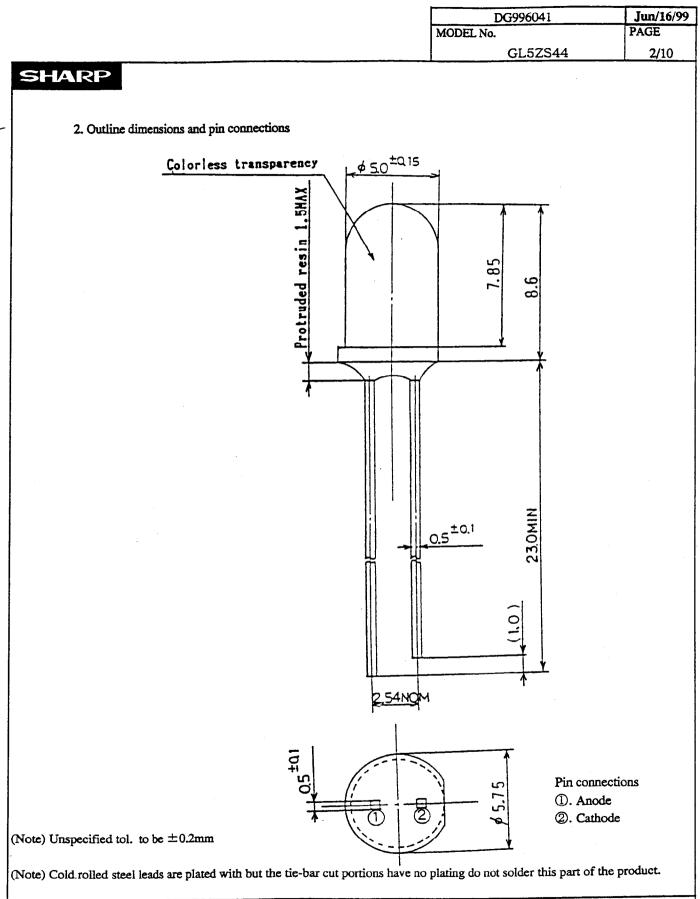
PREPARED BY: DATE:		SPEC.No.	DG996041
Jun 1,6199	SHARP	ISSUE	Jun/16/99
T. Ueda		PAGE	10 pages
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Jun / 16/99 F. Fulease	SPECIFICATION	Opto-Elect	ronic Devices Divisior
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DEVICE	SPECIFICATION FOR		
	Light Emitting Diode		
MODEL	No.		
	GL5ZS44		
			)
<b></b>			
			(#81
	ide materials protected under the copyright of se anyone to reproduce them without Sharp's		n ("Sharp").
•	e observe the absolute maximum ratings and t		use outlined
2. when using this product, please	e observe the absolute maximum ratings and t		use outlined
in these specification sheets, as	well as the precautions mentioned below. Sha	rp assumes no resp	polisionity
for any damage resulting from 1		the checkute mari	mum rotings
	use of the product which does not comply wit	the absolute maxi	mum ratings
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ARP	MODEL No. GL5ZS44	PAGE 1/10
ARP	GL5ZS44	1/10
ARP		1/10
<u>GL5ZS44 Specifica</u>	ation	
1. Application		
This specification applies to the light emitting diode device Mode	el No. GL5ZS44.	
[AlGaInP (dicing or scribe/brake type) Sunset-orange LED of	device]	
2. Outline dimensions and pin connections	Refer to the attached sheet Page	e 2.
5	····· Refer to the attached sheet Page	≥ 3~4.
3-1. Absolute maximum ratings		
3-2. Electro-optical characteristics		
3-3. Derating Curve		
3-4. Characteristics Diagram		
4. Reliability ·····	····· Refer to the attached sheet Page	• 5
4. Renability 4-1. Test items and test conditions	Notes to the attached sheet I age	
4-1. Test hems and test conditions 4-2. Measurement items and Failure judgement criteria		
· 2. Medsalement nems and I and o Judgement enterna		
5. Incoming inspection ·····	·····Refer to the attached sheet Page	e 6.
5-1. Applied standard		
5-2. Sampling method and level		
5-3. Test items, judgement criteria and classifica of defect		
5-4. Test items the surface is be applied for flat type, judgement	criteria and classifica of defect	
6. Supplement ·····	Defer to the attached cheet Dage	7~8
••	Refer to the attached sheet Fage	, , U.
6-1. Packing		
<ul><li>6-2. Luminous intensity rank</li><li>6-3. Dominant wavelength rank</li></ul>		
6-3. Dominant wavelengui rank 6-4. Environment		
7. Precautions for use ·····	Refer to the attached sheet Page	<b>9∼</b> 10.
7-1. Lead forming method		
7-2. Notice of installation		
7-3. Soldering Conditions		
7-4. For cleaning		
, /		

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Unit	Material	Finish	Drawing No.
	Lead: (Fe) Cold rolled steel		
mm	Package : Epoxy resin	Lead : Sn plated or wave soldering	51106022

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MODEL No.	PAGE
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# SHARP

3. Ratings and characteristics

3-1. Absolute maximum ratings						Га=25°С)
Parameter		Symbol		Value		Unit
Power dissipation	1	Р		130		mW
Continuous forwa	ard current	I <sub>F</sub>		50		mA
Peak forward cur	rent(Note 1)	I <sub>FM</sub>		100		mA
Derating factor	DC	-	0.67			mA/C
	Pulse	-		1.33		mA/C
Reverse voltage		V <sub>R</sub>		5		V
Operating temper	ature	Topr	-40	~	85	°C
Storage temperati	Tstg	-40	~	100	°C	
Soldering temper	ature(Note 2)	Tsol	260 (w	vithin 5 se	conds)	°C

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

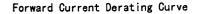
(Note 2) At the position of 1.6mm from the bottom resin package

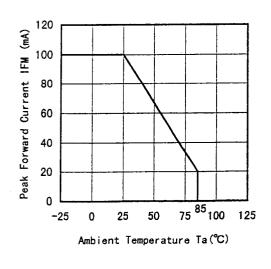
3-2. Electro-optical character			(	Ta=25°C		
Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Forward voltage	V <sub>F</sub>		-	2.1	2.6	V
Luminous intensity (Note 3)	Iv		1144	4200	-	mcd
Peak emission wavelength	λρ	IF=20mA		609	-	nm
Dominant wavelength	λd			605	-	nm
Spectrum radiation bandwidth	$\Delta \lambda$		-	15	-	nm
Reverse current	I <sub>R</sub>	VR=4V		-	100	μA
Terminal capacitance	Ct	V=0V,f=1MHz	_	60		pF
Viewing Angle	2 0 1/2	IF=20mA	-	15	-	deg.

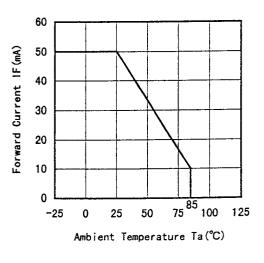
(Note 3) Refer to the suplement item 6. regarding the standard of rank classification.

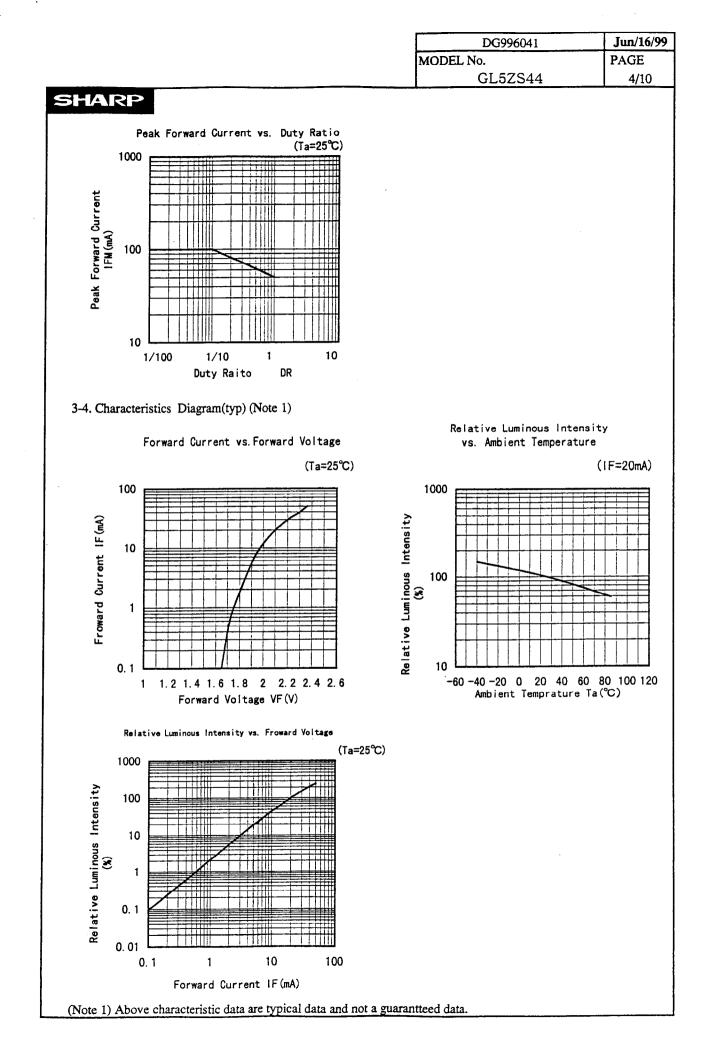
## 3-3. Derating Curve

Peak Forward Current Derating Curve









## SHARP

### 4. Reliability

The reliability of products shall be satisfied with items listed below.

#### 4-1. Test items and test conditions Confidence level: 90% Samples (n) LTPD Test conditions Test items Defective (C) (%) 230±5℃, 5s 20 Solderability n=11, C=0 Prior disposition : Dip in rosin flux Soldering 260±5℃, 5s n=11, C=0 20 temperature $15\ 000 \text{m/s}^2$ , 0.5ms, n=11, C=0 20 Mechanical shock 3times / $\pm X, \pm Y, \pm Z$ direction 200m/s<sup>2</sup>, 100 to 2 000 to 100Hz/sweep for 4min. Variable frequency n=11, C=0 20 4times/ $\pm X$ , $\pm Y$ , $\pm Z$ direction vibration Terminal strength Weight:10N, 5s/each terminal n=11, C=0 20 (Tension) Weight: 5N, $0^{\circ} \rightarrow 90^{\circ} \rightarrow 0^{\circ} \rightarrow -90^{\circ} \rightarrow 0^{\circ}$ Terminal strength n=11, C=0 20 /each terminal (Bending) -40°C(30min)~+100°C(30min),30 cycles n=22, C=0 10 Temperature cycling High temp. and high Ta=+60°C, 90%RH, t=1000h n=22, C=0 10 humidity storage High temperature storage Ta=100°C, t=1000h n=22, C=0 10 Low temperature storage Ta=-40°C, t=1000h n=22, C=0 10 Ta=25°C, I<sub>F</sub>MAX, t=1000h \*3 n=22, C=0 10 Operation life

### 4-2. Measurement items and Failure judgement criteria \*1

Measurement	Symbol	Failure judgement criteria *2
Forward voltage	V <sub>F</sub>	V <sub>F</sub> > U.S.L. × 1.2
Reverse current	I <sub>R</sub>	$I_R > U.S.L. \times 2.0$
Luminous intensity	Iv	Iv > The first stage value $\times$ 2.0 or The first stage value $\times$ 0.5 > Iv

X Solderability : Solder shall be adhere at the area of 95% or more of dipped portion.

X Terminal strength : Package is not destroyed, and terminal is not slack.

\*1: Measuring condition is in accordance with specification.

\*2: U.S.L. is shown by Upper Specification Limit.

\*3: I<sub>F</sub> MAX.is shown by forward current of absolute maximum ratings.

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5. Incoming inspection

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5-1. Applied standard : ISO 2859-1

5-2. Sampling method and level : A single sampling plan, normal inspection level  $\, \Pi \,$ 

: AQL Major defect : 0.065%

Minor defect : 0.4%

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

No.	Test items	judgement criteria	classifica of defect
1	Disconnection	Not emit light	
2	Position of Cutting off rim	Different from dimension	Major defect
3	Reverse terminal	Different from dimension	
4	Outline dimensions	Not satisfy outline specification	
5	Characteristics	Over the limit value of specification at $V_F$ , $I_R$ , and $I_V$	
6	Cut off the rim	Exceed -0.2mm	
7	Foreign substance	White point : Exceed $\phi 0.3 \text{mm}$ (on top view) Black point : Exceed $\phi 0.3 \text{mm}$ (on top view) String form : Exceed 3.0 mm (on top view)	
8	Scratch	Exceed $\phi$ 0.3mm or 0.1mm × 1.0mm (on top view)	Minor defect
9	Void	Exceed $\phi$ 0.3mm (on top view)	
10	Uneven density of material for scattering	Extremely uneven density	
11	Unbalanced center	Exceed ±0.25mm from package center	
12	Burr	Exceed +0.2mm againstprovided dimension	
13	Insertion position of terminal	Insertion position of terminal	

## 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
14	Chapped the surface	The surface chapped is striking for see the lamp top	Minor defect
15	Hollow the surface	The surface hollow is striking for see the lamp top	

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Product Indication lab SHIPMEN PART No. QUANTITY OT No. KAS S H A MADE II Production 2 Support co	pcs the same 1 t weight : 0.28 el sample) T TABLE GL5ZS44 250 99B19 Q-C A R P N JAPAN n plant code(to	Gg (One F ← Mode ← Quar ← Lot n ← Lumin ← Produ	Product, Typ.) el number ntity of produ number * nous intensity nant wavelen uction countr	) y rank gth rank Y	nto pack and put following laber * $\Box$	el by pack.
<ul> <li>Month of p</li> <li>Date of pr</li> <li>Date of pr</li> <li>Outer pa</li> <li>Put 8 pa</li> <li>(approx)</li> </ul>	oduction(01~ ackage acks (the same imately 670g p	(to be 31) e luminou per one o	indicated alp is intensity ra uter package	habetically	with January corresponding to er package.	<b>A</b> )
<ul> <li>Month of p</li> <li>Date of pr</li> <li>Date of pr</li> <li>Outer pa</li> <li>Put 8 pa</li> <li>(approx</li> <li>6-1-3. Outer pa</li> </ul>	production oduction(01~ ackage acks (the same imately 670g p	(to be 31) e luminou per one o e dimensi	indicated alp is intensity ra uter package on	habetically ank) into out		<b>A</b> )
<ul> <li>Month of p</li> <li>Date of pr</li> <li>6-1-2. Outer pa</li> <li>Put 8 pa</li> <li>(approx</li> <li>6-1-3. Outer pa</li> <li>Width :</li> </ul>	production oduction(01~ ackage acks (the same imately 670g p ackage out line 140mm, Dep	(to be 31) e luminou per one o e dimensi oth : 225	indicated alp is intensity ra uter package on	habetically ank) into out	er package.	<b>A</b> )
<ul> <li>Month of p</li> <li>Date of pr</li> <li>6-1-2. Outer pa</li> <li>Put 8 pa</li> <li>(approx</li> <li>6-1-3. Outer pa</li> <li>Width :</li> </ul>	production oduction(01~ ackage acks (the same imately 670g p ackage out line 140mm, Dep intensity rank	(to be 31) e luminou per one o e dimensi oth : 225	indicated alp is intensity ra uter package on mm, Hight :	habetically ank) into out		A)
<ul> <li>Month of p</li> <li>Date of pr</li> <li>Date of pr</li> <li>Put 8 pa</li> <li>(approx</li> <li>6-1-3. Outer pa</li> <li>Width :</li> <li>6-2.Luminous</li> </ul>	production oduction(01~ ackage acks (the same imately 670g p ackage out line 140mm, Dep intensity rank	(to be 31) e luminou per one o e dimensi oth : 225 (Note 1)	indicated alp is intensity ra uter package on mm, Hight :	habetically ank) into out ) 90mm	er package. (Ta=25°C)	<b>A</b> )
<ul> <li>Month of p</li> <li>Date of pr</li> <li>Date of pr</li> <li>Put 8 pa</li> <li>(approx</li> <li>6-1-3. Outer pa</li> <li>Width :</li> <li>6-2.Luminous</li> <li>Rank</li> </ul>	production oduction(01~ ackage ucks (the same imately 670g p ackage out line 140mm, Dep intensity rank	(to be 31) e luminou per one o e dimensi oth : 225 (Note 1) inous inte	indicated alp is intensity ra uter package on mm, Hight : ensity	habetically ank) into out ) 90mm	er package. (Ta=25°C)	<b>A</b> )
<ul> <li>Month of p</li> <li>Date of pr</li> <li>Date of pr</li> <li>Outer pa</li> <li>Put 8 pa</li> <li>(approx</li> <li>6-1-3. Outer pa</li> <li>Width :</li> <li>6-2.Luminous</li> <li>Rank</li> <li>N</li> <li>O</li> <li>P</li> </ul>	production oduction(01~ ackage imately 670g p ackage out line 140mm, Dep intensity rank Lumi 1144 1648 2373	(to be 31) e luminou per one o e dimensi oth : 225 (Note 1) inous inte	indicated alp is intensity ra uter package on mm, Hight : ensity 2229 3210 4623	habetically ank) into out ) 90mm Unit	er package. (Ta=25°C) Condition	<b>A</b> )
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<ul> <li>Month of p</li> <li>Date of profile</li> <li>Date of profile</li> <li>Date of profile</li> <li>Put 8 pa (approx</li> <li>6-1-3. Outer pa Width :</li> <li>6-1-3. Outer pa Width :</li> <li>6-2.Luminous</li> <li>6-2.Luminous</li> <li>Rank</li> <li>0</li> <li>P</li> <li>Q</li> <li>Note 1) Tolera In reg Hower In case point r</li> <li>6-3.Dominant v</li> <li>Rank</li> <li>0</li> <li>P</li> </ul>	production oduction(01~ ackage ucks (the same imately 670g p ackage out line 140mm, Dep intensity rank 1144 1648 2373 3417 ance:±15% ard to luminouver the quantit e of the distribute wavelength ran 598.5 601.0	(to be 31) e luminou per one o e dimensi oth : 225 (Note 1) inous inte ~ ~ ~ us intensi y of each ution of t k (Note ant wave ~	indicated alp is intensity ra uter package on mm, Hight : ensity 2229 3210 4623 (6657) ity, the follow rank shall n the luminous rribed and low 2) length 602.0 604.5	habetically ank) into out ) 90mm Unit mcd wing ranking ot be pre scr intensity sh wer rank is c	er package. $(Ta=25^{\circ}C)$ Condition $I_{F}=20mA$ g shall be carried out. ibed. ift to high, at that lelete. $(Ta=25^{\circ}C)$ Condition	A)

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6-4. Environment

6-4-1. Ozonosphere destructive chemicals.

- (1) The device doesn't contain following substance.
- (2) The device doesn't have a production line whose process requires following substance. Restricted part: CFCs,halones, CCl<sub>4</sub>, Trichloroethane(Methychloroform)

6-4-2. Bromic non-burning materials

The device doesn't contain bromic non-burning materials(PBBOs,PBBs)

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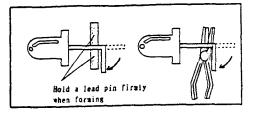
# SHARP

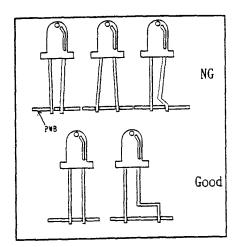
## 7. Precautions for use

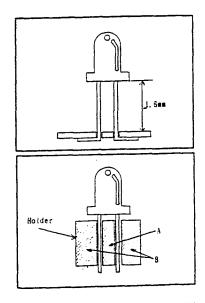
7-1. Lead forming method

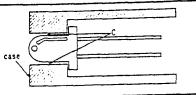
Avoid forming a lead pin with the lead pin base as a fulcrum:be sure to hold a lead pin firmly when forming. Lead pins should be formed before soldering.

- 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 1 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 that 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 heat, 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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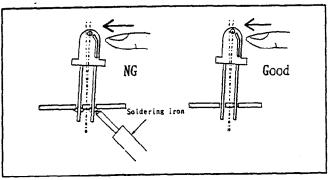
7-3. Soldering Conditions

Solder the lead pins under the following conditions

0
Conditions
295℃±5℃, within 3 seconds
260℃±5℃, within 5 seconds
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 occur.



7-4. For cleaning

- (1) Solvent cleaning: Solvent temperature 45°C or less Immersion for 3 min or less
- (2) Ultrasonic cleaning: The effect to device by ultrasonic cleaning differs by cleaning bath size, ultrasonic power output, cleaning time, PWB 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.
- (3) Applicable solvent: Ethyl alcohol, Methyl alcohol, Isopropyl alcohol

In case when the other solvent is used, there are cases that the packaging resin is eroded. Please use the other solvent after thorough confirmation is performed in actual using condition.