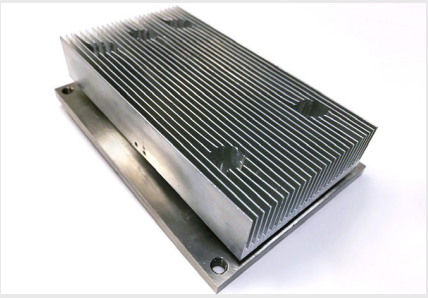
THERMOELECTRIC POWER GENERATOR

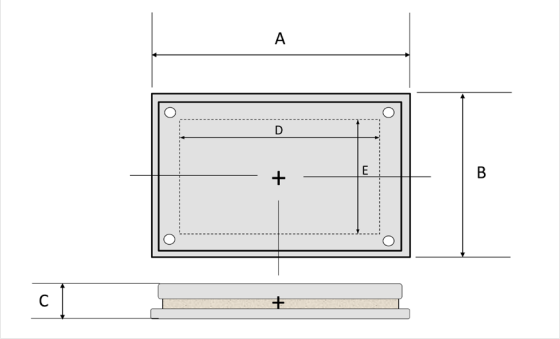
MPG PowerBlock50 Series 200 Beta

Description

The MPG PowerBlock structure is designed and built as a solid state thermoelectric system to convert heat to electricity in extreme operating temperatures at high efficiencies of up to 12%. The system consists of MicroPower Series 200 modules built with high performing PbTe and TAGS based materials produced using MicroPower Global's proprietary crystal growth and device manufacturing technologies.



MicroPower PowerBlock with air-cooled exchange integrated



A (cm)	B (cm)	C (cm)	D (cm)	E (cm)
10.0	10.0	2.0	8.5	8.5

Features

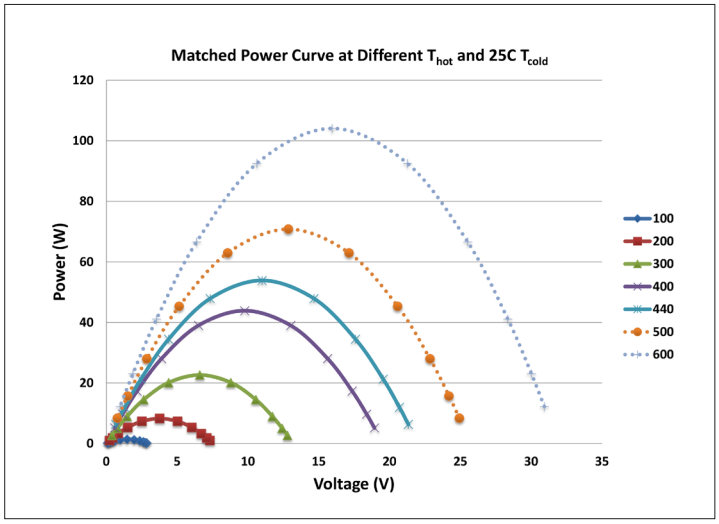
- **Produces up to 50 watts at ~400°C ΔT**
- **Operates in extreme temperatures – see notes**
- **Maximum Power potential up to 110 watts**
- **Rugged and durable encasement**
- **Sealed with high temperature ceramic**
- **Designed and manufactured in the USA**

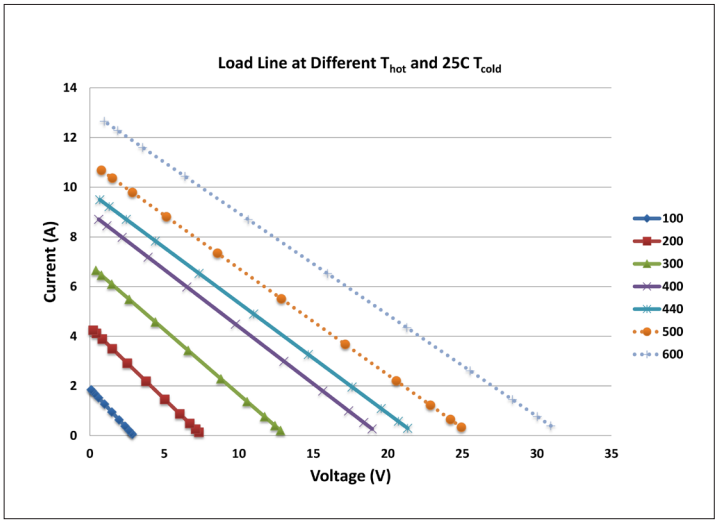
Applications

- Portable power generator
- Cooking appliances
- Camp stoves
- Personal Heaters
- Fireplaces, stoves and furnaces
- Cathodic protection
- Power Beaming
- Water Heaters
- Vehicle Engine Heaters
- Engine exhaust powered alternator replacement
- Industrial waste heat recovery in refineries, foundries, glass, steel and cement plants
- Power generation from bio waste and trash incinerators
- Thermoelectric solar power generators
- Wood burning stoves
- Geothermal

MicroPower

Parameter	Conditions	Typical	Units
Power	T_h=440°C, T_c=25°C @ matched load	50	Watts
Voltage	T_h=440°C, T_c=25°C @ open circuit	21.3	Volts
	T_h=440°C, T_c=25°C @ matched load	10.7	Volts
Internal Resistance	T_h=440°C, T_c=25°C	2.5	Ohms
	T=25°C	1.5	Ohms
Current	T_h=440°C, T_c=25°C @ matched load	4.8	Amps
	T_h=440°C, T_c=25°C @ short circuit	9.5	Amps





Topic	Notes
Testing and Validation	• PowerBlocks have received bench testing consisting of resistance and mechanical checks. • Test modules have received bench testing consisting of temperature cycles to 300°C T_{hot} at 25°C T_{cold} • Base material chips have received bench testing to 440°C T_{hot} at 25°C T_{cold} • High temperature performance based upon empirical test data • High temperature electrical connections (up to 700°C) are implemented providing better performance stability over multiple heat cycles and sustained high temperatures
Mechanical Interface	• Stainless steel on hot side, other materials may be used, i.e., carbon composite, titanium, copper and others • Hot side exposure to radiant, conductive or convective heat source should be limited to the area defined in the size diagram as D and E boundaries • Modules' hot side should not be exposed to temperatures of >600°C • Aluminum on cold side, various heat exchange mechanism may be used, i.e., heat sink, liquid cooled block and others • Maximum cold side temperature should not exceed 120°C • Orientation: External connectors tied to cold side • Positive normal compression required at all times with stress relief at temperature • Hot Side: Recommend use of high temperature interface (e.g. Grafoil sheet) • Cold Side: Recommend use of thermal paste
Electrical Connection	• High temperature wire with male quick connect terminals • All terminals attached on cold side plates

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