5050RGBW
0.5W R Series

RGBW 4-in-1 versatile package

The 5050RGBW R Series is a complementary portfolio of 4-in-1 package. With individual channel control, it make color tuning easier and deliver a wide variety of color option to the application.

Features and Benefits
RGBW 4-in-1 module
5.0mm x 5.0mmx 1.6mm
Individually control each channel

Primary Applications
Linear
Wall Wash
Decorative

Part Number Nomenclature

Part numbers for 5050RGBW R series follow the convention below:

L 1 M C – **A A B B R C** 5 0 0 0 **D D D**

Where:

A A – designates CCT (27=2700K,30=3000K,35=3500K,40=4000K,50=5000K,57=5700K,65=6500K)

B B – designates CRI (70=70CRI,80=80CRI,90=90CRI)

C – designates Product model (A=RGBW,B=RGBWW)

D D D – designates Lumileds internal code(0A1,0B1,0C1,etc.=shares the same base part)

Therefore, the following part number is used for the 5050RGBW R-series 2700K,80CRI LED:

L 1 M C – **2 7 8 0 R A 5 0 0 0** 0 B 1

Lumen Maintenance

Please contact your local Sales Representative or Lumileds Technical Solutions Manager for more information about the long-term performance of this product.

Environmental Compliance

Lumileds LLC is committed to providing environmentally friendly products to the solid-state lighting market. Lumileds 5050RGBW 0.2W R is compliant to the European Union directives on the restriction of hazardous substances in electronic equipment, namely the RoHS Directive 2011/65/EU and REACH Regulation (EC) 1907/2006. Lumileds LLC will not intentionally add the following restricted materials to its products: lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB) or polybrominated diphenyl ethers (PBDE).

Part Number List

Table1: Tested and binned at 25°C, If =60mA.

Product	CRI	CCT	BIN
5050RGBW 0.5W R	80	2700	L1MC-2780RA50000B1
	80	3000	L1MC-3080RA50000B1
	80	3500	L1MC-3580RA50000B1
	80	4000	L1MC-4080RA50000B1
	80	5000	L1MC-5080RA50000B1
	80	5700	L1MC-5780RA50000B1
	80	6000	L1MC-6080RA50000B1
	80	6500	L1MC-6580RA50000B1

Notes for Table 1:
1. Correlated color temperature at test conditions.
2. Luminous flux and CRI are based upon mounted package on highly reflective surface at Tj=25°C. Typical CRI is approximately 2 points higher than the minimum CRI specified, but this is not guaranteed.
3. Lumileds maintains a tolerance of ±2 on CRI,

Performance Characteristics

Table2: Tested and binned at 25°C, If =60mA.

TYPE	DOMINANT WAVELENGTH (nm)			OPTICAL PERFORMANCE (mcd@RGB ; lm@white)			FORWARD VOLTAGE (Vf)		
	MINIMUM	TYPICAL	MAXIMUM	MINIMUM	TYPICAL	MAXIMUM	MINIMUM	TYPICAL	MAXIMUM
Red	620	623	630	2500	2750	3000	1.8	2.1	2.4
Green	520	525	530	5000	5500	6000	2.8	3.0	3.4
Blue	460	465	470	1000	1200	1300	2.8	3.0	3.4
White @2700K	-	-	-	19	20	21	2.8	3.0	3.4
White @3000K	-	-	-	19	20	21	2.8	3.0	3.4
White @3500K	-	-	-	19	20	21	2.8	3.0	3.4
White @4000K	-	-	-	21	22	23	2.8	3.0	3.4
White @5000K	-	-	-	21	22	23	2.8	3.0	3.4
White @5700K	-	-	-	21	22	23	2.8	3.0	3.4
White @6500K	-	-	-	21	22	23	2.8	3.0	3.4

Notes for Table 2:
1. Lumileds maintains a tolerance of ±1nm on dominant wavelength measurements.
2. Lumileds maintains a tolerance of ±7.5% on luminous flux measurements and ±6.5% on radiometric power measurements
3. Lumileds maintains a tolerance of ±0.1V on forward voltage measurements.

Absolute Maximum Ratings

Table 3

PARAMETER	RED	GREEN	BLUE	WHITE
DC Forward Current (mA)	65	65	65	65
Power dissipation (mW)	156	221	221	221
LED junction temperature (°C)	125			
ESD sensitivity (V)	2000			
LED storage temperature (°C)	-40 ~ 85			
LED operating temperature range (°C)	-40 ~ 85			
Soldering temperature (°C)	260			
Allowable reflow cycles	3			

Notes for Table 3:
1. Proper current derating must be observed to maintain the junction temperature below the maximum allowable junction temperature.
2. At 0.01ms pulse on time test with a pulse period of 0.1ms.

Reliability Test Items And Conditions

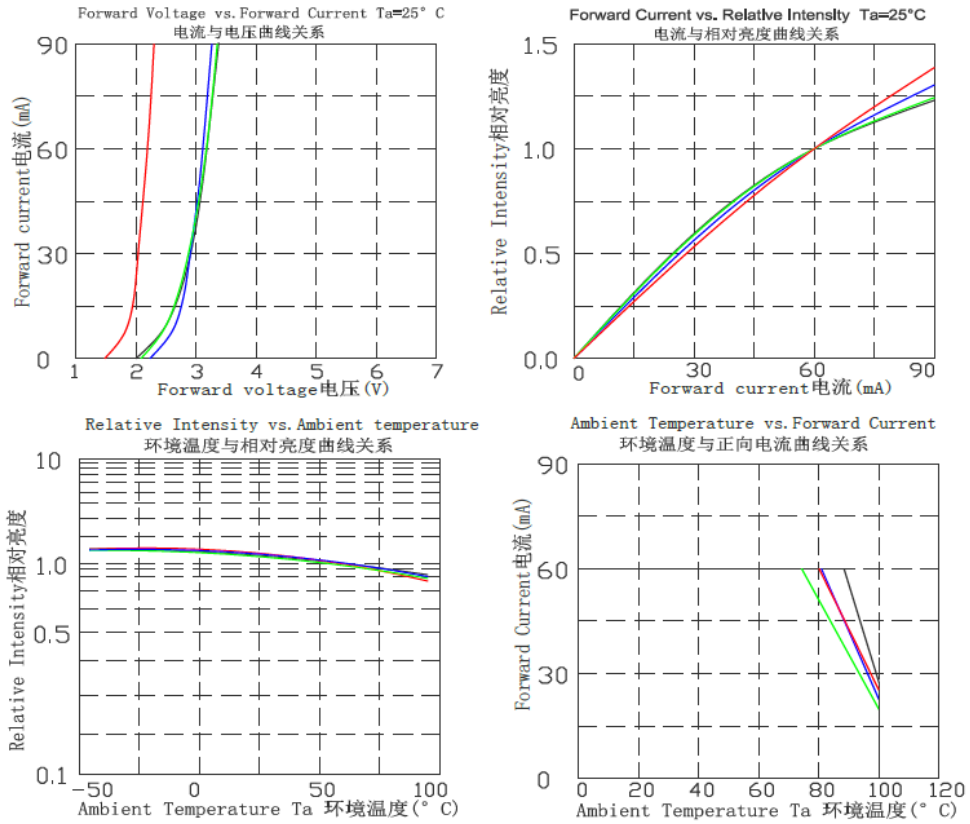
Test Items	Test condition	Time	Quantity	Ac/Re
Reflow Soldering	Temp. :260℃/10sec.	6Min.	22pcs	0/1
Thermal Shock	-40~125℃, 15min dwell, 10sec transfer	100Cycles	22pcs	0/1
High Temperature High Humidity life Test	85℃,85%RH, IF=20mA	1000Hrs.	10pcs	0/1
Low Temperature Storage	Ta=-40℃	1000Hrs.	10pcs	0/1
High Temperature Storage	Ta=100℃	1000Hrs.	10pcs	0/1
High Temperature Operation Life Test	Ta=105℃, IF =20mA.	1000Hrs.	10pcs	0/1

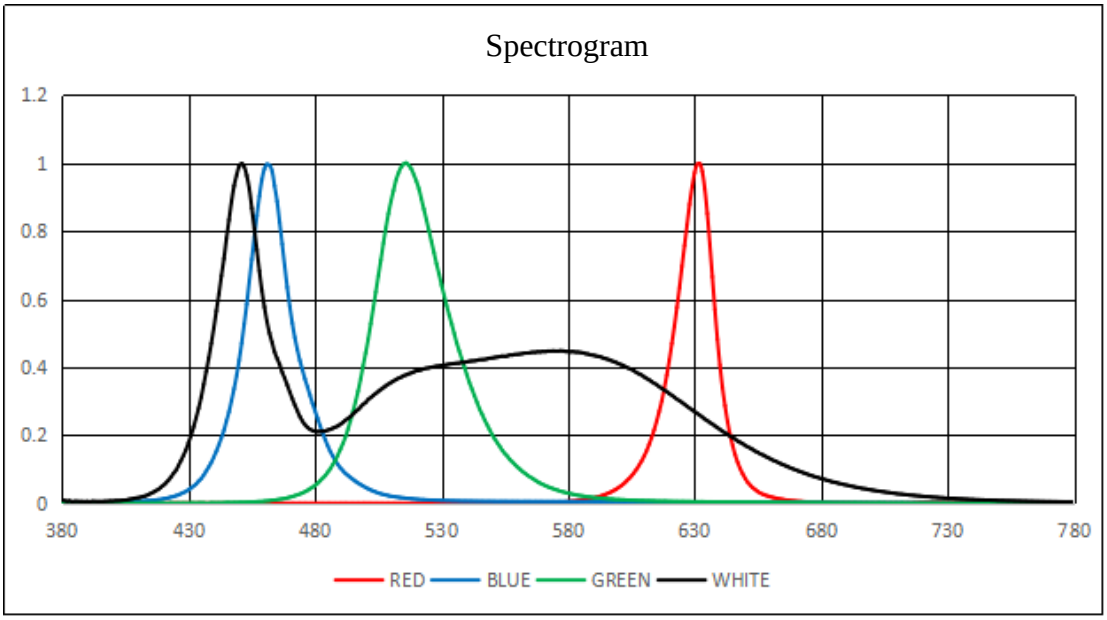
Failure Criteria

Item	Symbol	Failure Criteria
Luminous Flux	Lm	≧70%
Forward voltage	VF	±10%
Colour	CIE_X CIE_Y	±0.01

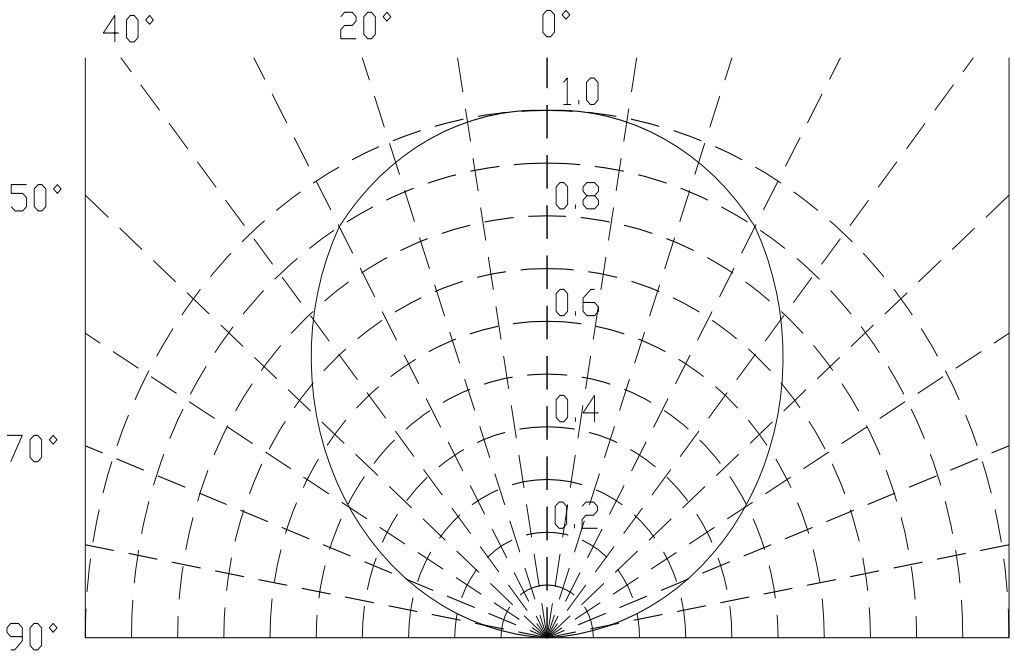
Typical optical characteristics curves

Typical optical characteristics curves 光电特性曲线





Curves of beam angle and relative brightness



Product Bin and Labeling Definitions

Decoding Product Bin Labeling

In the manufacturing of semiconductor products, there are variations in performance around the average values given in the technical datasheet. For this reason, Lumileds bins LED components for luminous flux or radiometric power, color point, peak wavelength or dominant wavelength, and forward voltage.

5050RGBW 0.2W R Series Cat code following the format below:

A B C D	–	Flux for R-G-B-W
EF GH JK LMN	–	Color for R-G-B-W
P Q R S	–	Vf for R-G-B-W

Where:

A B C D

– designates luminous flux bin (example: R=2500 to 3000mcd, G=5000 to 6000mcd, B=1000 to 1300mcd, W=19 to23 lm)

EF GH JK LMN

– designates color bin for white and dominant wavelength bins for RGB (example: 10=620 to 625nm, 20=520 to 525nm, 30=460 to 465nm, 27=2700k, 5=5SDCM)

P Q R S

– designates forward voltage bin (example: RA=red 1.8 to 2.0V, GA=green 2.8 to 3.0V, BA=blue 2.8 to 3.0V,WV=white 2.8 to 3.4V)

Luminous Flux Bins

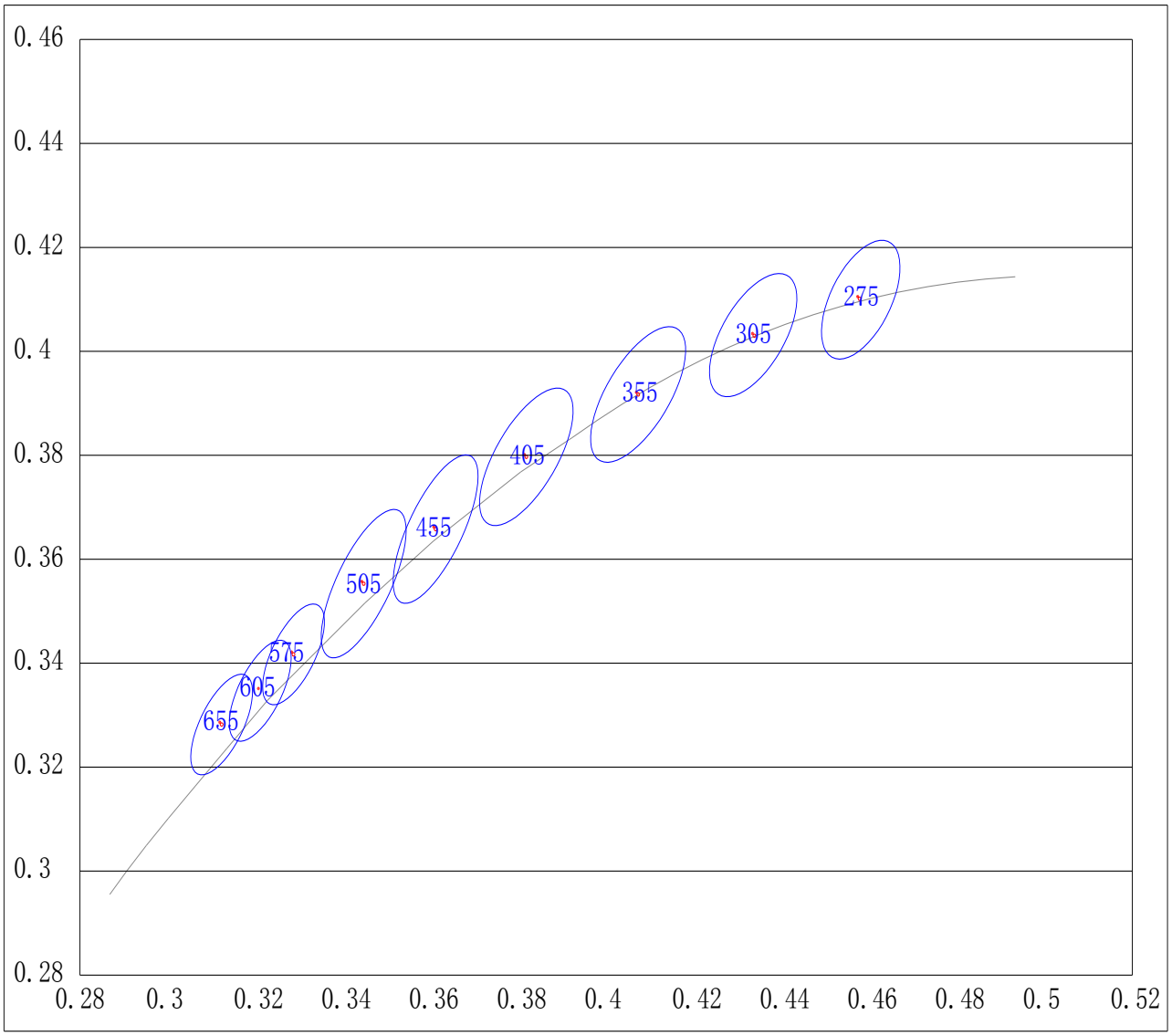
Table4: Tested and binned at 25°C, If =60mA.

TYPE	BIN	OPTICAL PERFORMANCE [1] (lm@white ; mcd@RGB)	
		MINIMUM	MAXIMUM
Red	R	2500	3000
Green	G	5000	6000
Blue	B	1000	1300
White	W	19	23

Notes for table 4:

1. Lumileds maintains a tolerance of ±7.5% on luminous flux measurements and ±6.5% on radiometric power measurements

Color Bin Definitions



White Bin Code	Target Center Point		Major Axis a	Major Axis b	Ellipse Rotation Angle	Color Temperature Range
	X	Y				
275	0.4578	0.4101	0.012889	0.006685	57.28	2650-2850K
305	0.4338	0.4030	0.013910	0.006831	53.16	2930-3200K
355	0.4073	0.3917	0.015452	0.006899	52.96	3300-3650K
405	0.3818	0.3797	0.015644	0.006725	54	3780-4250K
455	0.3611	0.3658	0.016183	0.006000	59.62	4260-4740K
505	0.3447	0.3553	0.016183	0.006000	59.62	4720-5400K
575	0.3287	0.3417	0.011029	0.004758	58.38	5350-6000K
605	0.3211	0.3347	0.011029	0.004758	58.38	5700-6450K
655	0.3123	0.3282	0.011029	0.004758	58.38	6130-7000K

Notes for table 5:
1. Lumileds maintains a tolerance of ±0.005 on x and y coordinates in the CIE 1931 color space.

Dominant Wavelength Bins

Table6: Tested and binned at 25°C, If =60mA.

TYPE	BIN	DOMINANT WAVELENGTH (nm)	
		MINIMUM	MAXIMUM
Red	R1	620	625
	R2	625	630
Green	G1	520	525
	G2	525	530
Blue	B1	460	465
	B2	465	470

Notes for table 6
1. Lumileds maintains a tolerance of ±1nm on dominant wavelength measurements.

Forward Voltage Bins

Table7: Tested and binned at 25°C, If =60mA.

TYPE	BIN	LUMINOUS FLUX [1] (lm@white ; mcd@RGB)	
		MINIMUM	MAXIMUM
Red	RA	1.8	2.0
	RB	2.0	2.2
	RC	2.2	2.4
Green	GA	2.8	3.0
	GB	3.0	3.2
	GC	3.2	3.4
Blue	BA	2.8	3.0
	BB	3.0	3.2
	BC	3.2	3.4
White	WV	2.8	3.4

Notes for table 7

1. Lumileds maintains a tolerance of ±0.1V on forward voltage measurements.

Mechanical Dimensions

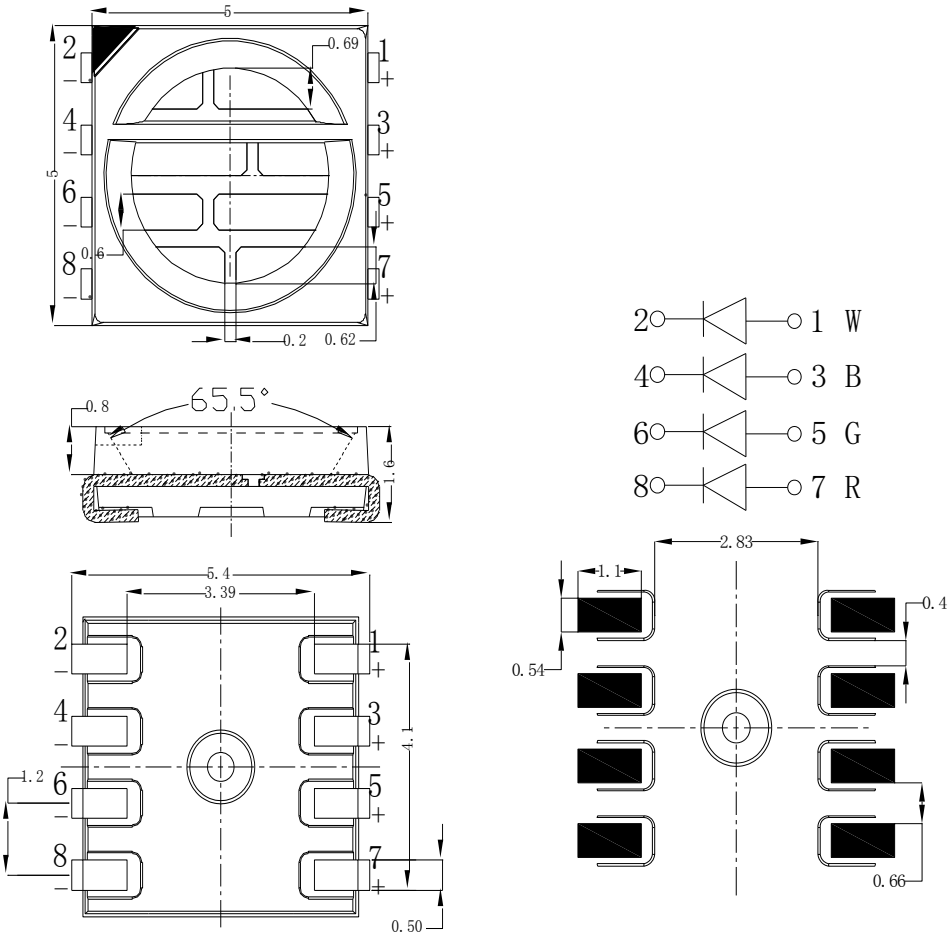


Figure. Mechanical dimensions for 5050RGBW 0.5W R

Notes:

1. Drawings are not to scale.
2. All dimensions are in millimeters.

Reflow Soldering Guidelines

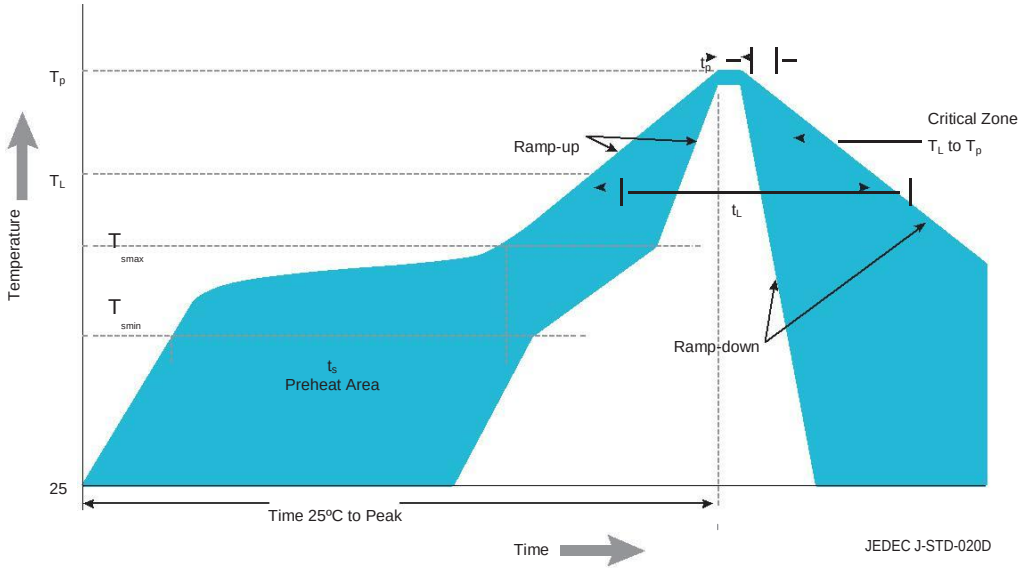


Figure. Visualization of the acceptable reflow temperature profile as specified in Table 8.

Table 8. Reflow profile characteristics for 5050RGBW 0.5W R Series

Profile Feature	Lead Free Assembly
Preheat Minimum Temperature (Tsmin)	150°C
Preheat Maximum Temperature (Tsmax)	200°C
Preheat Time (tsmin to tsmax)	60 to 120 seconds
Ramp-Up Rate (TL to Tp)	3°C / second maximum
Liquidus Temperature (TL)	217°C
Time Maintained Above Temperature TL (tL)	60 to 150 seconds
Peak / Classification Temperature (Tp)	260°C
Time Within 5°C of Peak Temperature (tp)	20 to 40 seconds
Ramp-Down Rate (Tp to TL)	6°C / second maximum
Time 25°C to Peak Temperature	8 minutes maximum

About Lumileds

Companies developing automotive, mobile, IoT and illumination lighting applications need a partner who can collaborate with them to push the boundaries of light. With over 100 years of inventions and industry firsts, Lumileds is a global lighting solutions company that helps customers around the world deliver differentiated solutions to gain and maintain a competitive edge. As the inventor of Xenon technology, a pioneer in halogen lighting and the leader in high performance LEDs, Lumileds builds innovation, quality and reliability into its technology, products and every customer engagement. Together with its customers, Lumileds is making the world better, safer, more beautiful—with light.

To learn more about our lighting solutions, visit lumileds.com.