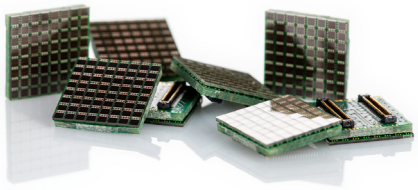
Data Sheet

AFBR-S4K11P6425B

8 × 8 SiPM Array, WB-Type, 1 × 1 mm^2 Channel Size



Description

The Broadcom® AFBR-S4K11P6425B is a silicon photomultiplier (SiPM) array.

The four-side seamlessly tileable 8 × 8 array has an 80% fill factor based on a 1.0 × 1.0 mm^2 pixel size and a pixel pitch of 1.36 mm. Low voltage and excellent uniformity enables tight integration into medical imaging, handhelds, and optical sorting.

Features

- 8 × 8 array, 1 × 1 mm^2 pixel size
- 1.36 mm pixel pitch
- Array fill factor 80%, four-side seamless tileable
- Replacement for PMTs, APDs, and PIN diodes
- Low voltage operation (typically about 30V)
- Excellent uniformity of V_{BD} with ± 300 mV

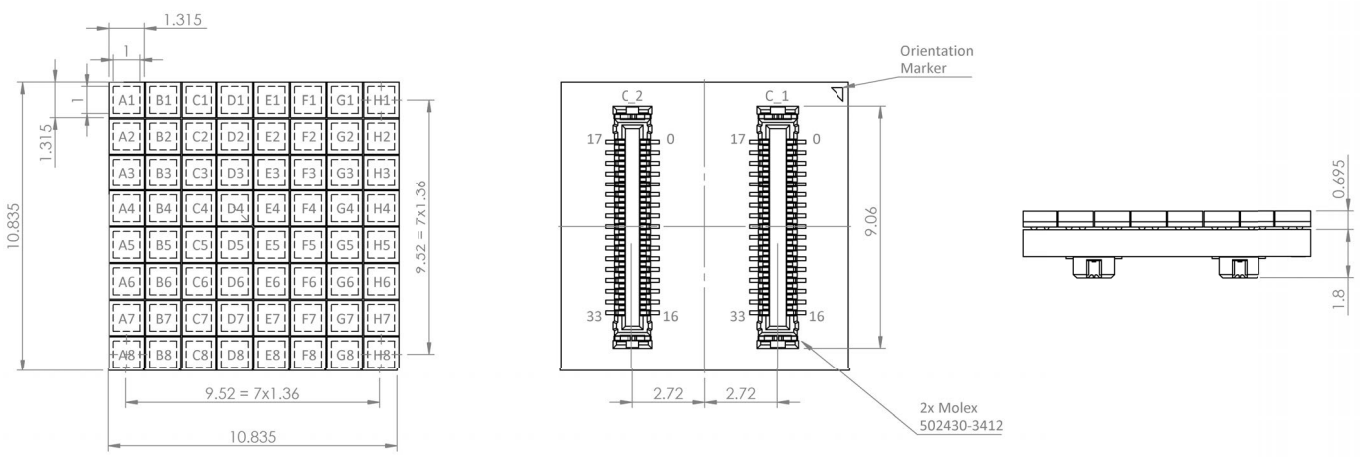
Applications

- 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-S4K11P6425B Dimensions



NOTE: General tolerances are ± 0.1 mm unless otherwise noted.

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-S4K11P6425B based on AFBR-S4K11C0125B SiPM[a]	1.0 × 1.0	25	1.36	10.835 × 10.835 × 2.495

a. Full SiPM specification can be found in the corresponding SiPM Datasheet of AFBR-S4K11C0125B at https://www.broadcom.com/products/optical-sensors/silicon-photomultiplier-sipm.

Main Characteristics

Parameter	Min.	Typ.	Max.	Units
Breakdown Voltage (V_{BD}) at 21°C	23.5	—	25.5	V
Breakdown Voltage Variation per Array	—	± 0.300	—	V
Recommended Overvoltage (V_{OV})	—	2.0 to 5.0	6.0	V
Temperature Dependency of V_{BD}	—	22.0	—	mV/K
Temperature Dependency of Gain	—	0.3% 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	—	

Pin Mapping

Connector C_1		
Molex 502430-3412[a]		
Pin	**SiPM Pixel**	**Common Cathode**
0	Cathode (BIAS_Q1)	BIAS_Q1
1	Anode (A1)	BIAS_Q1
2	Anode (B1)	BIAS_Q1
3	Anode (A2)	BIAS_Q1
4	Anode (B2)	BIAS_Q1
5	Anode (A3)	BIAS_Q1
6	Anode (B3)	BIAS_Q1
7	Anode (A4)	BIAS_Q1
8	Anode (B4)	BIAS_Q1
9	Anode (A5)	BIAS_Q2
10	Anode (B5)	BIAS_Q2
11	Anode (A6)	BIAS_Q2
12	Anode (B6)	BIAS_Q2
13	Anode (A7)	BIAS_Q2
14	Anode (B7)	BIAS_Q2
15	Anode (A8)	BIAS_Q2
16	Anode (B8)	BIAS_Q2
17	Cathode (BIAS_Q2)	BIAS_Q2
18	Anode (C1)	BIAS_Q1
19	Anode (D1)	BIAS_Q1
20	Anode (C2)	BIAS_Q1
21	Anode (D2)	BIAS_Q1
22	Anode (C3)	BIAS_Q1
23	Anode (D3)	BIAS_Q1
24	Anode (C4)	BIAS_Q1
25	Anode (D4)	BIAS_Q1
26	Anode (C5)	BIAS_Q2
27	Anode (D5)	BIAS_Q2
28	Anode (C6)	BIAS_Q2
29	Anode (D6)	BIAS_Q2
30	Anode (C7)	BIAS_Q2
31	Anode (D7)	BIAS_Q2
32	Anode (C8)	BIAS_Q2
33	Anode (D8)	BIAS_Q2

Connector C_2		
Molex 502430-3412[a]		
Pin	**SiPM Pixel**	**Common Cathode**
0	Cathode (BIAS_Q3)	BIAS_Q3
1	Anode (E1)	BIAS_Q3
2	Anode (F1)	BIAS_Q3
3	Anode (E2)	BIAS_Q3
4	Anode (F2)	BIAS_Q3
5	Anode (E3)	BIAS_Q3
6	Anode (F3)	BIAS_Q3
7	Anode (E4)	BIAS_Q3
8	Anode (F4)	BIAS_Q3
9	Anode (E5)	BIAS_Q4
10	Anode (F5)	BIAS_Q4
11	Anode (E6)	BIAS_Q4
12	Anode (F6)	BIAS_Q4
13	Anode (E7)	BIAS_Q4
14	Anode (F7)	BIAS_Q4
15	Anode (E8)	BIAS_Q4
16	Anode (F8)	BIAS_Q4
17	Cathode (BIAS_Q4)	BIAS_Q4
18	Anode (G1)	BIAS_Q3
19	Anode (H1)	BIAS_Q3
20	Anode (G2)	BIAS_Q3
21	Anode (H2)	BIAS_Q3
22	Anode (G3)	BIAS_Q3
23	Anode (H3)	BIAS_Q3
24	Anode (G4)	BIAS_Q3
25	Anode (H4)	BIAS_Q3
26	Anode (G5)	BIAS_Q4
27	Anode (H5)	BIAS_Q4
28	Anode (G6)	BIAS_Q4
29	Anode (H6)	BIAS_Q4
30	Anode (G7)	BIAS_Q4
31	Anode (H7)	BIAS_Q4
32	Anode (G8)	BIAS_Q4
33	Anode (H8)	BIAS_Q4

a. Molex 502430-3410 mates with Molex 502426-3412 (or alternatively Molex 502426-3410), mated stacking height 1 mm.

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Lead (Pb) Free
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