

**LED MODULE
LTM-1809RGBAC-LT**

LED MODULE

LTM-1809RGBAC-LT

<u>Rev</u>	<u>Description</u>	<u>By</u>	<u>Date</u>
01	Preliminary SPEC	Richard Lin	May.03.2018
02	PCB width change from 10mm to 8mm. LED P/N change from LTST-G563EGBW-HM4 to -HM2.	Richard Lin	Jun.13.2018
03	LED P/N change to LTST-G563EGBW. Add application circuit and Cautions	Richard Lin	Jun.21.2019
04	Change 3M tape from VHB 5952 to 9080.	Richard Lin	Apr.10.19
Above data for PD and Customer tracking only			
-	NPPR Received and Upload on System		

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1. Description

The specification is applied to the LTM-1809RGBAC-LT Light strips. Providing the standard specification for the purchase and inspection of the light module.

1.1 Features

- Full color RGB LED strip
- I.C. Compatible.
- One pixel contains R, G, and B color that each can achieve 256 level brightness grayscale, which forms 16,777,216 combination colors. Internal clock frequency is operated at 800 kHz.
- Serial data transmission signal by only single wire.
- RoHS compliance

1.2 Environmental condition

Items	Condition	Notes
Operation Temperature [°C]	-20~+60	
Storage Temperature [°C]	-20~+70	

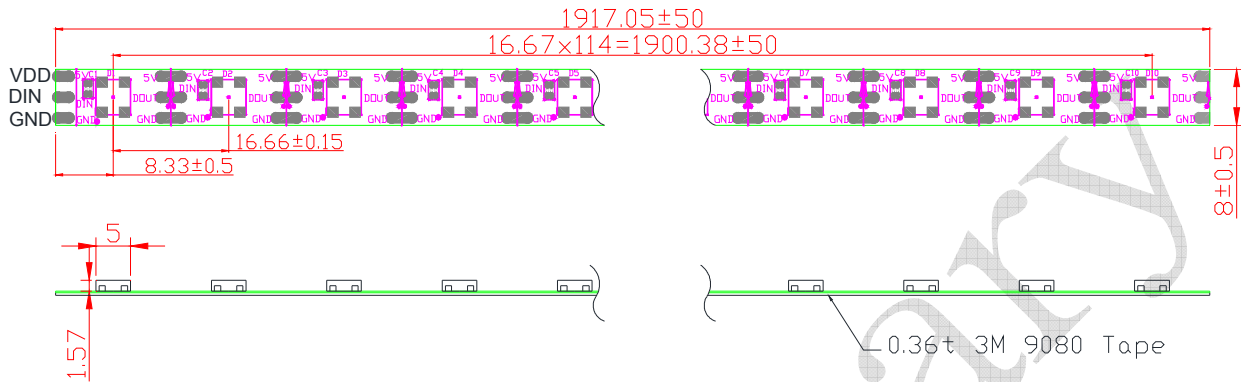
2. Package Dimensions

2.1 Bill of Material

Items	Specification Description	Usage
Flexible Printed Circuit	Thickness: 0.2±0.1mm , 2-layers , Top layer color of solder mask : White Bottom layer color of solder mask : White(PI)	1
LED	LTST-G563EGBW	115
Capacitance	0603 , 0.1uF	115
Tape	3M 9080	1

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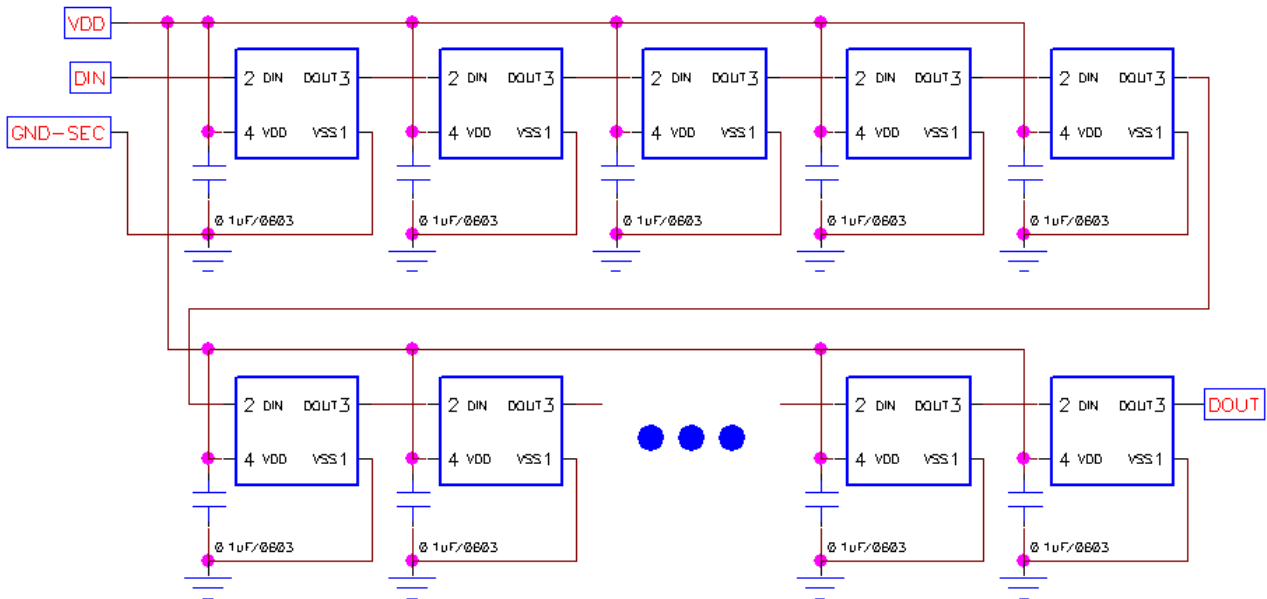
2.2 Mechanical Specification



Notes :

1. All dimensions are in millimeters. Tolerances are ± 0.2 mm (0.008") unless otherwise noted.
2. FPC length was 250m/unit, use soldering tin to connect FPCs.
3. Recommend to put RC filter at input "DIN" when using this light strip.
4. Do not use unspecified chemical liquid to clean LED they could harm the package. If cleaning is necessary, immerse the LED in ethyl alcohol or isopropyl alcohol at normal temperature for less one minute.

Internal Circuit Diagram



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4. Pin Assignment

Pin NO.	Assignment
1	VDD
2	DIN
3	VSS(GND)

Preliminary

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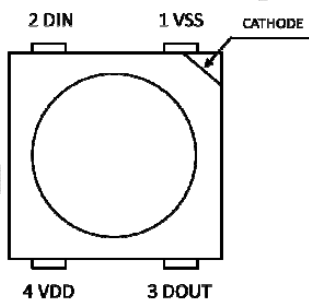
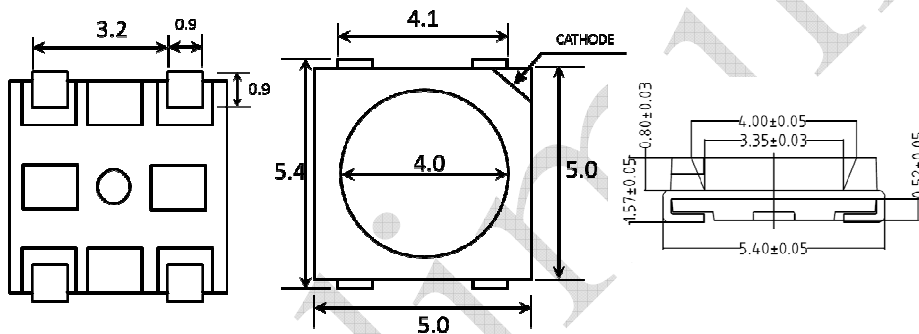
5. Light Source Rating and Characteristics (Light Strip)

Absolute Maximum Rating at Ta=25°C

Parameter	Maximum Rating	Unit
Total DC Current	2185	mA
VDD	5.5	V
DIN	-0.5~VDD+0.5	V

6. Light Source Specification (LED)

6.1 Package dimension



No.	Symbol	Function description
1	VSS	Ground
2	DIN	Control data signal input
3	DOUT	Control data signal output
4	VDD	Power supply LED

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6.2 Absolute Maximum Rating at Ta=25°C

Parameter	Maximum Rating	Unit
Total DC Forward Current(IF)	19mA	mA
LED Power Supply Voltage(VDD)	+3.8~+5.5	V
LED Input Voltage(VI)	-0.5~VDD+0.5	V
Internal Scan Frequency	800	KHz

6.3 Electrical / Optical Characteristics at Ta=25°C

Parameter	Symbol	color	LTST-G563EGBW			Unit	Test Condition
			MIN	TYP.	MAX		
Luminous Intensity	IV	Red	180	-	360	mcd	VDD=5V Note 1
		Green	450	-	900		
		Blue	70	-	224		
Viewing Angle	2θ _{1/2}	-	120			deg	Note 2 (Fig.5)
Dominant Wavelength	λ _d	Red	618	-	630	nm	VDD=5V Note 3
		Green	520	-	535		
		Blue	463	-	475		

6.4 Electrical Characteristics (Ta=-20~+70°C, V_{DD}=4.5~5.5V, V_{SS}=0V, unless otherwise specified)

Parameter	Symbol	Condition	LTST-G563EGBW			Unit
			MIN	TYP.	MAX	
Input current	I _I	V _I =V _{DD} /V _{SS}	-	-	±1	μA
Input voltage level	V _{IH}	D _{IN}	0.7V _{DD}	-	-	V
	V _{IL}	D _{IN}	-	-	0.3V _{DD}	V
Hysteresis voltage	V _H	D _{IN}	-	0.35	-	V

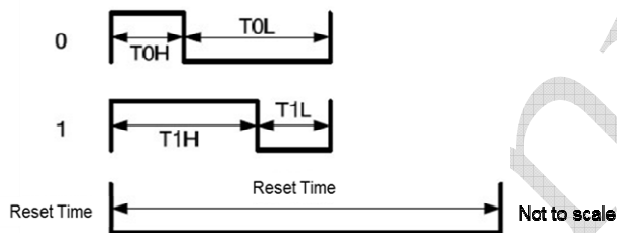
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6.5 Switching Characteristics (Ta=-20~+70°C, VDD=4.5~5.5V, VSS=0V, unless otherwise specified)

Parameter	Symbol	Condition	LTST-G563EGBW			Unit
			MIN	TYP.	MAX	
Propagation delay time	T _{PLZ}	D _{IN} →D _{OUT} CL=15pF, RL=10K Ω	-	-	300	ns
Fall time	T _{THZ}	CL=300pF, OUTR/OUTG/OUTB	-	-	20	μs
Input capacity	C _i	-	-	-	15	pF
Data transmission rate	F _{Max}	Duty ratio=50%	400	-	-	Kbps

6.6 Data transfer time

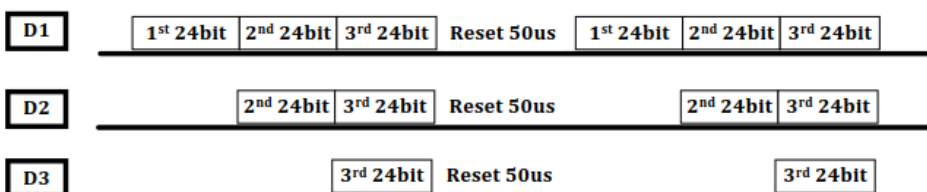
■ Timing Wave Form



■ High Speed mode

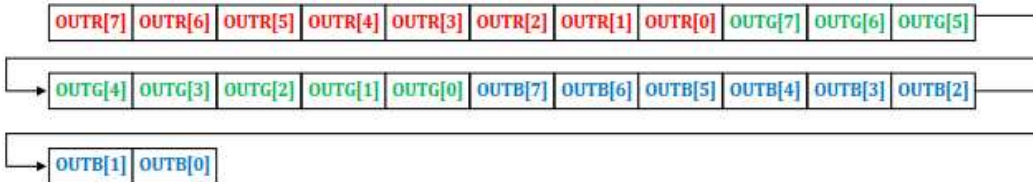
Item	Description	Typical	Allowance
T _{0H}	0 code, High-level time	300 ns	± 80ns
T _{0L}	0 code, Low-level time	900 ns	± 80ns
T _{1H}	1 code, High-level time	900 ns	± 80ns
T _{1L}	1 code, Low-level time	300 ns	± 80ns
RES	Reset time	>50 μs	-

■ Data Communication

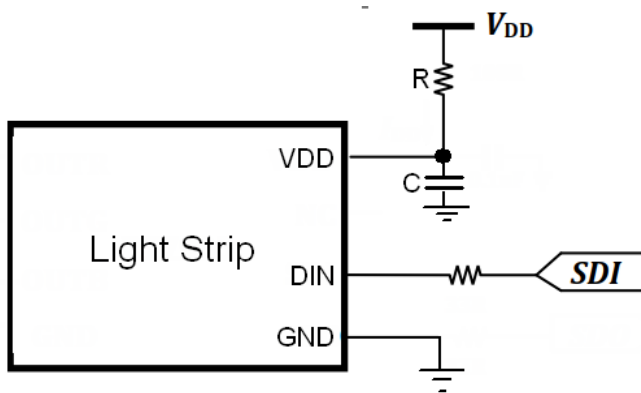


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■ Single Data in 24bit for RGB



■ Application circuit



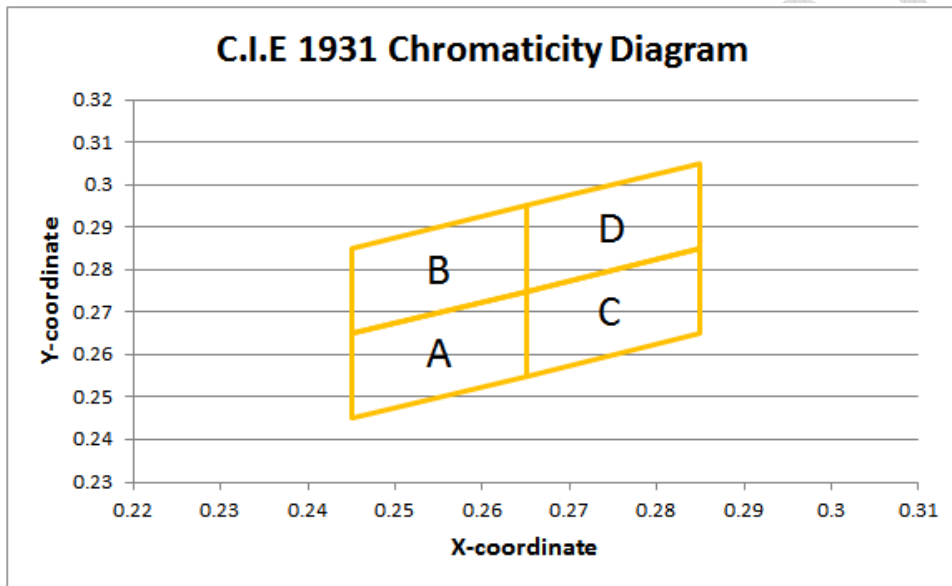
Notes:

1. Luminous intensity is measured with a light sensor and filter combination that approximates the CIE eye-response curve.
2. $\theta_{1/2}$ is the off-axis angle at which the luminous intensity is half the axial luminous intensity.
3. The dominant wavelength, λ_d is derived from the CIE chromaticity diagram and represents the single wavelength which defines the color of the device. Peak Emission Wavelength Tolerance is +/- 1nm.
4. Caution in ESD:
Static Electricity and surge damages the LED. It is recommend to use
 - Use of a conductive wrist band or anti-electrostatic glove when handling these product.
 - All devices, equipment and machinery must be properly grounded.
 - Work tables, storage racks, etc. should be properly grounded.
 - Use ion blower to neutralize the static charge which might have built up on surface of the LED's plastic lens as a result of friction between LEDs during storage and handling.

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6.7 Bin Rank

Color Bin Table						Test@VDD=5V					
Bin Code	Color Bin Limits					Bin Code	Color Bin Limits				
	CIE-	Point1	Point2	Point3	Point4		CIE-	Point1	Point2	Point3	Point4
A	x	0.2450	0.2650	0.2650	0.2450	C	x	0.2650	0.2850	0.2850	0.2650
	y	0.2450	0.2550	0.2750	0.2650		y	0.2550	0.2650	0.2850	0.2750
B	x	0.2450	0.2650	0.2650	0.2450	D	x	0.2650	0.2850	0.2850	0.2650
	y	0.2650	0.2750	0.2950	0.2850		y	0.2750	0.2850	0.3050	0.2950



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6.8 Typical Electrical / Optical Characteristics Curves

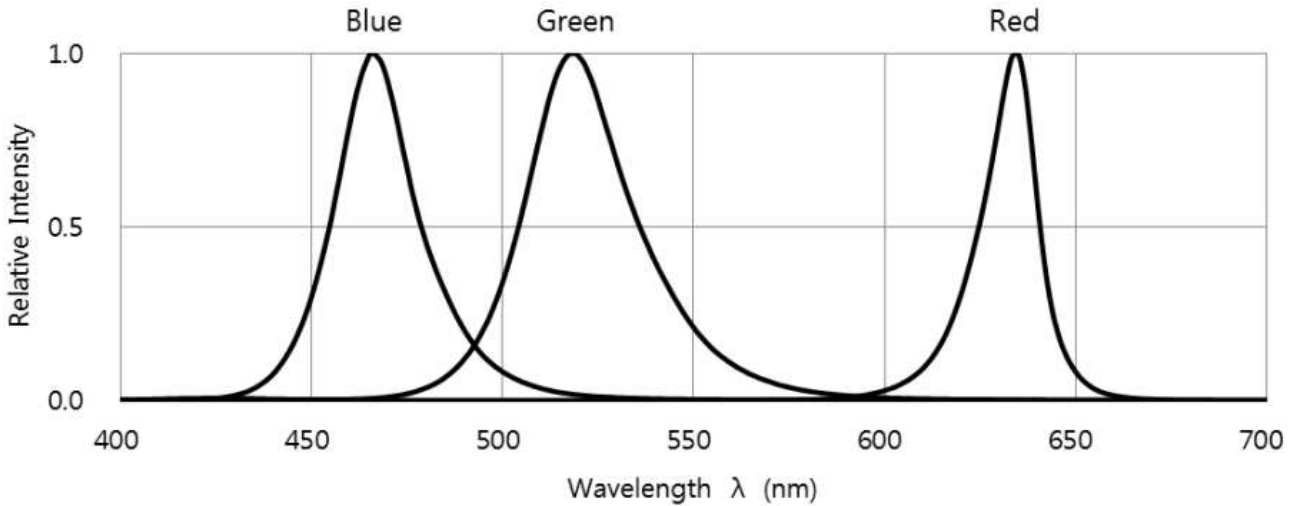


Fig. 1 RELATIVE INTENSITY VS. WAVELENGTH

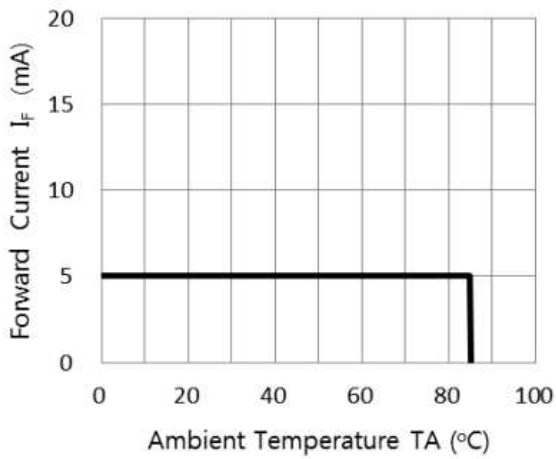


Fig. 2 FORWARD CURRENT VS. DERATING CURVE

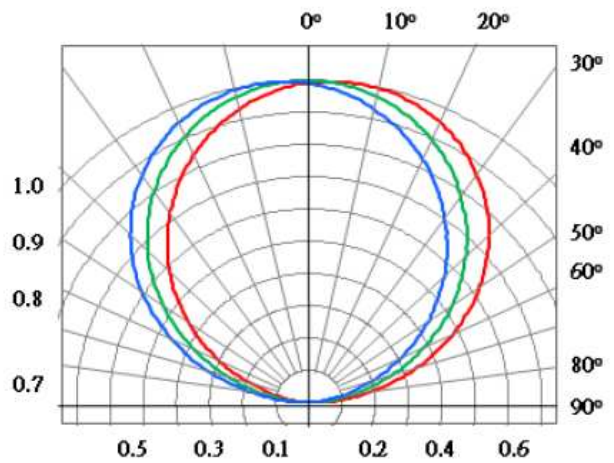


Fig. 3 Spatial Distribution - X axis

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7. Cautions

7.1 Cleaning

Do not use unspecified chemical liquid to clean LED they could harm the package. If cleaning is necessary, immerse the LED in ethyl alcohol or isopropyl alcohol at normal temperature for less one minute.

7.2 Application

The LEDs described here are intended to be used for ordinary electronic equipment (such as office equipment, communication equipment and household applications). Consult Liteon's Sales in advance for information on applications in which exceptional reliability is required, particularly when the failure or malfunction of the LEDs may directly jeopardize life or health (such as in aviation, transportation, traffic control equipment, medical and life support systems and safety devices).

7.3 Shelf Life of 3M tape

6 months from manufacture date when stored in the original carton at 21°C (70°F) & 50 % Relative Humidity.