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SINGLE DIGIT LED DISPLAY (0.40 Inch)


Lead-Free Parts

# LSD401/24-XX/RP13-PF

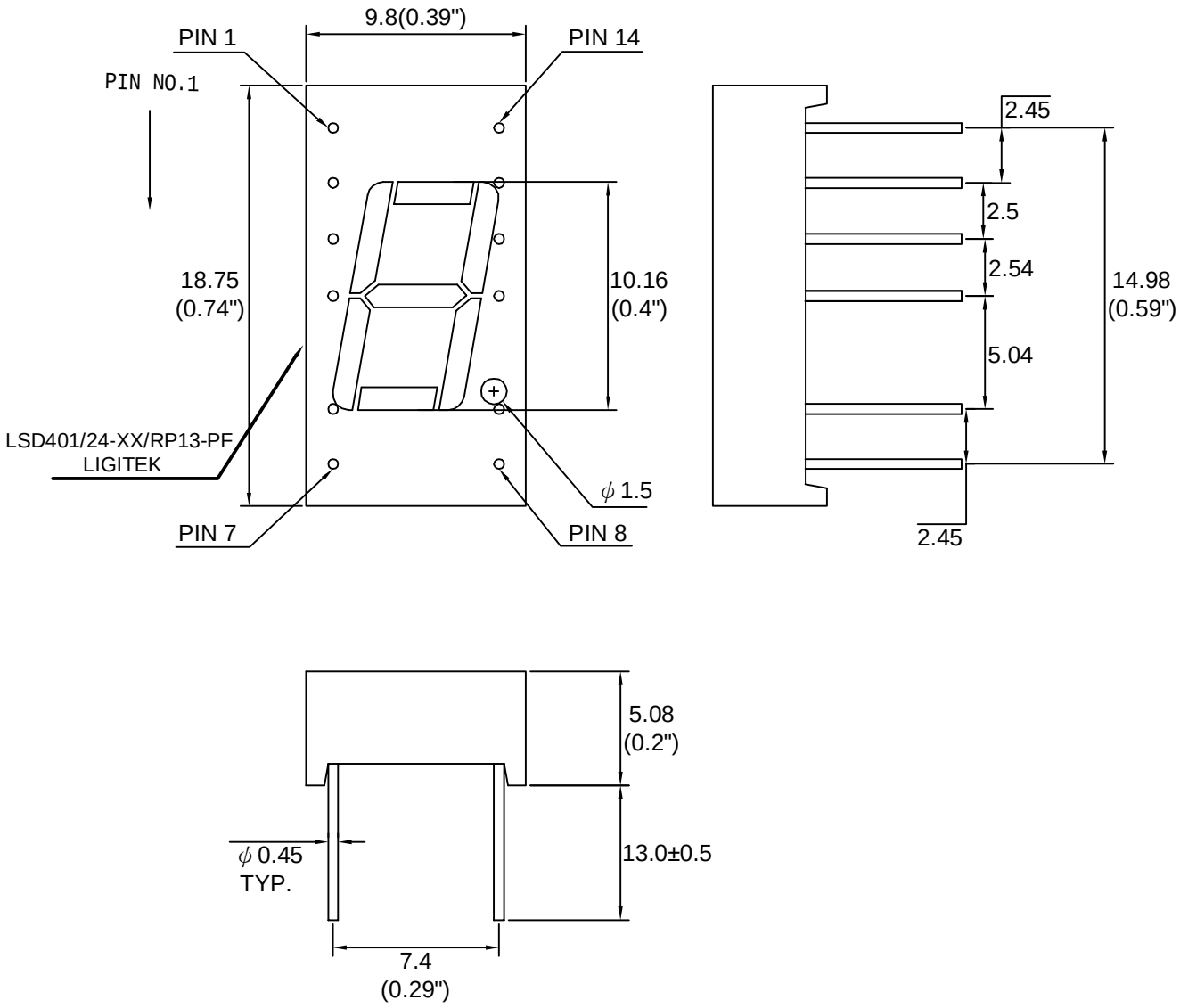
# DATA SHEET

DOC. NO : QW0905- LSD401/24-XX/RP13-PF-08

REV. : A

DATE : 11 - Feb. - 2008

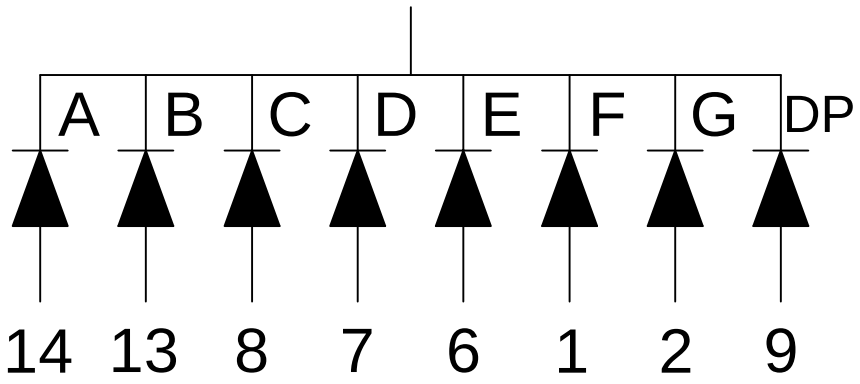
# Package Dimensions



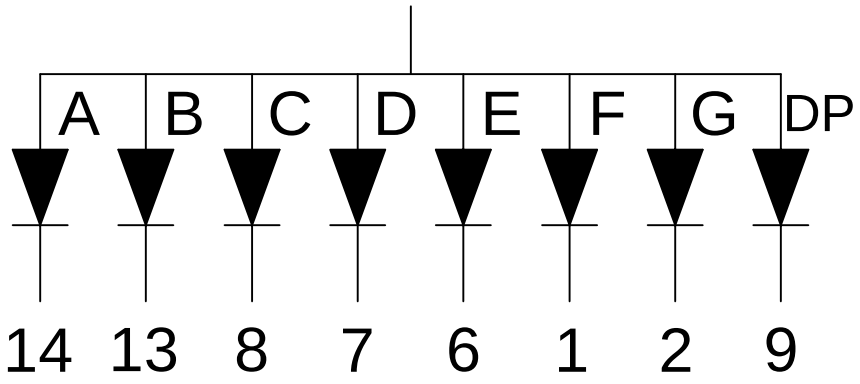

Note : 1.All dimension are in millimeters and (Inch) tolerance is ±0.25(0.01") unless otherwise noted.
2.Specifications are subject to change without notice.

Internal Circuit Diagram

LSD4014-XX/RP13-PF




LSD4024-XX/RP13-PF




NP: 3, 5, 10, 11

# Electrical Connection

| PIN NO. | LSD4014-XX/RP13-PF | PIN NO. | LSD4024-XX/RP13-PF |
|---|---|---|---|
| 1 | Anode F | 1 | Cathode F |
| 2 | Anode G | 2 | Cathode G |
| 3 | No Pin | 3 | No Pin |
| 4 | Common Cathode | 4 | Common Anode |
| 5 | No Pin | 5 | No Pin |
| 6 | Anode E | 6 | Cathode E |
| 7 | Anode D | 7 | Cathode D |
| 8 | Anode C | 8 | Cathode C |
| 9 | Anode DP | 9 | Cathode DP |
| 10 | No Pin | 10 | No Pin |
| 11 | No Pin | 11 | No Pin |
| 12 | Common Cathode | 12 | Common Anode |
| 13 | Anode B | 13 | Cathode B |
| 14 | Anode A | 14 | Cathode A |

## Absolute Maximum Ratings at Ta=25 ℃

| Parameter | Symbol | Ratings | UNIT |
|---|---|---|---|
| | | Orange | |
| Forward Current Per Chip | $I_F$ | 15 | mA |
| Peak Forward Current Per Chip (Duty 1/10,0.1ms Pulse Width) | $I_{FP}$ | 50 | mA |
| Power Dissipation Per Chip | PD | 50 | mW |
| Reverse Current Per Any Chip | Ir | 10 | μA |
| Operating Temperature | $T_{opr}$ | -25 ~ +85 | ℃ |
| Storage Temperature | Tstg | -25 ~ +85 | ℃ |

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

| PART NO | CHIP | | common cathode or anode | λP (nm) | △λ (nm) | Electrical | | | | | IV-M |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Vf(v) | | | Iv(mcd) | | |
| | Material | Emitted | | | | Min. | Typ. | Max. | Min. | Typ. | |
| LSD4014-XX/RP13-PF | GaAsP/GaP | Orange | Common Cathode | 635 | 45 | 1.7 | 2.1 | 2.6 | 1.0 | 1.75 | 2:1 |
| LSD4024-XX/RP13-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 | Vf | volt | If=10mA |
| Luminous Intensity Per Chip | Iv | mcd | If=10mA |
| Peak Wavelength | $\lambda$ P | nm | If=20mA |
| Spectral Line Half-Width | $\triangle \lambda$ | nm | If=20mA |
| Reverse Current Any Chip | Ir | $\mu$ A | Vr=5V |
| Luminous Intensity Matching Ratio | IV-M | | |

# Typical Electro-Optical Characteristics Curve

E CHIP

Fig.1 Forward current vs. Forward Voltage

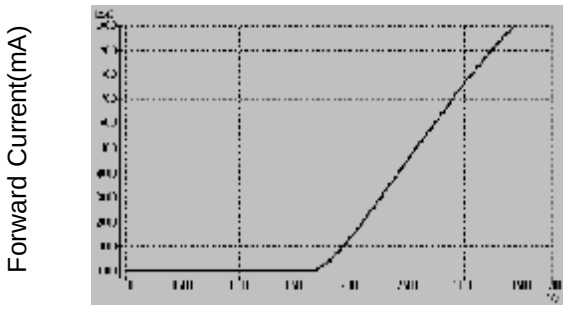



Fig.2 Relative Intensity vs. Forward Current

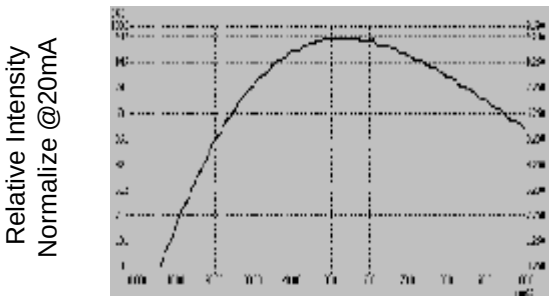



Fig.3 Forward Voltage vs. Temperature

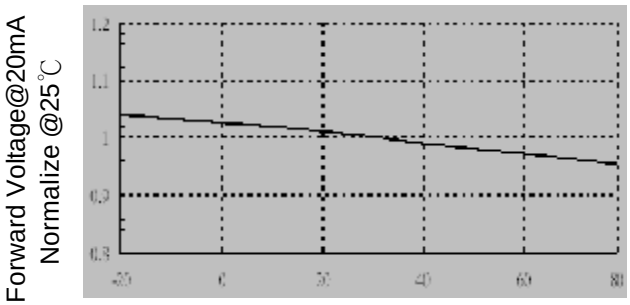



Fig.4 Relative Intensity vs. Temperature

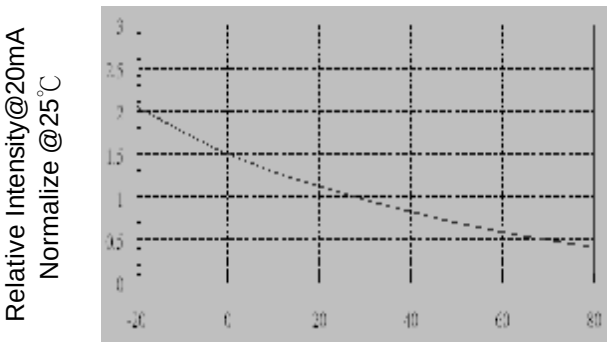
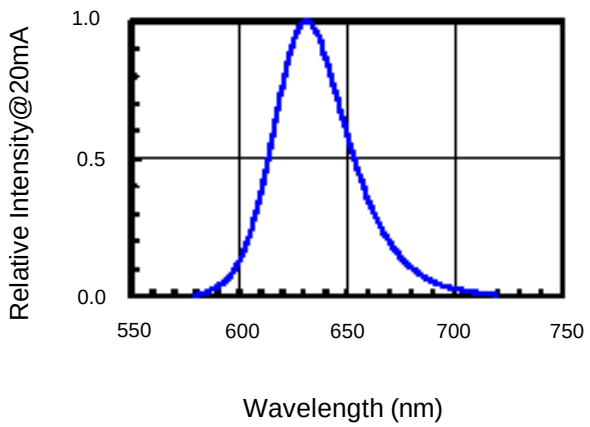



Fig.5 Relative Intensity vs. Wavelength



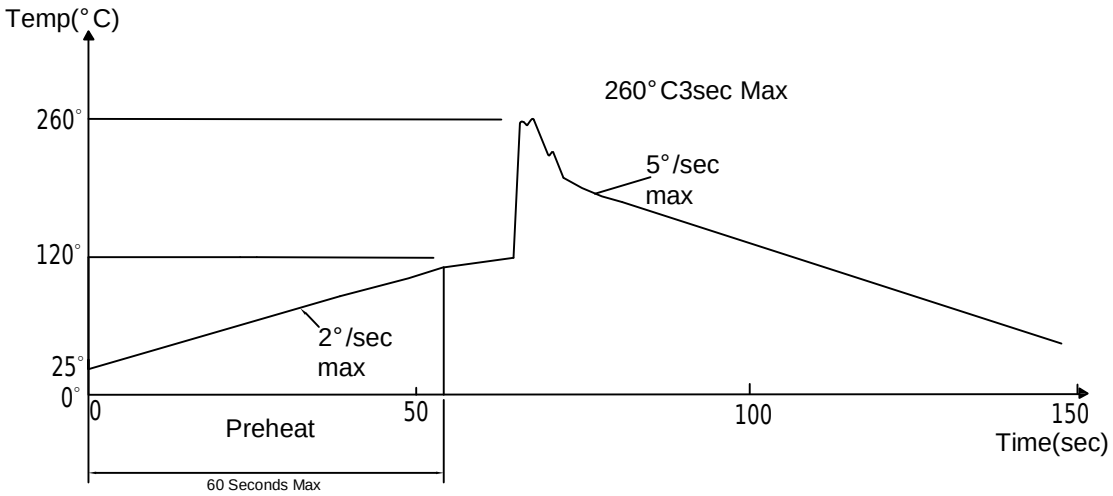
## Soldering Condition(Pb-Free)

1.Iron:

Soldering Iron:30W Max
Temperature 350°C Max
Soldering Time:3 Seconds Max(One Time)
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℃±5℃<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℃±5℃<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℃±5℃<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℃±5℃&-40℃±5℃<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℃±5℃<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℃±5℃<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 |