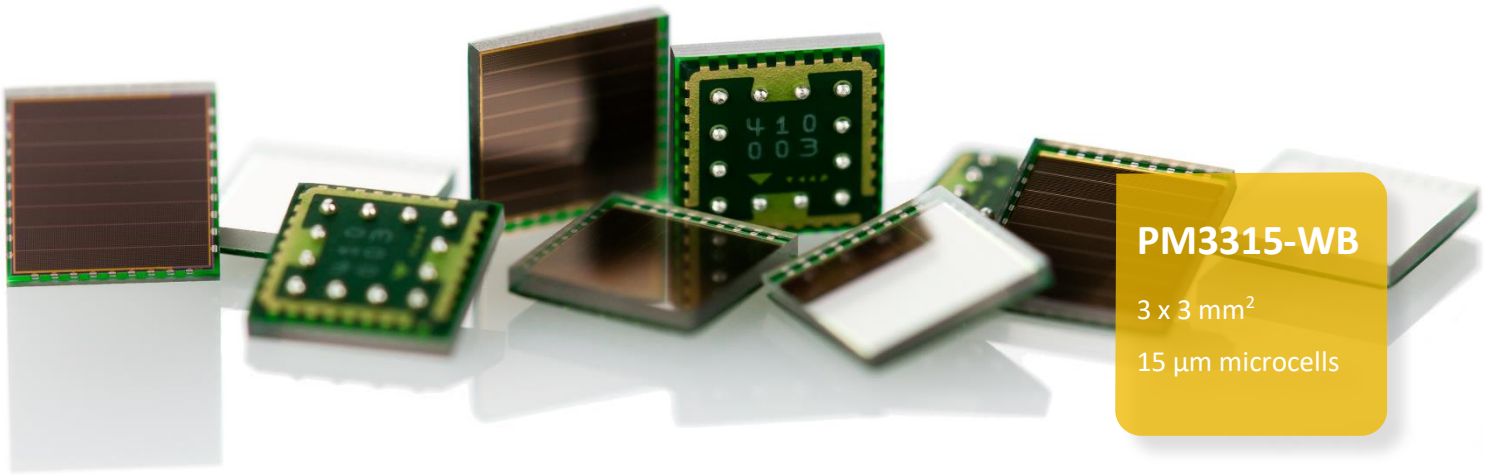
SiPM

Product Data Sheet
SiPM – Silicon Photomultiplier
PM3315-WB-C0

KETEK



Key Features Overview

- High Photo Detection Efficiency
- Excellent Timing Properties
- Extremely low Temperature Coefficient
- Fastest Recovery Time
- Ultra high Cell Density and Dynamic Range
- Very low Noise
- Low Voltage Operation
- MSL1 approved – Robust and Cost Efficient
- Industry-leading Breakdown Voltage Uniformity

Application Examples

- Cytometry
- X-Ray Photon Counting
- Medical Imaging
- Scintillator readout for Gamma and X-ray Detection
- Handheld and Mobile Devices
- Hazard & Threat Detection
- Biophotonics and Analytical Instrumentation
- High Energy Physics and Research
- Replacement for PMTs, APDs and PIN Diodes

Photo Detection Efficiency of WB Series at 5 V Overvoltage

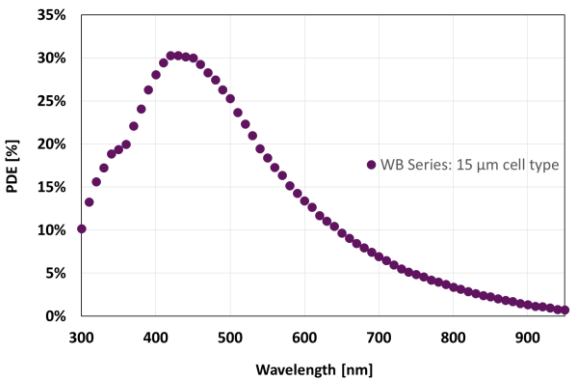
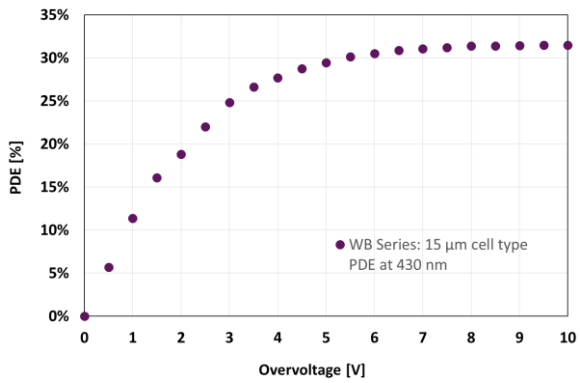


Photo Detection Efficiency vs. Overvoltage of WB Series at 21°C



General Parameters and Order Information

Type	Active Area [mm²]	Microcell Size [µm]	No. of Microcells	Package Dimensions [mm³]	Order-Code
PM3315-WB	3.0 x 3.0	15	38800	3.315 x 3.315 x 0.595	PM3315-WB-C0

KETEK GmbH
Hofer Str. 3
81737 Munich, Germany
www.ketek.net
info@ketek.net
phone +49 89 673 467 70
fax +49 89 673 467 77

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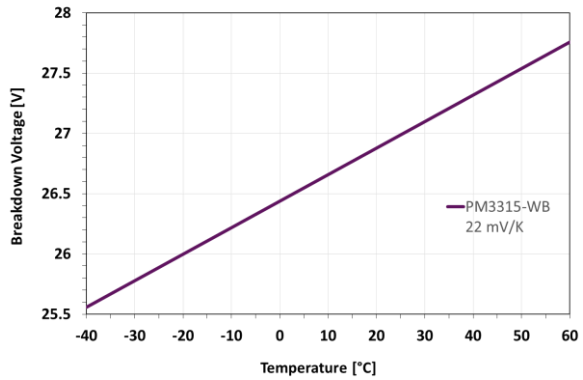
Main Characteristics		
Parameter		**Unit**
Breakdown Voltage (V_{BD}) at 21°C	min. 26.0, max. 28.0	V
Breakdown Voltage Variation per Reel	±0.125	V
Recommended Overvoltage (V_{OV})	2.0 – 5.0 (max. 6.0)	V
Temperature Dependency of V_{BD}	22.0	mV/K
Temperature Dependency of Gain	0.3% @ 5.0 V_{OV}	1/K
Operating Temperature Range	-40 to + 60	°C
Reliability Classification	MSL1	
Index of Refraction of Glass Entrance Window	1.52 @ 430 nm	

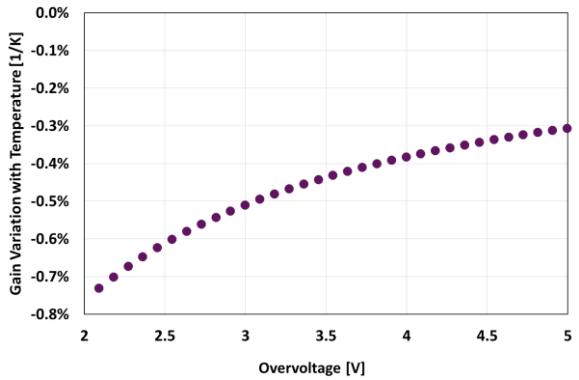
Performance Overview at 21°C					
Parameter	**Type**	**Microcell Size [µm]**	**Typ. @ 2.5 V_{OV}**	**Typ. @ 5.0 V_{OV}**	**Unit**
Photo Detection Efficiency at 430 nm	PM33	15	22	31	%
Dark Count Rate	PM33	15	50	125	kHz/mm²
Dark Current	PM33	15	0.08 (max. 0.16)	0.19 (max. 0.3)	µA
Gain	PM33	15	0.35	0.70	x 10^6
Crosstalk Probability*	PM33	15	8	18	%
Afterpulsing Probability	PM33	15	1	5	%
Terminal Capacitance	PM33	15	0.8		nF
Recovery Time τ **	PM33	15	13 (at 1 Ω load), 47 (at 50 Ω load)		ns
Signal Rise Time	PM33	15	630		ps

* including delayed crosstalk with a probability of < 0.1%

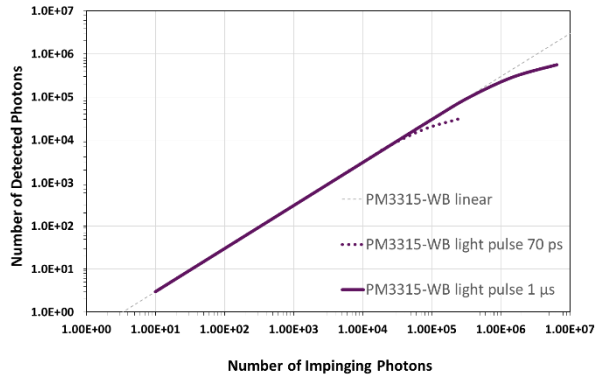
Temperature Coefficient of the Breakdown Voltage



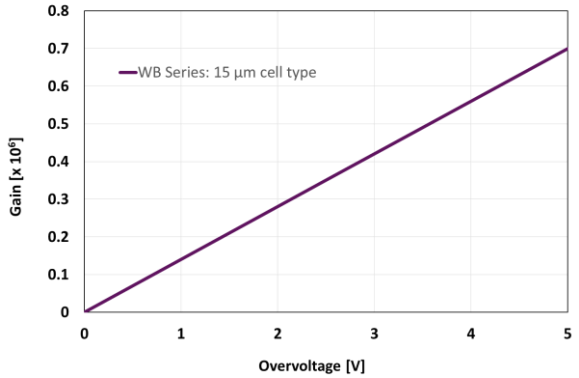
Temperature Coefficient of the Gain



Linearity at 4 V Overvoltage and 430 nm



Gain of WB Series



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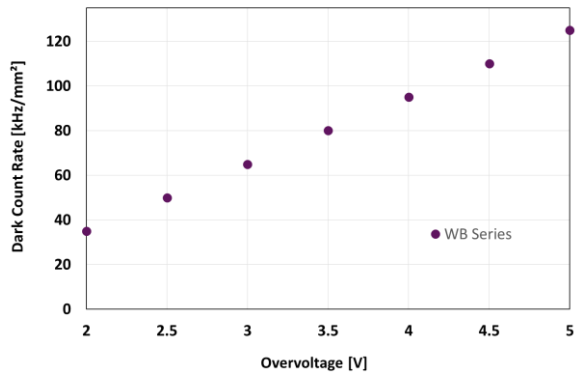
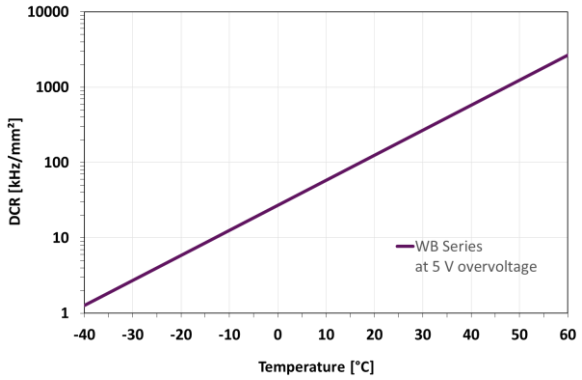
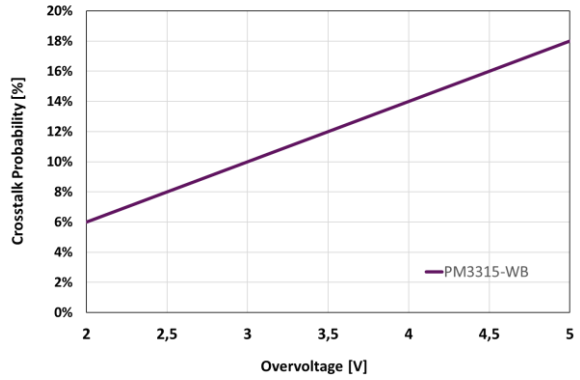
Dark Count Rate at 21°C



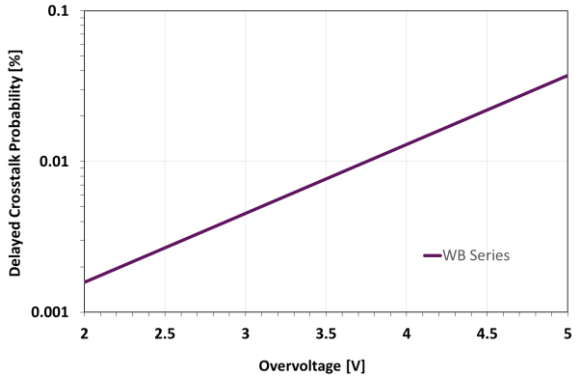
Dark Count Rate vs. Temperature



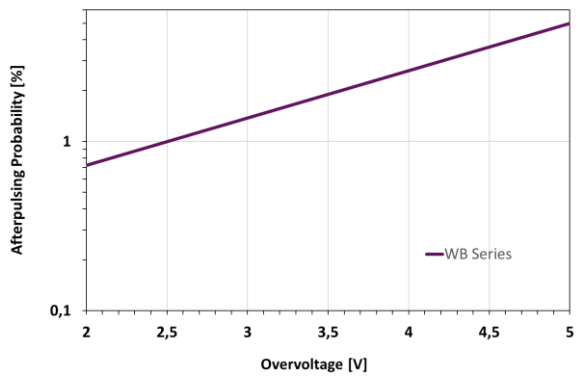
Direct Optical Crosstalk



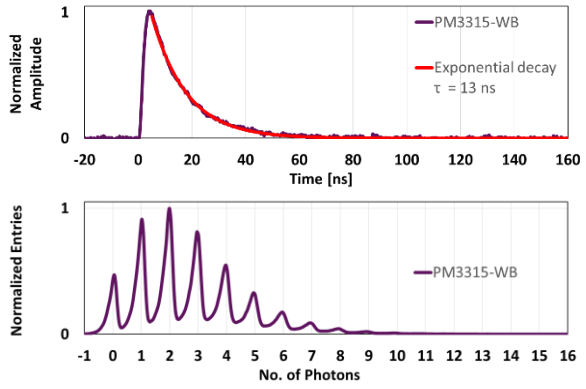
Delayed Optical Crosstalk



Afterpulsing Probability



Pulse Shape at 1 Ω Load
Example for a Single Photon Spectrum



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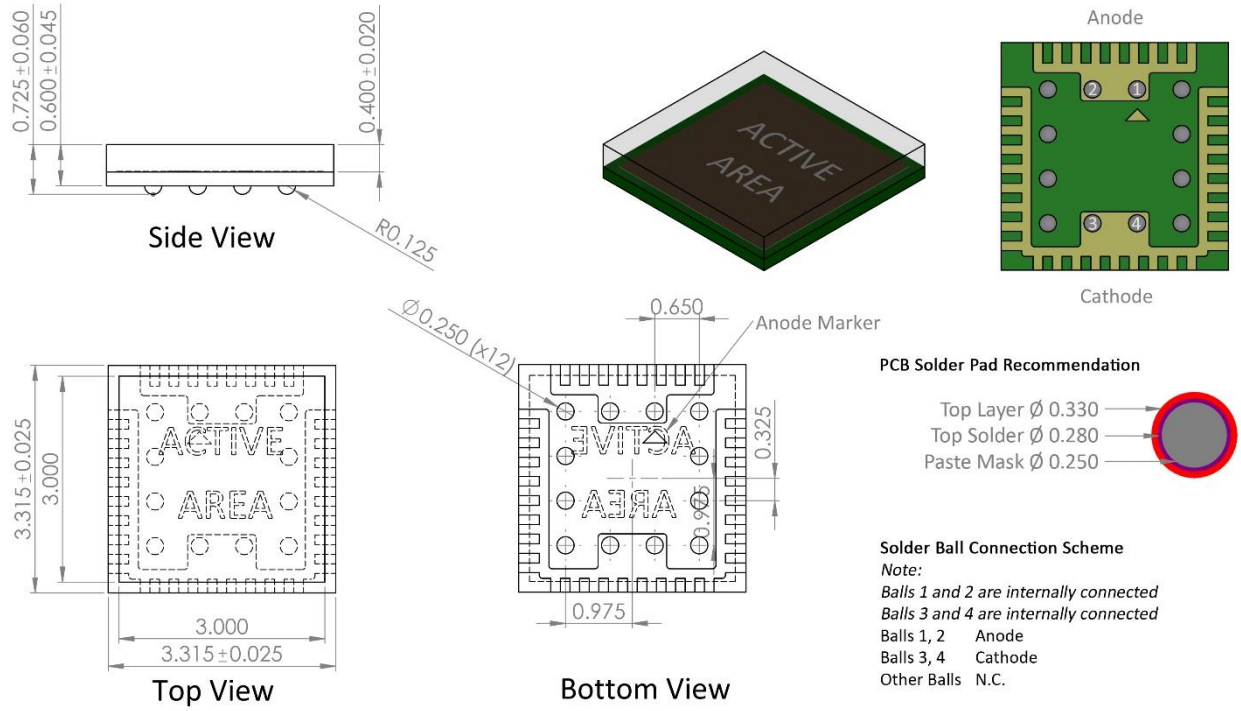
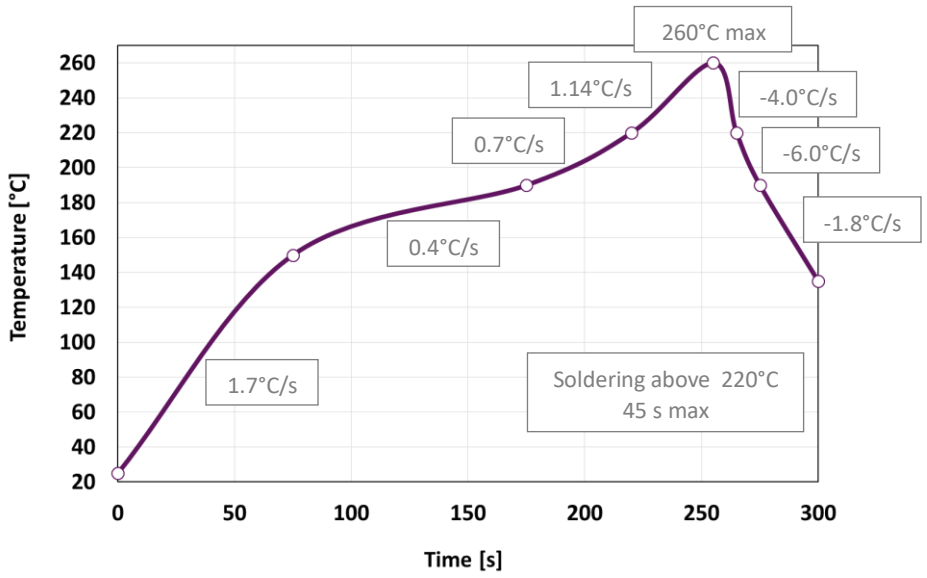
Technical Drawing and Recommended Footprint*



* Footprint and 3D model are available for download at www.ketek.net/sipm-downloads/

Recommended Reflow Solder Profile*



* A lead-free no-clean solder paste Type 4 is recommended, e.g. SAC305 ROL0 Nihon Handa PF305-118
A SMD stencil thickness of 80 – 100 µm is recommended

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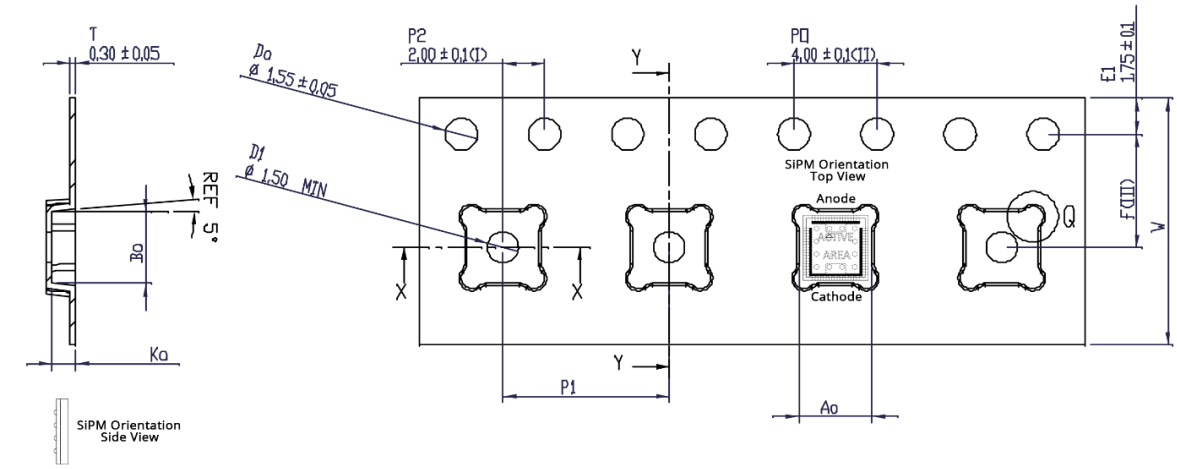
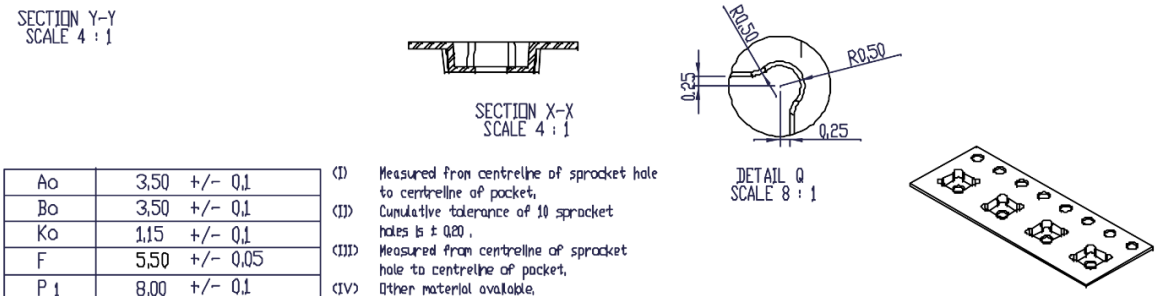
Tape and Reel Specifications





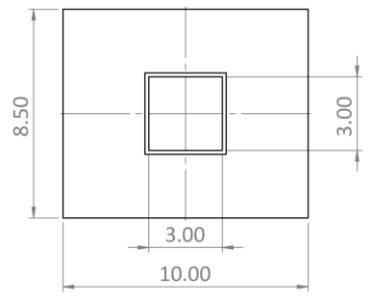
Ao	3,50	+/- 0,1
Bo	3,50	+/- 0,1
Ko	1,15	+/- 0,1
F	5,50	+/- 0,05
P 1	8,00	+/- 0,1
W	12,00	+/- 0,3

(I) Measured from centreline of sprocket hole to centreline of pocket.
(II) Cumulative tolerance of 10 sprocket holes is ± 0,20 .
(III) Measured from centreline of sprocket hole to centreline of pocket.
(IV) Other material available.

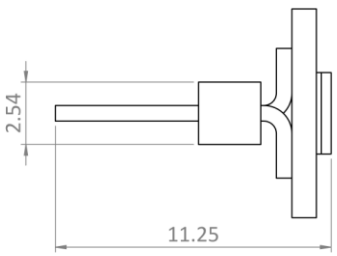
ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE STATED.

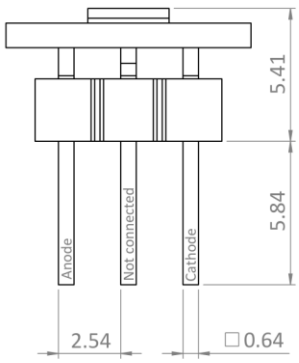
1000 pcs per 7” reel
1 – 999 pcs are delivered as cut tape

PM33xx-WB preassembled on PCB with Pins
Plug and Play compatible to KETEK SiPM Evaluation Kit*



Top View





Side Views

* Evaluation Kits, SiPMs, SiPM Arrays and Accessories are available for purchase at www.ketek.net/store/

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Revision History	
Revision and Date	**Changes**
Rev. 2019-C July 2019	Updated table “Main Characteristics” and corresponding plots Updated table “Performance Overview at 21°C” corresponding plots Updated “Recommended Reflow Solder Profile” Updated “Tape and Reel Specifications” with number of pcs per reel
Rev. 2019-B June 2019	Added part orientation to “Tape and Reel Specifications”
Rev. 2019-A January 2019	Updated design and layout Updated “Technical Drawing and Recommended Footprint” Added performance plots for all key parameters
Rev. 2018-A December 2018	Added “Tape and Reel Specifications”
Rev. 2017-B April 2017	Updated table “Performance Overview at 21°C” Added “Recommended Reflow Solder Profile”
Rev. 2017-A February 2017	Added “PM33xx-WB preassembled on PCB with Pins (available for Evaluation Purposes)”
Rev. 2016-A October 2016	Initial Release

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