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FOUR DIGIT LED DISPLAY (0.4 Inch)



Lead-Free Parts

**LFD4D5/65-XX/RP3-PF**

# **DATA SHEET**

DOC. NO : QW0905-LFD4D5/65-XX/RP3-PF

REV. : A

DATE : 15 - Jan. - 2007



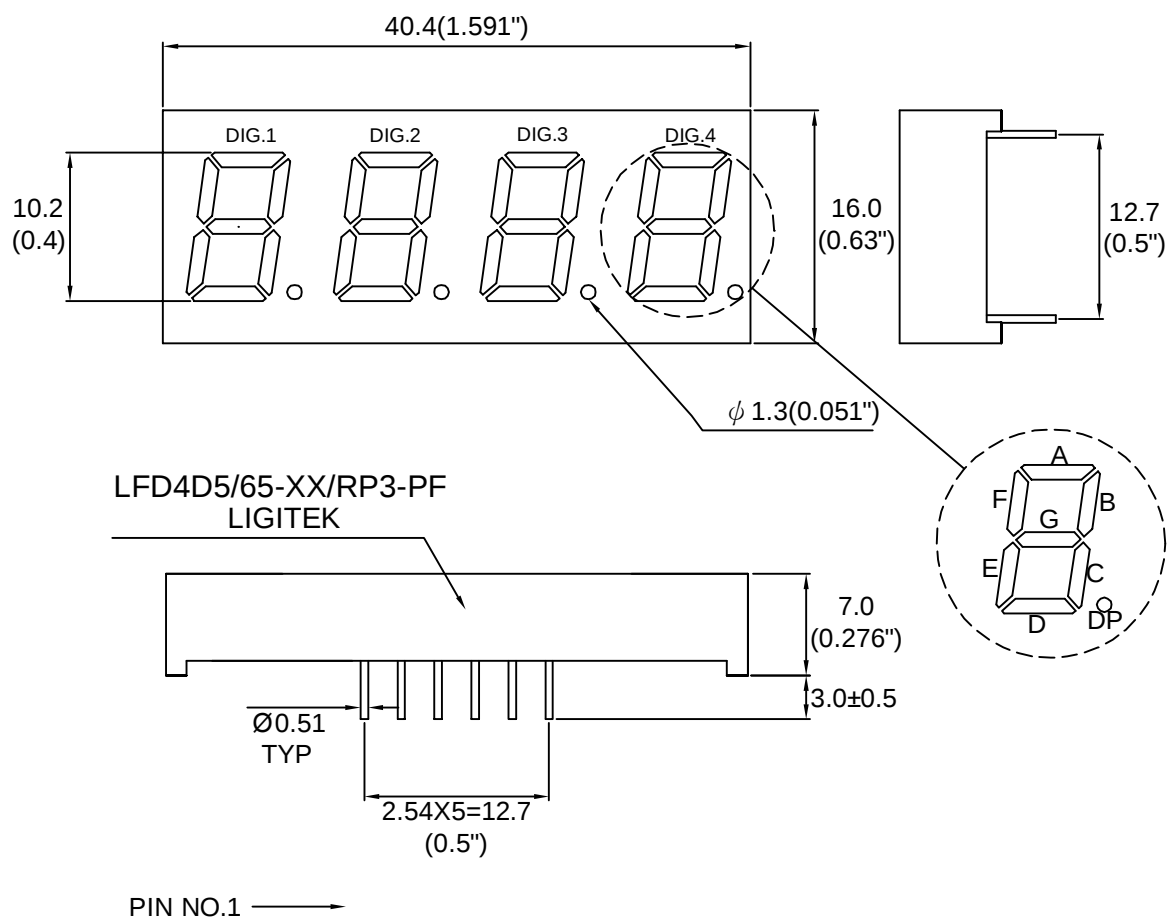
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PART NO. LFD4D5/65-XX/RP3-PF

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## Package Dimensions

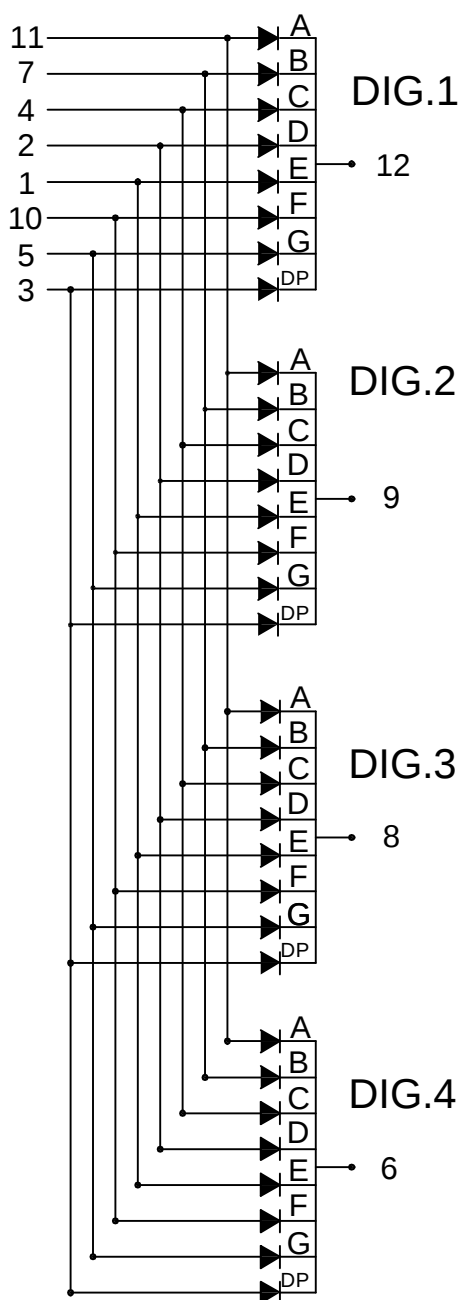


Note : 1.All dimension are in millimeters and (Inch) tolerance is  $\pm 0.25 (0.01")$  unless otherwise noted.  
2.Specifications are subject to change without notice.

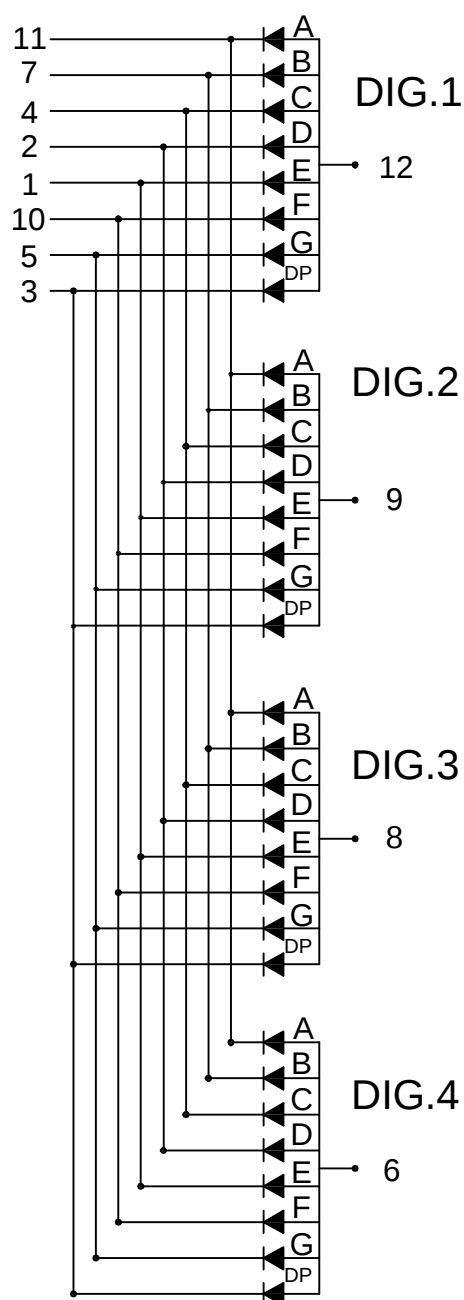


# Internal Circuit Diagram

LFD4D55-XX/RP3-PF



LFD4D65-XX/RP3-PF





## Electrical Connection

| PIN NO. | LFD4D55-XX/RP3-PF    | PIN NO. | LFD4D65-XX/RP3-PF  |
|---------|----------------------|---------|--------------------|
| 1       | Anode E              | 1       | Cathode E          |
| 2       | Anode D              | 2       | Cathode D          |
| 3       | Anode DP             | 3       | Cathode DP         |
| 4       | Anode C              | 4       | Cathode C          |
| 5       | Anode G              | 5       | Cathode G          |
| 6       | Common Cathode DIG.4 | 6       | Common Anode DIG.4 |
| 7       | Anode B              | 7       | Cathode B          |
| 8       | Common Cathode DIG.3 | 8       | Common Anode DIG.3 |
| 9       | Common Cathode DIG.2 | 9       | Common Anode DIG.2 |
| 10      | Anode F              | 10      | Cathode F          |
| 11      | Anode A              | 11      | Cathode A          |
| 12      | Common Cathode DIG.1 | 12      | Common Anode DIG.1 |



## Absolute Maximum Ratings at Ta=25 °C

| Parameter                                                                | Symbol | Ratings   | UNIT    |
|--------------------------------------------------------------------------|--------|-----------|---------|
|                                                                          |        | SR        |         |
| Forward Current Per Chip                                                 | IF     | 30        | mA      |
| Peak Forward Current Per Chip (Duty 1/10,0.1ms Pulse Width)              | IFP    | 100       | mA      |
| Power Dissipation Per Chip                                               | PD     | 100       | mW      |
| Reverse Current Per Any Chip                                             | Ir     | 10        | $\mu A$ |
| 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 | $\lambda$ P (nm) | $\triangle \lambda$ (nm) | Electrical |      |      |         |      | IV-M |
|-------------------|----------|---------|-------------------------|------------------|--------------------------|------------|------|------|---------|------|------|
|                   | Material | Emitted |                         |                  |                          | Vf(v)      |      |      | Iv(mcd) |      |      |
|                   |          |         |                         |                  |                          | Min.       | Typ. | Max. | Min.    | Typ. |      |
| LFD4D55-XX/RP3-PF | GaAlAs   | Red     | Common Cathode          | 660              | 20                       | 1.5        | 1.8  | 2.4  | 1.75    | 3.05 | 2:1  |
| LFD4D65-XX/RP3-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 <sub>f</sub>   | volt    | I <sub>f</sub> =20mA |
| Luminous Intensity Per Chip       | I <sub>v</sub>   | mcd     | I <sub>f</sub> =10mA |
| Peak Wavelength                   | $\lambda P$      | nm      | I <sub>f</sub> =20mA |
| Spectral Line Half-Width          | $\Delta \lambda$ | nm      | I <sub>f</sub> =20mA |
| Reverse Current Any Chip          | I <sub>r</sub>   | $\mu A$ | V <sub>r</sub> =5V   |
| Luminous Intensity Matching Ratio | IV-M             |         |                      |



## Typical Electro-Optical Characteristics Curve

### SR CHIP

Fig.1 Forward current vs. Forward Voltage

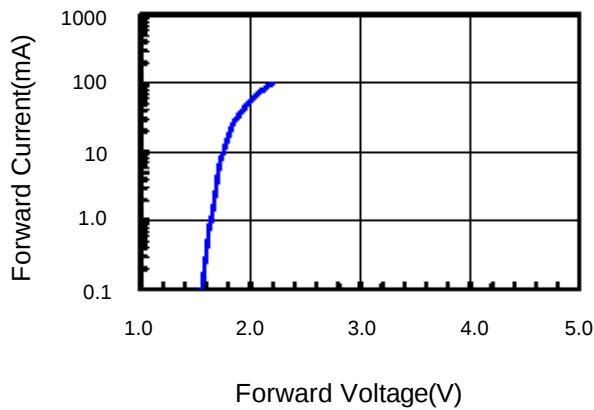


Fig.2 Relative Intensity vs. Forward Current

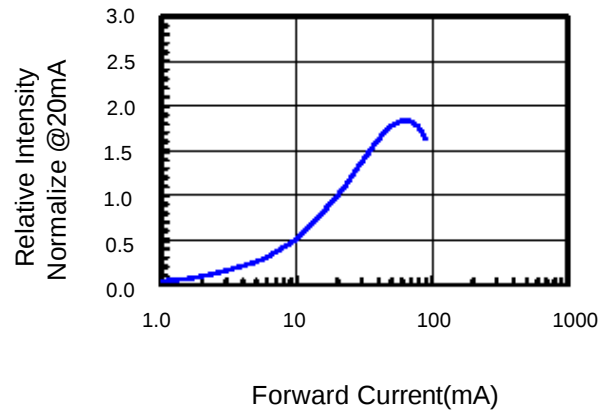


Fig.3 Forward Voltage vs. Temperature

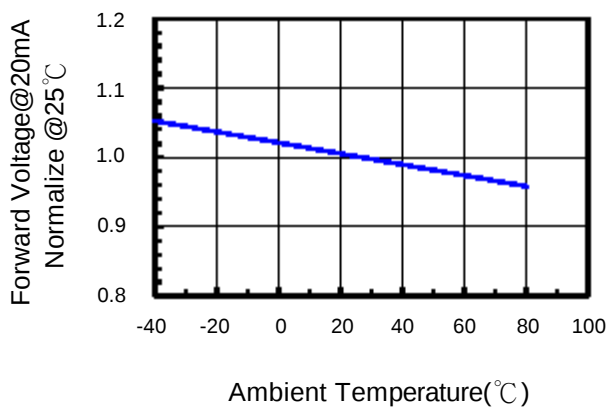


Fig.4 Relative Intensity vs. Temperature

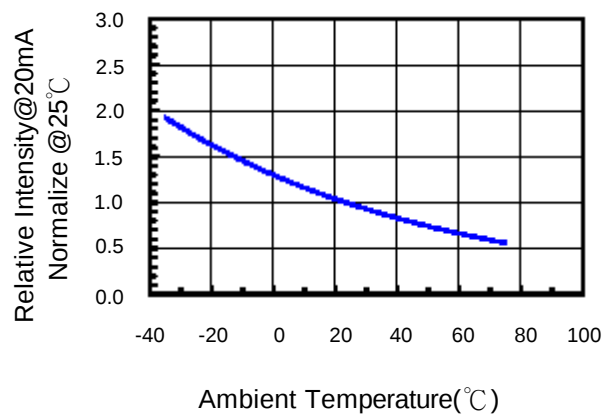
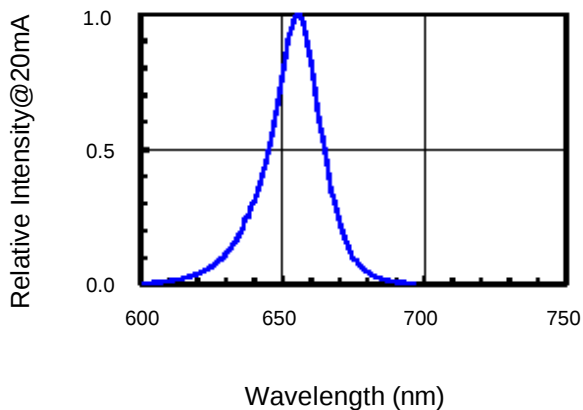


Fig.5 Relative Intensity vs. Wavelength



**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

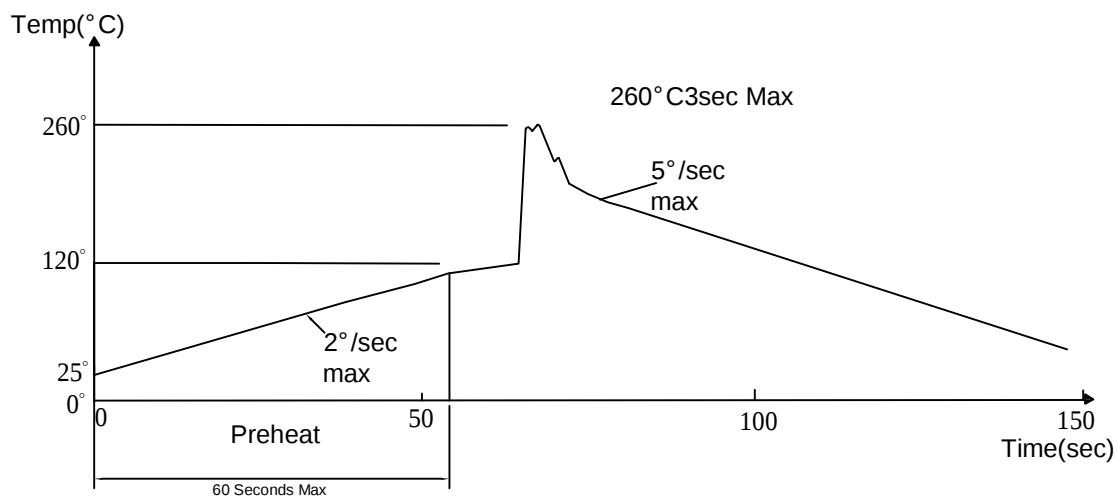
2°C/sec(max)

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<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 (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 |