

Features

- 1515 with integrated high quality external control single line serial cascade constant current LED driver IC.
- Single line data transmission, unlimited cascade.
- Specific Shaping Transmit Technology - number of LED stacked is not restricted.
- Output gray level: 65536.
- The transmission distance between two points is more than 10m.
- MSL 4.

Description

The IN-PH15TAT6R6G6B is 1.5*1.5*0.65mm RGB 65336 high gray LED with integrated IC. It is a SMD type LED which can be used in various applications.

Applications

- LED color module
- LED guardrail tube
- LED scene lighting
- LED point light
- LED pixel screen
- LED shaped screen
- General use.

Package Outline Dimensions & Pin Configuration

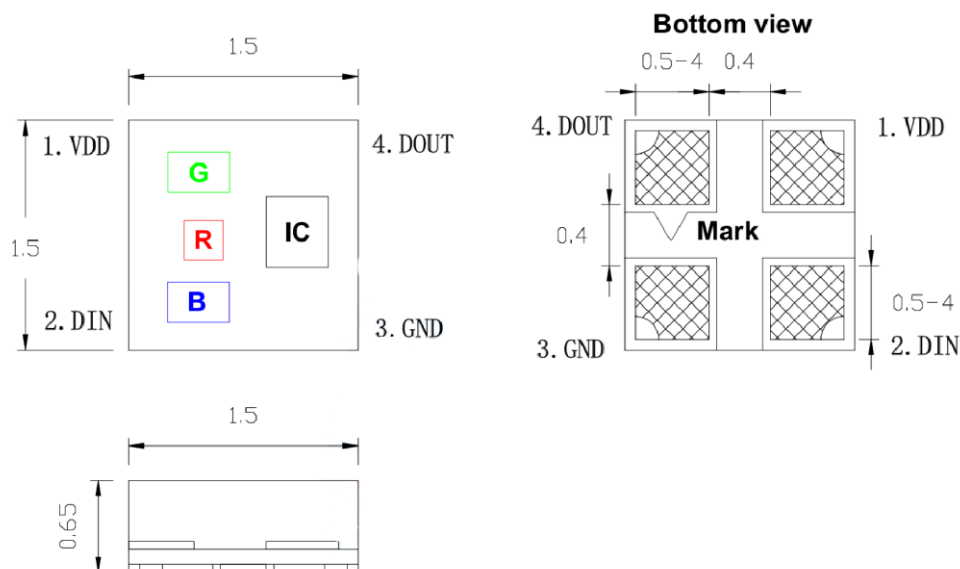


Figure 1. IN-PH15TAT6R6G6B Package Outline Dimensions

Note:

All dimensions are in millimeters.

Tolerance is $\pm 0.10\text{mm}$ unless otherwise note.

Pin Configuration

Top view

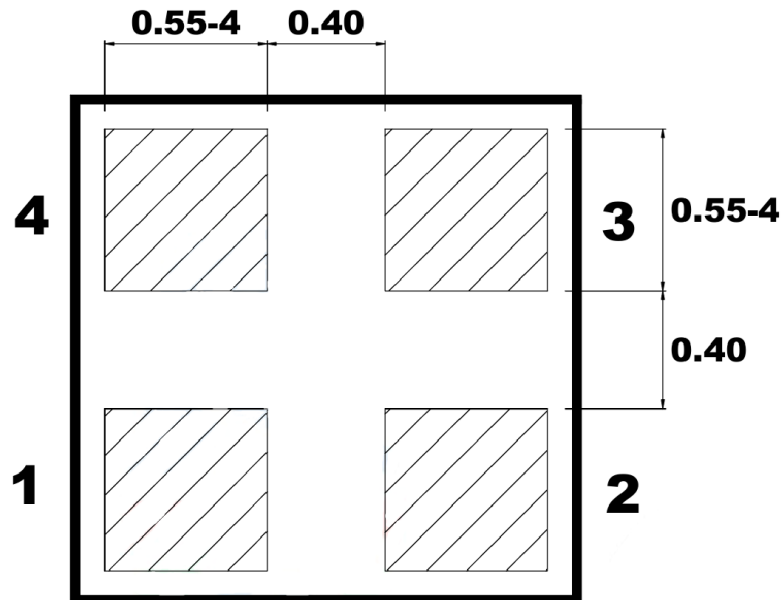


Figure 2. IN-PH15TAT6R6G6B Pin Configuration

Notes:

1. Dimension in millimeter, tolerance is $\pm 0.1\text{mm}$ unless otherwise noted.

Serial #	Symbol	Function Description
1	VDD	Power supply
2	DIN	Control data signal input
3	GND	Ground
4	DOUT	Control data signal output

Absolute Maximum Rating ($T_a = 25\text{ }^{\circ}\text{C}$)

Parameter	Symbol	Range	Unit
Power supply voltage	V_{DD}	+3.5~+5.5	V
Logical input voltage	V_{IN}	-0.5 ~ $V_{DD}+0.5$	V
Operating temperature	T_{OPT}	-30 ~ +85	$^{\circ}\text{C}$
Storage temperature	T_{STG}	-40 ~ +85	$^{\circ}\text{C}$
ESD pressure (DM)	V_{ESD}	200	V
ESD pressure (HBM)	V_{ESD}	>2K	V
Soldering Condition	Tsol	Reflow soldering: 260 $^{\circ}\text{C}$, 10s	
		Hand soldering: 300 $^{\circ}\text{C}$, 3s	

LED Characteristics ($T_a = 25^{\circ}\text{C}$, @12mA)

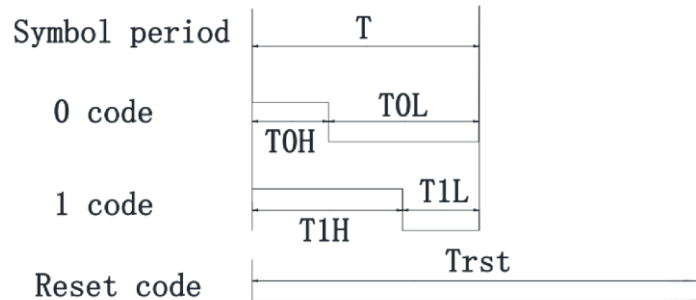
Color	IN-PH15TAT6R6G6B (6.5 mA)	
	Dominate Wavelength (nm)	Brightness (MCD)
Red	620-630	80-160
Green	515-530	120-240
Blue	460-475	25-50

Recommended Operating Ranges (unless otherwise specified, $T_a = 25\text{ }^{\circ}\text{C}$)

Parameter	Symbol	Min.	Typ.	Max	Unit	Test conditions
Input voltage	V_{DD}	3.5	-	5.5	V	-
High level input voltage	V_{IH}	0.6*VDD	-		V	DIN High level
Low level input voltage	V_{IL}	-	-	0.3*VDD	V	DIN Low level
G/R/B output drive current	I_{DOUT}	-	6.5	-	mA	$V_{DS}=1V$
PWM frequency	F_{PWM}	-	4.5	-	KHz	-
Static power consumption	I_{DD}	-	0.25	-	mA	-
Transfer rate	F_{DIN}	-	800		Kbps	-

Timing Waveforms

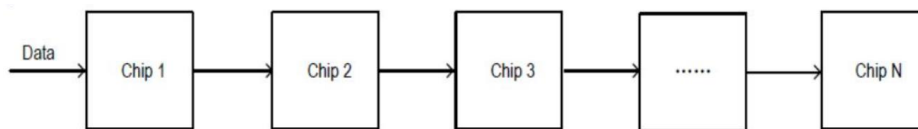
1. Input Code



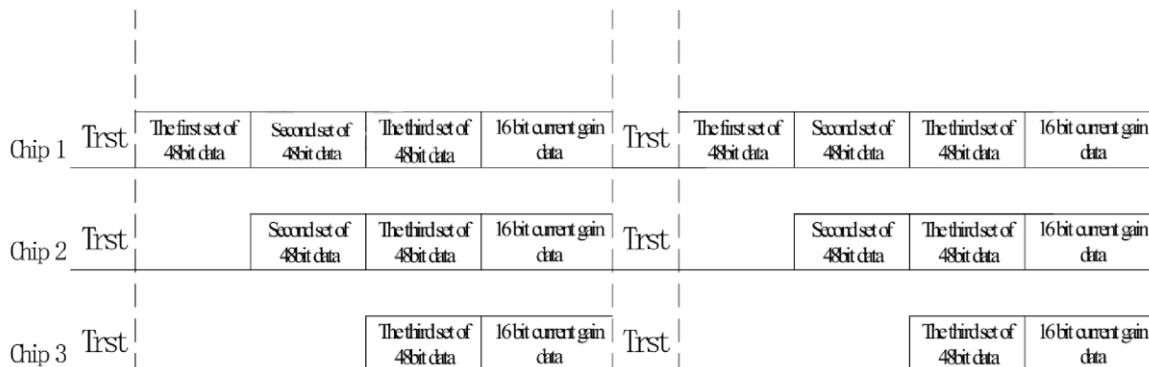
2. The data transmission time ($T_a=25\text{ }^{\circ}\text{C}$):

Name	Description	Min.	Typ.	Max.	Unit
T	code period	-	1.2	-	μs
T0H	0 code, high level time	0.2	0.3	0.4	μs
T0L	0 code, low level time	0.8	-	-	μs
T1H	1 code, high level time	0.8	0.9	1	μs
T1L	1 code, low level time	0.2	-	-	μs
Trst	Reset code, low level time	>200	-	-	μs

3. Connection Scheme



4. Data Transfer Format



Note: the D1 sends data for MCU, D2, D3, D4 for data forwarding automatic shaping cascade circuit.

5. The data structure of 48bit (Ta=25℃) :

G15	G14	G13	G12	G11	G10	G9	G8	G7	G6	G5	G4	G3	G2	G1	G0
R15	R14	R13	R12	R11	R10	R9	R8	R7	R6	R5	R4	R3	R2	R1	R0
B15	B14	B13	B12	B11	B10	B9	B8	B7	B6	B5	B4	B3	B2	B1	B0

Note: Note: High bit first send, send data in GRB order (G15 → G14 →.... B0)

Trst+48bit data from the first chip+48bit data from the second chip+...+48 bit data from the Nth chip+16bit current gain data+Trst.

48Bits grayscale data structure: high first, sent in GRB order.

G15	G14	G13	G12	G11	G10	G9	G8	G7	G6	G5	G4	G3	G2	G1	G0	R15.....R0	B15.....B0
Bit48.....bit0																	

Current gain adjustment parameter:

The current gain data is 16bits in total, this product supports software to set the current of OUT output. It contains 5bits of current gain, gain data and 1bit reserved bit data for each OUT G/R/B port. The current gain data is 16bits in total. High up in the front, send in the order of the GRBs, the structure is as follows:

Current gain parameter transmission format			
Green light (G)	Red light (R)	Blue light (B)	S0 (reserved data)
GG4 , GG3 , GG2,GG1 , GG0	GR4 , GR3 , GR2,GR1 , GR0	GB4 , GB3 , GB2, GB1 , GB0	0

- (1) GG4-GG0 is the current gain data of the OUTG port, GR4-GR0 is the current gain data of the OUTR port, GB4-GB0 is the current gain data of the OUTB port, and S0 is the reserved bit data.
- (2) When sending current gain data, the reserved bit data S0 must be 0.

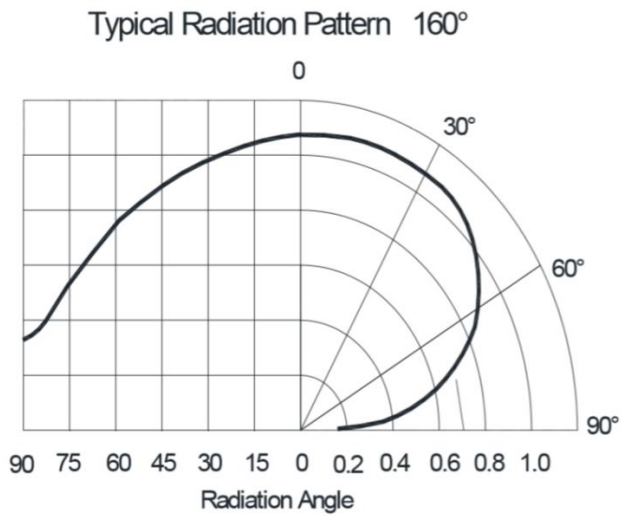
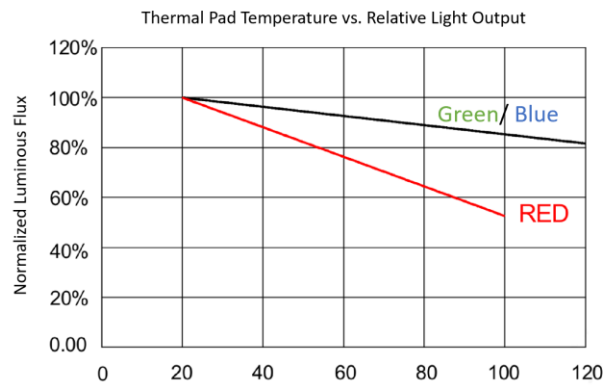
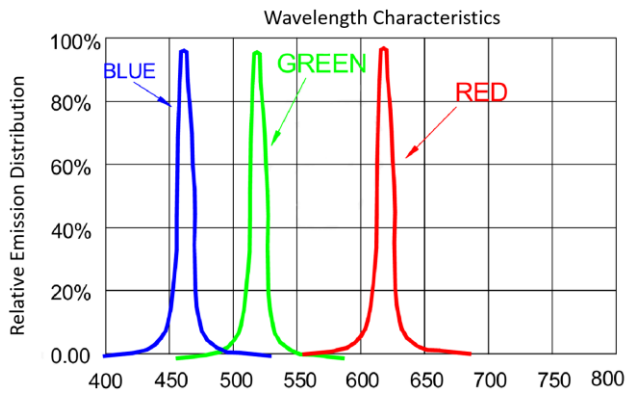
The maximum output of OUT G/R/B is 6.5mA, and users can set other current values by changing the current gain value. Please refer to the following table for reference current values:

Current gain	IOUT(mA)	Current gain	IOUT(mA)
0	0.2	16	3.4
1	0.4	17	3.6
2	0.6	18	3.8
3	0.8	19	4.0
4	1.0	20	4.2
5	1.2	21	4.4
6	1.4	22	4.6
7	1.6	23	4.8
8	1.8	24	5.0
9	2.0	25	5.2
10	2.2	26	5.4
11	2.4	27	5.6
12	2.6	28	5.8
13	2.8	29	6.0
14	3.0	30	6.2
15	3.2	31	6.4

Note :

- 1). The above current values are only theoretical data, and there may be deviations in actual current. It is recommended that customers adjust the current values based on actual measurements.
- 2). Suggested use of current: 0 ~ 24 current regulation grades.
- 3). Based on product heat dissipation, it is recommended to use a maximum current of 5mA (level 24) for this product, and current regulation levels of 25-31 are not recommended.

LED Performance Graph



Ordering Information

Product	Emission Color	IV(mcd)	Orderable Part Number
IN-PH15TAT6R6G6B	Red	80-160	IN-PH15TAT6R6G6B
	Green	120-240	
	Blue	25-50	

Label Specifications

 Inolux			Date: yyyy/mm/dd
CUSTOMER P/N: 			
INOLUX P/N: 	QTY: 	PCS 	
LOT NO: 		QC 	
IV BIN:	COLOR BIN:	VF:	

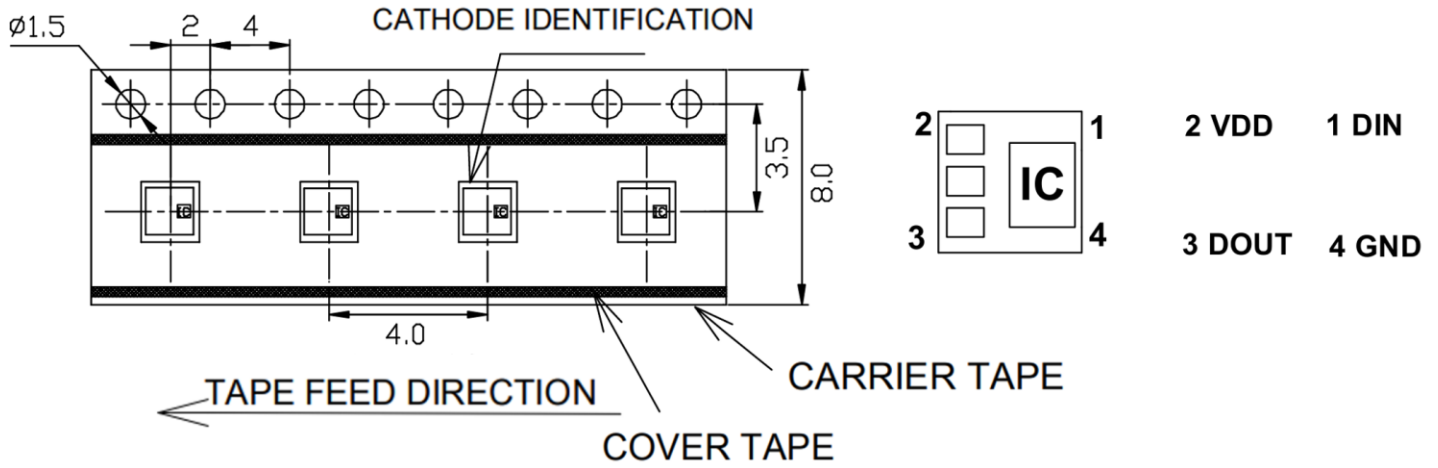
Inolux P/N:

I	N	-	PH	15	TA	T	6	R	6	G	6	B		X	X	X	X
Inolux		-	Product	Package	Variation	Orientation	Current	Color	Current	Color	Current			Customized Stamp-off			
		-	PH- High Gray Digital LED	15TA = 1.5 x 1.5 x 0.65 mm (4 pins)		T = Top Mount	6= 6.5mA	R = 620 nm	6= 6.5mA	G = 520 nm	6= 6.5mA	B = 460 nm					

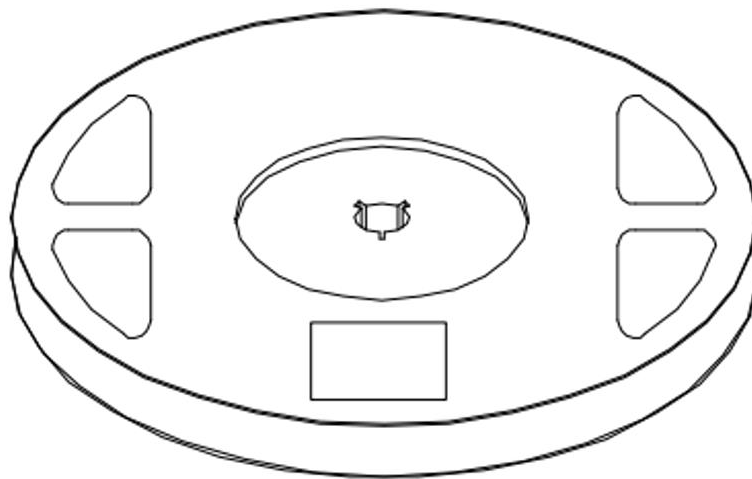
Lot No.:

Z	2	0	1	7	01	24	001
Internal Tracker	Year (2017, 2018,)				Month	Date	Serial

Packaging



1. All dimensions are in millimeters.
2. Tolerance is ± 0.1 mm unless otherwise noted.



reel(178x12mm)

Precautions

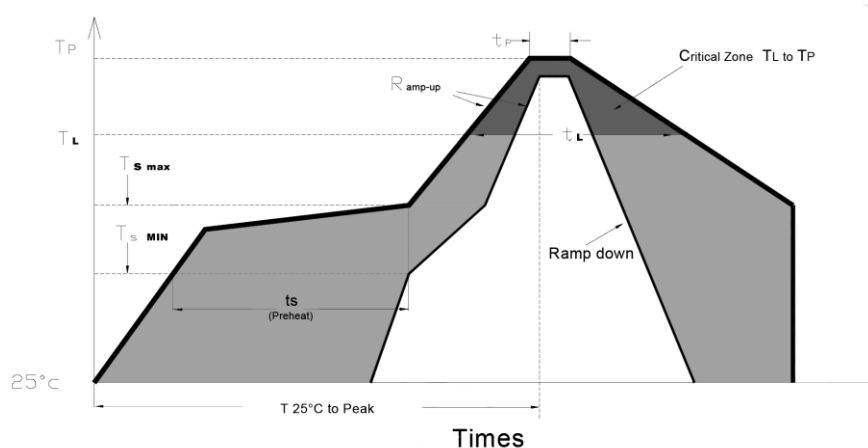
Please read the following notes before using the product:

1. Storage

- 1.1 Do not open moisture proof bag before the products are ready to use.
- 1.2 Before opening the package, the LEDs should be kept at 30°C or less and 80%RH or less.
- 1.3 The LEDs should be used within a year.
- 1.4 After opening the package, the LEDs should be kept at 30°C or less and 60%RH or less.
- 1.5 The LEDs should be used within 24 hours (1 days) after opening the package.
- 1.6 If the moisture adsorbent material has fabled away or the LEDs have exceeded the storage time, baking treatment should be performed using the following conditions. Baking treatment: 60±5°C for 24 hours.

2. Soldering Condition

Recommended soldering conditions:



Profile Feature	Lead-Free Solder
Average Ramp-Up Rate ($T_{s\ max}$ to T_p)	3°C/second max.
Preheat: Temperature Min ($T_{s\ min}$)	150°C
Preheat: Temperature Min ($T_{s\ max}$)	200°C
Preheat: Time ($t_{s\ min}$ to $t_{s\ max}$)	60-180 seconds
Time Maintained Above: Temperature (T_L)	217 °C
Time Maintained Above: Time (t_L)	60-150 seconds
Peak/Classification Temperature (T_p)	240 °C
Time Within 5°C of Actual Peak Temperature (t_p)	<10 seconds
Ramp-Down Rate	6°C/second max.
Time 25 °C to Peak Temperature	<6 minutes max.

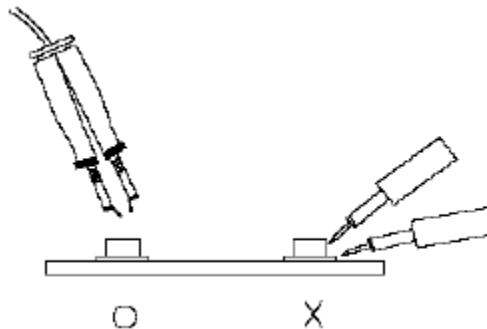
Note: Excessive soldering temperature and / or time might result in deformation of the LED lens or catastrophic failure of the LED.

3. Soldering Iron

Each terminal is to go to the tip of soldering iron temperature less than 260°C for 5 seconds within once in less than the soldering iron capacity 25W. Leave two seconds and more intervals, and do soldering of each terminal. Be careful because the damage of the product is often started at the time of the hand solder.

4. Repairing

Repair should not be done after the LEDs have been soldered. When repairing is unavoidable, a double-head soldering iron should be used (as below figure). It should be confirmed beforehand whether the characteristics of the LEDs will or will not be damaged by repairing.



5. Caution in ESD

Static Electricity and surge damage the LED. It is recommended to use a wristband or anti-electrostatic glove when handling the LED. All devices, equipment and machinery must be properly grounded.

Revision History

Changes since last revision	Page	Version No.	Revision Date
Initial Release		1.0	07-01-2024

DISCLAIMER

INOLUX reserves the right to make changes without further notice to any products herein to improve reliability, function or design. INOLUX does not assume any liability arising out of the application or use of any product or circuit described herein; neither does it convey any license under its patent rights, nor the rights of others.

LIFE SUPPORT POLICY

INOLUX's products are not authorized for use as critical components in life support devices or systems without the express written approval of the President of INOLUX or INOLUX CORPORATION. As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury of the user.
2. A critical component in any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.