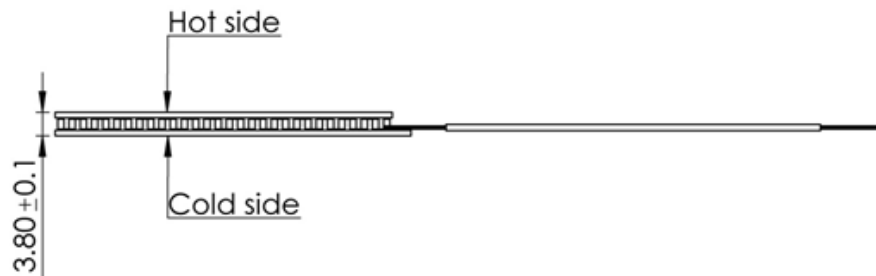
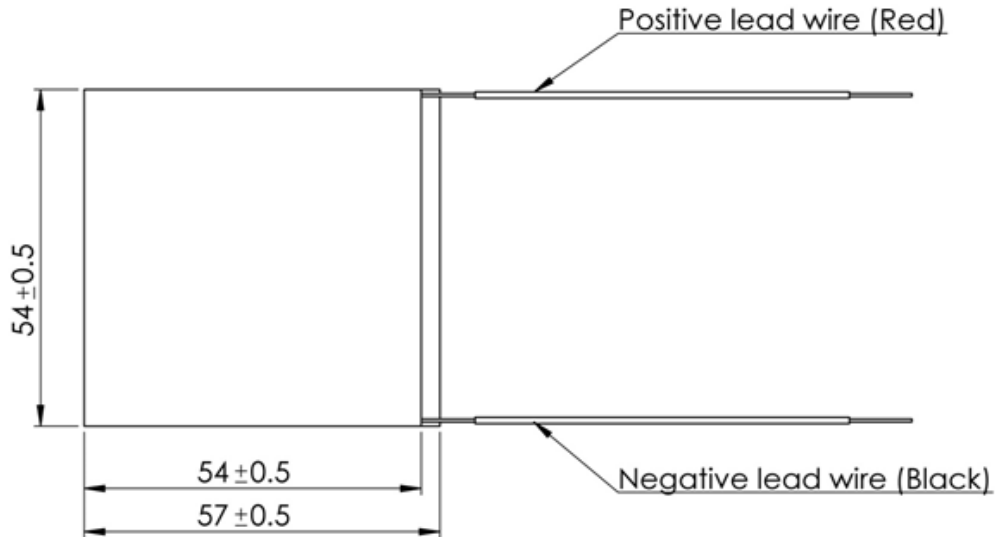


# GM250-449-10-12

## Thermoelectric generator module



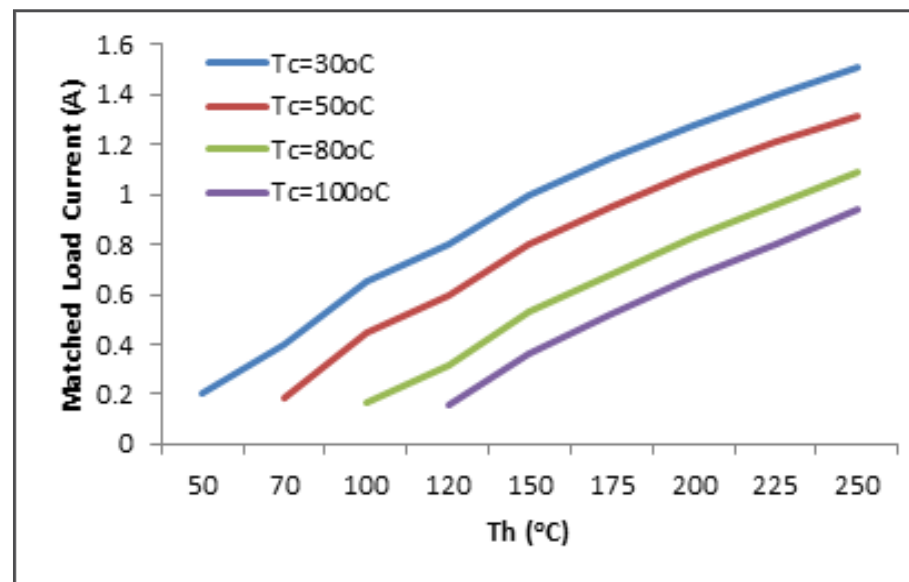
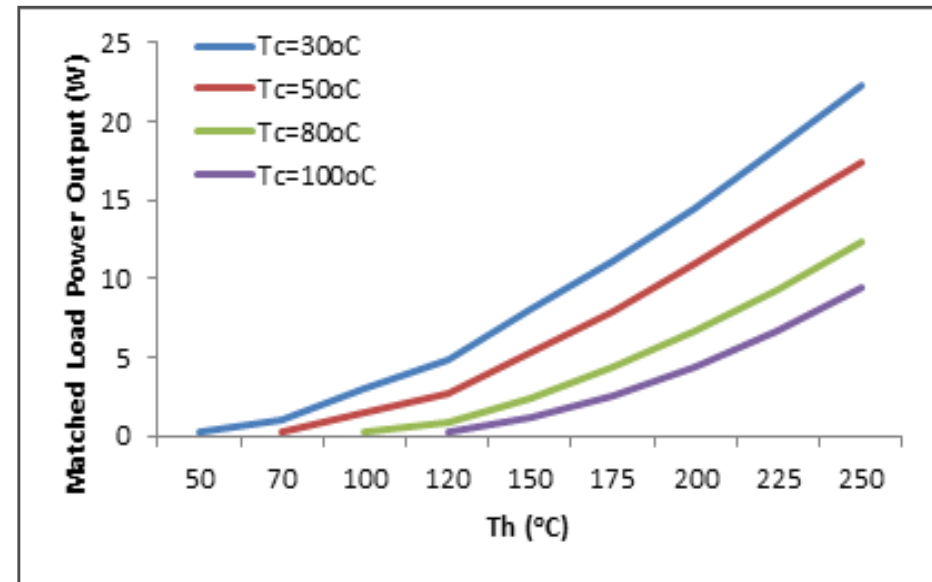
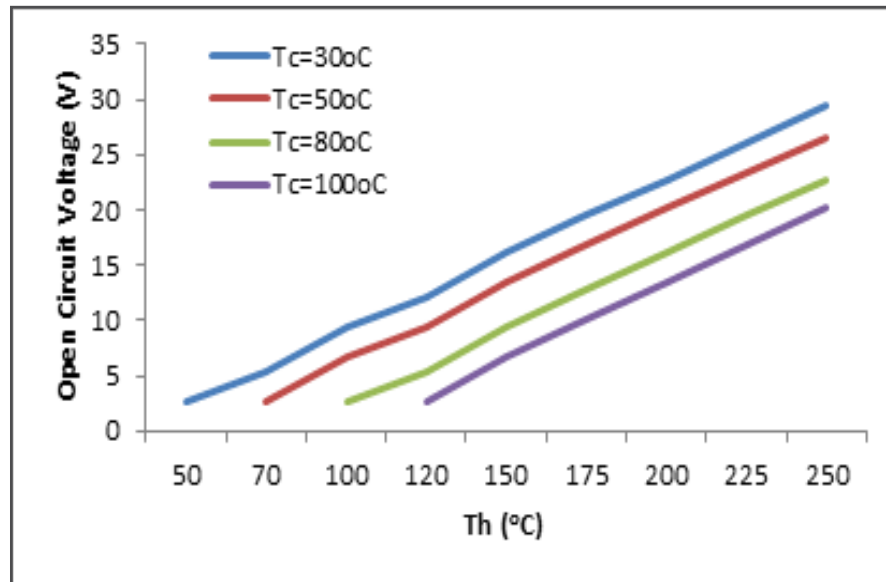
Parameters for hot side temp  $250^{\circ}\text{C}$  and cold side temp  $30^{\circ}\text{C}$

Matched load output power	22.3W
Matched load resistance	$9.76\Omega \pm 15\%$
Open circuit voltage	29.5V
Matched load output	1.51A
Matched load output voltage	14.75V
Heat flow through module	$\sim 446\text{W}$
Maximum compress (non-destructive)	1MPa
Maximum operation temperature	Hot side - $250^{\circ}\text{C}$ . Cold side - $175^{\circ}\text{C}$

### Features

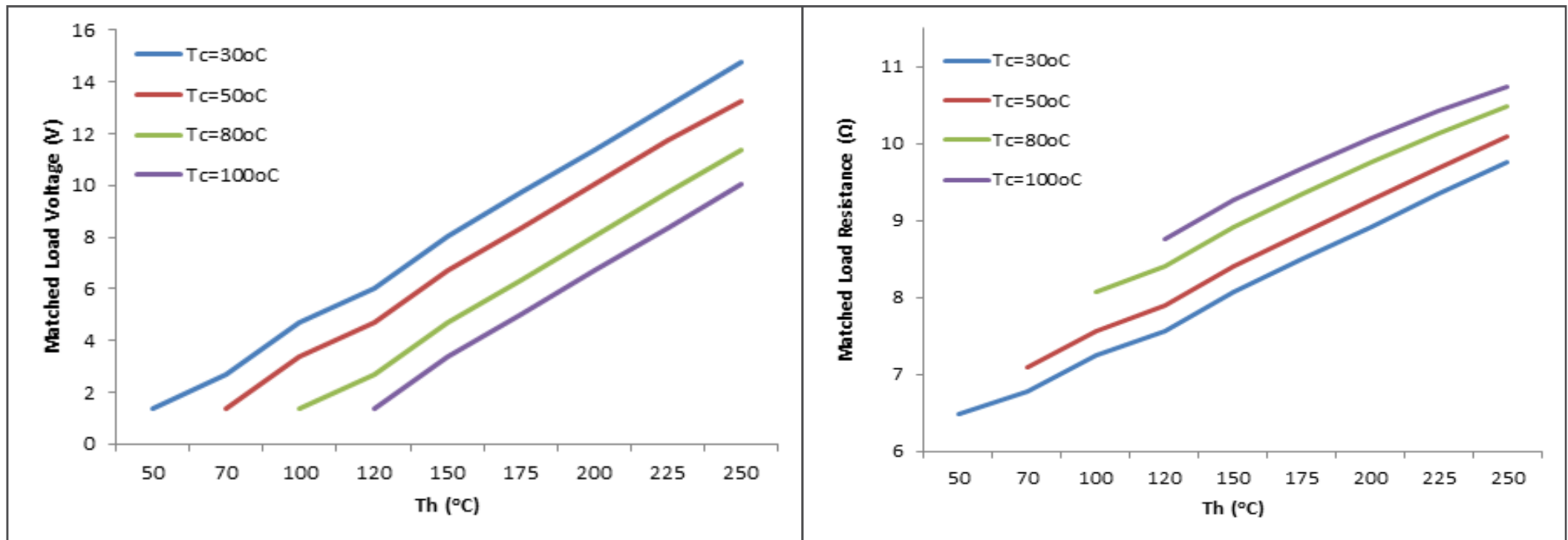
- Compact structure (no moving parts)
- Reliable performance
- Maintenance-free
- Noise-free operation
- Low-carbon, green technology





Note:  $T_h$  = hot side temperature





Note: Th = hot side temperature



Formulae for calculating thermoelectric properties (best fit derived from measured material characteristics)

#### Thermal conductivity

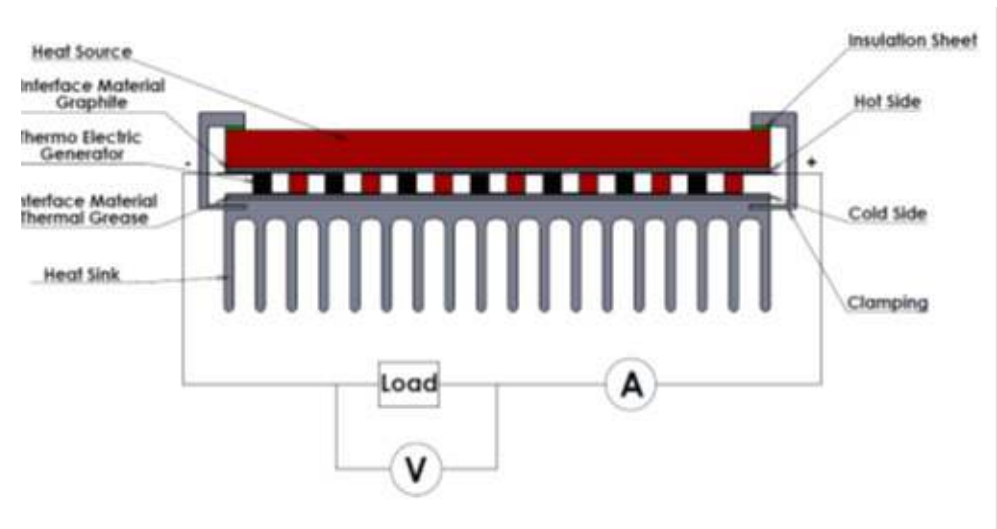
- $k_n = (0.0000334545 \times T^2 - 0.023350303 \times T + 5.606333) \text{ W/mK}$
- $k_p = (0.0000361558 \times T^2 - 0.026351342 \times T + 6.22162) \text{ W/mK}$

#### Seebeck coefficient

- $a_n = (0.001530736 \times T^2 - 1.08058874 \times T - 28.338095) \times 10^{-6} \text{ V/K}$
- $a_p = (-0.003638095 \times T^2 + 2.74380952 \times T - 296.214286) \times 10^{-6} \text{ V/K}$

#### Electrical conductivity

- $\sigma_p = (0.015601732 \times T^2 - 15.708052 \times T + 4466.38095) \times 10^2 \text{ S/m}$
- $\sigma_n = (0.01057143 \times T^2 - 10.16048 \times T + 3113.71429) \times 10^2 \text{ S/m}$



Where the subscript  $n$  refers to the n-type thermoelement and the subscript  $p$  refers to the p-type thermoelement. It should be noted here that the electrical conductivity relates to the electrical resistivity as follows:  $\rho = 1/\sigma$ . Thus, where electrical resistivity is needed, one can calculate the electrical conductivity through the aforementioned formulae and then reverse to calculate the electrical resistivity.

