NuPhotonics

Part Number: QSP-TO-5
Product State: Production Build

Rev. 1 – Dec 2023

Quadrature Silicon Photodiode – 5 mm active Area

Description

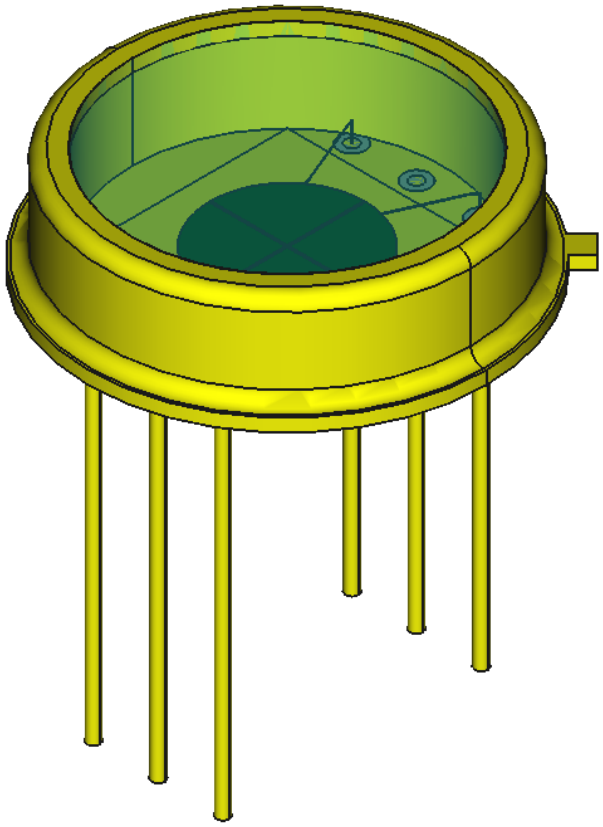
The QSP-TO-5 is a Silicon Quadrant photodiode with a 5 mm active area packaged in a hermetic TO package. The device offers high responsivity and balanced responsivity between the quadrants. Low cross talk between the quadrants makes the device suitable for detection applications.

Features

- Dark Current ~ 5 nA
- Spectral Noise Density ~ 5 $\frac{pA}{\sqrt{Hz}}$
- Terminal Capacitance 4.2 pF at $VBR_{90\%}$
- 15 MΩ Shunt resistance
- Balanced responsivity across quadrants

Applications

- Position Measurement
- Optical Guidance



Electro-Optical Characteristics (T_{op} 23 ± 3°c, unless otherwise specified)

Parameter	Symbol	Min.	Typ.	Max	Unit	Notes
Breakdown Voltage	V_{BR}		250		V	ID = 100
Dark Current	I_D		5		nA	Vr = 140
Terminal Capacitance	Ct		4.2		Pf	Taken at 90% VBR at f = 1 MHz
Responsivity	R		0.5		A/W	λ = 850 nm , M = 1
			0.6			λ = 1064 nm , M = 1
Active Area	A_{PD}		22		mm^2	Photodiode area
Gap	D		70		um	Between quadrants
Spectral Range	λ	400		1100	nm	
Cross Talk		1			%	
Rise Time	t_r		12		ns	10% - 90%
Shunt Resistance	R_s		15		MΩ	Between two quadrants
Spectral Noise Density	SN		5		$\frac{pA}{\sqrt{\text{Hz}}}$	Vr = 140

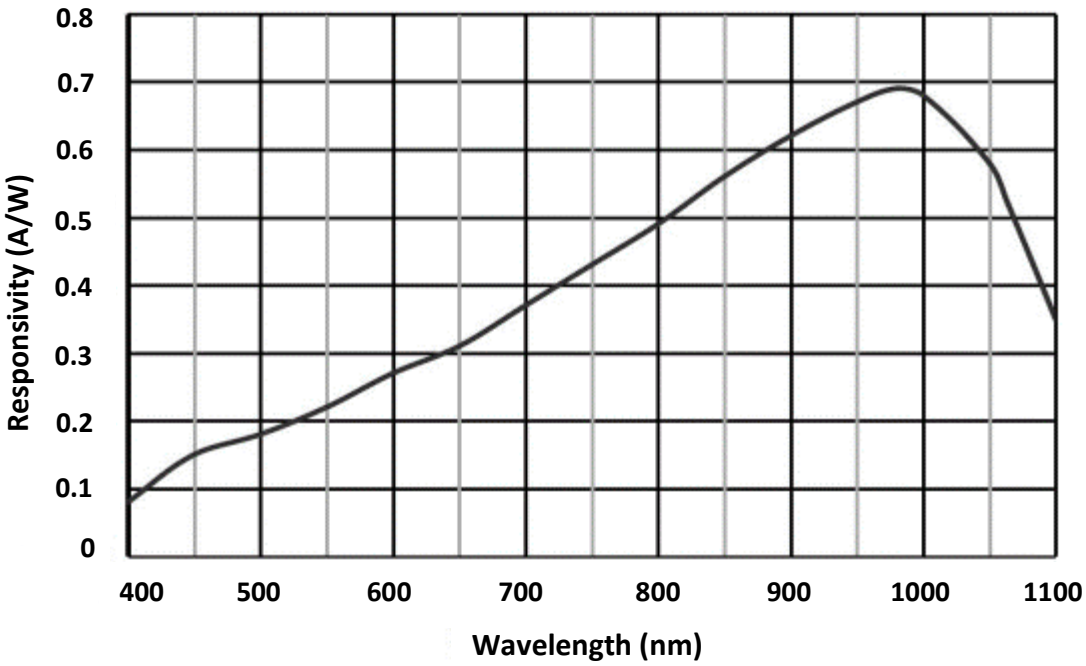
Absolute Maximum Ratings

Parameter	Symbol	Condition	Min.	Max.	Unit
Reverse Voltage	V_r			150	V
Saturated Incident Intensity	P_{sat}			0.3	W/cm^2
Reverse Current	I_R			0.5	mA
Storage Temperature	T_{stg}		-55	120	°C
Storage Humidity	H_{stg}			85	% r.H.
Operating Temperature	T_{op}		-40	105	°C
Soldering Temperature	T_{st}	10 sec		260	°C
ESD Susceptibility[1]		HBM		500	V

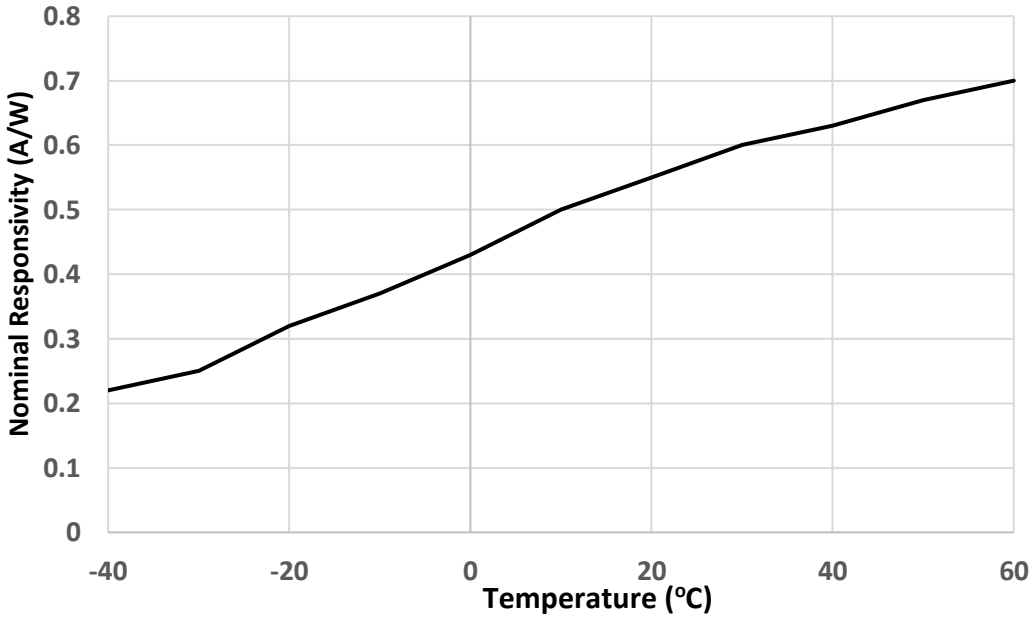
Operating at maximum ratings for a prolonged period will cause damage to the device.

[1] ESD Sensitive device. Proper ESD procedures must be followed

Spectral response (T_{op} 23 ± 3°c)

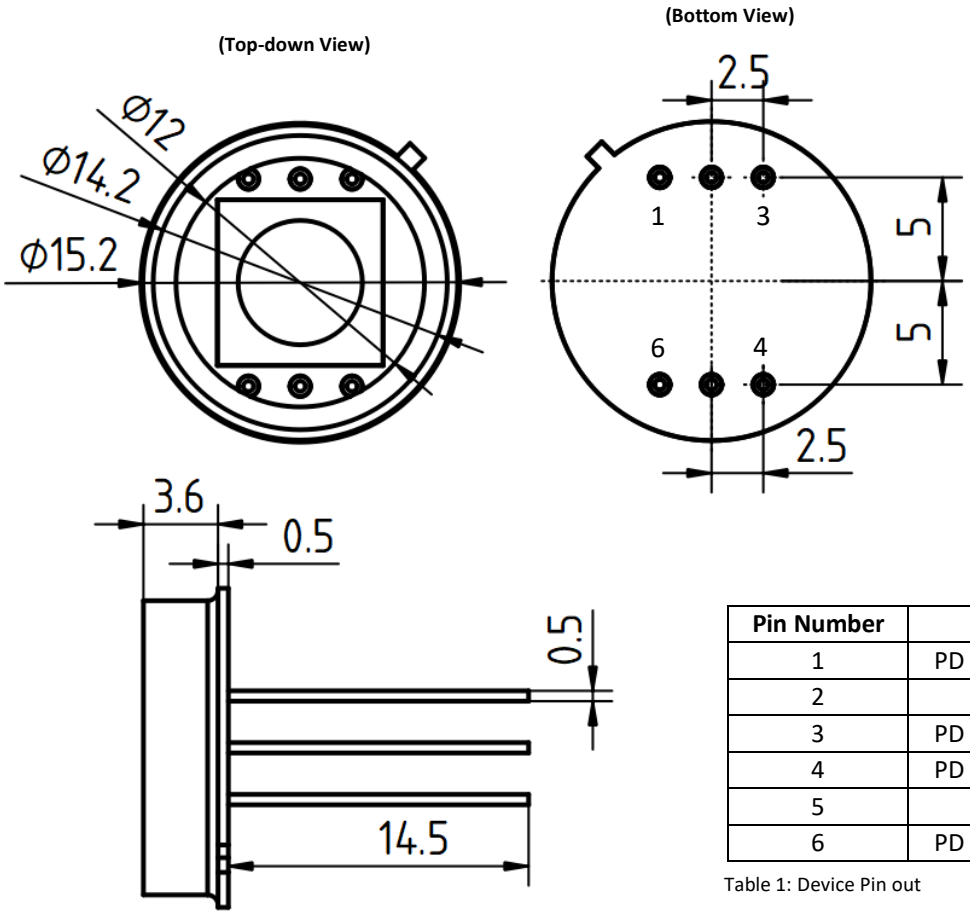


Typical Increase in responsivity as a function of photodiode temperature



Data taken between -40 °C and 60°C at 10°C increments. Data was interpolated to fill in data points.

Device Dimensions (all units in mm) and Pin Configuration



Pin Number	Function
1	PD Anode Quadrant 1 (+)
2	No Connect
3	PD Anode Quadrant 2 (+)
4	PD Anode Quadrant 3 (+)
5	Cathode (-)
6	PD Anode Quadrant 4 (+)

Table 1: Device Pin out

Inquiry Information

Sales: All inquiries regarding sales please contact Sales@NuPhotonics.com

General: If you are interested in a custom solution, general information, or engineering related information please contact Inquiry@NuPhotonics.com

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Definitions: Product State

Alpha Build: Devices in Alpha build are in internal engineering build and testing stages. Major changes may happen for production build.

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Obsolete: Currently not supported.