PRODUCT SPECIFICATION

Part Number

PLH3537SA6-WCRGBW1x

Details

• 3.5 x 3.7 x 1.9mm RGBW LED with integrated IC.

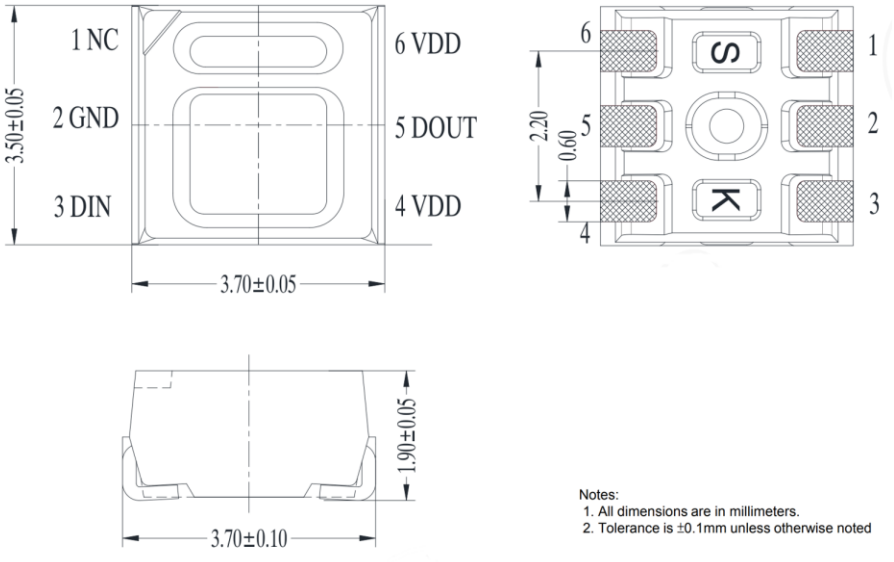
Applications

• Full color LED string light
• LED full color module
• LED guardrail tube
• LED scene lighting
• LED point light
• LED pixel screen
• LED shaped screen

Features

- 3537 with integrated high quality constant current IC and RGBW LED chips.
- Built-in IC, with high precision of constant current and internal RGBW chips spectral processing in advance.
- Single line data transmission (return to zero code).
- Specific Shaping Transmit Technology - number of LED stacked is not restricted.
- Cascading Enhancement Technology - any 2 LED spacing can be up to 10 meters
- Data transfer rate of 800 kbp/s at 30 frames per second.
- RGBW output port PWM control can achieve 256 grey level adjustments.
- Upon powering up, IC performs self-inspection then lights connection on the pin B lamp.
- SA-I Anti-interference patent technology for single line data transmission.
- Built-in power supply reverse connect protection module, reversed power input will not damage the IC.

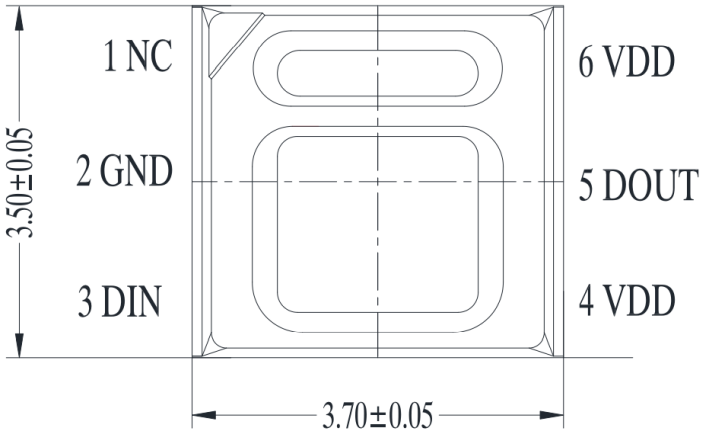
Package Outline Dimensions & Pin Configuration



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

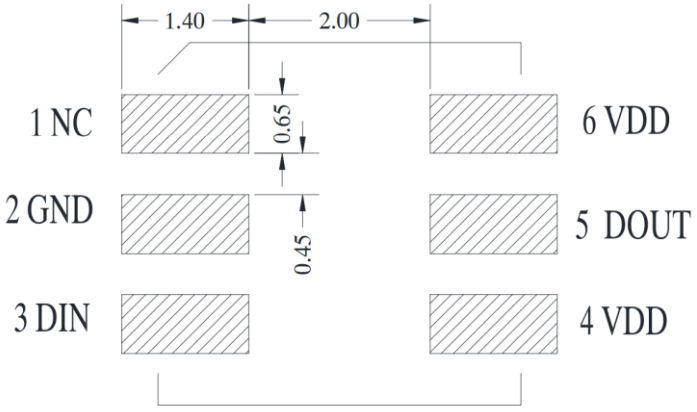
Note:
1. Specifications subject to change without notice

Pin Configuration



Number	Symbol	Function Description
1	NC	NC
2	GND	The signal and power supply and grounding
3	DIN	Control signal data input
4/6	VDD	Power supply pin
5	DOUT	Control signal data output

Soldering Pad Size



Notes:
1. Dimension in millimeter, tolerance is ±0.1mm unless otherwise noted.

Absolute Maximum Rating *(Ta = 25 ℃, VSS=0V)*

Parameter	Symbol	Range	Unit
Power supply voltage	V_{DD}	+3.7～+5.5	V
Logic input voltage	V_{IN}	-0.5 ~VDD+0.5	V
Working temperature	T_{OPT}	−40 ~ +80	℃
Storage temperature	T_{STG}	−40 ~ +80	℃
ESD pressure(HBM)	V_{ESD}	4K	V
ESD pressure(DM)	V_{ESD}	200	V

LED Characteristics *(Ta = 25℃)*

Color	12mA	
	Wavelength(nm)	Light Intensity(mcd)
Red	620-630	300-500
Green	515-530	1000-1500
Blue	460-470	200-400
Cool White	6000K	1500-2200
Neutral White	4000k	1500-2200
Warm White	3000k	1500-2200

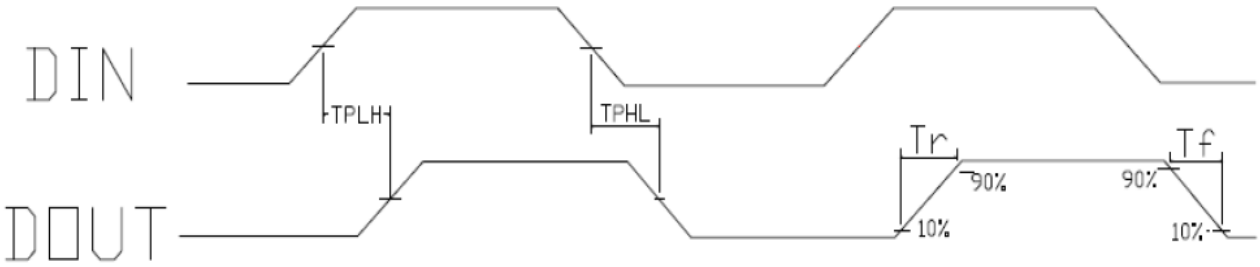
Recommended Operating Ranges

(unless otherwise specified, Ta= -20 ~ +70 ℃, VDD=4.5 ~ 5.5V,VSS=0V)

Parameter	Symbol	Min.	Typ.	Max	Unit	Test conditions
The chip Supply Voltage	V_{DD}	-	5.2	-	V	-
The signal input flip threshold	V_{IH}	0.7*+VDD	-		V	VDD=5.0V
The signal input flip threshold	V_{IL}	-	-	0.3*+VDD	V	VDD=5.0V
The frequency of PWM	F_{PWM}	-	1.2	-	KHZ	-
Static power consumption	I_{DD}	-	1	-	mA	-

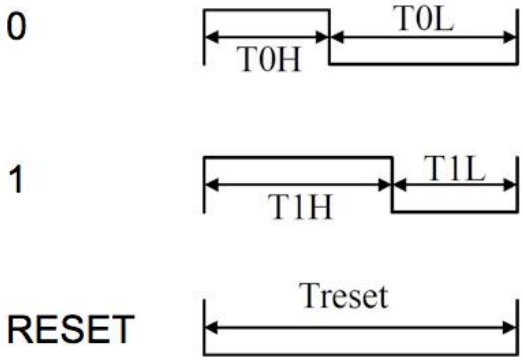
Switching Characteristics (unless otherwise specified, TA=25 °C)

Parameter	Symbol	Min.	Typ.	Max	Unit	Test conditions
The speed of data transmission	*fDIN*	-	800	-	KHZ	The duty ratio of 67% (data 1)
DOUT transmission delay	T_{PLH}	-	-	500	ns	DINŸ DOUT
	T_{PHL}	-	-	500	ns	
I_{OUT} Rise/Drop Time	T_r	-	100	-	ns	VDS=1.5 IOUT R/G/B = 9mA IOUT W = 18mA
	T_f	-	100	-	ns	



Timing Waveforms

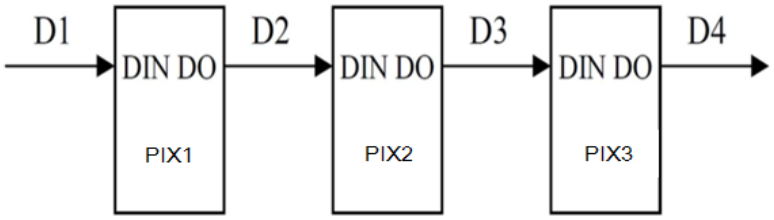
1. Input Code



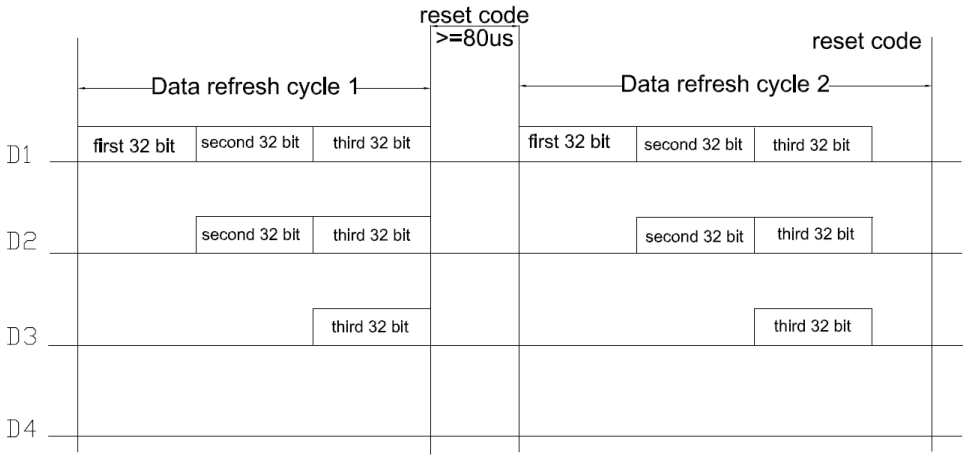
2. The data transmission time (TH+TL=1.25μs±600ns):

Name		Min.	Standard value	Max.	Unit
T	Code period	1.20	--	--	μs
T0H	0 code, high level time	0.2	0.32	0.4	μs
T0L	0 code, low level time	0.8	--	--	μs
T1H	1 code, high level time	0.58	0.64	1.0	μs
T1L	1 code, low level time	0.2	--	--	μs
Trst	Reset code, low level time	>80	--	--	μs

3. Connection Scheme



4. Data Transfer Format



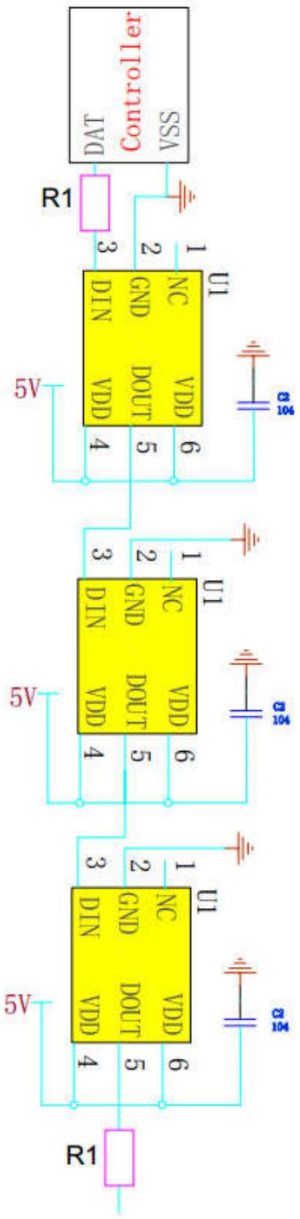
Note: the D1 sends data for MCU, D2, D3, D4 for data forwarding automatic shaping cascade circuit.

5. 24-bit data format

G7	G6	G5	G4	G3	G2	G1	G0	R7	R6	R5	R4
R3	R2	R1	R0	B7	B6	B5	B4	B3	B2	B1	B0
W7	W6	W5	W4	W3	W2	W1	W0				

Note: high starting, in order to send data (G7 - G6 - ....W0)

Typical Application Circuit



In the practical application circuit, the signal input and output pins of the IC signal input and output pins should be connected to the signal input and output terminals. In addition, to make the IC chip is more stable, even the capacitance between beads is essential back.

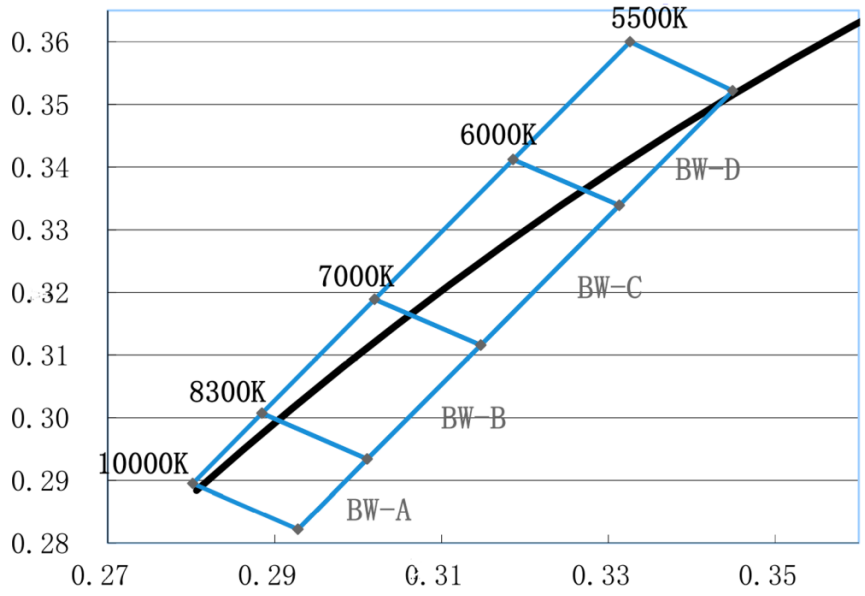
Application: used for soft lamp strip or hard light, lamp beads transmission distance is short, suggested in signal in time the clock line input and output end of each connected in series protection resistors, R1 of about 500 ohms.

Application: for module or general special-shaped products, lamp beads transmission distance is long, because of different wire and transmission distance, in the signal in time clock at both ends of the line on grounding protection resistance will be slightly different; to the actual use of fixed.

Color Bin Specification

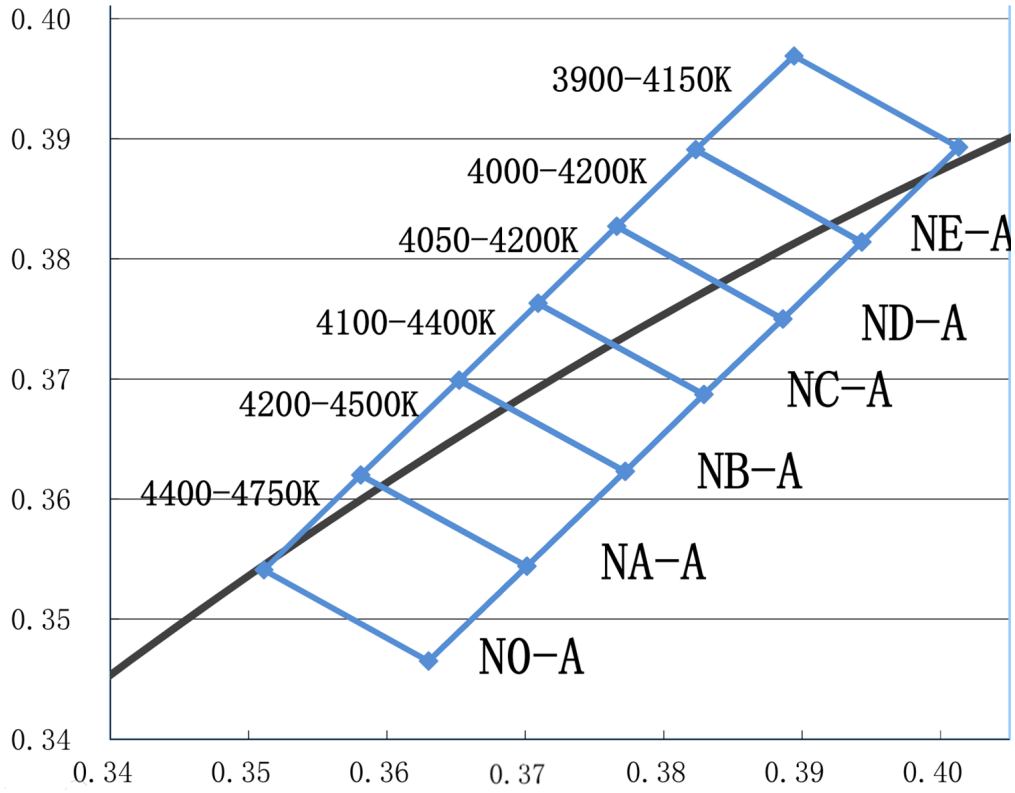
Name	Code	λd MIN (nm)	λd MAX (nm)
Red	R1	620	625
	R2	625	630
Blue	B5	460	465
	B6	465	470
Green	G2	515	520
	G3	520	525
	G4	525	530

Cool White: 7000K~10000K



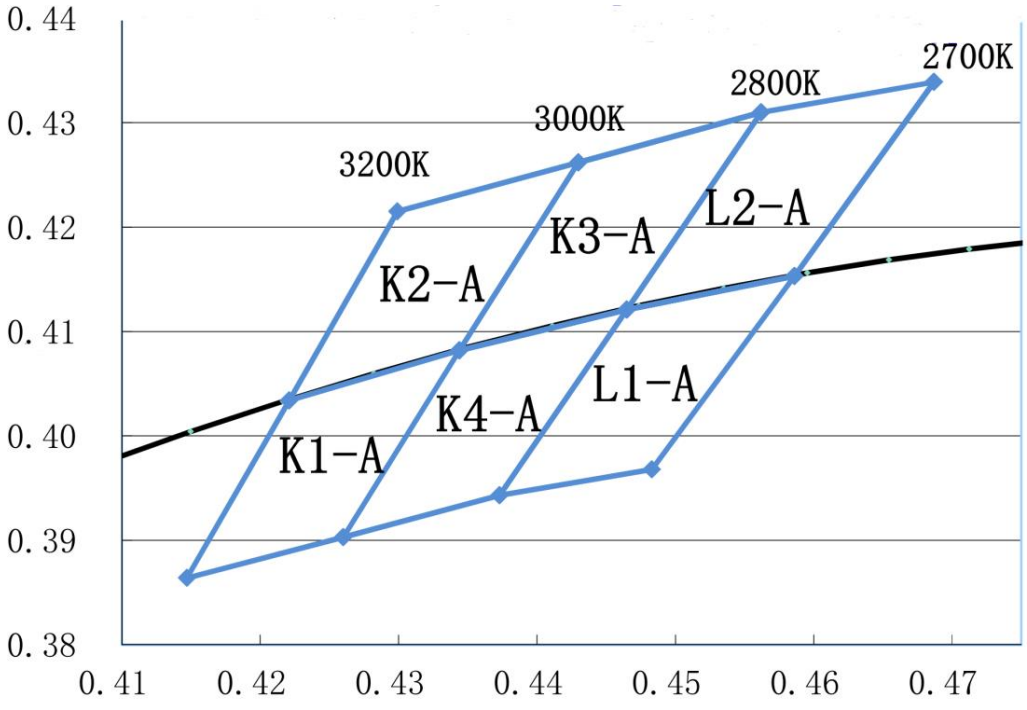
Name	X1	Y1	X2	Y2	X3	Y3	X4	Y4
BW-A	0.2928	0.2822	0.2802	0.2895	0.2885	0.3007	0.3011	0.2934
BW-B	0.3011	0.2934	0.2885	0.3007	0.302	0.3189	0.3147	0.3116
BW-C	0.3147	0.3116	0.302	0.3189	0.3186	0.3412	0.3313	0.3339
BW-D	0.3313	0.3339	0.3186	0.3412	0.3326	0.36	0.3449	0.3522

Neutral White: 3900K~4750K



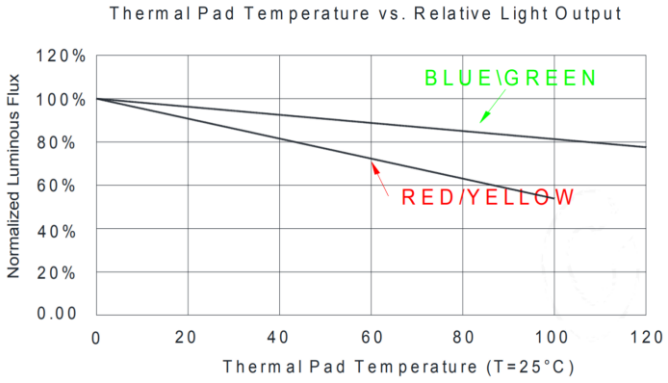
Name	X1	Y1	X2	Y2	X3	Y3	X4	Y4
NO-A	0. 358	0. 3445	0. 3461	0. 3521	0. 3531	0. 36	0. 3651	0. 3524
NA-A	0. 3651	0. 3524	0. 3531	0. 36	0. 3602	0. 3679	0. 3722	0. 3603
NB-A	0. 3722	0. 3603	0. 3602	0. 3679	0. 3659	0. 3743	0. 3779	0. 3667
NC-A	0. 3779	0. 3667	0. 3659	0. 3743	0. 3716	0. 3807	0. 3836	0. 373
ND-A	0. 3836	0. 373	0. 3716	0. 3807	0. 3773	0. 3871	0. 3893	0. 3794
NE-A	0. 3893	0. 3794	0. 3773	0. 3871	0. 3844	0. 3949	0. 3963	0. 3873

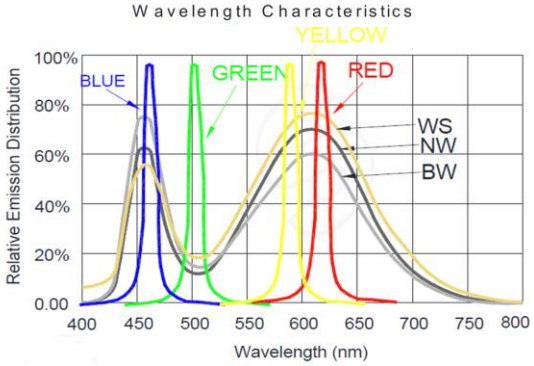
Warm White: 2700K~3200K

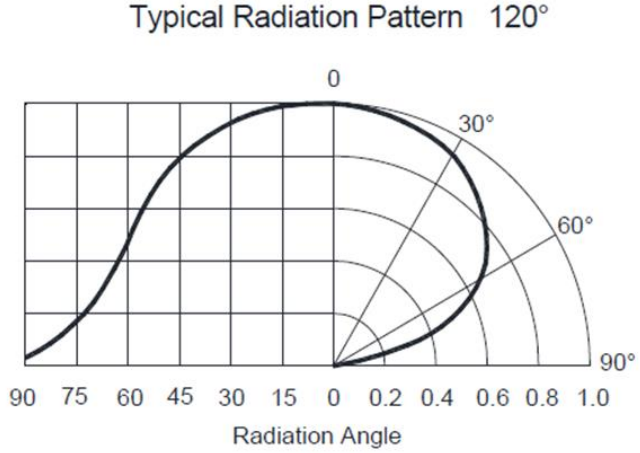


Name	X1	Y1	X2	Y2	X3	Y3	X4	Y4
K1-A	0. 4344	0. 4032	0. 4221	0. 3984	0. 4147	0. 3814	0. 426	0. 3853
K2-A	0. 443	0. 4212	0. 4299	0. 4165	0. 4221	0. 3984	0. 4344	0. 4032
K3-A	0. 4562	0. 426	0. 443	0. 4212	0. 4344	0. 4032	0. 4465	0. 4071
K4-A	0. 4465	0. 4071	0. 4344	0. 4032	0. 426	0. 3853	0. 4373	0. 3893
L1-A	0. 4586	0. 4103	0. 4465	0. 4071	0. 4373	0. 3893	0. 4483	0. 3918
L2-A	0. 4687	0. 4289	0. 4562	0. 426	0. 4465	0. 4071	0. 4586	0. 4103

LED Performance Graph







Ordering Information

Product	Emission Color	Iv (mcd) Typ.	Wavelength (Wd) / CCT Typ.	Orderable Part Number
PLH3537SA6-WCRGBW16	R	400	625	PLH3537SA64-WCRGB16
	G	1250	520	
	B	300	465	
	W	1850	6000k	
PLH3537SA6-WCRGBW14	R	400	625	PLH3537SA64-WCRGB14
	G	1250	520	
	B	300	465	
	W	1850	4000k	
PLH3537SA6-WCRGBW13	R	400	625	PLH3537SA64-WCRGB13
	G	1250	520	
	B	300	465	
	W	1850	3000k	

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℃ or less and 80%RH or less.

1.3 The LEDs should be used within a year.

1.4 After opening the package, the remaining LEDs should be kept in a resealed bag.

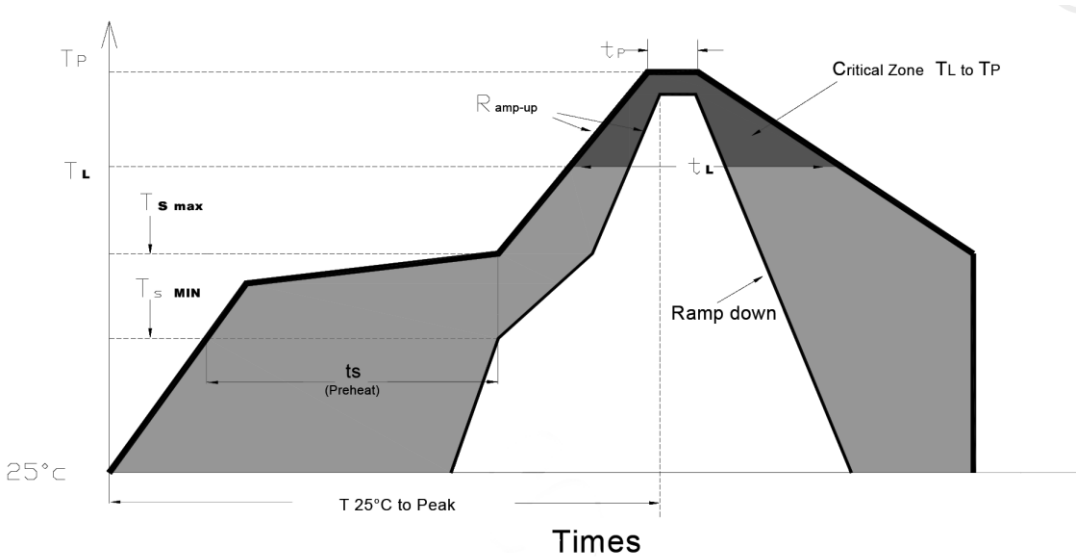
1.5 The LEDs require mandatory baking before usage. Baking treatment listed below.

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℃ for24 hours.

2. Soldering Condition

Recommended soldering conditions:

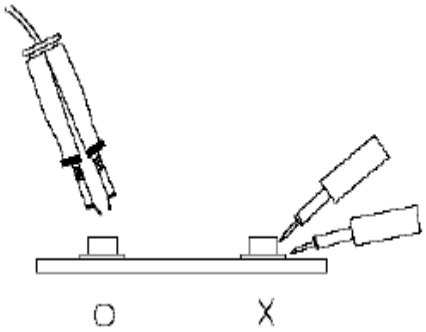


Profile Feature	Lead-Free Solder
Average Ramp-Up Rate (Ts $_{max}$ to Tp)	3℃/second max.
Preheat: Temperature Min (Ts $_{min}$)	150℃
Preheat: Temperature Min (Ts $_{max}$)	200℃
Preheat: Time (ts $_{min\ to}$ ts $_{max}$)	60-180 seconds
Time Maintained Above: Temperature (T_L)	217 ℃
Time Maintained Above: Time (t_L)	60-150 seconds
Peak/Classification Temperature (T_P)	240 ℃
Time Within 5℃ of Actual Peak Temperature (tp)	<10 seconds
Ramp-Down Rate	6℃/second max.
Time 25 ℃ 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℃ 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 damages 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.Re: da

Record of Revisions			
Rev.	**Comments**	**Page**	**Date**
0	Released Spec	--	4/27/2021