

iC212 HIGHSPEED PHOTORECEIVER

Rev C3, Page 1/10

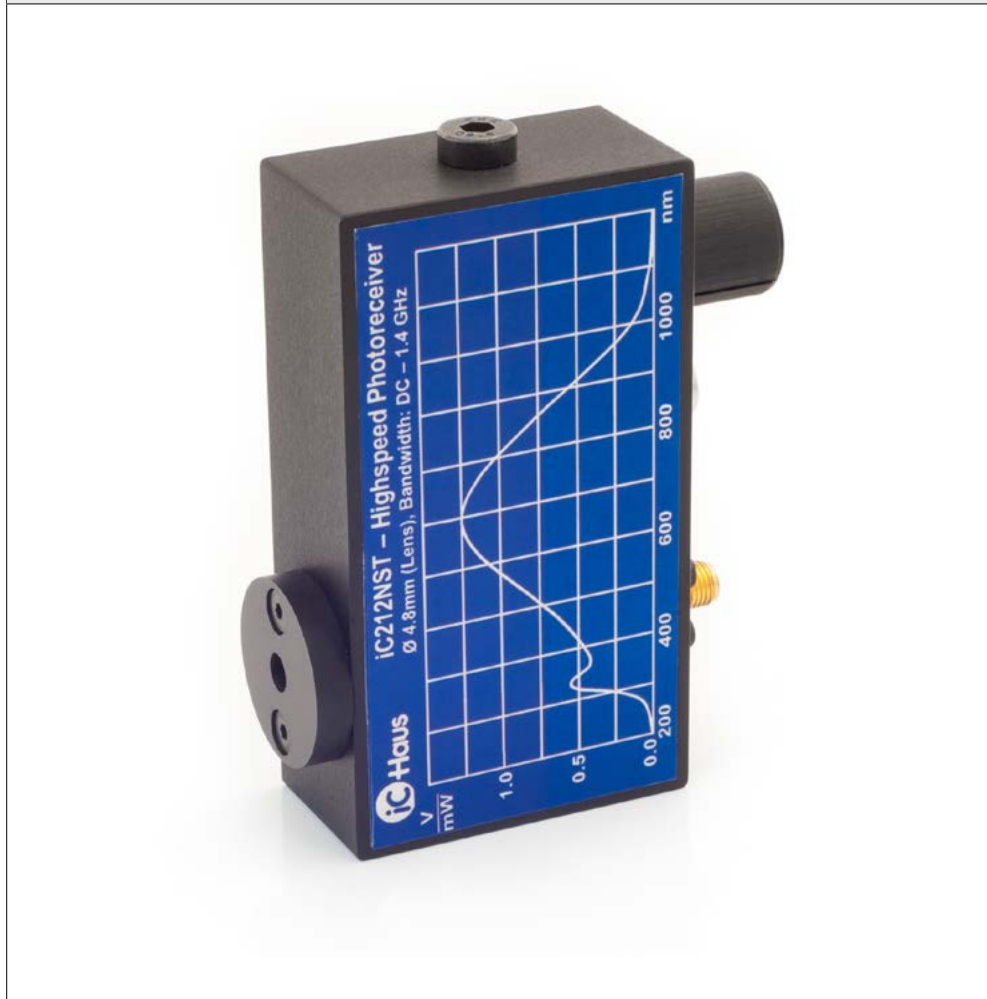
FEATURES

- ◆ Bandwidth DC to 1.4 GHz
- ◆ Si PIN photodiode, Ø 0.2 mm for "No Slow Tail" (NST) option
- ◆ InGaAs photodiode, Ø 0.1 mm for "Near Infrared" (NIR) option
- ◆ Spectral response range $\lambda = 320$ to 1000 nm (NST)
- ◆ Spectral response range $\lambda = 800$ to 1800 nm (NIR)
- ◆ Amplifier transimpedance (gain) 3.125 V/mA
- ◆ Max. conversion gain 1.25 V/mW @ 700 nm (NST)
- ◆ Max. conversion gain 3.25 V/mW @ 1500 nm (NIR)

APPLICATIONS

- ◆ Fast pulse and transient measurement
- ◆ Optical front-end for oscilloscopes

DEVICE



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IC212 HIGHSPEED PHOTORECEIVER

Rev C3, Page 2/10

DESCRIPTION

The iC-Haus Highspeed Photoreceiver IC212 has been developed for optical high speed measurement. With its bandwidth ranging from DC up to 1.4 GHz it detects photo signals from constant light to high speed with rise times down to 200 ps. The IC212 Highspeed Photoreceiver also features offset adjustment to compensate DC levels of the input signal.

The photodiode used with the standard "no slow tail" (NST, blue label) version covers a spectral range from 320 to 1000 nm with an active area diameter of about \varnothing 0.2 mm, which is increased by a \varnothing 4.6 mm lens, re-

sulting in an effective usable area of typical 12.5 mm². The Highspeed Photoreceiver is able to detect power levels in the sub mW range at GHz speed.

The "Near Infrared" (NIR, orange label) version covers a spectral range from ca. 800 to 1800 nm.

The IC212 Highspeed Photoreceiver comes with M6 mounting holes for integration in optical bench systems and an optional fiber-optic input adapter for optical fiber coupling.

ABSOLUTE MAXIMUM RATINGS

Beyond these values damage may occur; device operation is not guaranteed.

| Item No. | Symbol | Parameter | Conditions | | | Unit |
|----------|--------|----------------------|------------|------|------|------|
| | | | | Min. | Max. | |
| G001 | Pmax | Optical Input Power | | | 10 | mW |
| G002 | Vs | Power Supply Voltage | | | 20 | V |

ELECTRICAL CHARACTERISTICS

Test Conditions: Vs = 18 V, Ta = 25 °C*, System Impedance 50 Ω

| Item No. | Symbol | Parameter | Conditions | | | | Unit |
|---------------------------|------------|--|---|-----------------------|------|--------------|---------------------------|
| | | | | Min. | Typ. | Max. | |
| Gain | | | | | | | |
| 101 | A | Amplifier Transimpedance Conversion Gain | 50 Ω load; NST: λ = 700 nm NIR: λ = 1500 nm | 3.125 1.25 3.25 | | | V/mA V/mW V/mW |
| Frequency Response | | | | | | | |
| 201 | fmax | Upper Cut-Off Frequency | -3 dB | 1.4 | | | Ghz |
| 202 | Δ A | Gain Flatness | | \pm 1 | | | dB |
| 203 | tr | Rise Time | 10 to 90% | 280 | | | ps |
| 204 | tpd | Propagation Delay | optical in => electrical out, 50% to 50% | 750 | | | ps |
| Detector | | | | | | | |
| 301 | d | Active Area Diameter | NST NIR | 0.2 0.1 | | | mm mm |
| 302 | Aeff | Effective Active Area | 4.6 mm lens | 12.5 | | | mm ² |
| 303 | λ | Spectral Range | NST NIR | 320 800 | | 1000 1800 | nm nm |
| 304 | Pmax | Max. Optical Input Power | NST: average NST: linear amplification @ 700 nm NIR: linear amplification @ 1500 nm | 10 770 320 | | | mW μ W μ W |
| 305 | NEP | Noise equivalent power | including amplifier noise, f = 1 GHz | | 115 | | pW/ $\sqrt{\text{Hz}}$ |
| Output | | | | | | | |
| 401 | Rout | Output Impedance | | 50 | | | Ω |
| 402 | Vout | Output Voltage Swing | 50 Ω load, for linear amplification | -0.3 | | 1.0 | V |
| 403 | Vos | Offset Voltage (adjustable) [†] | DC offset cancellation | -1.25 | | 0.15 | V |
| 404 | Pos | Offset (adjustable) [†] | equivalent optical power | -92 | | 750 | μ W |
| 405 | twu | Warm-Up Time | stable offset voltage | | 30 | | min |

iC212

HIGHSPEED PHOTORECEIVER

Rev C3, Page 3/10

ELECTRICAL CHARACTERISTICS

Test Conditions: $V_s = 18\text{ V}$, $T_a = 25\text{ }^\circ\text{C}^*$, System Impedance $50\ \Omega$

| Item No. | Symbol | Parameter | Conditions | | | | Unit |
|---------------------|--------|----------------|------------|------|------|------|------|
| | | | | Min. | Typ. | Max. | |
| Power Supply | | | | | | | |
| 501 | V_s | Supply Voltage | | | | 18 | V |
| 502 | I_s | Supply Current | | 150 | | | mA |

* Caution! Even during regular operation, the aluminum case of the photoreceiver may heat up to $40\text{ }^\circ\text{C}$ max.
 † The output is clipped to -0.5 V , if the offset voltage is less than 0.5 V and no DC light is present.

iC212 HIGHSPEED PHOTORECEIVER

Rev C3, Page 4/10

CONTENTS

The purchased parts package includes

- Highspeed Photoreceiver iC212
(picture shows standard NST option)
- Power adapter (230 VAC)
- Coaxial cable with SMA plugs
- SMA to BNC adapter
- Fiber adapter



Figure 1: Box contents

iC212 HIGHSPEED PHOTORECEIVER

Rev C3, Page 5/10

DIMENSIONS

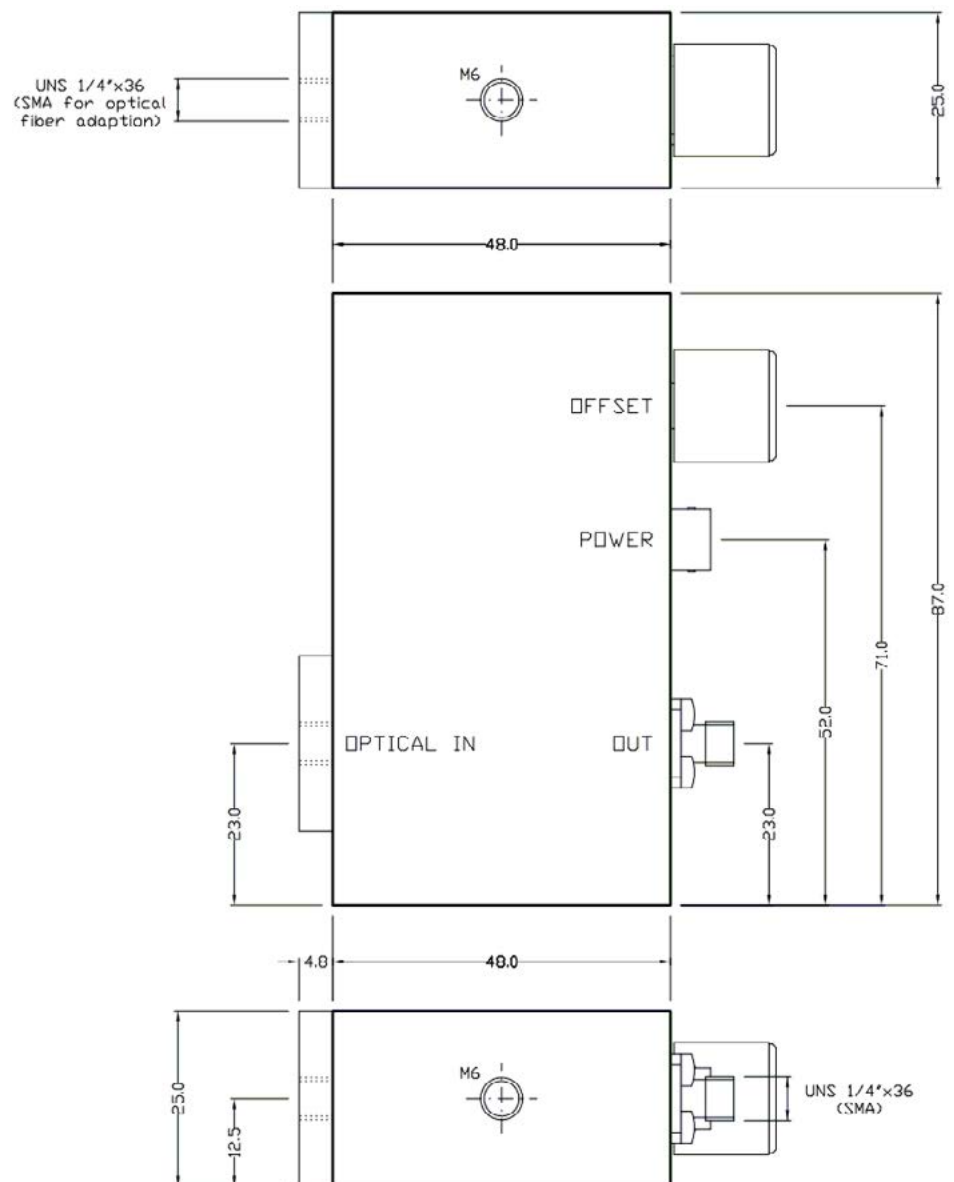


Figure 2: Case dimensions (all units in mm)

iC212 HIGHSPEED PHOTORECEIVER

Rev C3, Page 6/10

CONNECTORS

| | |
|--------------|---|
| Input | |
| NST | Optical, micro bench adaption - Free-space measurement (default) - SMA fiber adapter (optional) |
| NIR | FC/PC fiber adapter with integrated photodiode - Lens cap for free-space measurement (default) |
| Output | SMA Connector |
| Power Supply | DC power connector, 5.5 mm/2.1 mm +: Vs+ -: Vs- |



Table 1: Connectors

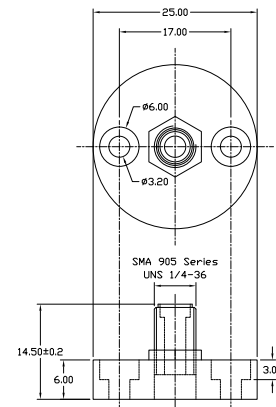


Figure 3: SMA fiber adapter (NST version only)

iC212 HIGHSPEED PHOTORECEIVER

Rev C3, Page 7/10

RESPONSE

Standard "No Slow Tail" (NST) option

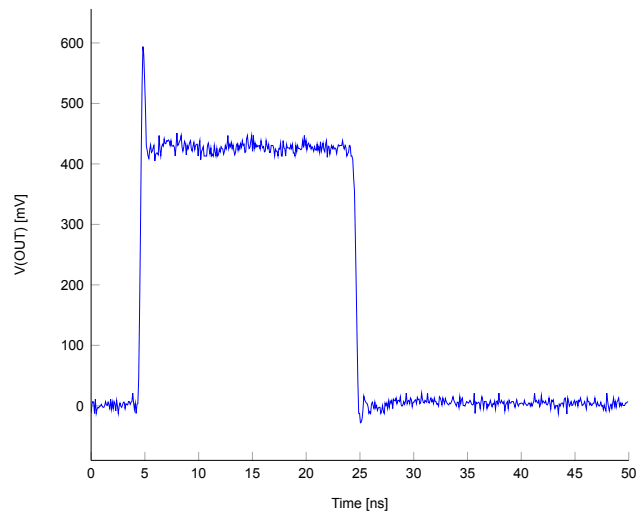


Figure 4: Pulse response (NST)

"Near Infrared" (NIR) option

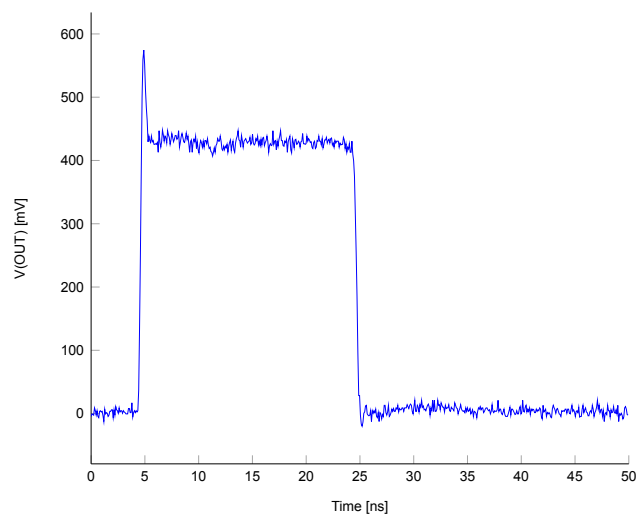


Figure 5: Pulse response (NIR)

iC212 HIGHSPEED PHOTORECEIVER

Rev C3, Page 8/10

Spectral response

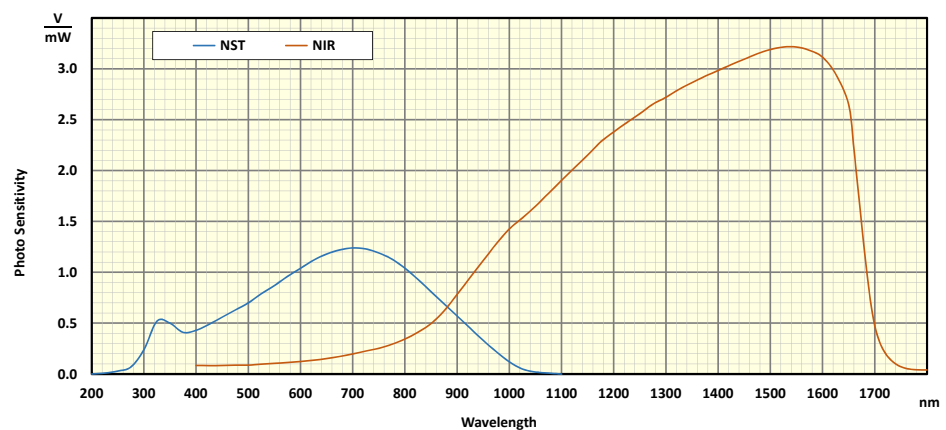


Figure 6: Spectral response

DISPOSAL INSTRUCTIONS

Electrical and electronic equipment must not be disposed with consumers waste. Its components must be recycled or disposed apart from each other. Otherwise contaminative and hazardous substances can pollute our environment. The customer is committed by law to dispose electrical and electronic devices to the producer, the dealer or public collecting points at the end

of the devices lifetime for free. For simplification for the customer and to ensure the environmental protection, iC-Haus requests the customer to send back the iC212 free of charge after lifetime. iC-Haus will disassemble and recycle all parts properly and in accordance with the applicable standards.

REVISION HISTORY

| Rel. | Rel. Date* | Chapter | Modification | Page |
|------|------------|----------------------------|---|------|
| B1 | 2015-07-30 | FEATURES | NIR version added | 1 |
| | | DEVICE | New standard NST version shown | 1 |
| | | DESCRIPTION | NIR version added | 2 |
| | | ELECTRICAL CHARACTERISTICS | NIR version added | 2 |
| | | CONTENTS | New standard NST version shown | 4 |
| | | DIMENSIONS | Fiber adapter added | 5 |
| | | CONNECTORS | Lens dropped | 6 |
| | | RESPONSE | NIR version added | 8 |
| | | APPLICATION NOTES | Equipment used: iC227, HV1M, HG2D added | 15 |
| | | ORDERING INFORMATION | NIR version added | 16 |

| Rel. | Rel. Date* | Chapter | Modification | Page |
|------|------------|----------------------------|--------------------------|------|
| C1 | 2019-03-15 | DEVICE | New product photo | 1 |
| | | ELECTRICAL CHARACTERISTICS | Single 18 V supply | 3 |
| | | CONNECTORS | Pin configuration | 6 |
| | | RESPONSE | Pulse response NIR added | 8 |

iC212

HIGHSPEED PHOTORECEIVER

Rev C3, Page 9/10

| Rel. | Rel. Date* | Chapter | Modification | Page |
|------|------------|-------------------|--|------|
| C2 | 2020-03-17 | CONTENTS | New picture box contents | 4 |
| | | CONNECTORS | Input NST/NIR updated | 6 |
| | | RESPONSE | Pulse response x-axis scale corrected | 7 |
| | | RESPONSE | New diagram spectral response | 8 |
| | | APPLICATION NOTES | Application notes moved to seperate document | |

| Rel. | Rel. Date* | Chapter | Modification | Page |
|------|------------|-----------------------|------------------------------|------|
| C3 | 2021-01-08 | CONNECTORS | Table 1 and Figure 3 updated | 6 |
| | | DISPOSAL INSTRUCTIONS | New | 8 |
| | | ATTACHMENTS | CE Declaration added | 11 |

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* Release Date format: YYYY-MM-DD

iC212

HIGHSPEED PHOTORECEIVER

Rev C3, Page 10/10

ORDERING INFORMATION

| Type | Options | Order Designation |
|-------|--|-------------------|
| iC212 | Standard "No Slow Tail" (NST) "Near Infrared" (NIR) | iC212 iC212NIR |

Please send your purchase orders to our order handling team.

For technical support, information about prices and terms of delivery please contact us.



European Conformity Declaration

iC212 Highspeed Photoreceiver

| | |
|-----------------------------|---|
| Manufacturer: | iC-Haus GmbH Am Kuemmerling 18 55294 Bodenheim Phone: +49-6135-9292-0 https://www.ichaus.de |
| Product Description: | iC212 High-Speed Photoreceiver |
| Product Category: | Electrical equipment for measurement, control and laboratory use. |

We hereby declare that the product conforms to the Restriction of certain Hazardous Substances Directive 2011/65/EU.

Date Issued:
September 15, 2020

Authorized Signature:



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