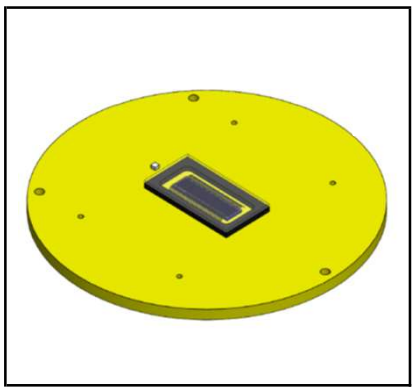
First Sensor

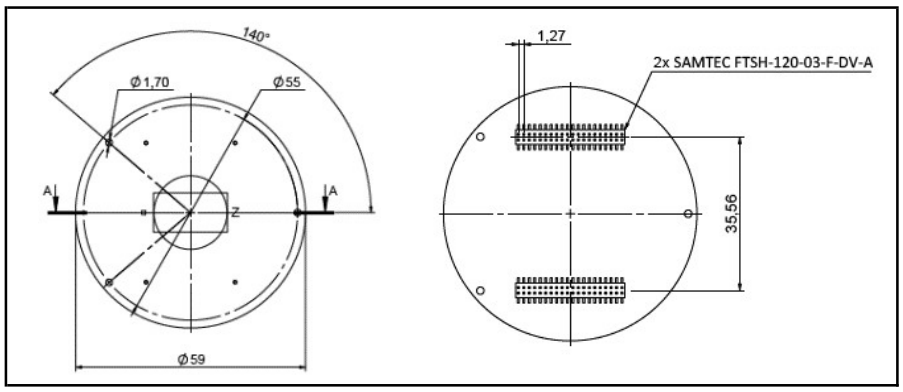
First Sensor APD Array Evaluation Board Data Sheet

Part Description 32AA1.2-9 Ch w/ PCB (160-240V)

Order # 3005816

Samples for evaluation purposes only





Features

- 32 element APD array
- High QE >80% for λ = 760-910 nm
- High speed, low noise

Description

Matrix APD array for NIR detection. Circular PCB with 2 Samtec FTSH-120-03-F-DV-A connectors, glued frame and AR coated cover glass for APD protection. Integrated temperature sensor and HV capacitor.

Application

- LIDAR applications

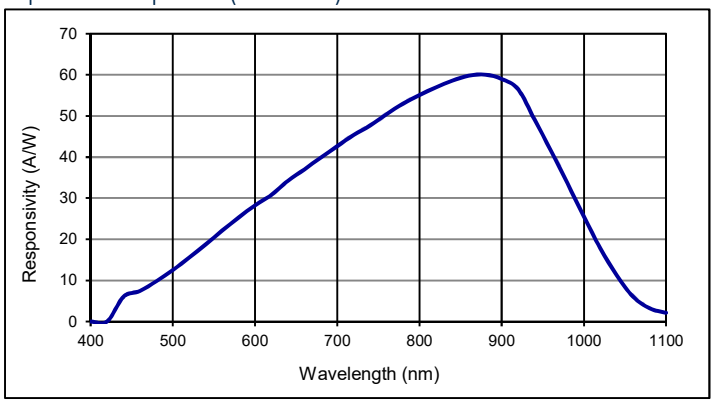
RoHS

2011/65/EU

Absolute maximum ratings

Symbol	Parameter	Min	Max	Unit
T_{STG}	Storage temp	-40	100	°C
T_{OP}	Operating temp	-40	85	°C
M_{max}	Gain (I_{P0} = 1 nA)	200		
I_{PEAK}	Peak DC current (linearity)		0.25	mA

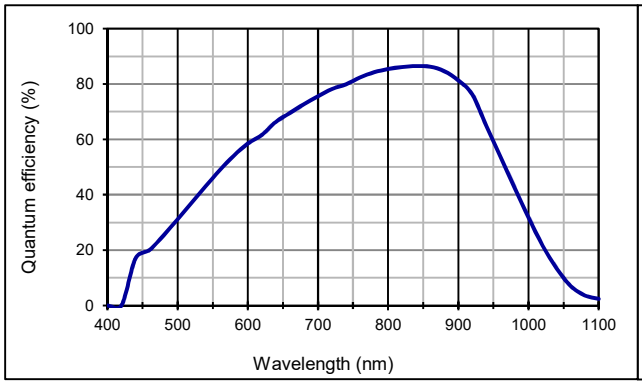
Spectral response (M = 100)



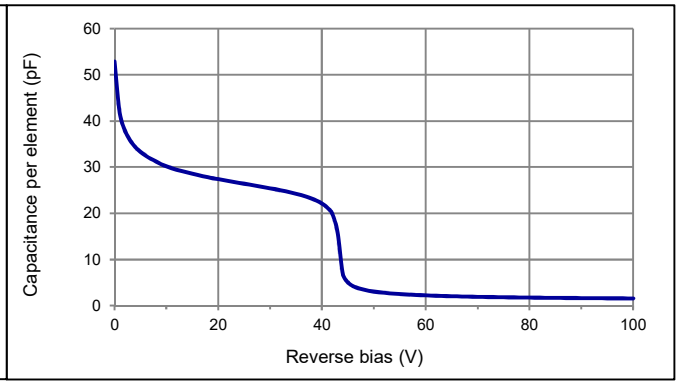
Electro-optical characteristics @ 23°C

Symbol	Characteristic	Test Condition	Min	Typ	Max	Unit
	No of elements			32		
	Chip size			12920 x 5280		µm
	Active area	per element		340 x 3600		µm
	Gap; Pitch			40 ; 380		µm
I_D	Dark current	M = 50, per element		0.25	1.5	nA
C	Capacitance	M = 50, per element		2,6		pF
	Responsivity	M = 100; λ = 905 nm	52	58		A/W
t_R	Rise time	M = 100; λ = 905 nm; R_L = 50 Ω		1.5		ns
V_{BR}	Breakdown voltage	I_R = 10 µA	160		240	V
	Temperature coefficient	Ubr		1.49		V/K
	Cross talk suppression	DC, λ = 905 nm		50		dB
	Gain uniformity	M = 50		± 15	± 30	%
t	Cover glass thickness		500	550	600	µm
T	Transmission AR coating	λ = 905 nm, AOI=0°	99			%
	Temperature sensor accuracy			± 1.5	± 4	°C
C_{HV}	High voltage capacitor			4.7		nF

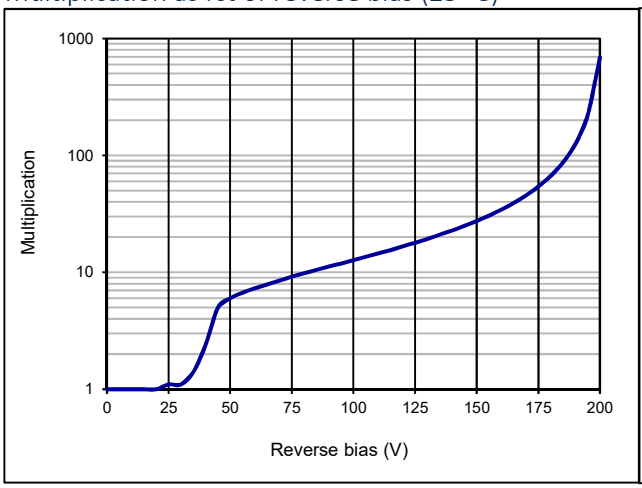
Quantum efficiency (23 °C)



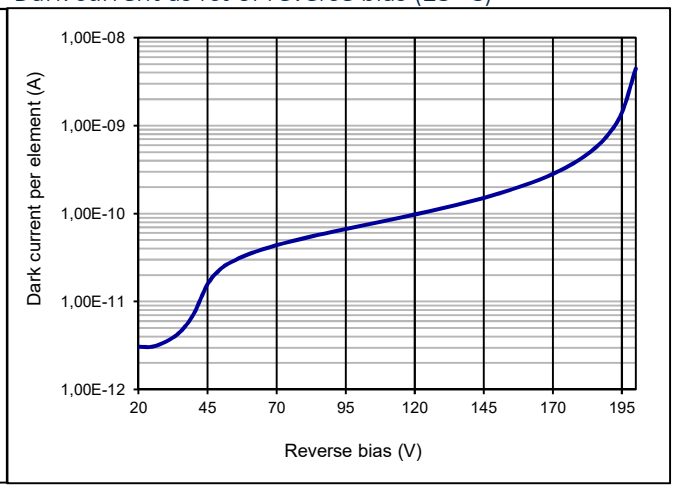
Capacitance as fct of reverse bias (23 °C)



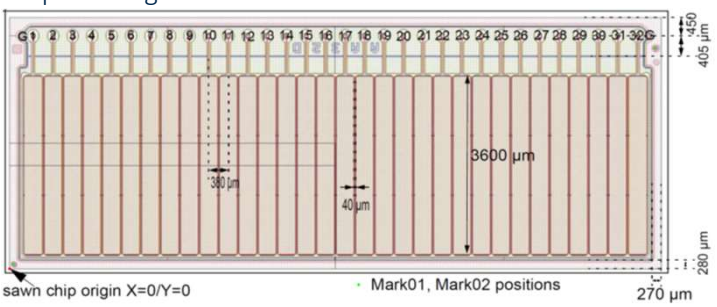
Multiplication as fct of reverse bias (23 °C)



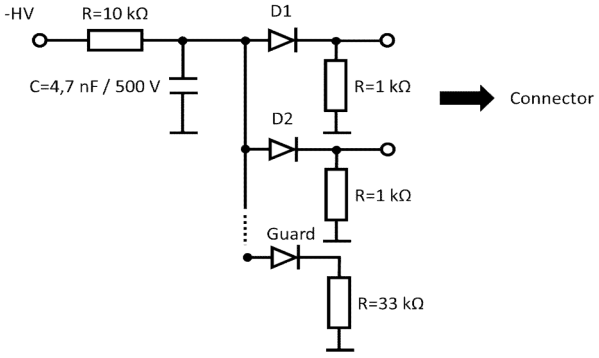
Dark current as fct of reverse bias (23 °C)



Chip drawing 32AA1.2-9



APD-Array circuitry



Technical drawing
t.b.d

Mating connectors: SAMTEC CLP-120-02-F-D-TR

First Sensor

Pin allocation

CONNECTOR J1 (FTSH-120-03-F-DV-A)			
1	nc	2	nc
3	GND	4	GND
5	nc	6	nc
7	nc	8	nc
9	nc	10	nc
11	nc	12	nc
13	nc	14	nc
15	nc	16	nc
17	nc	18	nc
19	nc	20	nc
21	nc	22	nc
23	nc	24	nc
25	nc	26	nc
27	nc	28	nc
29	nc	30	nc
31	nc	32	nc
33	nc	34	nc
35	nc	36	nc
37	GND	38	GND
39	OUT LM20	40	P5V

CONNECTOR J2 (FTSH-120-03-F-DV-A)			
1	nc	2	nc
3	GND	4	GND
5	C1	6	C2
7	C3	8	C4
9	C5	10	C6
11	C7	12	C8
13	C9	14	C10
15	C11	16	C12
17	C13	18	C14
19	C15	20	C16
21	C17	22	C18
23	C19	24	C20
25	C21	26	C22
27	C23	28	C24
29	C25	30	C26
31	C27	32	C28
33	C29	34	C30
35	C31	36	C32
37	GND	38	GND
39	-HV	40	-HV

Characteristics of temperature sensor

T [°C]	Voltage [V]	T [°C]	Voltage [V]	T [°C]	Voltage [V]
-40	2,317692	14	1,70213952	68	1,063959
-38	2,3	16	1,68	70	1,04
-36	2,27	18	1,66	72	1,02
-34	2,25	20	1,63	74	0,99
-32	2,23	22	1,61	76	0,97
-30	2,21	24	1,59	78	0,94
-28	2,18	26	1,56	80	0,92
-26	2,16	28	1,54	82	0,89
-24	2,14	30	1,52	84	0,87
-22	2,12	32	1,49	86	0,85
-20	2,09	34	1,47	88	0,82
-18	2,07	36	1,44	90	0,8
-16	2,05	38	1,42	92	0,77
-14	2,02	40	1,4	94	0,75
-12	2	42	1,37	96	0,72
-10	1,98	44	1,35	98	0,7
-8	1,96	46	1,33	100	0,68
-6	1,93	48	1,3	102	0,65
-4	1,91	50	1,28	104	0,63
-2	1,89	52	1,26	106	0,6
0	1,86	54	1,23	108	0,58
2	1,84	56	1,21	110	0,55
4	1,82	58	1,18	112	0,53
6	1,79	60	1,16	114	0,5
8	1,77	62	1,14	116	0,48
10	1,75	64	1,11	118	0,45
12	1,73	66	1,09	120	0,43

Characteristic curve of temperature sensor