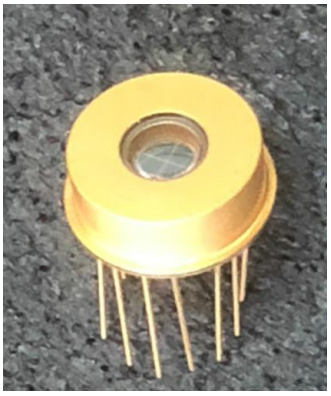
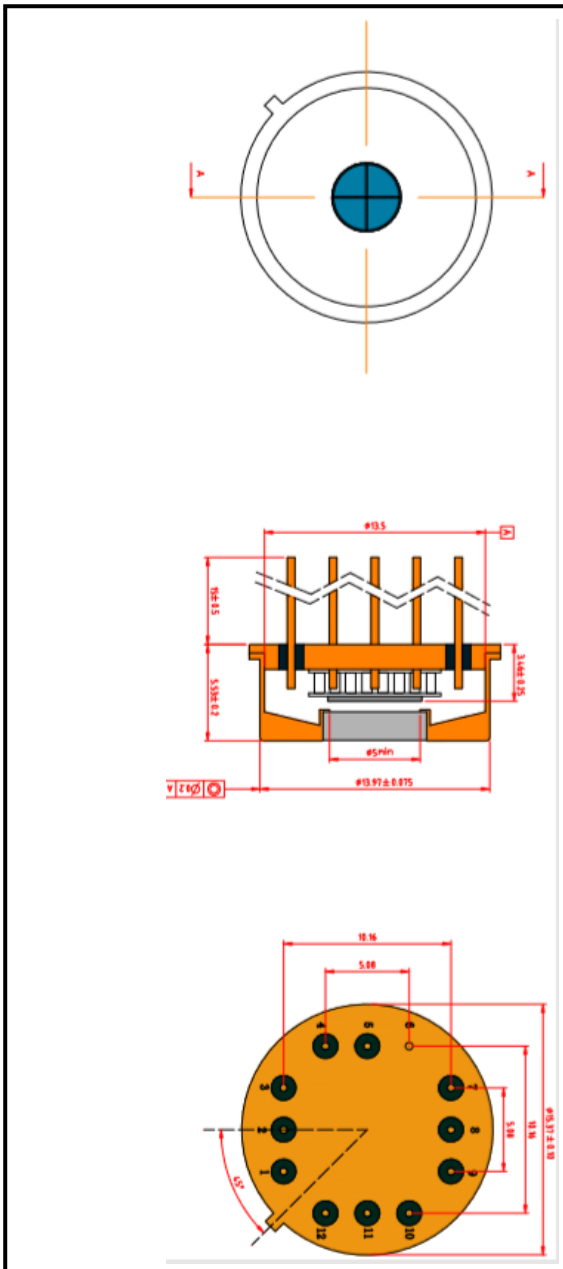
APD QUADRANT PHOTODIODE





Description

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

Features

* 4mm diameter active area
* Small gap
* High QE for 1064nm
* TEC for temperature control

Applications

* Laser beam position sensor
* Optical tweezers
* Laser guidance

Absolute maximum rating:

Storage temp.: -55~+125℃
Operating temp: -40~+100℃
Ipeak (peak DC current): 0.25mA
V_{TEC}: 4.3V (max.)
I_{TEC}: 1.8A (max.)

NOTES:

All dimension are in millimeters.

OTRON ELECTRONIC TECHNOLOGY CO., LTD
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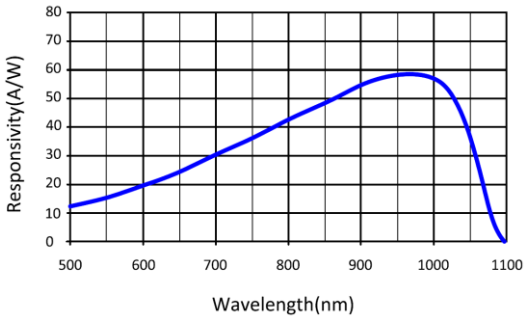
Absolute Maximum Ratings (Ta=25℃)

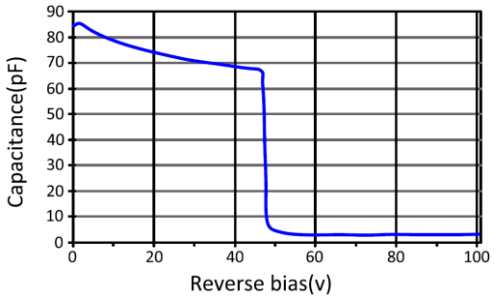
Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Chip size	Dia.			Φ4		mm
Gap	d	element to element		110		um
Dark current	I_D	M=100, λ=905nm, per segment		7	75	nA
Rise time	t_R	M=100; λ=905nm, R_L=50Ω		5		ns
Temp coefficient	T_{CID}			3.3		V/K
Reverse breakdown voltage	$V_{(BR)R}$	I_R=2μA Ev=0lx	220	300	600	V
Junction Capacitance	C_J	M=100, per segment		4		pF
Cross talk (Channel- to -Channel)					2	%
Uniformity of each Element	δ_{Re}	M=50		±5	±10	%
Saturation power	L	V_R=5V,	10			mw
Photo sensitivity	S_R	M=100, λ=905nm, per segment		36		A/W
Spectral Application Range	λ_{range}		400		1100	nm
Spectral Response-Peak	λ_p			1064		nm
Temp. sensor resistance		NTC, Beta (25/50)=3930K	9900	10000	10100	Ω
Heat transported by TEC		Performance under standard conditions			4.6	W
Angular Resp 50% Resp Pt	$\theta_{1/2}$			±70		Degrees

*please note that depending on operation voltage APD operation at temperatures below -15℃ may require sophisticated control circuit.

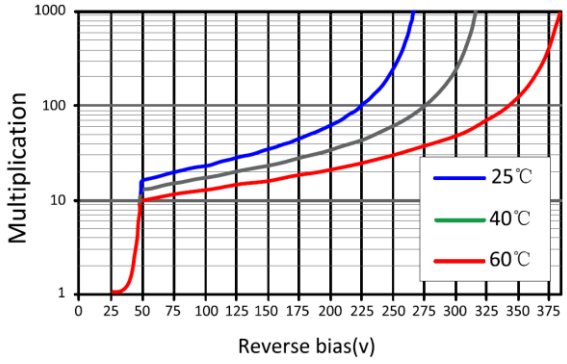
■ Spectral response (M=100, Ta=25℃)



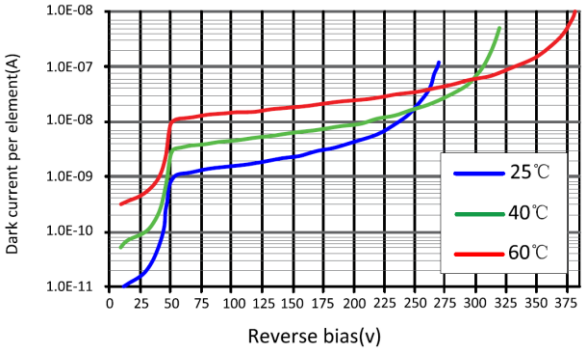
■ Capacitance vs. UR(per segment)



■ Multiplication vs. UR



■ Dark current vs. UR (per segment)



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Temperature Sensor (NTC)

$T_{temperature}$ (℃)	R_{min} (KΩ)	R_{nor} (KΩ)	R_{max} (KΩ)	$T_{temperature}$ (℃)	R_{min} (KΩ)	R_{nor} (KΩ)	R_{max} (KΩ)
-40	32.579	34.557	36.623	1	4.802	4.996	5.193
-39	30.877	32.734	34.672	2	4.612	4.796	4.983
-38	29.276	31.020	32.839	3	4.430	4.605	4.783
-37	27.769	29.408	31.116	4	4.256	4.423	4.592
-36	26.350	27.891	29.494	5	4.091	4.249	4.410
-35	25.014	26.462	27.969	6	3.932	4.083	4.236
-34	23.754	25.116	26.533	7	3.781	3.925	4.070
-33	22.566	23.848	25.180	8	3.637	3.773	3.911
-32	21.446	22.653	23.906	9	3.498	3.628	3.759
-31	20.389	21.525	22.704	10	3.366	3.490	3.615
-30	19.392	20.462	21.571	11	3.240	3.357	3.476
-29	18.449	19.458	20.503	12	3.119	3.231	3.344
-28	17.559	18.510	19.494	13	3.003	3.110	3.217
-27	16.718	17.614	18.541	14	2.892	2.994	3.096
-26	15.922	16.768	17.642	15	2.786	2.883	2.980
-25	15.170	15.968	16.792	16	2.685	2.777	2.869
-24	14.458	15.211	15.988	17	2.587	2.675	2.763
-23	13.784	14.495	15.229	18	2.494	2.578	2.662
-22	13.146	13.818	14.510	19	2.405	2.484	2.564
-21	12.542	13.176	13.830	20	2.319	2.395	2.471
-20	11.969	12.568	13.186	21	2.237	2.309	2.382
-19	11.426	11.992	12.575	22	2.158	2.227	2.296
-18	10.910	11.446	11.997	23	2.082	2.148	2.214
-17	10.422	10.928	11.449	24	2.010	2.073	2.135
-16	9.958	10.437	10.929	25	1.940	2.000	2.060
-15	9.518	9.971	10.436	26	1.872	1.930	1.989
-14	9.100	9.529	9.969	27	1.806	1.864	1.921
-13	8.703	9.109	9.526	28	1.744	1.799	1.855
-12	8.326	8.710	9.105	29	1.683	1.738	1.792
-11	7.967	8.332	8.705	30	1.625	1.679	1.732
-10	7.626	7.972	8.325	31	1.570	1.622	1.674
-9	7.302	7.629	7.964	32	1.516	1.567	1.618
-8	6.994	7.304	7.621	33	1.465	1.515	1.564
-7	6.700	6.995	7.295	34	1.416	1.464	1.513
-6	6.421	6.700	6.985	35	1.368	1.416	1.463
-5	6.155	6.420	6.690	36	1.323	1.369	1.415
-4	5.902	6.153	6.409	37	1.279	1.324	1.369
-3	5.660	5.899	6.142	38	1.237	1.281	1.325
-2	5.430	5.657	5.887	39	1.196	1.239	1.283
-1	5.211	5.426	5.645	40	1.157	1.199	1.242
0	5.002	5.206	5.414	41	1.120	1.161	1.202

T(℃)	R(KΩ)	R(KΩ)	R(KΩ)	T(℃)	R(KΩ)	R(KΩ)	R(KΩ)
42	1.084	1.124	1.164	84	0.309	0.325	0.340
43	1.049	1.088	1.127	85	0.301	0.316	0.331
44	1.015	1.054	1.092	86	0.293	0.307	0.322
45	0.983	1.020	1.058	87	0.285	0.299	0.314
46	0.952	0.988	1.025	88	0.277	0.291	0.306
47	0.922	0.958	0.994	89	0.269	0.283	0.297
48	0.893	0.928	0.963	90	0.262	0.276	0.290
49	0.865	0.899	0.934	91	0.255	0.268	0.282
50	0.839	0.872	0.905	92	0.248	0.261	0.275
51	0.813	0.845	0.878	93	0.242	0.254	0.267
52	0.788	0.819	0.851	94	0.235	0.248	0.260
53	0.763	0.794	0.826	95	0.229	0.241	0.254
54	0.740	0.770	0.801	96	0.223	0.235	0.247
55	0.718	0.747	0.777	97	0.217	0.2287	0.241
56	0.696	0.725	0.754	98	0.211	0.2228	0.235
57	0.675	0.703	0.732	99	0.206	0.2170	0.229
58	0.655	0.682	0.710	100	0.201	0.2114	0.223
59	0.635	0.662	0.689	101	0.195	0.2060	0.217
60	0.616	0.642	0.669	102	0.190	0.2007	0.212
61	0.598	0.624	0.650	103	0.185	0.1955	0.206
62	0.580	0.605	0.631	104	0.181	0.1906	0.201
63	0.563	0.588	0.613	105	0.176	0.1857	0.196
64	0.547	0.571	0.595	106	0.171	0.1810	0.191
65	0.531	0.554	0.578	107	0.167	0.1764	0.186
66	0.515	0.538	0.562	108	0.163	0.1720	0.182
67	0.501	0.523	0.546	109	0.159	0.1677	0.177
68	0.486	0.508	0.531	110	0.155	0.1635	0.173
69	0.472	0.494	0.516	111	0.151	0.1594	0.168
70	0.459	0.480	0.501	112	0.147	0.1554	0.164
71	0.446	0.466	0.487	113	0.143	0.1515	0.160
72	0.433	0.453	0.474	114	0.140	0.1478	0.156
73	0.421	0.441	0.461	115	0.136	0.1441	0.152
74	0.409	0.428	0.448	116	0.133	0.1406	0.149
75	0.398	0.417	0.436	117	0.130	0.1371	0.145
76	0.387	0.405	0.424	118	0.126	0.1338	0.142
77	0.376	0.394	0.412	119	0.123	0.1305	0.138
78	0.366	0.383	0.401	120	0.120	0.1273	0.135
79	0.356	0.373	0.390	121	0.117	0.1243	0.132
80	0.346	0.363	0.380	122	0.114	0.1213	0.128
81	0.336	0.353	0.370	123	0.112	0.1183	0.125
82	0.327	0.343	0.360	124	0.109	0.1155	0.122
83	0.318	0.334	0.350	125	0.106	0.1127	0.119

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

OUTLINE DRAWING:

PIN	1	2	3	4	5	6	7	8	9	10	11	12
FUN	anode	cathode 1	NTC2	NTC1	cathode 2	case	anode	cathode 3	NC	TEC-	cathode 4	TEC+