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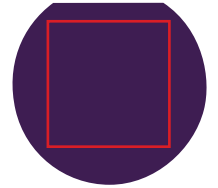
Product Data Sheet

SiPM – Silicon Photomultiplier Module

with integrated Transimpedance Amplifier and Bias Source

PE3315-WB-TIA-SP / PE3325-WB-TIA-SP

PE3315-WB-TIA-TP / PE3325-WB-TIA-TP



KETEK



Key Features Overview

- PM3315-WB or PM3325-WB SiPM based
- Integrated Transimpedance Amplifier (TIA)
- Integrated Controllable Bias Source for SiPM
- Optionally with integrated Gain Stabilization
- Plug and Play Solution to replace PMTs
- Compatible with Thorlabs® SM05 Optics, 16 mm Optical Cage Systems, Hamamatsu® PMT mounts

Application Examples



Biophotonics

- Cytometry
- Fluorescence Measurements
- Point-of-Care Diagnostics



Hazard & Threat Detection

- Single Photon Counting
- Scintillator Readout
- Handheld Devices



High Energy Physics

- Low Light Level Detection
- High Linearity Measurements
- Energy Measurements

General Parameters and Order Information

SiPM Type ^A	Active Area [mm ²]	Microcell Size [μm]	No. of Microcells	Gain stabilized vs. Temperature	Order-Code
PM3315-WB-C0	3.0 x 3.0	15	38800	No	PE3315-WB-TIA-SP
				Yes	PE3315-WB-TIA-TP
PM3325-WB-D0	3.0 x 3.0	25	13920	No	PE3325-WB-TIA-SP
				Yes	PE3325-WB-TIA-TP

Recommended Operation Parameters

Parameter	Description
Ctrl Voltage PE33xx-WB-TIA-xP	0.7 V (resulting SiPM over voltage of about 5 V)
Operating Temperature	0°C - 60 °C

Electrical and Optical Characteristics at 21°C (typ.)

Module Type ^A	Photo Detection Efficiency [%]	Dark Count Rate [kHz/mm ³]	Crosstalk Probability [%]	Afterpulsing Probability [%]	Recovery Time [ns]
PE3315-WB-TIA-xP @ Ctrl = 0.7 V	31 (@ 430 nm)	125	18	5	15
PE3325-WB-TIA-xP @ Ctrl = 0.7 V	45 (@ 430 nm)	125	26	<1	35

^A Full SiPM specification can be found in the corresponding SiPM datasheet, please visit www.ketek.net/sipm-downloads



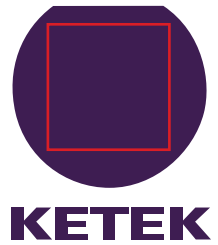
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Interfaces and Electrical Ratings

Parameter	Description
Outer Dimensions	40.0 x 50.0 x 19.8 mm ³ (L x W x H)
Mechanical Compatibility	Thorlabs® SM05 Optics and 16 mm cage system Hamamatsu® PMT mounts
Power Supply Input	+5 V DC (± 0.5 V, max + 12 V DC), 300 mA, MCX connector Recommended ripple noise < 10 mV
Typical Power Consumption	350 mW (69 mA @ 5 V power supply)
Bias Voltage / Gain Control (Ctrl)	0 V to +1 V (min. -0.2 V, max. +1.2 V), 50 mA, MCX connector
Signal Output (Signal)	Output range 0 V to +1 V, positive polarity, MCX connector matched to 50 Ω impedance
Max. recommended Cable Length	3 m

Electrical Characteristics of Signal Output

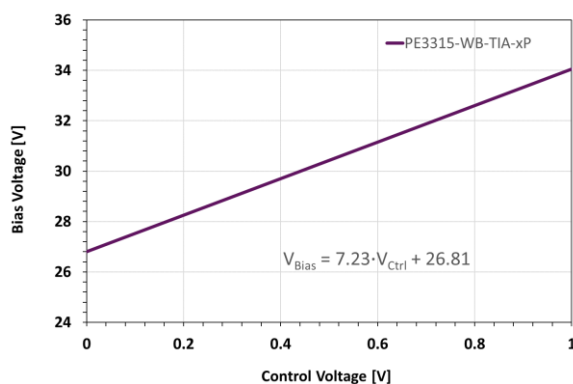
Parameter	Description
Transimpedance Amplifier Gain	2 stage design, total gain 150 V/A
Signal Output Bandwidth	12.5 MHz
Signal Output Amplitude Noise	500 μV (σ, AC coupled, 20 MHz bandwidth)
Bias Voltage / Gain Control (Ctrl)	0 V to +1 V, 50 mA, MCX connector
Output Offset Tuning Range	Preset to 0 V, upon request -1 V to 0 V
Output Offset Drift with Temperature	< 0.5 mV/K

Electrical Characteristics of Internal SiPM Bias Supply

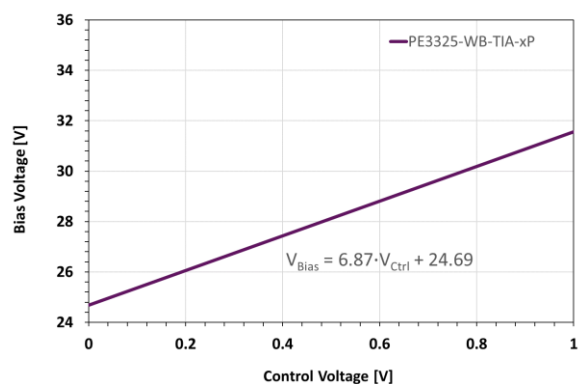
Parameter	Description
Bias Voltage Range PE3315-WB-TIA-xP	26.81 V to 34.00 V (SiPM V_{bd} at typ. 26.9 V @ 21°C, no internal SiPM amplification below V_{bd})
Bias Voltage Range PE3325-WB-TIA-xP	24.69 V to 31.55 V (SiPM V_{bd} at typ. 24.7 V @ 21°C, no internal SiPM amplification below V_{bd})
Ripple Noise	< 2 mV min-max (1 MΩ input resistance, 22 pF capacitive load, 0.5 m RG-174-U cable)
Stability	< 5 mV min-max (f = 0.1 Hz)
Input Impedance	400 kΩ
Settling Time	0.5 s (time to reach stable SiPM bias after change of Ctrl voltage)
Output Current Limit	10 mA

Typical Performance Characteristics

SiPM Bias Voltage vs. Ctrl Voltage
PE3315-WB-TIA-xP



SiPM Bias Voltage vs. Ctrl Voltage
PE3325-WB-TIA-xP



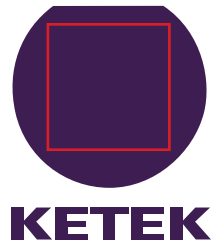
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SiPM – Silicon Photomultiplier Module

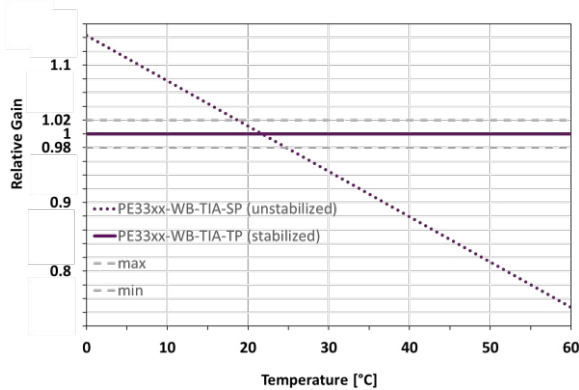
with integrated Transimpedance Amplifier and Bias Source

PE3315-WB-TIA-SP / PE3325-WB-TIA-SP

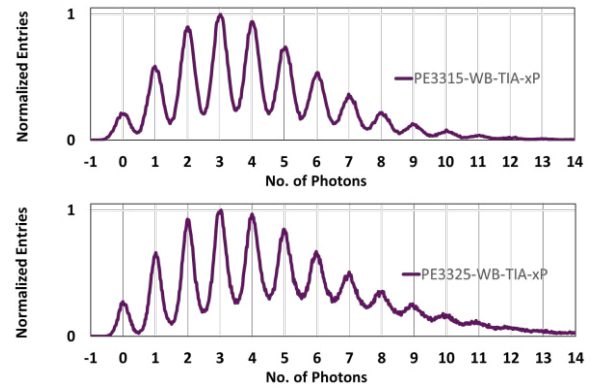
PE3315-WB-TIA-TP / PE3325-WB-TIA-TP



Normalized SiPM Gain vs. Temperature
Comparison of PE33xx-WB-TIA-SP and PM33xx-WB-TIA-TP

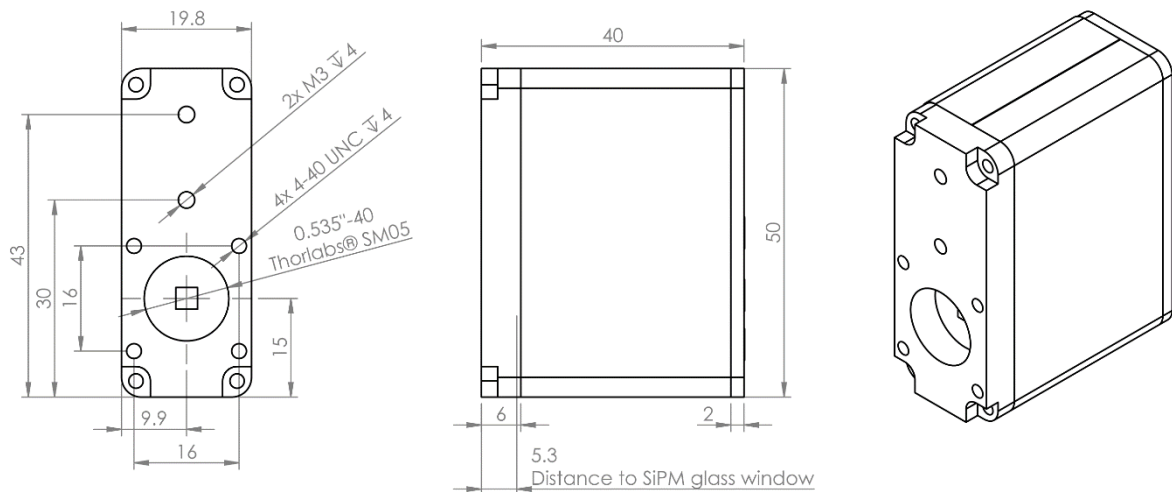


Single Photon Spectrum Example



Mechanical Specifications

Dimensions^B



^B General tolerances ± 0.1 mm unless otherwise noted

Revision History

Revision and Date	Changes
Rev. 2020-A February 2020	Added "Application Examples" and "Electrical and Optical Characteristics at 21°C and Ctrl = 0.7 V (typ.)" Updated "General Parameters and Order Information" Updated plot design, added "Normalized SiPM Gain vs. Temperature" and "Single Photon Spectrum Example" Updated "Dimensions" technical drawing
Rev. 2019-A December 2019	Initial release

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