

### Key Features Overview

- 3 x 3 mm<sup>2</sup> Active Area
- 15 μm / 35 μm / 47 μm Microcells
- High Photo Detection Efficiency & Low Noise
- Excellent Timing Properties
- Replacement for PMTs, APDs and PIN Diodes
- Cost Efficient and Robust (MSL1 approved)

### Application Examples

- Single Photon Counting
- Scintillator Readout
- Medical Imaging (PET, SPECT)
- Photon Timestamping
- Handheld and Mobile Devices
- Hazard & Threat Detection
- Biophotonics
- High Energy Physics & Research
- Analytical Instrumentation

### Spectral Response

Photo Detection Efficiency at 5 V Overvoltage

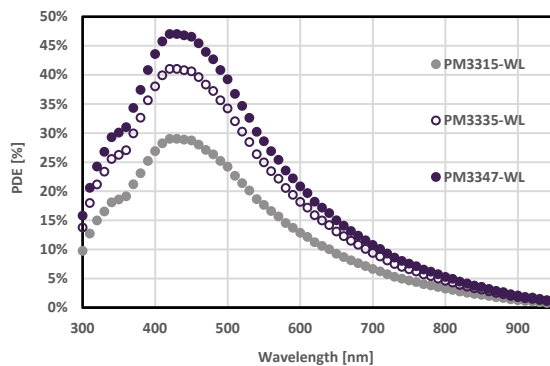
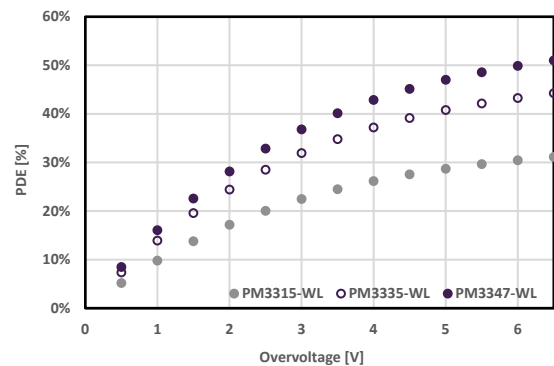
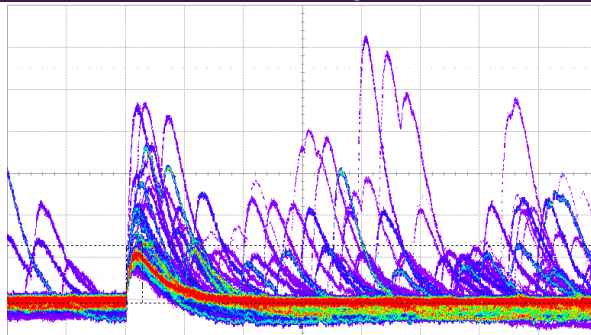


Photo Detection Efficiency vs. Overvoltage at 430 nm

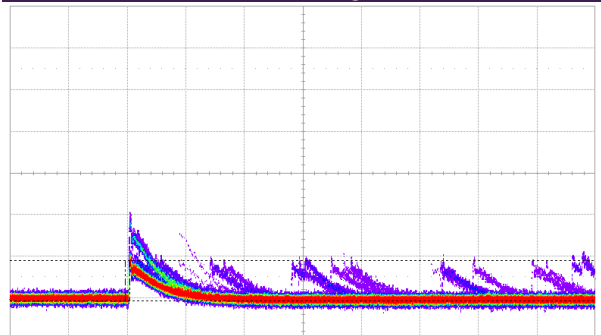


### Noise Improvement compared to WB Series

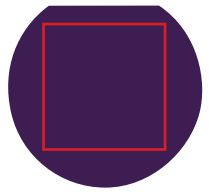
WB Series – previous product\*  
PM3325-WB-D0 at 5.0 V Overvoltage



WL Series\*  
PM3335-WL-A0 at 5.0 V Overvoltage



\* Measurement performed using KETEK SiPM Evaluation Kit (PEVAL-KIT-MCX) and Evaluation PCB (PEPCB-EVAL MCX-P)  
Oscilloscope set to 100 ns/div, 2.00 mV/div, 0.5 p. e. trigger, 0.5 s persistence, 200 MHz bandwidth limit



### General Parameters and Order Information

| SiPM Type | Active Area [mm <sup>2</sup> ] | Microcell Size [μm] | No. of Microcells | Dimensions [mm <sup>3</sup> ] | Order-Code   |
|-----------|--------------------------------|---------------------|-------------------|-------------------------------|--------------|
| PM3315-WL | 3.0 x 3.0                      | 15                  | 38400             | 3.315 x 3.315 x 0.595         | PM3315-WL-A0 |
| PM3335-WL | 3.0 x 3.0                      | 35                  | 7396              | 3.315 x 3.315 x 0.595         | PM3335-WL-A0 |
| PM3347-WL | 3.0 x 3.0                      | 47                  | 4096              | 3.315 x 3.315 x 0.595         | PM3347-WL-A0 |

### Main Characteristics

| Parameter                                    | Typ.                       | Unit |
|--|----------------------------|------|
| Breakdown Voltage (V <sub>BD</sub> ) at 21°C | min. 28.75, max. 30.25     | V    |
| Breakdown Voltage Variation per Reel         | ±0.125                     | V    |
| Recommended Overvoltage (V <sub>OV</sub> )   | 1.0 – 6.5 (max. 7.5)       | V    |
| Temperature Dependency of V <sub>BD</sub>    | 22                         | mV/K |
| Temperature Dependency of Gain               | 0.4% @ 5.0 V <sub>OV</sub> | 1/K  |
| Operating Temperature Range                  | -40 to + 60                | °C   |
| Reliability Classification                   | MSL1                       |      |
| Index of Refraction of Glass Entrance Window | 1.52 @ 430 nm              |      |

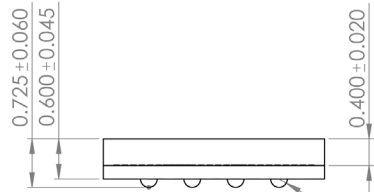
### Typical Electrical and Optical Characteristics at 21°C

| Parameter                            | PM3315-WL   |        |        | PM3335-WL |        |        | PM3347-WL |        |        | Unit                |
|--------------------------------------|-------------|--------|--------|-----------|--------|--------|-----------|--------|--------|---------------------|
|                                      | Overvoltage |        |        |           |        |        |           |        |        |                     |
|                                      | +2.5 V      | +5.0 V | +6.5 V | +2.5 V    | +5.0 V | +6.5 V | +2.5 V    | +5.0 V | +6.5 V |                     |
| Photo Detection Efficiency at 430 nm | 20          | 29     | 31     | 29        | 41     | 44     | 33        | 47     | 51     | %                   |
| Dark Count Rate                      | 25          | 45     | 60     | 30        | 60     | 80     | 40        | 85     | 110    | kHz/mm <sup>2</sup> |
| Dark Current                         | 0.0141      | 0.059  | 0.114  | 0.085     | 0.349  | 0.636  | 0.207     | 0.913  | 1.80   | μA                  |
| Dark Current – max.                  | 0.0252      | 0.112  | 0.322  | 0.154     | 0.517  | 1.21   | 0.60      | 2.00   | 4.25   | μA                  |
| Gain                                 | 0.35        | 0.70   | 0.91   | 2.0       | 4.0    | 5.2    | 3.5       | 7.0    | 9.1    | x 10 <sup>6</sup>   |
| Crosstalk Probability*               | 5           | 14     | 21     | 4         | 10     | 14     | 7         | 18     | 26     | %                   |
| Afterpulsing Probability             | 1           | 3      | 5      | 1         | 3      | 5      | 1         | 3      | 5      | %                   |
| Terminal Capacitance                 | 1           |        |        | 1         |        |        | 1         |        |        | nF                  |
| Recovery Time τ (at 1 Ω load)        | 7           |        |        | 35        |        |        | 95        |        |        | ns                  |

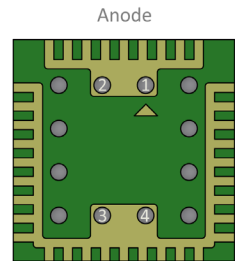
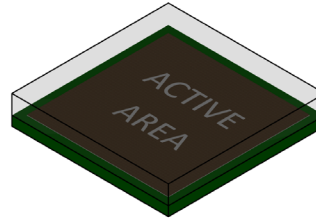
\* Including delayed crosstalk with a probability < 0.1%

### Mechanical Specifications

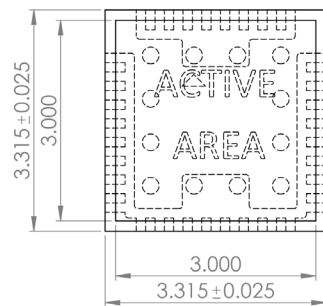
#### Dimensions and Recommended Footprint\*



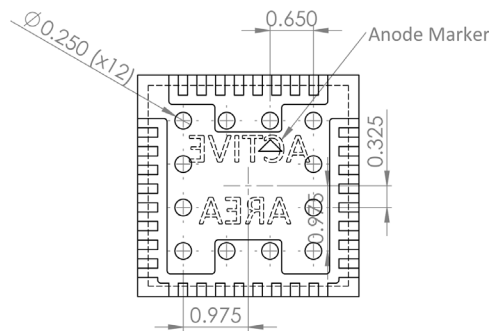
Side View



Cathode



Top View



Bottom View

#### PCB Solder Pad Recommendation

Top Layer  $\varnothing$  0.330  
 Top Solder  $\varnothing$  0.280  
 Paste Mask  $\varnothing$  0.250



#### Solder Ball Connection Scheme

Note:

Balls 1 and 2 are internally connected

Balls 3 and 4 are internally connected

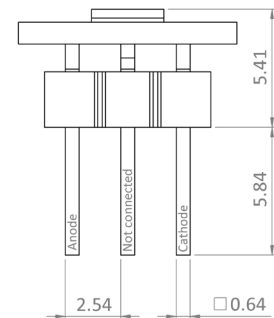
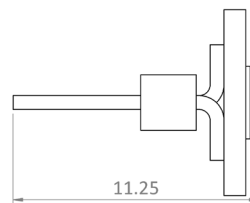
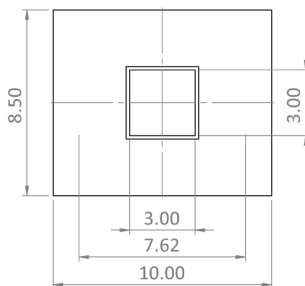
Balls 1, 2 Anode

Balls 3, 4 Cathode

Other Balls N.C.

\* Footprint and 3D model are available for download at [www.ketek.net/sipm-downloads/](http://www.ketek.net/sipm-downloads/)

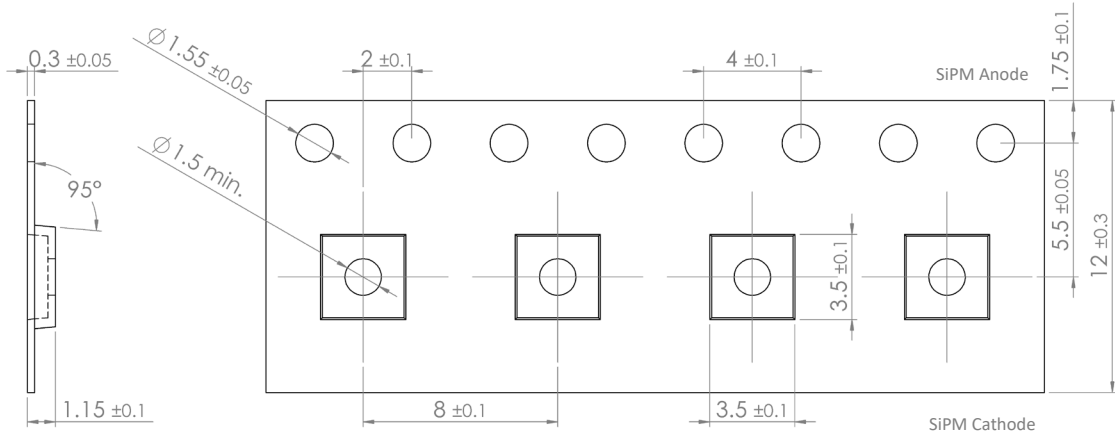
#### PM33xx-WL preassembled on PCB with Pins (available for Evaluation Purposes)\*



\* Mates e.g. with Preci-Dip 801-87-003-10-001101

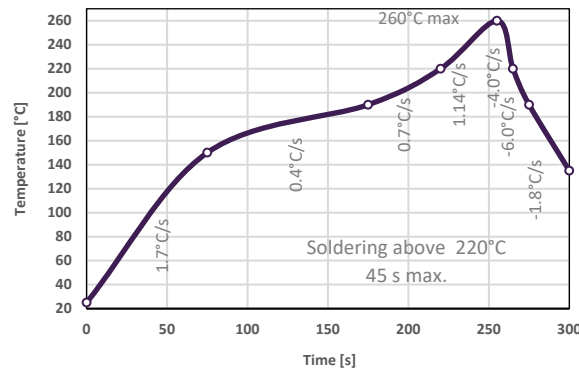
### Assembly Specifications

Tape and Reel\*



\* 1000 pcs per reel, quantities < 1000 pcs delivered as cut tape

### Recommended Reflow Solder Profile\*



\* Lead-free no-clean solder paste type 4 is recommended, e.g. SAC305 ROL0 Nihon Handa PF305-118  
SMD stencil thickness of 80 µm is recommended

### Revision History

| Revision and Date           | Changes   |
|-----------------------------|---|
| Rev. 2020-B<br>January 2020 | Initial Release of Product Data Sheet             |
| Rev. 2020-A<br>October 2020 | Initial Release of Preliminary Product Data Sheet |

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