

# 4014R Series



Standard 4014 package to address retrofit applications

4014R Series is a complementary portfolio with optimized performance and bin construction for the retrofit space. With an industry standard footprint, it provides the perfect balance between performance and cost efficiency for a variety of applications.

## FEATURES AND BENEFITS

Flexible voltage configurations to comply with various different system solutions

Industry standard footprint for drop-in replacement designs

High maximum drive current to allow for reduction of LED count

## PRIMARY APPLICATIONS

Downlights

High Bay and Low Bay

Indoor Area Lighting

Lamps

# Part Number Nomenclature

Part numbers for the 4014R Series follow the convention below:

L 1 40 – **A A B B** R A 1 4 0 0 **D D D**

Where:

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

B B - designates nominal CRI (70=70CRI, 75=75CRI, 80=80CRI and 90=90CRI)

C - designates voltage (A=3V, B=6V, C=9V, )

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

Therefore, the following part number is used for a 4014R 3000K, 80CRI, 3V LED:

L 1 4 0 – **3 0 8 0** R **A 1** 4 0 0 0 **A 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. The 4014R Series 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).

## Mass Production List of 4014R Series

Product	Product Number	CCT	Ra Min	Φ(lm) Min	Φ(lm) Typ	Test conditions
4014R 3V	L140-2780RA14000A1	2700	80	24	25.5	25°C, IF=60mA
	L140-3080RA14000A1	3000	80	25	26.5	
	L140-3580RA14000A1	3500	80	26	27	
	L140-4080RA14000A1	4000	80	27	28	
	L140-4580RA14000A1	4500	80	27	28	
	L140-5080RA14000A1	5000	80	27	28	
	L140-5780RA14000A1	5700	80	27	28	
	L140-6580RA14000A1	6500	80	27	28	

Notes:备注

- 1.Tolerance of Color Rendering Index:  $\pm 2$ .
- 2.Tolerance of Luminous flux:  $\pm 5\%$ .

## Absolute maximum ratings (Ta=25°C)

Parameter	Symbol	Value	Unit
Power dissipation	Pd	250	mW
Forward current	IF	80	mA
Reverse voltage	VR	5	V
Operating temperature range	Top	-35~+100	°C
Storage temperature range	Tstg	-35~+85	°C
Heatresistance	Rth	35	°C
Junction temperature	Tj	125	°C
Electrostatic Discharge	ESD	2000	V

## Electro-optical characteristics (Ta=25°C)

Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Forward voltage	Vf	2.7		3.2	V	IF=60mA
Luminous flux	Φ	24			lm	IF=60mA
Viewing Angle	2 θ 1/2		120		Deg	IF=60mA
Reverse current	IR			10	μA	Vr=5V
Color Index	Ra	80				IF=60mA

### NOTES :

\* The measurement of forward voltage maintains a tolerance of  $\pm 0.05V$ , flux maintains a tolerance of  $\pm 5\%$ .

\* Ra measurement tolerance is  $\pm 2$ .

\* Rth j-sp is the thermal resistance from LED junction to solder point on MCPCB with electrical power.

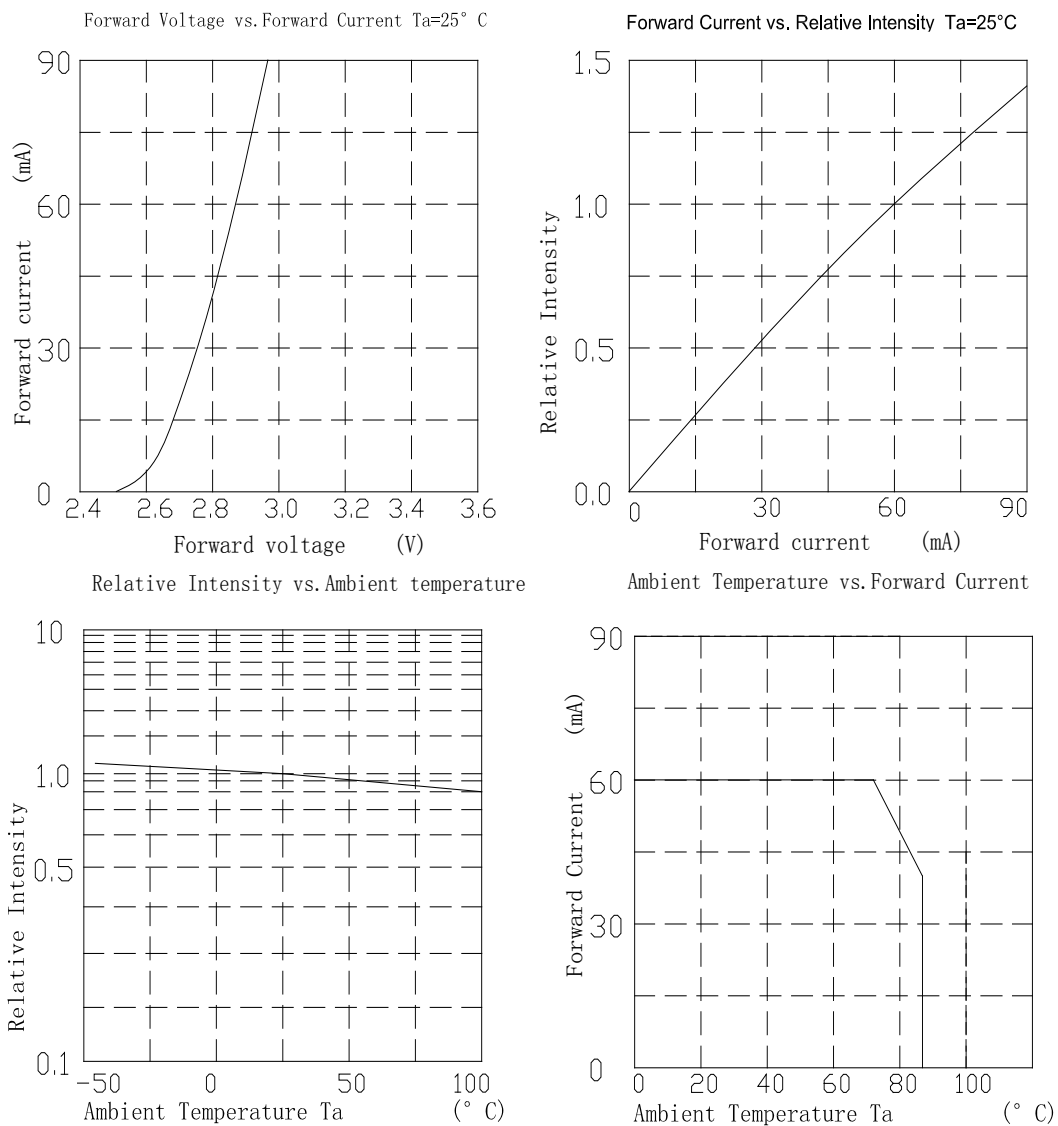
## Reliability Test Items And Conditions

Test Items	Test condition	Time	Quantity	Ac/Re
Reflow Soldering	Temp. :260°C/10sec.	6Min.	22pcs	0/22
Thermal Shock	-40~125C, 15min dwell, 10sec transfer	100Cycles	22pcs	0/22
High Temperature High Humidity life Test	85°C,85%RH, IF=60mA	1000Hrs.	10pcs	0/10
Low Temperature Storage	Ta=-40°C	1000Hrs.	10pcs	0/10
High Temperature Storage	Ta=100°C	1000Hrs.	10pcs	0/10
High Temperature Operation Life Test	Ta=85°C, IF =60mA.	1000Hrs.	10pcs	0/10

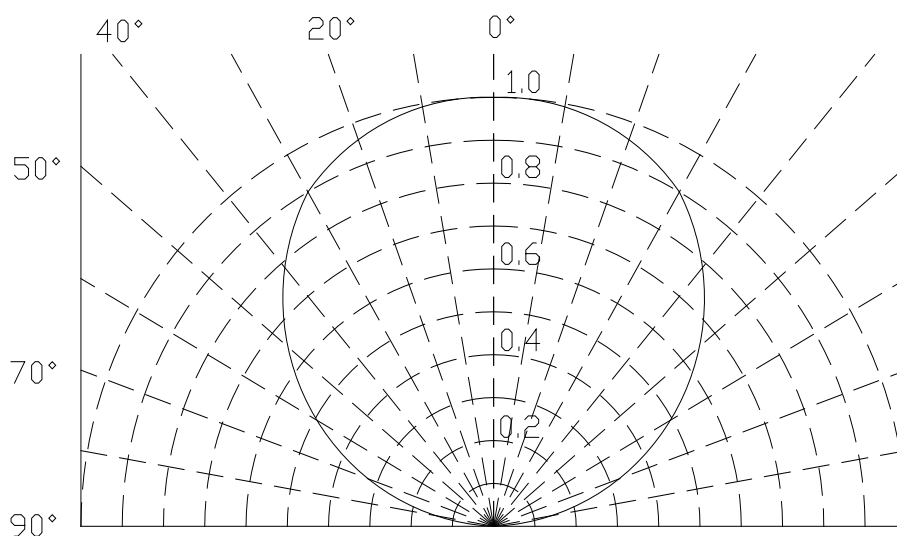
## Failure Criteria

Item	Symbol	Failure Criteria
Luminous Flux	Lm	$\geq 70\%$
Forward voltage	VF	$\pm 10\%$
Colour	CIE_X CIE_y	$\pm 0.01$

## Typical optical characteristics curves

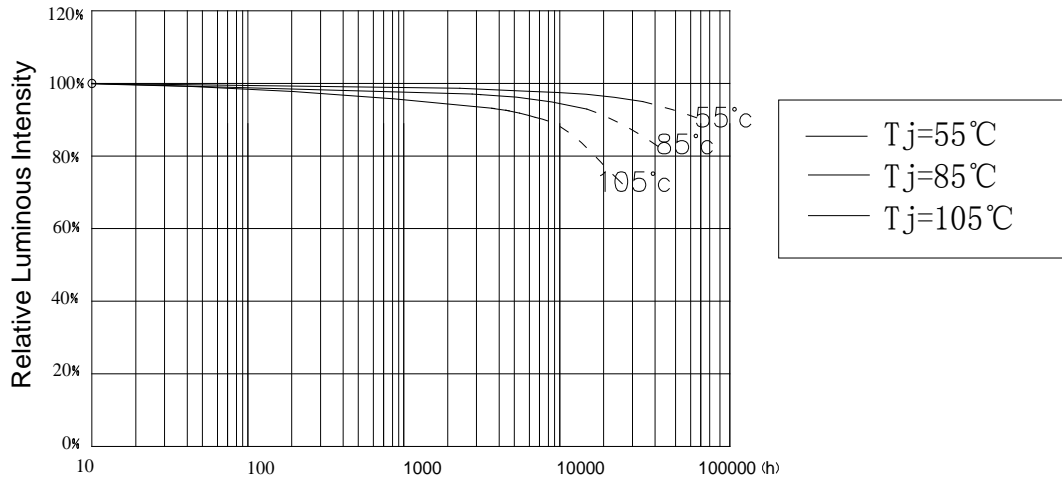


## Curves of beam angle and relative brightness

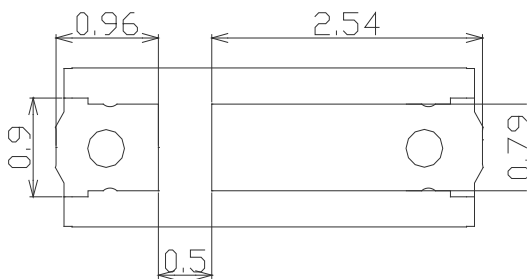
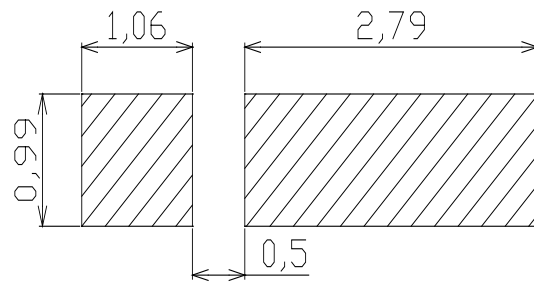
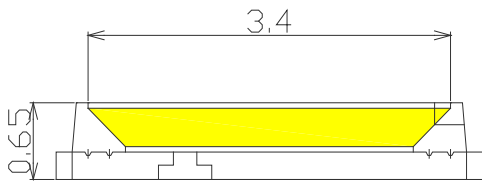
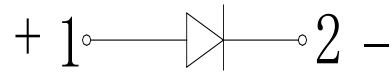
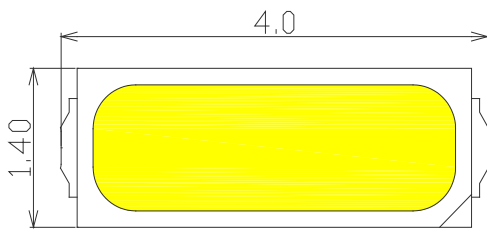


# life test:

Affect of Tj on Luminous Maintenance  
 (If=150mA)  
 (Dot line: Expected Life)



## Mechanical Dimensions : Unit (mm)



For reflow soldering

# 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 or dominant wavelength and forward voltage.

4014R Series LEDs are labeled using a 5-digit alphanumeric CAT code following the format below

Where:

### **A B C D E**

**A** - designates luminous flux bin (example: D=24 to 26 lumens, E=26 to 28 lumens)

**B C D** - designates correlated color bin (example: 27A, 27B, 27C, 27D, 27E, )

**E** - designates forward voltage bin (example: A=2.6 to 2.7V, B=2.7 to 2.8V)

Therefore, a 4014R LED with a lumen range of 24 to 26, color bin of 27A and a forward voltage range of 2.6 to 2.7V has the following CAT code:

### **D 2 7 A A**

## Luminous Flux Bins

### Luminous flux bin definitions for 4014R Series at rated current, Ta=25°C .

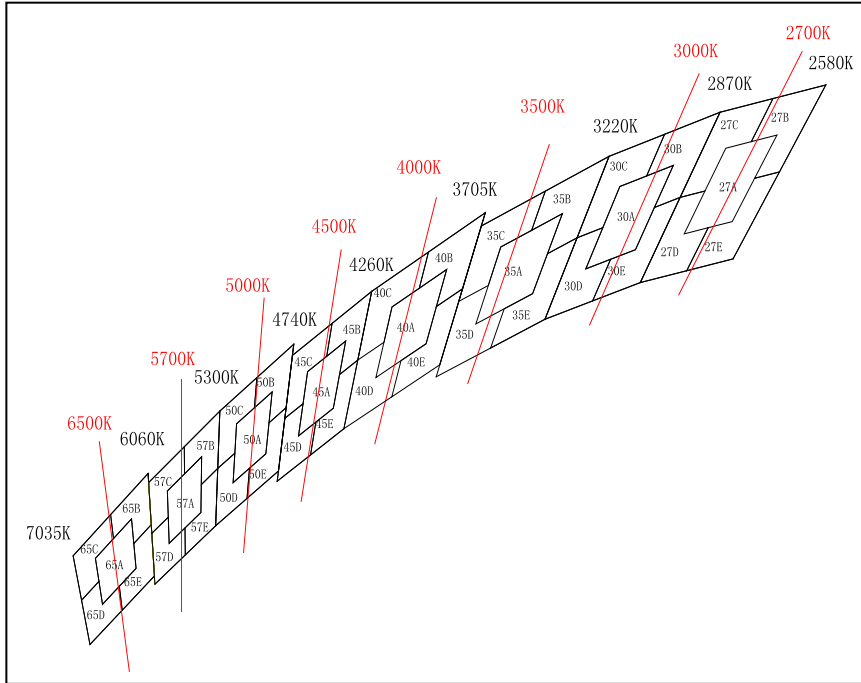
Product Number	Bin	Min	Max
L140-XXXXRA14000A1	I	24	26
	P	26	28
	Q	28	30

#### Notes

Lumileds Maintains a tolerance of  $\pm 5\%$  on lumionous flux measurements



# Color Bin Definition



Correlated color temperature bin definitions for 4014R Series at rated current, Ta=25°C

2700K	X	Y	3000K	X	Y	3500K	X	Y	4000K	X	Y	4500K	X	Y
Center	0.4578	0.4101	Center	0.4338	0.403	Center	0.4073	0.3917	Center	0.3818	0.3797	Center	0.3611	0.3658
27A	0.4576	0.4183	30A	0.4324	0.41	35A	0.4042	0.397	40A	0.3784	0.384	45A	0.3584	0.3701
	0.4697	0.4211		0.4451	0.4146		0.4188	0.4041		0.3914	0.3921		0.3674	0.3767
	0.4591	0.4025		0.4361	0.3964		0.4118	0.3869		0.3865	0.3761		0.3645	0.3622
	0.4477	0.3998		0.4244	0.3923		0.3983	0.3804		0.3746	0.3688		0.3562	0.3563
27B	0.4688	0.429	30B	0.4431	0.4213	35B	0.4148	0.409	40B	0.3871	0.3959	45B	0.3642	0.3805
	0.4813	0.4319		0.4562	0.426		0.4299	0.4165		0.4005	0.4044		0.3736	0.3874
	0.4703	0.4132		0.4468	0.4077		0.4223	0.399		0.3951	0.388		0.3703	0.3726
	0.4585	0.4104		0.4345	0.4033		0.4083	0.3921		0.3827	0.3803		0.3617	0.3663
27C	0.4562	0.426	30C	0.4299	0.4165	35C	0.3996	0.4015	40C	0.3736	0.3874	45C	0.3548	0.3736
	0.4688	0.429		0.4431	0.4213		0.4148	0.409		0.3871	0.3959		0.3642	0.3805
	0.4585	0.4104		0.4345	0.4033		0.4083	0.3921		0.3827	0.3803		0.3617	0.3663
	0.4468	0.4077		0.4223	0.399		0.3943	0.3853		0.3703	0.3726		0.353	0.3601
27D	0.4468	0.4077	30D	0.4223	0.399	35D	0.3943	0.3853	40D	0.3703	0.3726	45D	0.353	0.3601
	0.4585	0.4104		0.4345	0.4033		0.4083	0.3921		0.3827	0.3803		0.3617	0.3663
	0.4483	0.3919		0.426	0.3854		0.4018	0.3752		0.3784	0.3647		0.3591	0.3522
	0.4373	0.3893		0.4147	0.3814		0.3889	0.369		0.367	0.3578		0.3512	0.3465
27E	0.4585	0.4104	30E	0.4345	0.4033	35E	0.4083	0.3921	40E	0.3827	0.3803	45E	0.3617	0.3663
	0.4703	0.4132		0.4468	0.4077		0.4223	0.399		0.3951	0.388		0.3703	0.3726
	0.4593	0.3944		0.4373	0.3893		0.4147	0.3814		0.3897	0.3716		0.367	0.3578
	0.4483	0.3919		0.426	0.3854		0.4018	0.3752		0.3784	0.3647		0.3591	0.3522

5000K	X	Y	5700K	X	Y	6500K	X	Y
Center	0.3447	0.3553	Center	0.3287	0.3417	Center	0.3123	0.3282
50A	0.3416	0.3589	57A	0.3251	0.3444	65A	0.3081	0.3299
	0.35	0.3657		0.3333	0.3518		0.3167	0.3384
	0.3485	0.3524		0.3331	0.3398		0.3177	0.3277
	0.3407	0.3462		0.3256	0.3331		0.3098	0.32
50B	0.3464	0.3688	57B	0.3292	0.3539	65B	0.3117	0.3393
	0.3551	0.376		0.3376	0.3616		0.3206	0.3482
	0.3533	0.3624		0.3371	0.3493		0.3213	0.3371
	0.3452	0.3558		0.3293	0.3423		0.3131	0.329
50C	0.3376	0.3616	57C	0.3207	0.3462	65C	0.3028	0.3304
	0.3464	0.3688		0.3292	0.3539		0.3117	0.3393
	0.3452	0.3558		0.3293	0.3423		0.3131	0.329
	0.3371	0.3493		0.3215	0.3353		0.3048	0.3209
50D	0.3371	0.3493	57D	0.3215	0.3353	65D	0.3048	0.3209
	0.3452	0.3558		0.3293	0.3423		0.3131	0.329
	0.344	0.3428		0.3294	0.3306		0.3144	0.3187
	0.3366	0.3369		0.3222	0.3243		0.3068	0.3113
50E	0.3452	0.3558	57E	0.3293	0.3423	65E	0.3131	0.329
	0.3533	0.3624		0.3371	0.3493		0.3213	0.3371
	0.3515	0.3487		0.3366	0.3369		0.3221	0.3261
	0.344	0.3428		0.3294	0.3306		0.3144	0.3187

**Notes**

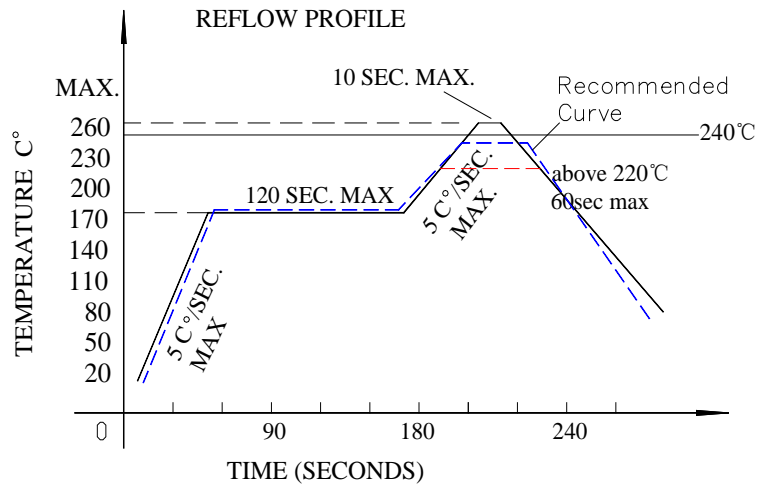
Tester tolerance:  $\pm 0.01$  in x and y coordinates

## Forward Voltage Bins

Forward voltage bin definitions for 4014R Series at rated current,  $T_a=25^\circ\text{C}$ .

Product Number	Bin	Min	Max
L140-XXXXRA14000A1	B	2.7	2.8
	C	2.8	2.9
	D	2.9	3.0
	E	3.0	3.1
	F	3.1	3.2

## Requirements for application and reflow soldering



Reflow soldering curve

(Product is highest resistant to 260°C reflow but suggested the highest temperature of 240°C within)

### ■ Notes for reflow soldering

1. No more than twice for reflow soldering.
2. To ensure the quality of our LEDs, we encapsulate them with silica gels. So please do not put pressure on the LEDs.
3. Please choose the right nozzle(try to learn from the plastic products parts) to avoid the damage to products due to the pressure.
4. Please put on the antistatic hand loop during the use. The worktable should be with antistatic finish. The equipments must be contacted with ground.

### ■ Handwork soldering

1. During the soldering, the electronic soldering iron must be kept under the temperature of 300°C and the soldering time must not be beyond 3 seconds. No touch between the electronic soldering iron and colloid.
2. Handwork soldering is only allowed once. We won't take responsibility for more than that.
3. Avoid using sharp objects to compress products Colloidal Part directly.
4. Please put on the antistatic hand loop during the use. The worktable should be with antistatic finish. The equipments must be contacted with ground.