

# LITEON

## 10.16 $\phi$ 5 $\times$ 7 Single Color & Multicolor Dot Matrix LED Displays

LTP-4057A/4157A Series  
4257AA/4357AA

### Features

- 4.0 inch (101.6mm) matrix height.
- Low power requirement.
- Single plane, wide viewing angle.
- 5  $\times$  7 array with X-Y select.
- Compatible with usascII and ebcdic codes.
- Stackable vertically and horizontally.
- Choices of Two matrix orientation.  
Cathode row or cathode column.
- Easy mounting on P.C. board.
- Categorized for luminous intensity.
- Single color displays have the choices of four bright colors-green/yellow/red orange/AlGaAs red.
- Multicolor displays are applicable to three bright colors : green, red orange and Yellow (green and red orange mixed)

### Description

The LTP-4X57A series are 2.0 inch (50.80mm)matrix height 5  $\times$  7 dot matrix displays.

The LTP-4257AA/4357AA are multicolor applicable displays.

The multicolor displays have gray face and white dots.

The LTP-4057A/4157A series are single color displays.

The green, red orange displays have gray face and white dot color.

The AlGaAs red devices have red face and white dots.

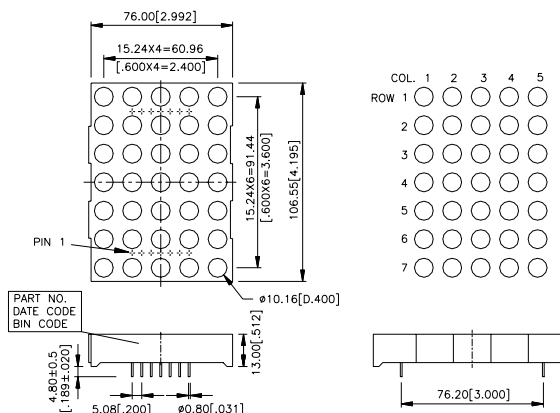
The green series devices utilize LED chipse which are made from GaP on a transparent GaP substrate.

The red orange series devices utilize LED chips which are made from GaAsP on a transparent GaP substrate.

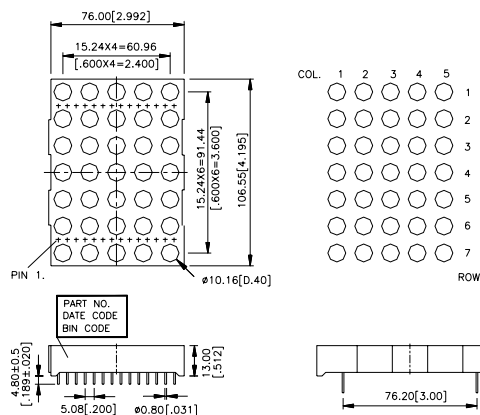
The AlGaAs Red series devices utilize LED chips which are made from AlGaAs on a non-transparent GaAs substrate.

### Package Dimensions

A. LTP-4057A/4157A



B. LTP-4257AA/4357AA



Notes : All dimensions are in millimeters(inches).  
Tolerance :  $\pm 0.25\text{mm}$  (0.01") unless otherwise noted.

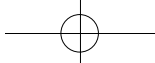
### Devices

| Part No. LTP- |        |            |            |             | Description                 | Package Dimension | Internal Circuit Diagram |
|---------------|--------|------------|------------|-------------|-----------------------------|-------------------|--------------------------|
| Green         | Yellow | Red Orange | AlGaAs Red | Multi Color |                             |                   |                          |
| 4057AG        | 4057AY | 4057AE     | 4057AC     | —           | Anode Column, Cathode Row   | A                 | A                        |
| 4157AG        | 4157AY | 4157AE     | 4157AC     | —           | Cathode Column, Anode Row   | A                 | B                        |
| —             | —      | —          | —          | 4257AA      | Anode Column, Cathode Row   | B                 | C                        |
| —             | —      | —          | —          | 4357AA      | Cathode Column, Cathode Row | B                 | D                        |

## Pin Connection

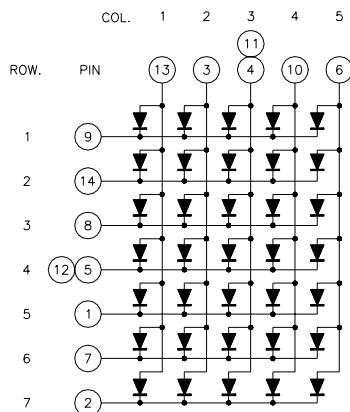
| Pin No. | Connection     |                  |
|---------|----------------|------------------|
|         | A. LTP-4057A   | B. LTP-4157A     |
| 1       | Cathode Row 5  | Anode Row 5      |
| 2       | Cathode Row 7  | Anode Row 7      |
| 3       | Anode Column 2 | Cathode Column 2 |
| 4       | Anode Column 3 | Cathode Column 3 |
| 5       | Cathode Row 4  | Anode Row 4      |
| 6       | Anode Column 5 | Cathode Column 5 |
| 7       | Cathode Row 6  | Anode Row 6      |
| 8       | Cathode Row 3  | Anode Row 3      |
| 9       | Cathode Row 1  | Anode Row 1      |
| 10      | Anode Column 4 | Cathode Column 4 |
| 11      | Anode Column 3 | Cathode Column 3 |
| 12      | Cathode Row 4  | Anode Row 4      |
| 13      | Anode Column 1 | Cathode Column 1 |
| 14      | Cathode Row 2  | Anode Row 2      |

| Pin No. | Connection                |                             |
|---------|---------------------------|-----------------------------|
|         | C. LTP-4257AA             | D. LTP-4357AA               |
| 1       | Anode Column 1 Green      | Cathode Column 1 Green      |
| 2       | Anode Column 1 Red Orange | Cathode Column 1 Red Orange |
| 3       | Cathode Row 7 Green       | Anode Row 7 Green           |
| 4       | Cathode Row 7 Red Orange  | Anode Row 7 Red Orange      |
| 5       | Anode Column 2 Green      | Cathode Column 2 Green      |
| 6       | Anode Column 2 Red Orange | Cathode Column 2 Red Orange |
| 7       | Anode Column 3 Green      | Cathode Column 3 Green      |
| 8       | Anode Column 3 Red Orange | Cathode Column 3 Red Orange |
| 9       | Cathode Row 5 Green       | Anode Row 5 Green           |
| 10      | Cathode Row 5 Red Orange  | Anode Row 5 Red Orange      |
| 11      | Cathode Row 4 Green       | Anode Row 4 Green           |
| 12      | Cathode Row 4 Red Orange  | Anode Row 4 Red Orange      |
| 13      | Cathode Row 6 Green       | Anode Row 6 Green           |
| 14      | Cathode Row 6 Red Orange  | Anode Row 6 Red Orange      |
| 15      | Anode Column 5 Green      | Cathode Column 5 Green      |
| 16      | Anode Column 5 Red Orange | Cathode Column 5 Red Orange |
| 17      | Cathode Row 1 Green       | Anode Row 1 Green           |
| 18      | Cathode Row 1 Red Orange  | Anode Row 1 Red Orange      |
| 19      | Anode Column 4 Green      | Cathode Column 4 Green      |
| 20      | Anode Column 4 Red Orange | Cathode Column 4 Red Orange |
| 21      | Anode Column 3 Green      | Cathode Column 3 Green      |
| 22      | Anode Column 3 Red Orange | Cathode Column 3 Red Orange |
| 23      | Cathode Row 3 Green       | Anode Row 3 Green           |
| 24      | Cathode Row 3 Red Orange  | Anode Row 3 Red Orange      |
| 25      | Cathode Row 4 Green       | Anode Row 4 Green           |
| 26      | Cathode Row 4 Red Orange  | Anode Row 4 Red Orange      |
| 27      | Cathode Row 2 Green       | Anode Row 2 Green           |
| 28      | Cathode Row 2 Red Orange  | Anode Row 2 Red Orange      |

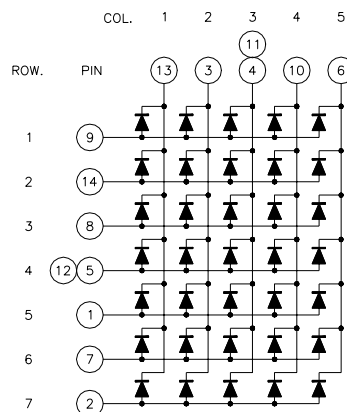


## Internal Circuit Diagrams

A. LTP-4057A

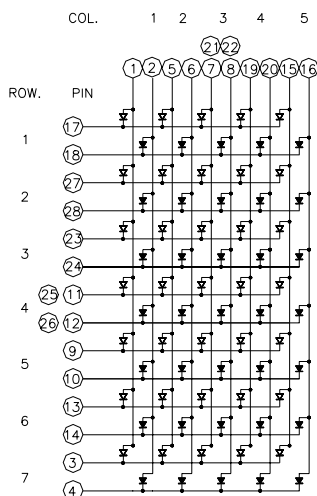


B. LTP-4157A

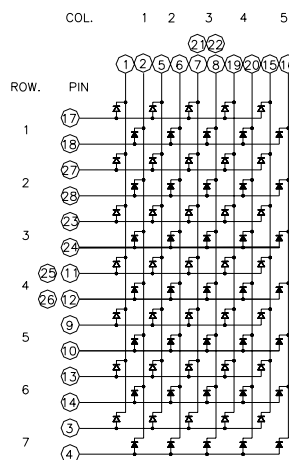


Note : The Sign "▶" Stands For 2 Chips in Series.

C. LTP-4257AA



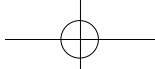
D. LTP-4357AA



Notes : The Sign "▶" stands for Green color 2 chips sceries.  
The Sign "▶" stands for Red Orange color 2 chips sceries.

## Absolute Maximum Ratings at Ta=25°C

| Parameter                                                               | Green          | Yellow    | Red Orange | AlGaAs Red | Unit        |
|-------------------------------------------------------------------------|----------------|-----------|------------|------------|-------------|
| Average Power Dissipation Per Dot                                       | 64             | 60        | 64         | 64         | mW          |
| Peak Forward Current Per Dot<br>(1/10 Duty Cycle, 0.1ms Pulse Width)    | 90             | 80        | 90         | 110        | mA          |
| Average Forward Current Per Dot<br>Derating Linear from 25°C Per Dot    | 11<br>0.15     | 8<br>0.11 | 11<br>0.15 | 14<br>0.19 | mA<br>mA/°C |
| Reverse Voltage Per Dot                                                 | 10             | 10        | 10         | 10         | V           |
| Operating Temperature Range                                             | -35°C to +85°C |           |            |            |             |
| Storage Temperature Range                                               | -35°C to +85°C |           |            |            |             |
| Solder Temperature 1/16 Inch Below Seating Plane for 3 Seconds at 260°C |                |           |            |            |             |

**Electrical/Optical Characteristics at Ta=25°C**

LTP-4057AG/4157AG &amp; LTP-4257AA/4357AA (Green)

| Parameter                         | Symbol           | Min. | Typ. | Max. | Unit | Test Condition                    |
|-----------------------------------|------------------|------|------|------|------|-----------------------------------|
| Average Luminous Intensity        | I <sub>v</sub>   | 3000 | 9600 |      | μ cd | I <sub>P</sub> =80mA<br>1/16 Duty |
| Peak Emission Wavelength          | λ <sub>P</sub>   |      | 565  |      | nm   | I <sub>F</sub> =20mA              |
| Spectral Line Half-Width          | Δλ               |      | 30   |      | nm   | I <sub>F</sub> =20mA              |
| Dominant Wavelength               | λ <sub>d</sub>   |      | 569  |      | nm   | I <sub>F</sub> =20mA              |
| Forward Voltage, any Dot          | V <sub>F</sub>   |      | 4.2  | 5.2  | V    | I <sub>F</sub> =20mA              |
|                                   |                  |      | 6    | 7.4  | V    | I <sub>F</sub> =80mA              |
| Reverse Current, any Dot          | I <sub>R</sub>   |      |      | 100  | μ A  | V <sub>R</sub> =10V               |
| Luminous Intensity Matching Ratio | I <sub>v-m</sub> |      |      | 2:1  |      | I <sub>P</sub> =80mA<br>1/16 Duty |

LTP-4057AY/4157AY

| Parameter                         | Symbol           | Min. | Typ. | Max. | Unit | Test Condition                    |
|-----------------------------------|------------------|------|------|------|------|-----------------------------------|
| Average Luminous Intensity        | I <sub>v</sub>   | 3000 | 9600 |      | μ cd | I <sub>P</sub> =80mA<br>1/16 Duty |
| Peak Emission Wavelength          | λ <sub>P</sub>   |      | 585  |      | nm   | I <sub>F</sub> =20mA              |
| Spectral Line Half-Width          | Δλ               |      | 35   |      | nm   | I <sub>F</sub> =20mA              |
| Dominant Wavelength               | λ <sub>d</sub>   |      | 588  |      | nm   | I <sub>F</sub> =20mA              |
| Forward Voltage, any Dot          | V <sub>F</sub>   |      | 4.2  | 5.2  | V    | I <sub>F</sub> =20mA              |
|                                   |                  |      | 6.0  | 7.4  | V    | I <sub>F</sub> =80mA              |
| Reverse Current, any Dot          | I <sub>R</sub>   |      |      | 100  | μ A  | V <sub>R</sub> =10V               |
| Luminous Intensity Matching Ratio | I <sub>v-m</sub> |      |      | 2:1  |      | I <sub>P</sub> =80mA<br>1/16 Duty |

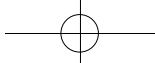
LTP-4057AE/4157AE &amp; LTP-4257AA/4357AA (Red Orange)

| Parameter                         | Symbol           | Min. | Typ. | Max. | Unit | Test Condition                    |
|-----------------------------------|------------------|------|------|------|------|-----------------------------------|
| Average Luminous Intensity        | I <sub>v</sub>   | 3000 | 9600 |      | μ cd | I <sub>P</sub> =80mA<br>1/16 Duty |
| Peak Emission Wavelength          | λ <sub>P</sub>   |      | 630  |      | nm   | I <sub>F</sub> =20mA              |
| Spectral Line Half-Width          | Δλ               |      | 40   |      | nm   | I <sub>F</sub> =20mA              |
| Dominant Wavelength               | λ <sub>d</sub>   |      | 621  |      | nm   | I <sub>F</sub> =20mA              |
| Forward Voltage, any Dot          | V <sub>F</sub>   |      | 4    | 5.2  | V    | I <sub>F</sub> =20mA              |
|                                   |                  |      | 5.2  | 6.8  | V    | I <sub>F</sub> =80mA              |
| Reverse Current, any Dot          | I <sub>R</sub>   |      |      | 100  | μ A  | V <sub>R</sub> =10V               |
| Luminous Intensity Matching Ratio | I <sub>v-m</sub> |      |      | 2:1  |      | I <sub>P</sub> =80mA<br>1/16 Duty |

LTP-4057AC/4157AC

| Parameter                         | Symbol           | Min.  | Typ.  | Max. | Unit | Test Condition                    |
|-----------------------------------|------------------|-------|-------|------|------|-----------------------------------|
| Average Luminous Intensity        | I <sub>v</sub>   | 11600 | 20000 |      | μ cd | I <sub>P</sub> =80mA<br>1/16 Duty |
| Peak Emission Wavelength          | λ <sub>P</sub>   |       | 660   |      | nm   | I <sub>F</sub> =20mA              |
| Spectral Line Half-Width          | Δλ               |       | 35    |      | nm   | I <sub>F</sub> =20mA              |
| Dominant Wavelength               | λ <sub>d</sub>   |       | 638   |      | nm   | I <sub>F</sub> =20mA              |
| Forward Voltage, any Dot          | V <sub>F</sub>   |       | 3.6   | 4.8  | V    | I <sub>F</sub> =20mA              |
|                                   |                  |       | 4     | 6.2  | V    | I <sub>F</sub> =80mA              |
| Reverse Current, any Dot          | I <sub>R</sub>   |       |       | 100  | μ A  | V <sub>R</sub> =10V               |
| Luminous Intensity Matching Ratio | I <sub>v-m</sub> |       |       | 2:1  |      | I <sub>P</sub> =80mA<br>1/16 Duty |

Note: Luminous intensity is measured with a light sensor and filter combination that approximates the CIE (Commission Internationale De L'Eclairage) eye-response curve.



## Typical Electrical/Optical Characteristic Curves (25°C Ambient Temperature Unless Otherwise Noted)

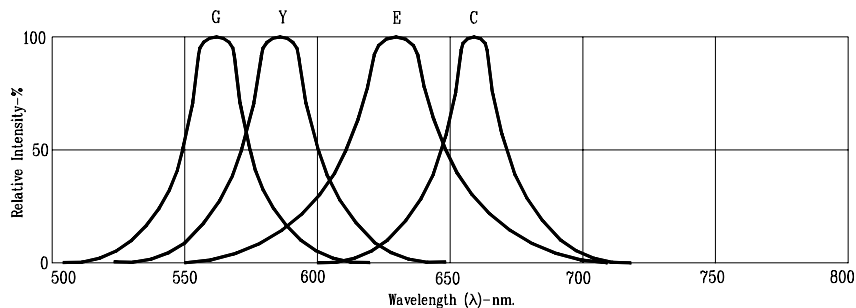


Fig1. RELATIVE INTENSITY VS. WAVELENGTH

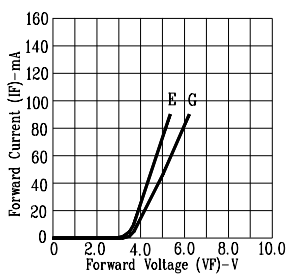


Fig2. FORWARD CURRENT VS. FORWARD VOLTAGE

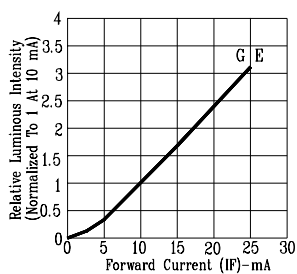


Fig3. RELATIVE LUMINOUS INTENSITY VS. FORWARD CURRENT

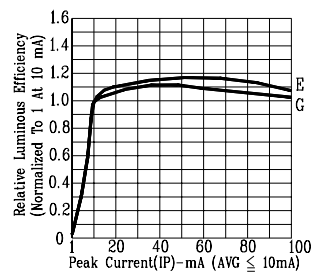


Fig4. RELATIVE LUMINOUS EFFICIENCY (LUMINOUS INTENSITY PER UNIT CURRENT) VS. PEAK CURRENT

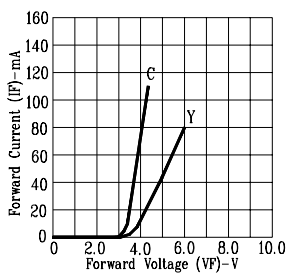


Fig5. FORWARD CURRENT VS. FORWARD VOLTAGE

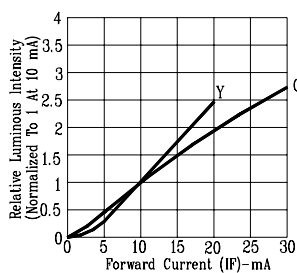


Fig6. RELATIVE LUMINOUS INTENSITY VS. FORWARD CURRENT

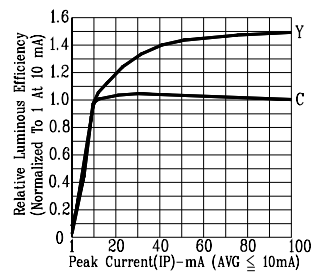


Fig7. RELATIVE LUMINOUS EFFICIENCY (LUMINOUS INTENSITY PER UNIT CURRENT) VS. PEAK CURRENT

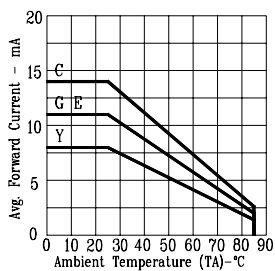


Fig8. MAX. AVERAGE FORWARD CURRENT VS. AMBIENT TEMPERATURE.

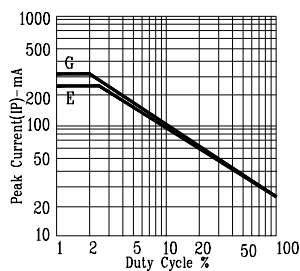


Fig9. MAX. PEAK CURRENT VS. DUTY CYCLE % (REFRESH RATE 1KHz)

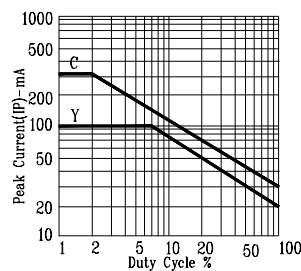


Fig10. MAX. PEAK CURRENT VS. DUTY CYCLE % (REFRESH RATE 1KHz)

NOTE: G=GREEN E=RED ORANGE C=AlGaAs RED Y=YELLOW (REFRESH RATE 1KHz)