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# LED Display Product Data Sheet LTP-2188AA

Spec No.: DS-30-94-168

Effective Date: 10/10/2012

Revision: A

**LITE-ON DCC**

**RELEASE**

BNS-OD-FC001/A4

**LED DISPLAY****LTP-2188AA**  
**DATA SHEET**

<b>Rev</b>	<b>Description</b>	<b>By</b>
-	Original Spec	Jenny Ni April 26, 2000
A	<ul style="list-style-type: none"><li>- Correct pin's quantity from 16pcs to 32pcs</li><li>- Add cosmetic spec</li><li>- Update Operating &amp; Storage Temperature Rang from -35°C to +85°C become to -35°C to +105°C</li></ul>	Phanomkorn J. September 25, 2012

<b>Spec No.</b>	DS-30-94-168
<b>Date</b>	September 25, 2012
<b>Revision No.</b>	A
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**FEATURES**

- \* 2.3 inch (58.42 mm) MATRIX HEIGHT.
- \* LOW POWER REQUIREMENT.
- \* SINGLE PLANE, WIDE VIEWING ANGLE.
- \* SOLID STATE RELIABILITY.
- \* 8x8 ARRAY WITH X-Y SELECT.
- \* COMPATIBLE WITH USASCII AND EBCDIC CODES.
- \* STACKABLE HORIZONTALLY.
- \* CATEGORIZED FOR LUMINOUS INTENSITY.
- \* LEAD-FREE PACKAGE (ACCORDING TO ROHS)

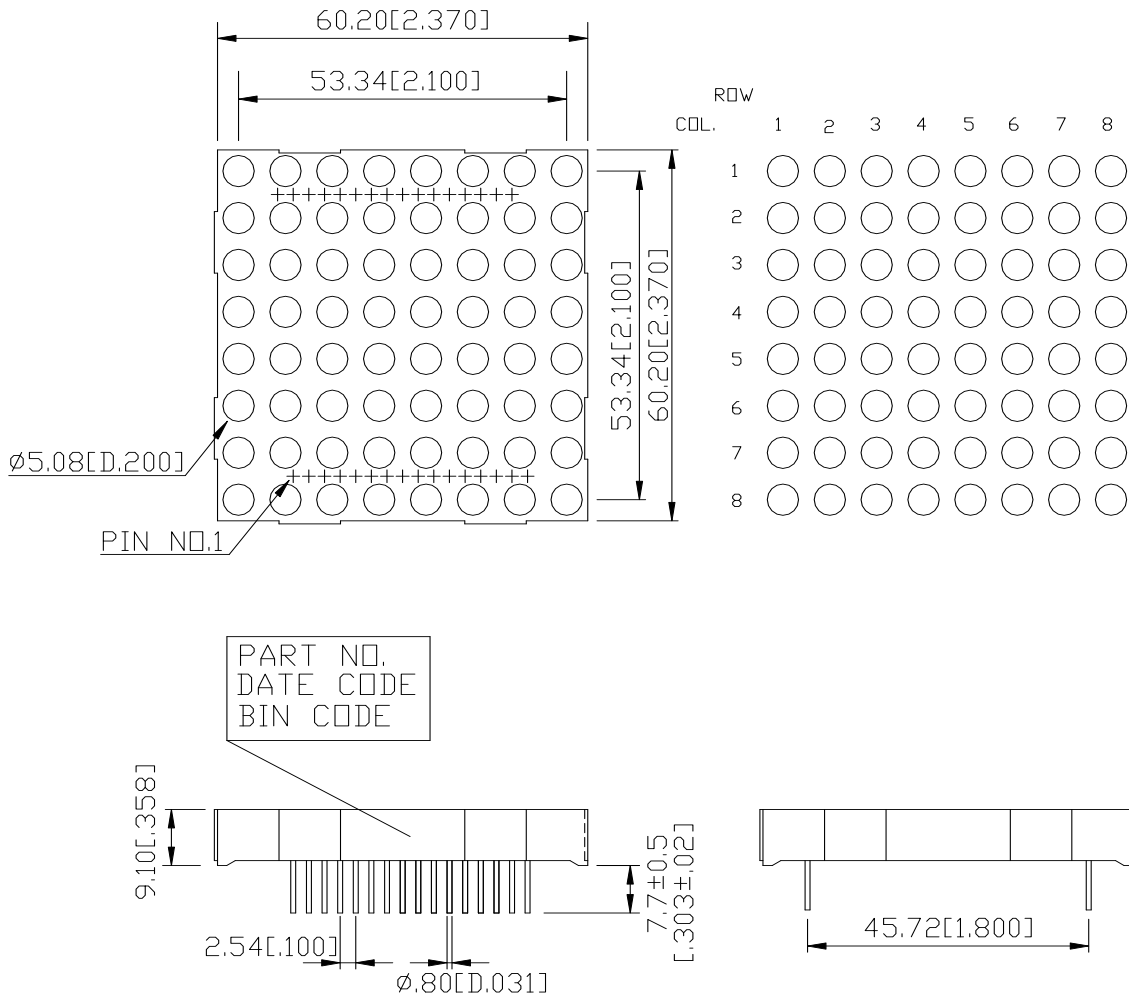
**DESCRIPTION**

The LTP-2188AA is a 2.3 inch (58.42 mm) matrix height 8x8 dot matrix displays. This device utilizes Red Orange and Green LED chips. The Red Orange LED chips are made from GaAsP on GaP substrate, the Green LED chips are made from GaP on GaP substrate, and this display has gray face and white dots.

**DEVICE**

<b>PART NO.</b>	<b>DESCRIPTION</b>
Green & Red Orange	ANODE COLUMN
LTP-2188AA	CATHODE ROW

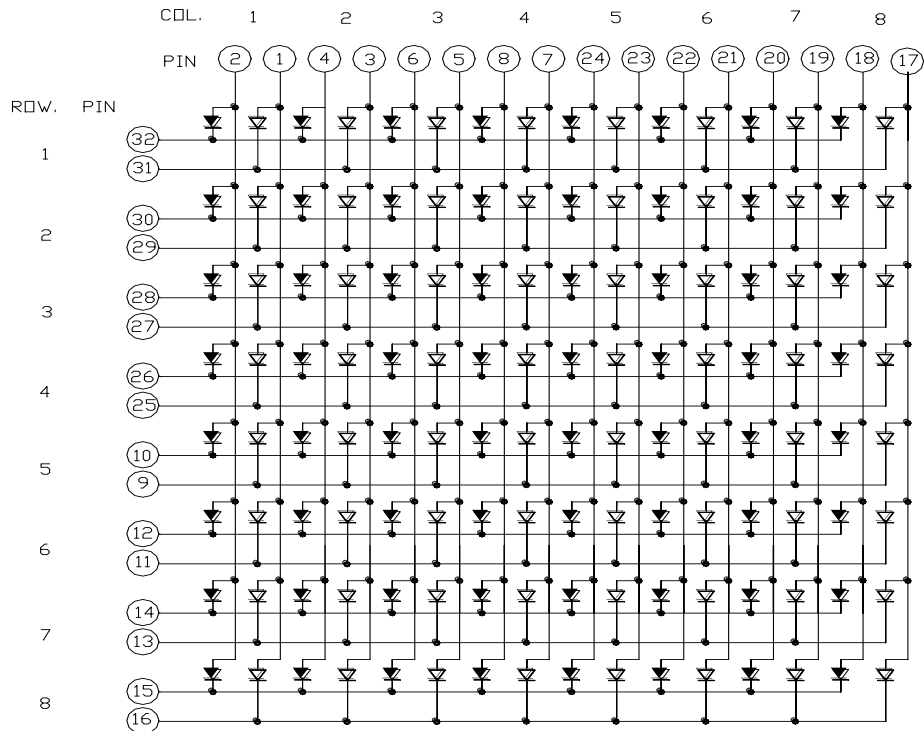
**PACKAGE DIMENSIONS**



**NOTES:**

1. All dimensions are in millimeters. Tolerances are  $\pm 0.25$  mm (0.01“) unless otherwise noted.
2. Pin tip’s shift tolerance is  $\pm 0.4$  mm.
3. Recommend the best PCB hole:  $\phi 1.0$ mm
4. Foreign material on segment  $\leq 20$ mils
5. Ink contamination (surface)  $\leq 20$ mils
6. Bending  $\leq 1/100$
7. Bubble in segment  $\leq 20$ mils

## INTERNAL CIRCUIT DIAGRAM



THE SIGN "  " STANDS FOR RED ORANGE CHIPS.  
 THE SIGN "  " STANDS FOR GREEN CHIPS.

**PIN CONNECTION**

<b>No.</b>	<b>CONNECTION</b>	<b>No.</b>	<b>CONNECTION</b>
1	ANODE COLUMN 1 GREEN	2	ANODE COIUMN 1 RED ORANGE
3	ANODE COLUMN 2 GREEN	4	ANODE COIUMN 2 RED ORANGE
5	ANODE COLUMN 3 GREEN	6	ANODE COIUMN 3 RED ORANGE
7	ANODE COLUMN 4 GREEN	8	ANODE COIUMN 4 RED ORANGE
9	CATHODE ROW 5 GREEN	10	CATHODE ROW 5 RED ORANGE
11	CATHODE ROW 6 GREEN	12	CATHODE ROW 6 RED ORANGE
13	CATHODE ROW 7 GREEN	14	CATHODE ROW 7 RED ORANGE
15	CATHODE ROW 8 GREEN	16	CATHODE ROW 8 RED ORANGE
17	ANODE COLUMN 8 GREEN	18	ANODE COIUMN 8 RED ORANGE
19	ANODE COLUMN 7 GREEN	20	ANODE COIUMN 7 RED ORANGE
21	ANODE COLUMN 6 GREEN	22	ANODE COIUMN 6 RED ORANGE
23	ANODE COLUMN 5 GREEN	24	ANODE COIUMN 5 RED ORANGE
25	CATHODE ROW 4 GREEN	26	CATHODE ROW 4 RED ORANGE
27	CATHODE ROW 3 GREEN	28	CATHODE ROW 3 RED ORANGE
29	CATHODE ROW 2 GREEN	30	CATHODE ROW 2 RED ORANGE
31	CATHODE ROW 1 GREEN	32	CATHODE ROW 1 RED ORANGE

**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°C Per Dot	0.17	mA/°C
Reverse Voltage Per Dot	5	V
Operating Temperature Range	-35°C to +105°C	
Storage Temperature Range	-35°C to +105°C	

Soldering Conditions : 1/16 inch below seating plane for 3 seconds at 260°C  
or of temperature unit (during assembly) not over max. temperature rating.

**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 (Similar Light Area)	I <sub>v-m</sub>			2:1		I <sub>F</sub> =10mA

**NOTES:**

- Luminous intensity is measured with a light sensor and filter combination that approximates the CIE (Commision Internationale De L'Eclairage) eye-response curve.
- Cross talk specification ≅ 2.5%
- Reverse voltage is only for IR test. It cannot continue to operate at this situation.



**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
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Operating Temperature Range	-35°C to +105°C	
Storage Temperature Range	-35°C to +105°C	
Soldering Conditions : 1/16 inch below seating plane for 3 seconds at 260°C or of temperature unit (during assembly) not over max. temperature rating.		

**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 (Similar Light Area)	I <sub>v-m</sub>			2:1		I <sub>F</sub> =10mA

**NOTES:**

- Luminous intensity is measured with a light sensor and filter combination that approximates the CIE (Commision Internationale De L'Eclairage) eye-response curve.
- Cross talk specification  $\cong$  2.5%
- Reverse voltage is only for IR test. It cannot continue to operate at this situation.

### TYPICAL ELECTRICAL / OPTICAL CHARACTERISTIC CURVES

(25°C Ambient Temperature Unless Otherwise Noted)

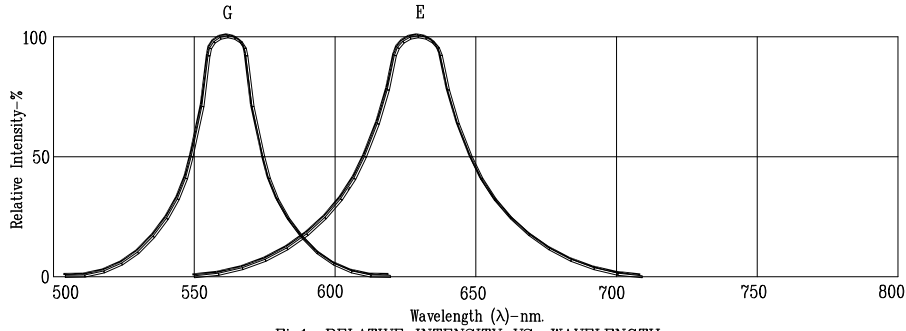


Fig.1. RELATIVE INTENSITY VS. WAVELENGTH

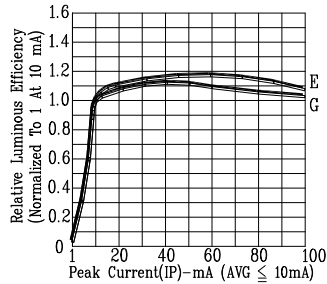


Fig.2. RELATIVE LUMINOUS EFFICIENCY (LUMINOUS INTENSITY PER UNIT CURRENT) VS. PEAK CURRENT

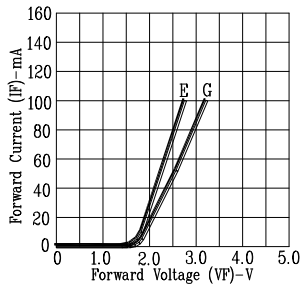


Fig.3. FORWARD CURRENT VS. FORWARD VOLTAGE

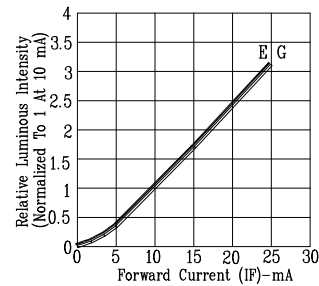


Fig.4. RELATIVE LUMINOUS INTENSITY VS. DC FORWARD CURRENT

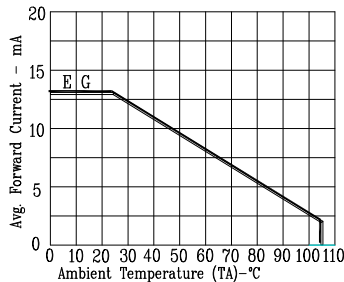


Fig.5. MAX AVERAGE FORWARD CURRENT VS. AMBIENT TEMPERATURE.

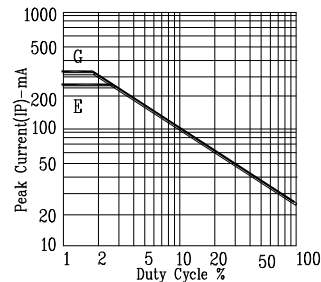


Fig.6. MAX PEAK CURRENT VS. DUTY CYCLE % (REFRESH RATE 1KHz)

NOTE: G=GREEN E=RED ORANGE