Type No. E1S07-AB1A7-02	Drawn	A. Kimura
	Technical Div. I	Koichi Ota
	Admin. Div.	K. Otaka

1. Product name TG BLUE LED Chip LED (1.6×0.6)

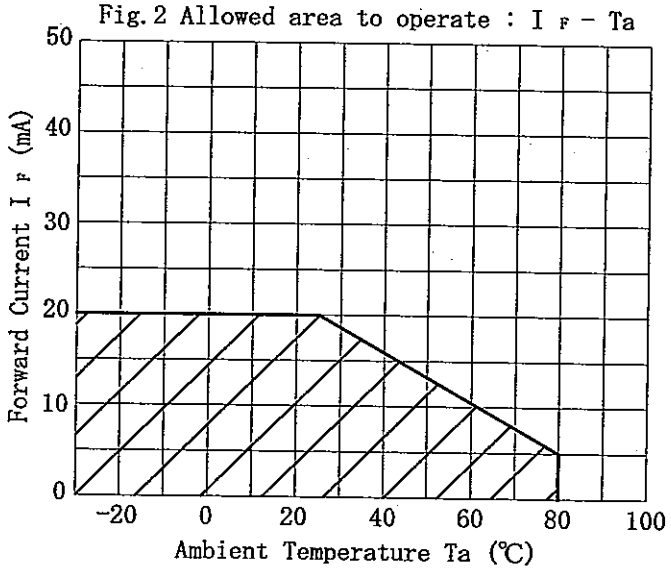
2. Absolute Maximum Ratings (T_a=25℃)

Fig.1

Item	Symbol	Value	Unit
Power Dissipation	P_D	80	mW
DC Forward Current	I_F	20	mA
DC Forward Current reduction (*1)	ΔI_F	-0.27	mA/℃
Pulsed Forward Current (*2)	I_{FP}	100	mA
Reverse Voltage	V_R	5	V
Operating Temperature	T_{opr}	-30 ～ +80	℃
Storage Temperature	T_{stg}	-40 ～ +85	℃

(*1) T_{opr}=25～80℃ Use under this condition.

Fig. 2 Allowed area to operate : I_F - Ta



(*2) Duty 1/10 Pulse Width 100 μ sec.

3. Electrical/Optical Characteristics (T_a=25±3℃)

Fig.3

Item	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Forward Voltage	V_F	I_F=20mA	—	(3.4)	3.9	V
Reverse Current	I_R	V_R= 5 V	—	—	2	μA
Luminous Intensity (Axial Direction)	I_V	I_F=20mA	15	(44)	74	mcd
Dominant Wavelength	λ_D	I_F=20mA	465	—	480	nm
Spectral Line Half Width	$\Delta\lambda$	I_F=20mA	—	(25)	—	nm

Fig.4 Following Ranking is applied. (I_F=20mA)

Rank			Luminous Intensity (mcd) (*3)
Dominant wavelength (nm) (*4)			
465 ～ 470	470 ～ 475	475 ～ 480	
B	K	T	15 ～ 20
C	L	U	20 ～ 26
D	M	V	26 ～ 34
E	N	W	34 ～ 44
F	P	X	44 ～ 57
G	Q	Y	57 ～ 74

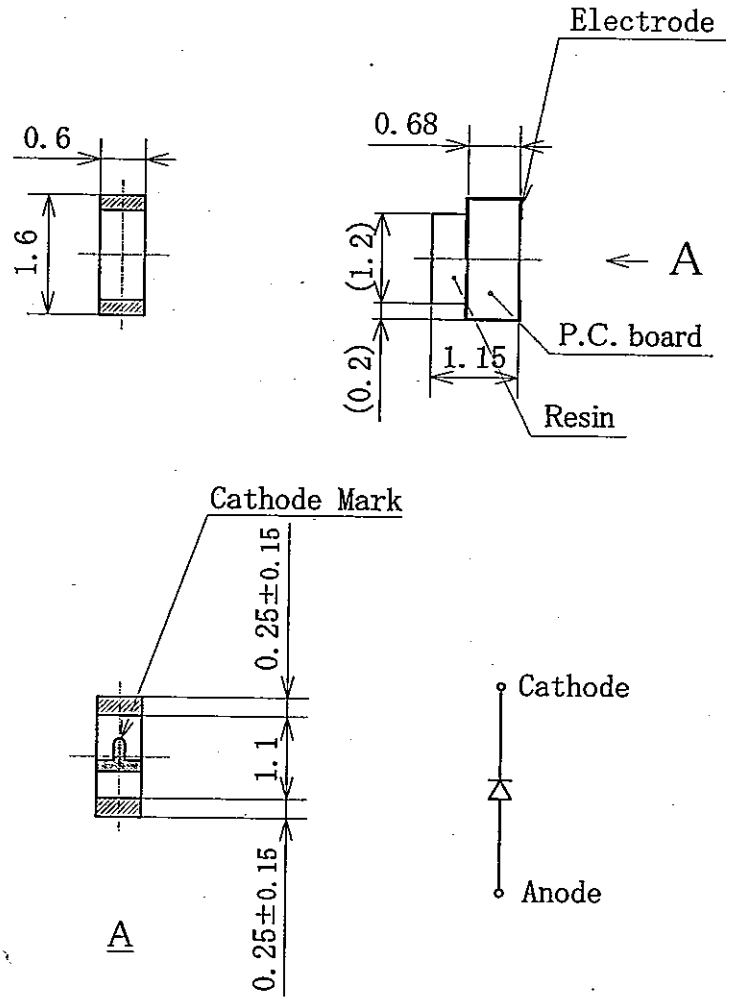
(*3) Guaranteed value is 20% higher and/or lower than this value.
(ex. rank B 12.0 ～ 24.0mcd)

(*4) Guaranteed value is 2nm longer and/or shorter than this value.
(ex. rank B 463 ～ 472nm)

4. Outline Dimensions

Fig.5

Unit : mm



- General tolerance : ±0.1
- Lens : transparent

5. Reliability Tests

Fig.6

Item	Standard Test Method (*5)	Test Conditions	Failure Rate (*6,7)
Operating Test	ED-4701 D-511	T_a = 25 ℃, I_F = 20 mA DC, t = 500 hrs.	0/20
High Temp. Operating Test	–	T_a = 80 ℃, I_F = 5 mA DC, t = 500 hrs.	0/20
High Humidity Operating Test	ED-4701-3 B-122A	T_a =60℃, RH=90%, I_F = 11 mA DC t = 500 hrs.	0/20
High Temp. Storage Test	ED-4701-3 B-111A	T_a = 85 ℃, t = 500 hrs.	0/20
Low Temp. Storage Test	ED-4701-3 B-112A	T_a = -40 ℃, t = 500 hrs.	0/20
High Humidity Storage Test	ED-4701-3 B-121A	T_a =60℃, RH=90%, t = 500 hrs.	0/20
Thermal shock Test	ED-4701-3 B-141A	T_a = (85 ℃, 5 min. ～ -40℃, 5 min.)×5 cy.	0/20
Soldering Heat Test	–	Recommended Refrow Soldering Profile, 2 times	0/20

(*5) Number : EIAJ ("Electronic Industries Association of Japan") standard methods are used.

(*6) Failure rate above is obtained when there is no damage by static electricity.

(*7) Failure rate evaluated based on following "Criteria for Judging the Damage"

Fig.7 Criteria for Judging the Damage

Item	Symbol	Test Condition	Limit	
			Min.	Max.
Forward Voltage	V_F	I_F=20 mA	–	U.S.L.×1.2
Reverse Current	I_R	V_R= 5 V	–	U.S.L.×2.0
Luminous Intensity	I_V	I_F=20 mA	L.S.L.×0.5	–

(*8) U.S.L. : Upper Standard Level (Max. of Value of Fig.3 (See P.2))

(*9) L.S.L. : Lower Standard Level (Min. of Value of Fig.3 (See P.2))

6. Typical Characteristics

Fig. 8 Forward Voltage VS Forward Current

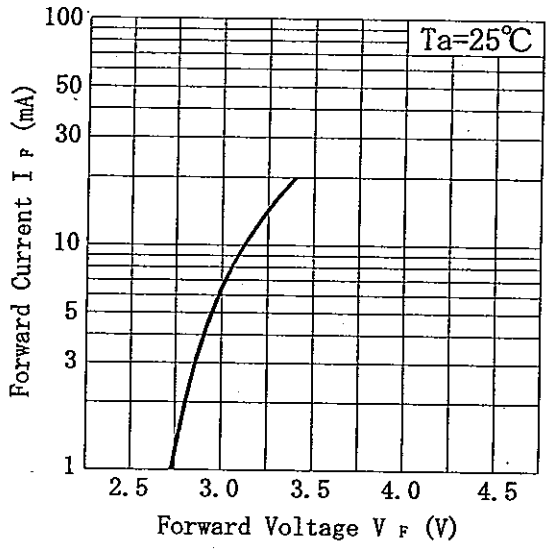


Fig. 9 Forward Current VS Relative Luminous Intensity

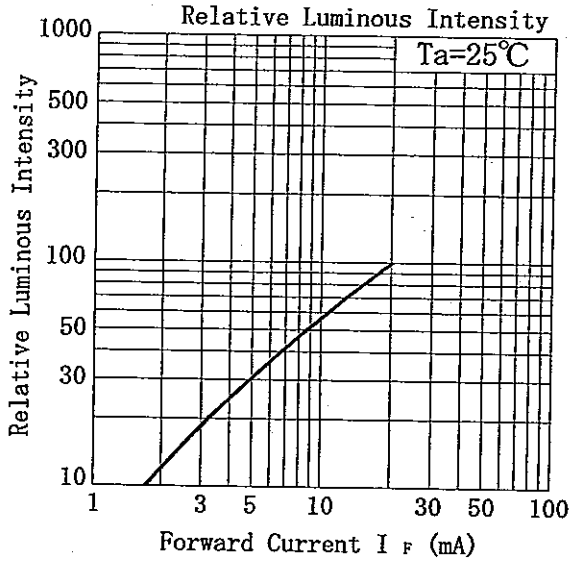


Fig. 10 Ambient Temperature VS Relative Luminous Intensity

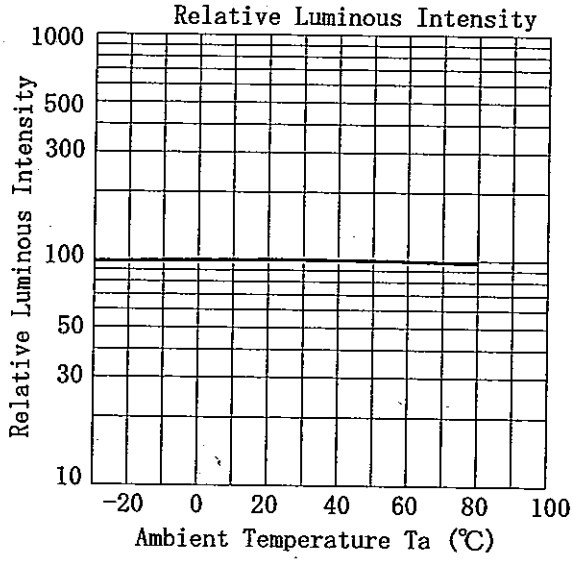


Fig. 11 Spectrum

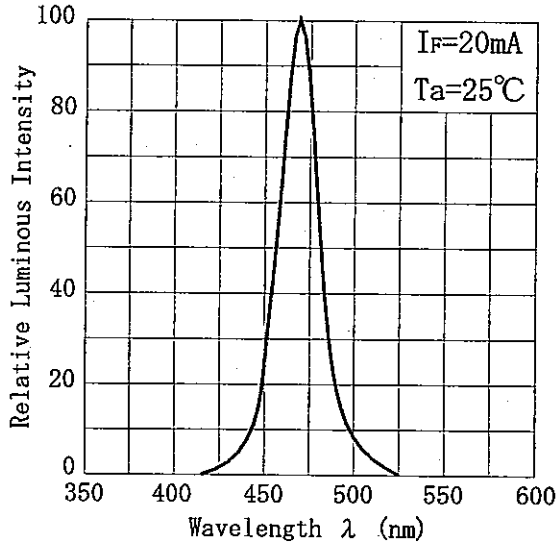


Fig. 12 Forward Current VS Dominant Wavelength

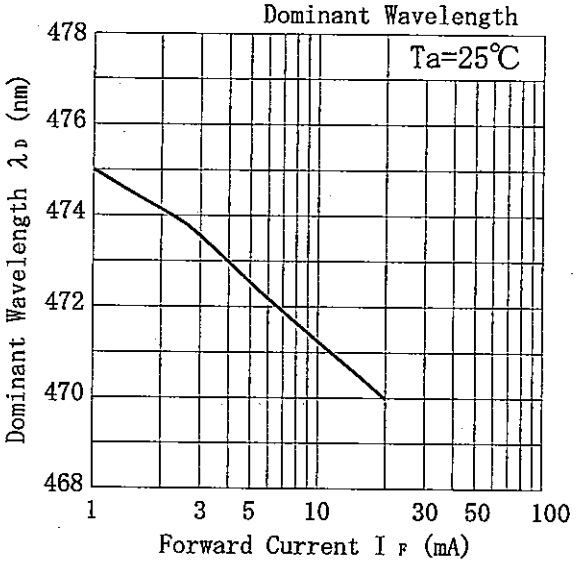


Fig. 13 Forward Current VS Chromaticity Diagram

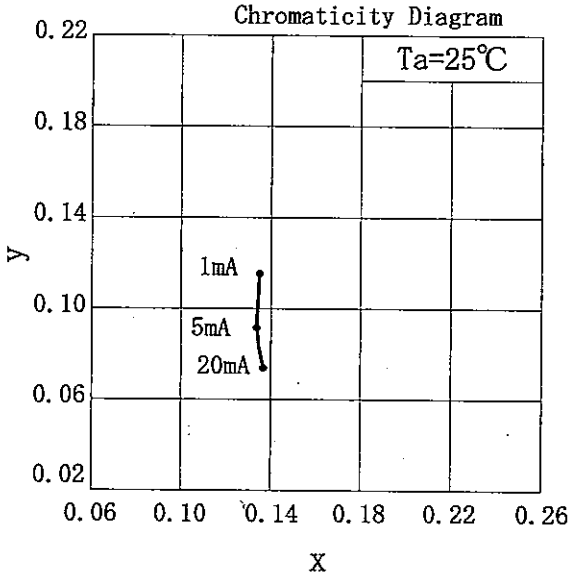
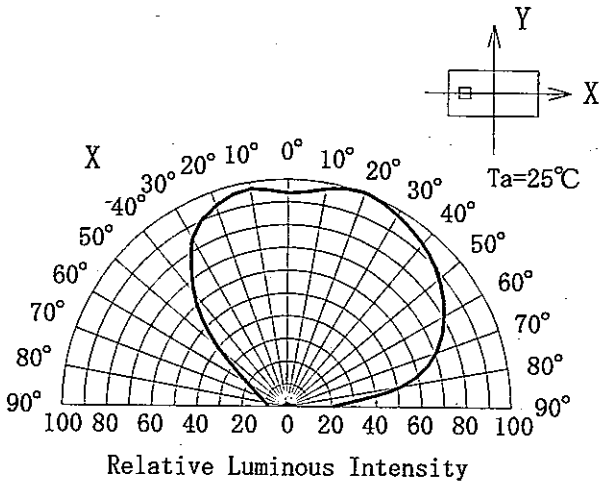
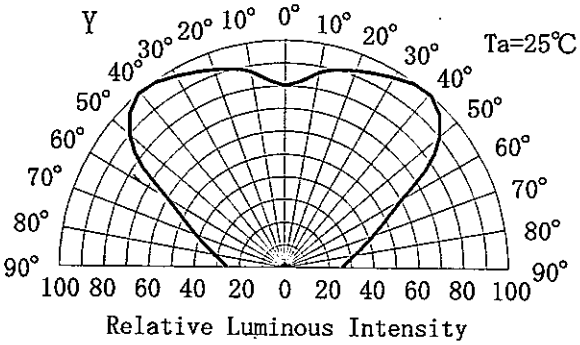
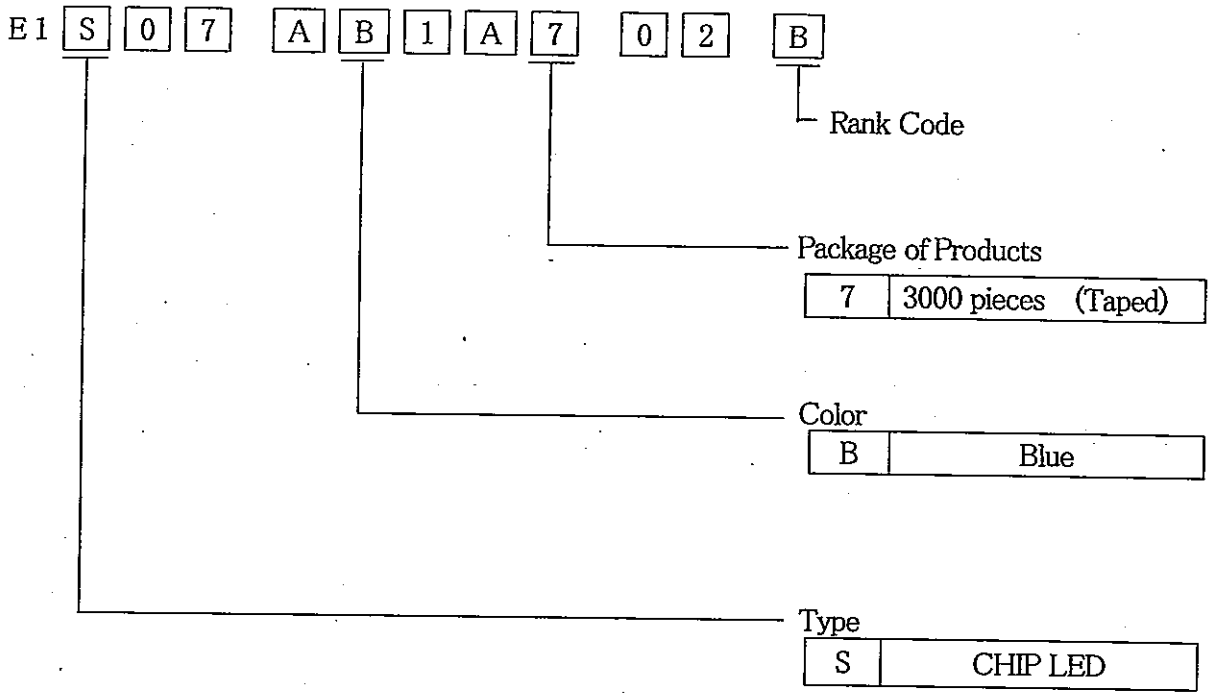


Fig. 14 Directive Characteristics





7.Code Formation

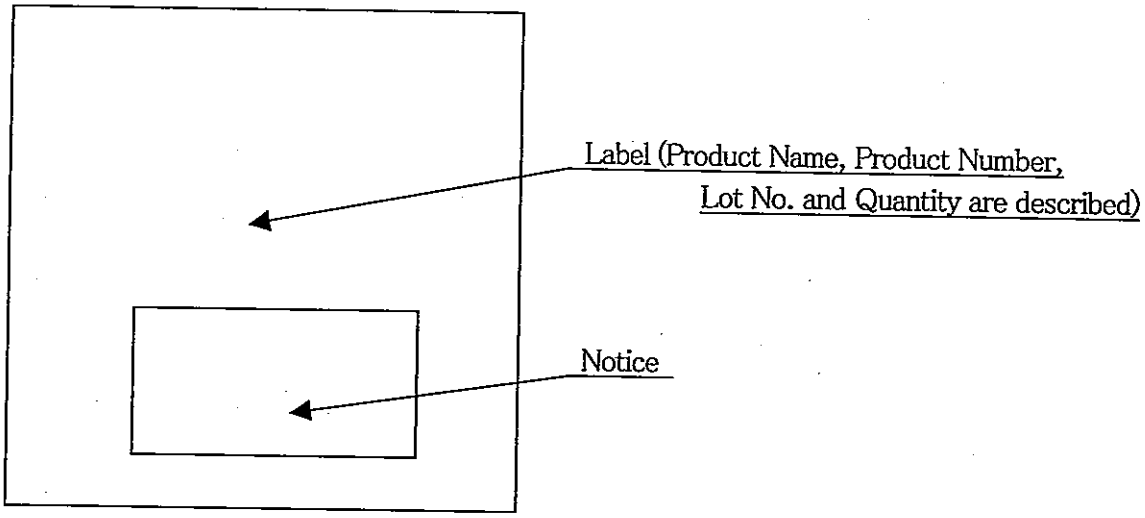


8. Shipping Package Style

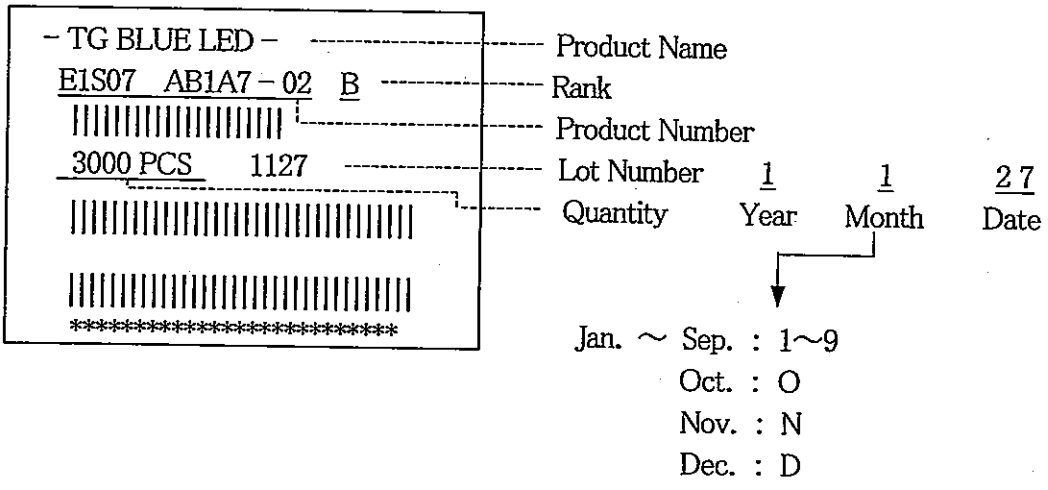
(1) Package

3000 pcs are packed in ESD protected bag.

Bag : damp-proof package made of aluminum



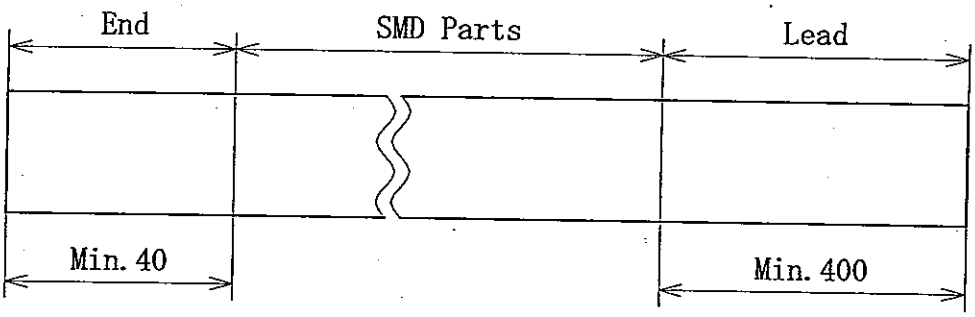
(2) Label Formation

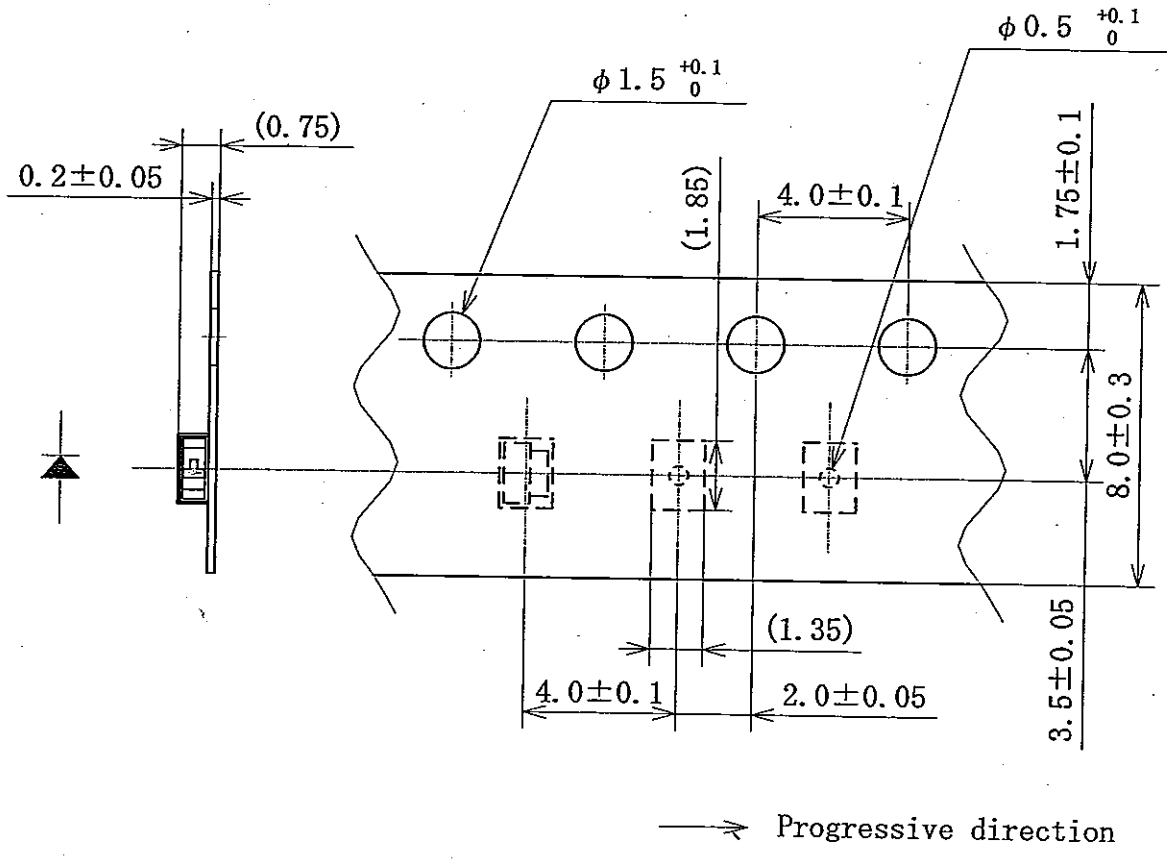


Type No. E1S07-AB1A7-02

Taping Dimensions

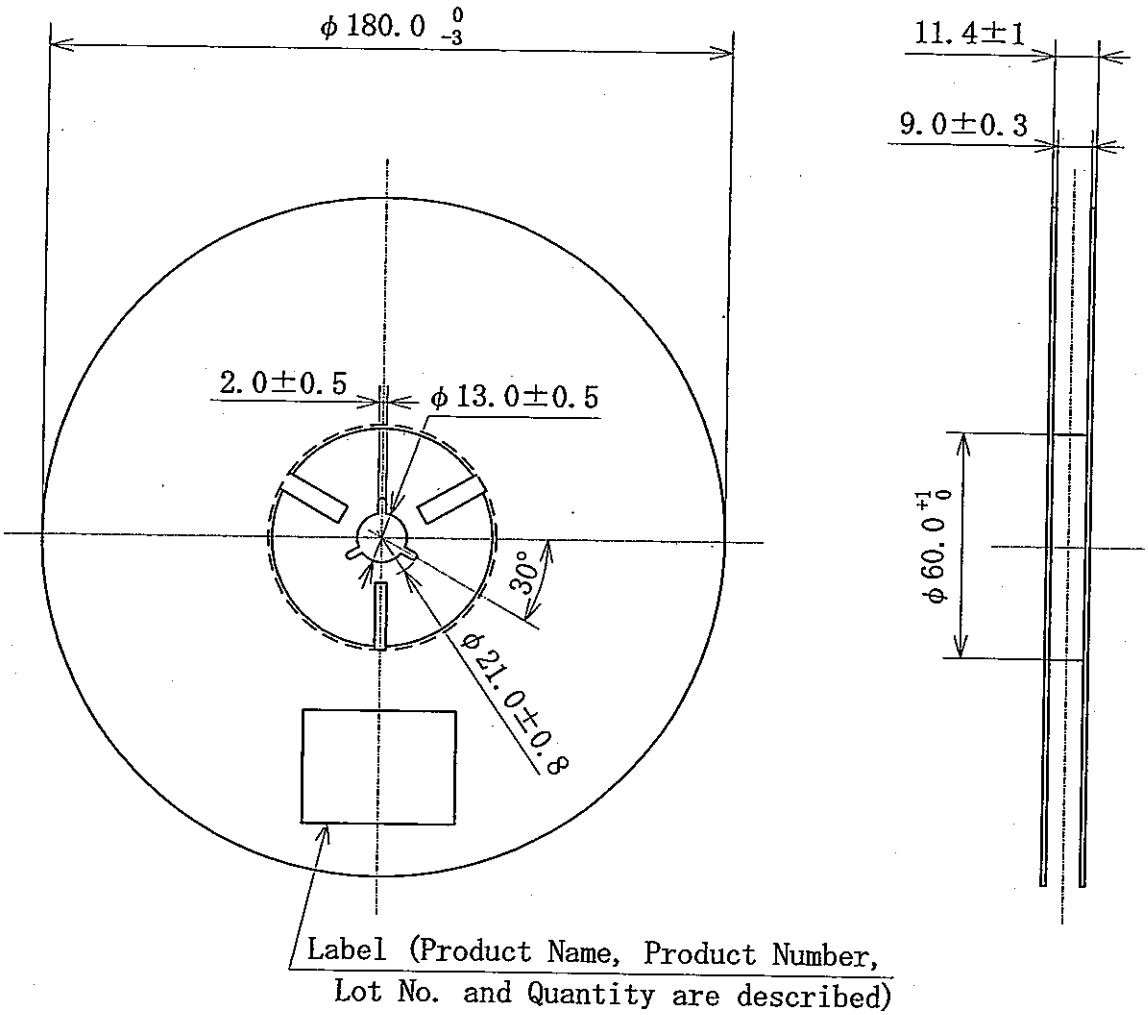
Unit:mm





・ General tolerance : ± 0.3

Type No. E1S07-AB1A7-02



- Reel standard: EIAJ RPM 08 B

9. PRECAUTIONS IN HANDLING

(1) Safety Precautions

- Do not look directly at the LED with unshielded eyes, or damage to the retina may result.

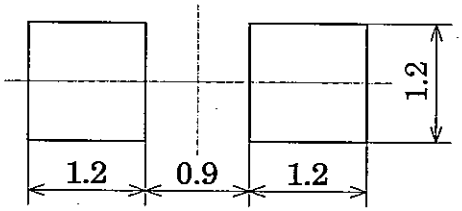
(2) Static Electricity

- These products are sensitive, a high standard of care must be used. Particularly if an over-current and over-voltage which exceeds the Absolute Maximum Rating of Products is applied, the overflow in energy may cause damage to, or possibly result in destruction of, the Products. Customer shall take absolutely secure countermeasures against static electricity and surge when handling Products.
- A protection device should be installed in the LED driving circuit, which does not exceed the max. rating for surge current during on/off switching.
- Proper grounding of Products (via 1 MΩ), use of conductive mat, semiconductive working uniform and shoes, and semiconductive containers are considered to be effective as countermeasures against static electricity and surge.
- A soldering iron with a grounded tip is recommended. An ionizer should also be installed where risk of static generation is high.
- If the countermeasures mentioned above are implemented, LED can work well.
  Users are required to confirm those countermeasures when problems are caused by static electricity.

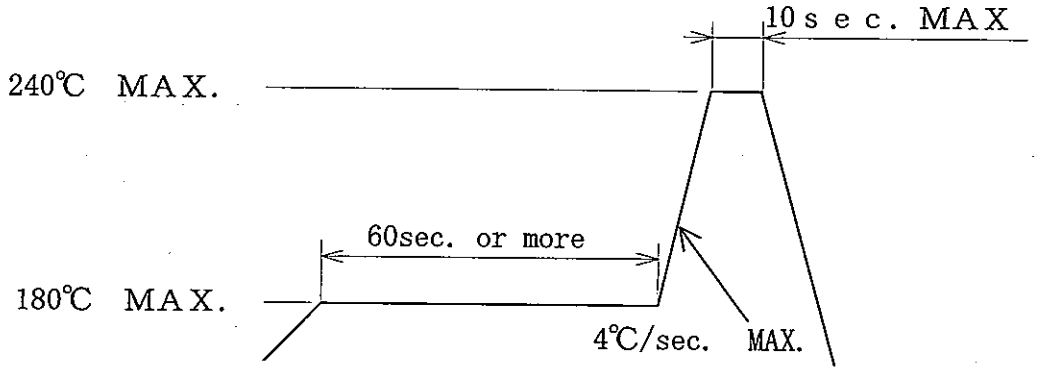
(3) Soldering Condition

When soldering chips LEDs, it is likely that the humidity within the resin may disturb the adherence of junction. The disturbance could influence the optical characteristics of products.

- Force or stress must not be applied to the resin portion while soldering.
- It is requested that products should be handled after their temperature has dropped down to the normal room temperature.
- Maximum allowable soldering conditions are:
  Reflow solder : 240 degrees C max., 10seconds max., twice.
  Pre-heat is 140-180 degrees C max., 1minute min.
  Soldering iron : 300 degrees C max., 3seconds max., once.
- Recommended Soldering Pattern



・Recommended Reflow Soldering Profile



(4) Others

・Use within 7 days after opening the sealed bag.

・After opening the bag once, fold the opening firmly and keep it in a dry area.

・If the Product packed in a package is stored over 6 months, or if it passes more than 15 days after package is opened , it is requested to make baking per following conditions.

Reel one : 60℃×12 hours or more

Loose one : 100℃×45 minutes or more

120℃×15 minutes or more

・Do not use organic solvents such as Tricloroethylene or acetone. Organic solvents will damage the surface of the chip.

・When ultrasonic cleaning, inspect before operation.

10.WARRANTY

(1) Manufacturer only warrants that the Products will conform with the items and conditions described in paragraphs 2,3 and 4 in these Specifications.

(2) Manufacturer's warranty as set forth in 10(1) above applies only when each Product stands alone. In no event shall Manufacturer assume responsibility for failure of injury arising out of Customer's installation or assembly of Products into Customer's equipment.

(3) Customer shall conduct its receiving inspection promptly upon delivery, and in the event any Product units in the respective delivery are found not to conform with any of Manufacturer's warranties, Customer may reject and shall return such non-conforming units to Manufacturer for replacement. Customer shall provide the reason and the number for such rejection with the return of each non-conforming unit.

(4) MANUFACTURER MAKES NO OTHER REPRESENTATION OR WARRANTIES, EITHER EXPRESS OR IMPLIED, CONCERNING THE PRODUCTS INCLUDING, WITHOUT LIMITATION, WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

(5) Manufacturer's liability for nonconforming Products shall be in any case limited to replacement of nonconforming Products, provided that such nonconformity is attributable to Manufacturer. In no event shall Manufacturer be liable for any costs of expenses incurred for replacement of such nonconforming Products, consequential damages or lost profits.

(6) The warranty for the Products shall be twelve (12) month from the date the Products are delivered to the Customer. Notwithstanding the foregoing, the warranty shall not apply to any of the following, even during such warranty period:

(a) failure of, or injury caused by the Products due to mishandling or misuse of the Products by Customer;
(b) failure of, or injury cased by the Products due to inappropriate repair or modification by Customer;
(c) failure of, or injury caused by Products due to force measure including, without limitation, fire, earthquake, flood, lightning or other natural disasters, or pollution, damage from briny air or outbreak of a state of emergency; or
(d) Any failure and damage caused by not following the handling precautions listed in Section 9 of these Specifications.

(7) The warranty provide for in these Specifications constitutes the entire and only agreement between Customer and Manufacturer with respect to the quality of the Products and supersedes, cancels and annuls all prior or contemporaneous negotiations or communications whether written or oral.

(8) The warranty provided for in these Specifications can only be modified by a written agreement signed by the representatives of both Customer and Manufacturer.

(9) IN NO EVENT SHALL MANUFACTURER BE LIABLE TO BUYER FOR (I) ANY LOSS OR DAMAGE (WHETHER SPECIAL, CONSEQUENTIAL, COMPENSATORY, PUNITIVE, EXEMPLARY, DIRECT, INDIRECT OR OTHERWISE) TO CUSTOMER'S PROPERTY RESULTING FROM THE USE, HANDLING, TRANSPORTATION, SALE, STORAGE, REPAIR, MODIFICATION OR MAINTENANCE OF THE PRODUCTS, WHETHER IN THE MANUFACTURING OR INSTALLATION PROCESS, ALONE, IN COMBINATION WITH OTHER GOODS, MATERIALS, EQUIPMENT OR SUBSTANCES OR OTHERWISE, (II) ANY LOSS OF USE, REVENUE OR PROFIT OR DIMINUTION OF GOODWILL, EVEN IF MANUFACTURER KNEW OR SHOULD HAVE KNOWN OF THE POSSIBILITY OF SUCH LOSS, DAMAGE OR DIMINUTION, (III) ANY INJURY TO OR DEATH OF PERSONS AND (IV) ANY CLAIM, DEMAND, ACTION, LAWSUIT OR OTHER PROCEEDING AGAINST CUSTOMER BY ANY THIRD PARTY, WITH RESPECT TO (A) ANY LOSS OR DAMAGE (WHETHER SPECIAL, CONSEQUENTIAL, COMPENSATORY, PUNITIVE, EXEMPLARY, DIRECT, INDIRECT OR OTHERWISE) INCURRED, SUFFERED OR OTHERWISE CLAIMED BY SUCH THIRD PARTY OR (B) ANY INJURY TO OR DEATH OF PERSONS.

11. MISCELLANEOUS

(1) The Products described in these Specifications are intended only for standard applications or general electronic equipment such as office equipment, communications, electronic instrumentation and household electrical appliances.

When they are used for transport equipment, disaster prevention and crime prevention equipment as well as other safety devices calling for high reliability and safety, Customers are requested to pay particular heed to the safety design of the equipment as a whole in terms of fail-safe design and redundant design to maintain the reliability safety of such equipment.

Do not use them for special applications (and such as aviation, space craft and life-sustaining equipment) which require exceptionally high reliability and safety, and if their failure or malfunction may threaten human lives or may detrimental to human bodies.

It is to be understood that the manufacturer shall not be held responsible for any damage incurred as a result of using the product for purpose which is not the standard the manufacturer has intended to be used for, unless the manufacturer articulate agrees to the no-standard use in writing.

(2) Customers must comply with the laws and public regulations concerning safety.

The content of these Specifications shall be deemed fully accepted by Customer either (1) upon execution hereof by the Customer or (2) if Customer does not advise Manufacture of any objections within two (2) weeks of the date of receipt of these Specifications, whichever is the earlier. If Customer does advise Manufacturer of any objections within two (2) weeks of the date of receipt of these Specifications, the parties shall negotiate an alternative acceptable to both parties, which alternative shall be deemed fully acceptable by Customer upon Customer's execution of the revised Specifications.

("Customer")

_____

_____

Date _____

("Manufacture")

_____

_____

Date _____

_____

_____

Date _____