

Power Beaming Demo Kit

PBDK-002

Datasheet



Key Features:

- High efficiency Si-based MIH[®] VMJ PV cells
- 10W 976nm laser sources system
- FC collimator with 15mm diameter beam spot
- Efficiency at 10W input: ~21%
- Up to 30V volts output

Applications:

- Remote sensors
- Handheld devices
- Unmanned aerial vehicles (UAVs)
- Wireless remote power delivery

Product Description

MH GoPower (“MHGP”) offers the only photovoltaic cell product line capable of delivering a wide range of power and voltage outputs. Power output levels range from tens of milliwatts to hundreds of watts, while output voltage levels are possible from 4 volts to over 60 volts. MHGP’s MIH[®] VMJPV Cell product line operates most efficiently with wavelengths in the range of 900nm to 1,000nm, but can also operate effectively over a broader range from approximately 800nm to 1,070nm.

MHGP’s Power Beaming Demo Kit (PBDK) aims to make power beaming (PB) more accessible to inventors and research teams. In doing so, new applications for power beaming will proliferate, as new products get to market faster, and at lower cost. With a single 10x10mm MIH[®] VMJ PV Cell, MHGP’s Power Beaming Demo Kit (PBDK) can deliver over 2 watts electrical output at a distance of 1.45 meters, with a laser to electricity conversion efficiency of greater than 21%.

Target applications include powering remote sensors, handheld devices, UAVs, as well as other applications requiring wireless power delivery or voltage isolation from the power source.

Customization: Customized is available upon request.

Electrical Characteristics *

Optical Power (mW)	1,000	3,000	5,000	10,000
Pmax (mW)	181	643	1,082	2,160
Vmax (V)	28.3	30.6	30.9	31.3
I _{max} (mA)	6.4	21.0	35.0	69.0
Efficiency (%)	18.1%	21.4%	21.6%	21.6%

* Typical converter performance with ambient temp of ~25°C

* Tested with 976 nm wavelength laser

* Φ 15mm Gaussian laser beam over PV Cell.

* PB receiver held in free space, with no additional electrical or airflow cooling.

PBDK Setup

Connect the LSM-010 to the collimator and place the PB Receiver at the working distance of $d = 145\text{cm}$ (Fig 1). Then adjust the laser beam such that the beam diameter (Φ) = 15mm, to overfill the 10x10mm MIH[®] VMJ PV cell (Fig 2). The DC electrical output can be measured from the two electrical wires on either end of the VMJ PV cell.

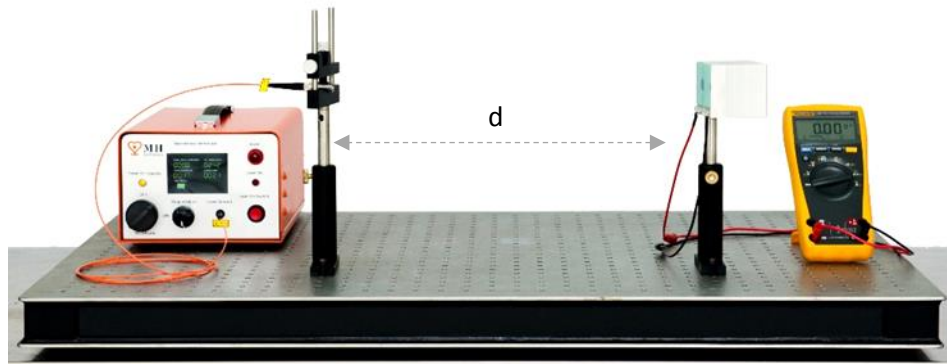


Fig 1. Power Beaming Demo Kit setup.

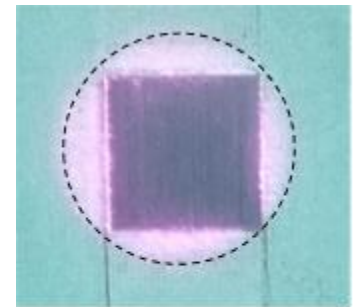
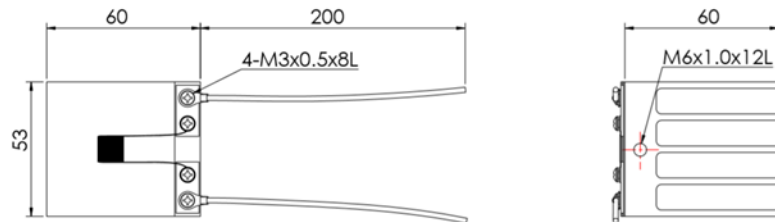
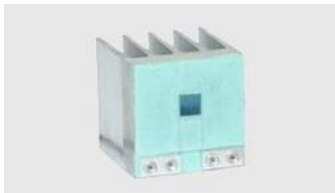


Fig 2. Laser beam pattern.

PB Receiver

PV Cell Size	10mm (W) x 10mm (L) x 400um (H)
Heatsink Dimensions	53mm(W) x 60mm(L) x 60mm(H)
Electrical Wires	200mm (L)
Mounting Hole	M6 x 1.5 x 12L
Weight	250g
Operating Temperature, Humidity	0°C ~ 50°C, 10% ~ 90% RH

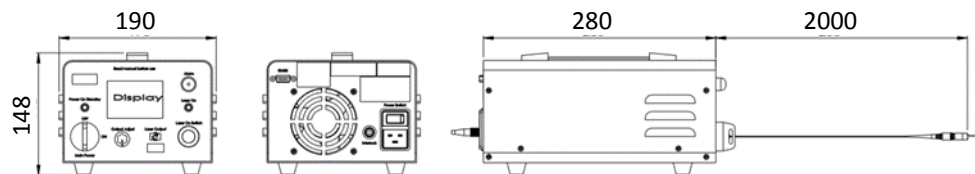
(Unit: mm)



LSM-010

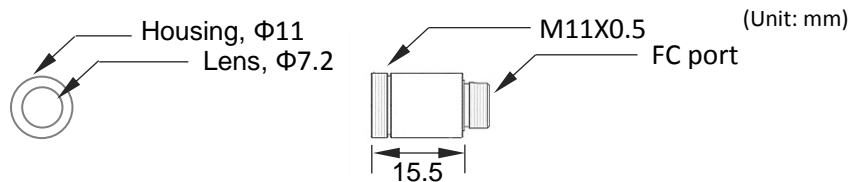
Laser Wavelength	976nm
Laser Output Power	0 ~ 10W
Connector Type	FC / UPC
Fiber Type	Fused multi-mode fiber
Fiber Core	105um
Fiber Length	2m
Numerical Aperture (NA)	0.22
Power Supply	AC 110V ~ 240V
Weight	4.2Kg
Operating Temperature, Humidity	5°C ~ 30°C, 40% ~ 60% RH

(Unit: mm)



Collimator

Alignment Wavelength	980nm
AR Coating	650nm ~ 1050nm
Connector Type	FC / PC
Focus Length	11.16mm
Numerical Aperture (NA)	0.25
Weight	90g
Operating Temperature, Humidity	0°C ~ 80°C, 10% ~ 90% RH



Recommended Testing Guidance

Our standard PV cells are designed for indoor, laboratory testing. It is not recommended that the PV cells be tested in outdoor applications subject to high humidity and condensation, since our standard PV cells do not come with an environmental protective coating. Customization for outdoor applications and testing is available upon request.

Safety Precaution

LSM-010 can provide up to 10 W optical power in the infrared region. Please follow the standard safety protocols for eye and skin protection for Class 4 IR lasers. Proper electrical interlocks should also be included as required for Class 4 laser systems. This product is in compliance with CDRH 21, CFR 1040.1 or 21 CFR 1040.11 or IEC 60825-1 as applicable to complete laser systems.