



# 9 $\phi$ 4 $\times$ 4 Single Color & Multicolor Dot Matrix LED Displays

LTP-2344 Series  
2844A<sub>3</sub>

## Features

- 2.0 inch (50.80mm) matrix height.
- Low power requirement.
- Single plane, wide viewing angle.
- Solid state reliability.
- 4  $\times$  4 array with X-Y select.
- Compatible with usascII and ebcidc codes.
- Stackable horizontally.
- Choices of two matrix orientation.
- 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-2X44 series are 2.0 inch (50.80mm)matrix height 4  $\times$  4 dot matrix displays.

The LTP-2844A<sub>3</sub> are multicolor applicable displays.

The multicolor displays have gray face and white dots.

The LTP-2344 series are single color displays. The yellow,green and red orange displays have gray face and white dot color. The AlGaAs red devices have red face and red dots.

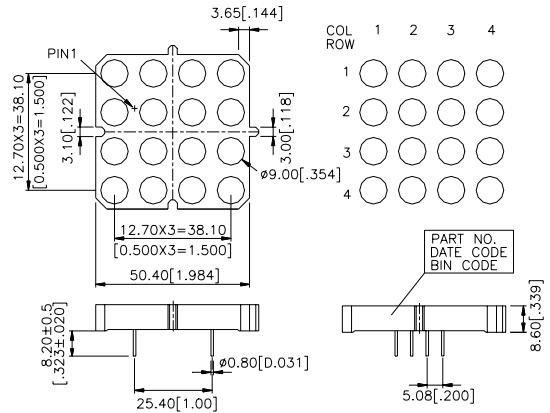
The green series devices utilize LED chipse which are made from GaP on a transparent GaP substrate.

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

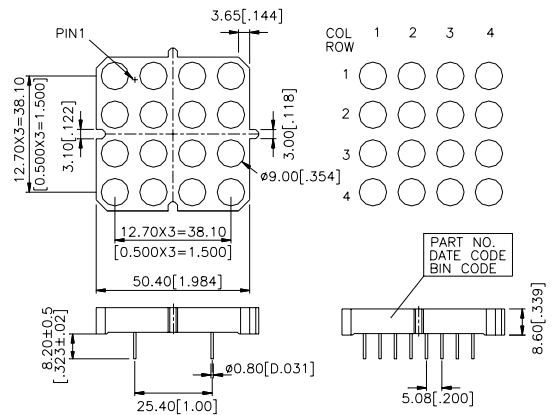
The AlGaAs red series devices utilize LED chips which are made from AlGaAs on a non-transparent GaAs substrate.

## Package Dimensions

A. LTP-2344



B. LTP-2844A<sub>3</sub>



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

## Devices

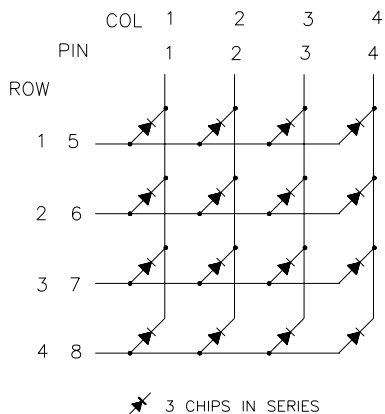
Part No.					Description	Package Dimension	Internal Circuit Diagram
Green	Yellow	Red Orange	AlGaAs Red	Multi Color			
2344G	2344Y	2344E	2344C	-	Anode Row, Cathode Column	A	A
-	-	-	-	2844A <sub>3</sub>	Anode Row, Cathode Column	B	B

## Pin Connection

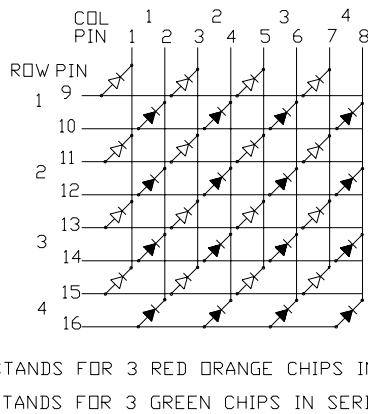
Pin No.	Connection	
	A. LTP-2344	B. LTP-2844A <sub>3</sub>
1	Cathode Column 1	Cathode Column 1 Red Orange
2	Cathode Column 2	Cathode Column 1 Green
3	Cathode Column 3	Cathode Column 2 Red Orange
4	Cathode Column 4	Cathode Column 2 Green
5	Anode Row 1	Cathode Column 3 Red Orange
6	Anode Row 2	Cathode Column 3 Green
7	Anode Row 3	Cathode Column 4 Red Orange
8	Anode Row 4	Cathode Column 4 Green
9		Anode Row 1 Red Orange
10		Anode Row 1 Green
11		Anode Row 2 Red Orange
12		Anode Row 2 Green
13		Anode Row 3 Red Orange
14		Anode Row 3 Green
15		Anode Row 4 Red Orange
16		Anode Row 4 Green

## Internal Circuit Diagrams

A. LTP-2344



B. LTP-2844A<sub>3</sub>



## Absolute Maximum Ratings at Ta=25°C

Parameter	Green	Yellow	Red Orange	AlGaAs Red	Unit
Average Power Dissipation Per Dot	96	92	96	96	mW
Peak Forward Current Per Dot	90	80	90	110	mA
Average Forward Current Per Dot Derating Linear from 25°C Per Dot	11 0.15	8 0.08	11 0.15	14 0.19	mA mA/°C
Reverse Voltage Per Dot	15	15	15	15	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-2344G/2844A<sub>3</sub> (Green)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Condition
Average Luminous Intensity	I <sub>v</sub>	5.0	11.0		m cd	I <sub>p</sub> =80mA 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>		6.3	7.8	V	I <sub>f</sub> =20mA
			9	11.1	V	I <sub>f</sub> =80mA
Reverse Current, any Dot	I <sub>R</sub>			100	μA	V <sub>R</sub> =15V
Luminous Intensity Matching Ratio	I <sub>v</sub> -m			2:1		I <sub>f</sub> =10mA

LTP-2344Y

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Condition
Average Luminous Intensity	I <sub>v</sub>	5.0	11.0		m cd	I <sub>p</sub> =80mA 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>		6.0	7.8	V	I <sub>f</sub> =20mA
			7.8	10.2	V	I <sub>f</sub> =80mA
Reverse Current, any Dot	I <sub>R</sub>			100	μA	V <sub>R</sub> =15V
Luminous Intensity Matching Ratio	I <sub>v</sub> -m			2:1		I <sub>f</sub> =10mA

LTP-2344E/2844A<sub>3</sub> (Red Orange)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Condition
Average Luminous Intensity	I <sub>v</sub>	5.0	11.0		m cd	I <sub>p</sub> =80mA 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>		6.0	7.8	V	I <sub>f</sub> =20mA
			7.8	10.2	V	I <sub>f</sub> =80mA
Reverse Current, any Dot	I <sub>R</sub>			100	μA	V <sub>R</sub> =15V
Luminous Intensity Matching Ratio	I <sub>v</sub> -m			2:1		I <sub>f</sub> =10mA

LTP-2344C

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Condition
Average Luminous Intensity	I <sub>v</sub>	15.1	28		m cd	I <sub>p</sub> =80mA 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, and Dot	V <sub>F</sub>		5.4	7.2	V	I <sub>f</sub> =20mA
			6	8.1	V	I <sub>f</sub> =80mA
Reverse Current, and Chip	I <sub>R</sub>			100	μA	V <sub>R</sub> =15V
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)

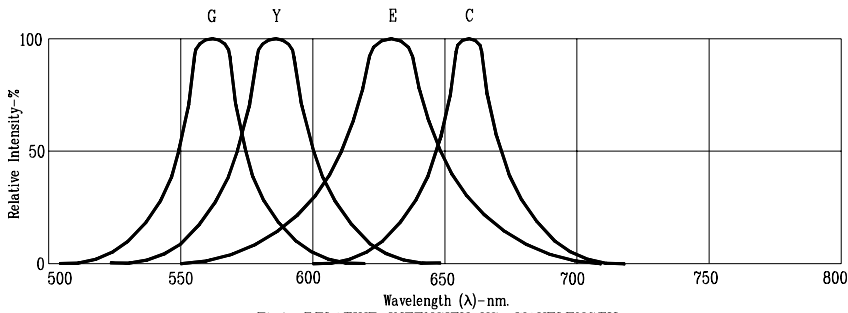


Fig1. RELATIVE INTENSITY VS. WAVELENGTH

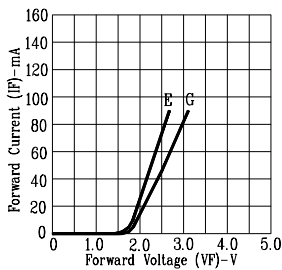


Fig2. FORWARD CURRENT VS. FORWARD VOLTAGE

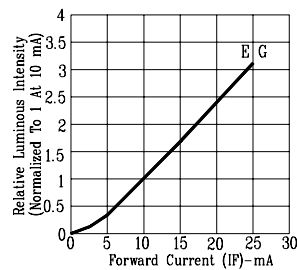


Fig3. RELATIVE LUMINOUS INTENSITY VS. FORWARD CURRENT

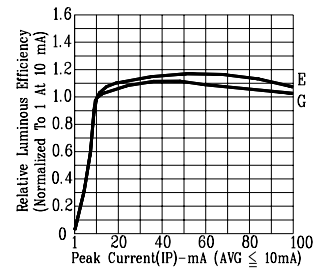


Fig4. RELATIVE LUMINOUS EFFICIENCY (LUMINOUS INTENSITY PER UNIT CURRENT) VS. PEAK CURRENT

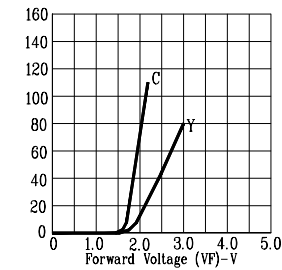


Fig5. FORWARD CURRENT VS. FORWARD VOLTAGE

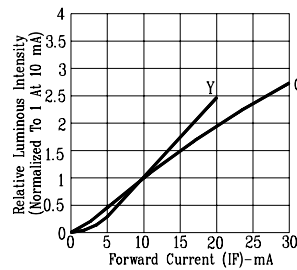


Fig6. RELATIVE LUMINOUS INTENSITY VS. FORWARD CURRENT

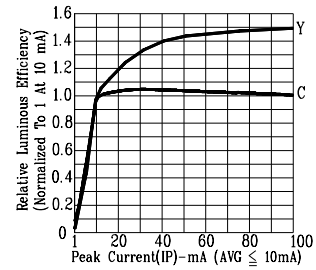


Fig7. RELATIVE LUMINOUS EFFICIENCY (LUMINOUS INTENSITY PER UNIT CURRENT) VS. PEAK CURRENT

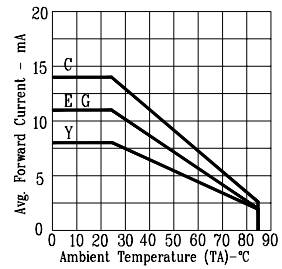


Fig8. MAX. AVERAGE FORWARD CURRENT VS. AMBIENT TEMPERATURE.

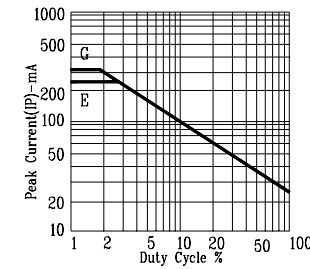


Fig9. MAX. PEAK CURRENT VS. DUTY CYCLE % (REFRESH RATE 1KHz)

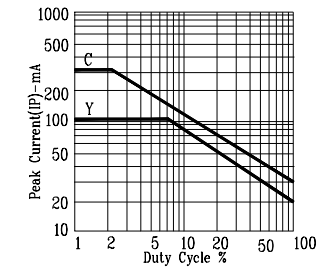


Fig10. MAX. PEAK CURRENT VS. DUTY CYCLE % (REFRESH RATE 1KHz)

NOTE: G=GREEN E=RED ORANGE C=AlGaAs RED Y=YELLOW

(REFRESH RATE 1KHz)