TECHNICAL LITERATURE

FOR

Infrared Detecting unit for Remote Control

MODEL No. GP1UM26RK/27RK/28RK/28QK series

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(Precautions)

(1) This product is designed for use in the following application areas ;

[• OA equipment • Audio visual equipment • Home appliances
• Telecommunication equipment (Terminal)]

If the use of the product in the above application areas is for equipment listed in paragraphs (2) or (3), please be sure to observe the precautions given in those respective paragraphs.

(2) Appropriate measures, such as fail-safe design and redundant design considering the safety design of the overall system and equipment, should be taken to ensure reliability and safety when this product is used for equipment which demands high reliability and safety in function and precision, such as ;

[• Transportation control and safety equipment (aircraft, train, automobile etc.)
• Traffic signals • Gas leakage sensor breakers • Rescue and security equipment
• Other safety equipment]

(3) Please do not use this product for equipment which require extremely high reliability and safety in function and precision, such as ;

[• Space equipment • Telecommunication equipment (for trunk lines)
• Nuclear power control equipment • Medical equipment]

(4) Please contact and consult with a Sharp sales representative if there are any questions regarding interpretation of the above three paragraphs.

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OPTO-ELECTRONIC DEVICES DIVISION
ELECTRONIC COMPONENTS GROUP
SHARP CORPORATION

1. Application

This specifications applied to the outline and characteristics of infrared detecting unit for remote control, Model No. GP1UM26RK/27RK/28RK/28QK.

Main application : TV set, VCR, Radio cassette recorder, Stereo

Model list

Model No.	B.P.F. center frequency (TYP)
GP1UM26RK/27RK/28RK/28QK	40 kHz
GP1UM260RK/270RK/280RK/280QK	36 kHz
GP1UM261RK/271RK/281RK/281QK	38 kHz
GP1UM262RK/272RK/282RK/282QK	36.7 kHz
GP1UM263RK/273RK/283RK/283QK	32.75 kHz
GP1UM267RK/277RK/287RK/287QK	56.8 kHz

2. Outline

Refer to the attached sheet, Page 8 to 11.

3. Ratings and characteristics

Refer to the attached sheet, Page 4 to 7.

4. Supplement

1) This infrared detecting unit for remote control satisfies each performance requirements in para. 3.5, in the standard optical system in Fig.2.

2) This product is built-in photodiode.

3) Production place indication of this product shall follow the indication in the drawing of the outline dimensions.

4) Product mass : Approx. 1.0g

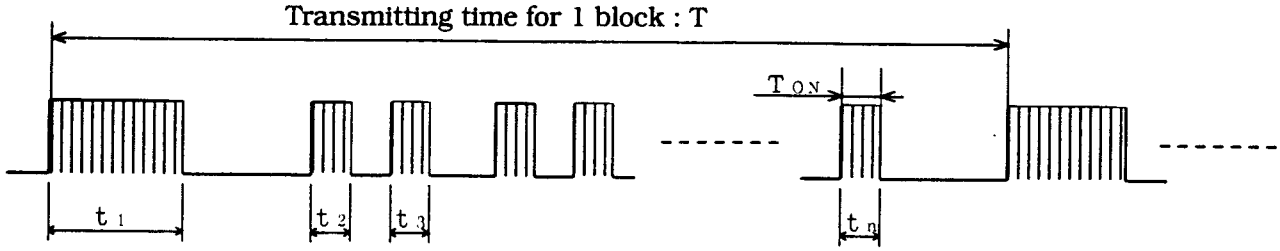
5) This product shall not contain the following materials.
Also, the following materials shall not be used in the production process for this product.

Materials for ODS : CFC_S, Halon, Carbon tetrachloride
1.1.1-Trichloroethane (Methylchloroform)

6) Brominated flame retardants
Specific brominated flame retardants such as the $PBBO_S$ and PBB_S are not used in this device at all.

5. Notes

1) When this infrared remote control detecting unit shall be adopted for wireless remote control, please use it with the signal format of transmitter, which total duty ratio D_t (Emitting time $\sum_{N=1}^{n} t_N$ / Transmitting time for 1 block T) is 40% or less. ON signal time TON (Pulse width of the presence of modulated IR) should be 300 μs or more. In case that the signal format of total duty and ON signal time is out of above conditions, there is a case that reception distance is much reduced or output is not appeared.



$$D_t = \left(\sum_{N=1}^{n} t_N / T\right) \times 100 \ (\%)$$

2) Please use a light emitting unit (remote control transmitter) taking into consideration such factors as the performances, characteristics and operating condition of the light emitting element and the characteristics of this light detecting unit.

3) If the surface of detector is smeared with dust or dirt, it may cause faulty operation. Caution shall be taken to avoid this. And do not touch the detector surface. If the surface was smeared, wipe it clean with soft cloth. If any solvent is needed, Methyl alcohol, Ethyl alcohol, or Isopropyl alcohol should be used. Please don't carry out washing. Because, after washing the remainder in solvent or flux in this device cause malfunction. Marking on this device is defaced by washing.

4) The shield case shall be grounded on the PCB pattern. (There are two cases that shield case and GND pin are connected in the shield case, or are not connected in it.)

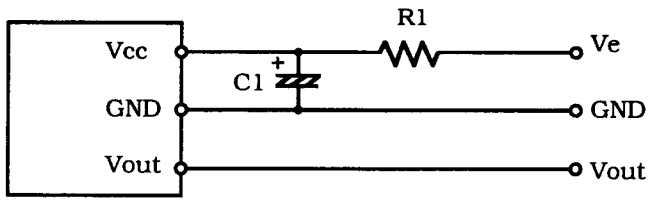
5) It shall not be applied the terminal and case with unnecessary stress.

6) Please don't push the detecting side (photodiode) from external.

7) In order to prevent electrostatic discharge of integrated circuit, human body and soldering iron, etc. shall be grounded.

8) The holes and the slits on the infrared detecting unit shall not be used as the other purpose to maintain its performance.

9) Recommended external circuit (External parts should be mounted as close as possible to the sensor.)



R1=47Ω±5%

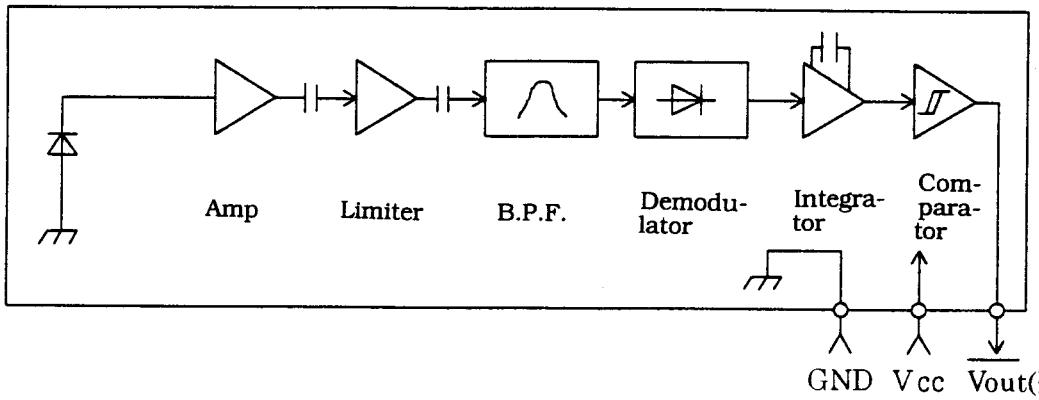
C1=47μF

The circuit constant is a example. It is difference from mounting equipment. Please select it by your mounting equipment.

10) There is a possibility that noise on output may be caused by environmental condition etc. even if there is no input transmission signal.

3. Ratings and characteristics

3.1 Schematic



※ : Built-in pull up resistor (100kΩ)

3.2 Absolute maximum ratings

Parameter	Symbol	Ratings	Unit
Supply voltage	Vcc	0 to 6.3	V
Operating temperature	Topr	-10 to +70 ※1	℃
Storage temperature	Tstg	-20 to +70	℃
Soldering temperature	Tsol	260 (Soldering time : 5s)	℃

※1) No dew formation

3.3 Recommended operating conditions

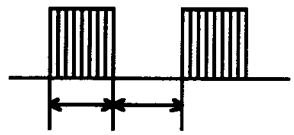
Parameter	Symbol	Operating condition	Unit
Supply voltage	Vcc	4.5 to 5.5	V

3.4 Electrical characteristics

(Unspecified Ta=25℃, Vcc=+5V)

Parameter	Symbol	MIN.	TYP.	MAX.	Unit	Remark
Current dissipation	Icc	-	-	1.5	mA	No input light
High level output voltage	V_{OH}	Vcc-0.5	-	-	V	※2
Low level output voltage	V_{OL}	-	-	0.45	V	※2
High level pulse width	T_1	700	-	1300	μs	※2
Low level pulse width	T_2	300	-	900	μs	※2
B.P.F. center frequency	f_0	-	※3	-	kHz	

※2) The burst wave as shown in the figure on the right shall be transmitted by the transmitter shown in Fig.1. However, the carrier frequency of transmitter is same as ※3. Measuring shall be 50pulse or later after starting the transmission.



600 μs 1000 μs

f_0=※3 kHz Duty 50%

※3) B.P.F. center frequency : f_0 of each model is shown in the list below.

Model No.	B.P.F. center frequency (TYP)
GP1UM26RK/27RK/28RK/28QK	40 kHz
GP1UM260RK/270RK/280RK/280QK	36 kHz
GP1UM261RK/271RK/281RK/281QK	38 kHz
GP1UM262RK/272RK/282RK/282QK	36.7 kHz
GP1UM263RK/273RK/283RK/283QK	32.75 kHz
GP1UM267RK/277RK/287RK/287QK	56.8 kHz

3.5 Performance

The output signal of this infrared detecting unit shall satisfy the following requirements with the transmitter shown in Fig.1 used in the standard optical system in Fig.2.

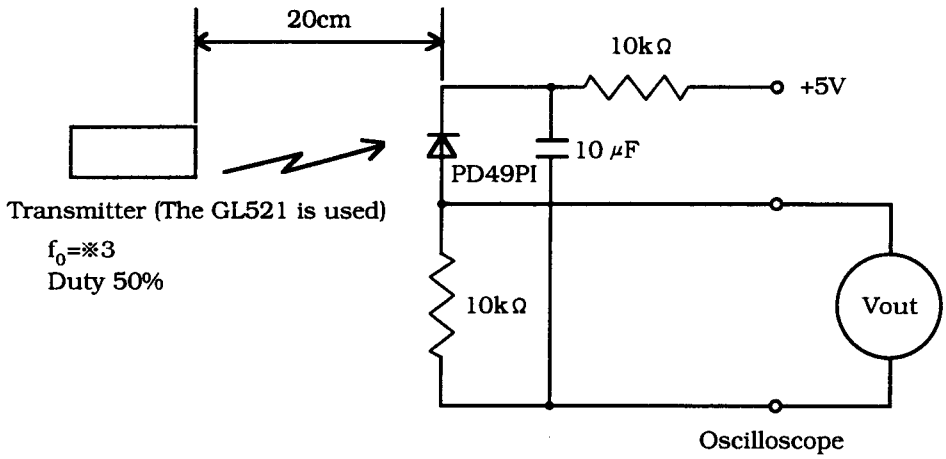
3.5.1 Characteristics of linear reception distance

The output signal shall satisfy the electrical characteristic requirements in para. 3.4 at L=0.2 to 8.0m, (※4) Ev< 10 ℓ x, ϕ =0° in Fig.2.

3.5.2 Characteristics of sensitivity angle reception distance

The output signal shall satisfy the electrical characteristic requirements in para. 3.4 at L=0.2 to 5.0m, (※4) Ev< 10 ℓ x, $\phi \leqq 30°$ in Fig.2.

※4) It refers to detector face illuminance.



In the figure above, the transmitter shall be set as the output Vout(p-p) will be 40mV. Note that the PD49PI in this application is the one with short-circuit current Isc=2.6 μA measured at Ev=100 ℓx. (Ev is the illuminance by CIE standard light source A (tungsten lamp)).

Fig. 1 Transmitter

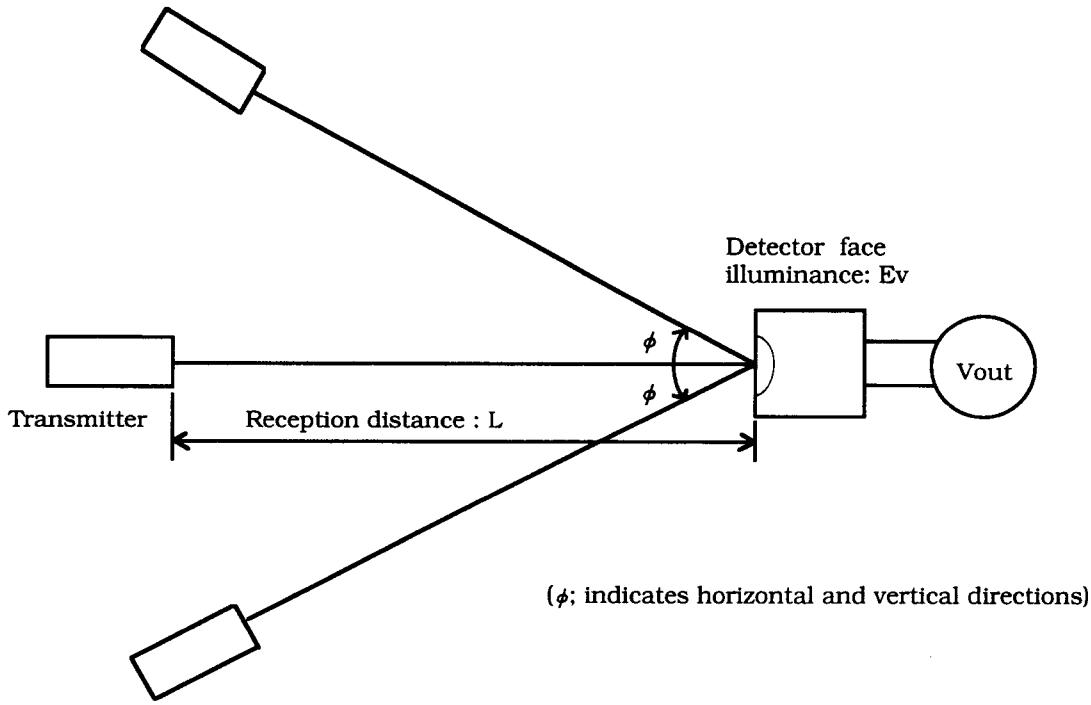
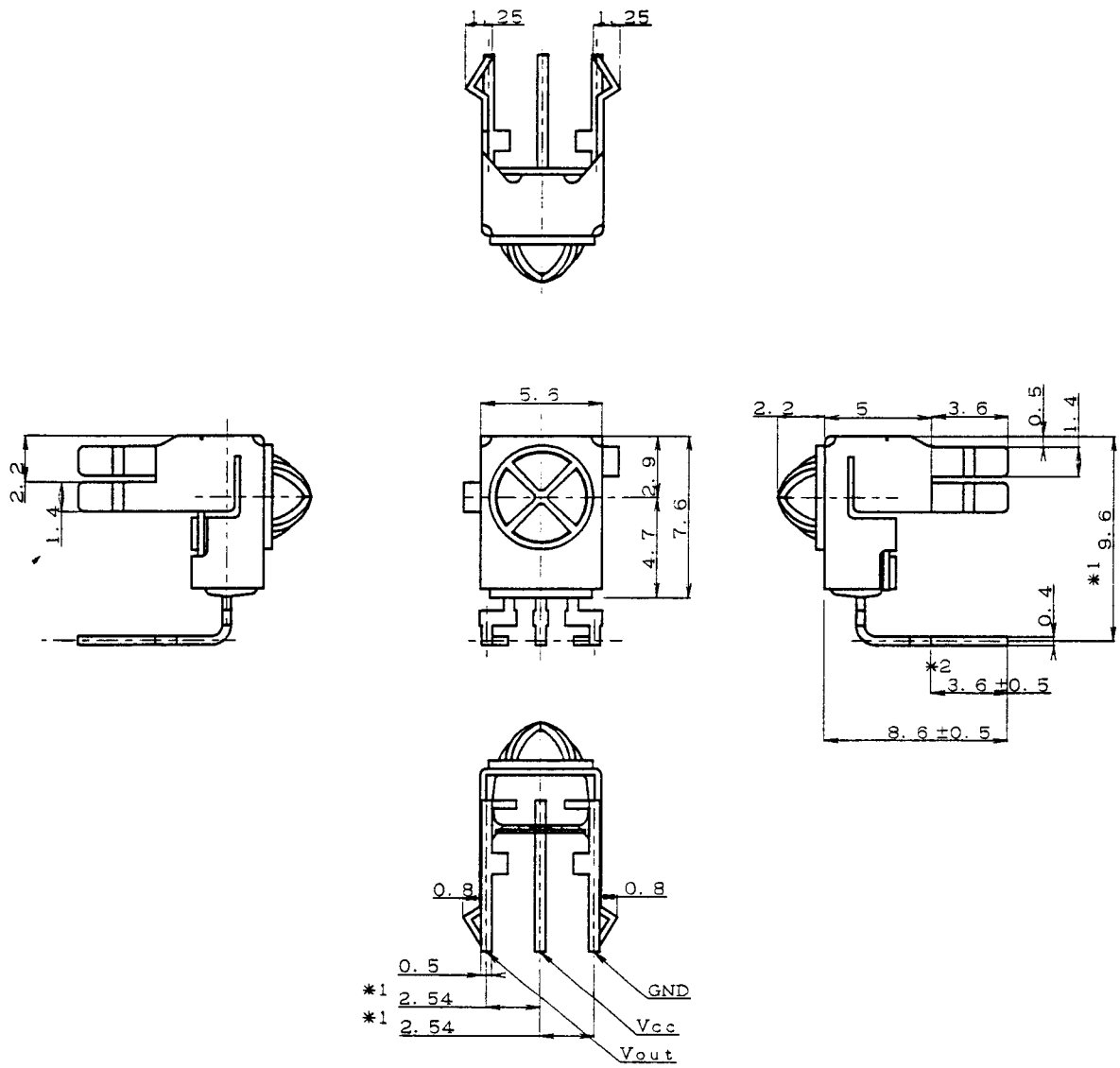
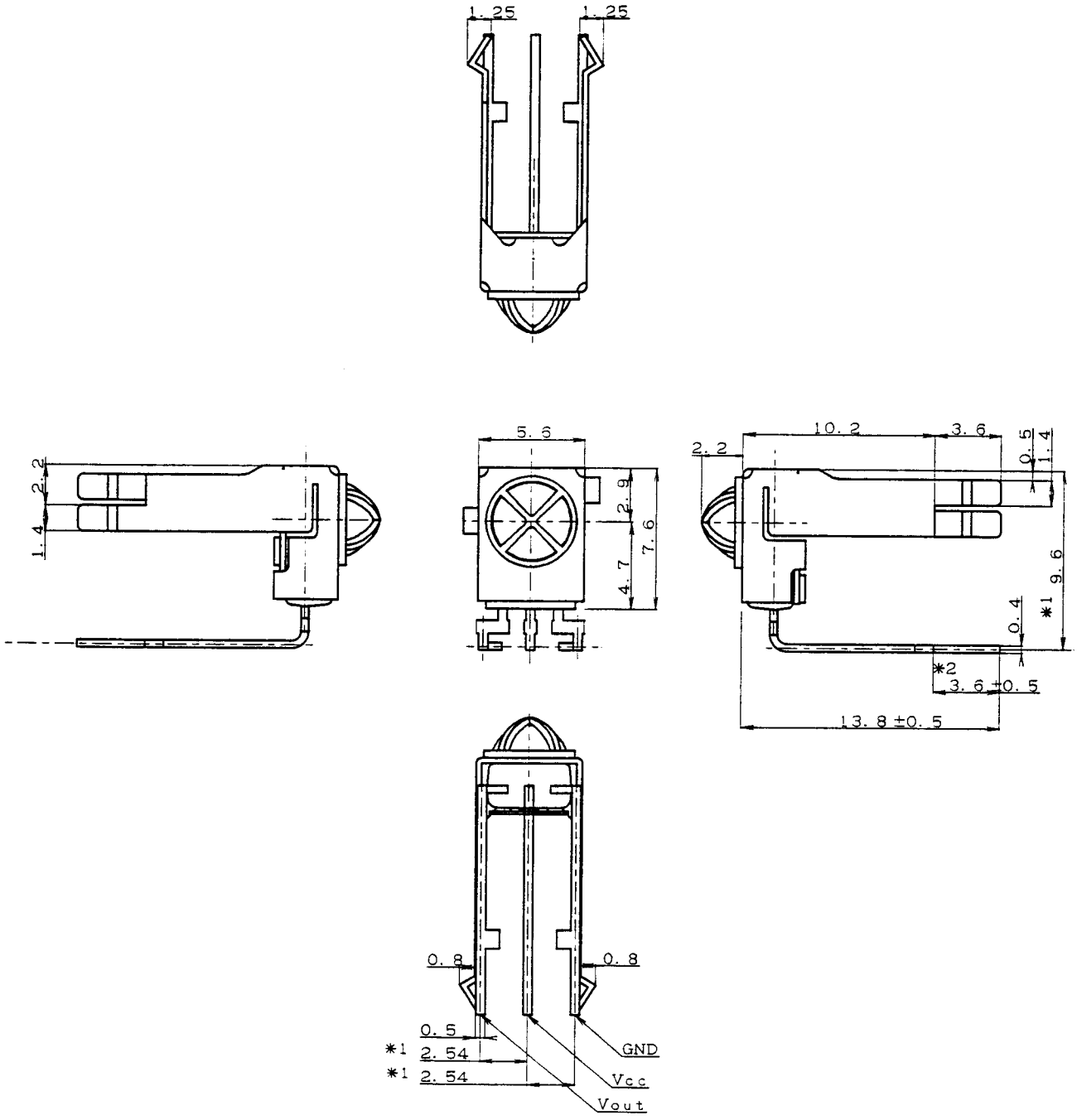


Fig.2 Standard optical system



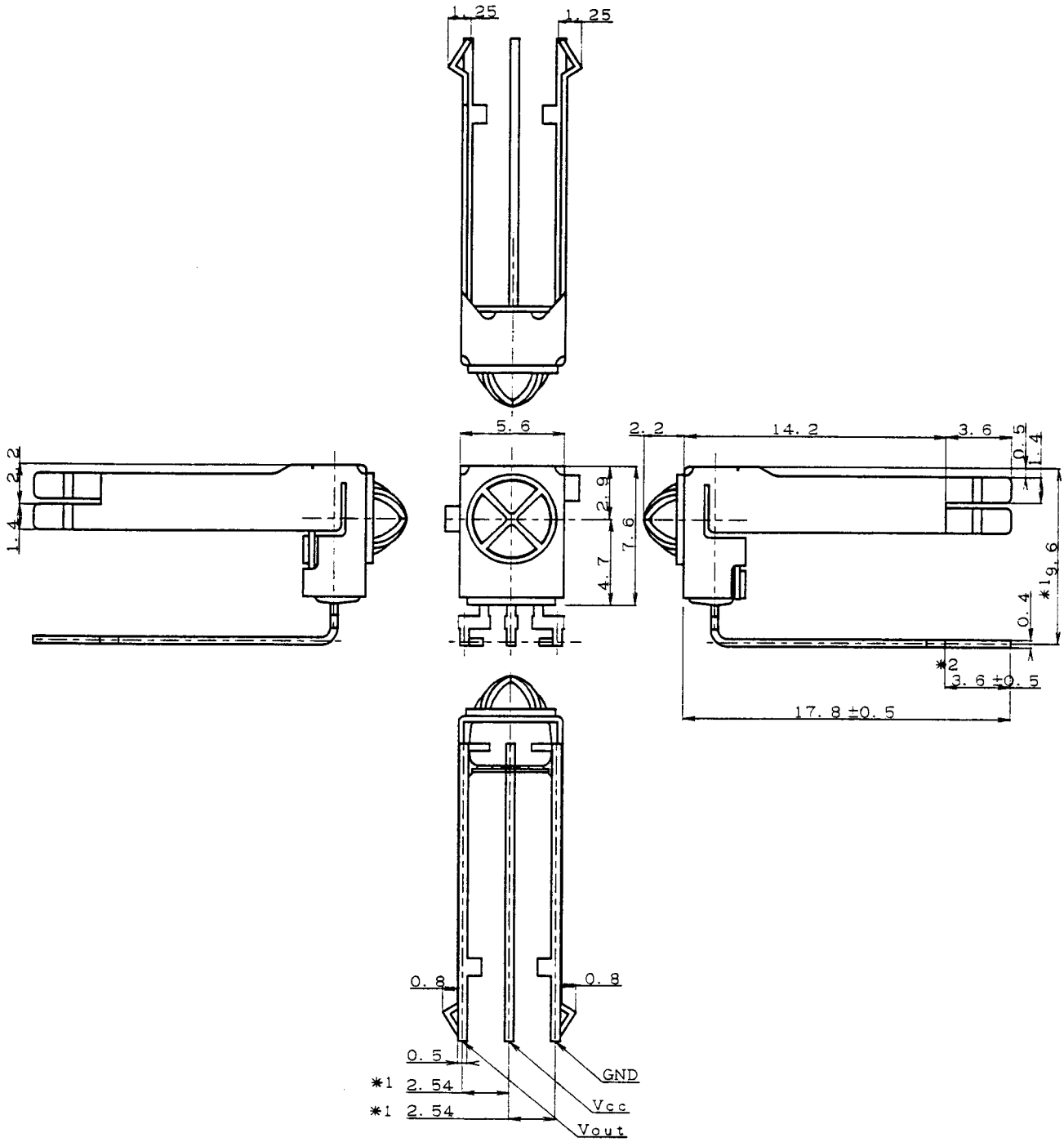
1. *1 indicates root dimensions of connector.
2. Unspecified tolerance : ±0.3
3. Case thickness : 0.3TYP.
4. Case material : Fe
5. Lead material : Fe (Ag plating)
6. Lead edge finish : Solder plating or solder dip
7. Mold resin : Epoxy resin
8. Product mass : Approx. 1.0g
9. *2 : Exclude sagged solder

Scale	Name	GP1UM26RK series Outline Dimensions
3/1		
Unit	Drawing No.	
1=1/1mm		



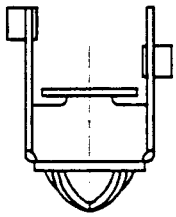
1. *1 indicates root dimensions of connector.
2. Unspecified tolerance : ±0.3
3. Case thickness : 0.3TYP.
4. Case material : Fe
5. Lead material : Fe (Ag plating)
6. Lead edge finish : Solder plating or solder dip
7. Mold resin : Epoxy resin
8. Product mass : Approx. 1.0g
9. *2 : Exclude sagged solder

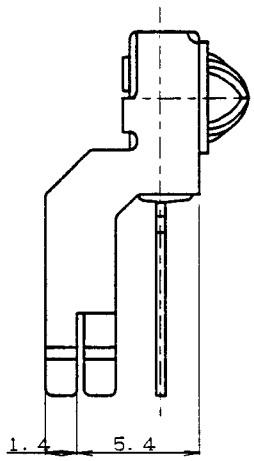
Scale	Name	GP1UM27RK series Outline Dimensions
3/1		
Unit	Drawing No.	
1=1/1mm		

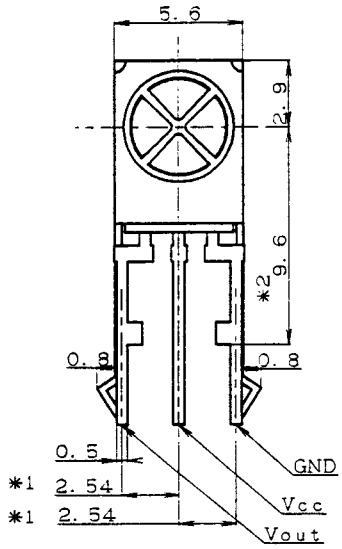


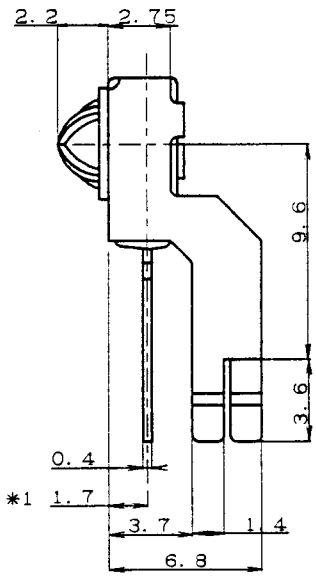
1. *1 indicates root dimensions of connector.
2. Unspecified tolerance : ±0.3
3. Case thickness : 0.3TYP.
4. Case material : Fe
5. Lead material : Fe (Ag plating)
6. Lead edge finish : Solder plating or solder dip
7. Mold resin : Epoxy resin
8. Product mass : Approx. 1.0g
9. *2 : Exclude sagged solder

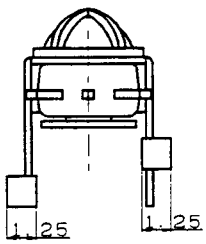
Scale	Name	GP1UM28RK series Outline Dimensions
3/1		
Unit	Drawing No.	
1=1/1mm		







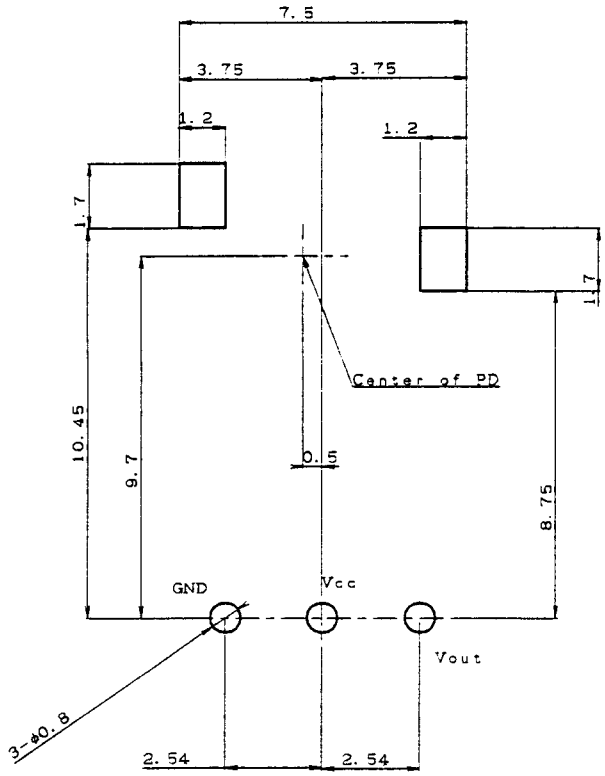




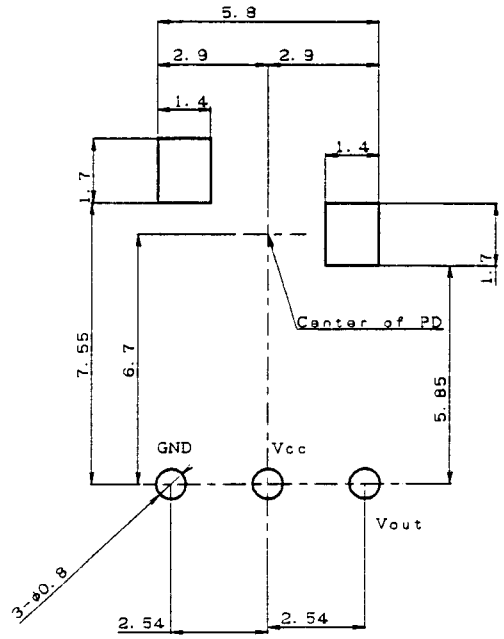
1. *1 indicates root dimensions of connector.
2. Unspecified tolerance : ±0.3
3. Case thickness : 0.3TYP.
4. Case material : Fe
5. Lead material : Fe (Ag plating)
6. Lead edge finish : Solder plating or solder dip
7. Mold resin : Epoxy resin
8. Product mass : Approx. 1.0g
9. *2 : Exclude sagged solder

Scale	Name	GP1UM28QK series Outline Dimensions
3/1		
Unit	Drawing No.	
1=1/1mm		

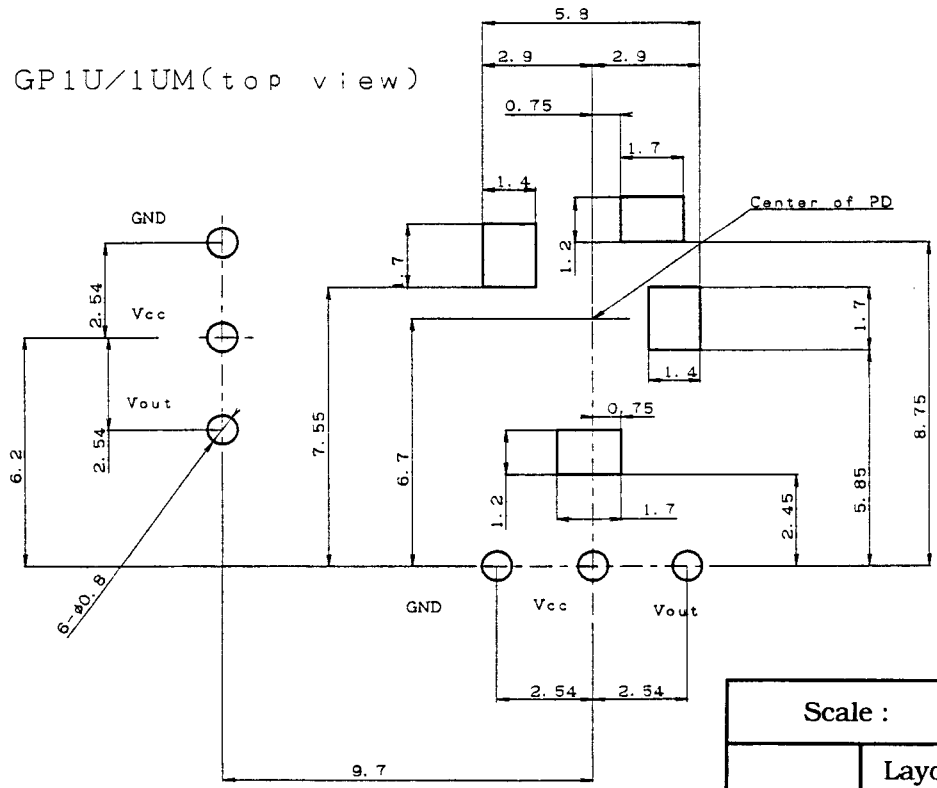
GP1U26X/27X/28X/
26R/27R/28R(top view)



GP1UM26XK/27XK/28XK/
26RK/27RK/28RK(top view)

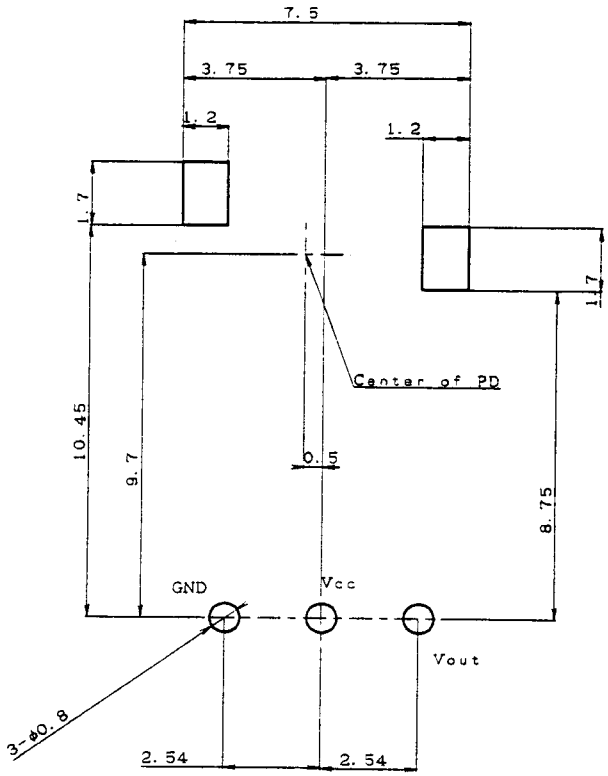


GP1U/1UM(top view)

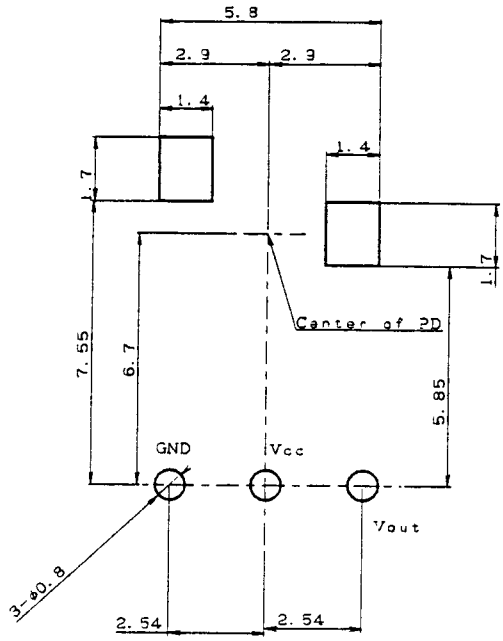


Scale :	Unit : 1=1/1mm
Name	Layout for 1.0mm thickness PCB (Reference) (PCB material : Glass epoxy)

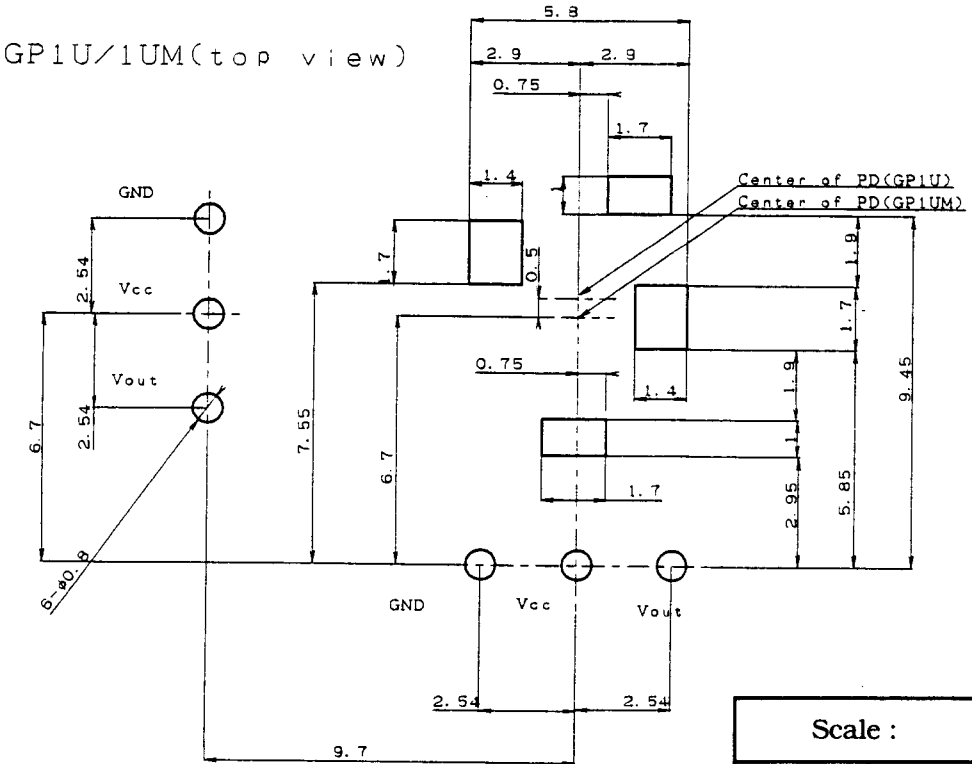
GP1U26X/27X/28X/
26R/27R/28R(top view)



GP1UM26XK/27XK/28XK/
26RK/27RK/28RK(top view)

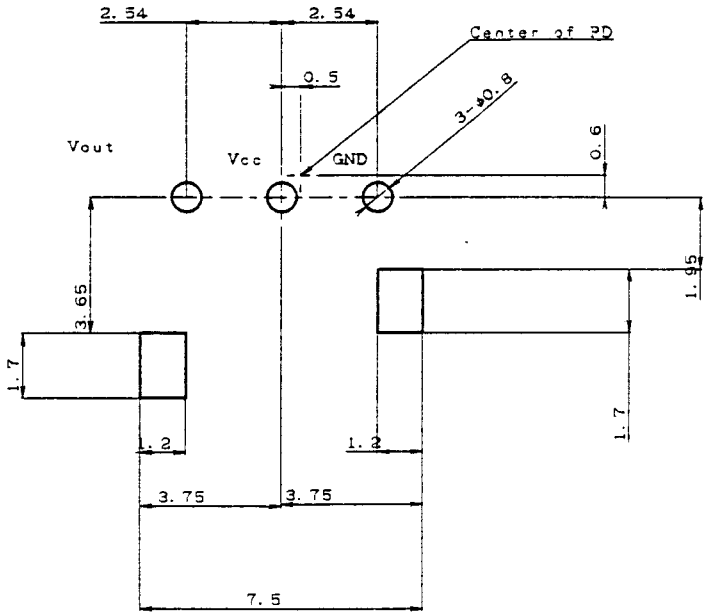


GP1U/1UM(top view)

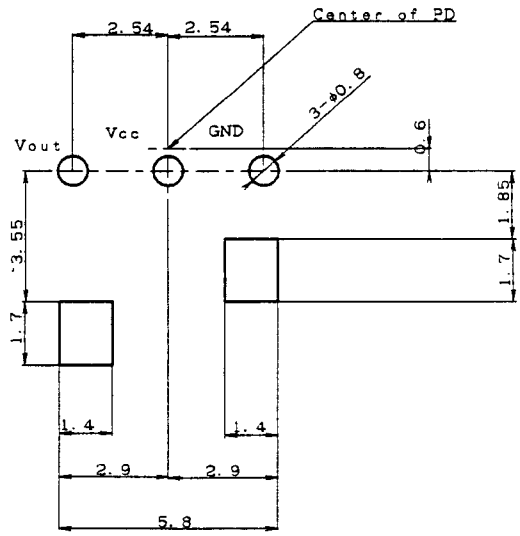


Scale :	Unit : 1=1/1mm
Name	Layout for 1.6mm thickness PCB (Reference)

GP1U28Y/Q(side view)



GP1UM28YK/QK(side view)



Scale :	Unit : 1=1/1mm
Name	Layout for PCB of GP1UM28Y/28Q (Reference)

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