

### Features

- $\phi$  4 mm total active area
- Segmented in 4 quadrants
- High QE for  $\lambda = 850\text{-}1064$  nm
- TEC for temperature control

### Description

Segmented quadrant avalanche photodiode with enhanced IR responsivity in hermetic TO type metal can including peltier element.

### Application

- Pulsed 1064 nm laser detection
- Light source positioning
- Laser alignment

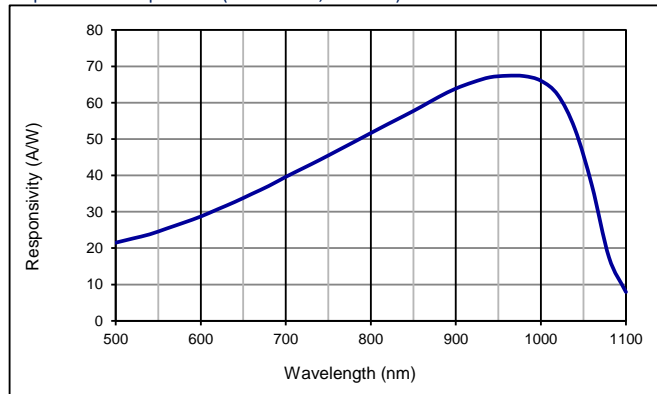
### RoHS

2011/65/EU

### Absolute maximum ratings

Symbol	Parameter	Min	Max	Unit
$T_{STG}$	Storage temp	-55	125	$^{\circ}\text{C}$
$T_{OP}$	Operating temp	-40*	100	$^{\circ}\text{C}$
$M_{max}$	Gain ( $I_{P0} = 1$ nA)	1000		
$I_{PEAK}$	Peak DC current		0.25	mA
$V_{TEC}$	TEC voltage		3.9	V
$I_{TEC}$	TEC current		1.9	A

### Spectral response ( $M = 100$ ; $23^{\circ}\text{C}$ )

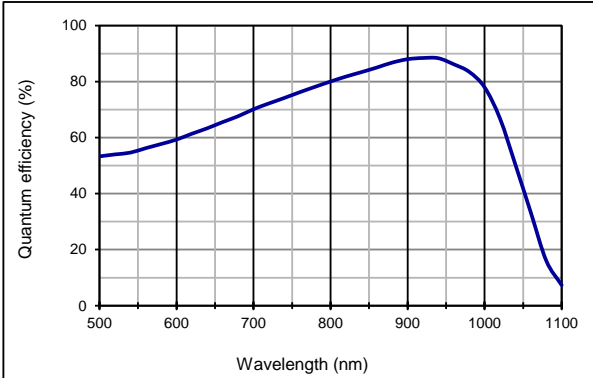


### Electro-optical characteristics @ $23^{\circ}\text{C}$

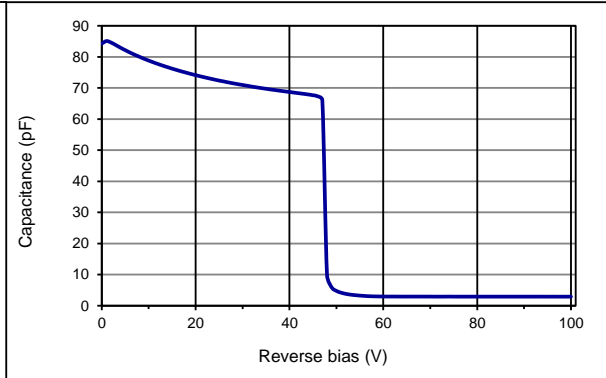
Symbol	Characteristic	Test Condition	Min	Typ	Max	Unit
	No of elements			4		
	Active area	segmented in 4 quadrants		$\phi$ 4000		$\mu\text{m}$
	Gap			110		$\mu\text{m}$
$I_D$	Dark current	$M = 100$ ; per segment		7	75	nA
$C$	Capacitance	$M = 100$ , per segment		4		pF
	Responsivity	$M = 100$ ; $\lambda = 1064$ nm		36		A/W
$t_R$	Rise time	$M = 100$ ; $\lambda = 905$ nm; $R_L = 50 \Omega$		5		ns
$V_{BR}$	Breakdown voltage	$I_R = 2 \mu\text{A}$	220	300	600	V
	Temperature coefficient			3.3		V/K
	Photo current uniformity	$M = 50$		$\pm 5$	$\pm 10$	%
	N.E.P.	$M = 100$ , $\lambda = 1064$ nm		$1.3\text{E-}15$		W/VHz
FOV	Field of view		$\pm 70$			$^{\circ}$
	Temp. sensor resistance	Thermistor (NTC), Beta( $25^{\circ}\text{C}/50^{\circ}\text{C}$ ) = 3930 K	9900	10000	10100	$\Omega$
	Heat transported by TEC	Performance under standard conditions			4.6	W

\* please note that depending on operation voltage APD operation at temperatures below  $-15^{\circ}\text{C}$  may require sophisticated control circuit.

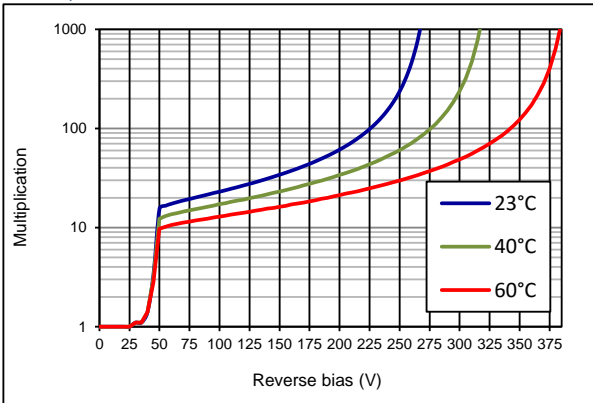
Quantum efficiency (23 °C)



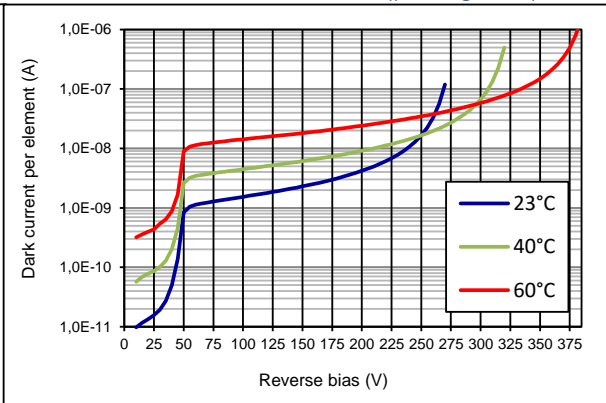
Capacitance as fct of reverse bias (23 °C, per segment)



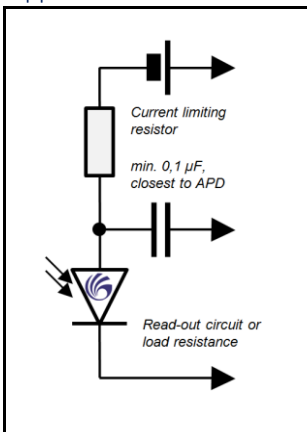
Multiplication as fct of reverse bias



Dark current as fct of reverse bias (per segment)



## Application hints:

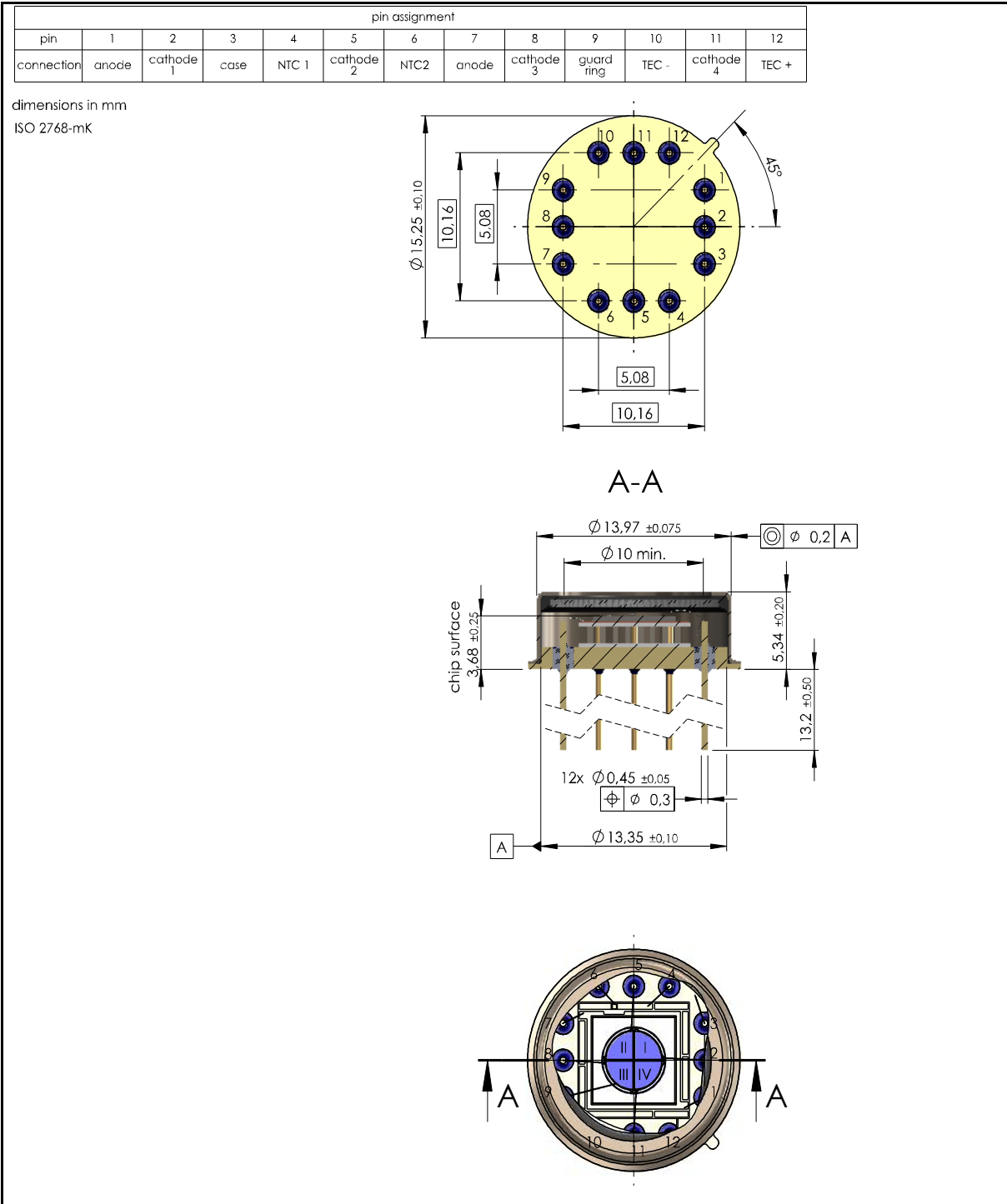


- Current should be limited by a protecting resistor or current limiting - IC inside the power supply
- Guard ring should be connected to ground
- For low light level applications blocking of ambient light should be used
- For high gain applications bias voltage should be temperature compensated
- Please consider basic ESD protection while handling
- Use low noise read-out - IC
- For further questions please refer to document "Instructions for handling and processing" and application notes for APDs and APD-Arrays

## Package dimension

Small quantities: Chips on foam pad, boxed (12 cm x 16.5 cm)

Technical Drawing, Package: TO8S TEC



Temperature Sensor (NTC)

Temp		Resistance [kΩ]		
[°C]	[K]	min	typ	max
-20	253	93,98	97,18	100,50
-19	254	88,83	91,80	94,86
-18	255	83,99	86,75	89,58
-17	256	79,44	81,99	84,62
-16	257	75,15	77,52	79,96
-15	258	71,11	73,31	75,57
-14	259	67,30	69,35	71,44
-13	260	63,72	65,62	67,56
-12	261	60,34	62,10	63,91
-11	262	57,16	58,80	60,47
-10	263	54,16	55,68	57,23
-9	264	51,33	52,73	54,17
-8	265	48,66	49,96	51,30
-7	266	46,14	47,35	48,59
-6	267	43,77	44,89	46,04
-5	268	41,53	42,57	43,64
-4	269	39,42	40,39	41,37
-3	270	37,43	38,33	39,24
-2	271	35,55	36,38	37,23
-1	272	33,77	34,55	35,33
0	273	32,10	32,82	33,55
1	274	30,51	31,18	31,86
2	275	29,02	29,64	30,26
3	276	27,60	28,18	28,76
4	277	26,27	26,80	27,34
5	278	25,00	25,49	25,99
6	279	23,80	24,26	24,72
7	280	22,67	23,09	23,52
8	281	21,60	21,99	22,39
9	282	20,58	20,95	21,31
10	283	19,62	19,96	20,30
11	284	18,71	19,02	19,34
12	285	17,84	18,13	18,42
13	286	17,02	17,29	17,56
14	287	16,25	16,49	16,74
15	288	15,51	15,74	15,97
16	289	14,81	15,02	15,23
17	290	14,15	14,34	14,54
18	291	13,52	13,70	13,88
19	292	12,92	13,08	13,25

Temp		Resistance [kΩ]		
[°C]	[K]	min	typ	max
20	293	12,35	12,50	12,66
21	294	11,81	11,95	12,09
22	295	11,29	11,42	11,55
23	296	10,81	10,93	11,04
24	297	10,34	10,45	10,56
25	298	9,90	10,00	10,10
26	299	9,47	9,57	9,67
27	300	9,06	9,16	9,26
28	301	8,68	8,78	8,87
29	302	8,31	8,41	8,50
30	303	7,96	8,05	8,15
31	304	7,62	7,72	7,82
32	305	7,30	7,40	7,50
33	306	7,00	7,09	7,19
34	307	6,71	6,80	6,90
35	308	6,44	6,53	6,62
36	309	6,17	6,26	6,36
37	310	5,92	6,01	6,10
38	311	5,68	5,77	5,86
39	312	5,46	5,54	5,63
40	313	5,24	5,33	5,41
41	314	5,03	5,12	5,20
42	315	4,83	4,92	5,00
43	316	4,64	4,73	4,81
44	317	4,46	4,54	4,63
45	318	4,29	4,37	4,45
46	319	4,13	4,20	4,28
47	320	3,97	4,04	4,12
48	321	3,82	3,89	3,97
49	322	3,67	3,75	3,82
50	323	3,54	3,61	3,68
51	324	3,40	3,47	3,55
52	325	3,28	3,35	3,42
53	326	3,16	3,22	3,29
54	327	3,04	3,11	3,18
55	328	2,93	3,00	3,06
56	329	2,82	2,89	2,95
57	330	2,72	2,78	2,85
58	331	2,62	2,69	2,75
59	332	2,53	2,59	2,65

$R(T_N)$

Technical Drawing, Package: TO8S TEC

Temp		Resistance [kΩ]		
[°C]	[K]	min	typ	max
60	333	2,44	2,50	2,56
61	334	2,36	2,41	2,47
62	335	2,27	2,33	2,39
63	336	2,19	2,25	2,31
64	337	2,12	2,17	2,23
65	338	2,05	2,10	2,15
66	339	1,98	2,03	2,08
67	340	1,91	1,96	2,01
68	341	1,84	1,89	1,95
69	342	1,78	1,83	1,88
70	343	1,72	1,77	1,82
71	344	1,67	1,71	1,76
72	345	1,61	1,66	1,70
73	346	1,56	1,60	1,65
74	347	1,51	1,55	1,60
75	348	1,46	1,50	1,54
76	349	1,41	1,45	1,50

Temp		Resistance [kΩ]		
[°C]	[K]	min	typ	max
77	350	1,37	1,41	1,45
78	351	1,32	1,36	1,40
79	352	1,28	1,32	1,36
80	353	1,24	1,28	1,32
81	354	1,20	1,24	1,28
82	355	1,16	1,20	1,24
83	356	1,13	1,16	1,20
84	357	1,09	1,13	1,16
85	358	1,06	1,09	1,13

<b>B [K]</b>	3890,7	3930	3969,3
<b>T<sub>N</sub> [K]</b>	298		

$$T = \frac{B \cdot T_N}{B + \ln\left(\frac{R_T}{R_N}\right) \cdot T_N}$$

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