

LC-301 DQD

Principle of operation

Incident light creates photocurrents in the four photodiodes, which are converted to corresponding voltage signals by transimpedance amplifiers. Positional information can be derived from the relationship between these voltages according to the equation given below. Dividing the individual positional voltages X and Y by the SUM signal eliminates errors caused by fluctuations in the total light intensity as well as allowing operation over a wide range of light conditions.

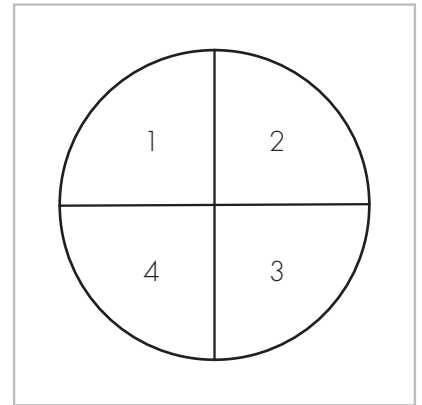
Definition

The four quadrants of the diode are defined as shown here, independent of the type of photodiode or manufacturer.

The normalized position signals for X and Y are calculated by the internal circuit according to the following principle

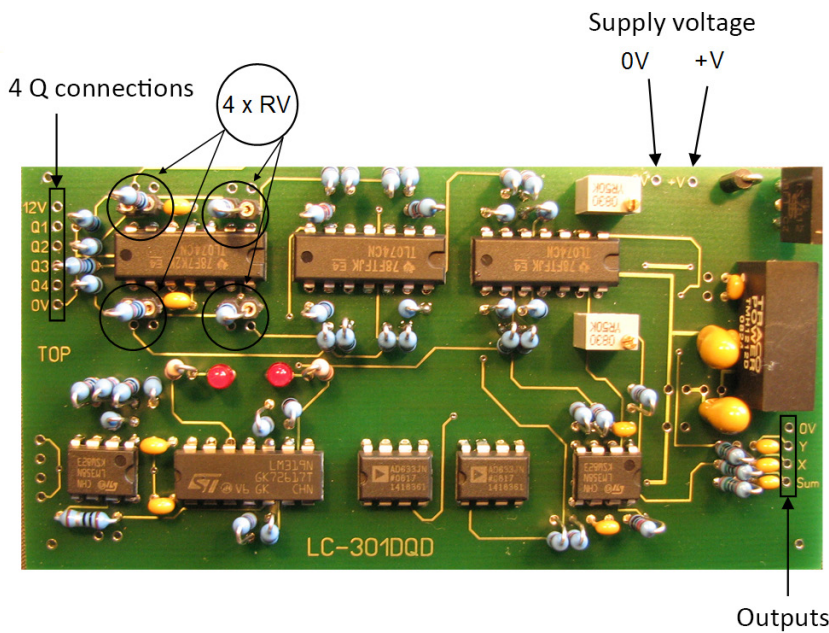
$$X = (2+3) - (1+4) / \text{SUM}$$

$$Y = (1+2) - (3+4) / \text{SUM}$$



Front view

LC-301DQD



Setup

Connect the voltage supply to the two solder points provided for this purpose (see illustration). The supply voltage must be in the range 15 – 28V. Please note that the voltage controller on the board may become warm during operation. For this reason the use of an external heat sink is recommended.

Connect the four quadrants of the photodiode to the solder contacts provided („4Q connections“ shown in the illustration). The common cathode of the diode should be connected to the 12V connection of the same connector block. The diode anodes should be connected to Q1 – Q4 according to the above definition. If a shielded cable is used, the cable ground should be attached to the 0V solder point.

Outputs

Four output connection points are available: Signal X, Signal Y, SUM and 0V.

Operation

The SUM signal indicates the total light intensity falling on the diode. The value of this signal must lie in the range 1-9V. If the signal is outside this range the board will not function correctly: in this case the value of the four RV resistors should be modified accordingly. All four resistors must have the same value; if the light level is too low, use a higher resistance value to bring the SUM signal into range, if the light level is too high, reduce the value of RV accordingly.

Two LEDs on the PCB indicate the status of the board. Under normal operating conditions only one LED should illuminate.

The three possible operating conditions are:

Both LEDs off	=	Power too low
One LED on	=	Power is in the correct range
Both LEDs on	=	Power too high

Two potentiometers on the PCB allow the working range for X and Y to be set. The maximum allowable output voltage for both directions is +/- 10V.

In many applications only the zero point is of primary interest, in which case the full +/-10V range is recommended for best results.

Technical data:	Operating voltage:	15 V – 28 V DC
	Current consumption:	max. 400 mA
	Output signals:	X and Y = +/-10 V
	SUM output signal:	0 – 10 V
	PCB dimensions:	110 mm x 55 mm