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BAR DIGIT LED DISPLAY



Lead-Free Parts

LBD101/22-XX-PF

DATA SHEET

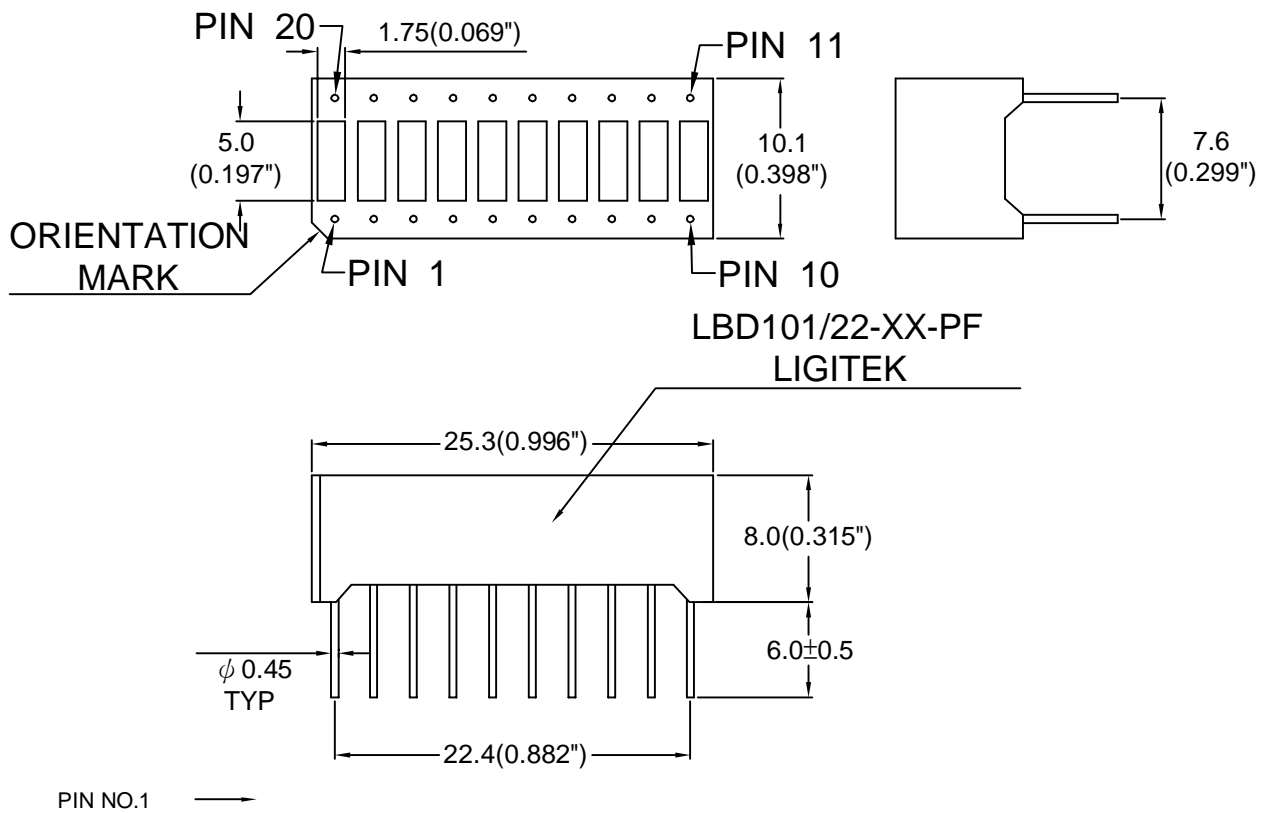
DOC. NO : QW0905-LBD101/22-XX-PF

REV. : A

DATE : 01- Sep. - 2008



Package Dimensions

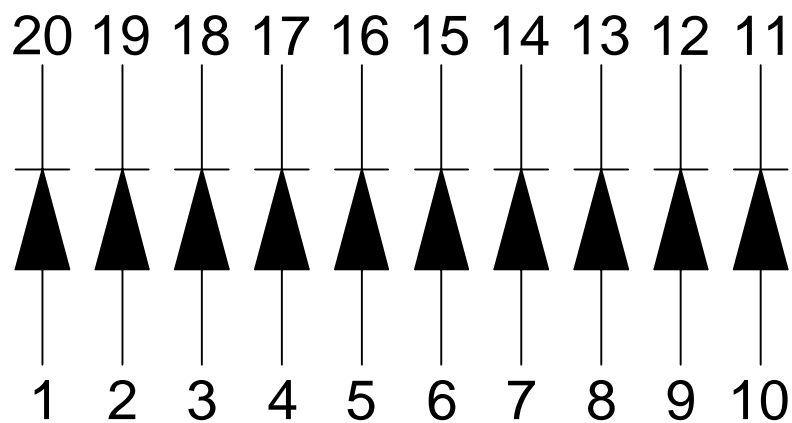


Note : 1.All dimension are in millimeters and (Inch) tolerance is $\pm 0.25\text{mm}$ unless otherwise noted.
2.Specifications are subject to change without notice.

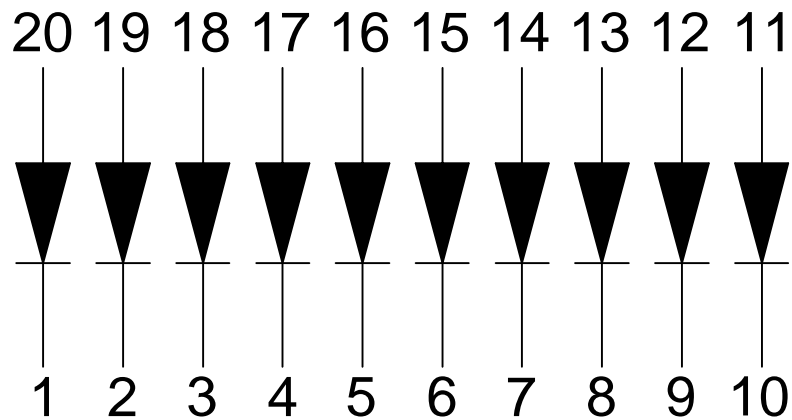


Internal Circuit Diagram

LBD1012-XX-PF



LBD1022-XX-PF



**Electrical Connection**

| PIN NO. | LBD1012-XX-PF | | |
|---------|---------------|-----|---------|
| 1. | Anode | 11. | Cathode |
| 2. | Anode | 12. | Cathode |
| 3. | Anode | 13. | Cathode |
| 4. | Anode | 14. | Cathode |
| 5. | Anode | 15. | Cathode |
| 6. | Anode | 16. | Cathode |
| 7. | Anode | 17. | Cathode |
| 8. | Anode | 18. | Cathode |
| 9. | Anode | 19. | Cathode |
| 10. | Anode | 20. | Cathode |

| PIN NO. | LBD1022-XX-PF | | |
|---------|---------------|-----|-------|
| 1. | Cathode | 11. | Anode |
| 2. | Cathode | 12. | Anode |
| 3. | Cathode | 13. | Anode |
| 4. | Cathode | 14. | Anode |
| 5. | Cathode | 15. | Anode |
| 6. | Cathode | 16. | Anode |
| 7. | Cathode | 17. | Anode |
| 8. | Cathode | 18. | Anode |
| 9. | Cathode | 19. | Anode |
| 10. | Cathode | 20. | Anode |



Absolute Maximum Ratings at Ta=25 °C

| Parameter | Symbol | Ratings | UNIT |
|---|--------|-----------|------|
| | | G | |
| Forward Current Per Chip | IF | 30 | mA |
| Peak Forward Current Per Chip (Duty 1/10,0.1ms Pulse Width) | IFP | 120 | mA |
| Power Dissipation Per Chip | PD | 100 | mW |
| Reverse Current Per Any Chip | Ir | 10 | μA |
| Operating Temperature | Topr | -25 ~ +85 | °C |
| Storage Temperature | Tstg | -25 ~ +85 | °C |

Part Selection And Application Information(Ratings at 25°C)

| PART NO | CHIP | | common cathode or anode | λ P (nm) | Δ λ (nm) | Electrical | | | | | IV-M |
|---------------|----------|---------|-------------------------|----------|----------|------------|------|------|---------|------|------|
| | Material | Emitted | | | | Vf(v) | | | Iv(mcd) | | |
| | | | | | | Min. | Typ. | Max. | Min. | Typ. | |
| LBD1012-XX-PF | GaP | Green | Common Cathode | 565 | 30 | 1.7 | 2.1 | 2.6 | 3.05 | 6.1 | 2:1 |
| LBD1022-XX-PF | | | Common Anode | | | | | | | | |

Note : 1.The forward voltage data did not including ±0.1V testing tolerance.
2. The luminous intensity data did not including ±15% testing tolerance.



Test Condition For Each Parameter

| Parameter | Symbol | Unit | Test Condition |
|-----------------------------------|----------------|------|----------------------|
| Forward Voltage Per Chip | V _f | volt | I _f =20mA |
| Luminous Intensity Per Chip | I _v | mcd | I _f =10mA |
| Peak Wavelength | λ _p | nm | I _f =20mA |
| Spectral Line Half-Width | Δλ | nm | I _f =20mA |
| Reverse Current Any Chip | I _r | μA | V _r =5V |
| Luminous Intensity Matching Ratio | IV-M | | |



Typical Electro-Optical Characteristics Curve

G CHIP

Fig.1 Forward current vs. Forward Voltage

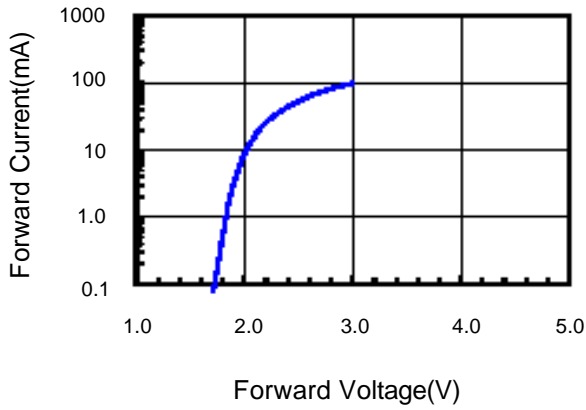


Fig.2 Relative Intensity vs. Forward Current

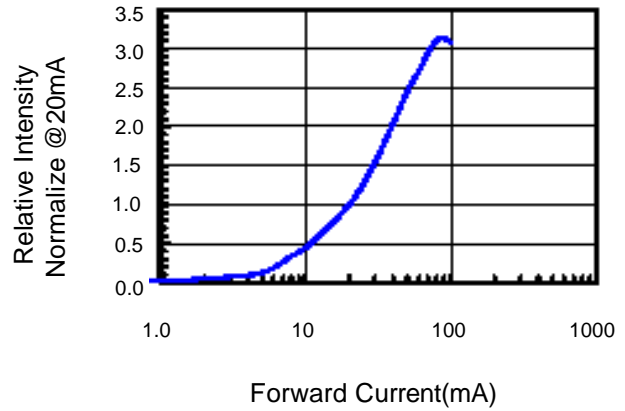


Fig.3 Forward Voltage vs. Temperature

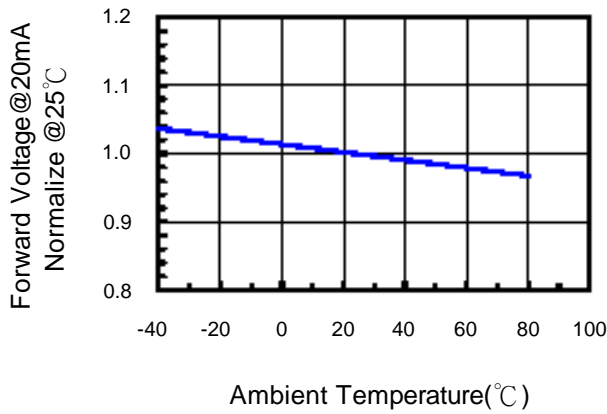


Fig.4 Relative Intensity vs. Temperature

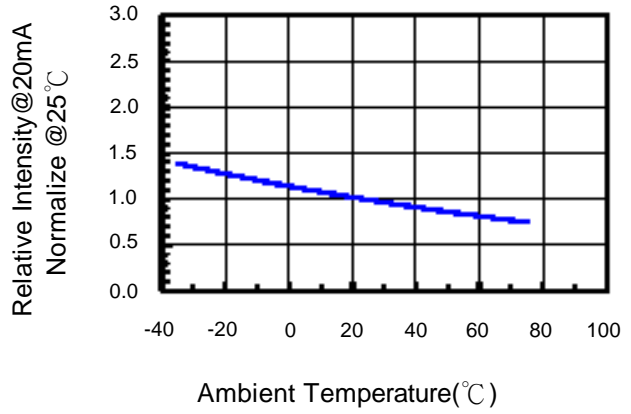


Fig.5 Relative Intensity vs. Wavelength

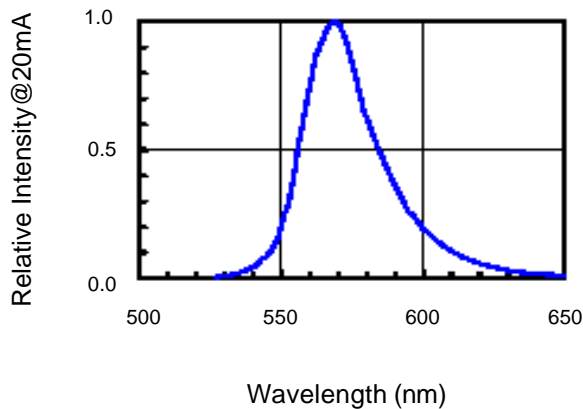


Fig.6 Directive Radiation



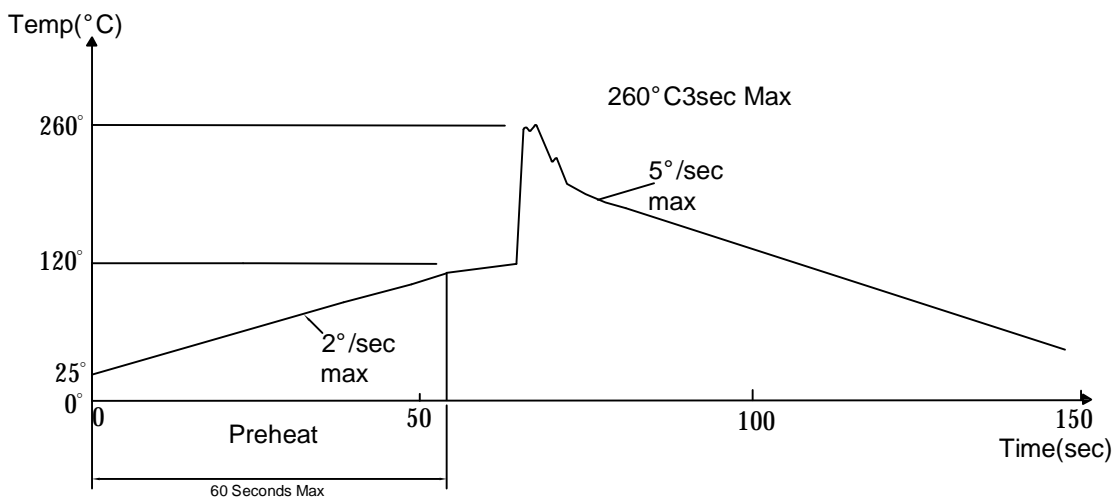
Soldering Condition(Pb-Free)

1.Iron:

Soldering Iron:30W Max
Temperature 350° C Max
Soldering Time:3 Seconds Max(One time only)
Distance:Solder Temperature 1/16 Inch Below Seating
Plane For 3 Seconds At 260° C

2.Wave Soldering Profile

Dip Soldering
Preheat: 120° C Max
Preheat time: 60seconds Max
Ramp-up
2° C/sec(max)
Ramp-Down:-5° C/sec(max)
Solder Bath:260° C Max
Dipping Time:3 seconds Max
Distance:Solder Temperature 1/16 Inch Below Seating
Plane For 3 Seconds At 260° C



Note: 1.Wave solder should not be made more than one time.
2.You can just only select one of the soldering conditions as above.



Reliability Test:

| Test Item | Test Condition | Description | Reference Standard |
|-------------------------------------|--|---|--|
| Operating Life Test | 1.Under Room Temperature 2.If=10mA 3.t=1000 hrs (-24hrs, +72hrs) | This test is conducted for the purpose of detemining the resistance of a part in electrical and themal stressed. | MIL-STD-750: 1026 MIL-STD-883: 1005 JIS C 7021: B-1 |
| High Temperature Storage Test | 1.Ta=105 °C ±5°C 2.t=1000 hrs (-24hrs, +72hrs) | The purpose of this is the resistance of the device which is laid under condition of high temperature for hours. | MIL-STD-883:1008 JIS C 7021: B-10 |
| Low Temperature Storage Test | 1.Ta=-40 °C ±5°C 2.t=1000 hrs (-24hrs, +72hrs) | The purpose of this is the resistance of the device which is laid under condition of low temperature for hours. | JIS C 7021: B-12 |
| High Temperature High Humidity Test | 1.Ta=65 °C ±5°C 2.RH=90%~95% 3.t=240hrs ±2hrs | The purpose of this test is the resistance of the device under tropical for hours. | MIL-STD-202:103B JIS C 7021: B-11 |
| Thermal Shock Test | 1.Ta=105 °C ±5°C & -40 °C ±5°C (10min) (10min) 2.total 10 cycles | The purpose of this is the resistance of the device to sudden extreme changes in high and low temperature. | MIL-STD-202: 107D MIL-STD-750: 1051 MIL-STD-883: 1011 |
| Solder Resistance Test | 1.T.Sol=260 °C ±5°C 2.Dwell time= 10 ±1sec. | This test intended to determine the thermal characteristic resistance of the device to sudden exposures at extreme changes in temperature when soldering the lead wire. | MIL-STD-202: 210A MIL-STD-750: 2031 JIS C 7021: A-1 |
| Solderability Test | 1.T.Sol=230 °C ±5°C 2.Dwell time=5 ±1sec | This test intended to see soldering well performed or not. | MIL-STD-202: 208D MIL-STD-750: 2026 MIL-STD-883: 2003 JIS C 7021: A-2 |