



# LED Display Product Data Sheet LTM-0124M-01

Spec No.: DS30-2003-057

Effective Date: 08/21/2003

Revision: -

**LITE-ON DCC**

**RELEASE**

BNS-OD-FC001/A4

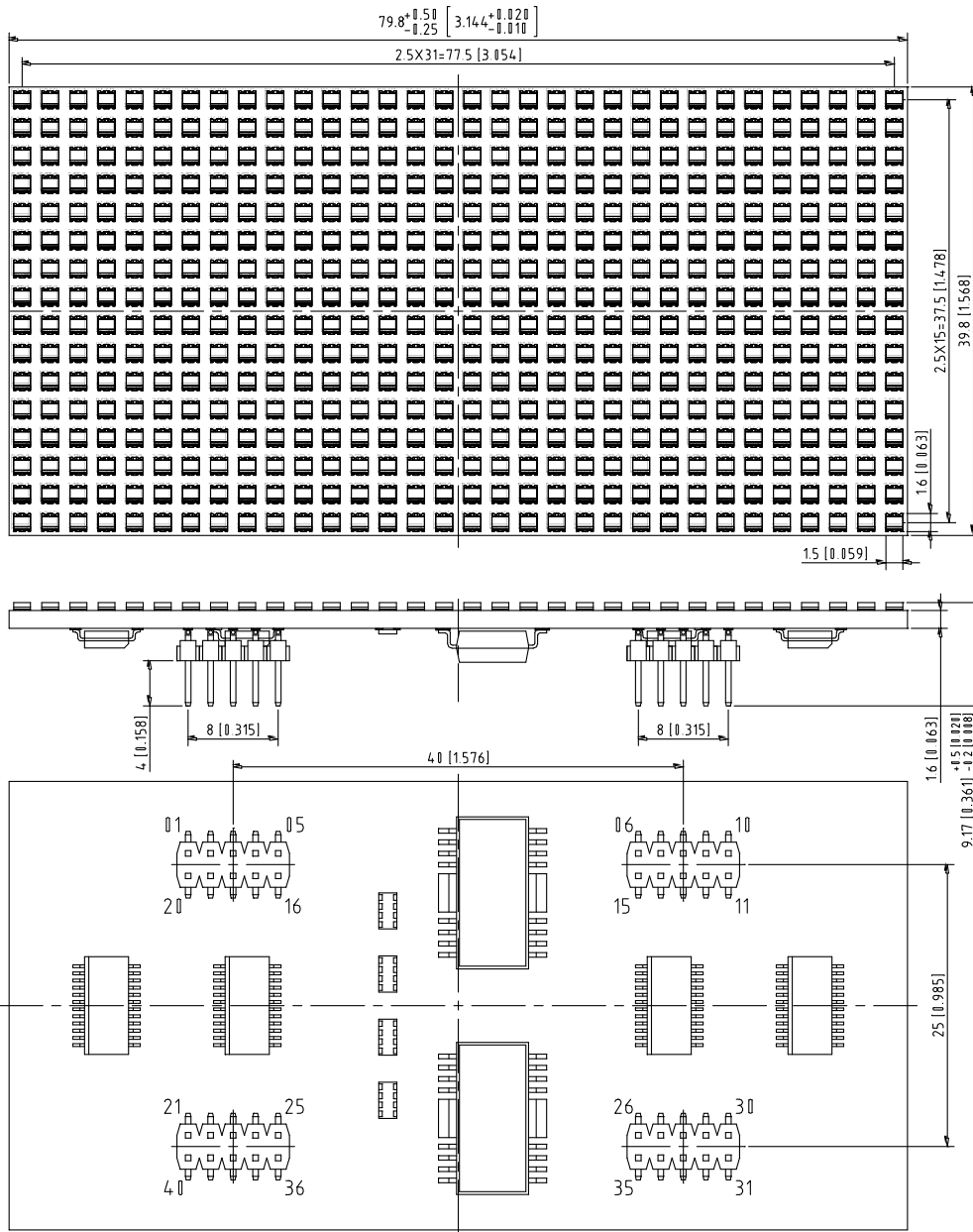
**FEATURES**

- \* 1.52 inch (38.6 mm) MATRIX HEIGHT
- \* LOW POWER REQUIREMENT
- \* SOLID STATE RELIABILITY
- \* 16x32 ARRAY WITH X-Y SELECT
- \* MULTICOLOR DISPLAYS ARE APPLICABLE TO THREE BRIGHT COLORS  
( GREEN AND RED)
- \* 1/16 DUTY DYNAMIC SCAN METHOD
- \* CONTROL METHOD: SHIFT REGISTER TYPE
- \* COMPATIBLE WITH USASCII AND EBCDIC CODES
- \* STACKABLE HORIZONTALLY
- \* CATEGORIZED FOR LUMINOUS INTENSITY

**DESCRIPTION**

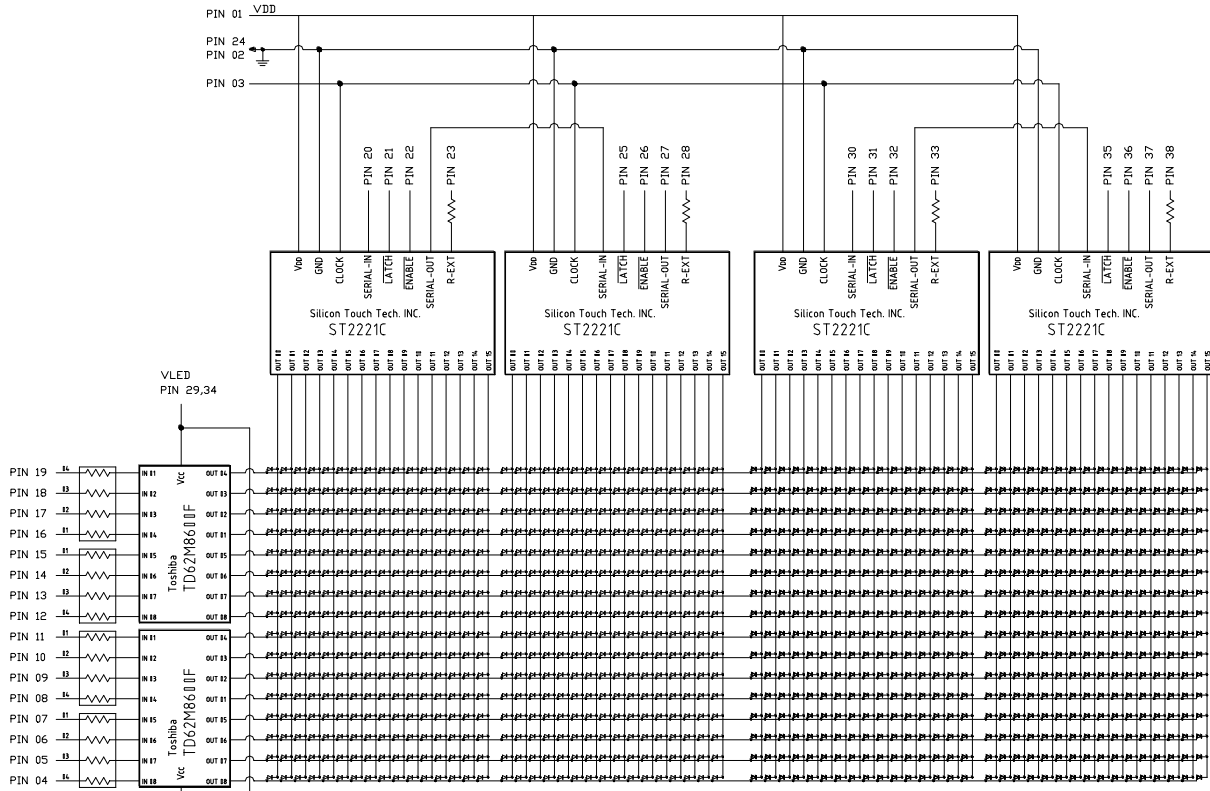
The LTM-0124M-01 is a 1.52 inch (38.6 mm) matrix height 16x32 dot matrix display which is multicolor applicable and built with constant current drivers ( shift register control type). This device uses AS-AlInGaP SUPER RED chip LED and AS-AlInGaP GREEN chip LED.

## PACKAGE DIMENSIONS



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

## INTERNAL CIRCUIT DIAGRAM



Note :

1. The sign "⤴" stands for AlInGaP Super Red color chip ( $\lambda_d = 631\text{nm}$ )
2. VCC= +4.5~5.2V  
I<sub>p</sub>= 40 mA , 1/16 duty
- The sign "⤵" stands for AlInGaP Green color chip ( $\lambda_d = 572\text{nm}$ )

**PIN CONNECTION**

<b>No.</b>	<b>CONNECTION</b>	<b>No.</b>	<b>CONNECTION</b>
1	V <sub>DD</sub>	21	LATCH( Red Column1~16)
2	GND	22	ENABLE( Red Column1~16)
3	CLOCK	23	R-EXT( Red Column1~16)
4	Anode Row 16, Red & Green	24	GND
5	Anode Row 15, Red & Green	25	LATCH( Red Column17~32)
6	Anode Row 14, Red & Green	26	ENABLE( Red Column17~32)
7	Anode Row 13, Red & Green	27	Red Data Serial Out
8	Anode Row 12, Red & Green	28	R-EXT( Red Column17~32)
9	Anode Row 11, Red & Green	29	V <sub>LED</sub>
10	Anode Row 10, Red & Green	30	Green Data Serial In
11	Anode Row 9, Red & Green	31	LATCH( Green Column1~16)
12	Anode Row 8, Red & Green	32	ENABLE( Green Column1~16)
13	Anode Row 7, Red & Green	33	R-EXT( Green Column1~16)
14	Anode Row 6, Red & Green	34	V <sub>LED</sub>
15	Anode Row 5, Red & Green	35	LATCH( Green Column17~32)
16	Anode Row 4, Red & Green	36	ENABLE( Green Column17~32)
17	Anode Row 3, Red & Green	37	Green Data Serial Out
18	Anode Row 2, Red & Green	38	R-EXT( Green Column17~32)
19	Anode Row 1, Red & Green	39	No Connection
20	Red Data Serial In	40	No Connection

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

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Average Luminous Intensity	I <sub>v</sub>	6	10		mcd	I <sub>p</sub> =40mA 1/16Duty
Peak Emission Wavelength	λ <sub>p</sub>		639		nm	I <sub>F</sub> =20mA
Spectral Line Half-Width	Δλ		20		nm	I <sub>F</sub> =20mA
Dominant Wavelength	λ <sub>d</sub>		631		nm	I <sub>F</sub> =20mA
Forward Voltage any Dot	V <sub>F</sub>		2.0	2.4	V	I <sub>F</sub> =20mA
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>p</sub> =32mA 1/16Duty

**Green**

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Average Luminous Intensity	I <sub>v</sub>	3.6	6.4		mcd	I <sub>p</sub> =32mA 1/16Duty
Peak Emission Wavelength	λ <sub>p</sub>		574		nm	I <sub>F</sub> =20mA
Spectral Line Half-Width	Δλ		15		nm	I <sub>F</sub> =20mA
Dominant Wavelength	λ <sub>d</sub>		571		nm	I <sub>F</sub> =20mA
Forward Voltage any Dot	V <sub>F</sub>		2.0	2.4	V	I <sub>F</sub> =20mA
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>p</sub> =32mA 1/16Duty

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 FOR SHIFT REGISTER AT Ta=25°C**

CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	VDD	0~7.0	V
Input Voltage	VIN	-0.4~VDD+0.4	V
Output Current per VOUT	IOUT	120	mA
Output Voltage per VOUT	VCE	-0.5~9.5	V
Clock Frequency	fCK	25	MHz
GND Terminal Current	IGND	1920	mA
Power Dissipation	PD	1.27(T=25°C)	W
		0.61(T=85°C)	
Operating Temperature	Topr	-25°C ~ 45°C	°C
Storage Temperature	Tstg	-25°C ~ 85°C	°C

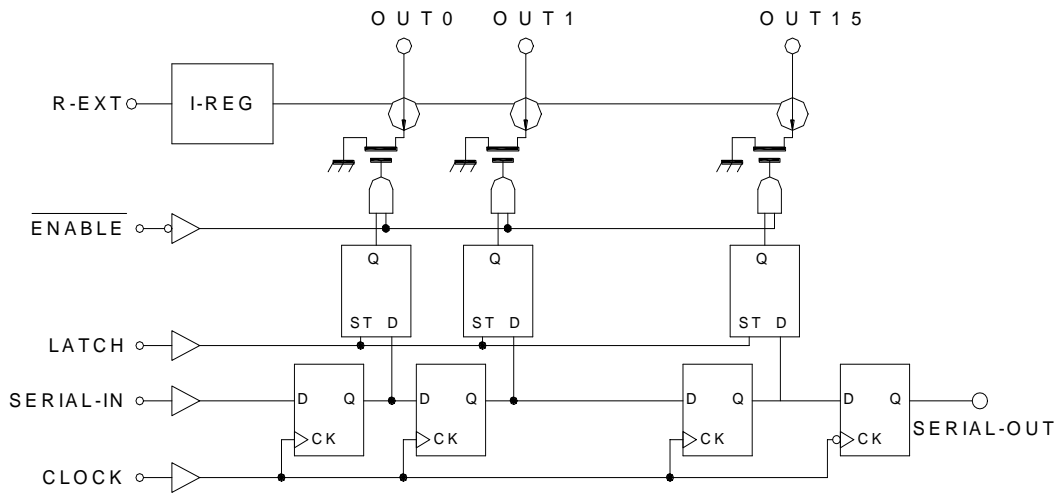
Solder Temperature 1/16 inch Below Seating Plane for 3 Seconds at 260°C

**RECOMMENDED OPERATING CONDITION**

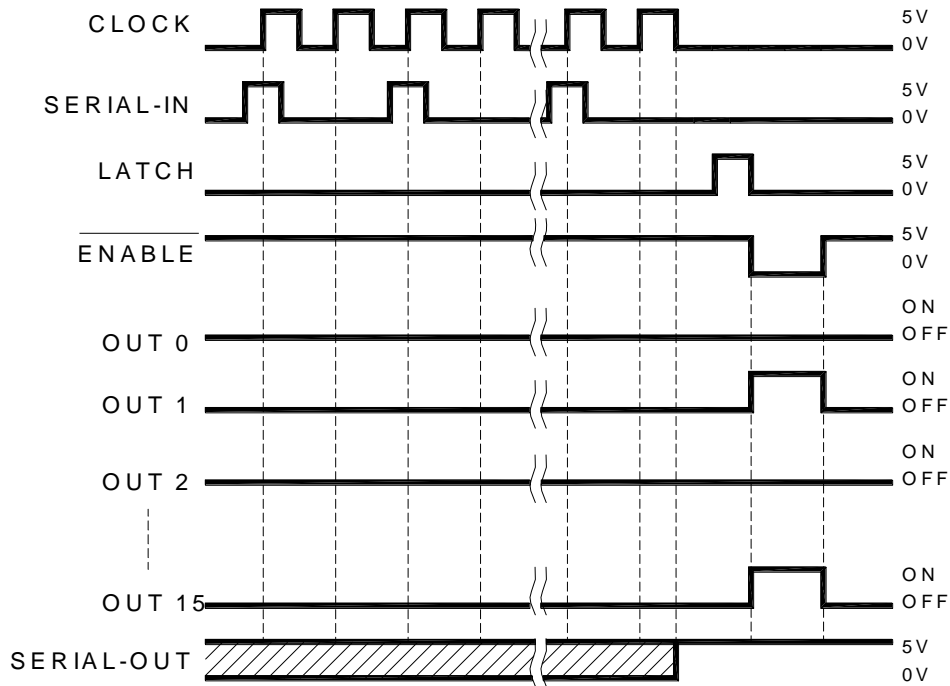
(T=-40~85°C unless otherwise noted)

CHARACTERISTIC	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
LED Voltage	VLED	-	3	3.5	4	V
Supply Voltage	VDD	-	4.5	5.0	5.5	V
Output Voltage	VOUT	-	-	-	9	V
Output Current per	IO	OUTn	5	-	115	mA
	IOH	SERIAL-OUT	-	-	1.0	
	IOL	SERIAL-OUT	-	-	-1.0	
Input Voltage	VIH	-	0.7VDD	-	VDD+0.3	V
	VIL	-	-0.3	-	0.3VDD	
LATCH Pulse Width	tw LAT	VDD=4.5~5.5V	15	-	-	ns
CLOCK Pulse Width	tw CLK		15	-	-	ns
Set-up Time for DATA	tsetup( D)		20	-	-	ns
Hold Time for DATA	thold( D)		20	-	-	ns
Set-up Time for LATCH	tsetup( L)		15	-	-	ns
Clock Frequency	fCLK		Cascade operation	-	-	25
Power Dissipation	PD	T=85°C	-	-	0.61	W

**BLOCK DIAGRAM**



**TIMING DIAGRAM**



Latches are level sensitive( not edge triggered).

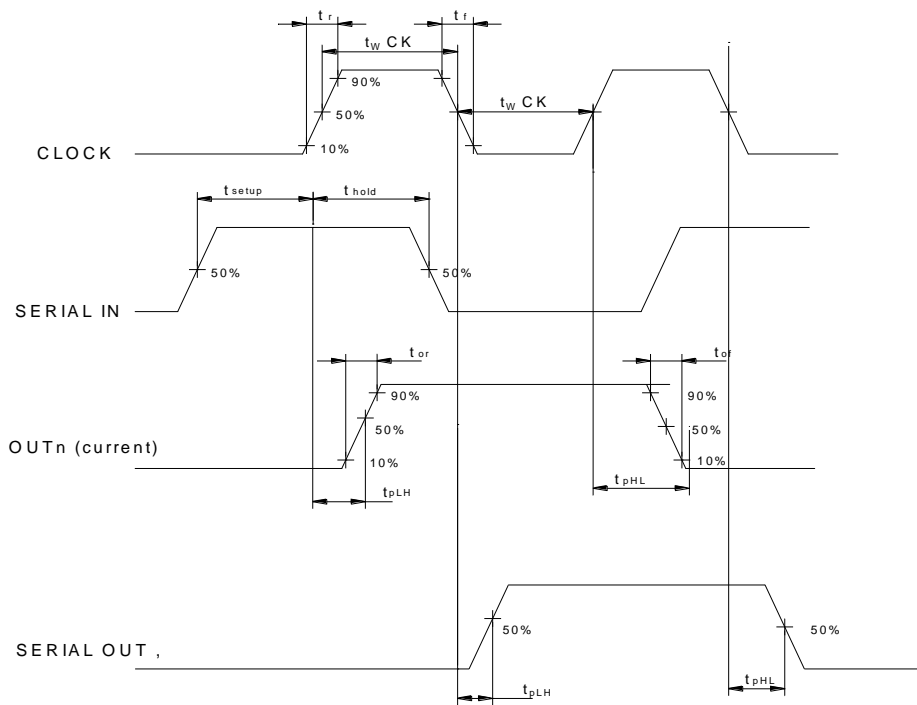
Latch-terminal= H level, latches become transparent; Latch-terminal= L level, hold data.

ENABLE-terminal= H level, all outputs( OUT0~15) are off.

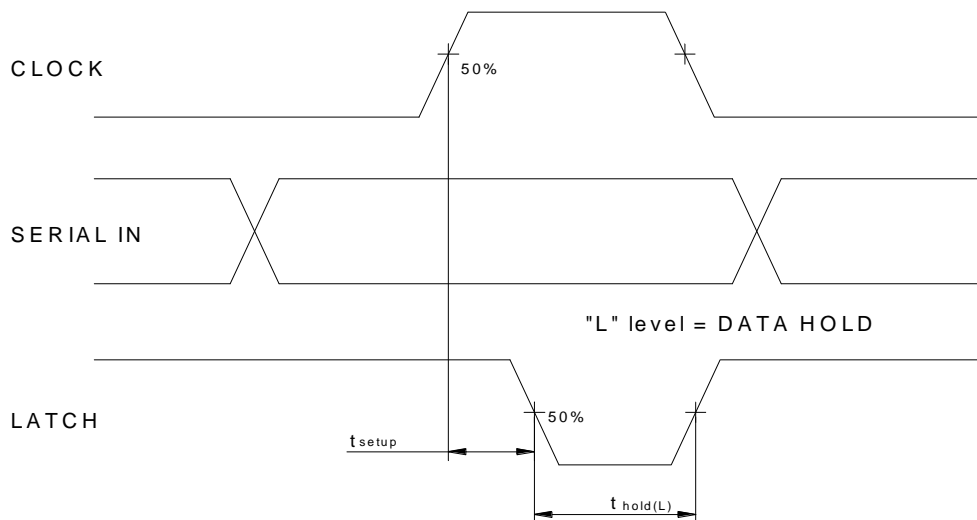
SERIAL-OUT changes state on falling edges of clock.



## CLOCK – SERIAL , OUT , OUTn



## Clock - LATCH



**ENABLE - OUTn**