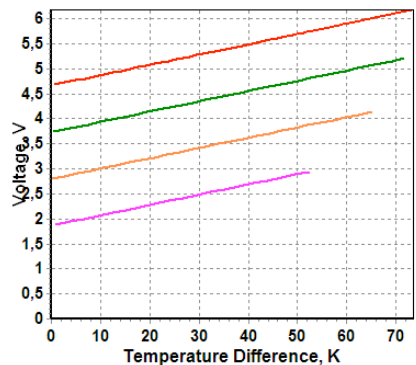
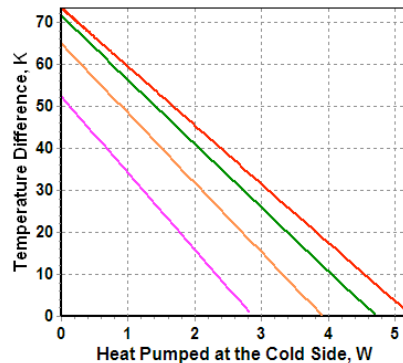
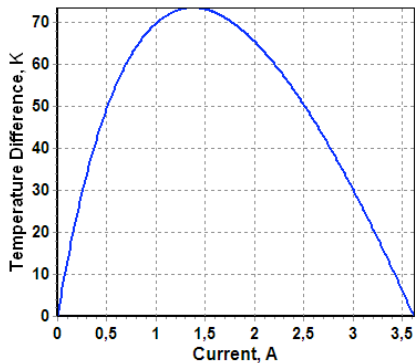
Performance Plots

1ML06-050-09AN



Color Legend: I<sub>max</sub>, 0.8 I<sub>max</sub>, 0.6 I<sub>max</sub>, 0.4 I<sub>max</sub>

**Performance Plots** 1ML06-050-12AN



Color Legend:  $0.8 I_{max}$ ,  $0.6 I_{max}$ ,  $0.4 I_{max}$ ,  $0.2 I_{max}$

**Application Tips**

1. Never heat TE module more than 200°C (TEC assembled at 230°C).
2. Never use TE module without 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  $I_{max}$ .

**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.
2. **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.
3. **Gluing.** 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.

