GP2Y3A003K0F

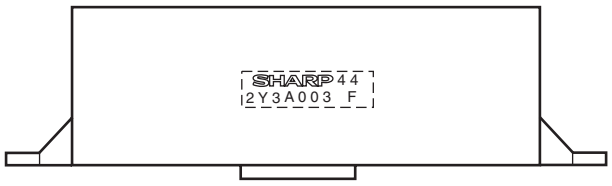
Optoelectronic Device

FEATURES

- Trigger point set at factory to 25°
- Analog output
- Effective Range: 40 to 300 cm
- Typical response time: 16.5 ms
- Typical start up delay: 21.5 ms

DESCRIPTION

The GP2Y3A003K0F is a distance measuring sensor with integrated signal processing and analog voltage output.



PIN NUMBER 1 → 9

CONNECTOR SIGNAL

PIN	SIGNAL NAME
1 - 5	Signal inputs for selecting LED 1 - 5
6	V_O
7	GND
8	V_{CC}
9	V_{IN} Input for controlling distance measuring operation

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Figure 1. Pinout

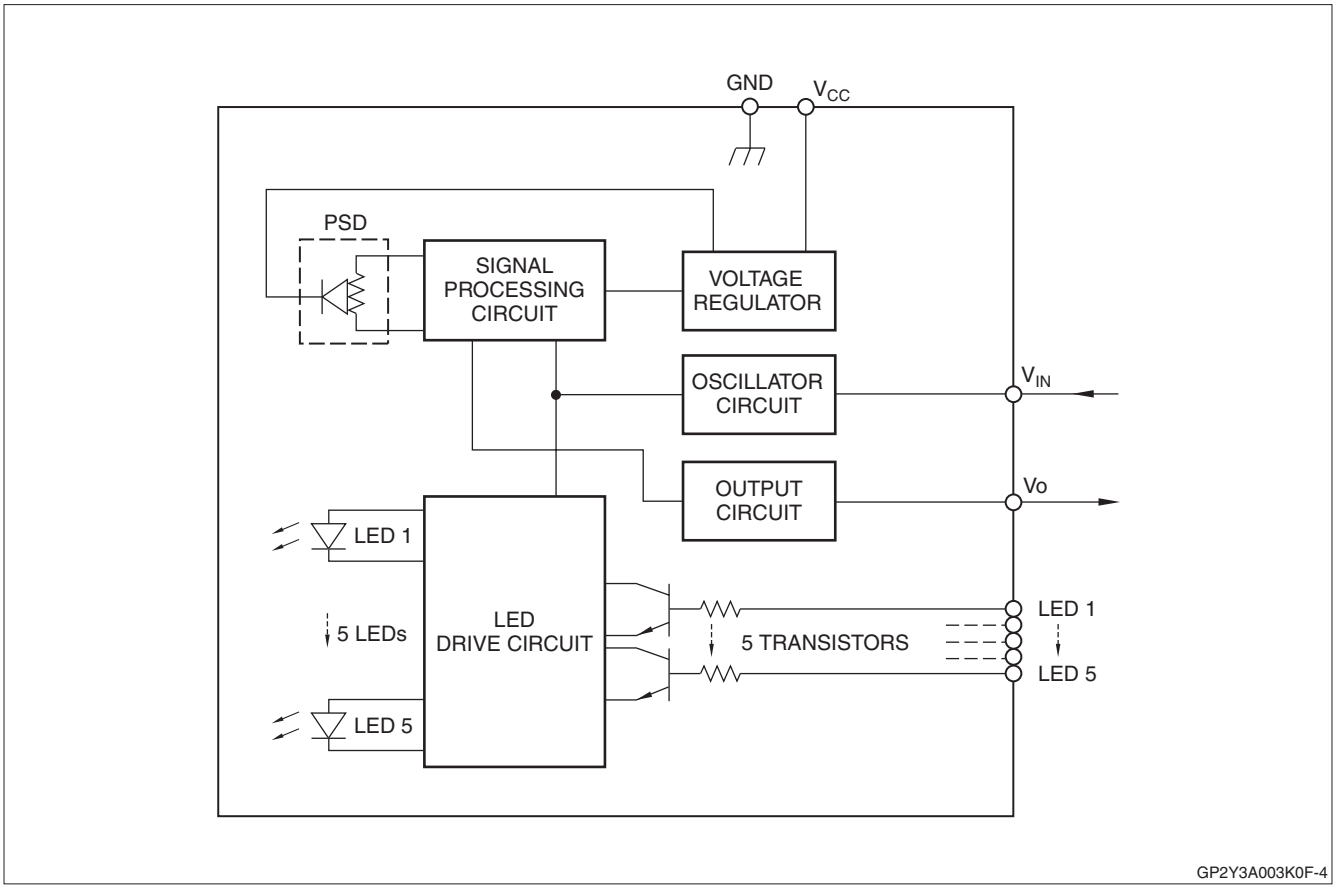


Figure 2. Block Diagram

ELECTRICAL SPECIFICATIONS

Absolute Maximum Ratings

Ta = 25°C, V_{CC} = 5 VDC

PARAMETER	SYMBOL	RATING	UNIT
Supply Voltage	V_{CC}	-0.3 to +7.0	V
Output Terminal Voltage	V_O	-0.3 to (V_{CC} + 0.3)	V
Input Voltage	V_{IN} H/L LED H/L	-0.3 to (V_{CC} + 0.3)	V
Operating Temperature	Topr	-10 to +60	°C
Storage Temperature	Tstg	-40 to +70	°C

Operating Supply Voltage

PARAMETER	SYMBOL	RATING	UNIT
Operating Supply Voltage	V_{CC}	4.5 to 5.5	V

Electro-optical Characteristics

DISTANCE MEASURING SENSOR

Ta = 25°C, V_{CC} = 5 VDC

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Measuring Distance Range	ΔL		40	—	300	cm
Output Terminal Voltage	V_O	L = 40 cm	2.0	2.3	2.6	V
Output Voltage Gap	ΔV_O	Output voltage gap between L = 40 cm and L = 100 cm	0.9	1.2	1.5	V
Average Supply Current	I_{CC}		—	30	50	mA
Input Voltage	V_{IN} H	Input voltage for operating distance measuring sensor	4.5	—	—	V
	V_{IN} L	Input voltage for turning off distance measuring sensor	—	—	0.3	V
	LED H	Input voltage for turning LED ON	4.5	—	—	V
	LED L	Input voltage for turning LED OFF	—	—	0.5	V

NOTES:

1. Measurements made with Kodak R-27 Gray Card, using the white side, (90% reflectivity).
2. L = Distance to reflective object.

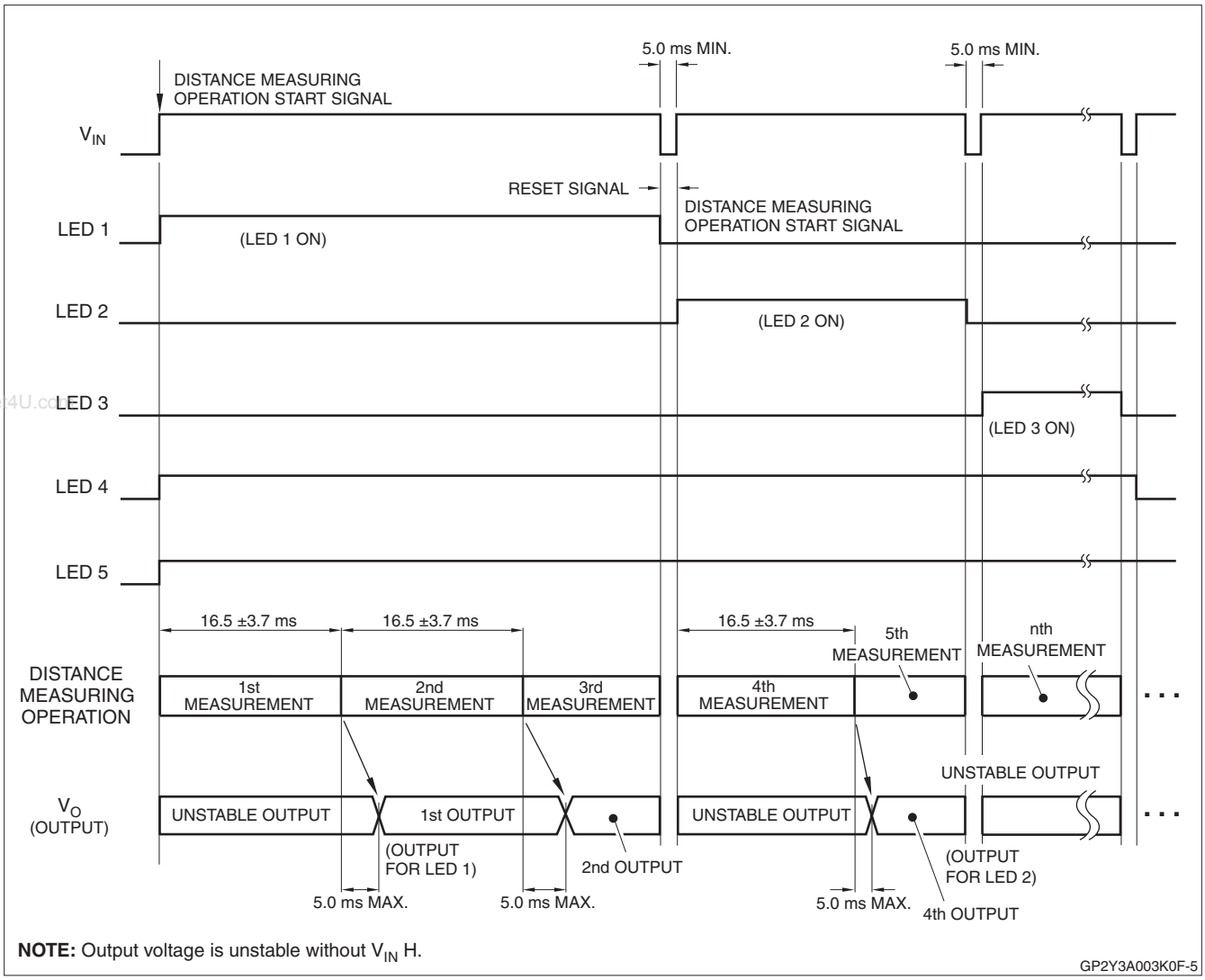


Figure 3. Timing Diagram

REALIABILITY

The reliability requirements of this device are listed in Table 1.

Table 1. Reliability

TEST ITEMS	TEST CONDITIONS	FAILURE JUDGEMENT CRITERIA	SAMPLES (n), DEFECTIVE (C)
Temperature Cycling	One cycle -40°C (30 min.) to +70°C in 30 minutes, repeated 25 times	Initial × 0.8 > V_O V_O > Initial × 1.2	n = 11, C = 0
High Temperature and High Humidity Storage	+40°C, 90% RH, 500h		n = 11, C = 0
High Temperature Storage	+70°C, 500h		n = 11, C = 0
Low Temperature Storage	-40°C, 500h		n = 11, C = 0
Operational Life (High Temperature)	+60°C, V_{CC} = 5 V, 500h		n = 11, C = 0
Mechanical Shock	100 m/s², 6.0 ms 3 times/±X, ±Y, ±Z direction		n = 8, C = 0
Variable Frequency Vibration	10-to-55-to-10 Hz in 1 minute Amplitude: 1.5 mm 2h in each X, Y, Z direction		n = 8, C = 0

NOTES:
1. Test conditions are according to Electro-optical Characteristics, shown on page 2.
2. At completion of the test, allow device to remain at nominal room temperature and humidity (non-condensing) for two hours.
3. Confidence level: 90%, Lot Tolerance Percent Defect (LTPD): 20%/40%.

MANUFACTURER'S INSPECTION

Inspection Lot

Inspection shall be carried out per each delivery lot.

Inspection Method

A single sampling plan, normal inspection level II based on ISO 2859 shall be adopted.

Table 2. Quality Level

DEFECT	INSPECTION ITEM and TEST METHOD	AQL (%)
Major Defect	Electro-optical characteristics defect	0.4
Minor Defect	Defect to appearance or dimensions (crack, split, chip, scratch, stain)*	1.0

NOTE: *Any one of these that affects the Electro-optical Characteristics shall be considered a defect.

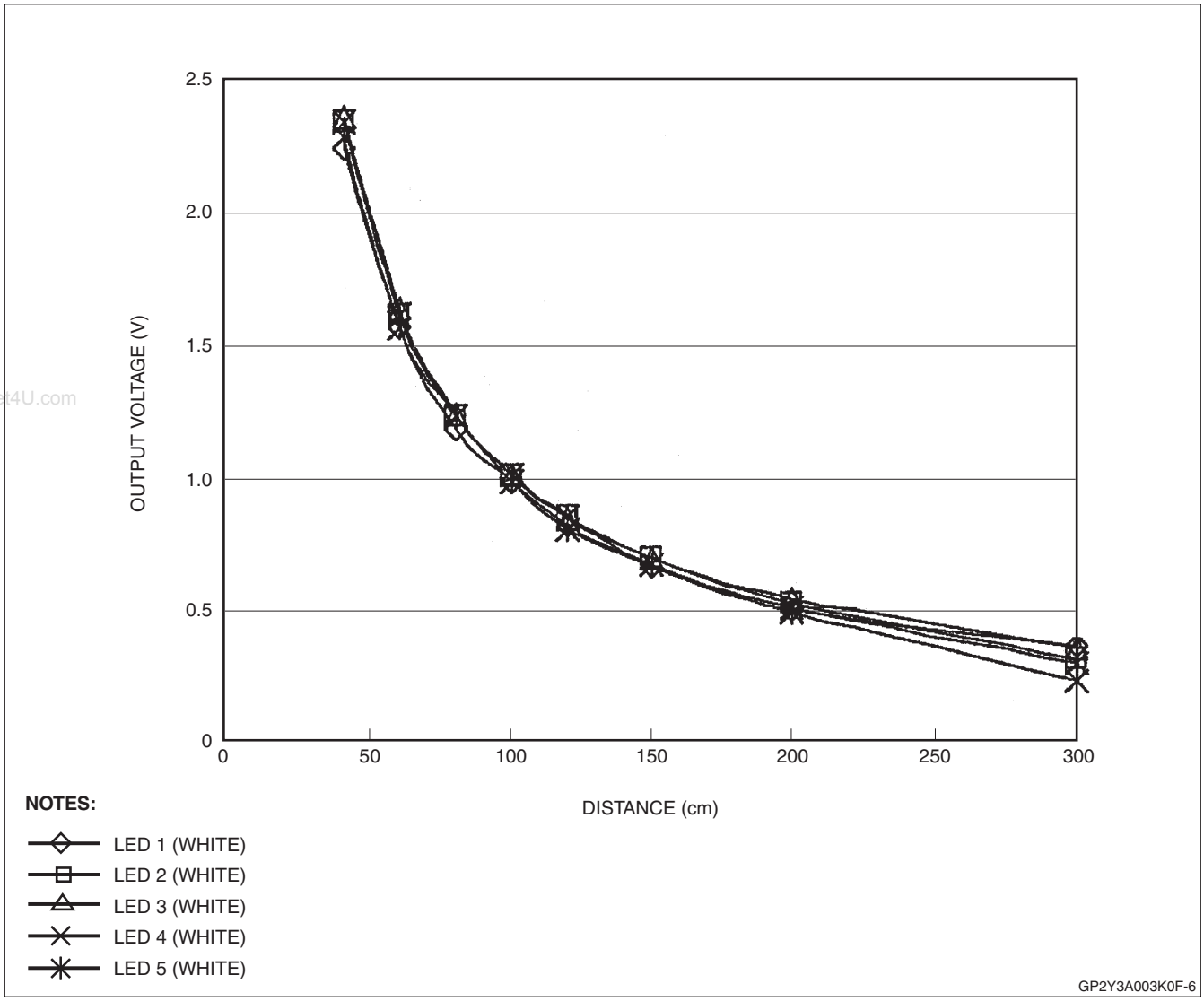
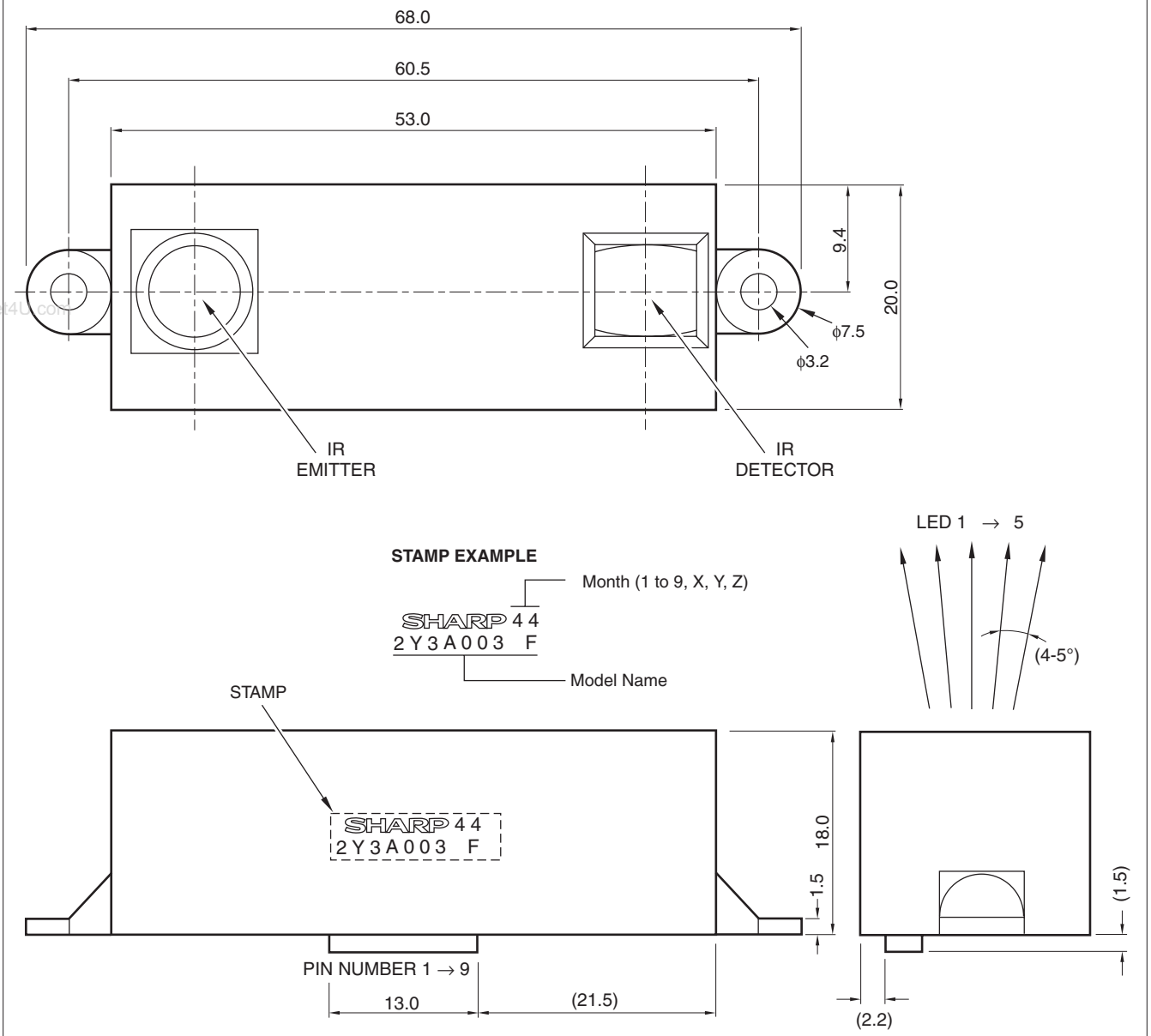


Figure 4. GP2Y0D21YK Example of Output Distance Characteristics

PACKAGE SPECIFICATIONS



CONNECTOR SIGNAL

PIN	SIGNAL NAME
1 - 5	Signal inputs for selecting LED 1 - 5
6	V_O
7	GND
8	V_{CC}
9	V_{IN} Control input for distance measuring operation

NOTES:
1. Unspecified tolerances are ±0.3 mm.
2. The connector is made by Molex, part number is 53047-0910.
3. ( ): Reference value.
4. Dimensions are in mm.

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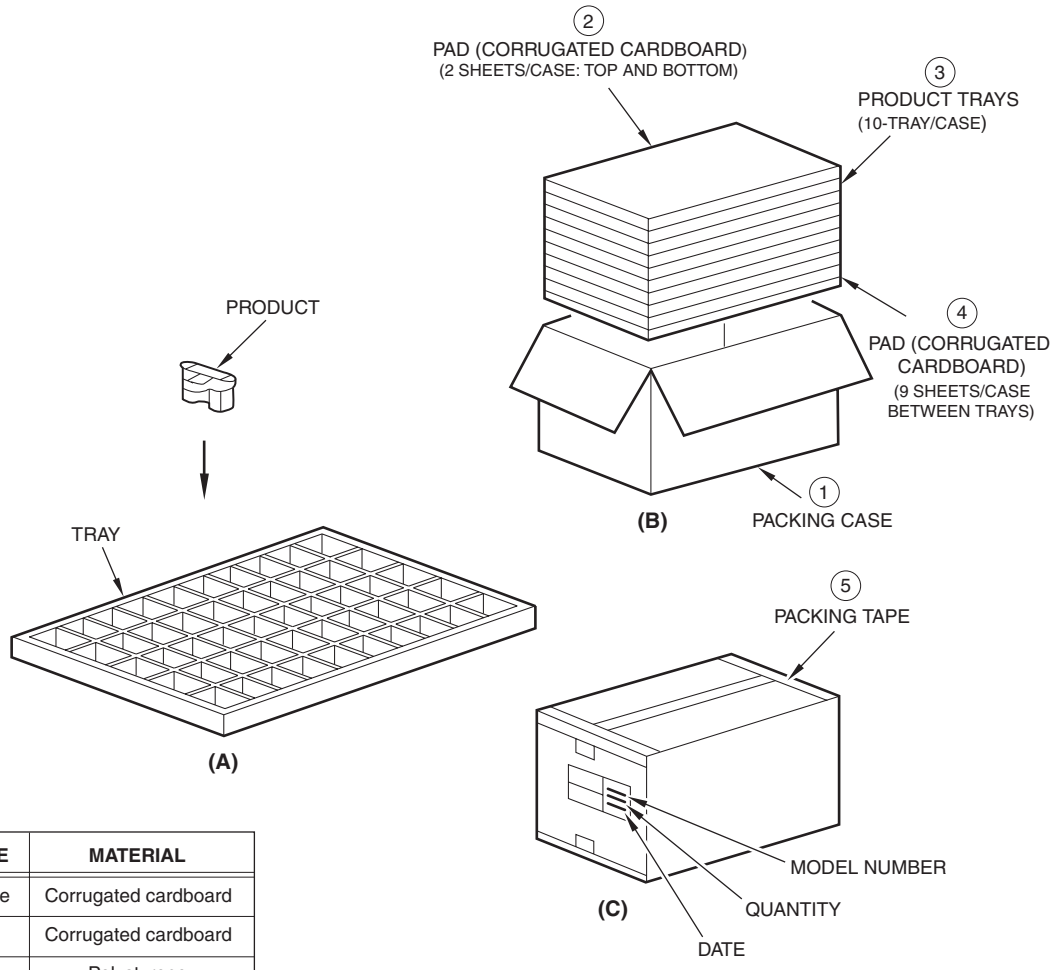
PACKING SPECIFICATION



PART NAME	MATERIAL
Packing case	Corrugated cardboard
Pad	Corrugated cardboard
Tray	Polystyrene

PACKING METHOD

1. Each tray holds 50 pieces. Packing methods are shown in (A).
2. Each box holds 10 trays. Pads are added to top and bottom, and between layers, as in (B).
   top and bottom. Put pads between each tray (9 pads total) see above drawing (B).
3. The box is sealed with craft tape. (C) shows the location of the Model number, Quantity, and Inspection date.
4. Package weight: Approximately 4 kg.

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NOTES

- Keep the sensor lens clean. Dust, water, oil, and other contaminants can deteriorate the characteristics of this device. Applications should be designed to eliminate sources of lens contamination.
- When using a protective cover over the emitter and detector, ensure the cover efficiently transmits light throughout the wavelength range of the LED (λ = 850 nm ± 70 nm). Both sides of the protective cover should be highly polished. Use of a protective cover may decrease the effective distance over which the sensor operates. Ensure that any cover does not negatively affect the operation over the intended application range.
- Objects in proximity to the sensor may cause reflections that can affect the operation of the sensor.
- Sources of high ambient light (the sun or strong artificial light) may affect measurement. For best results, the application should be designed to prevent interference from direct sunlight or artificial light.
- Using the sensor with a mirror can induce measurement errors. Often, changing the incident angle on the mirror can correct this problem.
- If a prominent boundary line exists in the surface being measured, it should be aligned vertically to avoid measurement error. See Figure 5 for further details.
- When measuring the distance to objects in motion, align the sensor so that the motion is in the horizontal direction instead of vertical. Figure 6 illustrates the preferred alignment.
- A 10 µF (or larger) bypass capacitor between V_{CC} and GND near the sensor is recommended.
- To clean the sensor, use a dry cloth. Use of any liquid to clean the device may result in decreased sensitivity or complete failure.
- Excessive mechanical stress can damage the internal sensor or lens.

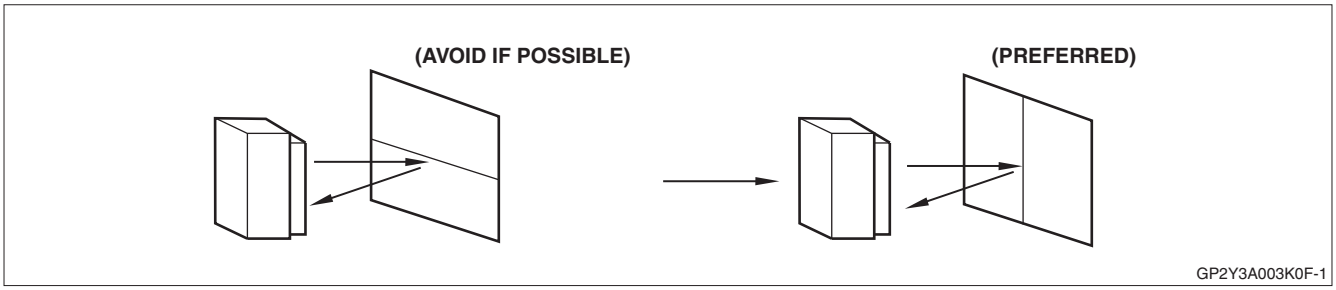

Figure 5. Proper Alignment to Surface Being Measured

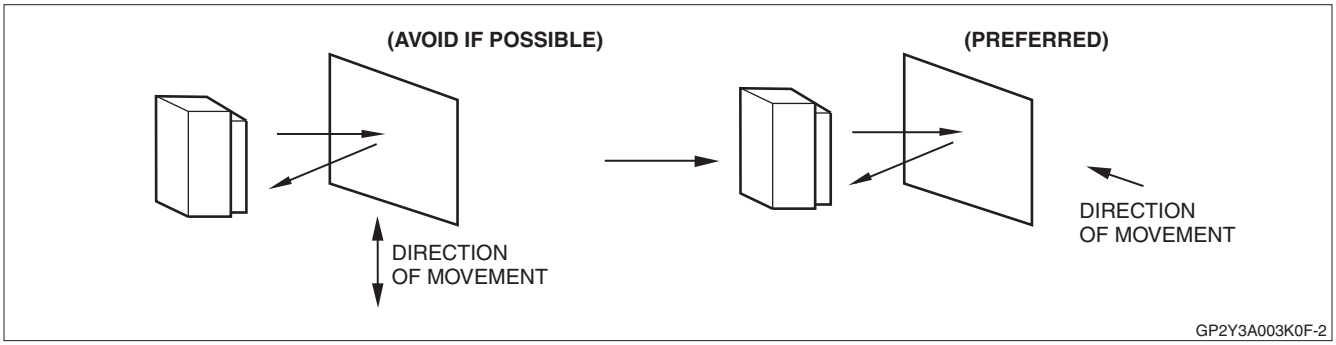

Figure 6. Proper Alignment to Moving Surfaces

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