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DEVICE SPECIFICATION FOR

Light emitting diode Lamp

MODEL No. **GL57643**

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 - Please obey the instructions mentioned below for actual use of this device. SHARP takes no responsibility for damage caused by improper use of the devices.
 - This device is designed for general electronic equipment. Main uses of this device are as follows:
 - SOA equipment ● Telecommunication equipment (Terminal)
 - Measuring equipment AV equipment Home appliance, etc.
 - Please take proper steps in order to maintain reliability and safety, in case this device is used for the uses mentioned below which require high reliability,
 - Unit concerning control and safety of a vehicle (air plane, train, automobile etc.)
 - Traffic signal -Gas leak detection breaker Fire box and burglar alarm box
 - Other safety equipment, etc.
 - Please do not use for the uses mentioned below which require extremely high reliability.
 - Space equipment Telecommunication equipment (Trunk)
 - Nuclear control equipment Medical equipment etc.
- Contact a SHARP representative of sales office in advance when you intend to use SHARP devices for any applications other than those applications for general electronic equipment recommend by SHARP at (1).

CUSTOMER'S APPROVAL

DATE *Jan. 16, 1996*

PRESENTED BY *M. Abe*

M. Abe
 Department General Manager of
 Engineering Dept., III
 Opto-Electronic Devices Div.
 ELECOM Group
 SHARP CORPORATION

DATE _____

BY _____

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1. Application

This Specification applies to the outline and characteristics of Light emitting diode Model No. **GL 5 F G 4 3**. This model is designed for every kind of indicators lamp used GaP Yellow-green LED chip,

2. Outline and pin connections

Refer to the attached sheet, Page 2.

3. Ratings and characteristics

Refer to the attached sheet, Page 3. to 4.

4. Reliability

Refer to the attached sheet, Page 5.

5. Outgoing inspection

Refer to the attached sheet, Page 6.

6. Supplement

Refer to the attached sheet, Page 7,

7. Notes

Refer to the attached sheet, Page 8. to 9.

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3. Ratings and characteristics

3-1. Absolute maximum ratings

($T_a = 25^\circ\text{C}$)

Parameter	Symbol	Value	Unit
Power dissipation	P	8.4	mW
Continuous forward current	I_F	30	mA
Peak forward current (Note 1)	I_{FM}	50	
Derating factor		(DC) 0.40 (Pulse) 0.67	mA/ $^\circ\text{C}$
Reverse voltage	V_R	5	V
Operating temperature	T_{opr}	-25 ~ +85	$^\circ\text{C}$
Storage temperature	T_{stg}	-25 ~ +100	
Soldering temperature (Note 2)	T_{sol}	260 (within 5 seconds)	

(Note 1) Duty ratio = 1/10, Pulse width = 0.1 ms

(Note 2) At the position of 1, 6mm from the bottom resin package

3-2. Electro-optical characteristics

($T_a = 25^\circ\text{C}$)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
Forward voltage	V_F	$I_F = 20\text{mA}$	-	2.2	2.8	V	
Luminous intensity (Note 3)	I_v		200	600	-	mcd	
Peak emission wavelength	λ_p				565	-	nm
Spectrum radiation bandwidth	$\Delta\lambda$				30		
Reverse current	I_R	$V_R = 4\text{V}$			10	μA	
Terminal capacitance	C_t	$V = 0\text{V}, f = 1\text{MHz}$		14		pF	

(Note 3) Reference rank of the luminous intensity.

3-3. Rank of the luminous intensity. (Note 4)

Rank	Luminous intensity	Unit	Conditions
A	200 ~ 540	mcd	$I_F = 20\text{mA}$
B	400 ~ 1081		
C	800 ~ (2162)		

(Note 4) Tolerance; $\pm 15\%$

In regard to luminous intensity, the following ranking shall be carried out. However the quantity of each rank shall not be prescribed.

In case of the distribution of the luminous intensity shift to high. at that point new upper rank is prescribed and lower rank is delete,

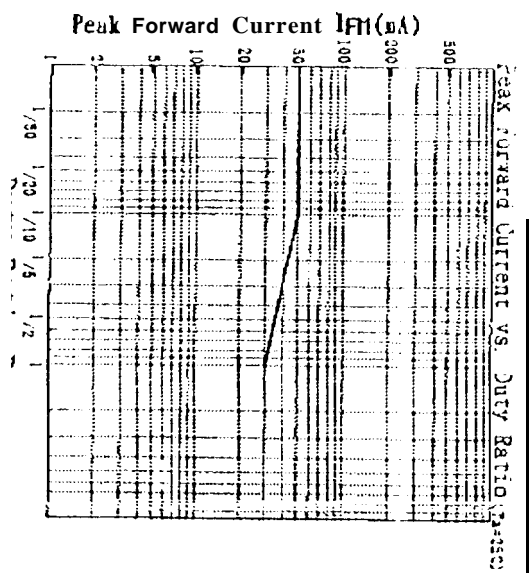
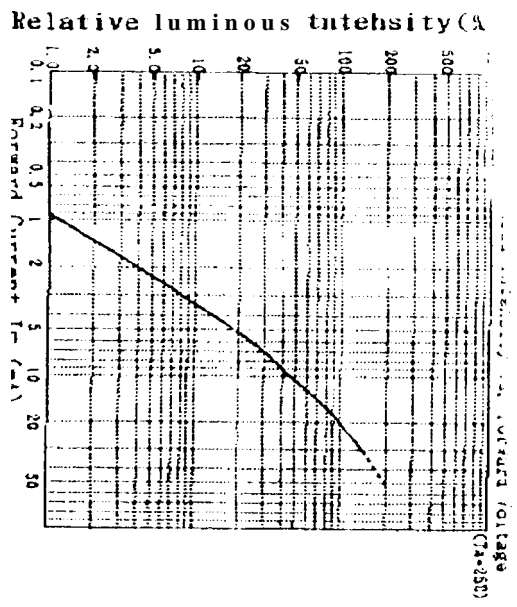
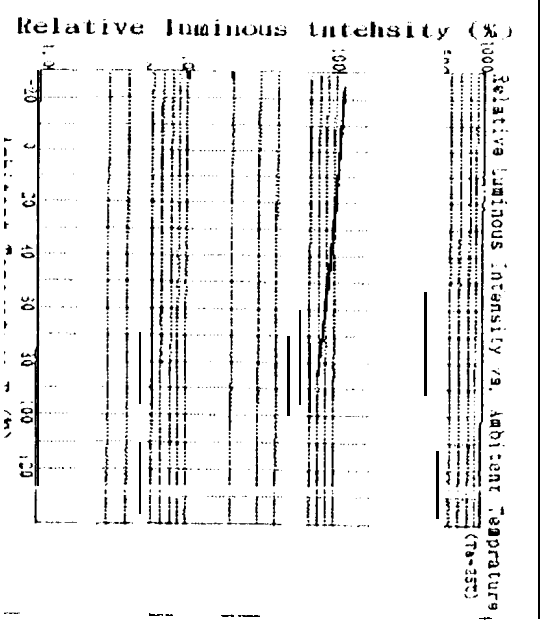
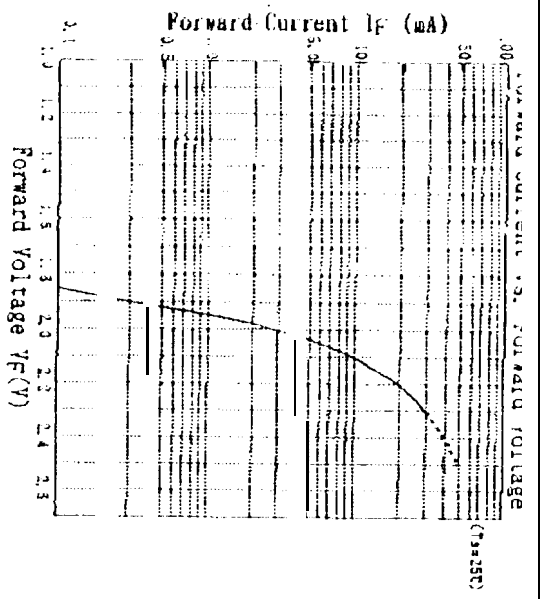
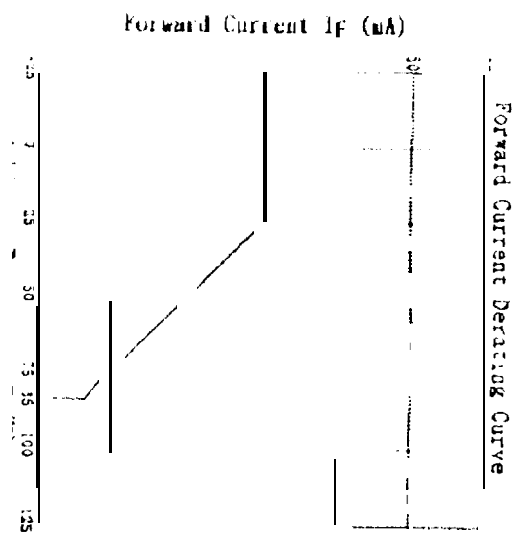
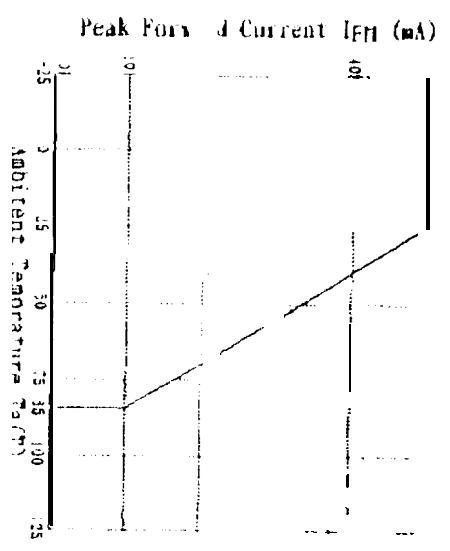
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3-5 Characteristics Diagrams



(Note) Above characteristic data are typical data and not a guaranteed data

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4. Reliability

The reliability of products shall be satisfied with items below.

4-1. Test items and test conditions

Test Items	Test Conditions	Samples Defective: 90%		
		Samples Defective	LTPD(%)	
Soldrabilitys : dispositi	Prior disposition: Dip in login flux. Dip in login flux	1 1	0	2 0
Soldering heat		1 1	0	2 0
Mecanical	3 times/±X, ±Y, ±Z direction	1 1	0	2 0
Variable frequency vibration	200m/s ² , 100 to 2000 to 100Hz/sweep for 4min 4 times/±X, ±Y, ±Z direction	1 1	0	2 0
Terminal strength (Tension)	Weight: 10N, 5s/each terminal	1 1	0	2 0
Terminal strength (Bending)	Weight: 5N, 0°-90°-0°--90°-0°/each terminal	1 1	0	2 0
Temperature cycling	-25℃(30min)~100℃(30min), 30 cycles	2 2	0	1 0
High temperature and high humidity storage	60℃ 90%RH, 1000h	2 2	0	1 0
High temp. storage	100℃, 1000h	2 2	0	1 0
Low temp. storage	-25℃, 1000h	2 2	0	1 0
Operation life	25℃, I F MAX, 1000h	2 2	0	1 0

4-2. Measurement items and failure judgement criteria

Measurement Items	Symbol	Failure Judgement Criteria
Forward voltage	V _F	U.S.L x 1.2
Reverse current	I _R	U.S.L x 2.0
Luminous intensity	I _v	Initial intensity x 0.5

...shall be ... at the area of 80% or more of dipped portion.

- *Terminal strength: Package is not destroyed, and terminal is not shakey.
- Measuring condition is in accordance with specification.
 - U.S.L is shown by upper standard limit.
 - I_F MAX is shown by foward current of adsolute maximum ratings.

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5. Incoming inspection

5-1. Applied standard: ISO 2859-1

5-2. Sampling method and criteria : A single sampling plan, normal inspection criteria
 AQL Major defect: 0.065%
 Minor defect: 0.4%
 Finely defect: 1.0%

5-3. Test items, judgement criteria and classifica of defect

No.	Test Items	Judgement criteria	classifica of Defect
1	Disconnection	Not emit light	Major defect
2	Short	Not emit light	Major defect
3	Position of Cutting off rim	Different from dimension	Major defect
4	Reverse terminal	Different from dimension	Major defect
5	Luminous color	Different from provided color	Major defect
6	Label	Wrong label of lamp type	Major defect
7	Mixture of wrong type	Wrong type lamp intermix	Major defect
8	Outline dimension	Not satisfy outline specification	Minor defect
9	Characteristic	Over the limit value of specification at V_f , I_r and I_v	Minor defect
10	Chip-off the rim	Exceed 0.2mm	Finely defect
11	Foreign substance	White point: Exceed $\phi 0.3mm$ Black point: Exceed $\phi 0.3mm$ String form: Exceed 3.0mm (on top view)	Finely defect
12	Scratch	Exceed 0.3mm or 0.1mmx1.0mm	Finely defect
13	Void	Exceed $\phi 0.3mm$ (on top view)	Finely defect
14	Uneven color of resin	Uneven color	Finely defect
15	Uneven density of material for scattering	Extremely uneven density	Finely defect
16	Unbalanced center	Exceed 0.25mm from package center	Finely defect
17	Burr	Exceed 0.2mm against provided dimension	Finely defect
18	Insertion position of terminal	Terminal is not inserted into resin enough	Finely defect

5-4. Test items the surface is be applied for flat type, judgement criteria and classifica of defect

No.	Test Items	Judgement criteria	classifica of Defect
100	Chapped the surface	The surface chapped is striking for see the lamp top	Finely defect
200	Hollow the surface	The surface hollow is striking for see the lamp top.	Finely defect

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6. Supplement

6-1. Packing

6-1-1. Inner package

Put 250pcs the same luminous intensity rank products into pack and put following label by pack.

(Indication label sample)

SHIPMENT TABLE	
PART No.	GL5FG43
QUANTITY	250
LOT No.	KA96A18
S H A R P	
MADE IN JAPAN	

Model number

Quantity

Lot number

Luminous intensity rank

country of origin

*The defination of the lot number

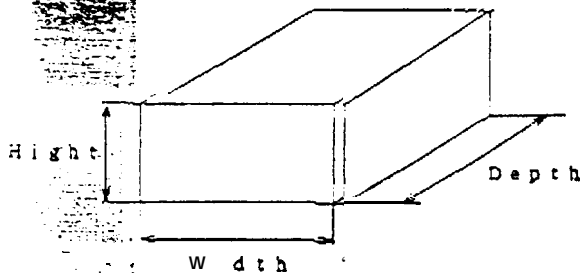
K	A	96	A	18
Factory	Support code	Year (the last two digit of A.D.)	Month (Jan. to Dec. = A to L)	Date

6-1-2. Outer package

Put 8 packs (the same luminous intensity rank) into outer package,
-(approxintly 670g per one outer package)

6-1-3 Outer package out line dimension

Width:140mm, Depth:225mm, Hight:90mm



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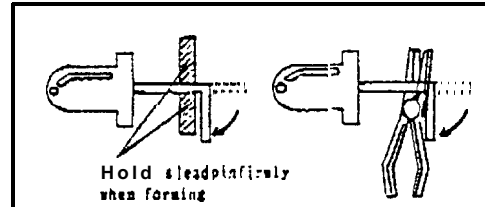
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7. Notes

7-1. Lead forming method

Avoid forming a lead pin with the lead pin base as a fulcrum: be sure to hold a lead pin firmly when forming. Lead pins should be formed before soldering.



7-2. Notice of installation

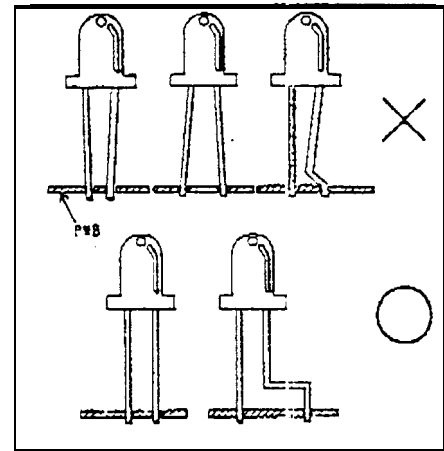
7-2-1 installation on a PWB

When mounting an LED lamp on a PWB, do not apply physical stress to the lead pins.

- The lead pin pitch should match the PWB pin-hole pitch: absolutely avoid widening or narrowing the lead pins.
- When positioning an LED lamp, basically employ an LED with tie-bar cut or use a spacer.

7-2-2 When an LED is mounted directly on a PWB

If the bottom face of an LED lamp is mounted directly on single-sided PWB, the base of the lead pins may be subjected to physical stress due to PWB warp, cutting or clinching of lead pins. Prior to use, be sure to check that no disconnection inside of the resin or damage to resin etc. is found. When an LED lamp is mounted on a double-sided PWB, the heat during soldering affects the resin; therefore, keep the LED lamp more than 1.6mm afloat above the PWB.



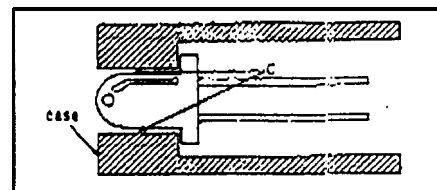
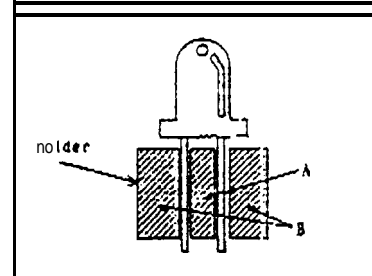
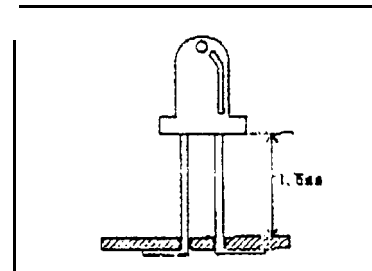
7-2-3 Installation using a holder

During an LED lamp positioning, when a holder is used, a holder should be designed not to subject lead pins to any undue stress.

(Note) Pay attention to the thermal expansion coefficient of the material used for the holder. Since the holder expands and contracts due to preheat and soldering, best mechanical stress may be applied to the lead pins, resulting in disconnection.

7-2-4 Installation to the case

Do not fix part C with adhesives when fixed to the case as shown in Figure. A hole of the case should be designed not to subject the inside of resin to any undue stress.



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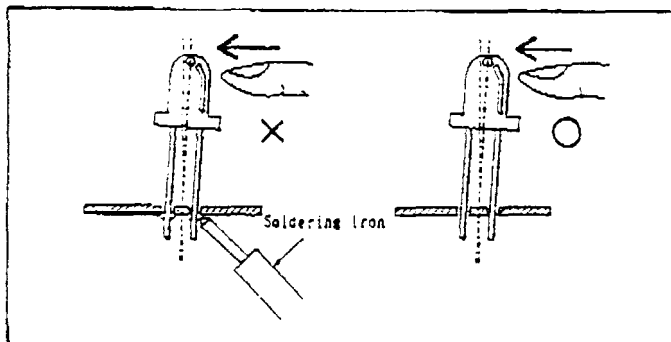
7 - 3. Soldering Conditions

Solder the lead pins under the following conditions

Type of Soldering	Conditions
1. Manual soldering	295°C ± 5°C, within 3 seconds
2. Wave soldering	260°C ± 5°C, within 5 seconds
3. Auto soldering	Preheating 70°C to 80°C, within 30 seconds Soldering 245°C ± 5°C, within 5 seconds

(Note) Avoid dipping resin into soldering bath.

Avoid applying stress to lead pins while they are heated. For example, when the LED lamp is moved with the heat applied to the lead pins during manual soldering or solder repair, disconnection may recur.



7 - 4. Solvent in Cleaning

7-4-1 Solvents

The Package resin may be penetrated by solvents used in cleaning. Refer to the table below for usable solvents.

Solvent	Usable
Ethyl alcohol	O
Isopropyl alcohol	o
Chlorosen	x
Acetone	x
Trichloroethylene	x

(Note) There is a world-wide movement to restrict the use of chlorofluorocarbon (CFC) based solvents and we recommend that you avoid their use.

However, before using a CFC substitute, carefully check that it will not penetrate the package resin.

7-4-2 Cleaning methods

Cleaning method	Usable	Remarks
Solvent cleaning	O	Immersion up to one minute at room temperature
Ultrasonic cleaning	Δ	Generally we recommend the following conditions. (3T, 40kHz, 30W/Not exceeding 90 seconds)

(Note) The affect on the device from ultrasonic cleaning differs depending on the size of the cleaning bath, ultrasonic output, duration, board size and device mounting method.

Test the cleaning method under actual conditions and check for abnormalities before actual use.

Cleaning with water is not allowed with the lead pins resin-tubulated; water may remain, thus causing rust to the lead pins.

Please contact your representative before using a cleaning solvent or method not given above.