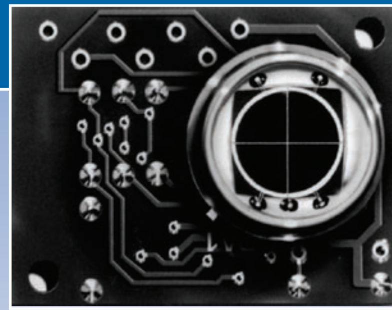
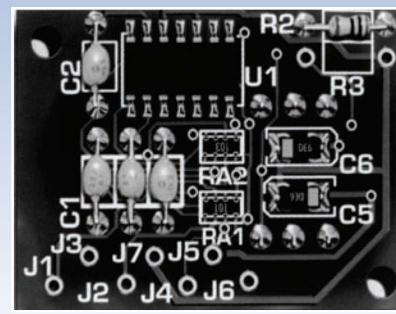
Sum and Difference Amplifier Modules

Position Sensing Modules

QD7-0-SD or QD50-0-SD are quadrant photodiode arrays with associated circuitry to provide two difference signals and a sum signal. The two difference signals are voltage analogs of the relative intensity difference of the light sensed by opposing pairs of the photodiode quadrant elements. In addition the amplified sum of all 4 quadrant elements is provided as the sum signal. This makes the QD7-0-SD or QD50-0-SD ideal for both light beam nulling and position applications. Very precise light beam alignments are possible, and the circuit can also be used for target acquisition and alignment.





APPLICATIONS

- Position Measuring
- Beam Centering
- Targeting
- Guidance Systems

FEATURES

- A 10µm gap is available for the QD50-SD Module.
- Other QD7-XX or QD50-XX are available upon request

Model Number	Active Area Per Element: Area (mm²)	Active Area Per Element: Dimensions (mm)	Element Gap (nm)	Responsivity (A/W) 900 nm min.	Responsivity (A/W) 900 nm typ.	Capacitance (pF) 0 V typ.	Dark Current (nA) 900nm typ.	Dark Current (nA) 900nm max.	NEP (W/√Hz) 0 V 900 nm typ.	Reverse Voltage (V) max.	Rise Time (ns) -30 V 900 nm 50 Ω typ.	Temp Range (°C) Operating	Temp Range (°C) Storage	Package Style ¶
'O' Series														
QD7-0	7	3.0 ϕ	0.2	0.47	0.54	20	4.0	15.0	9.0 e-14	30	10	-40 ~ +100	-55 ~ +125	41 / TO-5
QD50-0	50	8.0 ϕ				125	15.0	30.0	1.3 e-13					73 / TO-8

INPUT

Power supply voltage Vcc = ±4.5V min; ±15V typical; ±18V max
Photodiode bias voltage = (.91) x (V_{PDBIAS})
V_{PDBIAS} = 0 TO +Vcc; Absolute maximum V_{PDBIAS} is +Vcc
NOTE: Negative voltages applied to PDBIAS will render the QD7-0-SD or QD50-0-SD inoperative.

ENVIRONMENTAL

Operating temperature	0 to 70° C
Theoretical noise	15 nV/Hz$^{1/2}$
Frequency response	(-3dB): 120kHz @ V_{PDBIAS}=0V;880nm 250kHz @ V_{PDBIAS}=15V;880nm
Max slew rate	10V/µs
Output current limit	25 ma

OUTPUT

Where i_x is the current from quadrant x
$V_{T-B} = -\{(i_1 + i_2) - (i_3 + i_4)\} \times (10^4)$
$V_{L-R} = -\{(i_1 + i_2) - (i_3 + i_4)\} \times (10^4)$
$V_{SUM} = -\{(i_1 + i_2) - (i_3 + i_4)\} \times (10^4)$

MAXIMUM OUTPUT VOLTAGE

Positive: (+Vcc - 3V)
Negative: (- Vcc + 3V)