GP2TD02 Tilt Sensor   *T-65-13*
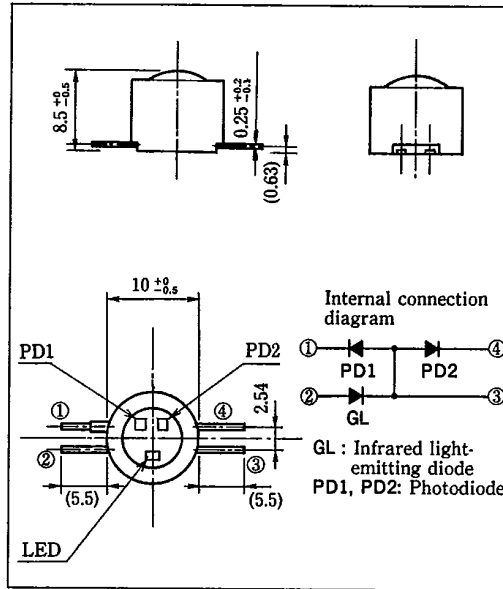
■ Features

1. With incorporating lens
2. Linear output in accordance with tilt

■ Applications

1. Optical video disk players
2. Magneto-optical disks

■ Outline Dimensions   (Unit : mm)

Internal connection diagram

GL : Infrared light-emitting diode
PD1, PD2: Photodiode

■ Absolute Maximum Ratings   (Ta=25°C)

	Parameter	Symbol	Rating	Unit
Input	Forward current	I_F	50	mA
	Reverse voltage	V_R	6	V
	Power dissipation	Pin	75	mW
Output	Reverse voltage	V_R	20	V
	Power dissipation	P_{out}	75	mW
	Operating temperature	T_{opr}	$-10 \sim +70$	°C
	Storage temperature	T_{stg}	$-25 \sim +85$	°C
	*¹Soldering temperature	T_{sol}	260	°C

*1 For 5 seconds at the position of 2.0mm or more from the surface of resin edge.

■ Electro-optical Characteristics

(Ta=25°C)

	Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Input	Forward voltage	V_F	$I_F=15mA$	—	—	1.5	V
	Reverse current	I_R	$V_R=6V$	—	—	10	μA
Output	*2 Collector dark current	I_d	$V_R=10V$	—	—	100	nA
*4 Junction characteristics	*3 Difference output increment rate	A/deg.	$I_F=15mA. H=11.82mm$ $\theta=-1\sim0\sim+1$ deg.	1.15	2.7	14.3	$\mu A/$ deg.
	*5 Sum output	B	$I_F=15mA. H=11.82mm$ $\theta=0$ deg.	5.5	11.4	40.3	μA
	*6 Angle range of tilt angle output 0	θ_o		−1	—	+1	deg.
	*7 Monotonous increase range of tilt angle output	$\mid \theta_r \mid$	$I_F=15mA, H=11.82mm$	2.0	—	—	deg.
	*8 Non-invert range of tilt angle output	$\mid \theta_i \mid$		5	—	—	deg.

*2 Values for each 1 element
*3 Difference output A is defined as follows :
$A=I_{sc}$ (PD1)$-I_{sc}$ (PD2)
Difference output increment rate (A/deg.) is the increment rate of current A at 1 deg.
$$A/deg. = \frac{\{I_{sc} (PD1)-I_{sc} (PD2)\} \ at \ (+1 \ deg.)+ \ \{I_{sc} (PD2)-I_{sc} (PD1)\} \ at \ (-1 \ deg.)}{2}$$
*4 The reflective object of which junction characteristics are given is a multi-layer coating mirror.
*5 Sum output B is defined as follows :
$B=I_{sc}$ (PD1)$+I_{sc}$ (PD2)
*6 Tilt angle output C is defined as follows :
$C=A/B$
Angle range of tilt angle output 0 is defined as the range of angles that makes C=0.
*7 Monotonous increase range of tilt angle output is the range of angles with respect to which C increases monotonously with the coordinate original point at the angle that makes C=0.
*8 Non-invert range of tilt angle output is the range of angles that don't make C negative.
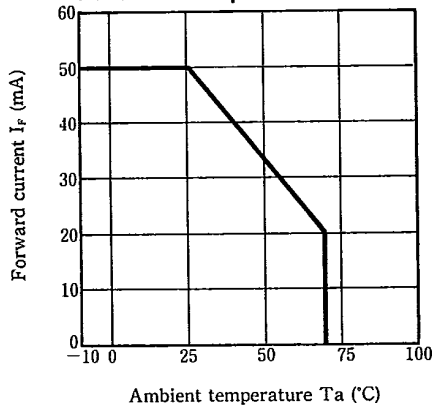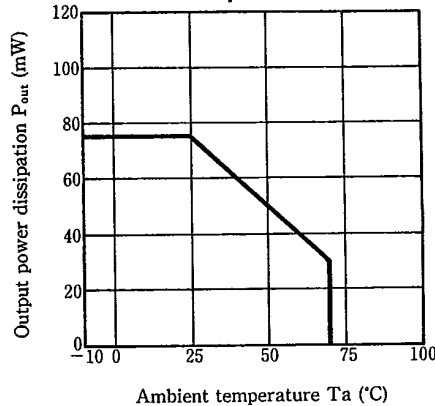
Fig. 1 Forward Current vs. Ambient Temperature

Ambient temperature Ta (°C)

Fig. 2 Output Power Dissipation vs. Ambient Temperature

Ambient temperature Ta (°C)

SHARP

Photointerrupter   GP2TD02

T-65-13

Fig. 3 Difference Output Characteristics
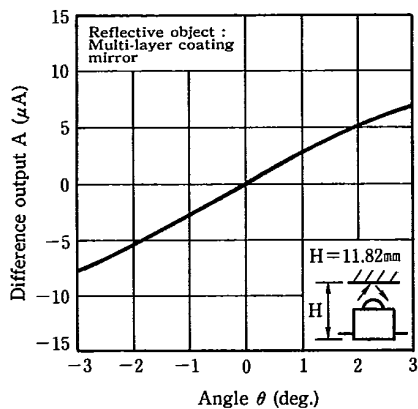
Difference output A (μA) vs Angle θ (deg.)

Reflective object :
Multi-layer coating
mirror

H=11.82mm

Fig. 4 Sum Output Characteristics

Sum output B (μA) vs Angle θ (deg.)

H=11.82mm

Reflective object :
Multi-layer coating
mirror

Fig. 5 Tilt Angle Output Characteristics

Tilt angle output C (%) vs Angle θ (deg.)

Reflective object :
Multi-layer coating
mirror

H=11.82mm
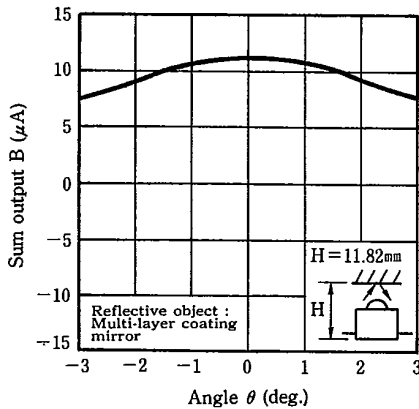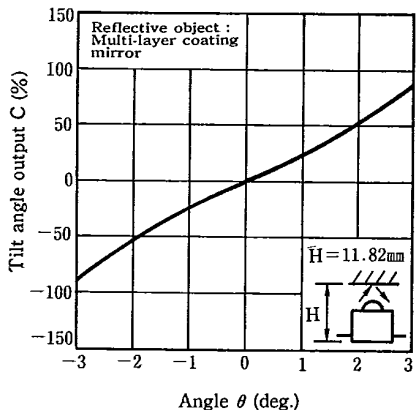
Test Circuit for Sum Output Characteristics,
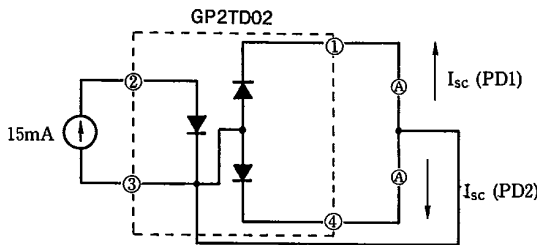Difference Output Characteristics, Tilt
Angle Output Characteristics

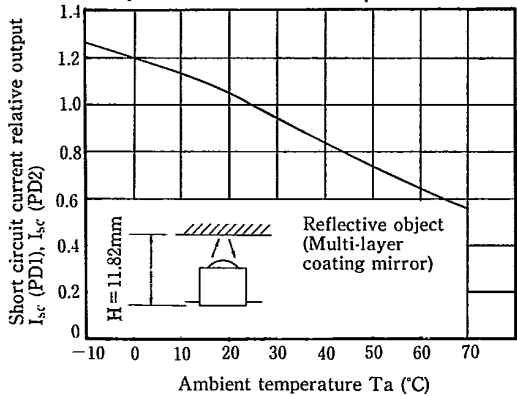GP2TD02

15mA

I_{sc} (PD1)

I_{sc} (PD2)

PD1, PD2: Photodiode

Fig. 6 Short Circuit Current Relative
Output vs. Ambient Temperature

Short circuit current relative output I_{sc} (PD1), I_{sc} (PD2) vs Ambient temperature Ta (°C)

H=11.82mm

Reflective object
(Multi-layer
coating mirror)

Test Circuit for Short Circuit
Current Relative Output vs.
Ambient Temperature

I_{sc} (PD1)

15mA

I_{sc} (PD2)

SHARP

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