OSQ50-SPB

This

OTRON SENSOR quadrant photodiode series are common substrate photodetector segmented into four (4) separate active areas, Position information can be obtained when the light spot diameter is larger than the gap between each cell.

The OSQ50-SPB SPC board combined high precision amplifier and operation circuit, it can output the Adjacent quadrant difference voltage, diagonalquadrant difference voltage and Sum voltage, it can work well and conveience for customer to connect power directly.
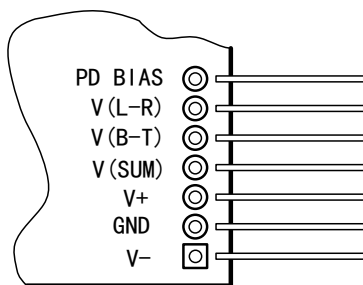
Application

◆ Position Measuring
◆ Beam Centering
◆ Targeting
◆ Guidance Systems
◆ Solar Tracking Systems

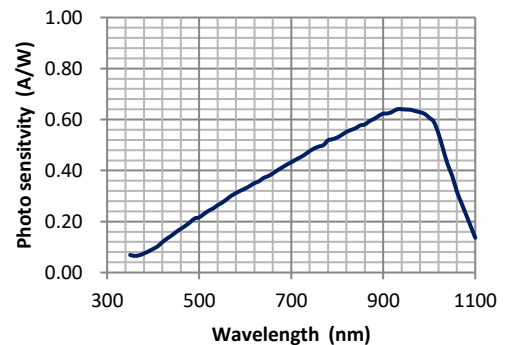## Absolute Maximum Rating

Symbol	Parameter	Min.	Max.	Typ.	Units
T_{STD}	Storage Temp.	-15	+100	25	℃
T_{OP}	Operating Temp	0	+70	25	℃
V_S	Power Supply Voltage	±4.5	±18	±12	V
V_R	Applied Bias Voltage	0	15	5	V

Pin legs

Spectral response

Optoelectronic Characteristics @25℃

| Symbol	Parameter	Test Conditions	Min.	Typ.	Max	Units
Dia	Recommended Spot Size		Φ0.1		Φ4	mm
V_O	Output Voltage	$V_S=\pm12V$，VR=0V	$-V_S+3$	-	$+V_S-3$	V
I_O	Output current	$V_S=\pm12V$，VR=0V	-	25	-	mA
	Theoretical noise	$V_S=\pm12V$，VR=0V	-	15	-	nV/Hz
Gain	Transimpedance gain			-	12	kV/A
Pmin	Minimum input power	1% accuracy, 12Bit A/D	12.2uA/photosensitivity(A/W)			W
Pmax	Saturationinput power	$V_S=\pm12V$，VR=0V	250uA/photosensitivity (A/W)			W
f_{3dB}	3dB bandwidth	$V_S=\pm12V$，VR=0V	-	250	Φ2	kHz
PD BIAS	Bias voltage	0	V_S	V	$+V_S-3$	
V(L-R)	Adjacent quadrant difference voltage	$-V_S+3$	V_S-3	V	-	
V(B-T)	Diagonal quadrant difference voltage	$-V_S+3$	V_S-3	V	-	
V(SUM)	Sum Voltage	$-V_S+3$	V_S-3	V	12	
V+	Positive voltage	4.5	18	V		
GND	Ground	0	0	V		
V-	Negative Voltage	-18	-4.5	V		
t_R	Rise time	VR=5V;λ=850nm;RL=50Ω		1.5		μs
λ	Spectral response range		400		1100	mm
Re	Responsivity	VR=5v,λ=650nm		0.38		A/W
		VR=5v,λ=940nm		0.64		
I_D	Lower dark Current	VR=5V		0.14		nA
V_{BR}	Reverse breakdown voltage	IR=10uA		40		V
C_j	Capacitance	f=1MHz VR=5V		120		pF

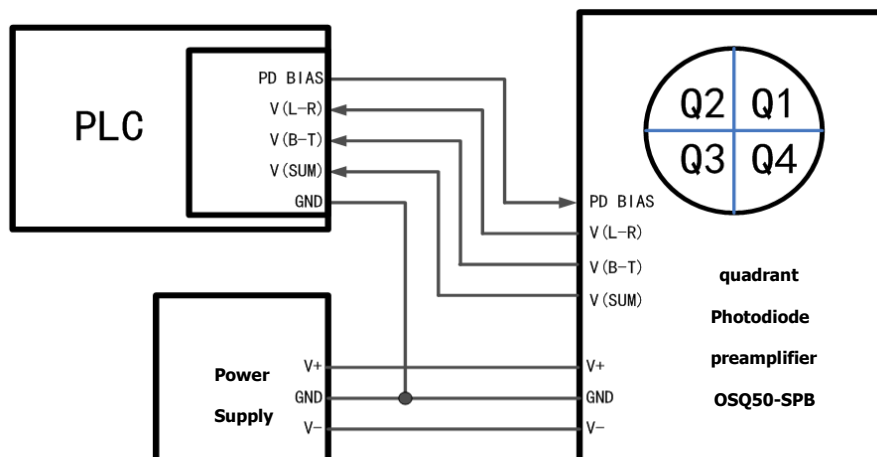## OSQ16-SPB principle diagram
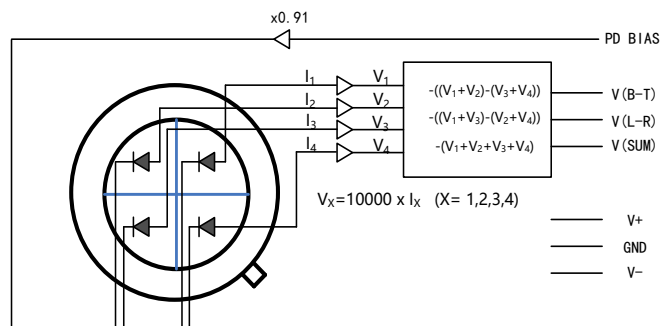
Application notes:

1.Peripheral Connection:

   Below show two different application examples.
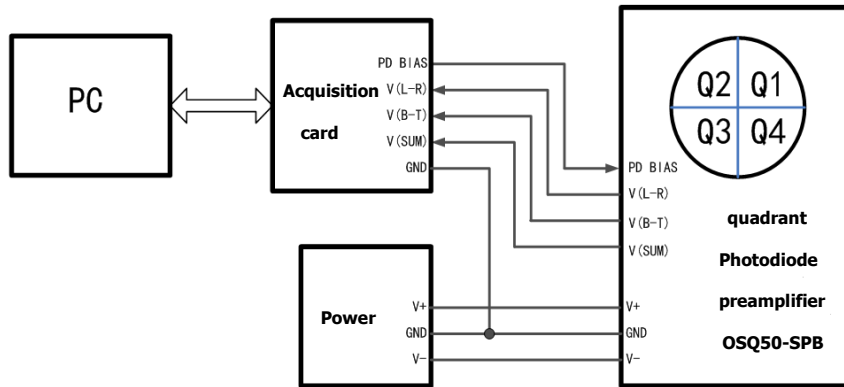
Connect to PCI card

SPB board connect to PLC

2.Beam size

   The beam size has something with the detect torelance of total quadrant system. Basically，the beam size can't be much bigger that is more than the active area of a quadrant photodiode，or else the output voltage won't change linearly according to input intensity. The beam size can't be much smaller too, or else the quadrant can't tracking the light sourcing when it is on the quadrant center。The best beam size is one haf of the diameter of this quadrant active area. Also, since the signal strength decreases significantly when large portions of the spot cross the boundary between each quadrant area, beam diameters greater than 1mm are suggested. Therefore,   the best beam size of OSQ50-SPB is Φ0.1-Φ3

   3.Reverse Voltage

   OSQ50-SPB is a four PIN photodiode to be combined, it can worked at zero bias voltage or reverse bias voltage. The application of reverse bias voltage can greatly improve the response time and linearly, but the dark current and noise will be also increased. The VBIAS must be less than Vs and best reverse voltage due

to response time and noise, There are divide voltage circuit on OSQ50-SPB，The true bias voltage of each photodiode is 0.91V$_{BIAS}$.

4.Power supply module

OSQ50-SPB be supplied by linear power to reduce the noise and rejection wave, we can promote the matched switch power module for it together.

5.Working tempeture

It can work well under 0℃ to +70℃，the best working tempeture is +25℃. All of OTRON SENSOR's quadrant photodiode module can work well under low tempeture due to sealed package, but it need to be attention the thermal drift and noise when it work at more than +70℃.

Technology support items,

* Any technology or application questions for our sensors, please contact us directly, we can support you to test, calculate and talk more technology details.