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FOUR DIGIT LED DISPLAY (0.28 Inch)



Lead-Free Parts

**LFD211/24S-XX-PF**

# **DATA SHEET**

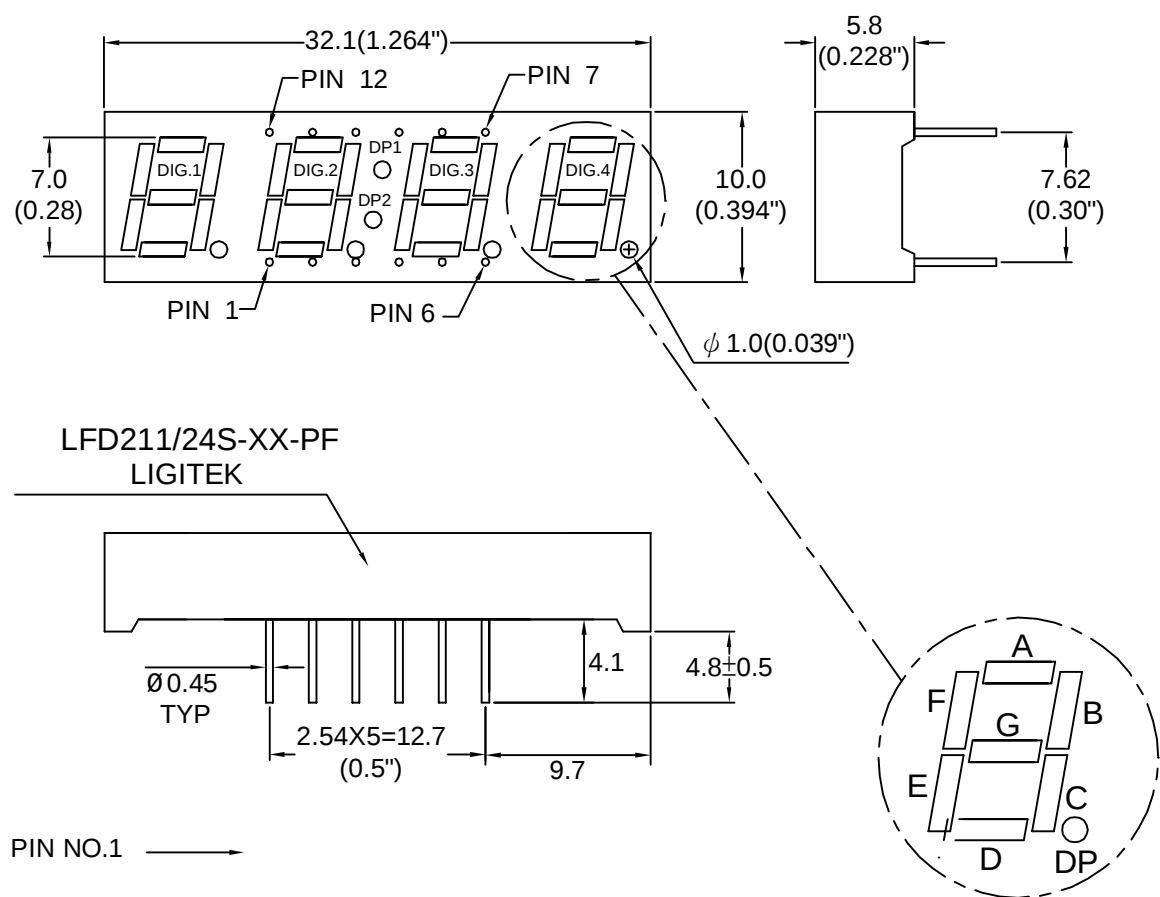
DOC. NO : QW0905-LFD211/24S-XX-PF

REV. : B

DATE : 27 - Aug- 2008



## Package Dimensions

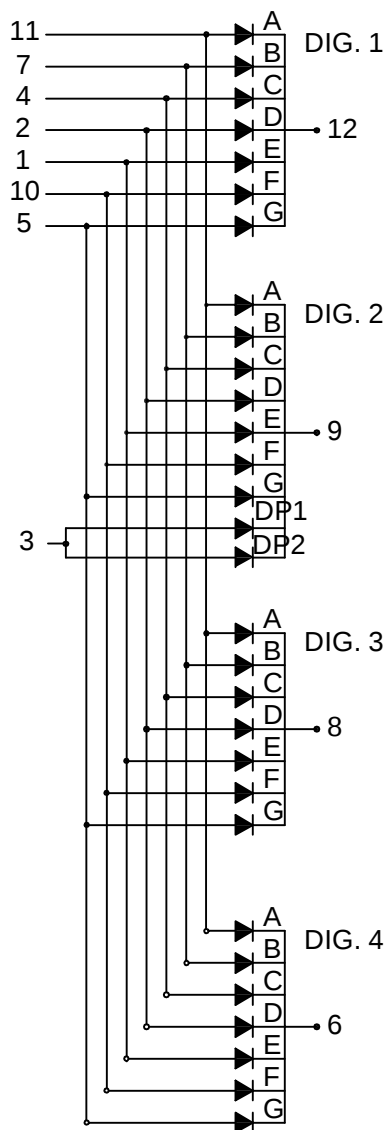


Note : 1.All dimension are in millimeters and (Inch) tolerance is  $\pm 0.25(0.01")$  unless otherwise noted.  
2.Specifications are subject to change without notice.

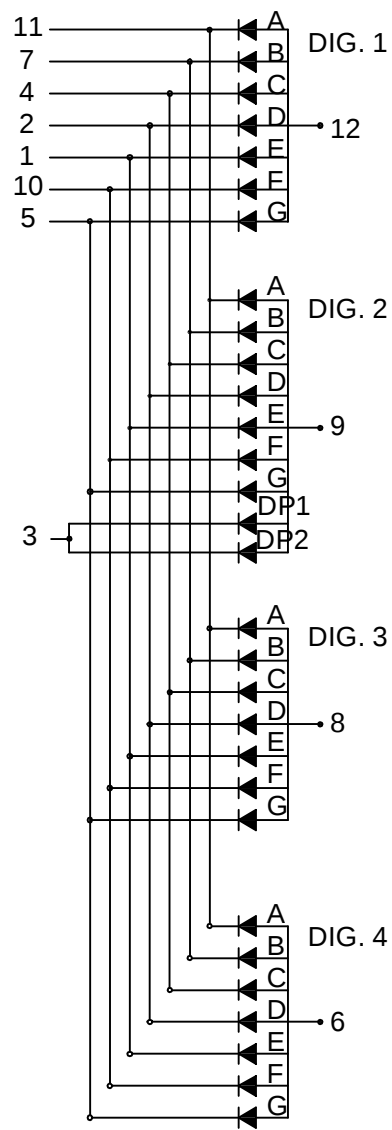


## Internal Circuit Diagram

LFD2114S-XX-PF



LFD2124S-XX-PF





## Electrical Connection

| PIN NO. | LFD2114S-XX-PF               | PIN NO. | LFD2124S-XX-PF             |
|---------|------------------------------|---------|----------------------------|
| 1       | Anode E                      | 1       | Cathode E                  |
| 2       | Anode D                      | 2       | Cathode D                  |
| 3       | Anode DP1,DP2                | 3       | Cathode DP1,DP2            |
| 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,DP1,DP2 | 9       | Common Anode Dig.2,DP1,DP2 |
| 10      | Anode F                      | 10      | Cathode F                  |
| 11      | Anode A                      | 11      | Cathode A                  |
| 12      | Common Cathode Dig.1         | 12      | Common Anode Dig.1         |



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PART NO. LFD211/24S-XX-PF

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## Absolute Maximum Ratings at Ta=25

| Parameter                                                   | Symbol | Ratings   | UNIT |
|-------------------------------------------------------------|--------|-----------|------|
|                                                             |        | SE        |      |
| Forward Current Per Chip                                    | IF     | 20        | mA   |
| Peak Forward Current Per Chip (Duty 1/10,0.1ms Pulse Width) | IFP    | 80        | mA   |
| Power Dissipation Per Chip                                  | PD     | 80        | mW   |
| Reverse Current Per Any Chip                                | Ir     | 10        | μA   |
| Operating Temperature                                       | Topr   | -25 ~ +85 |      |
| Storage Temperature                                         | Tstg   | -25 ~ +85 |      |

## Part Selection And Application Information(Ratings at 25 )

| PART NO        | CHIP      |         | common cathode or anode | $\lambda$ P (nm) | $\lambda$ (nm) | Electrical |      |      |         |      | IV-M |
|----------------|-----------|---------|-------------------------|------------------|----------------|------------|------|------|---------|------|------|
|                | Material  | Emitted |                         |                  |                | Vf(v)      |      |      | Iv(mcd) |      |      |
|                |           |         |                         |                  |                | Min.       | Typ. | Max. | Min.    | Typ. |      |
| LFD2114S-XX-PF | GaAsP/GaP | Orange  | Common Cathode          | 610              | 45             | 1.7        | 2.1  | 2.6  | 0.5     | 1.0  | 2:1  |
| LFD2124S-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 <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

### SE CHIP

Fig.1 Forward current vs. Forward Voltage

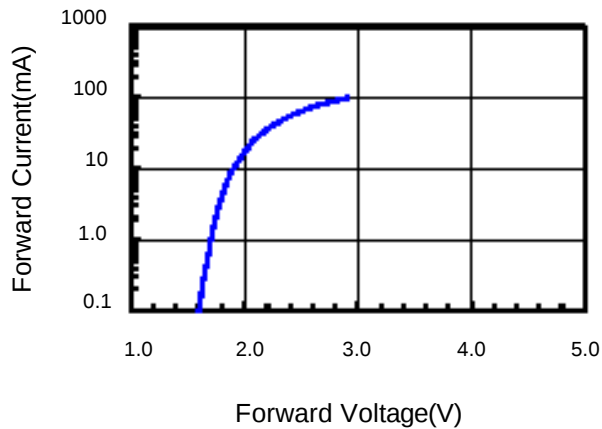


Fig.2 Relative Intensity vs. Forward Current

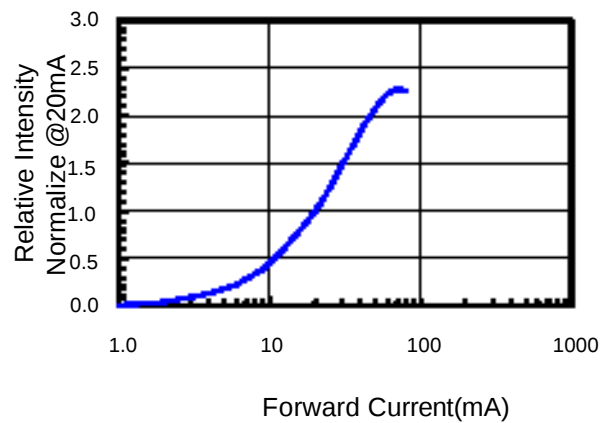


Fig.3 Forward Voltage vs. Temperature

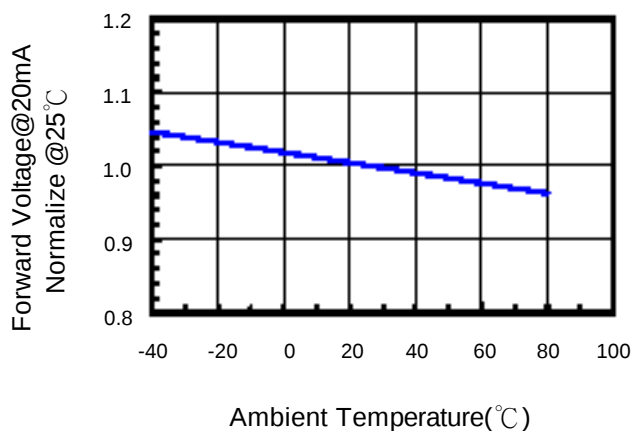


Fig.4 Relative Intensity vs. Temperature

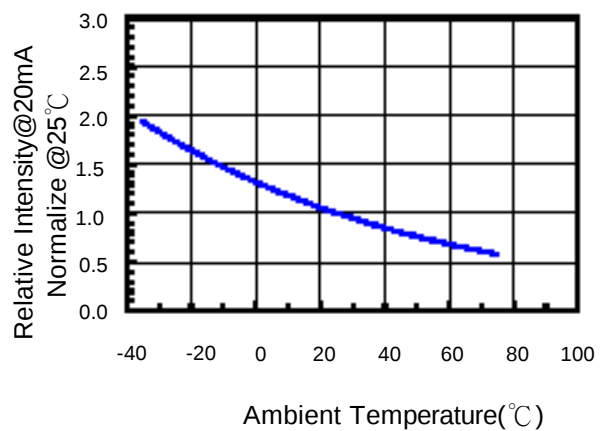
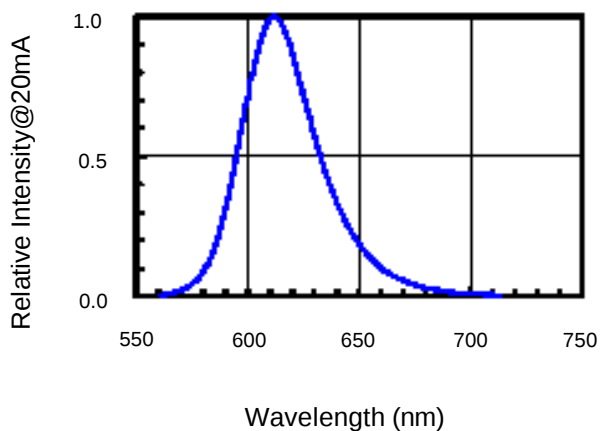


Fig.5 Relative Intensity vs. Wavelength





## 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)

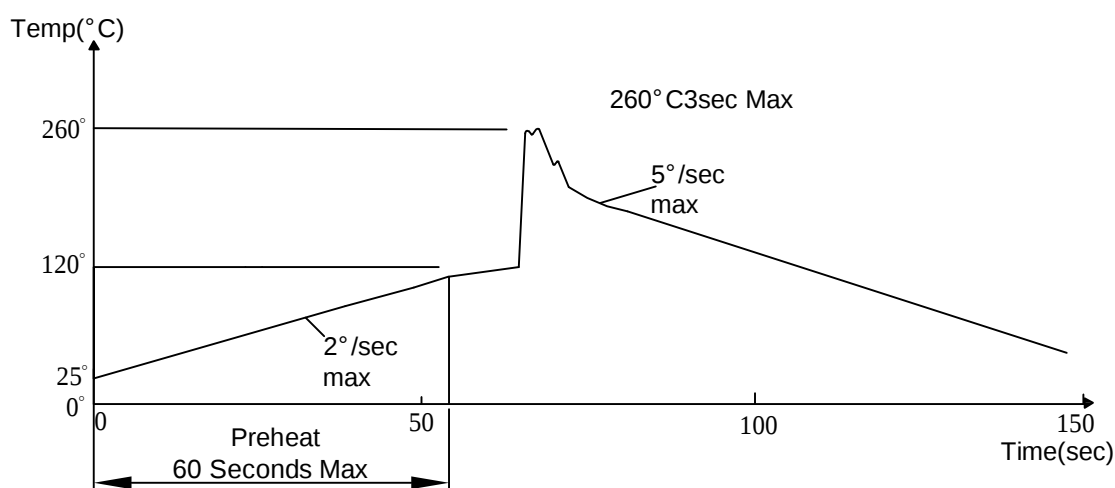
Ramp-Down:-5° C/sec(max)

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 detemining the resistance of a part in electrical and themal 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 |