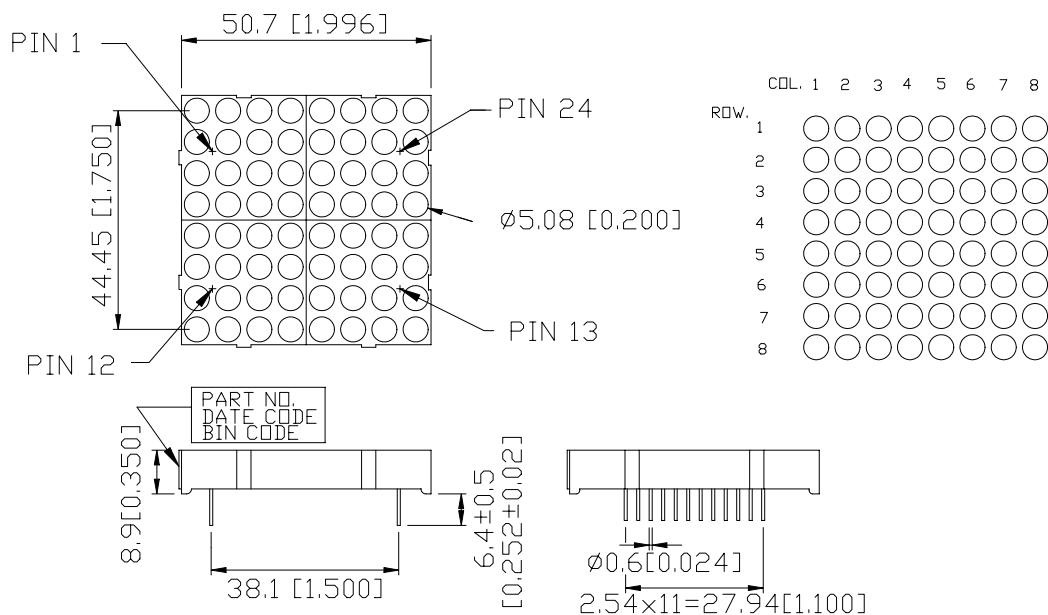
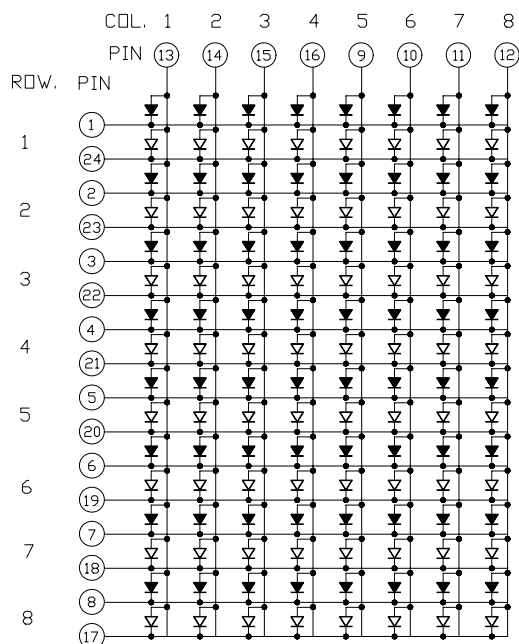


## PACKAGE DIMENSIONS



NOTES: All dimensions are in millimeters. Tolerances are  $\pm 0.25$  mm (0.01") unless otherwise noted.

## INTERNAL CIRCUIT DIAGRAM



THE SIGN "  " STANDS FOR RED ORANGE COLOR CHIPS.

THE SIGN "  " STANDS FOR GREEN COLOR CHIPS.

**FEATURES**

- \* 1.95 inch (49.53 mm) MATRIX HEIGHT.
- \* LOW POWER REQUIREMENT.
- \* SINGLE PLANE, WIDE VIEWING ANGLE.
- \* SOLID STATE RELIABILITY.
- \* 8× 8 ARRAY WITH X-Y SELECT.
- \* COMPATIBLE WITH USASCII AND EBCDIC CODES.
- \* STACKABLE HORIZONTALLY.
- \* CATEGORIZED FOR LUMINOUS INTENSITY.

**DESCRIPTION**

The LTP-20088A-01 is 1.95 inch (49.53 mm) matrix height 8× 8 dot matrix display. The green series devices utilize LED chips 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 multicolor displays have gray face and white dots.

**DEVICE**

| PART NO.           | DESCRIPTION              |
|--------------------|--------------------------|
| RED ORANGE & GREEN | MULTIPLEX<br>CATHODE ROW |
| LTP-20088A-01      |                          |

**PIN CONNECTION**

| No. | CONNECTION               | No. | CONNECTION          |
|-----|--------------------------|-----|---------------------|
| 1   | CATHODE ROW 1 RED ORANGE | 13  | ANODE COLUMN 1      |
| 2   | CATHODE ROW 2 RED ORANGE | 14  | ANODE COLUMN 2      |
| 3   | CATHODE ROW 3 RED ORANGE | 15  | ANODE COLUMN 3      |
| 4   | CATHODE ROW 4 RED ORANGE | 16  | ANODE COLUMN 4      |
| 5   | CATHODE ROW 5 RED ORANGE | 17  | CATHODE ROW 8 GREEN |
| 6   | CATHODE ROW 6 RED ORANGE | 18  | CATHODE ROW 7 GREEN |
| 7   | CATHODE ROW 7 RED ORANGE | 19  | CATHODE ROW 6 GREEN |
| 8   | CATHODE ROW 8 RED ORANGE | 20  | CATHODE ROW 5 GREEN |
| 9   | ANODE COLUMN 5           | 21  | CATHODE ROW 4 GREEN |
| 10  | ANODE COLUMN 6           | 22  | CATHODE ROW 3 GREEN |
| 11  | ANODE COLUMN 7           | 23  | CATHODE ROW 2 GREEN |
| 12  | ANODE COLUMN 8           | 24  | CATHODE ROW 1 GREEN |

**ABSOLUTE MAXIMUM RATING AT Ta=25°C**

| PARAMETER                                                                        | GREEN      | UNIT |
|----------------------------------------------------------------------------------|------------|------|
| Average Power Dissipation Per Dot                                                | 36         | mW   |
| Peak Forward Current Per Dot                                                     | 100        | mA   |
| Average Forward Current Per Dot                                                  | 13         | mA   |
| Derating Linear From 25 Per Dot                                                  | 0.17       | mA/  |
| Reverse Voltage Per Segment                                                      | 5          | V    |
| Operating Temperature Range                                                      | -35 to +85 |      |
| Storage Temperature Range                                                        | -35 to +85 |      |
| Solder Temperature: max 260 for max 3sec at 1.6mm[1/16inch] below seating plane. |            |      |

**ELECTRICAL / OPTICAL CHARACTERISTICS AT Ta=25°C**
**GREEN**

| PARAMETER                         | SYMBOL            | MIN. | TYP. | MAX. | UNIT | TEST CONDITION                |
|-----------------------------------|-------------------|------|------|------|------|-------------------------------|
| Average Luminous Intensity        | I <sub>v</sub>    | 1780 | 4800 |      | μcd  | I <sub>p</sub> =80mA 1/16Duty |
| 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>    |      | 2.1  | 2.6  | V    | I <sub>F</sub> =20mA          |
|                                   |                   |      | 3.0  | 3.7  |      | I <sub>F</sub> =80mA          |
| Reverse Current any Dot           | I <sub>R</sub>    |      |      | 100  | μA   | V <sub>R</sub> =5V            |
| Luminous Intensity Matching Ratio | I <sub>v</sub> -m |      |      | 2:1  |      | I <sub>F</sub> =10mA          |

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

**ABSOLUTE MAXIMUM RATING AT Ta=25°C**

| PARAMETER                                                                        | RED ORANGE | UNIT |
|----------------------------------------------------------------------------------|------------|------|
| Average Power Dissipation Per Dot                                                | 36         | mW   |
| Peak Forward Current Per Dot                                                     | 100        | mA   |
| Average Forward Current Per Dot                                                  | 13         | mA   |
| Derating Linear From 25 Per Dot                                                  | 0.17       | mA/  |
| Reverse Voltage Per Segment                                                      | 5          | V    |
| Operating Temperature Range                                                      | -35 to +85 |      |
| Storage Temperature Range                                                        | -35 to +85 |      |
| Solder Temperature: max 260 for max 3sec at 1.6mm[1/16inch] below seating plane. |            |      |

**ELECTRICAL / OPTICAL CHARACTERISTICS AT Ta=25°C**
**RED ORANGE**

| PARAMETER                         | SYMBOL            | MIN. | TYP. | MAX. | UNIT | TEST CONDITION                |
|-----------------------------------|-------------------|------|------|------|------|-------------------------------|
| Average Luminous Intensity        | I <sub>v</sub>    | 1780 | 4800 |      | μcd  | I <sub>p</sub> =80mA 1/16Duty |
| 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>    |      | 2.0  | 2.6  | V    | I <sub>F</sub> =20mA          |
|                                   |                   |      | 2.6  | 3.4  |      | I <sub>F</sub> =80mA          |
| Reverse Current any Dot           | I <sub>R</sub>    |      |      | 100  | μA   | V <sub>R</sub> =5V            |
| Luminous Intensity Matching Ratio | I <sub>v</sub> -m |      |      | 2:1  |      | I <sub>F</sub> =10mA          |

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)

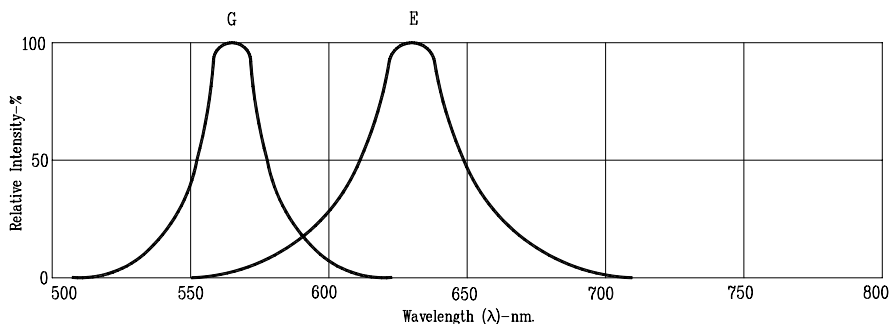


Fig1. RELATIVE INTENSITY VS. WAVELENGTH

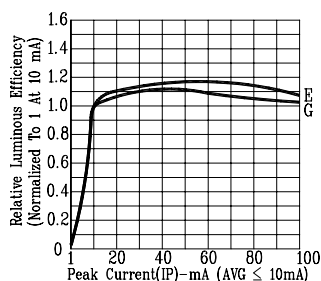


Fig2. RELATIVE LUMINOUS EFFICIENCY (LUMINOUS INTENSITY PER UNIT CURRENT) VS. PEAK CURRENT (REFRESH RATE 1KHz)

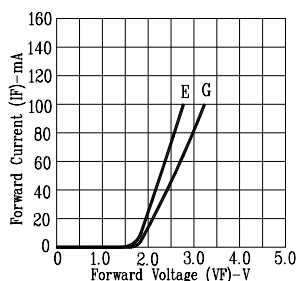


Fig3. FORWARD CURRENT VS. FORWARD VOLTAGE

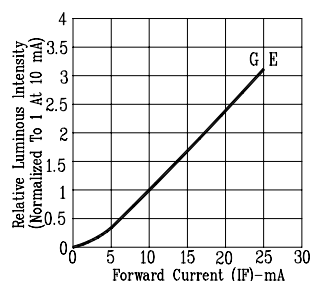


Fig4. RELATIVE LUMINOUS INTENSITY VS. FORWARD CURRENT

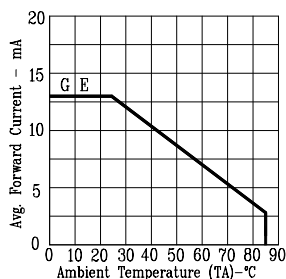


Fig5. MAX. AVERAGE FORWARD CURRENT VS. AMBIENT TEMPERATURE.

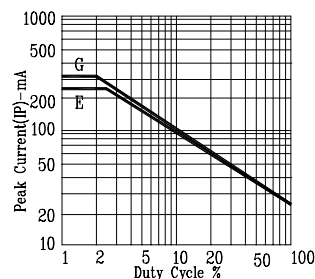


Fig6. MAX. PEAK CURRENT VS. DUTY CYCLE % (REFRESH RATE 1KHz)

NOTE: G=GREEN E=RED ORANGE