
Features

- 25 element APD array
- 120 MHz bandwidth
- 10 kΩ transimpedance
- Low noise

Description

Analog evaluation board for APD array including digital on/off switch, temperature compensated bias, amplifiers and comparators.

Application

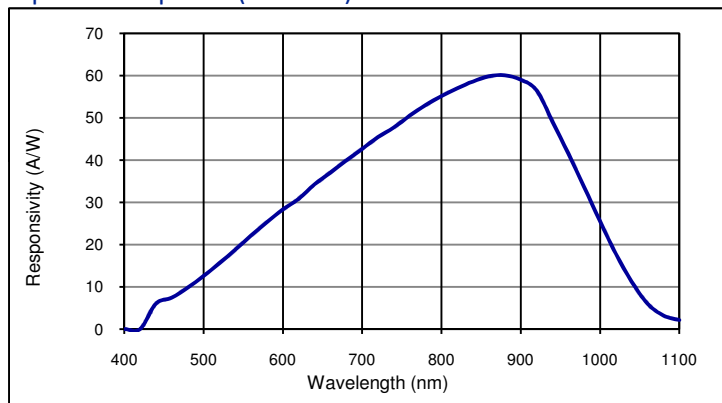
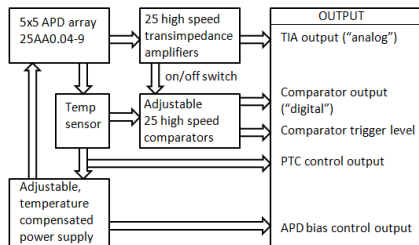
- LIDAR applications
- Shape recognition
- Collision warning

RoHS

2002/95/EC


Absolute maximum ratings

Symbol	Parameter	Min	Max	Unit
T_{STG}	Storage temp	-40	125	°C
T_{OP}	Operating temp	-25	70	°C
M_{max}	Overall gain	2E6		

Spectral response (M = 100)

Schematic

Electro-optical characteristics of APD chip @ 23 °C

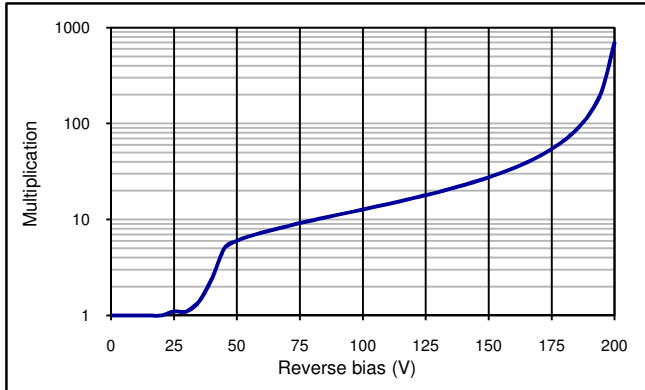
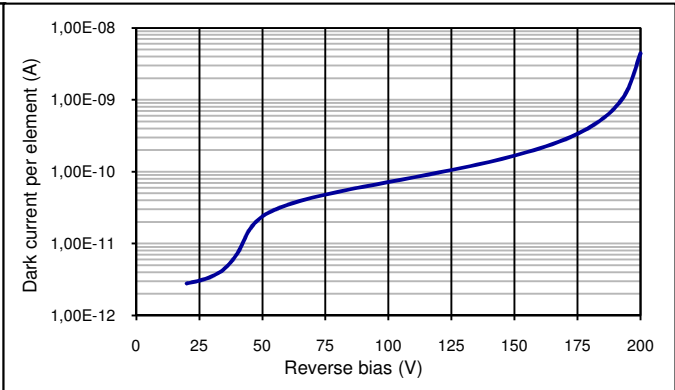
Symbol	Characteristic	Test Condition	Min	Typ	Max	Unit
	No of elements		25			
	Active area		205 x 205			μm
	Gap; Pitch		95 ; 300			μm
I_D	Dark current	M = 100, per element		0.6		nA
C	Capacitance	M = 100, per element		1		pF
	Responsivity	M = 100; λ = 905 nm	55	60		A/W
t_R	Rise time	M = 100; λ = 905 nm; $R_L = 50 \Omega$		1		ns
V_{BR}	Breakdown voltage	$I_R = 2 \mu A$	120	200	240	V
	Temperature coefficient			1.45		V/K
	Cross talk	λ = 905 nm		50		dB
	Photo current uniformity	M = 50		± 5	± 20	%
	Dark current uniformity	M = 50		± 5	± 20	%

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APD multiplication as fct of reverse bias (23 °C)

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

Characteristics of evaluation board @ 23 °C

Part	Characteristic	Test Condition	Min	Typ	Max	Unit
Module	Supply voltage			+/- 5		V
Module	Supply current		650	700	750	mA
Amplifiers						
Amplifier	Supply voltage	all 25 Channels	+/- 4.5	+/- 5	+/- 5.5	V
Amplifier	Supply current	all 25 Channels		220		mA
Amplifier	Transimpedance*			10		kΩ
Amplifier	Output impedance			0,3		Ω
Amplifier	Differential output voltage			+/-2		V
Amplifier	Rise time	1 Volt Step		2.2		ns
Amplifier	Voltage noise	1 MHz		3.7		nV/√Hz
Amplifier	Current noise	1 MHz		1.1		pA/√Hz
Amplifier	Bandwidth*	-3 db	120			MHz
Amplifier	Power supply rejection ratio			73		db
Amplifier	Offset voltage typical			0.8		mV
Amplifier	Coupling		AC (DC upon special request)			
Comparitors						
Compar.	Supply voltage		4.7	5	5.3	V
Compar.	Supply current	no load		65		mA
Compar.	Output voltage	logic high/low		0.8/4.7		V
Compar.	Output short circuit current			68		mA
Compar.	Max. differential output voltage			8		mV
Compar.	Rise time			1.3		ns
Compar.	Voltage noise			-85		dB
Power Supply						
Power Sup.	Output to APD (user adjustable)	DC	0	250	490	V
Power Sup.	Supply current			350		mA
Power Sup.	Temperature compensated			yes		
Detector head						
D. H.	Field of view		+/- 30			°
T-Sensor	PTC	R ₂₅	9.5	10	10.5	kOhm
		B _{25/85}	3366	3435	3504	K
Connector						
Maker	Samtec (www.samtec.com)	Type	QSE-040-01-L-D-A			
		Pitch	0.8			mm
		Mating cable	EQCD series (Samtec)			

* Transimpedance and bandwidth can be altered upon special request. A lower transimpedance with higher bandwidth is possible.

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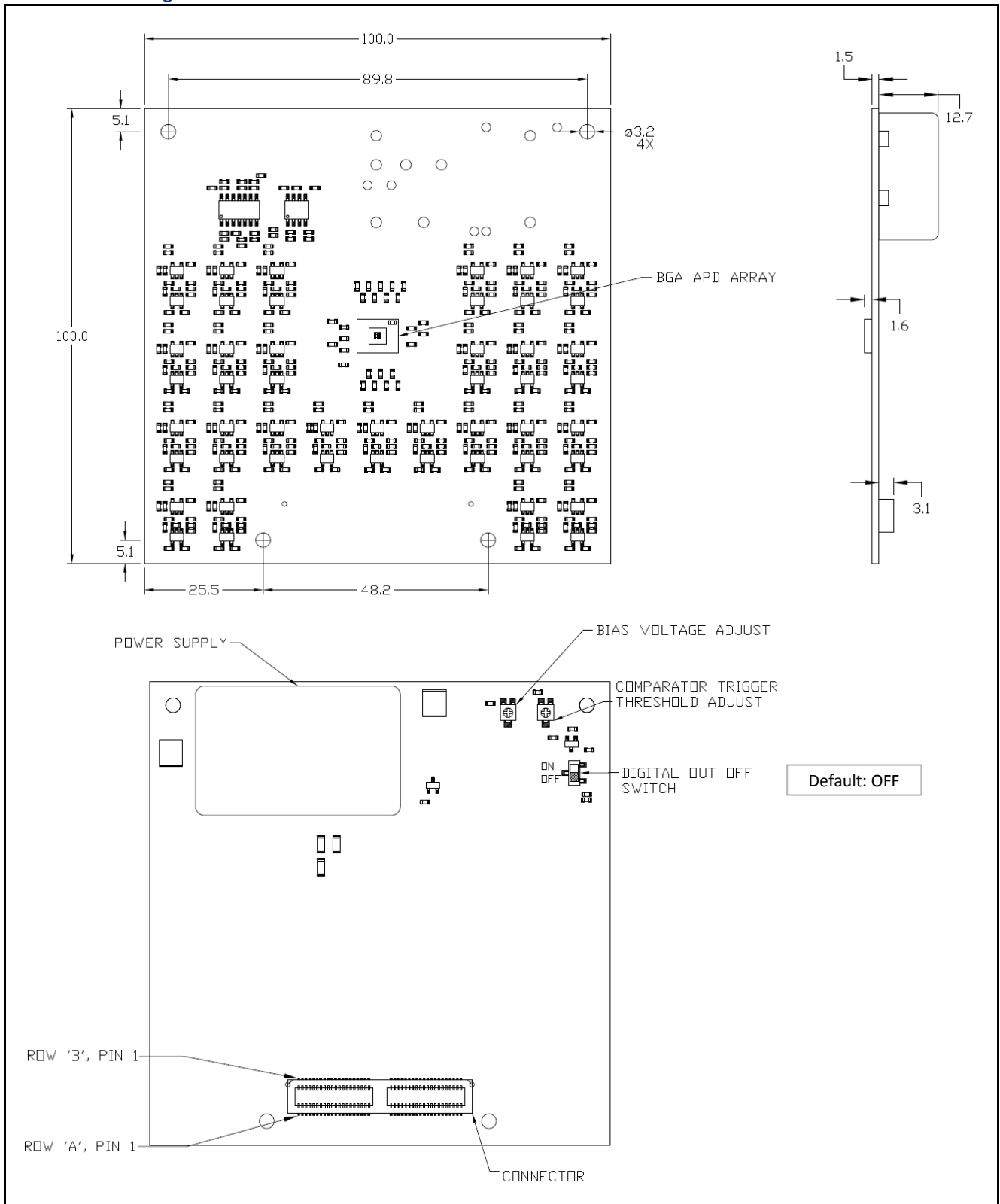
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Technical Drawing



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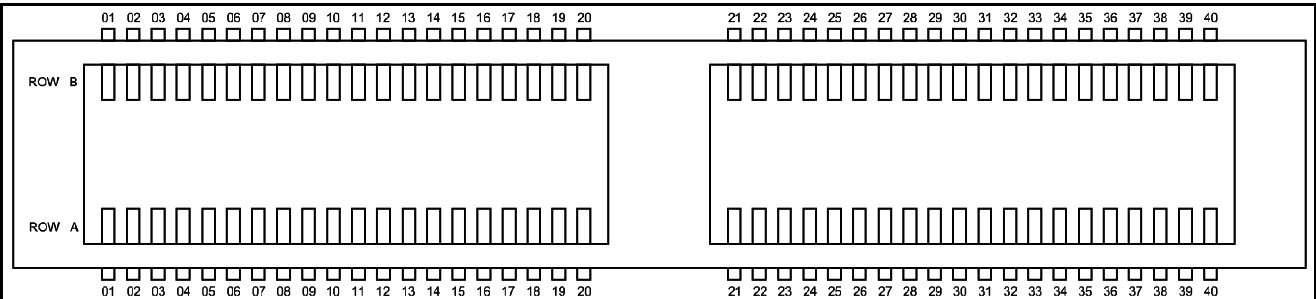


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Connector schedule


Connector row A [Power]			
PIN	Designator	PIN	Designator
1	APD E5 A	21	T1
2	APD E5 D	22	T2
3	APD D4 A	23	TRIGGER
4	APD D4 D	24	GROUND
5	APD E4 D	25	GROUND
6		26	GROUND
7	-5V DC	27	GROUND
8	-5V DC	28	GROUND
9	-5V DC	29	GROUND
10	-5V DC	30	GROUND
11	-5V DC	31	GROUND
12		32	GROUND
13	+5V DC	33	GROUND
14	+5V DC	34	100:1 BIAS MON
15	+5V DC	35	APD E2 D
16	+5V DC	36	APD E2 A
17	+5V DC	37	APD C2 A
18	+5V DC	38	APD C2 D
19	+5V DC	39	APD E1 A
20	+5V DC	40	APD E1 D

Connector row B [Signal]			
PIN	Designator	PIN	Designator
1	APD E4 A	21	APD E3 A
2	APD D3 A	22	APD D2 A
3	APD D3 D	23	APD D2 D
4	APD D5 A	24	APD B3 A
5	APD D5 D	25	APD B3 D
6	APD C5 A	26	APD A1 A
7	APD C5 D	27	APD A1 D
8	APD C4 A	28	
9	APD C4 D	29	APD A3 A
10	APD B5 A	30	APD A3 D
11	APD B5 D	31	APD A2 A
12	APD A4 A	32	APD A2 D
13	APD A4 D	33	APD B2 A
14	APD B4 A	34	APD B2 D
15	APD B4 D	35	APD B1 A
16	APD A5 A	36	APD B1 D
17	APD A5 D	37	APD D1 A
18	APD C3 D	38	APD D1 D
19	APD E3 D	39	APD C1 A
20	APD C3 A	40	APD C1 D

T1; T2... Contacts for temperature sensor (PTC) with 10kOhm, monitoring only

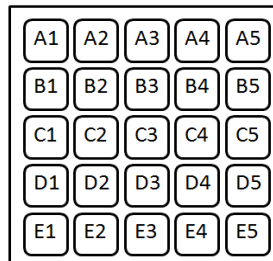
D... Digital output out of comparator

A... Analog output out of TIA

TRIGGER... Trigger voltage of comparator

100:1 BIAS MON... APD bias monitor output

APD - Array (common anode):



Handling: Please consider ESD protection while handling.

Disclaimer: Due to our strive for continuous improvement, specifications are subject to change within our PCN policy according to JESD46C.

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