

gRAY Laser Power Detectors

For fast and accurate measurements





gRAY *Thermal Laser Power Detectors*

POWER MONITORING & KEY-FEATURES

Laser power monitoring is crucial in ensuring the optimal operation of your laser system.

Our laser power detectors measure in real time and provide you with accurate data. By delivering information about the laser power, the gRAY detectors allow you to monitor and control your laser system. Since all gRAY modules are based on thermal sensors, they detect radiation power independent of the laser wavelength.

The benefits of all gRAY detectors are

- **Large spectral range (UV to MIR)**
- **Fast response time**
- **Compact design**

APPLICATIONS & BENEFITS

- **Laser systems (medical and industrial):**
Robust detector for integration into systems for reliable control of laser power, yielding superior reproducibility and uniformity
- **Laser sources (IR or tunable sources):**
Compact and cost effective monitoring element to determine laser power, which needs to be controlled to fulfill specifications
- **Power meters (thermal power meters):**
Easy to integrate and cost effective sensing element
- **Universities / R&D division:**
Flexible and highly accurate laser power measurement



gRAY

For OEM applications

FLEXIBLE SOLUTIONS FOR OEM INTEGRATION

greenTEG caters to individual OEM requirements by offering multiple levels of integration. The customer can flexibly choose what he wants to pay for.

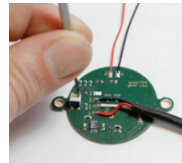
Bare-die sensors for soldering and glueing



Sensors pre-mounted on PCB or Aluminum for easier integration



All sensors compatible with compact amplification or analog-to-digital electronics



Fully integrated housed sensor solutions



Increasing level of integration

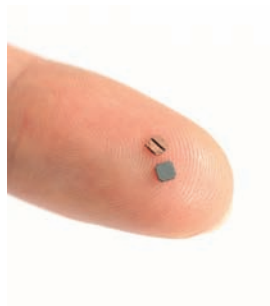


INNOVATIVE TECHNOLOGY FOR CHALLENGING MEASUREMENT TASKS

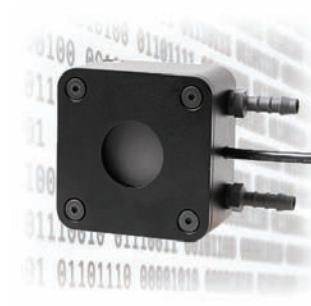
greenTEG constantly broadens its sensor portfolio with innovative product ideas. A dedicated team of specialists is ready to craft customized solutions to perfectly match the requirements of our customers.



Fiber-coupled sensor





Sensor with a footprint of only 2x2 mm²






Housed sensor with digital signal output (I²C) and T compensation



gRAY Overview

	PRODUCT NAME	POWER RANGE	APERTURE SIZE	APPLICATION
Housed Detectors 	C05-HC	5 mW to 5 W	Ø 25 mm	Laser systems/standalone
	C10-HC	10 mW to 10 W	Ø 25 mm	Laser systems/standalone
	C50-HW	50 mW to 50 W	Ø 25 mm	Laser systems/standalone
	C100-HW	100 mW to 100 W	Ø 25 mm	Laser systems/standalone
Mounted Detectors 	C50-MC	50 mW to 50 W	Ø 26 mm	Laser systems/power meters
	B05-MC	10 µW to 5 W	10 x 10 mm ²	Laser systems/power meters /standalone
	B01-SMC	100 µW to 1 W	4.4 x 4.4 mm ²	Laser sources/laser systems /power meters
	B05-SMC	100 µW to 5 W	10 x 10 mm ²	Laser sources/laser systems /power meter

	PRODUCT NAME	POWER RANGE	APERTURE SIZE	APPLICATION
Bare Die Components 	B0.5-SC	100 μ W to 0.5W	2 x 2 mm ²	Laser sources
	B01-SC	100 μ W to 1 W	4.4 x 4.4 mm ²	Laser sources/laser systems /power meters
	B05-SC	100 μ W to 5 W	10 x 10 mm ²	Laser sources/laser systems /power meter
Position Detectors 	B05-PC	1 mW to 5 W	18 x 18 mm ²	Laser systems/position meters
	C50-PC	100 mW to 30 W	18 x 18 mm ²	Laser systems/position metersT
Amplifiers 	AMP-2100			Tunable gain analog amplifier
	AMP-2780D			Amplifier with digital output (I ² C) and optional T compensation



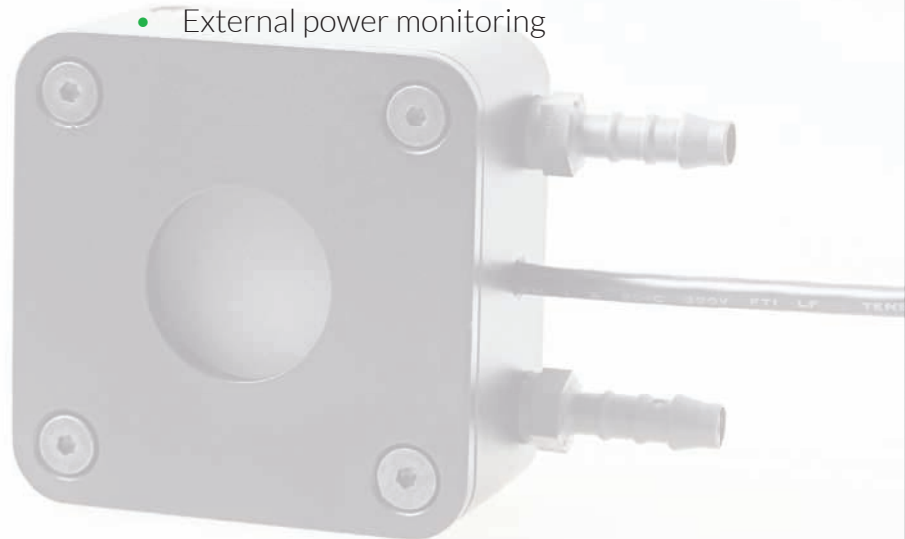
gRAY Housed Detectors

KEY FEATURES

- Absolute power sensing of laser beams up to 100 W
- 480 ms rise time
- Full electrical and thermal integration provided
- Robust design for system integration or standalone applications
- **Digital output signal (I²C)**
- **Temperature compensated signal**

APPLICATION

- Integration into laser systems
- External power monitoring



PRODUCT NAME	C05-HC(T)	C10-HC(T)	C50-HW(T)	C100-HW(T)
Sensing Area (Ø) [mm]	25	25	25	25
Max. Power [W]	5	10	50	100
Min. Detectable Power [mW]	5	10	50	100
Response Time (0 - 95%) [s]	0.48	0.48	0.48	0.48
Min. Beam Diameter [mm]	15 @ 100W / 10 @ 50W / 7 @ 25W			
Spectral Range [µm]	0.19 - 15	0.19 - 15	0.19 - 15	0.19 - 15
Sensitivity [mV/W]	2000	1000	200	100
Cooling Method	conduction, convection	conduction, convection	water cooling	water cooling
Signal Output	analog/digital	analog/digital	analog/digital	analog/digital



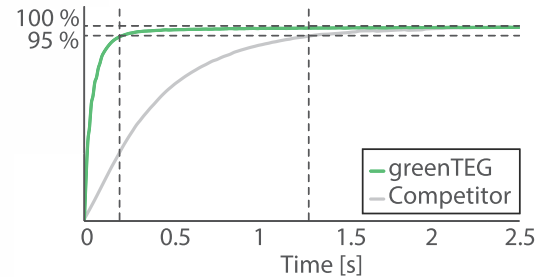
gRAY Mounted High Power Detector

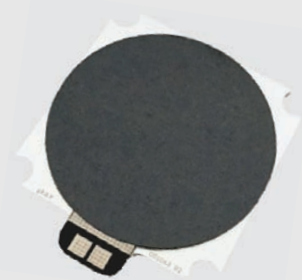
KEY FEATURES

- Absolute power sensing of laser beams up to 100 W
- 480 ms rise time
- Compact design for versatile system integration
- Optional: Amplification circuit board for electrical integration

APPLICATION

- Integration into power meters
- Integration into laser systems





PRODUCT NAME	C50-MC	C50-MC-LA
Sensing Area (Ø) [mm]	26	26
Max. Power [W]	50 (100 w. active cooling)	50 (100 w. active cooling)
Min. Detectable Power [mW]	10	10
Response Time (0 - 95%) [s]	0.48	0.48
Min. Beam Diameter [mm]	15 @ 100W / 10 @ 50W / 7 @ 25W	
Spectral Range [µm]	0.19 - 15	0.19 - 15
Min. Sensitivity [mV/W]	0.5	0.5
Cooling Method	conduction, convection	
Amplification board	optional	

gRAY Mounted Detectors

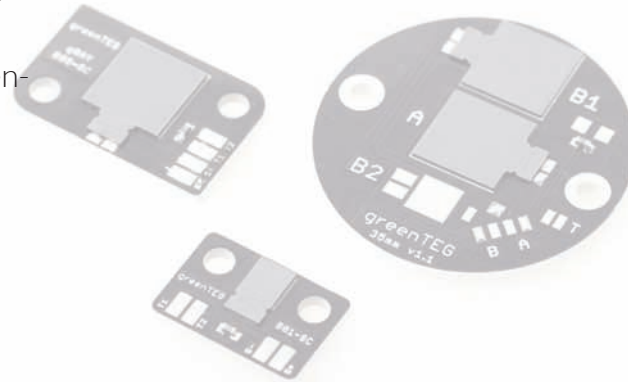


KEY FEATURES

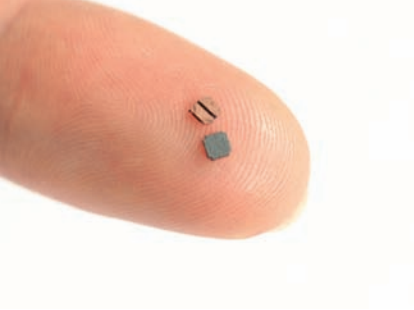
- Mounted on a metal-core PCB; no thermal integration needed
- 10 μ W to 5 W power range
- Simple, compact and robust mounting
- Integrated NTC
- Optional: thermal background compensation
- Available with NIST/PTB traceable calibration

APPLICATION

- Integration into power meters
- Integration into laser systems
- External power monitoring



PRODUCT NAME	B05-MC	B01-SMC	B05-SMC
Sensing Area [mm x mm]	10.0 x 10.0	4.4 x 4.4	10.0 x 10.0
Max. Power [W]	5	1	5
Min. Detectable Power [μ W]	10	100	100
Response Time (0 - 95%) [s]	1.5	1.5	1.5
Max. Power Density [kW/cm ²]	1.5	1.5	1.5
Spectral Range [μ m]	0.19 - 15	0.19 - 15	0.19 - 15
Min. Sensitivity [mV/W]	70	70	70
Cooling Method	conduction, convection	conduction, convection	conduction, convection
Signal Output	analog/digital	analog/digital	analog/digital



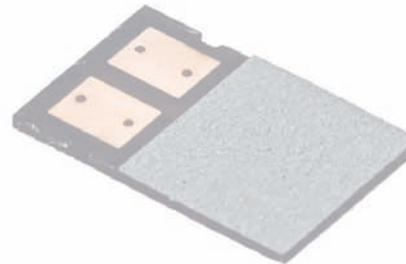
gRAY Bare Die Components

KEY FEATURES

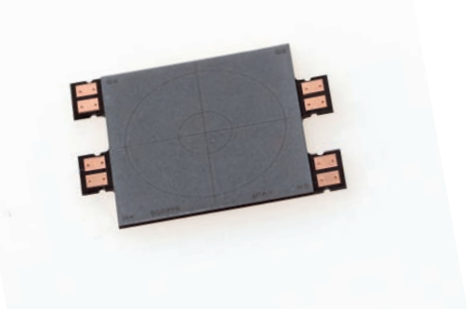
- 100 μ W to 5 W power range
- Linear power response
- Signal independent of illumination angle
- Ultra-thin design
- Simple integration on PCBs
- Attractive OEM pricing
- Various sizes available (2 x 2 to 10 x 10 mm²)

APPLICATION

- Integration into power meters
- Integration into laser sources and systems



PRODUCT NAME	B0.5-SC	B01-SC	B05-SC
Sensing Area [mm x mm]	2.0 x 2.0	4.4 x 4.4	10.0 x 10.0
Max. Power [W]	0.5	1	5
Min. Detectable Power [μ W]	100	100	100
Response Time (0 - 95%) [s]	2.1	2.1	2.1
Max. Power Density [kW/cm ²]	1.5	1.5	1.5
Spectral Range [μ m]	0.19 - 15	0.19 - 15	0.19 - 15
Min. Sensitivity [mV/W]	80	70	70
Cooling Method	conduction, convection	conduction, convection	conduction, convection



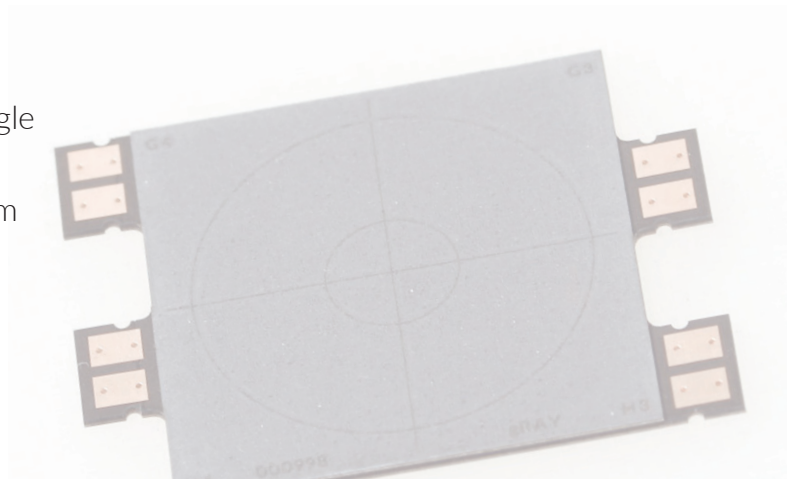
gRAY Position Sensitive Devices

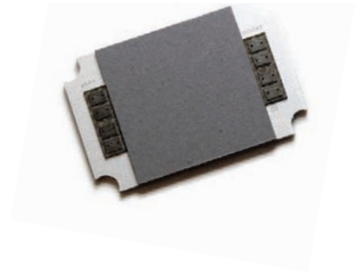
KEY FEATURES

- Position sensing of laser beams
- Highly sensitive thermopile sensor
- Sensitive to all wavelengths from UV to MIR
- Wide power range from μW to W
- Signal independent of illumination angle
- Ultra-thin design
- Compact and robust design for system integration

APPLICATION

- Integration into power/position meters
- Integration into laser systems





PRODUCT NAME	B05-PC	C50-PC
Sensing Area [mm x mm]	18.0 x 18.0	18.0 x 18.0
Max. Power [W]	5	30
Min. Detectable Power [mW]	1	100
Spatial resolution [μm]	30	50
Response Time (0 - 95%) [s]	2.1	0.48
Max. Power Density [kW/cm^2]	1.5	1.5
Spectral Range [μm]	0.19 - 15	0.19 - 15
Min. Sensitivity [mV/W]	80	0.5
Cooling Method	conduction, convection	conduction, convection



Company Overview

WE OFFER

With our thermal laser power detectors, we provide you with fast and accurate power monitoring devices. Integrating these into your system will supply you and your customers with a key parameter that will enable more reliable system operation.

You will benefit from working with us through

- Laser power detectors with unique technical features
- Know-how of thermal and electronic integration of thermal power detectors into applications
- Partnerships with OEMs, system integrators and distributors for bringing new products to market
- Development of customized sensors and systems for OEM customers

Contact us and tell us about your application ideas. We will support you in finding the best solution for your requirements.



ABOUT

greenTEG develops, manufactures and markets thermal sensor solutions. The company was founded in 2009 as an ETH Zurich spin-off and has since built up an international customer base, coupled with a global distributor network.

greenTEG's thermal sensors are integrated into diverse applications by customers active in markets such as laser, building technologies, medtech, automotive, processing industry and R&D.

greenTEG AG

Technoparkstr. 1
8005 Zürich
Switzerland

T: +41 44 632 04 20

info@greenTEG.com
www.greenTEG.com

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