

SHARP

OPTO-ANALOG DEVICES DIVISION
ELECTRONIC COMPONENTS GROUP
SHARP CORPORATION

SPECIFICATION

DEVICE SPECIFICATION FOR

REFERENCE

INFRARED EMITTING DIODE

MODEL No.

GL480E00000F

Specified for

Enclosed please find copies of the Specifications which consists of 10 pages including cover.
After confirmation of the contents, please be sure to send back copy of the Specifications
with approving signature on each.

CUSTOMER'S APPROVAL

DATE

BY

PRESENTED

DATE

BY

H. Nakamura,
Department General Manager of
Engineering Dept., III
Opto-Analog Devices Div.
ELECOM Group
SHARP CORPORATION

Product name : INFRARED EMITTING DIODE

Model No. : GL480E0000F

1. These specification sheets include materials protected under copyright of Sharp Corporation ("Sharp"). Please do not reproduce or cause anyone to reproduce them without Sharp's consent.
2. When using this product, please observe the absolute maximum ratings and the instructions for use outlined in these specification sheets, as well as the precautions mentioned below. Sharp assumes no responsibility for any damage resulting from use of the product which does not comply with the absolute maximum ratings and the instructions included in these specification sheets, and the precautions mentioned below.

(Precautions)

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

· OA equipment	· Audio visual equipment	· Home appliances
· Telecommunication equipment (Terminal)	· Measuring equipment	
· Tooling machines	· Computers	

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.

3. Please contact and consult with a Sharp sales representative for any questions about this product.

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1. Application

This specification applies to the outline and characteristics of GaAs type chip infrared emitting diode Model No. GL480E0000F.

2. Outline

Refer to the attached drawing No. CY12975i02, page 3.

3. Ratings and characteristics

Refer to the attached sheet, page 4, 5.

4. Reliability

Refer to the attached sheet, page 6.

5. Outgoing inspection

Refer to the attached sheet, page 7.

6. Supplement

(6-1)Packing

Refer to the attached sheet, page 8.

(6-2) 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 : CFCs, Halon, Carbon tetrachloride, 1,1,1-Trichloroethane (Methyl chloroform)

(6-3) This product does not contain specific brominated flame retardants such as the PBB and PBDE .

(6-4) Compliance with each regulation

6.4.1 The RoHS directive(2002/95/EC)

This product complies with the RoHS directive(2002/95/EC) .

Object substances: mercury, lead, cadmium, hexavalent chromium, polybrominated biphenyls (PBB) and polybrominated diphenyl ethers (PBDE)

6.4.2 Content of six substances specified in Management Methods for Control of Pollution Caused by Electronic Information Products Regulation (Chinese : 电子信息产品污染控制管理办法).

Category	Toxic and hazardous substances					
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent chromium (Cr ⁶⁺)	Polybrominated biphenyls (PBB)	Polybrominated diphenyl ethers (PBDE)
Infrared emitting diode	✓	✓	✓	✓	✓	✓

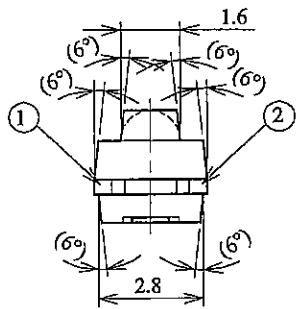
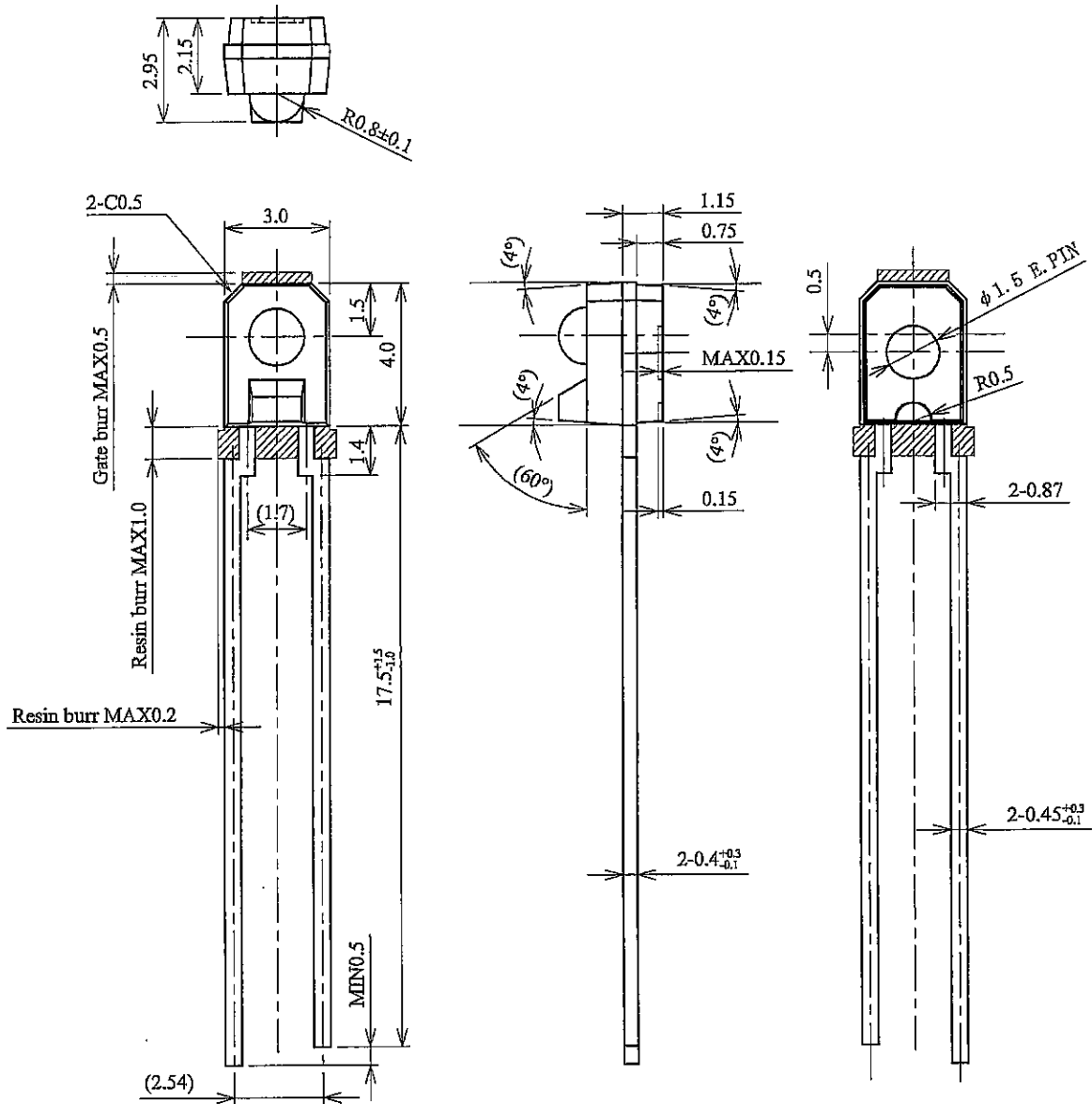
✓ : indicates that the content of the toxic and hazardous substance in all the homogeneous materials of the part is below the concentration limit requirement as described in SJ/T 11363-2006 standard .

(6-5) Product mass (Piece) : Approximately 0.09g

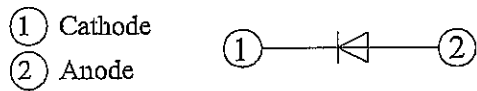
7. Notes

- (7-1) In circuit designing, make allowance for the degradation of the light emitting diode output that results from long continuous operation. (50% degradation/ 5years)
- (7-2) Cleaning conditions :
- Solvent cleaning : Solvent temperature 45°C or less Immersion for 3 min or less
 - Ultrasonic cleaning : The effect to device by ultrasonic cleaning differs by cleaning bath size, ultrasonic power output, cleaning time, PCB size or device mounting condition etc.
Please test it in actual using condition and confirm that doesn't occur any defect before starting the ultrasonic cleaning.
The cleaning shall be carried out with solvent below.
- Solvent : Ethyl alcohol, Methyl alcohol, Isopropyl alcohol
- (7-3) Soldering
- The lead pins should be soldered according to the absolute maximum ratings.
While or after soldering, the lead pins shall be free from external force.
This device shall not be soldered with preheat or reflow.
The terminal covering of this device consists of lead free solder.
In case of mounting this device in a lead free soldering process, special care should be taken to avoid any boundary exfoliation (Lift-off phenomenon) between the solder and the solder pad on the printed circuit board.

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- 1) Unspecified tolerance shall be ± 0.2 .
- 2) Package : Transparent red
- 3) Dimensions in parenthesis are shown for reference.
- 4) The thin burr thickness (MAX. 0.05mm) and the gate burr (MAX. 0.5mm) shall not be inclusive to the outline dimensions.
- 5) Protruded resin 1.0mm MAX. However, the thin burr with a lead attached is 1.4mm MAX. from the resin.



Scale	Material	Finish	Name	GL480E00000F	
5 / 1	Lead : Fe Package : Epoxy resin	Lead pin: Solder dip Lead-free solder use Composition(Standard value) Sn96.5%,Ag3.0%,Cu0.5%	Drawing No.	Outline Dimensions	
Unit				C Y 1 2 9 7 5 i 0 2 1	
1 = 1 / 1 mm					

REFERENCE

3. Ratings and characteristics

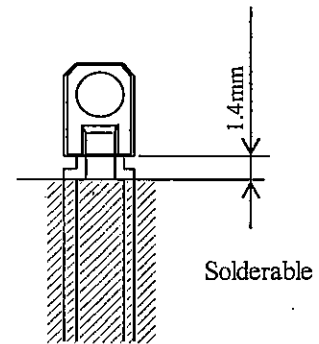
3.1 Absolute maximum ratings

Ta=25°C

Parameter	Symbol	Rating	Unit
Forward current	I_F	50	mA
Peak forward current *1	I_{FM}	1	A
Reverse voltage	V_R	6	V
Power dissipation	P	75	mW
Operating temperature	Topr	-25 to +85	°C
Storage temperature	Tstg	-40 to +85	°C
Soldering temperature *2	Tsol	260	°C

*1 Pulse width : 100 μ s, Duty ratio : 0.01

*2 For 5 seconds MAX. at the position of 1.4mm from the resin edge.



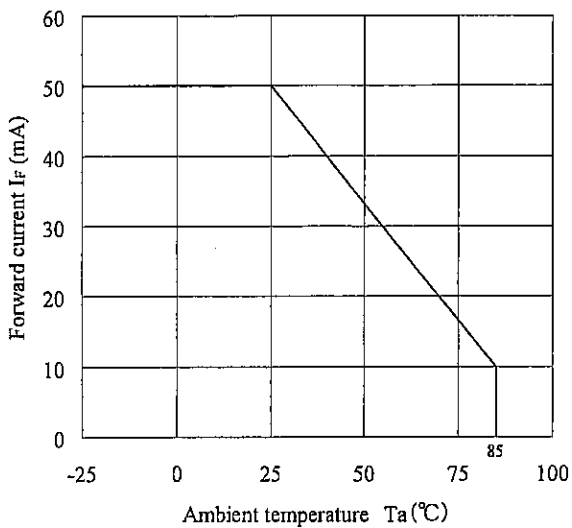
3.2 Electro-optical characteristics

Ta=25°C

Parameter	Symbol	MIN.	TYP.	MAX.	Unit	Conditions
Forward voltage	V_F	-	1.2	1.4	V	$I_F=20\text{mA}$
Peak forward voltage	V_{FM}	-	3.0	4.0	V	$I_{FM}=0.5\text{A}$
Reverse current	I_R	-	-	10	μA	$V_R=3\text{V}$
Radiant flux	Φ_e	0.7	-	3.0	mW	$I_F=20\text{mA}$
Peak emission wavelength	λ_p	-	950	-	nm	$I_F=5\text{mA}$
Half intensity wavelength	$\Delta\lambda$	-	45	-	nm	$I_F=5\text{mA}$
Terminal capacitance	C_t	-	50	-	pF	$V_R=0, f=1\text{MHz}$
Cut-off frequency	f_c	-	300	-	kHz	-
Half intensity angle	$\Delta\theta$	-	± 13	-	°	-

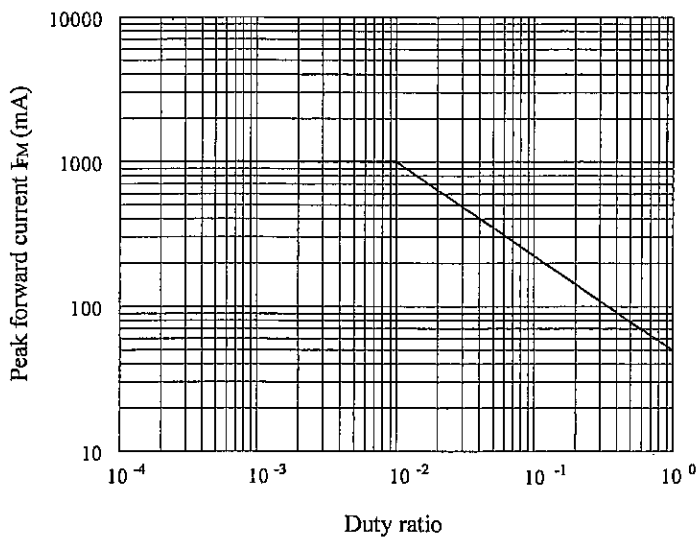
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(3.3) Forward current vs. ambient temperature



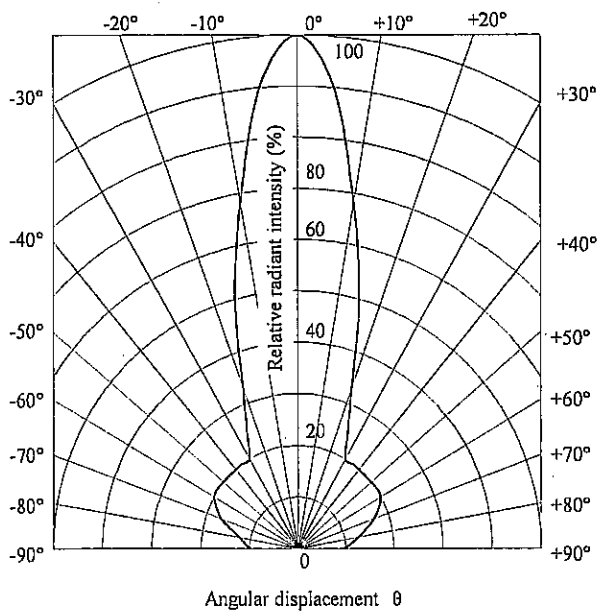
(3.4) Peak forward current vs. duty ratio

Pulse width $\leq 100\mu s$
 $T_a = 25^\circ C$



(3.5) Radiation diagram (reference)

$T_a = 25^\circ C$



4. Reliability

The reliability of products shall satisfy items listed below.

Confidence level : 90%

LTPD : 10 or 20

Test Items	Test Conditions	Failure Judgement Criteria	Samples (n) Defective(C)	
Temperature cycling	1 cycle -40°C←→+85°C (30min) (30min) 20 cycles test	$\Phi_e < L \times 0.8$ $\Phi_e > U \times 1.2$ $I_R > U \times 2.0$ $V_F > U \times 1.2$	n=22, C=0	
High temp. and high humidity storage	+60°C, 90%RH, 500h		n=22, C=0	
High temp. storage	+85°C, 500h		n=22, C=0	
Low temp. storage	-40°C, 500h		n=22, C=0	
Operation life	+25°C, $I_f=50\text{mA}$, 500h		n=22, C=0	
Mechanical shock	1000m/s ² , 6ms, Half sine wave 3 times/±X, ±Y, ±Z direction		n=11, C=0	
Variable frequency vibration	100 to 2000 to 100Hz/For approx. 4min 200m/s ² , 48 min/X, Y, Z direction		n=11, C=0	
Terminal strength (Tension)	Weight: 5N 10 s/each terminal		U: Upper specification limit L: Lower specification limit	n=11, C=0
Terminal strength (Bending)	Weight: 2.5N 0° →90° →0° →90° →0° The one test should be performed.		n=11, C=0	
Soldering heat	260±5°C, 5±0.5 s Position of 1.4mm from the resin edge.		n=11, C=0	
Solderability	245±5°C, 5±1 s Position of 1.4mm from the resin edge. Flux:EC-19S (Tamura kaken corporation) No pretreatment	Solder shall adhere at less than 95% area of dipped portion.	n=11, C=0	

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5. Outgoing inspection

(1) Inspection lot

Inspection shall be carried out per each delivery lot.

(2) Inspection method

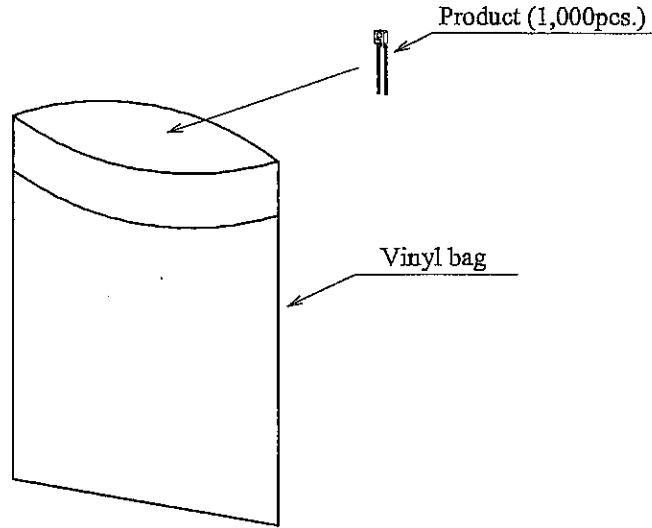
A single sampling plan, normal inspection level II based on ISO2859 shall be adopted.

Defect	Inspection items and test method				AQL(%)	
Major Defect	1	Disconnection, short			0.065	
	2	Inverse polarity on terminal				
	3	Characteristics defect				
		Parameter	Symbol	Judgement criteria MIN. MAX.		Unit
		Forward voltage	V_F	- 1.4		V
		Reverse current	I_R	- 10		μA
	Radiant flux	Φ_e	0.7 3.0	mW		
	Test conditions refer to paragraph 3.2.					
Minor Defect	1	Appearance defect			0.25	
		Parameter	Judgement criteria			
		Crack	Visible crack irrespective of its position shall be defect.			
		Split, Chip, Scratch, Stain, Blur	One which affects the characteristics of paragraph 3.2 shall be defect.			
	Bubble, Foreign matter (One on resin surface which can wipe off shall not be applied.)	1. On light emitter ϕ 0.4mm or more shall be defect. 2. Area excepting on light emitter ϕ 1.0mm or more shall be defect.				

6-1 Packaging

6-1-1 Inner packing

① Inner packing drawing

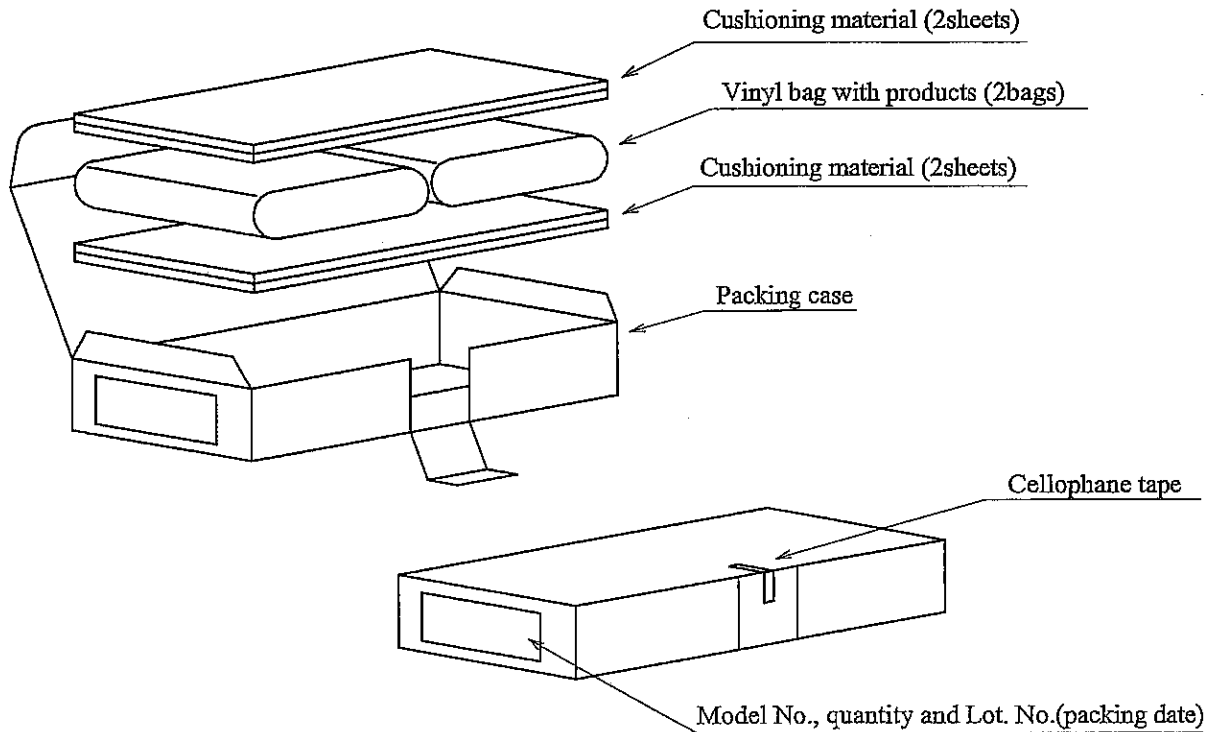


② Inner packing material : Vinyl bag (Polyethylene)

③ Quantity : 1,000pcs./bag

6-1-2 Outer packing

① Outer packing drawing



② Outer material : Packing case (Corrugated cardboard),
Cushioning material (Urethane), Cellophane tape

③ Quantity : 2,000pcs./box

④ Indication : Model No., quantity and Lot. No.(packing date)

⑤ Regular packaged mass : Approximately 270g