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BAR DIGIT LED DISPLAY



Lead-Free Parts

LBD101/24-XX/P3-PF

DATA SHEET

DOC. NO : QW0905-LBD101/24-XX/P3-PF

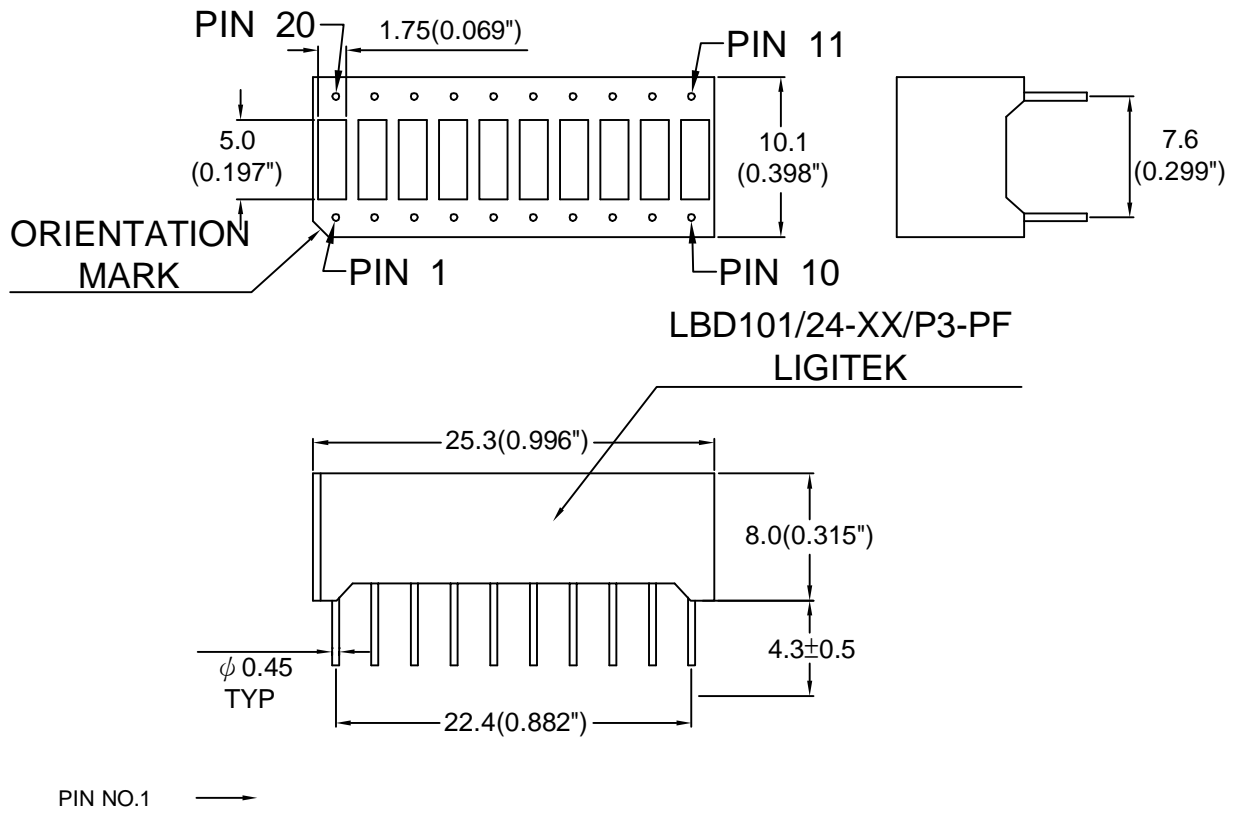
REV. : A

DATE : 11- May. - 2009





Package Dimensions

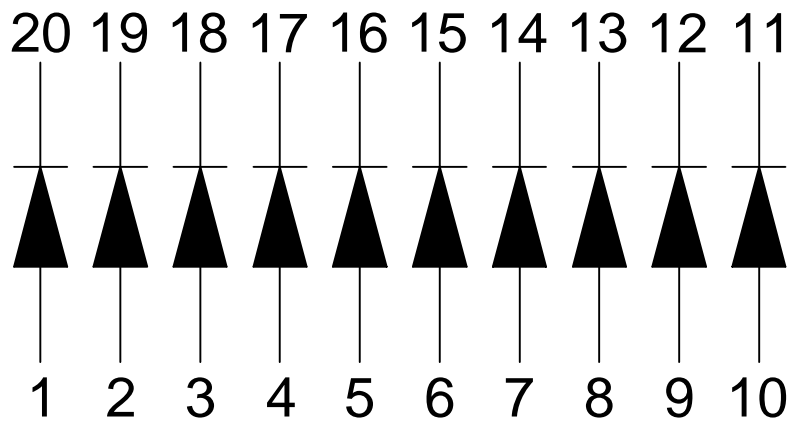


Note : 1.All dimension are in millimeters and (Inch) tolerance is ± 0.25 mm unless otherwise noted.
2.Specifications are subject to change without notice.

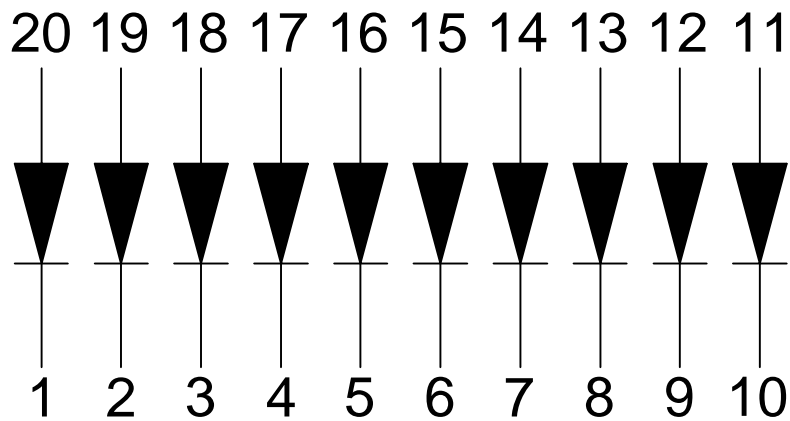


Internal Circuit Diagram

LBD1014-XX/P3-PF



LBD1024-XX/P3-PF





Electrical Connection

| PIN NO. | LBD1014-XX/P3-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. | LBD1024-XX/P3-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 |
|---|--------|-----------|------|
| | | E | |
| 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. | |
| LBD1014-XX/P3-PF | GaAsP/GaP | Orange | Common Cathode | 635 | 45 | 1.7 | 2.1 | 2.6 | 2.35 | 4.0 | 2:1 |
| LBD1024-XX/P3-PF | | | Common Anode | | | | | | | | |

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

**Test Condition For Each Parameter**

| Parameter | Symbol | Unit | Test Condition |
|-----------------------------------|------------------|---------------|-------------------|
| Forward Voltage Per Chip | V_f | volt | $I_f=20\text{mA}$ |
| Luminous Intensity Per Chip | I_v | mcd | $I_f=10\text{mA}$ |
| Peak Wavelength | λ_p | nm | $I_f=20\text{mA}$ |
| Spectral Line Half-Width | $\Delta \lambda$ | nm | $I_f=20\text{mA}$ |
| Reverse Current Any Chip | I_r | μA | $V_r=5\text{V}$ |
| Luminous Intensity Matching Ratio | IV-M | | |



Typical Electro-Optical Characteristics Curve

E CHIP

Fig.1 Forward current vs. Forward Voltage

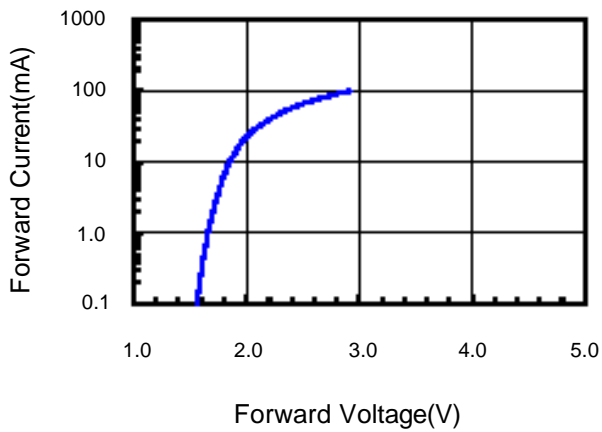


Fig.2 Relative Intensity vs. Forward Current

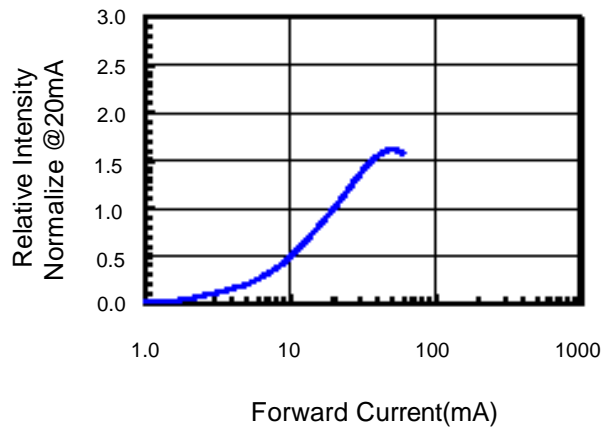


Fig.3 Forward Voltage vs. Temperature

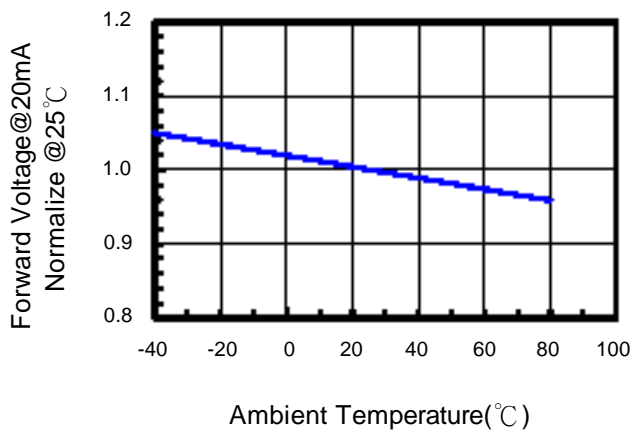


Fig.4 Relative Intensity vs. Temperature

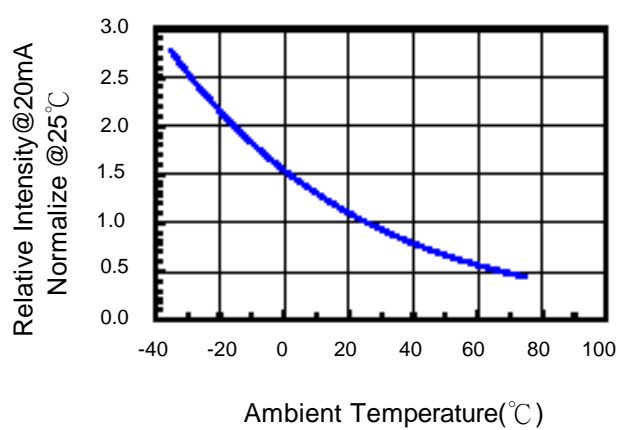
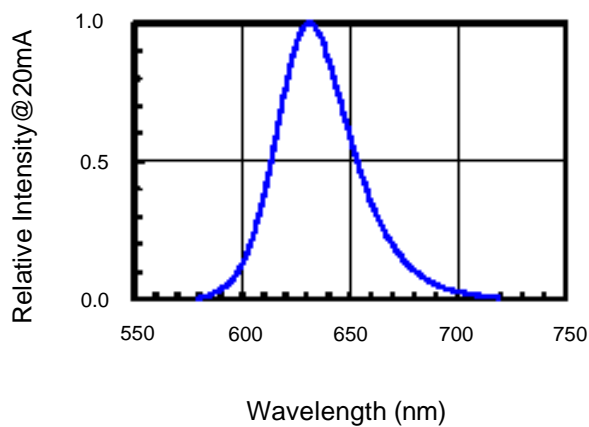


Fig.5 Relative Intensity vs. Wavelength





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

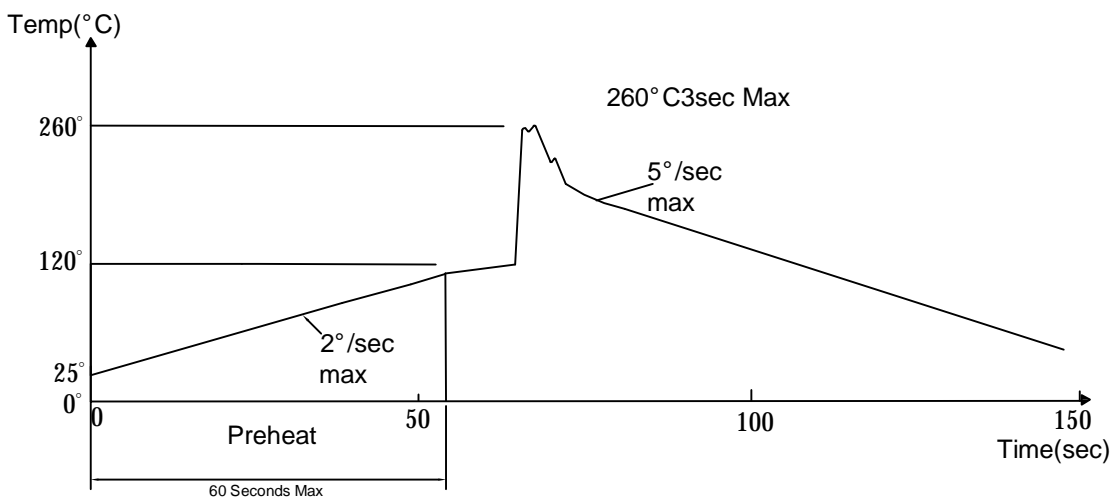
2° C/sec(max)

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 determining the resistance of a part in electrical and thermal 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 |