Pb-free HEAT

STANLEY

# U□1105W Series

Single Color Ultra High Brightness Type

## Features

| | |
|---|---|
| Package | 3216 Dome Lens Type, Water Clear resin |
| Product features | • Outer Dimension 3.2 x 1.6 x 1.85mm ( L x W x H )<br>• Temperature range<br>Storage Temperature : InGaN : -40℃～100℃<br>AlGaInP : -40℃～120℃<br>Operating Temperature : InGaN : -40℃～ 85℃<br>AlGaInP : -40℃～100℃<br>• Lead-free soldering compatible<br>• RoHS compliant |
| Dominant wavelength | Blue : 470nm(HUB)<br>Blue Green : 508nm(HUC)<br>Green : 530nm(HUG)<br>Yellow : 590nm(UY)<br>Red : 630nm(UR) |
| Half Intensity Angle | 50 deg. |
| Die materials | HUB,HUC,HUG : InGaN, UY,UR : AlGaInP |
| Rank grouping parameter | Sorted by luminous intensity and wavelength per rank taping |
| Assembly method | Auto pick & place machine (Auto Mounter) |
| Soldering methods | Reflow soldering and manual soldering |
| Taping and reel | 2,000pcs per reel in a 8mm width tape. (Standard)<br>Reel diameter: $\phi$ 180mm |
| ESD | InGaN : 1kV(HBM), AlGaInP : More than 2kV(HBM) |

## Recommended Applications

Amusement Equipment, Electric Household Appliances, OA/FA, Other General Applications

## Color and Luminous Intensity

(Ta=25℃)

| Part No. | Material | Emitted Color | Lens Color | Dominant Wavelength λd (nm) | | Luminous Intensity Iv (mcd) | | |
|---|---|---|---|---|---|---|---|---|
| | | | | TYP. | $I_F$ | MIN. | TYP. | $I_F$ |
| HUB1105W | InGaN | Blue | Water Clear | 470 | 10 | 70 | 200 | 10 |
| HUC1105W | InGaN | Blue Green | | 508 | 10 | 140 | 560 | 10 |
| HUG1105W | InGaN | Green | | 530 | 10 | 200 | 560 | 10 |
| UY1105W | AlGaInP | Yellow | | 590 | 20 | 140 | 500 | 20 |
| UR1105W | AlGaInP | Red | | 630 | 20 | 140 | 500 | 20 |

## Absolute Maximum Ratings

(Ta=25℃)

| Item | Symbol | Absolute Maximum Ratings | | | | | Unit |
|---|---|---|---|---|---|---|---|
| | | HUB | HUC | HUG | UY | UR | |
| Power Dissipation | $P_d$ | 78 | 78 | 78 | 87 | 87 | mW |
| Forward Current | $I_F$ | 20 | 20 | 20 | 30 | 30 | mA |
| Pulse Forward Current ※1 | $I_{FRM}$ | 48 | 48 | 48 | 100 | 100 | mA |
| Derating (Ta=25℃ or higher) | $\Delta I_F$ | 0.28 | 0.28 | 0.28 | 1.00※2 | 1.00※2 | mA/℃ |
| | $\Delta I_{FRM}$ | 0.69 | 0.69 | 0.69 | 3.33※2 | 3.33※2 | mA/℃ |
| Reverse Voltage | $V_R$ | 5 | 5 | 5 | 5 | 5 | V |
| Operating Temperature | $T_{opr}$ | -40～+85 | | | -40～+100 | | ℃ |
| Storage Temperature | $T_{stg}$ | -40～+100 | | | -40～+120 | | ℃ |

※1 $I_{FRM}$ Measurement condition : Pulse Width≦1ms., Duty≦1/20. (UY,UR : Duty≦1/10)

※2 Temperature Condition : Ta=75℃ or higher.

## Electro-Optical Characteristics(**HUB,HUC,HUG**)

(Ta=25℃)

| Item | Conditions | Symbol | | Characteristics | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | HUB | HUC | HUG | |
| Forward Voltage | $I_F$=10mA | $V_F$ | TYP. | 3.4 | 3.4 | 3.4 | V |
| | | | MAX. | 3.9 | 3.9 | 3.9 | |
| Reverse Current | $V_R$=5V | $I_R$ | MAX. | 100 | 100 | 100 | μA |
| Peak Wavelength | $I_F$=10mA | $\lambda_p$ | TYP. | 465 | 502 | 522 | nm |
| Dominant Wavelength | $I_F$=10mA | $\lambda_d$ | TYP. | 470 | 508 | 530 | nm |
| Spectral Line Half Width | $I_F$=10mA | $\Delta\lambda$ | TYP. | 26 | 30 | 35 | nm |
| Half Intensity Angle | $I_F$=10mA | $2\theta 1/2$ | TYP. | 50 | 50 | 50 | deg. |

## Electro-Optical Characteristics (**UY,UR**)

(Ta=25℃)

| Item | Conditions | Symbol | | Characteristics | | Unit |
|---|---|---|---|---|---|---|
| | | | | UY | UR | |
| Forward Voltage | $I_F$=20mA | $V_F$ | TYP. | 2.2 | 2.2 | V |
| | | | MAX. | 2.8 | 2.8 | |
| Reverse Current | $V_R$=5V | $I_R$ | MAX. | 100 | 100 | μA |
| Peak Wavelength | $I_F$=20mA | $\lambda_p$ | TYP. | 592 | 641 | nm |
| Dominant Wavelength | $I_F$=20mA | $\lambda_d$ | TYP. | 590 | 630 | nm |
| Spectral Line Half Width | $I_F$=20mA | $\Delta\lambda$ | TYP. | 18 | 18 | nm |
| Half Intensity Angle | $I_F$=20mA | $2\theta 1/2$ | TYP. | 50 | 50 | deg. |

## Luminous Intensity Rank

(Ta=25℃)

| Rank | $I_V$(mcd) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | HUB | | HUC | | HUG | | UY | | UR | |
| | $I_F$=10mA | | $I_F$=10mA | | $I_F$=10mA | | $I_F$=20mA | | $I_F$=20mA | |
| | MIN. | MAX. | MIN. | MAX. | MIN. | MAX. | MIN. | MAX. | MIN. | MAX. |
| A | | | 140 | 280 | | | 140 | 280 | 140 | 280 |
| B | 70 | 140 | 200 | 400 | 200 | 400 | 200 | 400 | 200 | 400 |
| C | 100 | 200 | 280 | 560 | 280 | 560 | 280 | 560 | 280 | 560 |
| D | 140 | 280 | 400 | 800 | 400 | 800 | 400 | 800 | 400 | 800 |
| E | 200 | 400 | 560 | 1,120 | 560 | 1,120 | 560 | 1,120 | 560 | 1,120 |
| F | 280 | 560 | 800 | - | 800 | 1,600 | 800 | - | 800 | - |
| G | 400 | - | | | 1,120 | - | | | | |

※ Please contact our sales staff concerning rank designation.

## Color Tone Groups ( λ d)

(Ta=25℃)

| Rank | Dominant Wavelength λ d (nm) | | | |
|---|---|---|---|---|
| | UY | | UR | |
| | $I_F$=20mA | | $I_F$=20mA | |
| | MIN. | MAX. | MIN. | MAX. |
| A | 580 | 585 | 620 | 630 |
| B | 584 | 589 | 628 | 638 |
| C | 588 | 593 | | |
| D | 592 | 597 | | |
| E | 596 | 601 | | |

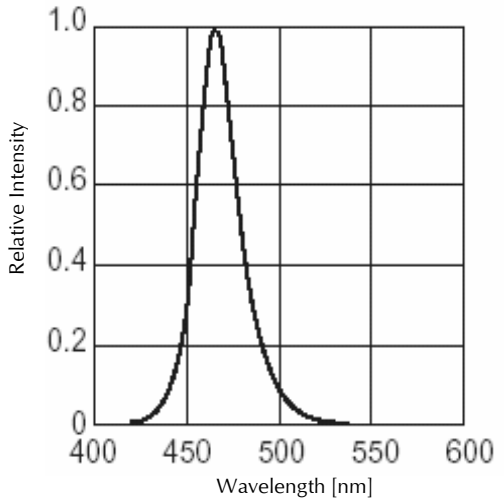
※ Please contact our sales staff concerning rank designation.

# Technical Data(**HUB**)

## Spectral Distribution

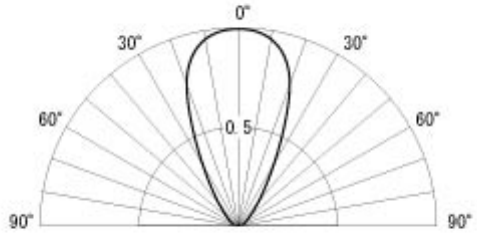
Relative Intensity vs. Wavelength

Condition : Ta = 25℃, $I_F$ = 20mA



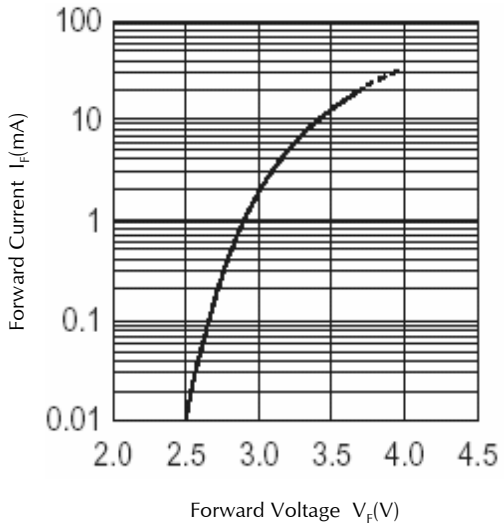

## Spatial Distribution Example

Condition : Ta = 25℃



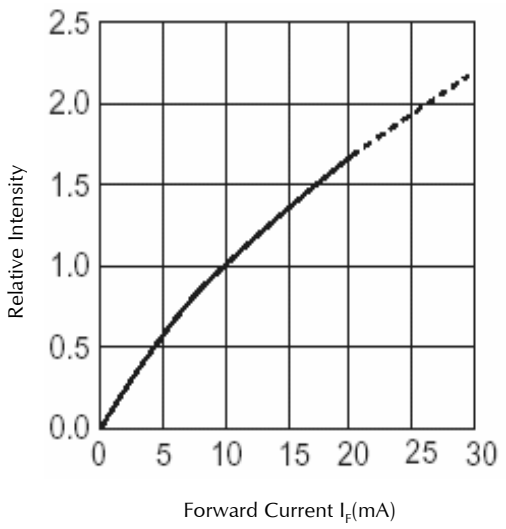

## Forward Voltage vs. Forward Current

Condition : Ta = 25℃




## Forward Current vs. Relative Intensity

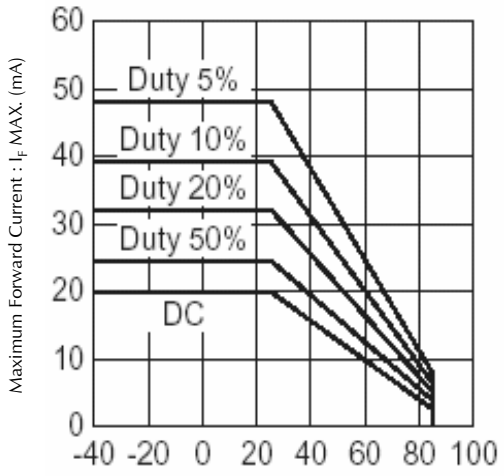
Condition : Ta = 25℃



# Technical Data(**HUB**)

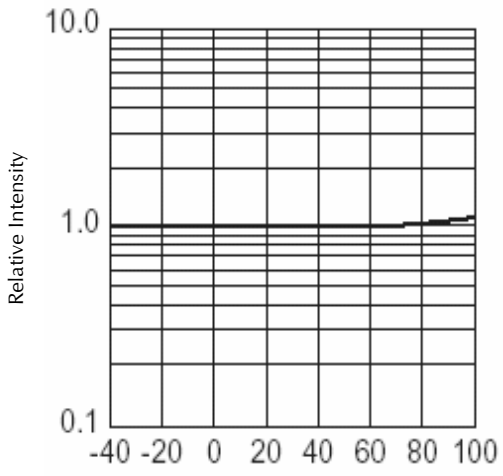
## Derating

Ambient Temperature vs. Maximum Forward Current
Repetition Frequency : f ≧ 50Hz

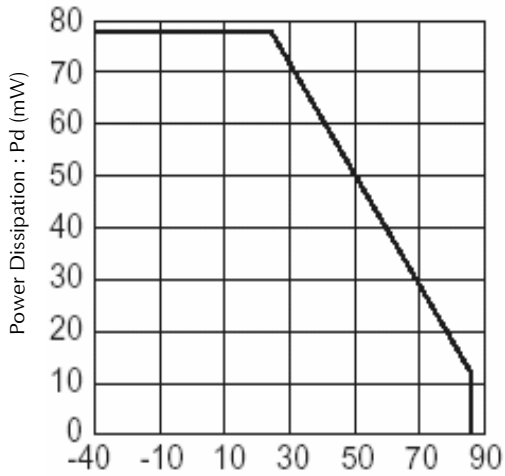



## Ambient Temperature vs. Relative Intensity

Condition : $I_F$=20mA

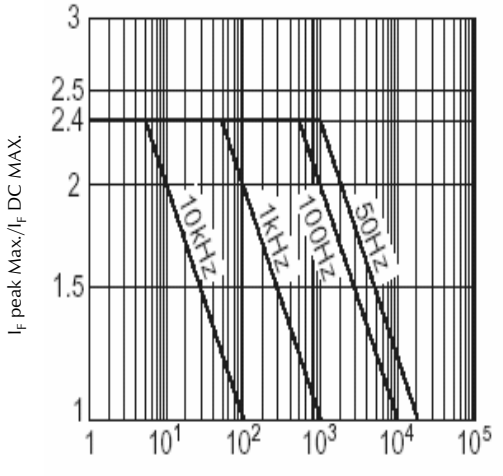



## Power Dissipation vs. Ambient Temperature




## Pulse Width vs. Maximum Tolerable Peak Current

Condition : Ta = 25℃

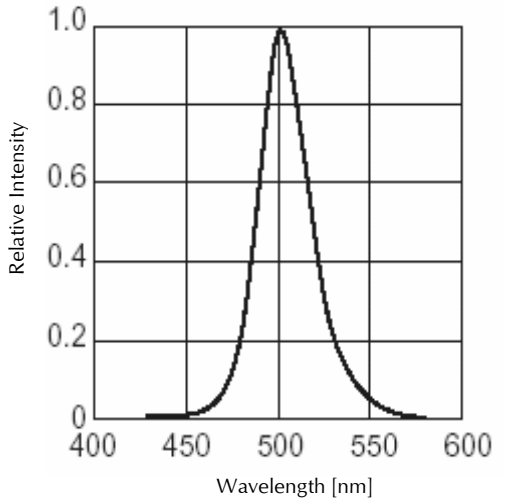


# Technical Data(**HUC**)

## Spectral Distribution

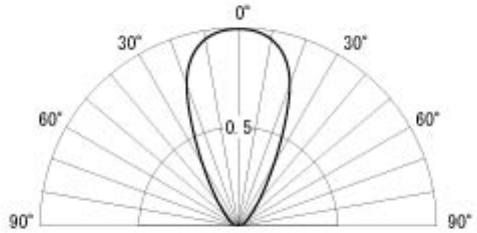
Relative Intensity vs. Wavelength

Condition : Ta = 25℃, $I_F$ = 20mA



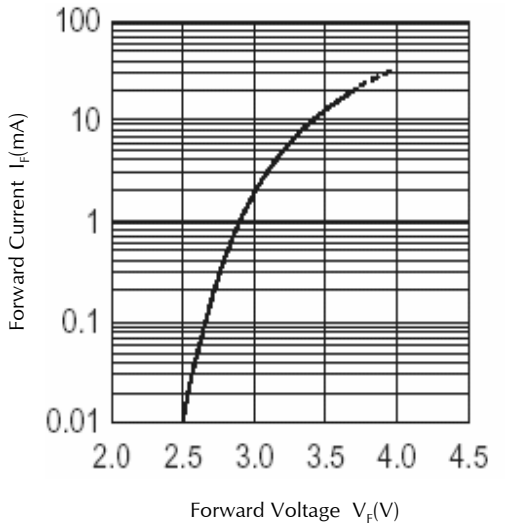

## Spatial Distribution Example

Condition : Ta = 25℃



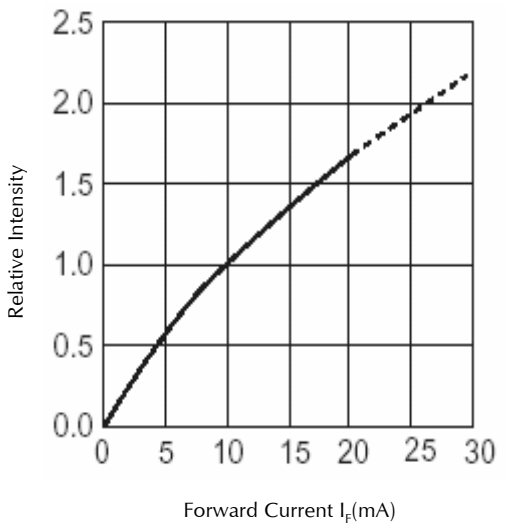

## Forward Voltage vs. Forward Current

Condition : Ta = 25℃




## Forward Current vs. Relative Intensity

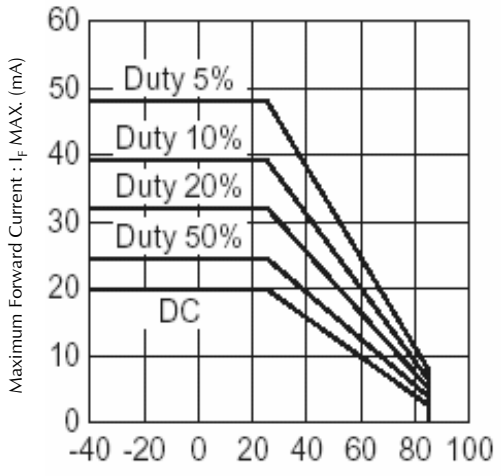
Condition : Ta = 25℃



# Technical Data(**HUC**)

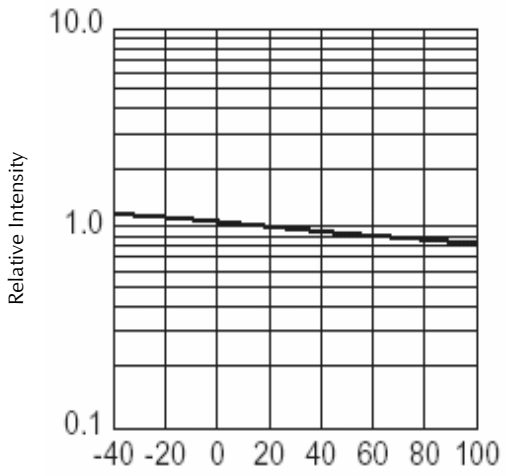
## Derating

Ambient Temperature vs. Maximum Forward Current
Repetition Frequency : f ≧ 50Hz

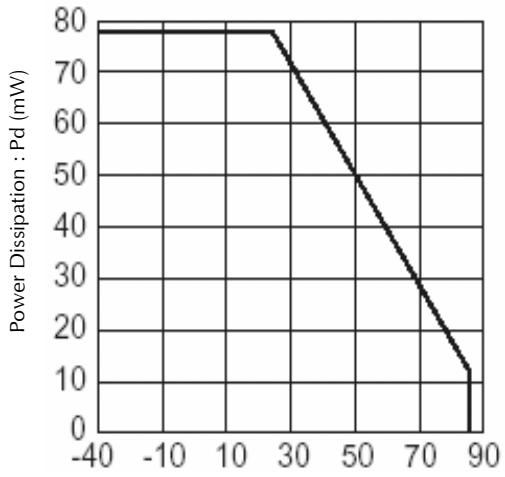



## Ambient Temperature vs. Relative Intensity

Condition : $I_F$=20mA

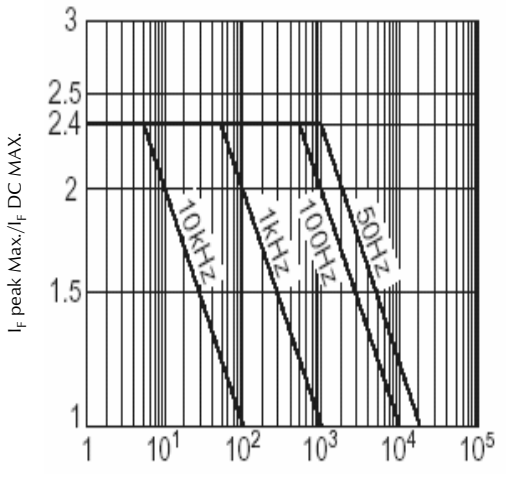



## Power Dissipation vs. Ambient Temperature




## Pulse Width vs. Maximum Tolerable Peak Current

Condition : Ta = 25℃

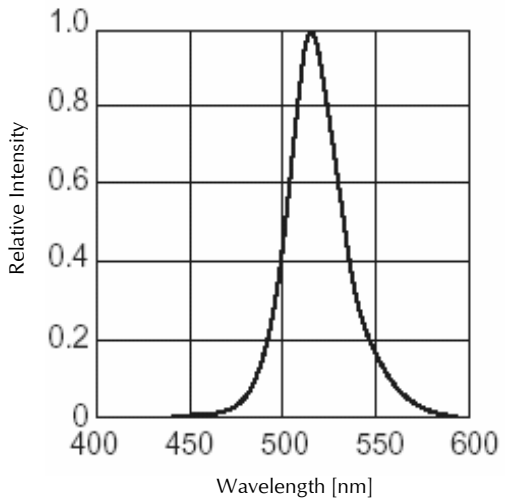


# Technical Data(**HUG**)

## Spectral Distribution

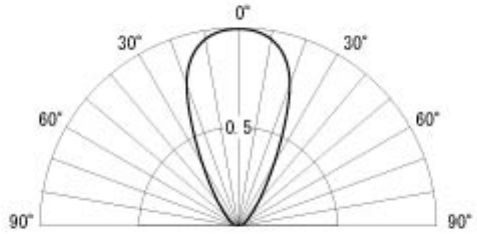
Relative Intensity vs. Wavelength

Condition : Ta = 25℃, $I_F$ = 20mA



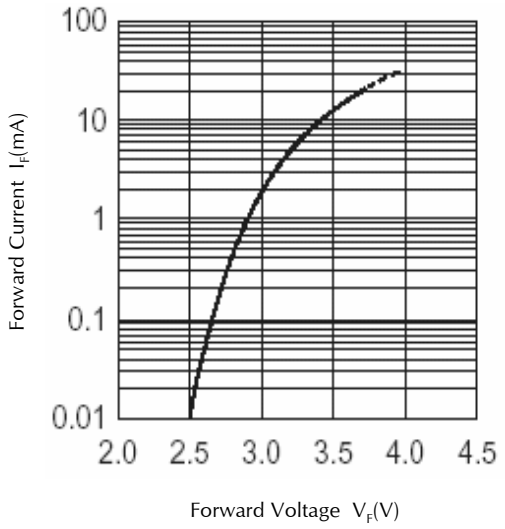

## Spatial Distribution Example

Condition : Ta = 25℃



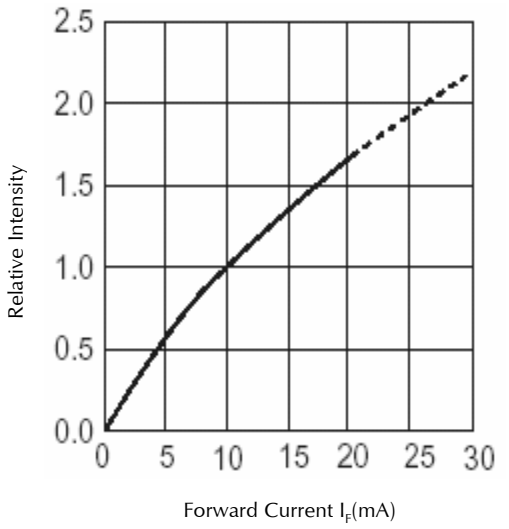

## Forward Voltage vs. Forward Current

Condition : Ta = 25℃




## Forward Current vs. Relative Intensity

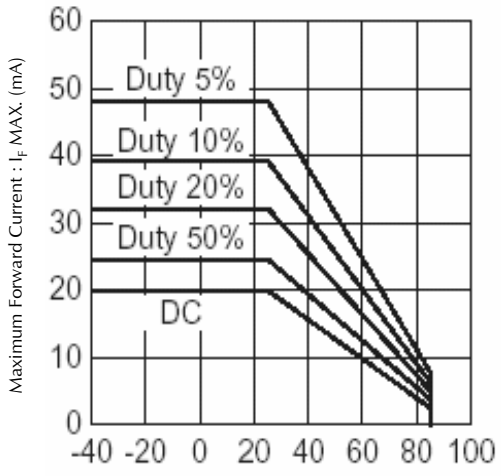
Condition : Ta = 25℃



# Technical Data(**HUG**)

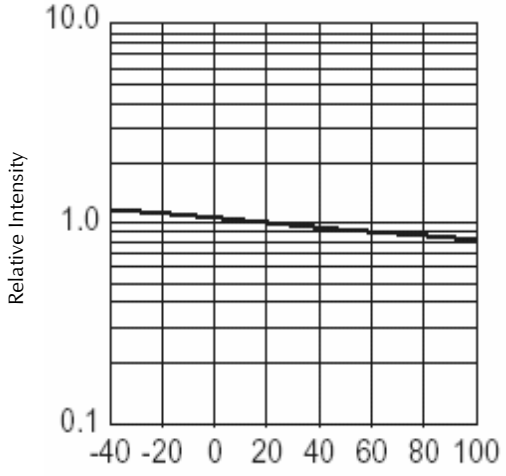
## Derating

Ambient Temperature vs. Maximum Forward Current
Repetition Frequency : f ≧ 50Hz

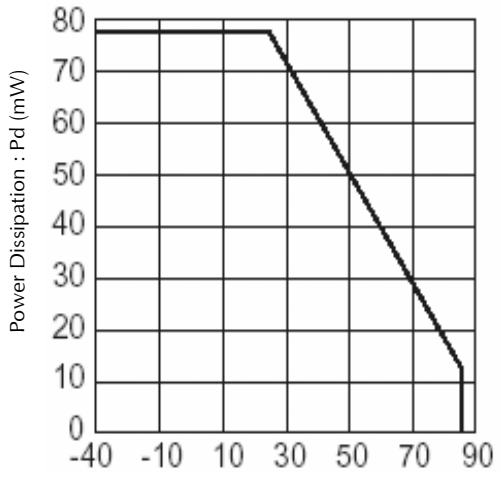



## Ambient Temperature vs. Relative Intensity

Condition : $I_F$=20mA

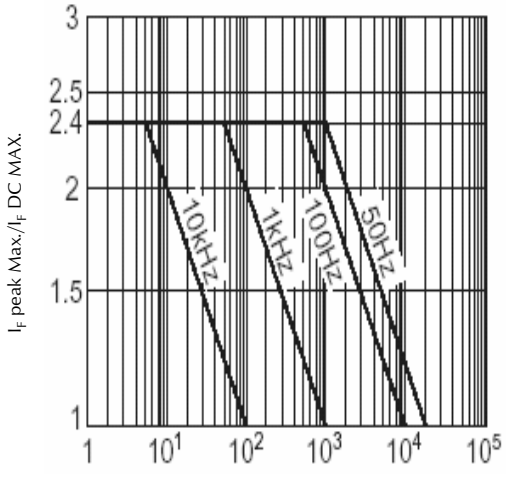



## Power Dissipation vs. Ambient Temperature



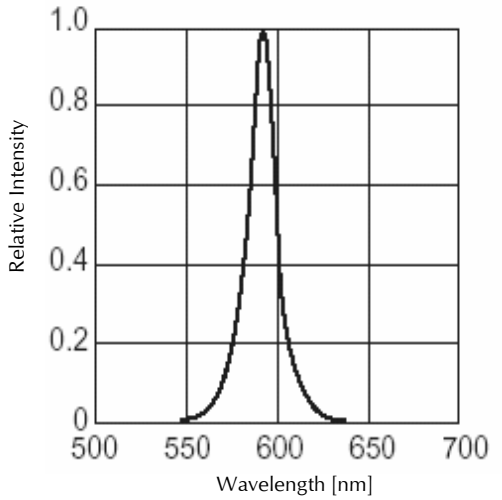

## Pulse Width vs. Maximum Tolerable Peak Current

Condition : Ta = 25℃



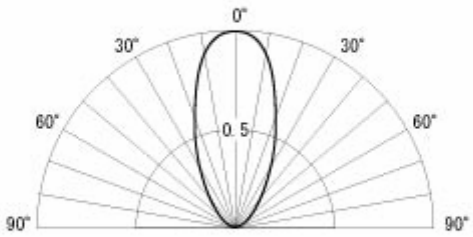
# Technical Data(**UY**)

Spectral Distribution
Relative Intensity vs. Wavelength
Condition : Ta = 25℃, $I_F$ = 20mA

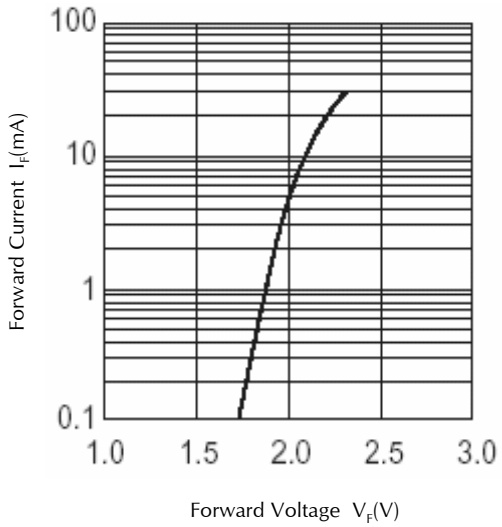



Spatial Distribution Example

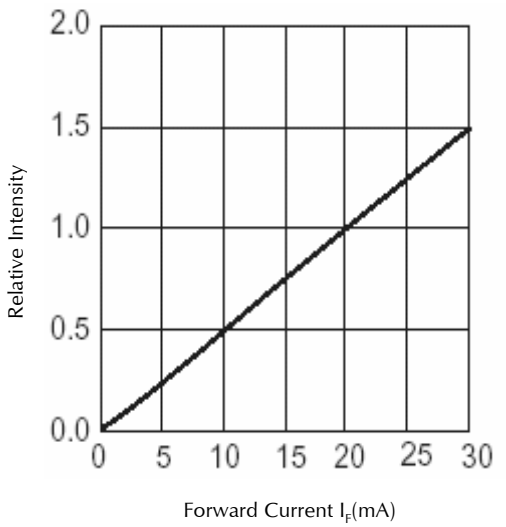
Condition : Ta = 25℃




Forward Voltage vs. Forward Current
Condition : Ta = 25℃



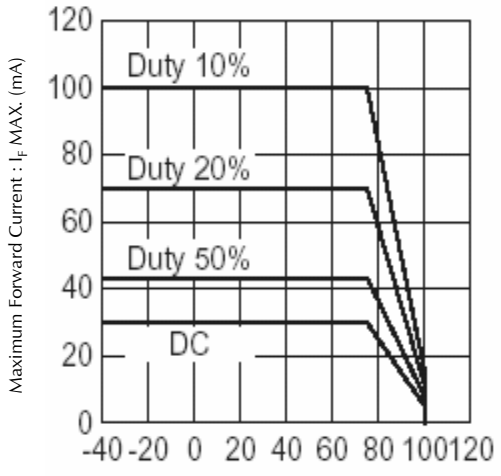

Forward Current vs. Relative Intensity
Condition : Ta = 25℃



# Technical Data(**UY**)

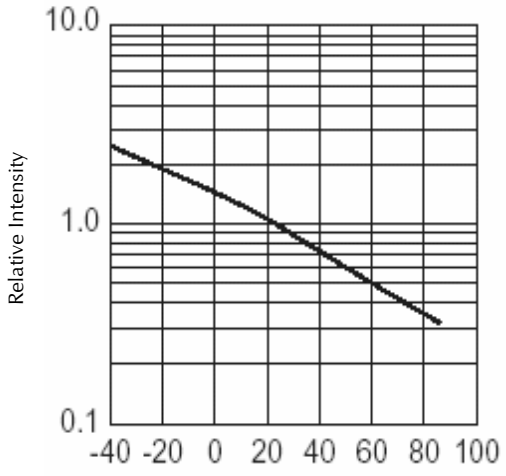
## Derating

Ambient Temperature vs. Maximum Forward Current
Repetition Frequency : f ≧ 50Hz

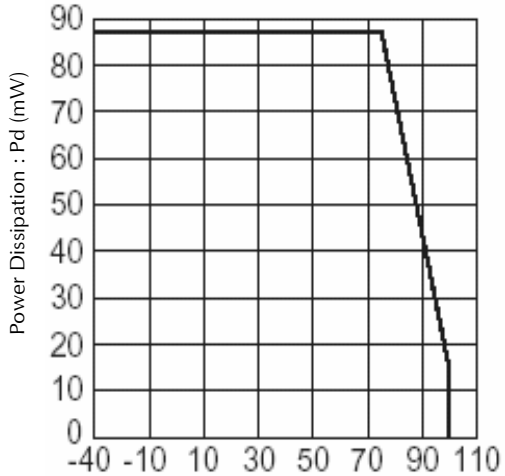



## Ambient Temperature vs. Relative Intensity

Condition : $I_F$=20mA

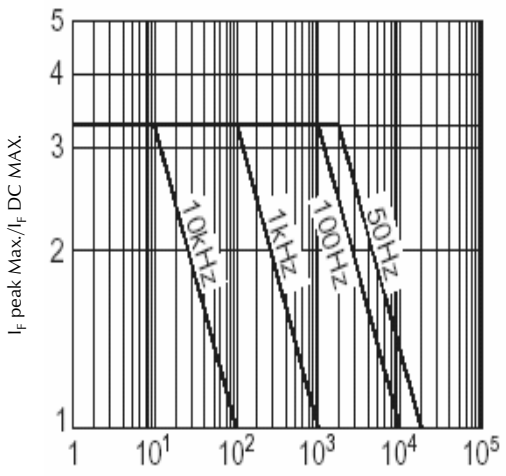



## Power Dissipation vs. Ambient Temperature




## Pulse Width vs. Maximum Tolerable Peak Current

Condition : Ta = 25℃

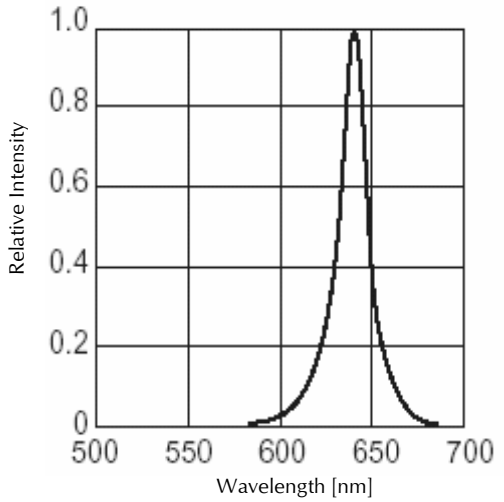


# Technical Data(**UR**)

## Spectral Distribution

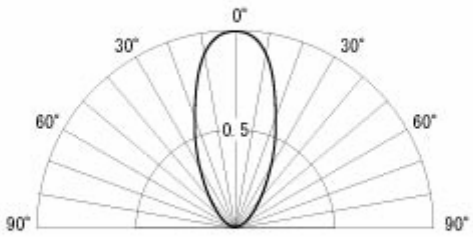
Relative Intensity vs. Wavelength

Condition : Ta = 25℃, $I_F$ = 20mA



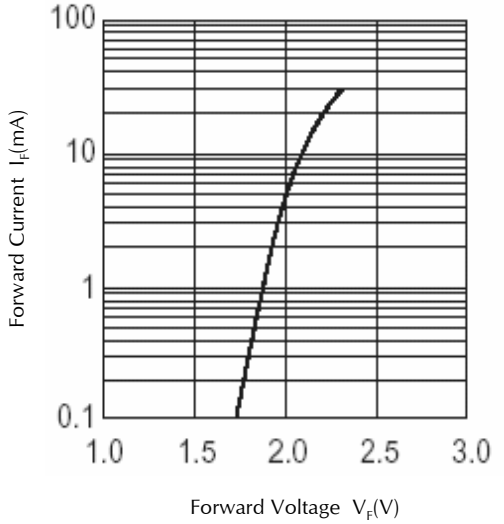

## Spatial Distribution Example

Condition : Ta = 25℃



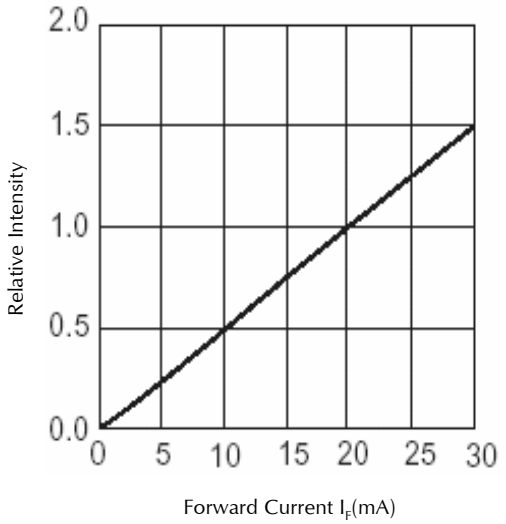

## Forward Voltage vs. Forward Current

Condition : Ta = 25℃




## Forward Current vs. Relative Intensity

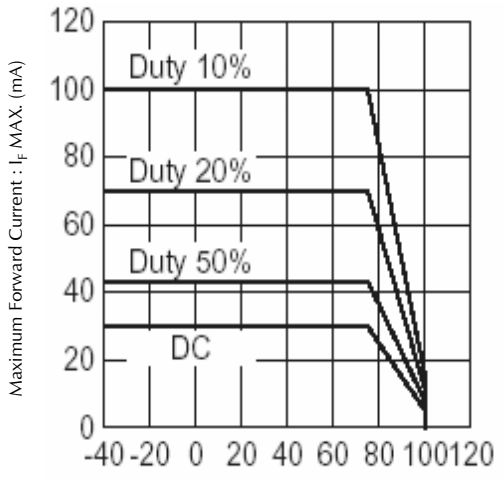
Condition : Ta = 25℃



# Technical Data(**UR**)

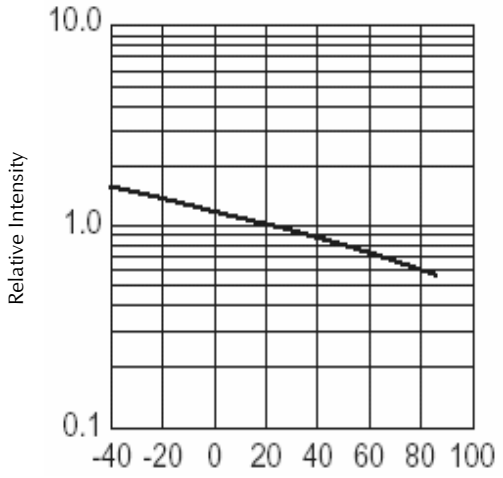
## Derating

Ambient Temperature vs. Maximum Forward Current
Repetition Frequency : f ≧ 50Hz

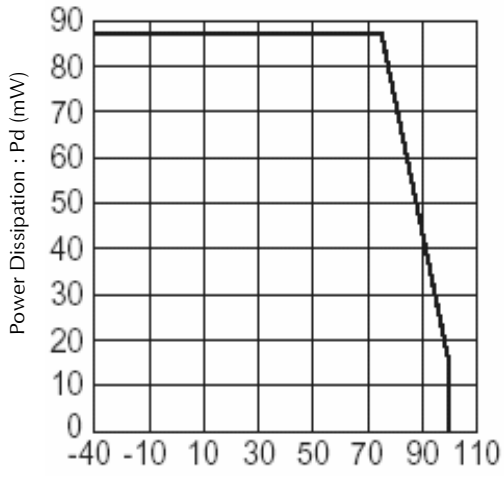



## Ambient Temperature vs. Relative Intensity

Condition : $I_F$=20mA

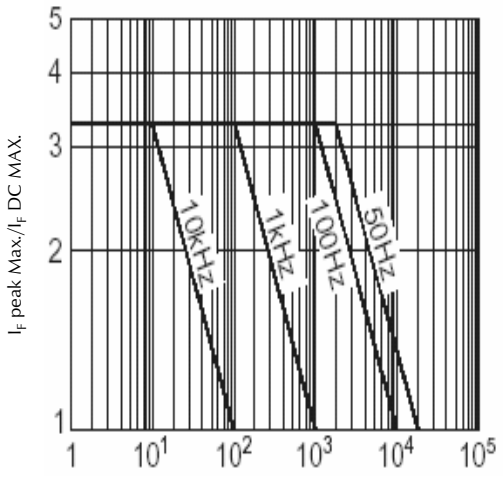



## Power Dissipation vs. Ambient Temperature




## Pulse Width vs. Maximum Tolerable Peak Current

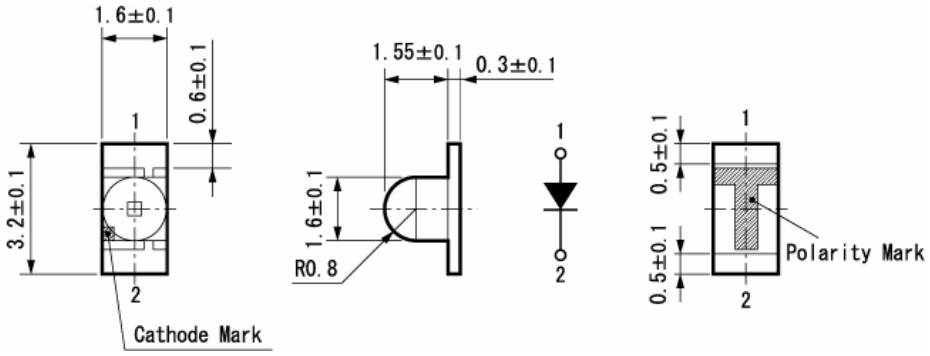
Condition : Ta = 25℃



## Package Dimensions

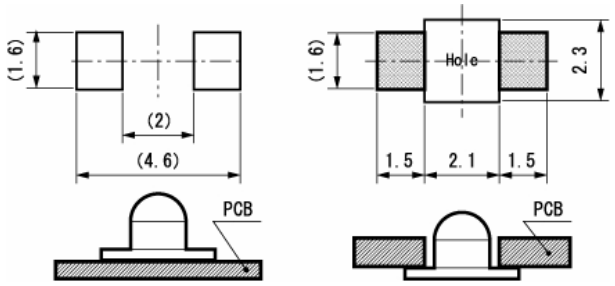
(Unit: mm)

Weight: (7.81)mg




## Recommended Soldering Pattern

(Unit: mm)



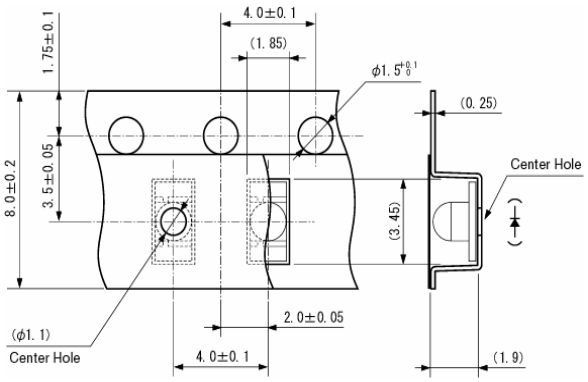

Surface Mount Reverse Mount

## Taping Specification

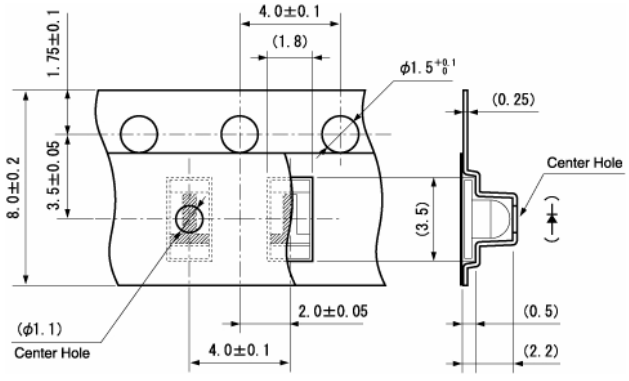
(Unit: mm)

Quantity : 2,000pcs/ reel (standard)

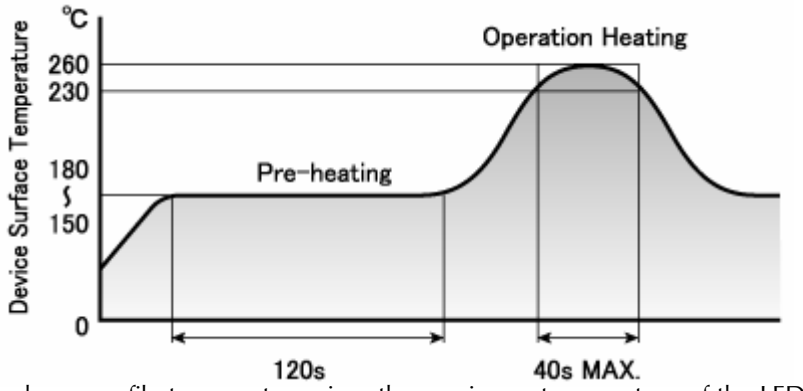
1105W-TR (Surface Mount)




1105W-RR (Reverse Mount)



## Reflow Soldering Conditions




1) The above profile temperature gives the maximum temperature of the LED resin surface. Please set the temperature so as to avoid exceeding this range.

2) Total times of reflow soldering process shall be no more than 2 times. When the second reflow soldering process is performed, intervals between the first and second reflow should be short as possible (while allowing some time for the component to return to normal temperature after the first reflow) in order to prevent the LED from absorbing moisture.

3) Temperature fluctuation to the LED during the pre-heating process shall be minimized. (6℃ maximum)

## Manual Soldering Conditions

| | | |
|---|---|---|
| Iron tip temp. | 350 ℃ | (MAX.) |
| Soldering time and frequency | 3 s<br>1 time | (MAX.)<br>(MAX.) |

## Reliability Testing Result(**HUB,HUC,HUG**)

| Reliability Testing Result | Applicable Standard | Testing Conditions | Duration | Failure |
|---|---|---|---|---|
| Room Temp. Operating Life | EIAJ ED-4701/100(101) | Ta = 25℃, $I_F$ = Maxium Rated Current | 1,000 h | 0/25 |
| Resistance to Soldering Heat | EIAJ ED-4701/300(301) | Pre-heating : 150～180℃ 120s Max.<br>Operation Heating : 230℃ 40s Max.<br>Peak Temperature : 260℃ | Twice | 0/25 |
| Temperature Cycling | EIAJ ED-4701/100(105) | Minimum Rated Storage Temperature(30min)<br>～Normal Temperature(15min)<br>～Maximum Rated Storage Temperature(30min)<br>～Normal Temperature(15min) | 5 cycles | 0/25 |
| Wet High Temp. Storage Life | EIAJ ED-4701/100(103) | Ta = 60±2℃, RH = 90±5% | 1,000 h | 0/25 |
| High Temp. Storage Life | EIAJ ED-4701/200(201) | Ta = Maximum Rated Storage Temperature | 1,000 h | 0/25 |
| Low Temp. Storage Life | EIAJ ED-4701/200(202) | Ta = Minimum Rated Storage Temperature | 1,000 h | 0/25 |
| Vibration, Variable Frequency | EIAJ ED-4701/400(403) | 98.1m/s$^2$ (10G), 100 ～ 2KHz sweep for 20min., XYZ each direction | 2 h | 0/10 |

## Reliability Testing Result(**UY,UR**)

| Reliability Testing Result | Applicable Standard | Testing Conditions | Duration | Failure |
|---|---|---|---|---|
| Room Temp. Operating Life | EIAJ ED-4701/100(101) | Ta = 25℃, $I_F$ = Maxium Rated Current | 1,000 h | 0/25 |
| Resistance to Soldering Heat | EIAJ ED-4701/300(301) | Pre-heating : 150～180℃ 120s Max.<br>Operation Heating : 230℃ 40s Max.<br>Peak Temperature : 260℃ | Twice | 0/25 |
| Temperature Cycling | EIAJ ED-4701/100(105) | Minimum Rated Storage Temperature(30min)<br>～Normal Temperature(15min)<br>～Maximum Rated Storage Temperature(30min)<br>～Normal Temperature(15min) | 200 cycles | 0/25 |
| High Temp. Operating Life | EIAJ ED-4701/100(101) | Ta = 100℃, $I_F$ = 5mA | 1,000 h | 0/25 |
| Humidity Temp. Operating Life | EIAJ ED-4701/100(102) | Ta = 60±2℃, RH = 90±5%, $I_F$ = 30mA | 1,000 h | 0/25 |
| High Temp. Storage Life | EIAJ ED-4701/200(201) | Ta = Maximum Rated Storage Temperature | 1,000 h | 0/25 |
| Low Temp. Storage Life | EIAJ ED-4701/200(202) | Ta = Minimum Rated Storage Temperature | 1,000 h | 0/25 |
| Vibration, Variable Frequency | EIAJ ED-4701/400(403) | 98.1m/s$^2$ (10G), 100 ～ 2KHz sweep for 20min., XYZ each direction | 2 h | 0/10 |

## Failure Criteria

| Items | Symbols | Conditions | Failure criteria |
|---|---|---|---|
| Luminous Intensity | $I_V$ | $I_F$ Value of each product Luminous Intensity | Testing Min. Value < Spec. Min. Value x 0.5 |
| Forward Voltage | $V_F$ | $I_F$ Value of each product Forward Voltage | Testing Max. Value ≧ Spec. Max. Value x 1.2 |
| Reverse Current | $I_R$ | $V_R$ = Maximum Rated Reverse Voltage V | Testing Max. Value ≧ Spec. Max. Value x 2.5 |
| Cosmetic Appearance | - | - | Occurrence of notable decoloration, deformation and cracking |

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