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TRIPLE DIGIT LED DISPLAY (0.56 Inch)



Lead-Free Parts

**LTD521/22-XX-PF**

**DATA SHEET**

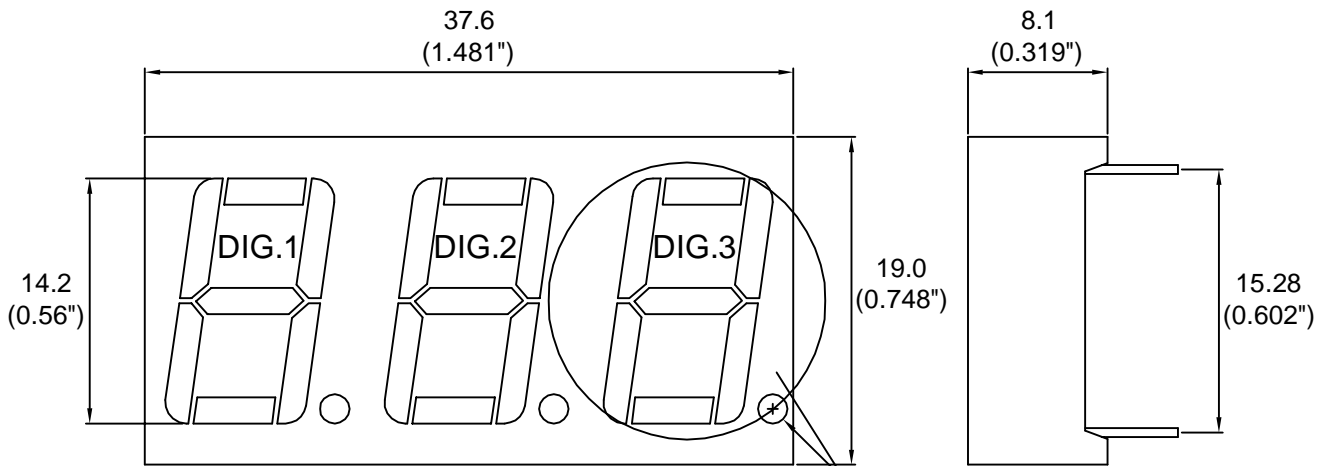
DOC. NO : QW0905-LTD521/22-XX-PF

REV. : A

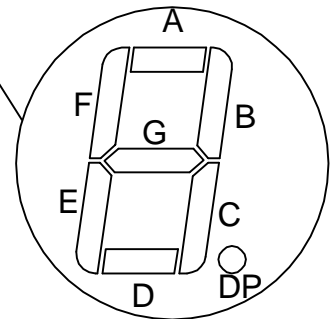
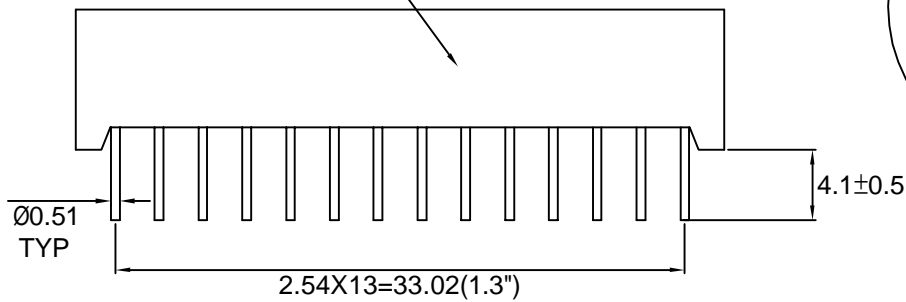
DATE : 23 - Apr. - 2006



### Package Dimensions



LTD521/22-XX-PF  
LIGITEK



PIN NO.1 ———→

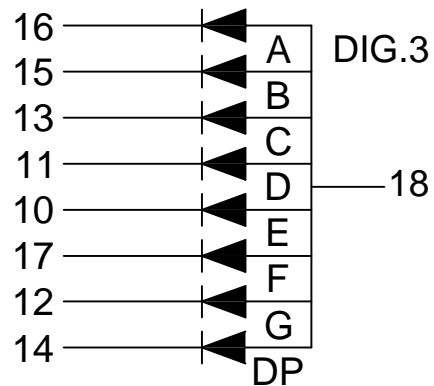
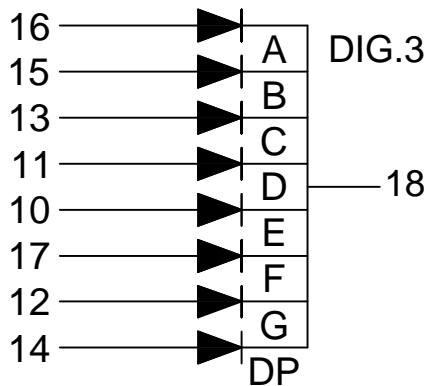
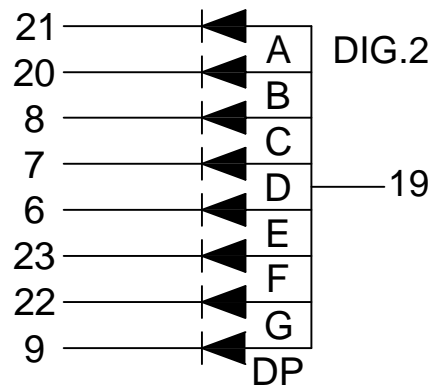
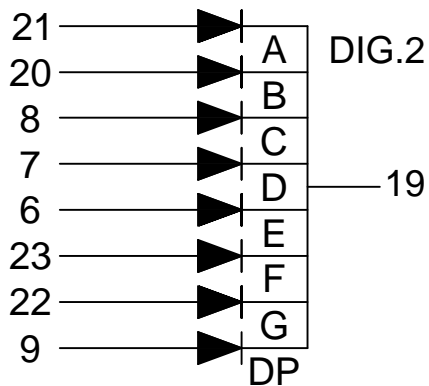
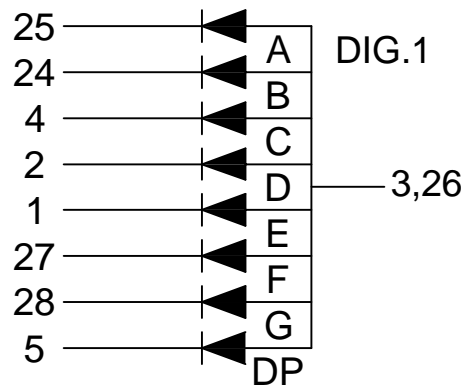
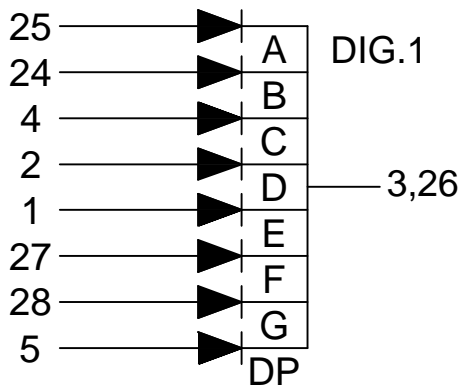
Note : 1.All dimension are in millimeters and (Inch) tolerance is  $\pm 0.25(0.01)$ " unless otherwise noted.  
 2.Specifications are subject to change without notice.



Internal Circuit Diagram

LTD5212-XX-PF

LTD5222-XX-PF



**Electrical Connection**

| PIN NO. | LTD5212-XX-PF        | PIN NO. | LTD5212-XX-PF        |
|---------|----------------------|---------|----------------------|
| 1       | Anode Dig.1 E        | 15      | Anode Dig.3 B        |
| 2       | Anode Dig.1 D        | 16      | Anode Dig.3 A        |
| 3       | Common Cathode Dig.1 | 17      | Anode Dig.3 F        |
| 4       | Anode Dig.1 C        | 18      | Common Cathode Dig.3 |
| 5       | Anode Dig.1 DP       | 19      | Common Cathode Dig.2 |
| 6       | Anode Dig.2 E        | 20      | Anode Dig.2 B        |
| 7       | Anode Dig.2 D        | 21      | Anode Dig.2 A        |
| 8       | Anode Dig.2 C        | 22      | Anode Dig.2 G        |
| 9       | Anode Dig.2 DP       | 23      | Anode Dig.2 F        |
| 10      | Anode Dig.3 E        | 24      | Anode Dig.1 B        |
| 11      | Anode Dig.3 D        | 25      | Anode Dig.1 A        |
| 12      | Anode Dig.3 G        | 26      | Common Cathode Dig.1 |
| 13      | Anode Dig.3 C        | 27      | Anode Dig.1 F        |
| 14      | Anode Dig.3 DP       | 28      | Anode Dig.1 G        |

**Electrical Connection**

| PIN NO. | LTD5222-XX-PF      | PIN NO. | LTD5222-XX-PF      |
|---------|--------------------|---------|--------------------|
| 1       | Cathode Dig.1 E    | 15      | Cathode Dig.3 B    |
| 2       | Cathode Dig.1 D    | 16      | Cathode Dig.3 A    |
| 3       | Common Anode Dig.1 | 17      | Cathode Dig.3 F    |
| 4       | Cathode Dig.1 C    | 18      | Common Anode Dig.3 |
| 5       | Cathode Dig.1 DP   | 19      | Common Anode Dig.2 |
| 6       | Cathode Dig.2 E    | 20      | Cathode Dig.2 B    |
| 7       | Cathode Dig.2 D    | 21      | Cathode Dig.2 A    |
| 8       | Cathode Dig.2 C    | 22      | Cathode Dig.2 G    |
| 9       | Cathode Dig.2 DP   | 23      | Cathode Dig.2 F    |
| 10      | Cathode Dig.3 E    | 24      | Cathode Dig.1 B    |
| 11      | Cathode Dig.3 D    | 25      | Cathode Dig.1 A    |
| 12      | Cathode Dig.3 G    | 26      | Common Anode Dig.1 |
| 13      | Cathode Dig.3 C    | 27      | Cathode Dig.1 F    |
| 14      | Cathode Dig.3 DP   | 28      | Cathode Dig.1 G    |



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   |
| Solder Temperature 1/16 Inch Below Seating Plane For 3 Seconds At 260 °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. |      |
| LTD5212-XX-PF | GaP      | Green   | Common Cathode          | 565      | 30       | 1.7        | 2.1  | 2.6  | 1.75    | 3.05 | 2:1  |
| LTD5222-XX-PF | GaP      | Green   | Common Anode            | 565      | 30       | 1.7        | 2.1  | 2.6  | 1.75    | 3.05 | 2:1  |

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          | Vf               | volt    | If=20mA        |
| Luminous Intensity Per Chip       | Iv               | mcd     | If=10mA        |
| Peak Wavelength                   | $\lambda p$      | nm      | If=20mA        |
| Spectral Line Half-Width          | $\Delta \lambda$ | nm      | If=20mA        |
| Reverse Current Any Chip          | Ir               | $\mu A$ | Vr=5V          |
| Luminous Intensity Matching Ratio | IV-M             |         |                |



### Typical Electro-Optical Characteristics Curve

G CHIP

Fig.1 Forward current vs. Forward Voltage

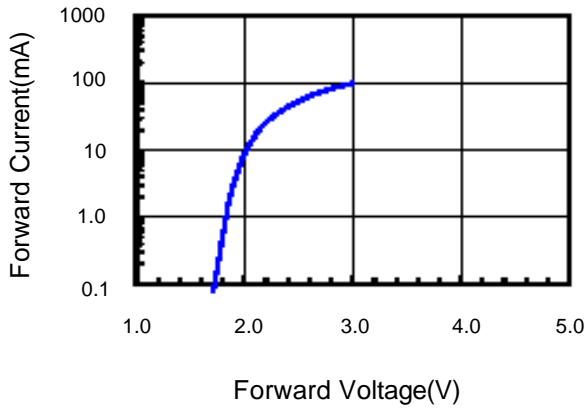


Fig.2 Relative Intensity vs. Forward Current

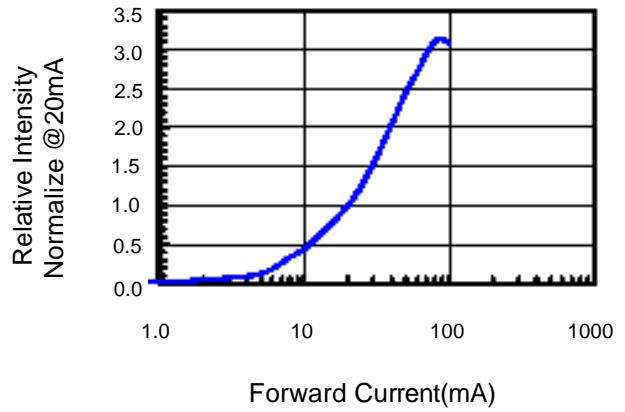


Fig.3 Forward Voltage vs. Temperature

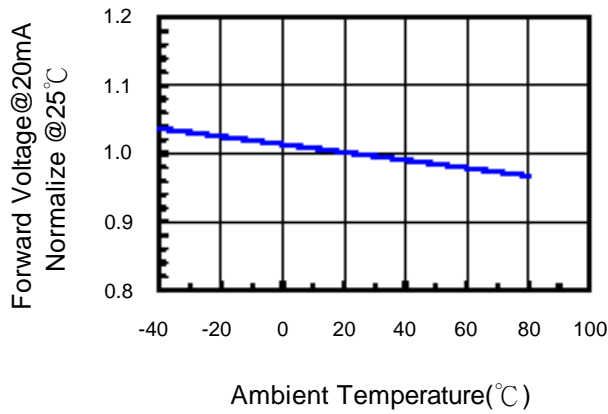


Fig.4 Relative Intensity vs. Temperature

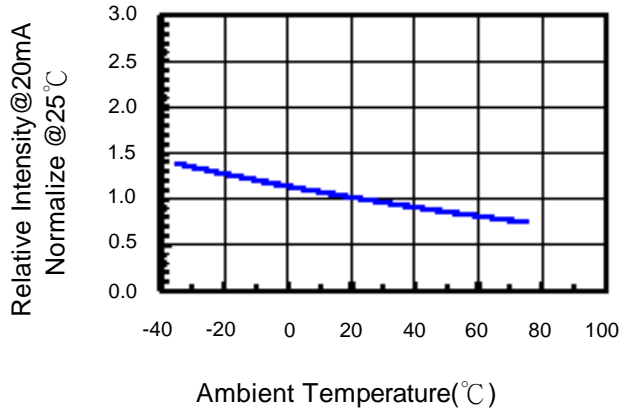


Fig.5 Relative Intensity vs. Wavelength

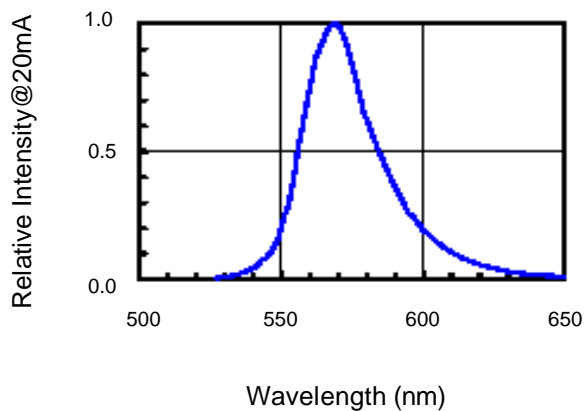


Fig.6 Directive Radiation





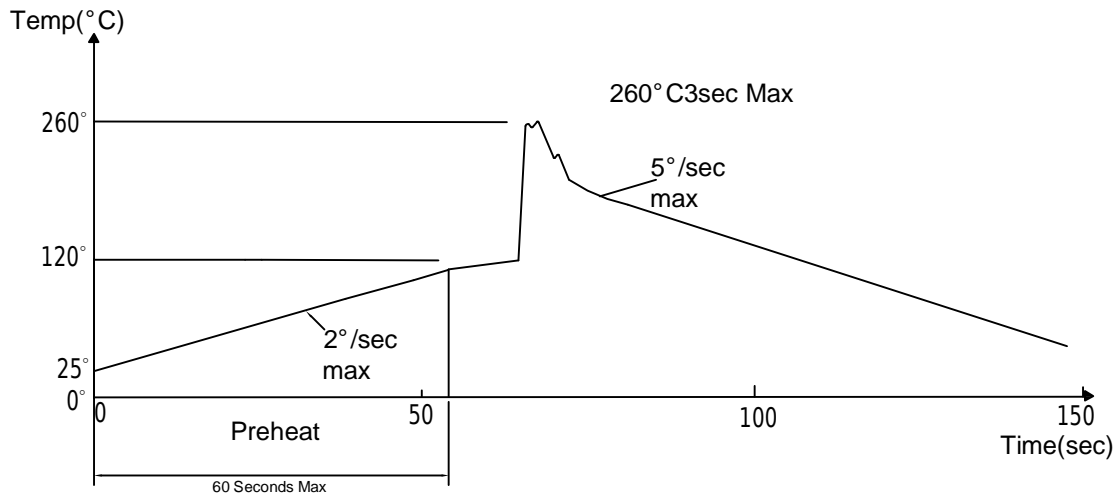
### Soldering Condition(Pb-Free)

#### 1.Iron:

- Soldering Iron:30W Max
- Temperature 350° C Max
- Soldering Time:3 Seconds Max(One Time)
- 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



**Reliability Test:**

| Test Item                           | Test Condition   | Description   | Reference Standard   |
|-------------------------------------|--|---|--|
| Operating Life Test                 | 1.Under Room Temperature<br>2.If=10mA<br>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<br>MIL-STD-883: 1005<br>JIS C 7021: B-1                      |
| High Temperature Storage Test       | 1.Ta=105 °C ±5°C<br>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<br>JIS C 7021: B-10   |
| Low Temperature Storage Test        | 1.Ta=-40 °C ±5°C<br>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<br>2.RH=90 %-95%<br>3.t=240hrs ±2hrs                   | The purpose of this test is the resistance of the device under tropical for hours.  | MIL-STD-202:103B<br>JIS C 7021: B-11   |
| Thermal Shock Test                  | 1.Ta=105 °C ±5°C & -40 °C ±5°C<br>(10min) (10min)<br>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<br>MIL-STD-750: 1051<br>MIL-STD-883: 1011                    |
| Solder Resistance Test              | 1.T.Sol=260 °C ±5°C<br>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<br>MIL-STD-750: 2031<br>JIS C 7021: A-1                      |
| Solderability Test                  | 1.T.Sol=230 °C ±5°C<br>2.Dwell time=5 ±1sec                            | This test intended to see soldering well performed or not.  | MIL-STD-202: 208D<br>MIL-STD-750: 2026<br>MIL-STD-883: 2003<br>JIS C 7021: A-2 |