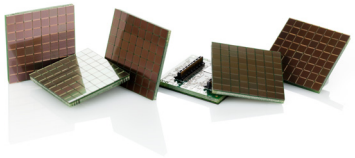
Data Sheet

AFBR-S4K33P64XXL Series

8 × 8 SiPM Array, WL-Type, 3 × 3 mm^2 Channel Size, 15-µm, 35-µm, or 47-µm Microcells



Description

The Broadcom® AFBR-S4K33P64XXL series are silicon photomultiplier (SiPM) arrays.

The four-side seamlessly tileable 8 × 8 arrays have an 80% fill factor based on a 3.0 × 3.0 mm^2 pixel size and a pixel pitch of 3.36 mm. The WL-type series stands for high efficiency and improved low noise performance. Low voltage and excellent uniformity enables tight integration into medical imaging, handhelds, and optical sorting.

Features

- 8 × 8 array, 3 × 3 mm^2 pixel size
- 3.36 mm pixel pitch
- Array fill factor 80%, four-side seamless tileable
- Replacement for PMTs, APDs, and PIN diodes
- Low voltage operation (< 40V)
- Excellent uniformity of V_{BD} with ± 125 mV

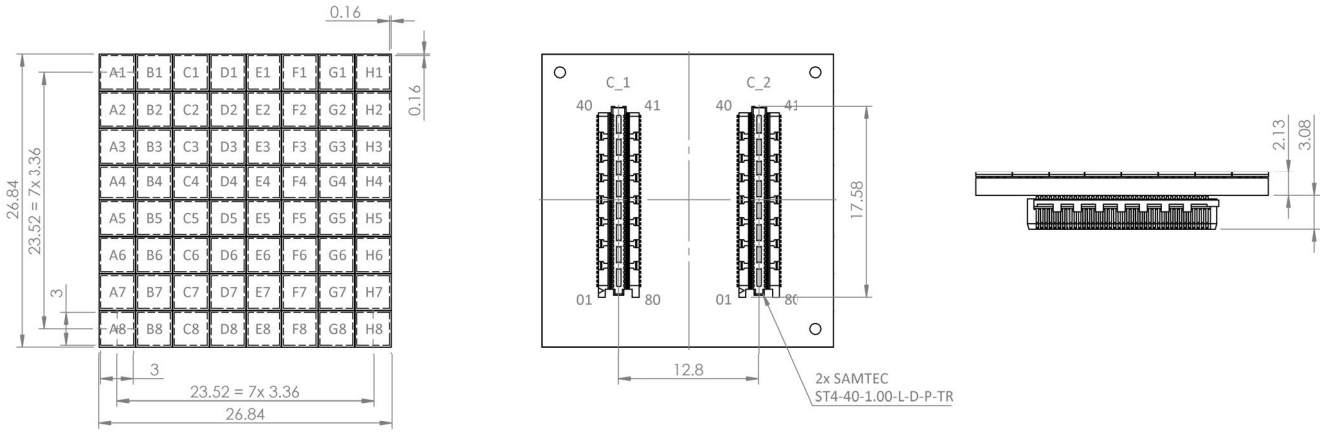
Applications

- Positron emission tomography
- Scintillator readout
- Medical imaging
- Gamma and compton cameras
- Handhelds
- High-energy physics and research
- Optical sorting
- Hazard and threat detection
- Analytical instrumentation

NOTE: All values in this data sheet are typical values if not marked with min., max., <, or >.

Mechanical Specifications

Figure 1: AFBR-S4K33P6447L



General Parameters and Ordering Information

Type	Active Area of SiPM Pixel [mm^2]	Microcell Size of SiPM Pixel [µm]	SiPM Pixel Pitch in Array [mm]	Array Dimensions [mm^3]
AFBR-S4K33P6415L based on AFBR-S4K33C0115L SiPM	3.0 × 3.0	15	3.36	26.835 × 26.835 × 5.4
AFBR-S4K33P6435L based on AFBR-S4K33C0135L SiPM	3.0 × 3.0	35	3.36	26.835 × 26.835 × 5.4
AFBR-S4K33P6447L based on AFBR-S4K33C0147L SiPM	3.0 × 3.0	47	3.36	26.835 × 26.835 × 5.4

Main Characteristics

Parameter	Min.	Typ.	Max.	Units
Breakdown Voltage (V_{BD}) at 21°C	28.75	—	30.25	V
Breakdown Voltage Variation per Array	—	± 0.125	—	V
Recommended Overvoltage (V_{OV})	—	1.0 to 6.5	7.5	V
Temperature Dependency of V_{BD}	—	22	—	mV/K
Temperature Dependency of Gain	—	0.4% at 5.0 V_{OV}	—	1/K
Operating Temperature Range	–40	—	+60	°C
Reliability Classification	—	MSL1	—	
Index of Refraction of Glass Entrance Window	—	1.52 at 430 nm	—	
Surface Roughness of the Array	—	< 10	—	µm (signal)

Pin Mapping

Connector C_1			
SAMTEC ST4-40-1.00-L-D-P-TR[a]			
Pin	**SiPM Pixel**	**Pin**	**SiPM Pixel**
1	Cathode (G8)	41	Cathode (F1)
2	Cathode (H8)	42	Cathode (E1)
3	NC[b]	43	NC
4	Anode (G8)	44	Anode (F1)
5	Anode (H8)	45	Anode (E1)
6	Anode (H7)	46	Anode (E2)
7	Anode (G7)	47	Anode (F2)
8	NC	48	NC
9	Cathode (H7)	49	Cathode (E2)
10	Cathode (G7)	50	Cathode (F2)
11	Cathode (G6)	51	Cathode (F3)
12	Cathode (H6)	52	Cathode (E3)
13	NC	53	NC
14	Anode (G6)	54	Anode (F3)
15	Anode (H6)	55	Anode (E3)
16	Anode (H5)	56	Anode (E4)
17	Anode (G5)	57	Anode (F4)
18	NC	58	NC
19	Cathode (H5)	59	Cathode (E4)
20	Cathode (G5)	60	Cathode (F4)
21	Cathode (G4)	61	Cathode (F5)
22	Cathode (H4)	62	Cathode (E5)
23	NC	63	NC
24	Anode (G4)	64	Anode (F5)
25	Anode (H4)	65	Anode (E5)
26	Anode (H3)	66	Anode (E6)
27	Anode (G3)	67	Anode (F6)
28	NC	68	NC
29	Cathode (H3)	69	Cathode (E6)
30	Cathode (G3)	70	Cathode (F6)
31	Cathode (G2)	71	Cathode (F7)
32	Cathode (H2)	72	Cathode (E7)
33	NC	73	NC
34	Anode (G2)	74	Anode (F7)
35	Anode (H2)	75	Anode (E7)
36	Anode (H1)	76	Anode (E8)
37	Anode (G1)	77	Anode (F8)
38	NC	78	NC

Connector C_2			
SAMTEC ST4-40-1.00-L-D-P-TR[a]			
Pin	**SiPM Pixel**	**Pin**	**SiPM Pixel**
1	Cathode (C8)	41	Cathode (B1)
2	Cathode (D8)	42	Cathode (A1)
3	NC	43	NC
4	Anode (C8)	44	Anode (B1)
5	Anode (D8)	45	Anode (A1)
6	Anode (D7)	46	Anode (A2)
7	Anode (C7)	47	Anode (B2)
8	NC	48	NC
9	Cathode (D7)	49	Cathode (A2)
10	Cathode (C7)	50	Cathode (B2)
11	Cathode (C6)	51	Cathode (B3)
12	Cathode (D6)	52	Cathode (A3)
13	NC	53	NC
14	Anode (C6)	54	Anode (B3)
15	Anode (D6)	55	Anode (A3)
16	Anode (D5)	56	Anode (A4)
17	Anode (C5)	57	Anode (B4)
18	NC	58	NC
19	Cathode (D5)	59	Cathode (A4)
20	Cathode (C5)	60	Cathode (B4)
21	Cathode (C4)	61	Cathode (B5)
22	Cathode (D4)	62	Cathode (A5)
23	NC	63	NC
24	Anode (C4)	64	Anode (B5)
25	Anode (D4)	65	Anode (A5)
26	Anode (D3)	66	Anode (A6)
27	Anode (C3)	67	Anode (B6)
28	NC	68	NC
29	Cathode (D3)	69	Cathode (A6)
30	Cathode (C3)	70	Cathode (B6)
31	Cathode (C2)	71	Cathode (B7)
32	Cathode (D2)	72	Cathode (A7)
33	NC	73	NC
34	Anode (C2)	74	Anode (B7)
35	Anode (D2)	75	Anode (A7)
36	Anode (D1)	76	Anode (A8)
37	Anode (C1)	77	Anode (B8)
38	NC	78	NC

Connector C_1			
SAMTEC ST4-40-1.00-L-D-P-TR[a]			
Pin	**SiPM Pixel**	**Pin**	**SiPM Pixel**
39	Cathode (H1)	79	Cathode (E8)
40	Cathode (G1)	80	Cathode (F8)

Connector C_2			
SAMTEC ST4-40-1.00-L-D-P-TR[a]			
Pin	**SiPM Pixel**	**Pin**	**SiPM Pixel**
39	Cathode (D1)	79	Cathode (A8)
40	Cathode (C1)	80	Cathode (B8)

a. SAMTEC ST4-40-1.00-L-D-P-TR mates with SAMTEC SS4-40-3.00-L-D-K-TR, mated stacking height 4 mm.

b. NC = Not Connected

BROADCOM®

Lead (Pb) Free
RoHS Compliant