

## Legal and additional information.

### About Samsung Electronics Co., Ltd.

Samsung Electronics Co., Ltd. is a global leader in technology, opening new possibilities for people everywhere. Through relentless innovation and discovery, we are transforming the worlds of televisions, smartphones, personal computers, printers, cameras, home appliances, LTE systems, medical devices, semiconductors and LED solutions. We employ 236,000 people across 79 countries with annual sales of US\$187.8 billion. To discover more, please visit [www.samsungled.com](http://www.samsungled.com).

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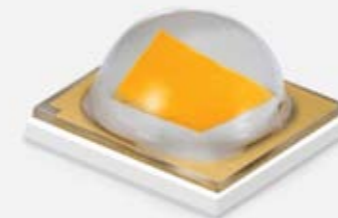
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Samsung  
LED Lighting



# Smart Partner, Brilliant Solutions

The best solution for luminaires



Samsung  
LED Lighting



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# Overview & Performance

Samsung Electronics Co., Ltd. is a global leader in consumer electronics and the core components that go into them.

## Overview

Samsung's global network extends across the world where the creativity, expertise and diverse perspectives of employees are helping to drive growth.

Manufacturing Sites	37
R&D Centers	33
Design Centers	6
Distribution Centers	3
Regional Headquarters	15

**79** Countries

\* As of April 2013. Figures include domestic and overseas facilities.

## Brand Value

Rising in rank from its No. 9 position in 2012, this year Samsung recorded a brand value of \$39.6 billion, a 20.4% increase compared to last year's \$32.9 billion.

Rank	Company	Rank	Company	Rank	Company	Rank	Company
1	Coca-Cola	1	Coca-Cola	1	Coca-Cola	1	Apple
2	IBM	2	IBM	2	Apple	2	Google
3	Microsoft	3	Apple	3	IBM	3	Coca-Cola
4	Google	4	Google	4	Google	4	IBM
...	...	...	...	...	...	...	...
9	Samsung Electronics	7	Samsung Electronics	8	Samsung Electronics	8	Samsung Electronics
...	...	...	...	...	...	...	...
19	Nokia	19	Nokia	19	Nokia	9	Intel
20	Amazon	20	Amazon	20	Amazon	10	Toyota
...	...	...	...	...	...	...	...
26	Nike	35	Sony	...	...	...	...
29	Sony	41	Philips	...	...	...	...
30	Starbucks	...	...	...	...	...	...

\* Source : Interbrand / Business Week

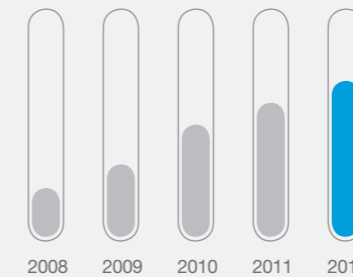
Samsung aspires to create new technologies and innovative products that inspire the world, while delivering new value to enhance the lives of customers, partners and employees.

## Intellectual Property

In 2012, Samsung registered 5,081 new patents at the U.S. Patent & Trade Office. This placed it as the second-highest U.S. patent winner, a position it has held for the past six consecutive years.

### Samsung Patents (U.S.)

(5081 in 2012)



### Top Patent Holders (U.S.)



\* Source: USPTO, based on registration

## Design Leadership

Samsung has been recognized with over 600 design accolades, including 91 design awards from prestigious design bodies such as iF and IDEA. In 2012, the company had 44 products awarded by the iF International Forum Design, the largest number for any participant, placing it at top of the iF rankings over the last three years.

### Ranked #1 in iF (Germany)

2010-2013

Rank	Point	Company	Country
1	2600	Samsung Electronics	South Korea
2	2600	Sony	Japan
3	2300	Philips	Netherlands
4	1860	LG	Korea
5	1580	Apple	US

### Ranked #1 in IDEA (US)

2008-2012

Rank	Point	Company	Country
1	13	Samsung Electronics	South Korea
2	13	Microsoft	US
3	12	GE Healthcare	US
4	12	Beikin	US
5	11	Dell Inc.	US
11	11	Apple	US

# High Power



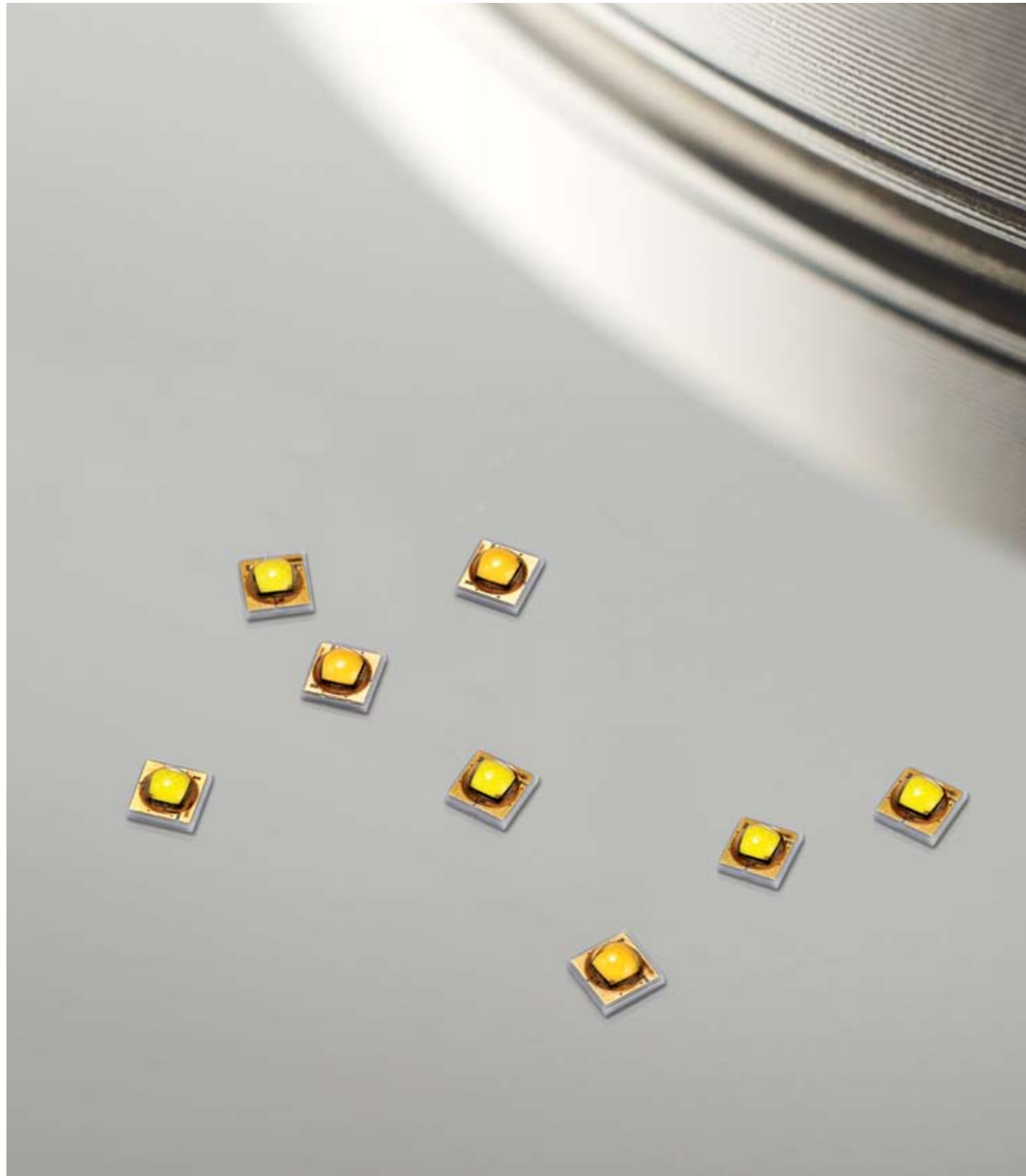
A powerful source of illumination, ideal for a variety of high-power lighting applications.

LH351A  
LH351Z  
LH351B

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LC013B  
LC026B  
LC040B

# LH351A Series

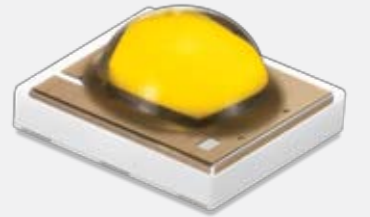


## Features

High efficacy (145lm/W @5000K) and high quality color rendering that is backed by LM-80 test makes the LH351A suitable for a broad range of applications.

The reduced form factor allows for PCB optimization - resulting in more uniform light output, reduced overall system cost, and dramatically improved heat dissipation.

- 3W class LED with 145lm/W efficacy
- Completed 10000 hours of LM-80 testing @ 1000mA, 105°C
- Available in white (2700 to 7600K) / • MacAdam 3 Step binning and hot binning available
- Suitable for use in general lighting applications / • Footprint (3.5mmx3.5mm)



## Specification (Ta = 25°C)

Part Number	Color	CCT (K)	CRI	Luminous Flux		Forward Voltage		IF (mA)	Beam Angle(°)
				Min (lm)	Max (lm)	Typ (V)	Max (V)		
SPHWHTL3D305E6W0G4		2700	80	80	140				
SPHWHTL3D307E6W0E6		2700	90	100	140				
SPHWHTL3D303E6V0H5		3000	70	110	160				
SPHWHTL3D305E6V0G4		3000	80	100	140				
SPHWHTL3D305E6U0G4		3500	80	100	140				
SPHWHTL3D303E6T0K3		4000	70	130	160				
SPHWHTL3D305E6T0G4	White	4000	80	100	140	2.95	3.30	350	125
SPHWHTL3D303E6RTJ4		5000	70	120	160				
SPHWHTL3D304E6RTJ4		5000	75	120	160				
SPHWHTL3D303E6QTJ4		5700	70	120	160				
SPHWHTL3D304E6QTJ4		5700	75	120	160				
SPHWHTL3D303E6PTJ4		6500	70	120	160				
SPHWHTL3D303E6N0J4		7600	68	120	160				

## Applications

[Indoor Lighting] Spot light, Downlight Ceiling light, High/Low-bay light

[Outdoor Lighting] Street light, Security light, Tunnel light, Parking lot light [Consumer Lighting] Retrofit lamp



**Absolute Maximum Ratings (Ta = 25°C)**

If (mA)	Rth j-c (°C/W)	Tj (°C)	Tstg (°C)	Topr (°C)
1,500	6	150	-40 ~ 100	-40 ~ 85

- Rth j-c : Thermal Resistance from junction to solder point
- Tj : Junction Temperature
- Tstg : Storage temperature range
- Topr : Operating temperature range

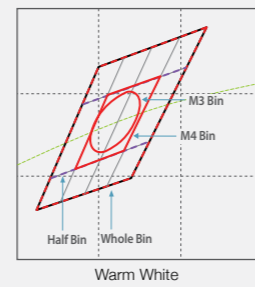
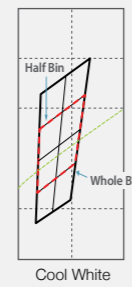
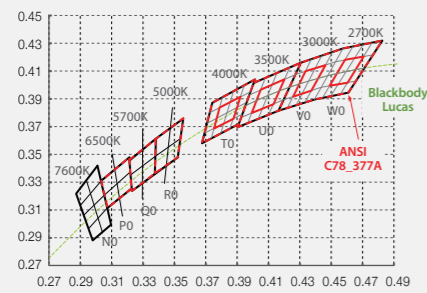
**Forward Voltage (Ta = 25°C)**

Condition	Min.	Typ.	Max.	Unit
If=350mA	2.70	2.95	3.30	V

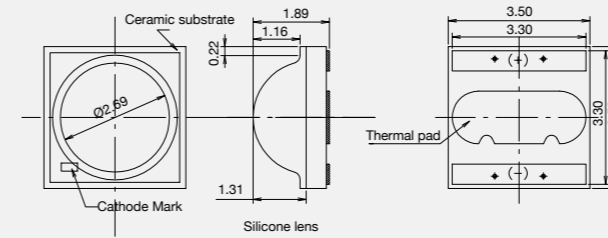
**Color Binning**

CCT	Whole Bin	Half Bin	M7 Bin	M4 Bin
2700K (Ra80+)	SPHWHTL3D305E6W0G4	SPHWHTL3D305E6WUG4	SPHWHTL3D305E6WPG4	SPHWHTL3D305E6WMG4
2700K (Ra90+)	SPHWHTL3D307E6W0E6	SPHWHTL3D307E6WUE6	SPHWHTL3D307E6WPE6	SPHWHTL3D307E6WME6
3000K (Ra70+)	SPHWHTL3D303E6V0H5	-	SPHWHTL3D303E6VPH5	-
3000K (Ra80+)	SPHWHTL3D305E6V0G4	SPHWHTL3D305E6VUG4	SPHWHTL3D305E6VPG4	SPHWHTL3D305E6VMG4
3500K	SPHWHTL3D305E6U0G4	SPHWHTL3D305E6UUG4	SPHWHTL3D305E6UPG4	SPHWHTL3D305E6UMG4
4000K (Ra70+)	SPHWHTL3D303E6T0K3	-	-	-
4000K (Ra80+)	SPHWHTL3D305E6T0G4	SPHWHTL3D305E6TUG4	SPHWHTL3D305E6TPG4	SPHWHTL3D305E6TMG4
5000K (Ra70+)	-	SPHWHTL3D303E6RTJ4	-	-
5000K (Ra75+)	-	SPHWHTL3D304E6RTJ4	-	-
5700K (Ra70+)	-	SPHWHTL3D303E6QTJ4	-	-
5700K (Ra75+)	-	SPHWHTL3D304E6QTJ4	-	-
6500K (Ra70+)	-	SPHWHTL3D303E6PTJ4	-	-
7600K	SPHWHTL3D303E6N0J4	-	-	-

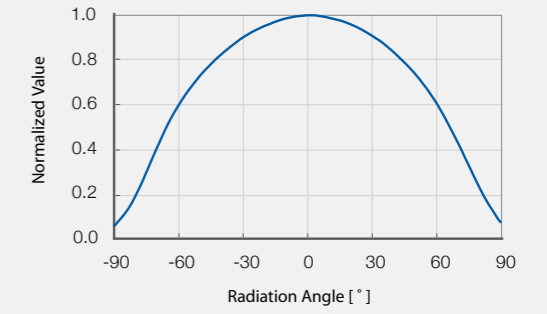
**Chromaticity Region**



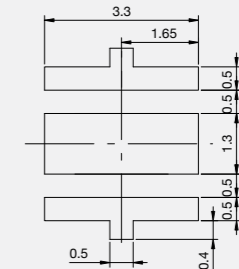
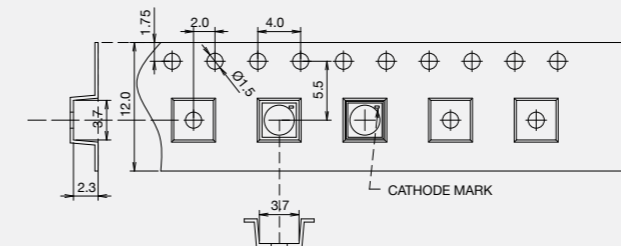
**Package Outline (unit : mm)**



**Beam Distribution**

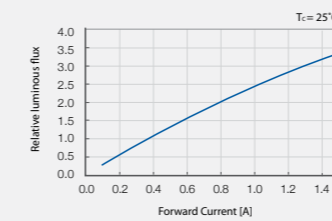


**Tape (unit : mm)**

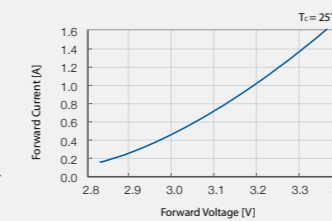


**Recommended Soldering Pattern (unit : mm)**

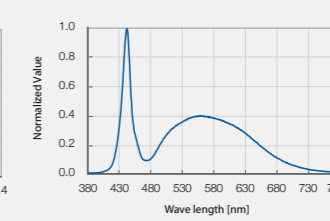
**Optical & Electrical Characteristics**



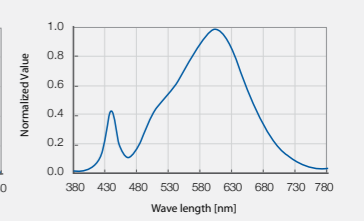
Relative Luminous Flux vs. Forward Current



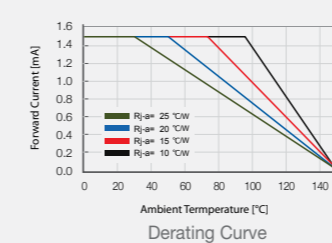
Forward Current vs. Forward Voltage



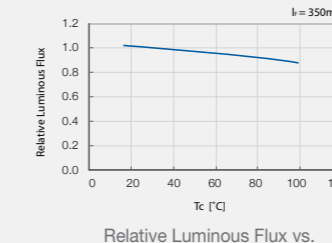
Spectrum Distribution (Cool White)



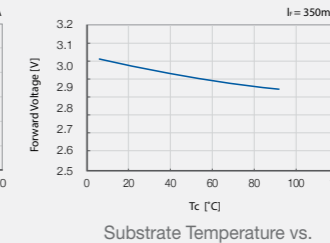
Spectrum Distribution (Warm White)



Derating Curve

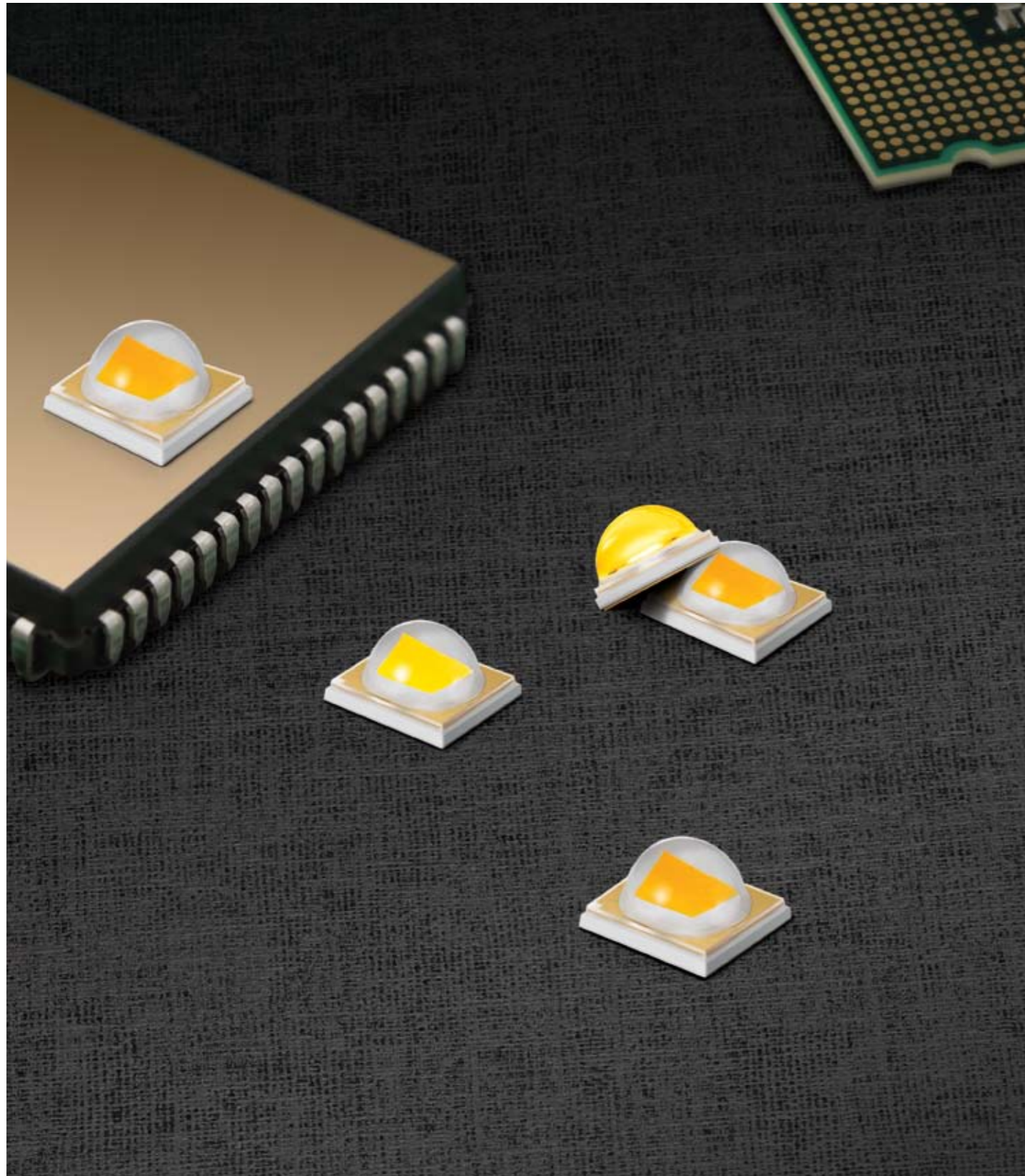


Relative Luminous Flux vs. Substrate Temperature



Substrate Temperature vs. Forward Voltage

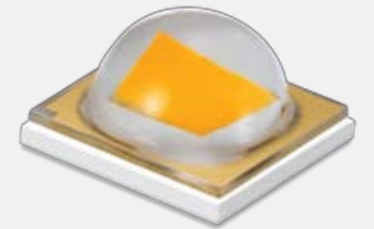
# LH351Z Series



## Features

High efficacy 2W class high power LEDs makes the LH351Z suitable for high brightness applications.

- Highest efficacy among 2W high power LEDs - 143 lm/W
- Suitable for use in torches, indoor directional, and outdoor directional lighting
- Completed 6000 hours of LM-80 testing @ 1000mA, 105°C
- Utilizes Samsung TZ chip platform technology
- Footprint (3.5mmx3.5mm)



## Specification (Ta = 85°C)

Part Number	Color	CCT (K)	CRI	Luminous flux		Forward Voltage		IF (mA)	Beam Angle (°)
				Min (lm)	Max (lm)	Typ (V)	Max (V)		
SPHWHTL3D20EE3W0F2		2700	80	90	110	2.9	3.0		
SPHWHTL3D20EE3V0F3		3000	80	90	120	2.9	3.0		
SPHWHTL3D20EE3U0G3		3500	80	100	130	2.9	3.0		
SPHWHTL3D20EE3T0G3		4000	80	100	130	2.9	3.0		
SPHWHTL3D20CE3T0H3		4000	70	110	140	2.9	3.0		115
SPHWHTL3D20DE3RTH3		5000	75	110	140	2.9	3.0		
SPHWHTL3D20CE3RTH3	White	5000	70	110	140	2.9	3.0	350	
SPHWHTL3D20DE3QTH3		5700	75	110	140	2.9	3.0		
SPHWHTL3D20CE3QTH3		5700	70	110	140	2.9	3.0		
SPHWHTL3D20CE3PTH3		6500	70	110	140	2.9	3.0		
SPHWHTL3D201F3PSJ3		6500	68	120 (@25°C)	-	3.0 (@25°C)	3.1 (@25°C)		
SPHWHTL3D201F3ASJ3		7000	68	120 (@25°C)	-	3.0 (@25°C)	3.1 (@25°C)		120
SPHWHTL3D201F3NSJ3		7600	68	120 (@25°C)	-	3.0 (@25°C)	3.1 (@25°C)		

## Applications

[Indoor Lighting] Spot light, Downlight Ceiling light, High/Low-bay light

[Outdoor Lighting] Street lighting, Security light, Tunnel light, Parking lot light [Consumer Lighting] Retrofit lamp, Torch light



**Absolute Maximum Ratings (Ta = 85°C)**

If (mA)	Rth j-c (°C/W)	Tj (°C)	Tstg (°C)	Topt (°C)
1,000	7	150	-40 ~ 100	-40 ~ 85

- Rth j-c : Thermal Resistance from junction to solder point
- Tj : Junction Temperature
- Tstg : Storage temperature range
- Topt : Operating temperature range

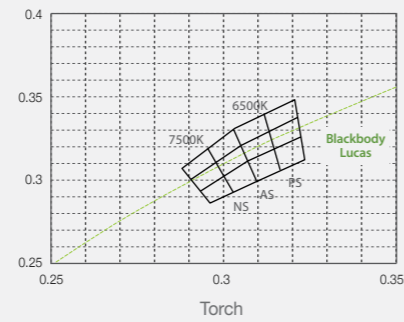
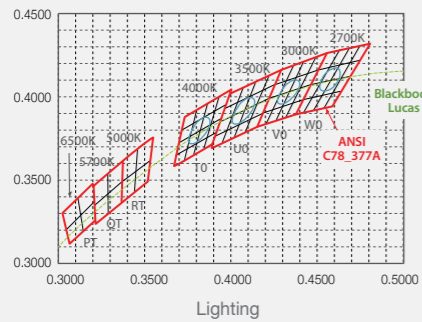
**Forward Voltage (Ta = 85°C)**

Condition	Min.	Typ.	Max.	Unit
If=350mA	2.70	2.90	3.00	V

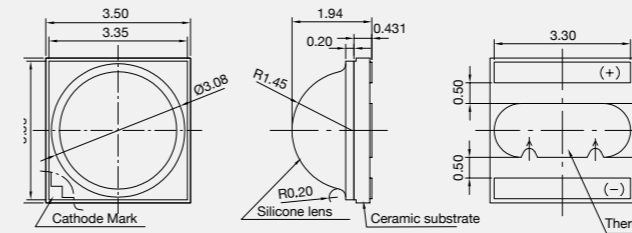
**Color Binning**

CCT	Whole Bin	Quarter Bin	M7 Bin	M3 Bin	Torch Bin
2700K	SPHWHTL3D20EE3W0F2	SPHWHTL3D20EE3WPF2	-	SPHWHTL3D20EE3WMF2	-
3000K	SPHWHTL3D20EE3V0F3	SPHWHTL3D20EE3VPF3	-	SPHWHTL3D20EE3VMF3	-
3500K	SPHWHTL3D20EE3U0G3	SPHWHTL3D20EE3UPG3	-	SPHWHTL3D20EE3UMG3	-
4000K (Ra80+)	SPHWHTL3D20EE3T0G3	SPHWHTL3D20EE3TPG3	-	SPHWHTL3D20EE3TMG3	-
4000K (Ra70+)	SPHWHTL3D20CE3T0H3	SPHWHTL3D20CE3TPH3	-	SPHWHTL3D20CE3TMH3	-
5000K (Ra75+)	-	-	SPHWHTL3D20DE3RTH3	-	-
5000K (Ra70+)	-	-	SPHWHTL3D20CE3RTH3	-	-
5700K (Ra75+)	-	-	SPHWHTL3D20DE3QTH3	-	-
5700K (Ra70+)	-	-	SPHWHTL3D20CE3QTH3	-	-
6500K	-	-	SPHWHTL3D20CE3PTH3	-	-
6500K (Ra68+)	-	-	-	-	SPHWHTL3D201F4PSJ3
7000K (Ra68+)	-	-	-	-	SPHWHTL3D201F4ASJ3
7600K (Ra68+)	-	-	-	-	SPHWHTL3D201F4NSJ3

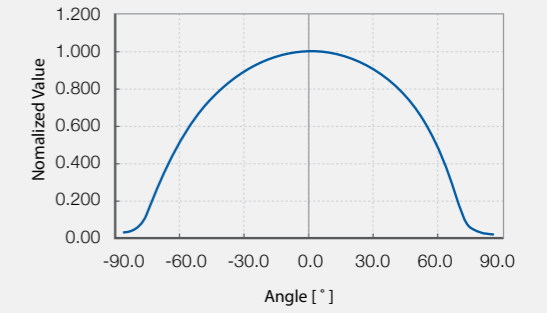
**Chromaticity Region**



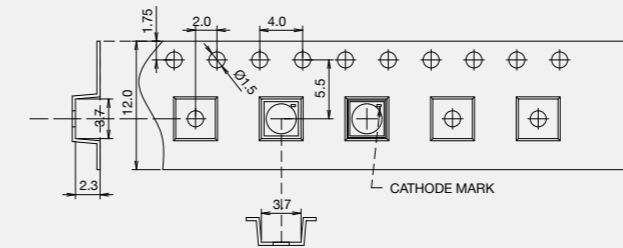
**Package Outline (unit : mm)**



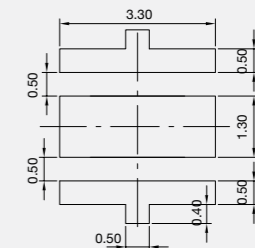
**Beam Distribution**



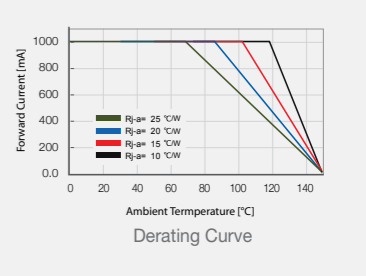
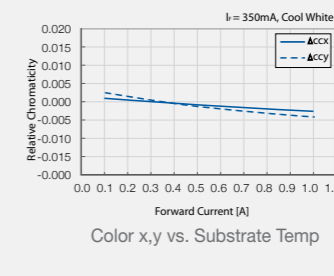
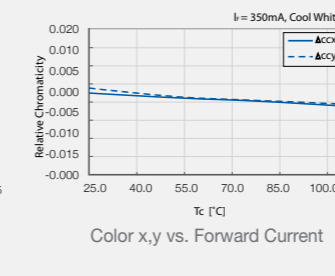
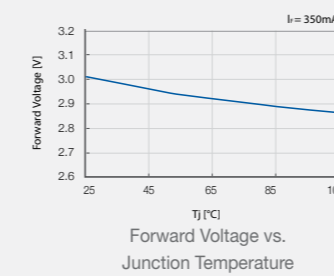
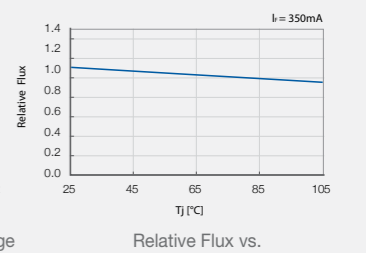
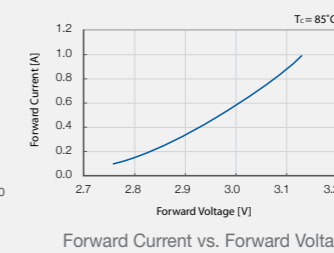
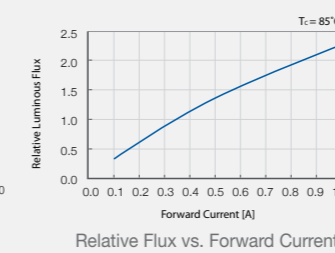
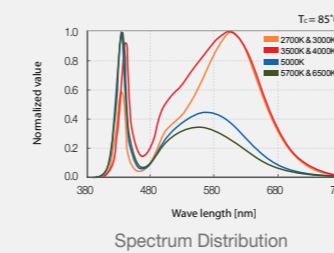
**Tape (unit : mm)**



**Recommended Soldering Pattern (unit : mm)**



**Optical & Electrical Characteristics**





# LH351B Series



## Features

High efficacy (160lm/W @ 5000K) and high quality color rendering makes the LH351B suitable for use in a broad range of applications.

- Operates at a maximum current of up to 1.5 A
- Uniform light distribution under any beam angle
- CRI 80+ makes it well suited for most applications
- Footprint (3.5mmx3.5mm)



## Specification (Ta = 85°C)

Part Number	Color	CCT (K)	CRI	Luminous flux		Forward Voltage		IF (mA)	Beam Angle (°)
				Min (lm)	Max (lm)	Typ (V)	Max (V)		
SPHWH1L3D30ED4W0F3		2700	80	90	120				
SPHWH1L3D30ED4V0G3		3000	80	100	130				
SPHWH1L3D30ED4U0G3		3500	80	100	130				
SPHWH1L3D30CD4T0J3		4000	70	120	150				
SPHWH1L3D30ED4T0G3		4000	80	100	130				
SPHWH1L3D30DD4RTJ3	White	5000	75	120	150	2.85	3.00	350	120
SPHWH1L3D30DD4RTK3		5000	75	130	160				
SPHWH1L3D30CD4RTJ3		5000	70	120	150				
SPHWH1L3D30CD4RTK3		5000	70	130	160				
SPHWH1L3D30DD4QTJ3		5700	75	120	150				
SPHWH1L3D30CD4QTJ3		5700	70	120	150				
SPHWH1L3D30CD4PTJ3		6500	70	120	150				

## Applications

[Indoor Lighting] Spot light, Downlight Ceiling light, High/Low-bay light

[Outdoor Lighting] Street lighting, Security light, Tunnel light, Parking lot light [Consumer Lighting] Retrofit lamp, Torch light



**Absolute Maximum Ratings (Ta = 85°C)**

If (mA)	Rth j-c (°C/W)	Tj (°C)	Tstg (°C)	Topr (°C)
1,500	6	150	-40 ~ 120	-40 ~ 85

- Rth j-c : Thermal Resistance from junction to solder point
- Tj : Junction Temperature
- Tstg : Storage temperature range
- Topr : Operating temperature range

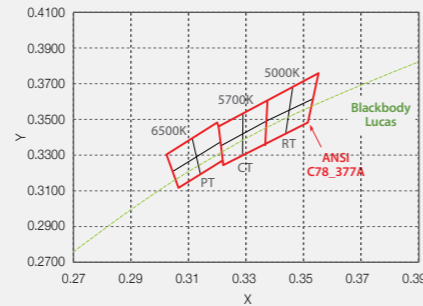
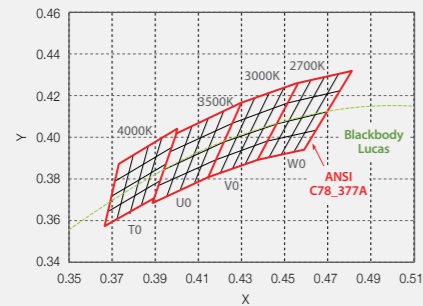
**Forward Voltage (Ta = 85°C)**

Condition	Min.	Typ.	Max.	Unit
If=350mA	2.60	2.85	3.00	V

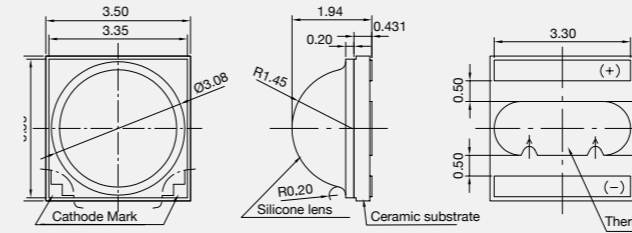
**Color Binning**

CCT	Whole Bin	Half	Quarter Bin	M3 Bin
2700K	SPHWH1L3D30ED4W0F3	-	SPHWH1L3D30ED4WPF3	SPHWH1L3D30ED4WMF3
3000K	SPHWH1L3D30ED4V0G3	-	SPHWH1L3D30ED4VPG3	SPHWH1L3D30ED4VMG3
3500K	SPHWH1L3D30ED4U0G3	-	SPHWH1L3D30ED4UPG3	SPHWH1L3D30ED4UMG3
4000K (Ra70+)	SPHWH1L3D30CD4T0J3	-	SPHWH1L3D30CD4TPJ3	SPHWH1L3D30CD4TMJ3
4000K (Ra80+)	SPHWH1L3D30ED4T0G3	-	SPHWH1L3D30ED4TPG3	SPHWH1L3D30ED4TMG3
5000K (Ra70+)	-	SPHWH1L3D30CD4RTJ3	-	-
5000K (Ra70+)	-	SPHWH1L3D30CD4RTK3	-	-
5000K (Ra75+)	-	SPHWH1L3D30DD4RTJ3	-	-
5000K (Ra75+)	-	SPHWH1L3D30DD4RTK3	-	-
5700K (Ra70+)	-	SPHWH1L3D30CD4QTJ3	-	-
5700K (Ra75+)	-	SPHWH1L3D30DD4QTJ3	-	-
6500K	-	SPHWH1L3D30CD4PTJ3	-	-

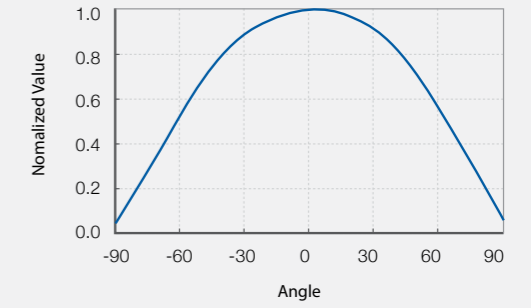
**Chromaticity Region**



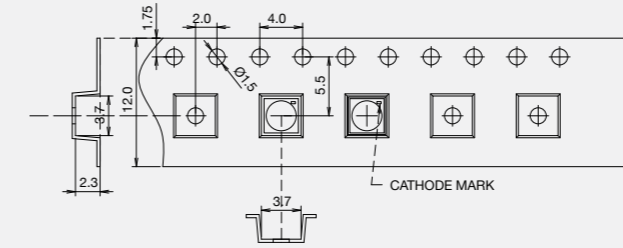
**Package Outline (unit : mm)**



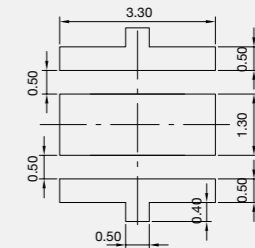
**Beam Distribution**



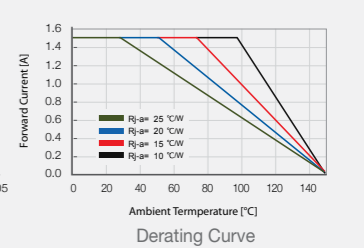
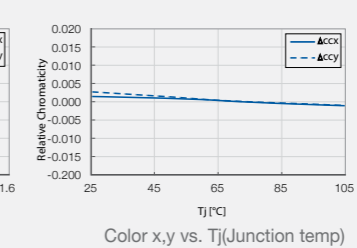
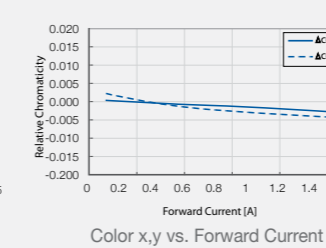
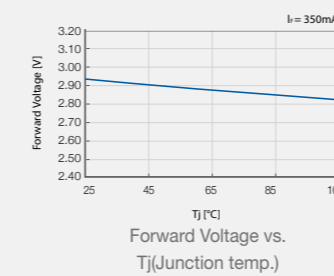
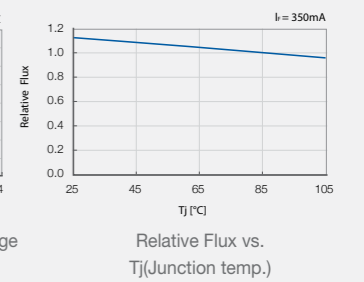
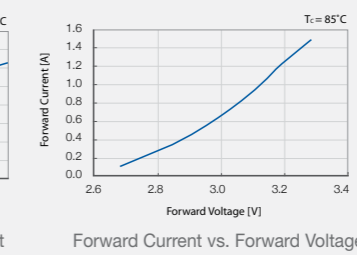
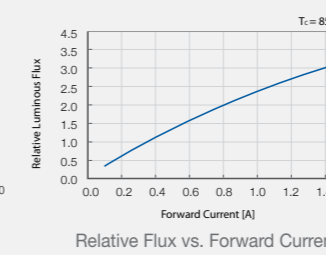
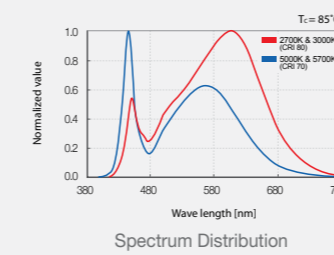
**Tape (unit : mm)**



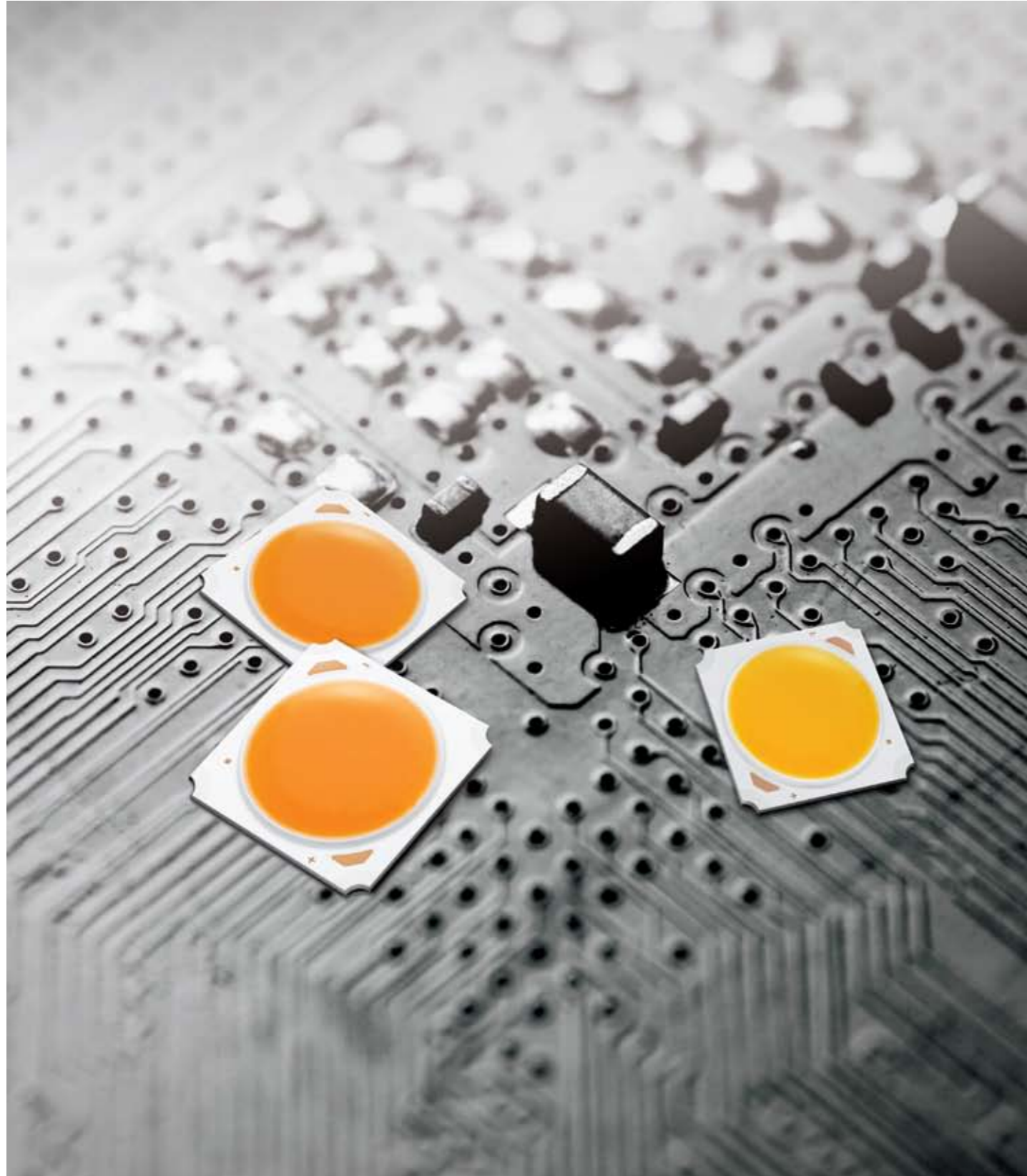
**Recommended Soldering Pattern (unit : mm)**



**Optical & Electrical Characteristics**



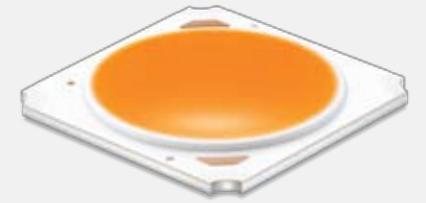
# LC013B Series



## Features

The LC013B's high efficacy (129lm/W @5000K) and compact size (11mm LES) not only outpaces the competition but also delivers design freedom.

- Completed 6000 hours of LM-80 testing @ 360mA, 105°C
- Chip on Board (COB) solution makes it easy to design in
- Low thermal resistance for high reliability
- Simple assembly reduces manufacturing cost
- Lumen Output up to 2,000lm in a single LED package
- Small 11mm diameter light emitting surface size makes lighting design easier
- Footprint (17mmx17mm)



## Specification (Ta = 25°C)

Part Number	Color	CCT (K)	CRI	Luminous flux		Forward Voltage		IF (mA)	Beam Angle (°)
				Min (lm)	Typ (lm)	Typ (V)	Max (V)		
SPHWW1HDNA25YHW31F		2700		1300	1600				
SPHWW1HDNA25YHV31F		3000		1350	1670				
SPHWW1HDNA25YHU31F	White	3500	80	1400	1730	35.5	38.5	360	115
SPHWW1HDNA25YHT31F		4000		1430	1780				
SPHCW1HDNA25YHRT1F		5000		1430	1800				

## Applications

[Indoor Lighting] Spot light, Downlight [Indoor Lighting] High/Low-bay light  
[Outdoor Lighting] Security light, Parking lot light



**Absolute Maximum Ratings (Ta = 25°C)**

If (mA)	Rth j-c (°C/W)	Tj (°C)	Tstg (°C)	Topr (°C)
660	1.6	150	-40 ~ 120	-40 ~ 105

- Rth j-c : Thermal Resistance from junction to solder point
- Tj : Junction Temperature
- Tstg : Storage temperature range
- Topr : Operating temperature range

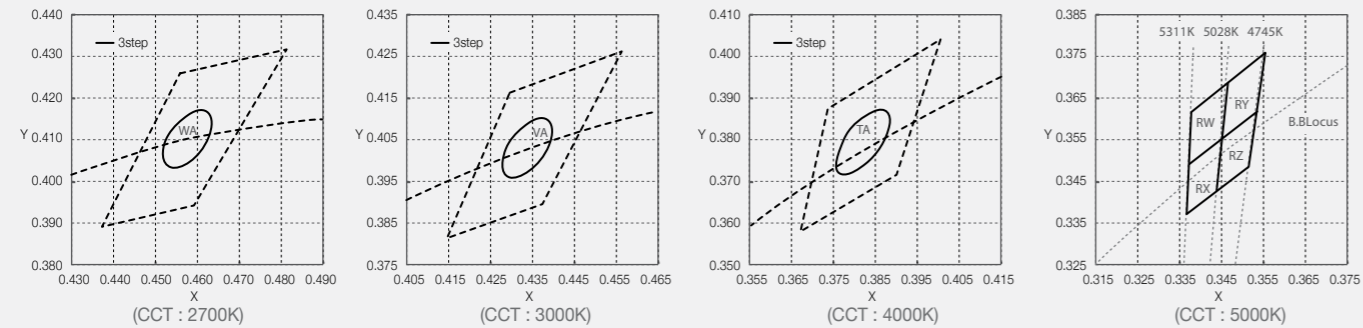
**Forward Voltage (Ta = 25°C)**

Condition	Min.	Typ.	Max.	Unit
If=360mA	32.5	35.5	38.5	V

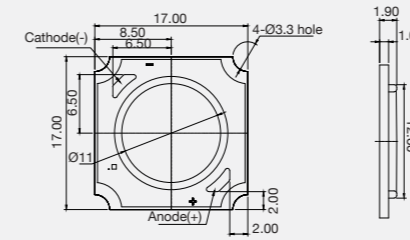
**Color Binning**

CCT	Whole Bin	3-Step	M4 Bin
2700K	-	SPHWW1HDNA25YHW31F	-
3000K	-	SPHWW1HDNA25YHV31F	-
3500K	-	SPHWW1HDNA25YHU31F	-
4000K	-	SPHWW1HDNA25YHT31F	-
5000K	SPHCW1HDNA25YHRT1F	-	-

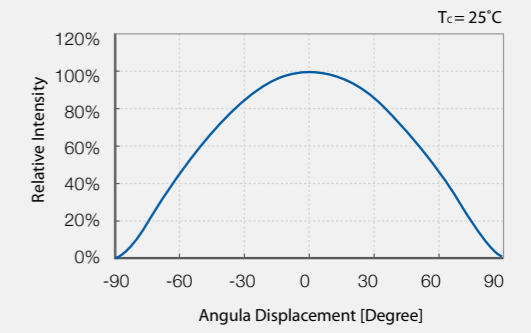
**Chromaticity Region**



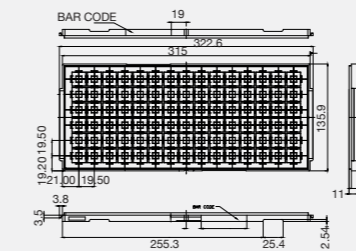
**Package Outline (unit : mm)**



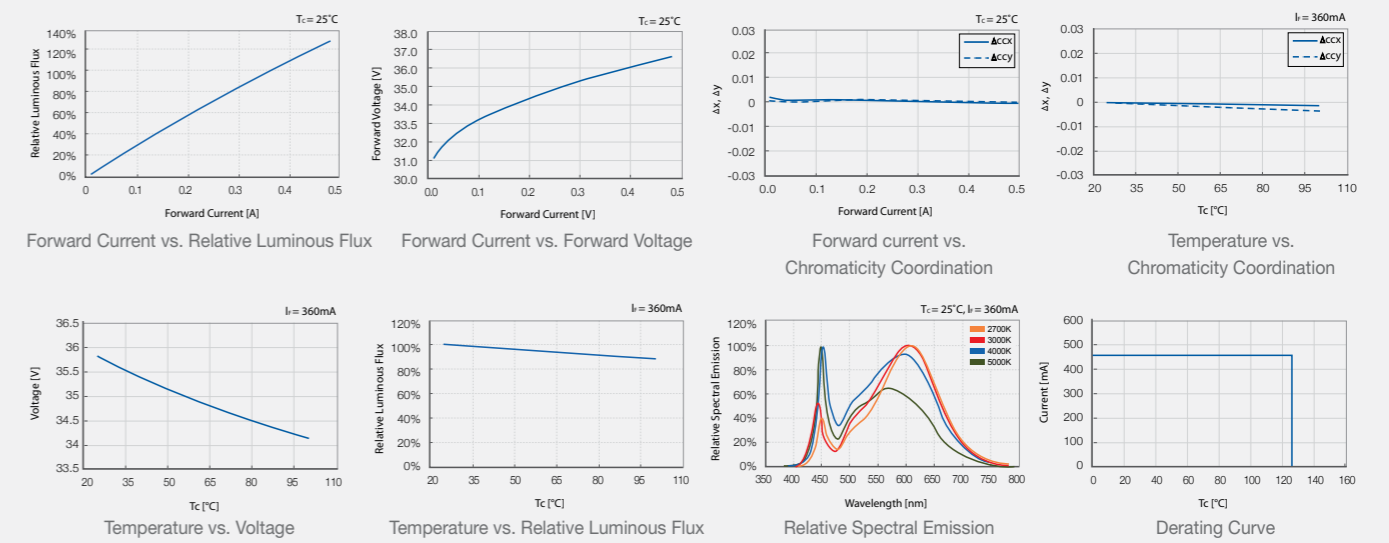
**Beam Distribution (Ta = 25°C)**



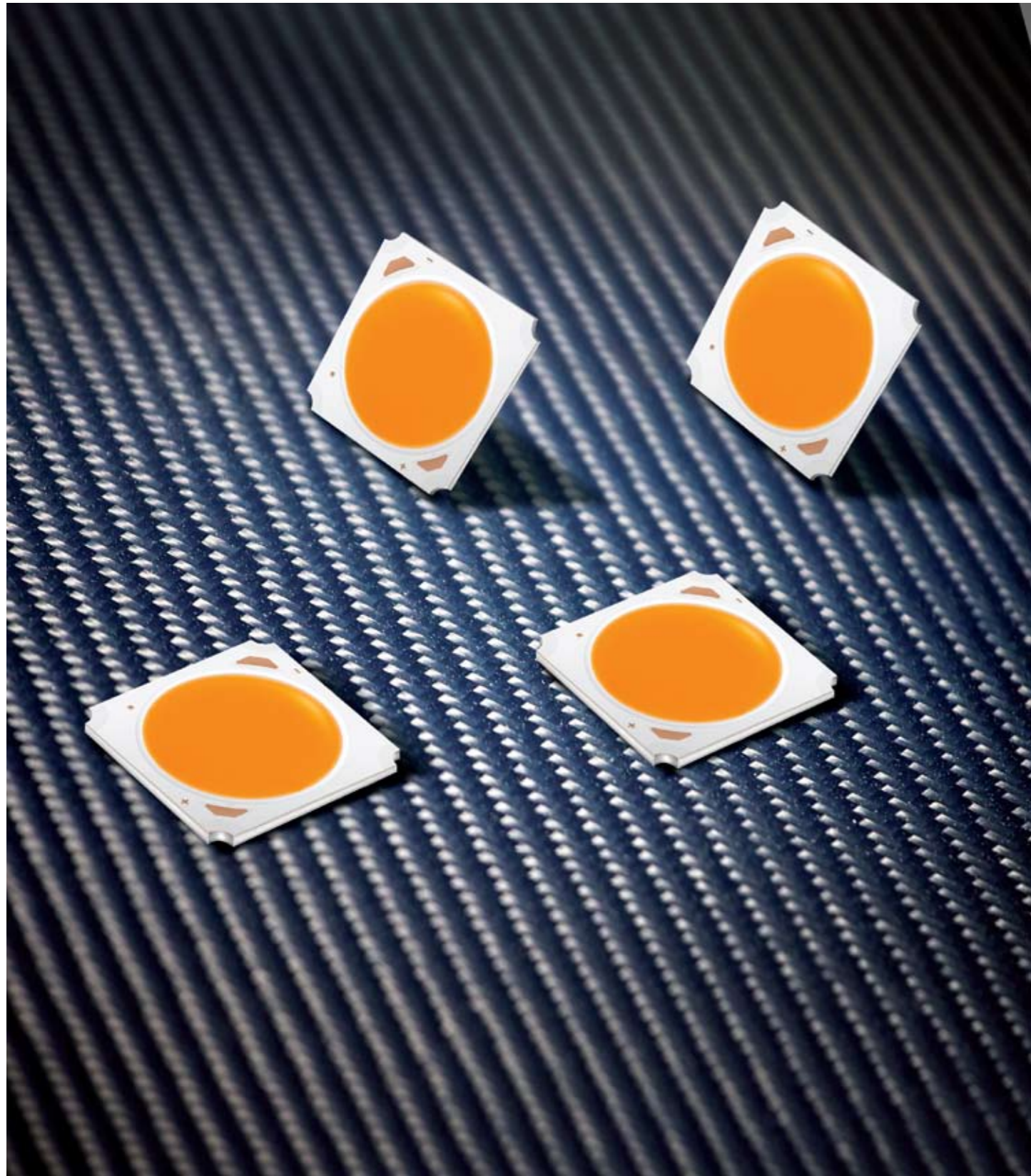
**Tray (unit : mm)**



**Optical & Electrical Characteristics**



# LC026B Series

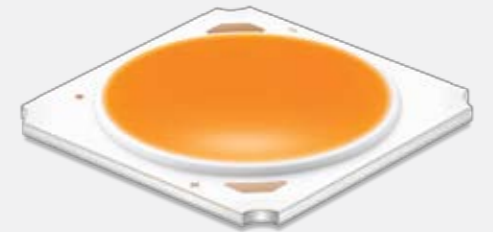


# LC026B Series

## Features

High efficacy (129lm/W @5000K) COB LED package with CRI 80+ performance, well suited for use in spotlight applications.

- Completed 6000 hours of LM-80 testing @ 720mA, 105°C
- Chip on Board (COB) solution makes it easy to design in
- Low thermal resistance for high reliability
- Simple assembly reduces manufacturing cost
- Lumen Output up to 4,100lm in a single LED package
- Ideal for use in spotlight applications, LES Size : 17mm
- Footprint (21.5mmx21.5mm)



## Specification (Ta = 25°C)

Part Number	Color	CCT (K)	CRI	Luminous flux		Forward Voltage		IF (mA)	Beam Angle (°)
				Min (lm)	Typ (lm)	Typ (V)	Max (V)		
SPHWW1HDNC25YHW32F		2700		2510	3130				
SPHWW1HDNC25YHV32F		3000		2680	3330				
SPHWW1HDNC25YHU32F	White	3500	80	2780	3440	35.5	38.5	720	115
SPHWW1HDNC25YHT32F		4000		2850	3540				
SPHCW1HDNC25YHRT3F		5000		2890	3590				

## Applications

- [Indoor Lighting] Spot light, Downlight
- [Indoor Lighting] High/Low-bay light
- [Outdoor Lighting] Security light, Parking lot light



**Absolute Maximum Ratings (Ta = 25°C)**

If (mA)	Rth j-c (°C/W)	Tj (°C)	Tstg (°C)	Topr (°C)
1300	0.9	150	-40 ~ 120	-40 ~ 105

- Rth j-c : Thermal Resistance from junction to solder point
- Tj : Junction Temperature
- Tstg : Storage temperature range
- Topr : Operating temperature range

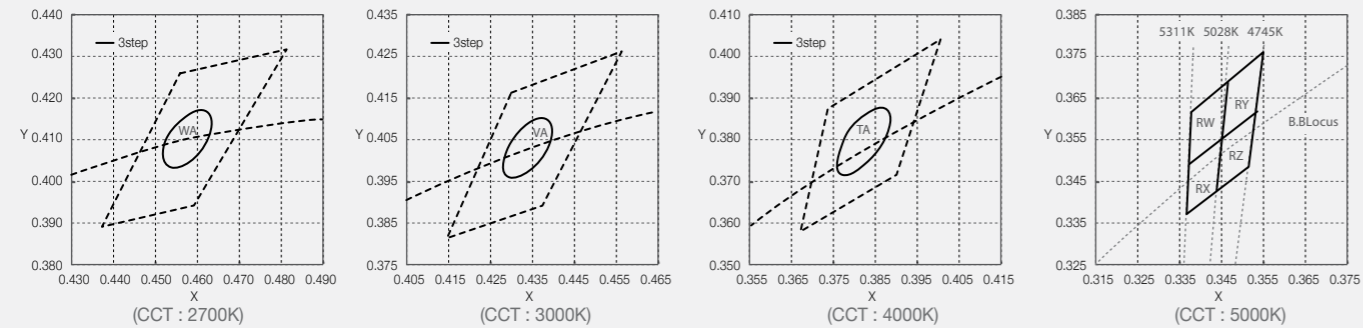
**Forward Voltage (Ta = 25°C)**

Condition	Min.	Typ.	Max.	Unit
If=720mA	32.5	35.5	38.5	V

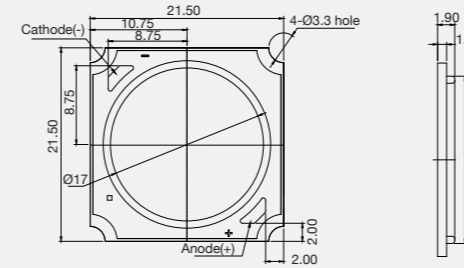
**Color Binning**

CCT	Whole Bin	3-Step	M4 Bin
2700K	-	SPHWW1HDNC25YHW32F	-
3000K	-	SPHWW1HDNC25YHV32F	-
3500K	-	SPHWW1HDNC25YHU32F	-
4000K	-	SPHWW1HDNC25YHT32F	-
5000K	SPHCW1HDNC25YHRT3F	-	-

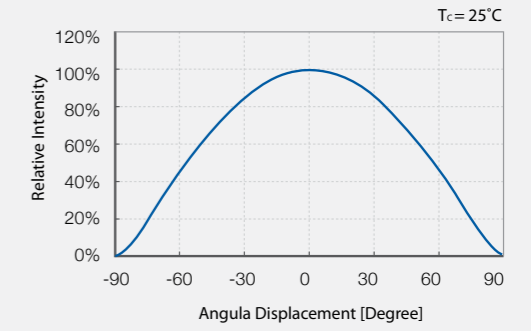
**Chromaticity Region**



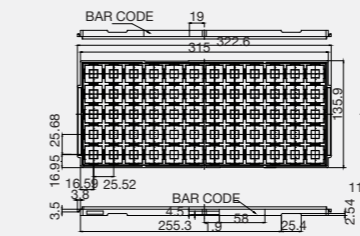
**Package Outline (unit : mm)**



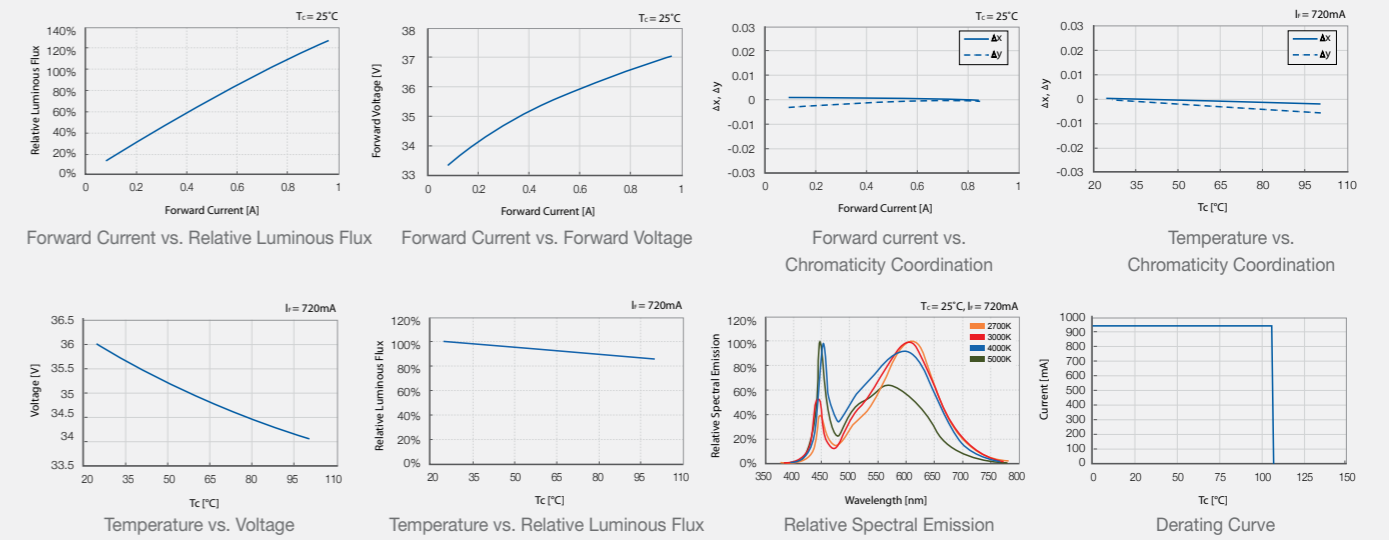
**Beam Distribution (Ta = 25°C)**



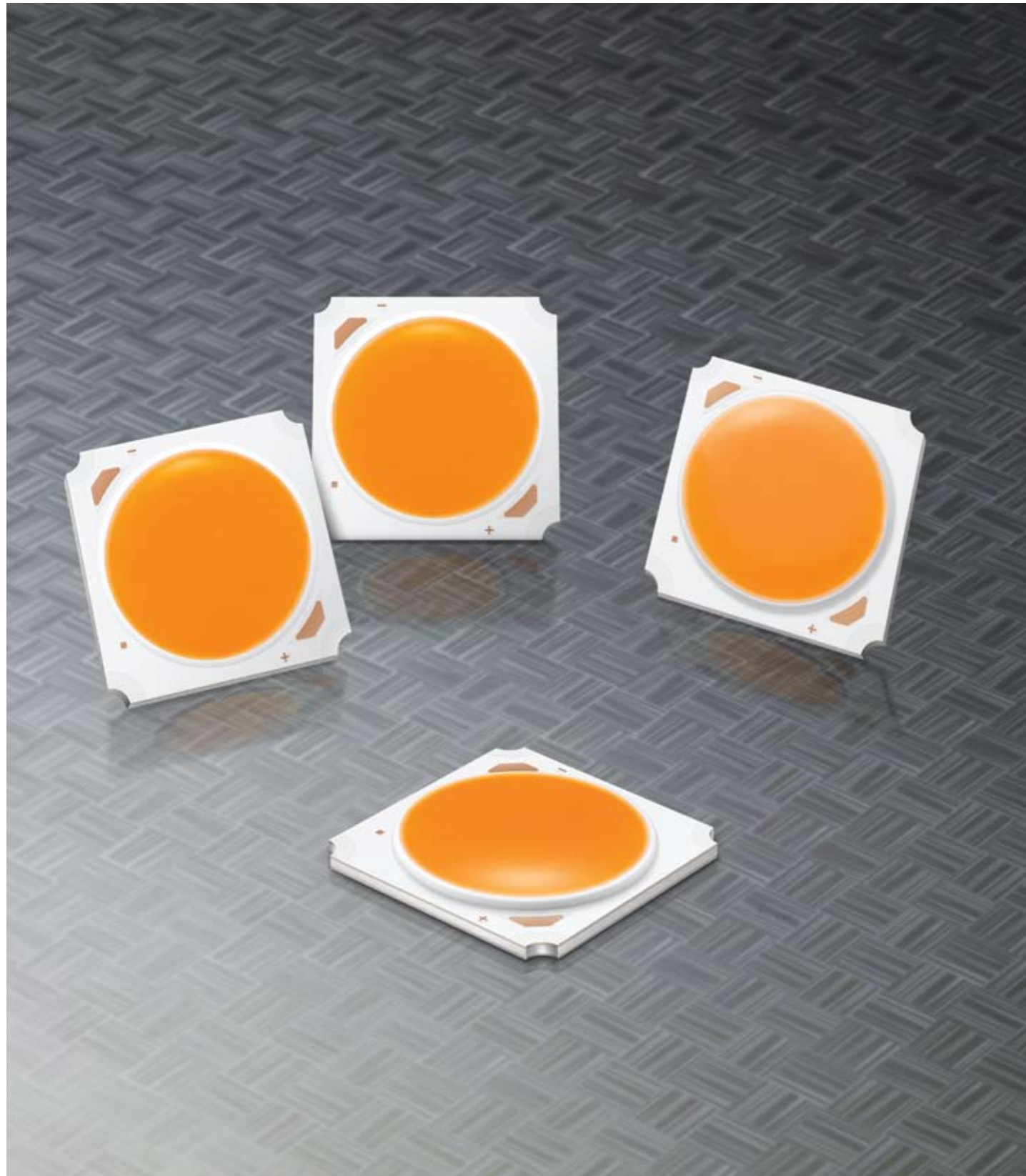
**Tray (unit : mm)**



**Optical & Electrical Characteristics**



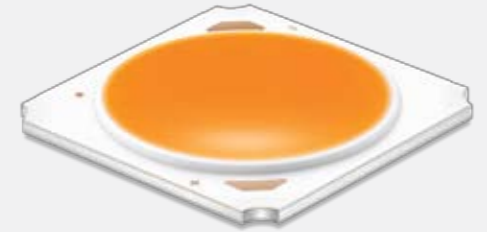
## LC040B Series



### Features

High efficacy (120lm/W @3000K) COB LED package with up to 6,000 lumen output makes the LC040B well suited for high light output spotlight applications.

- Completed 6000 hours of LM-80 testing @ 1080mA, 105°C
- Chip on Board (COB) solution makes it easy to design in
- Low thermal resistance for high reliability
- Simple assembly reduces manufacturing cost
- Lumen Output up to 6,000lm in a single LED package
- Ideal for use in spotlight applications, LES Size : 17mm
- Footprint (21.5mmx21.5mm)



### Specification (Ta = 25°C)

Part Number	Color	CCT (K)	CRI	Luminous flux		Forward Voltage		IF (mA)	Beam Angle (°)
				Min (lm)	Typ (lm)	Typ (V)	Max (V)		
SPHWW1HDNE25YHW34J		2700		3695	4050				
SPHWW1HDNE25YHV34J		3000		3810	4175				
SPHWW1HDNE25YHU34J	White	3500	80	3960	5100	35.5	38.5	1080	115
SPHWW1HDNE25YHT34J		4000		4075	4465				
SPHCW1HDNE25YHRT4J		5000		4115	4505				

### Applications

[Indoor Lighting] Spot light, Downlight [Indoor Lighting] High/Low-bay light

[Outdoor Lighting] Security light, Parking lot light



**Absolute Maximum Ratings (Ta = 25°C)**

If (mA)	Rth j-c (°C/W)	Tj (°C)	Tstg (°C)	Topr (°C)
1620	0.8	150	-40 ~ 120	-40 ~ 105

- Rth j-c : Thermal Resistance from junction to solder point
- Tj : Junction Temperature
- Tstg : Storage temperature range
- Topr : Operating temperature range

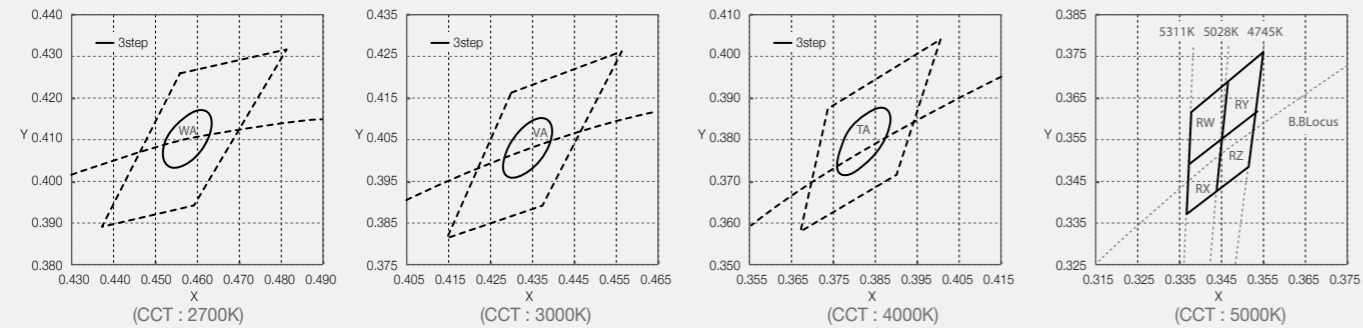
**Forward Voltage (Ta = 25°C)**

Condition	Min.	Typ.	Max.	Unit
If=1080mA	32.5	35.5	38.5	V

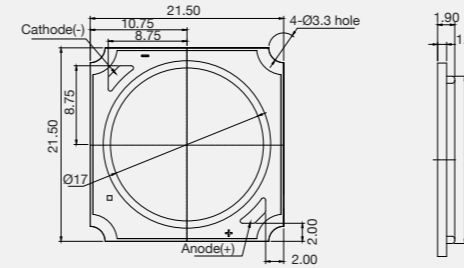
**Color Binning**

CCT	Whole Bin	3-Step	M4 Bin
2700K	-	SPHWW1HDNE25YHW34J	-
3000K	-	SPHWW1HDNE25YHV34J	-
3500K	-	SPHWW1HDNE25YHU34J	-
4000K	-	SPHWW1HDNE25YHT34J	-
5000K	SPHCW1HDNE25YHRT4J	-	-

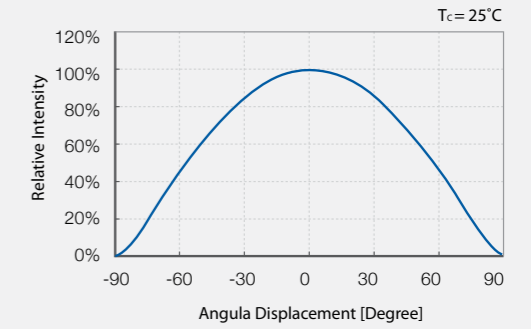
**Chromaticity Region**



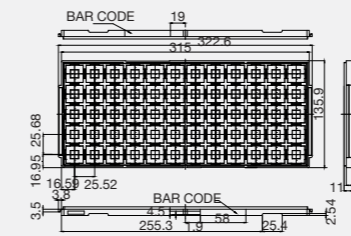
**Package Outline (unit : mm)**



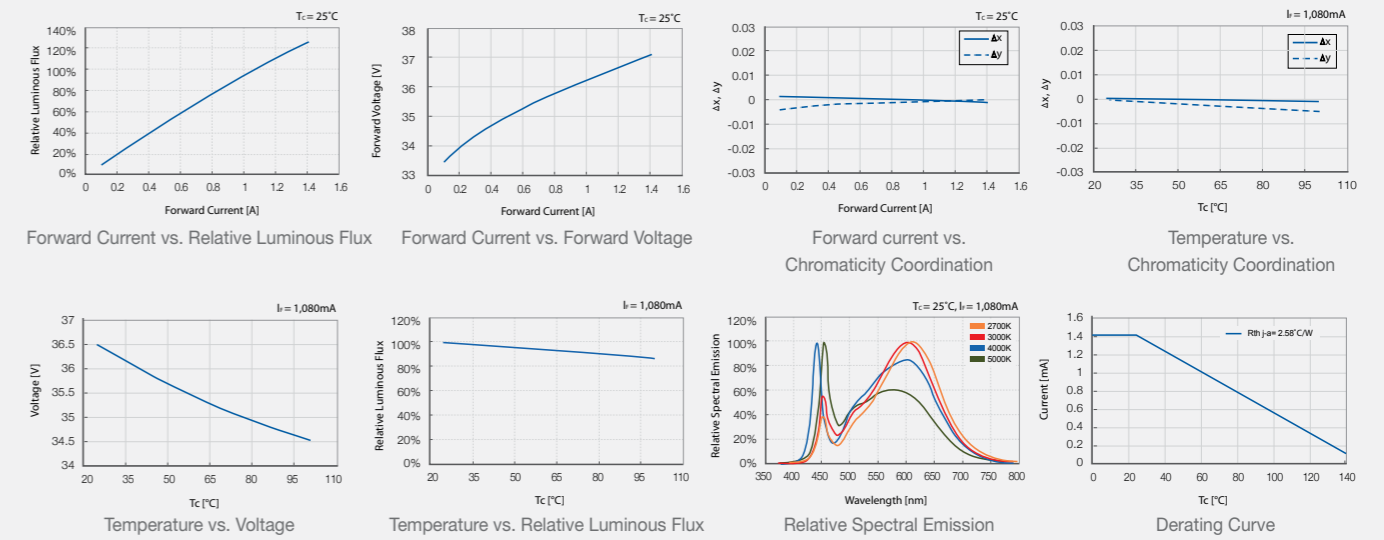
**Beam Distribution (Ta = 25°C)**



**Tray (unit : mm)**



**Optical & Electrical Characteristics**





## Mid Power



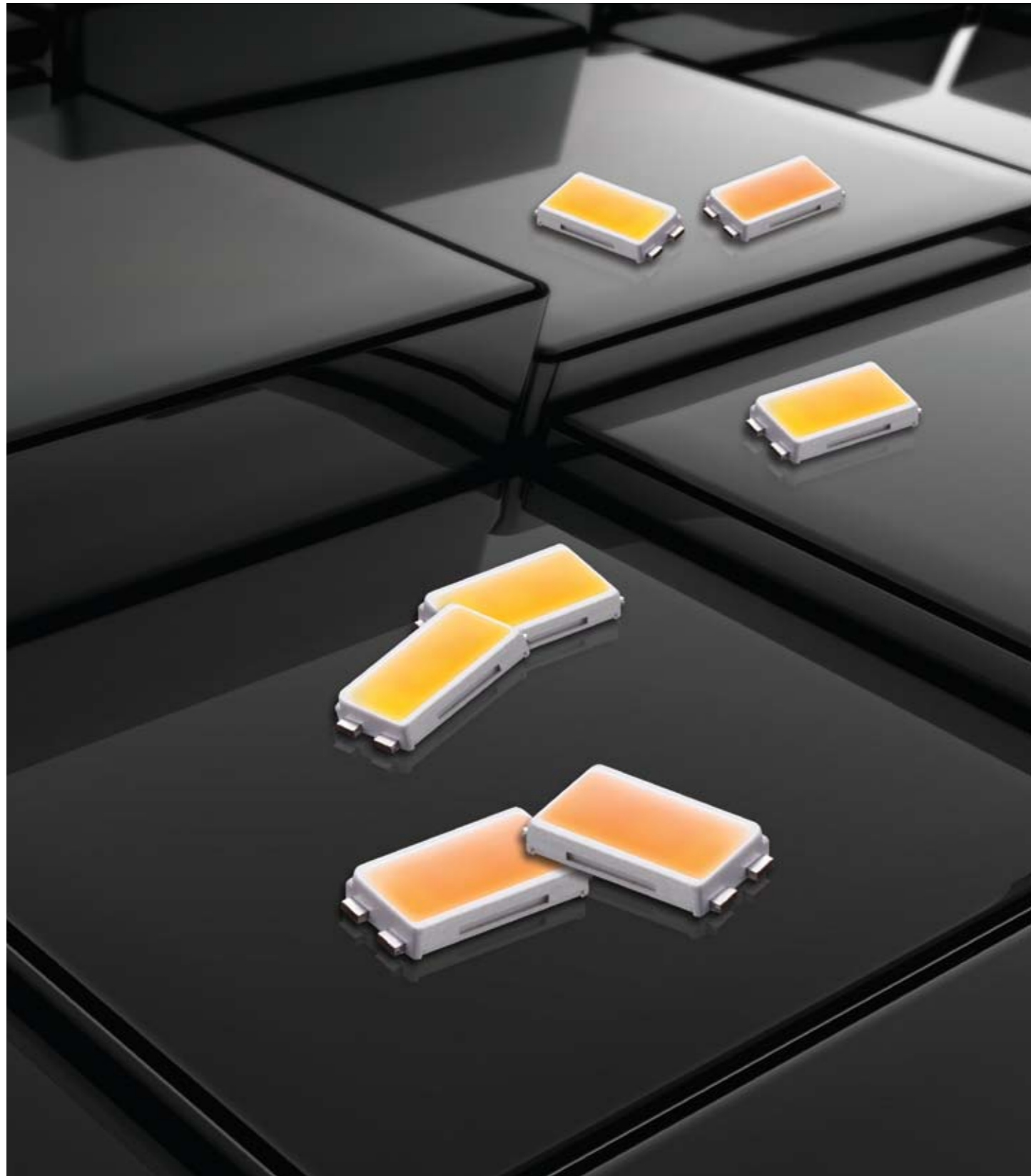
High quality light output, the optimum solution for retrofit lamps and ambient lighting.

LM561B  
LM561A

LM231B  
LM231A

LM362A

# LM561B Series



# LM561B Series

## Features

Highest efficacy available among middle power LED packages worldwide.

- Highest efficacy mid-power LED (160lm/W)
- Completed 6000 hours of LM-80 testing @ 150mA, 105°C
- Great for use in premium bulbs, ambient lighting, and LED tubes
- Variety of CIE bin support options - whole bin, quarter bin, and kitting bin
- Footprint (5.6mmx3.0mm)



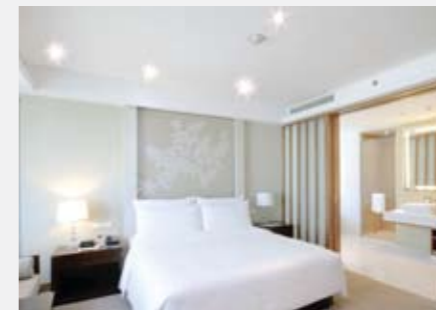
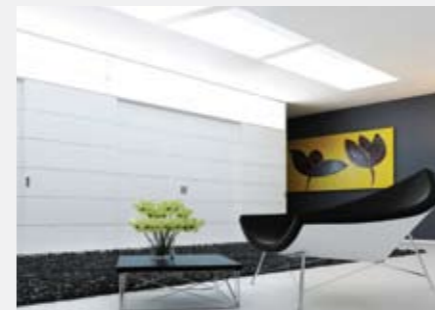
## Specification (Ta = 25°C)

Part Number	Color	CCT (K)	CRI	Luminous flux		Forward Voltage		IF (mA)	Beam Angle (°)
				Min (lm)	Max (lm)	Typ (V)	Max (V)		
SPMWHT541MD5WAW0S*		2700		24.0	30.0				
SPMWHT541MD5WAV0S*		3000		24.5	30.5				
SPMWHT541MD5WAW0S*		3500		25.0	31.0				
SPMWHT541MD5WAT0S*		4000	80	26.0	32.0				
SPMWHT541MD5WAR0S*		5000		27.0	33.0				
SPMWHT541MD5WAQ0S*	White	5700		26.5	32.5	2.9	3.2	65	120
SPMWHT541MD5WAP0S*		6500		26.0	32.0				
SPMWHT541MD7WAW0S0		2700		20.0	26.0				
SPMWHT541MD7WAV0S0		3000	90	20.5	26.5				
SPMWHT541MD7WAW0S0		3500		22.0	28.0				
SPMWHT541MD7WAT0S0		4000		23.0	29.0				

## Applications

[Indoor Lighting] LED tube, Ambient light

[Consumer Lighting] Downlight



**Absolute Maximum Ratings (Ta = 25°C)**

If (mA)	Rth j-c (°C/W)	Tj (°C)	Tstg (°C)	Topr (°C)
150	16.0	110	-40 ~ 120	-40 ~ 85

- Rth j-c : Thermal Resistance from junction to solder point
- Tj : Junction Temperature
- Tstg : Storage temperature range
- Topr : Operating temperature range

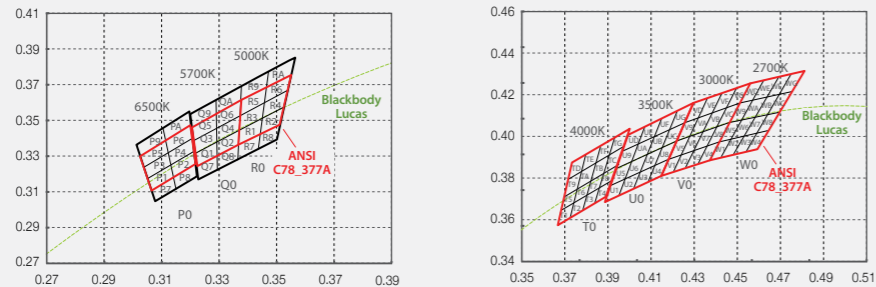
**Forward Voltage (Ta = 25°C)**

Condition	Min.	Typ.	Max.	Unit
If=65mA	2.7	2.9	3.2	V

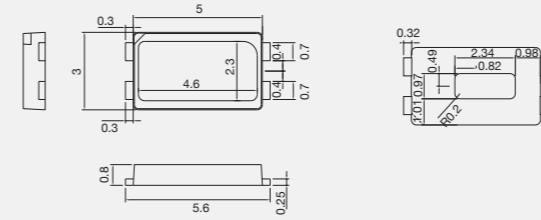
**Color Binning**

CCT	Whole Bin	Half Bin	M7 Bin	M4 Bin
2700K(CRI80+)	SPMWHT541MD5WAW0S3	SPMWHT541MD5WAWHS3	-	SPMWHT541MD5WAWMS3
3000K(CRI80+)	SPMWHT541MD5WAV0S3	SPMWHT541MD5WAVHS3	-	SPMWHT541MD5WAVMS3
3500K(CRI80+)	SPMWHT541MD5WU0S3	SPMWHT541MD5WUHS3	-	SPMWHT541MD5WUMS3
4000K(CRI80+)	SPMWHT541MD5WAT0S3	SPMWHT541MD5WATHS3	-	SPMWHT541MD5WATMS3
5000K(CRI80+)	SPMWHT541MD5WAR0S3	-	SPMWHT541MD5WARMS3	-
5700K(CRI80+)	SPMWHT541MD5WAQ0S3	-	SPMWHT541MD5WAQMS3	-
6500K(CRI80+)	SPMWHT541MD5WAP0S3	-	SPMWHT541MD5WAPMS3	-
2700K(CRI90+)	SPMWHT541MD7WAW0S0	SPMWHT541MD7WAWHS0	-	SPMWHT541MD7WAWMS0
3000K(CRI90+)	SPMWHT541MD7WAV0S0	SPMWHT541MD7WAVHS0	-	SPMWHT541MD7WAVMS0
3500K(CRI90+)	SPMWHT541MD7WU0S0	SPMWHT541MD7WUHS0	-	SPMWHT541MD7WUMS0
4000K(CRI90+)	SPMWHT541MD7WAT0S0	SPMWHT541MD7WATHS0	-	SPMWHT541MD7WATMS0
5000K(CRI90+)	SPMWHT541MD7WAR0S0	-	SPMWHT541MD7WARMS0	-

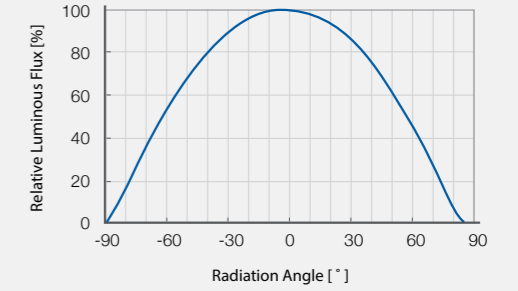
**Chromaticity Region**



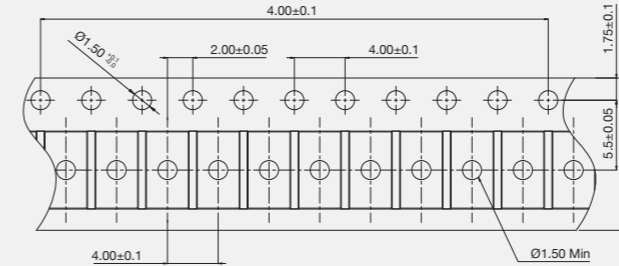
**Package Outline (unit : mm)**



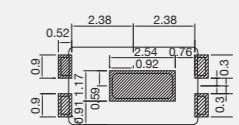
**Beam Distribution**



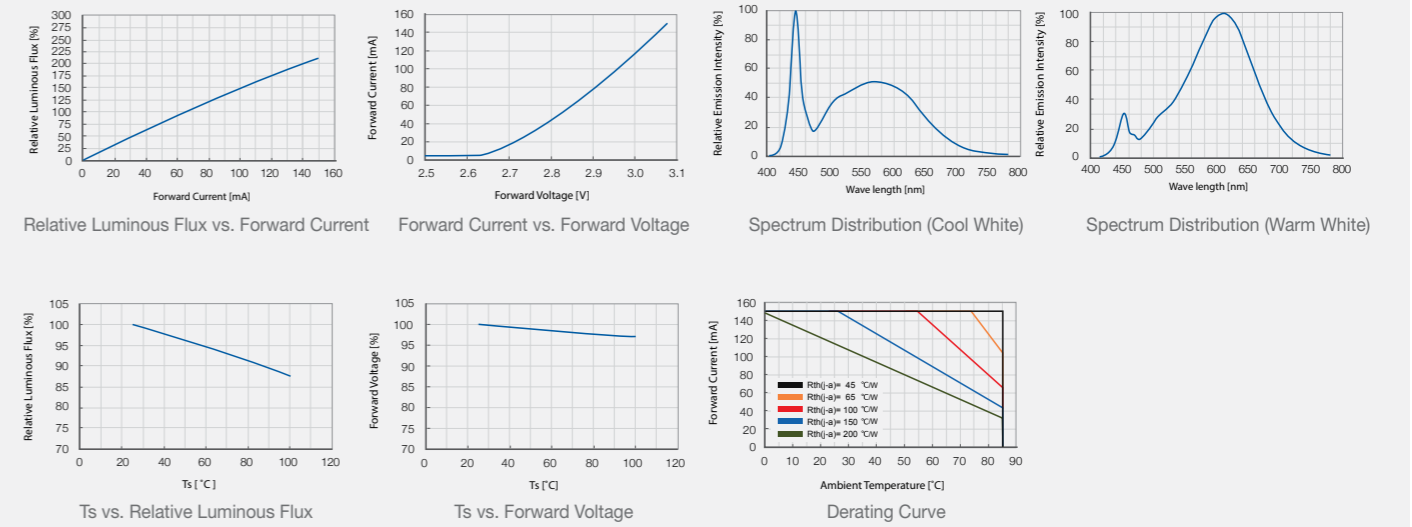
**Carrier Tape (unit : mm)**



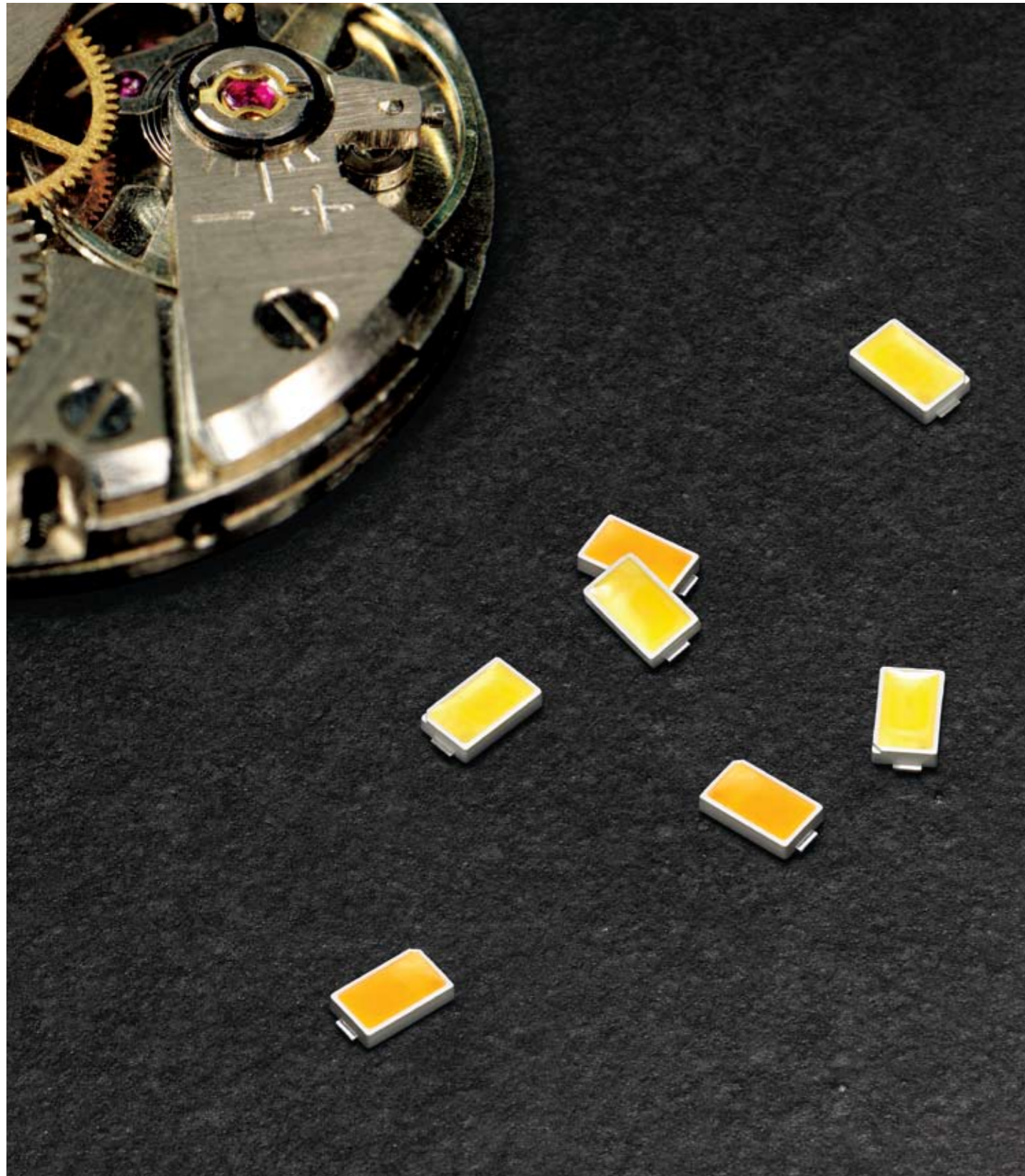
**Recommended Soldering Pattern**



**Optical & Electrical Characteristics**



# LM561A Series



## Features

The LM561A is designed for use in LED tubes and in Ambient lighting applications and delivers 141lm/W efficacy with CRI 80 light quality.

- Suitable for use in Ambient lighting and LED tubes
- 141lm/W @5000K
- Footprint (5.6mmx3.0mm)



## Specification (Ta = 25°C)

Part Number	Color	CCT (K)	CRI	Luminous flux		Forward Voltage		IF (mA)	Beam Angle (°)
				Min (lm)	Max (lm)	Typ (V)	Max (V)		
SPMWHT5225D5WAW0S0	White	2700	80	14.0	21.8	2.9	3.3	50	120
SPMWHT5225D5WAV0S0		3000		14.9	22.7				
SPMWHT5225D5WAU0S0		3500		15.3	23.4				
SPMWHT5225D5WAT0S0		4000		15.6	24.0				
SPMWHT5225D5WAS0S0		4500		15.8	24.0				
SPMWHT5225D5WAR0S0		5000		15.9	24.3				
SPMWHT5225D5WAQ0S0		5700		15.6	24.0				
SPMWHT5225D5WAP0S0		6500		15.3	23.6				

## Applications

[Indoor Lighting] LED tube, Ambient light



**Absolute Maximum Ratings (Ta = 25°C)**

If (mA)	Rth j-c (°C/W)	Tj (°C)	Tstg (°C)	Topr (°C)
150	17.7	110	-40 ~ 100	-40 ~ 85

- Rth j-c : Thermal Resistance from junction to solder point
- Tj : Junction Temperature
- Tstg : Storage temperature range
- Topr : Operating temperature range

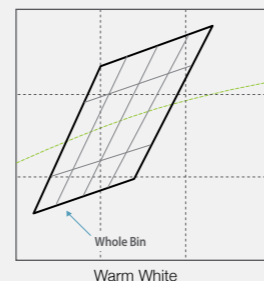
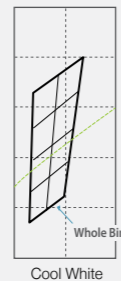
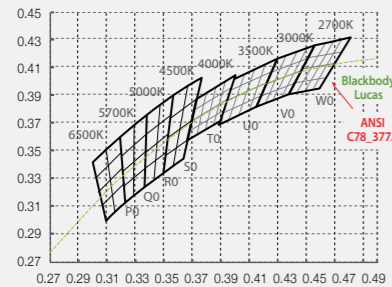
**Forward Voltage (Ta = 25°C)**

Condition	Min.	Typ.	Max.	Unit
If=50mA	2.8	2.9	3.3	V

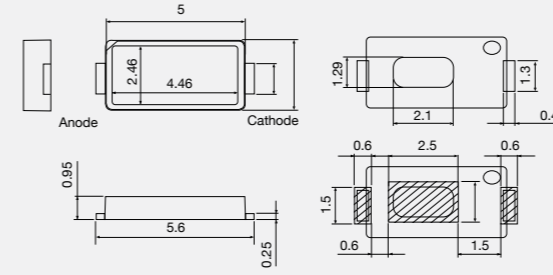
**Color Binning**

CCT	Whole Bin	Half Bin	M7 Bin	M4 Bin
2700K	SPMWHT5225D5WAW0S0	-	-	-
3000K	SPMWHT5225D5WAV0S0	-	-	-
3500K	SPMWHT5225D5WAU0S0	-	-	-
4000K	SPMWHT5225D5WAT0S0	-	-	-
4500K	SPMWHT5225D5WAS0S0	-	-	-
5000K	SPMWHT5225D5WAR0S0	-	-	-
5700K	SPMWHT5225D5WAQ0S0	-	-	-
6500K	SPMWHT5225D5WAP0S0	-	-	-

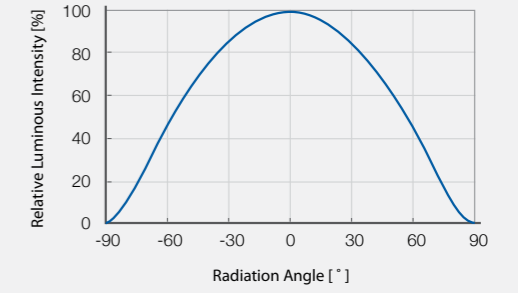
**Chromaticity Region**



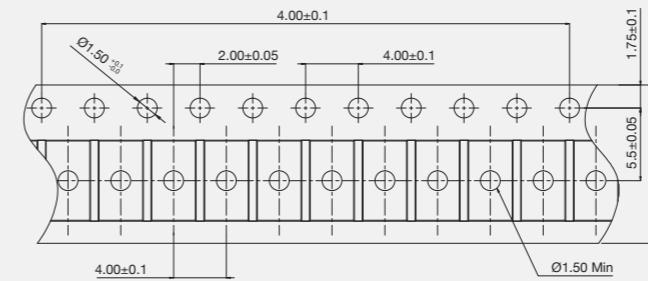
**Package Outline (unit : mm)**



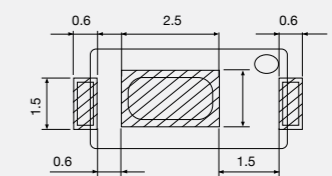
**Beam Distribution**



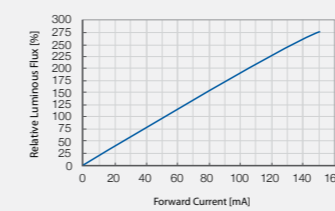
**Carrier Tape (unit : mm)**



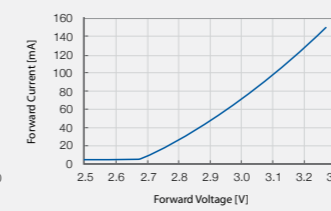
**Recommended Soldering Pattern**



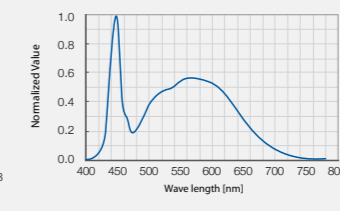
**Optical & Electrical Characteristics**



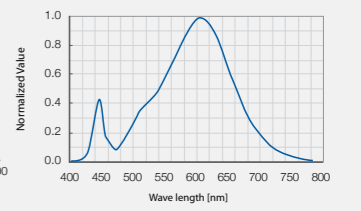
Relative Luminous Flux vs. Forward Current



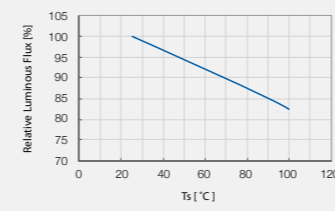
Forward Current vs. Forward Voltage



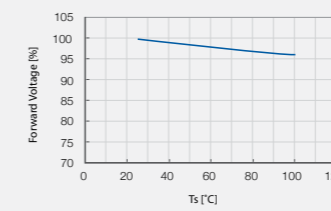
Spectrum Distribution (Cool White)



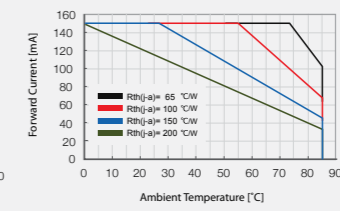
Spectrum Distribution (Warm White)



Ts vs. Relative Luminous Flux

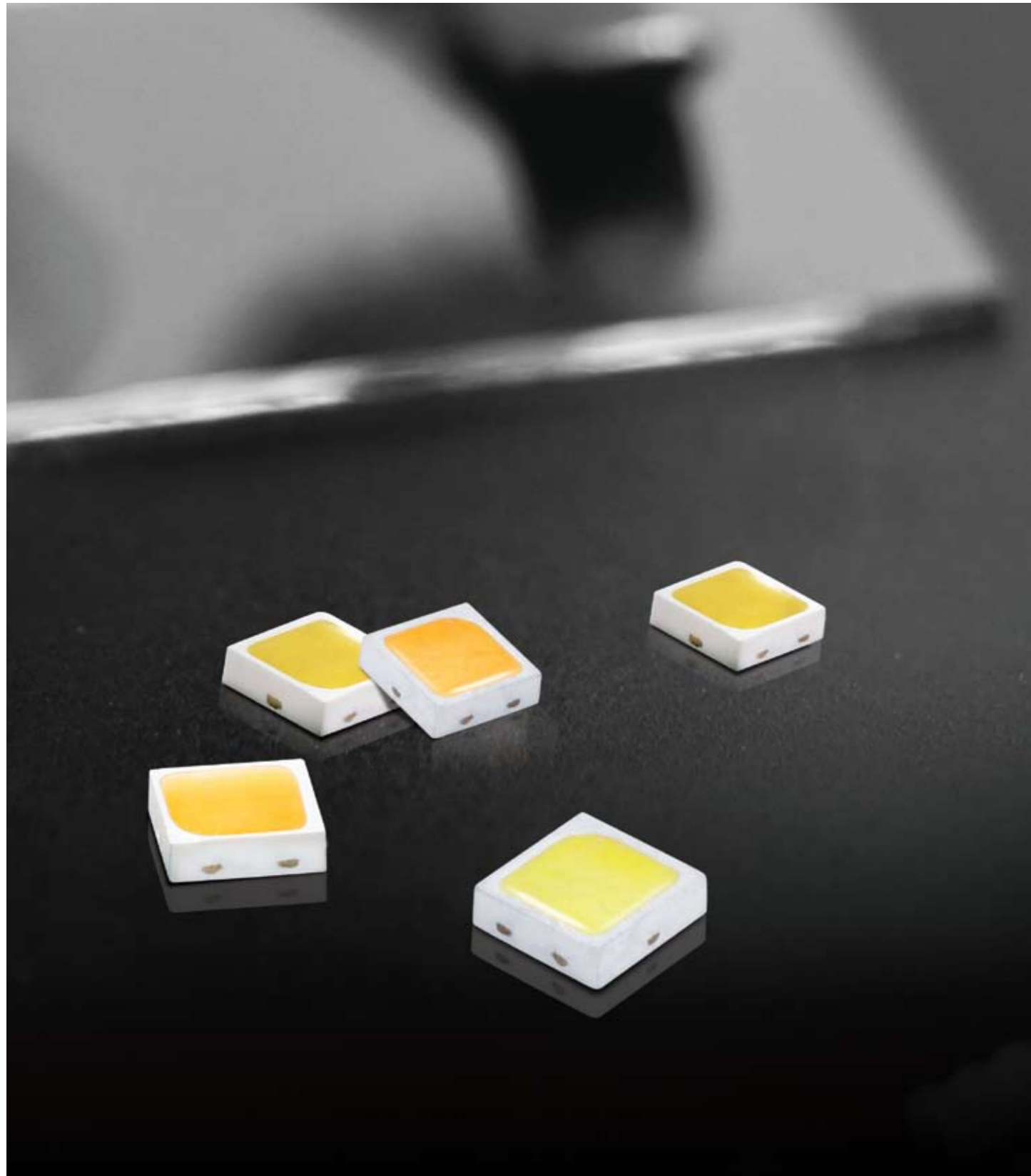


Ts vs. Forward Voltage



Derating Curve

# LM231B Series



# LM231B Series

## Features

The LM231B delivers the same light output as the competition but in a more compact form factor, making it easy to use in downlights and linear tubes.

- Optimized for bulbs, downlights, ambient lighting, and LED Tubes
- Completed 6000 hours of LM-80 testing @ 130mA, 105°C
- Smaller footprint than the competition, but able to deliver equivalent light output as competition (130lm/W)
- Compatible with LM231A
- Compact footprint (2.3mmx2.3mm)



## Specification (Ta = 25°C)

Part Number	Color	CCT (K)	CRI	Luminous flux		Forward Voltage		IF (mA)	Beam Angle (°)
				Min (lm)	Max (lm)	Typ (V)	Max (V)		
SPMWHT223MD5WAW0S0	White	2700	80	19.8	30.1	2.9	3.2	65	120
SPMWHT223MD5WAV0S0		3000		19.8	30.1				
SPMWHT223MD5WAW0S0		3500		19.8	30.1				
SPMWHT223MD5WAT0S0		4000		20.6	31.2				
SPMWHT223MD5WAR0S0		5000		20.6	31.2				
SPMWHT223MD5WAQ0S0		5700		20.6	31.2				
SPMWHT223MD5WAP0S0		6500		20.6	31.2				
SPMWHT223MD7WAW0S0		2700		16.5	24.0				
SPMWHT223MD7WAV0S0		3000		17.0	24.5				
SPMWHT223MD7WAW0S0		3500		17.5	25.0				
SPMWHT223MD7WAT0S0		4000		18.0	25.5				

## Applications

[Indoor Lighting] LED tube, Ambient light



**Absolute Maximum Ratings (Ta = 25°C)**

If (mA)	Rth j-c (°C/W)	Tj (°C)	Tstg (°C)	Topr (°C)
150	20	110	-40 ~ 100	-40 ~ 85

- Rth j-c : Thermal Resistance from junction to solder point
- Tj : Junction Temperature
- Tstg : Storage temperature range
- Topr : Operating temperature range

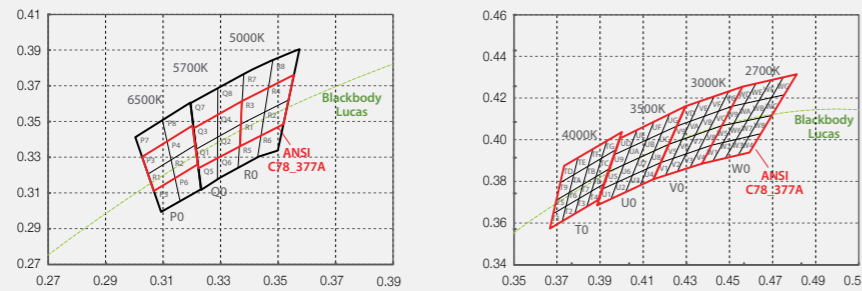
**Forward Voltage (Ta = 25°C)**

Condition	Min.	Typ.	Max.	Unit
If=65mA	2.7	2.9	3.2	V

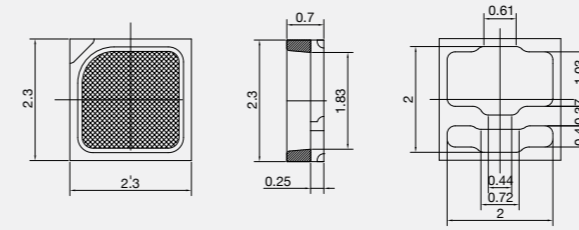
**Color Binning**

CCT	Whole Bin	Half Bin	M7 Bin	M4 Bin
2700K(CRI80+)	SPMWHT223MD5WAW0S0	-	-	SPMWHT223MD5WAWMS0
3000K(CRI80+)	SPMWHT223MD5WAV0S0	-	-	SPMWHT223MD5WAVMS0
3500K(CRI80+)	SPMWHT223MD5WAU0S0	-	-	SPMWHT223MD5WAUMS0
4000K(CRI80+)	SPMWHT223MD5WAT0S0	-	-	SPMWHT223MD5WATMS0
5000K(CRI80+)	SPMWHT223MD5WAR0S0	-	SPMWHT223MD5WARMS0	-
5700K(CRI80+)	SPMWHT223MD5WAQ0S0	-	SPMWHT223MD5WAQMS0	-
6500K(CRI80+)	SPMWHT223MD5WAP0S0	-	SPMWHT223MD5WAPMS0	-
2700K(CRI90+)	SPMWHT223MD7WAW0S0	-	-	-
3000K(CRI90+)	SPMWHT223MD7WAV0S0	-	-	-
3500K(CRI90+)	SPMWHT223MD7WAU0S0	-	-	-
4000K(CRI90+)	SPMWHT223MD7WAT0S0	-	-	-

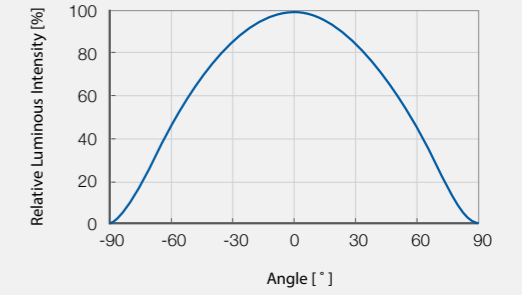
**Chromaticity Region**



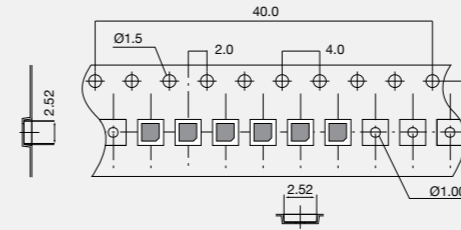
**Package Outline (unit : mm)**



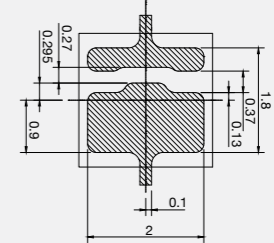
**Beam Distribution**



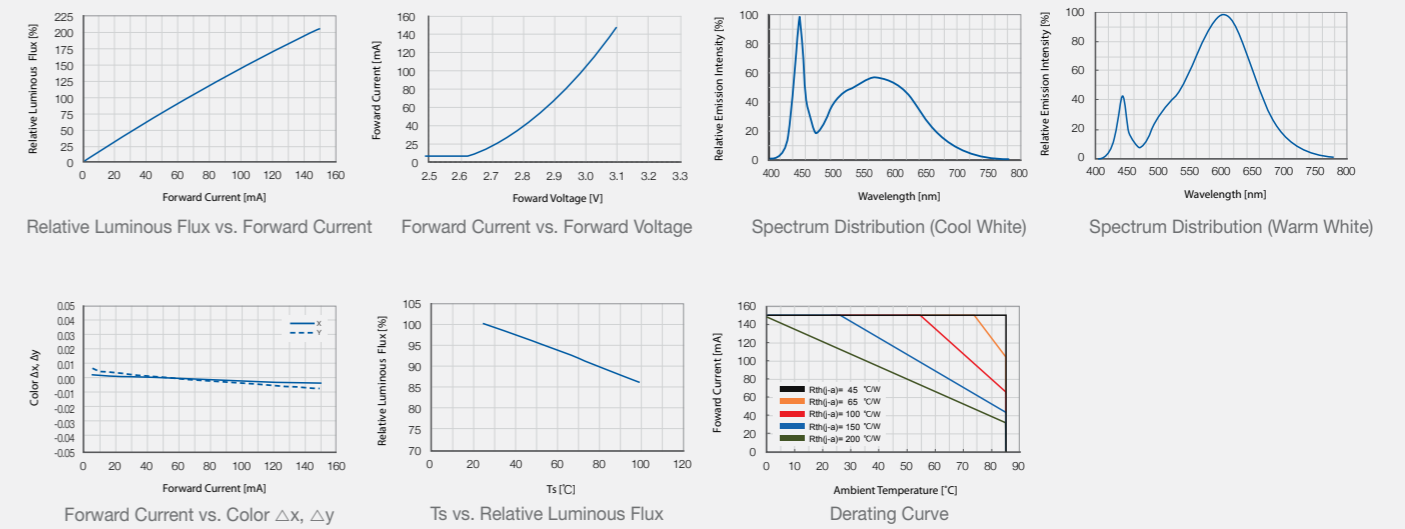
**Carrier Tape (unit : mm)**



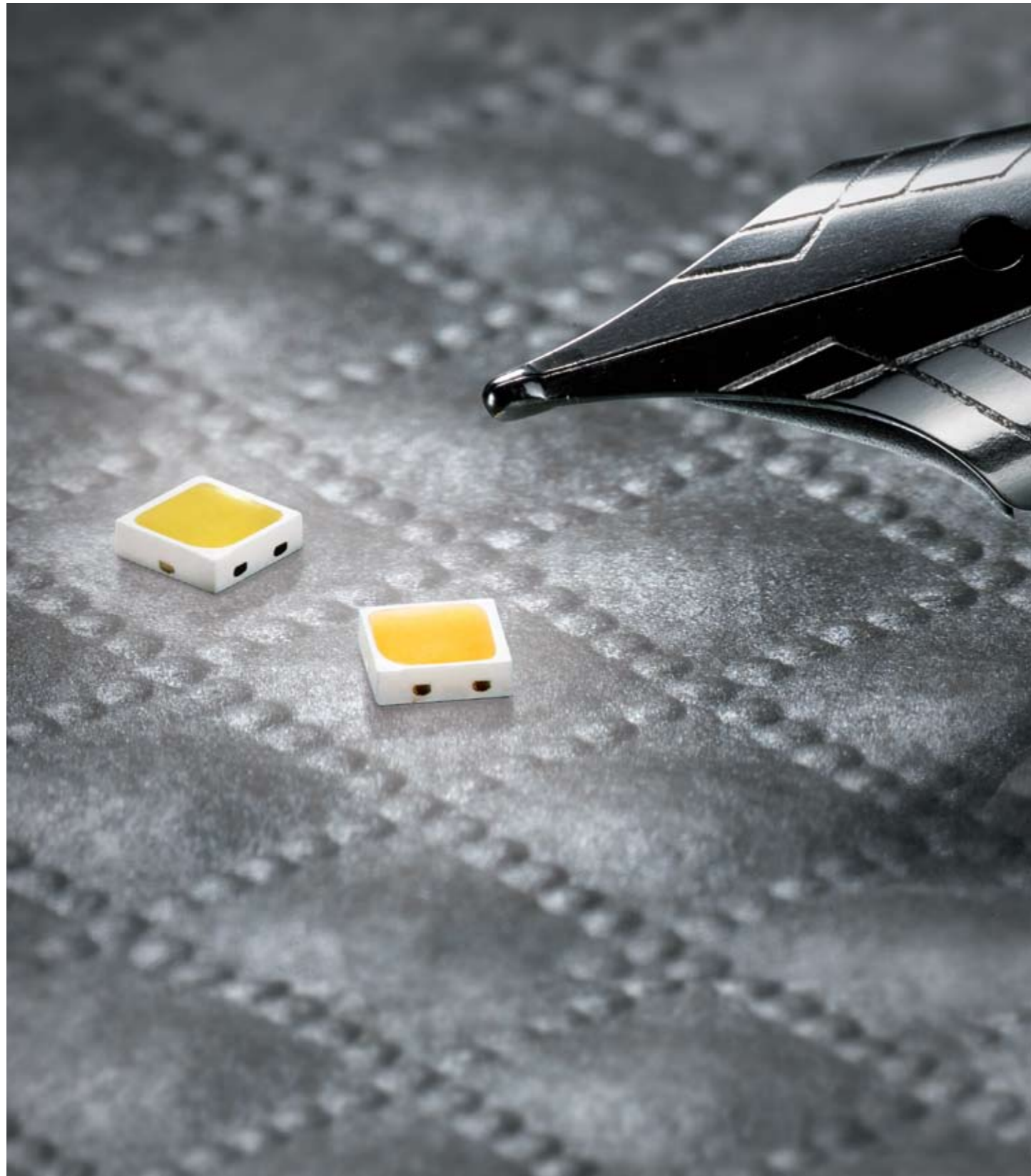
**Recommended Soldering Pattern**



**Optical & Electrical Characteristics**



# LM231A Series



# LM231A Series

## Features

Reliable LED in a 2.3mm x 2.3mm package that delivers superior design flexibility.

- Suitable for Ambient lighting and LED tubes
- Completed 10000 hours of LM-80 testing @ 100mA, 55°C
- Its small footprint makes it easy to use in downlights and retrofit lamps
- Compact footprint (2.3mmx2.3mm)



## Specification (Ta = 25°C)

Part Number	Color	CCT (K)	CRI	Luminous flux		Forward Voltage		IF (mA)	Beam Angle (°)
				Min (lm)	Max (lm)	Typ (V)	Max (V)		
SPMWHT221MD5WAW0S0		2700		19.8	30.1				
SPMWHT221MD5WAV0S0		3000		19.8	30.1				
SPMWHT221MD5WAU0S0		3500		19.8	30.1				
SPMWHT221MD5WAT0S0	White	4000	80	20.6	31.2	2.9	3.2	65	120
SPMWHT221MD5WAS0S0		4500		20.6	31.2				
SPMWHT221MD5WAR0S0		5000		20.6	31.2				
SPMWHT221MD5WAQ0S0		5700		20.6	31.2				
SPMWHT221MD5WAP0S0		6500		20.6	31.2				

## Applications

[Indoor Lighting] LED tube, Ambient light

[Consumer Lighting] Downlight





**Absolute Maximum Ratings (Ta = 25°C)**

If (mA)	Rth j-c (°C/W)	Tj (°C)	Tstg (°C)	Topr (°C)
150	20	110	-40 ~ 100	-40 ~ 85

- Rth j-c : Thermal Resistance from junction to solder point
- Tj : Junction Temperature
- Tstg : Storage temperature range
- Topr : Operating temperature range

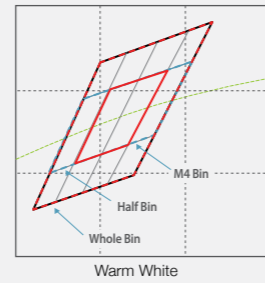
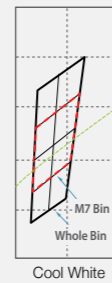
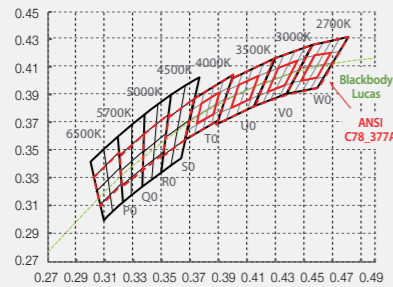
**Forward Voltage (Ta = 25°C)**

Condition	Min.	Typ.	Max.	Unit
If=65mA	2.7	2.9	3.2	V

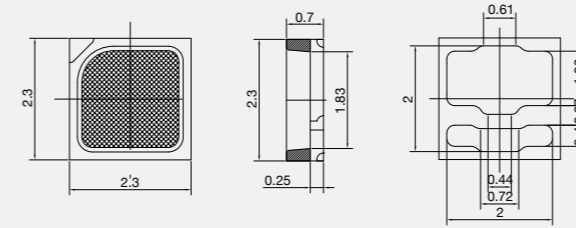
**Color Binning**

CCT	Whole Bin	Half Bin	M7 Bin	M4 Bin
2700K	SPMWHT221MD5WAW0S0	SPMWHT221MD5WAWHS0	-	SPMWHT221MD5WAWMS0
3000K	SPMWHT221MD5WAV0S0	SPMWHT221MD5WAVHS0	-	SPMWHT221MD5WAVMS0
3500K	SPMWHT221MD5WAU0S0	SPMWHT221MD5WAUHS0	-	SPMWHT221MD5WAUMS0
4000K	SPMWHT221MD5WAT0S0	SPMWHT221MD5WATHS0	-	SPMWHT221MD5WATMS0
4500K	SPMWHT221MD5WAS0S0	-	SPMWHT221MD5WASMS0	-
5000K	SPMWHT221MD5WAR0S0	-	SPMWHT221MD5WARMS0	-
5700K	SPMWHT221MD5WAQ0S0	-	SPMWHT221MD5WAQMS0	-
6500K	SPMWHT221MD5WAP0S0	-	SPMWHT221MD5WAPMS0	-

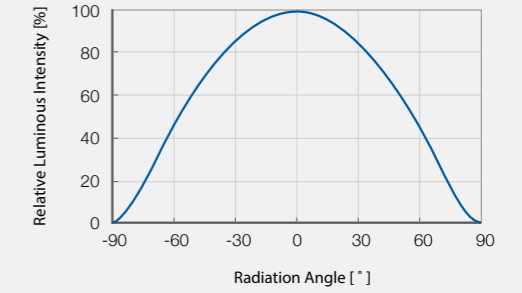
**Chromaticity Region**



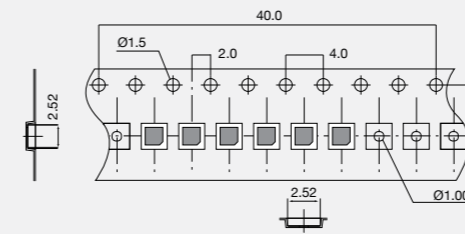
**Package Outline (unit : mm)**



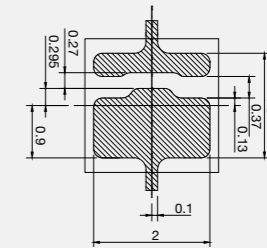
**Beam Distribution**



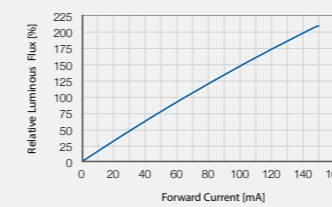
**Carrier Tape (unit : mm)**



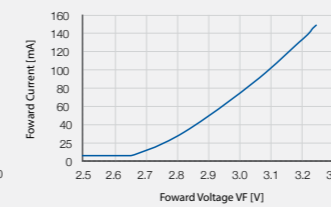
**Recommended Soldering Pattern**



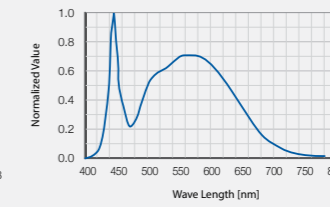
**Optical & Electrical Characteristics**



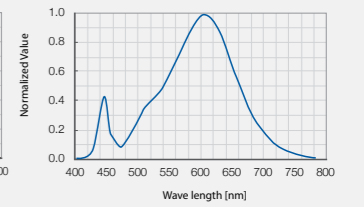
Relative Luminous Flux vs. Forward Current



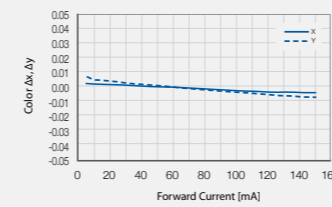
Forward Current vs. Forward Voltage



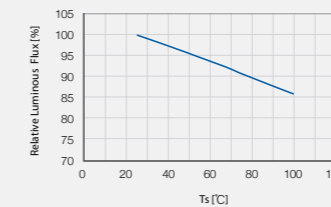
Spectrum Distribution (Cool White)



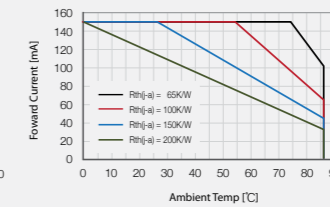
Spectrum Distribution (Warm White)



Forward Current vs. Color Δx, Δy

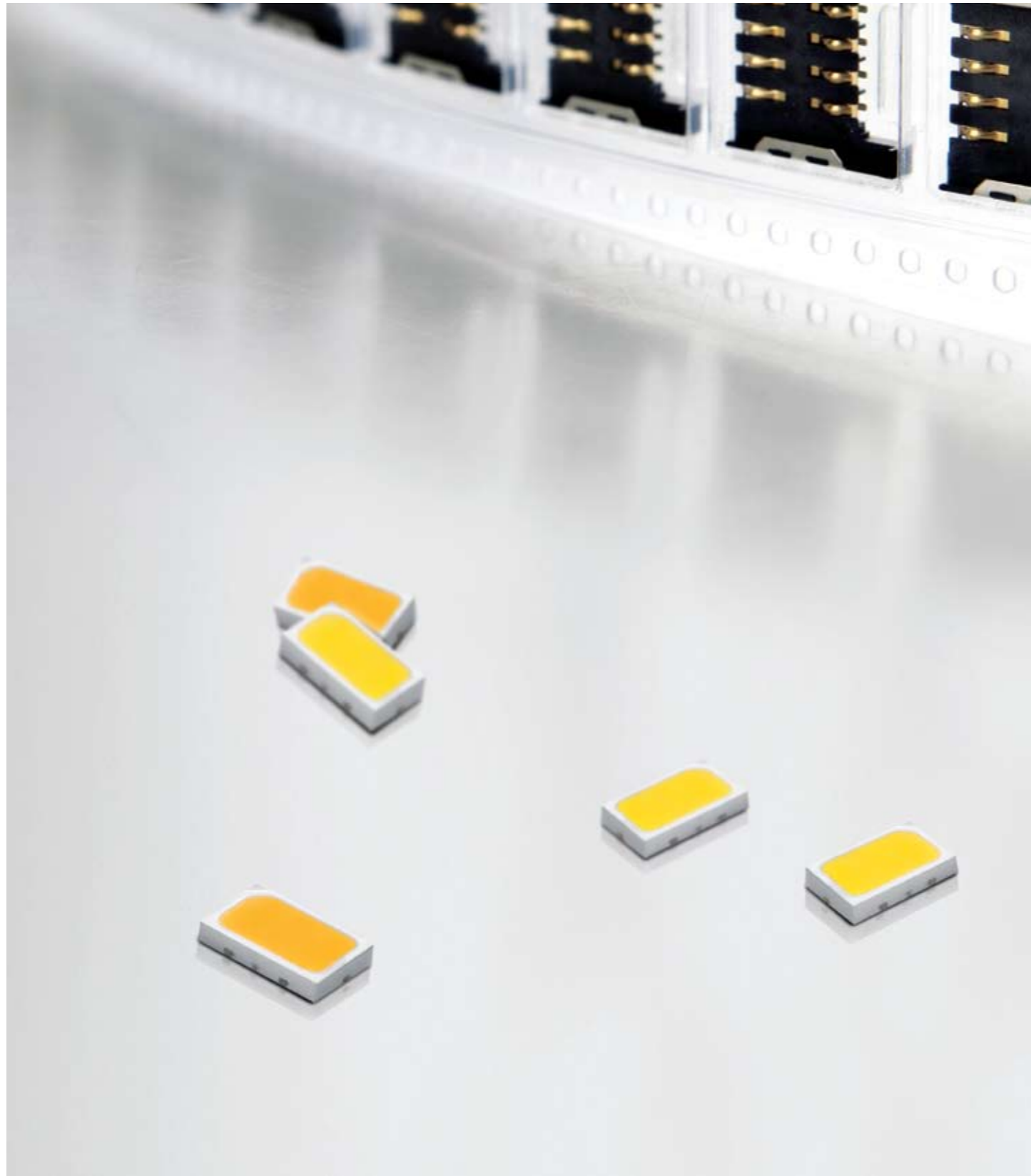


Ts vs. Relative Luminous Flux



Derating Curve

# LM362A Series



# LM362A Series

## Features

High quality light output makes the LM362A the optimal solution for retrofit lamps, downlights, and ambient lighting.

- 0.6W Class middle power LED that is suitable for LED Lamps, downlights and ambient lighting
- Completed 6000 hours of LM-80 testing @ 200mA, 105°C
- Whole / half binning available
- Footprint (3.6mmx2.3mm)



## Specification (Ta = 25°C)

Part Number	Color	CCT (K)	CRI	Luminous flux		Forward Voltage		IF (mA)	Beam Angle (°)
				Min (lm)	Max (lm)	Typ (V)	Max (V)		
SPMWHT325AD5YBW0S0	White	2700	80	51.0	78.0	6.0	6.6	100	120
SPMWHT325AD5YBV0S0		3000		51.0	80.0				
SPMWHT325AD5YBU0S0		3500		51.0	83.0				
SPMWHT325AD5YBT0S0		4000		55.0	85.0				
SPMWHT325AD5YBR0S0		5000		55.0	86.0				
SPMWHT325AD5YBQ0S0		5700		55.0	85.0				
SPMWHT325AD5YBP0S0		6500		55.0	85.0				
SPMWHT325AD7YBW0S0		2700		48.0	63.0				
SPMWHT325AD7YBV0S0		3000		50.0	65.0				
SPMWHT325AD7YBU0S0		3500		52.0	67.0				
SPMWHT325AD7YBT0S0	4000	54.0	69.0						

## Applications

[Indoor Lighting] LED tube, Ambient light

[Consumer Lighting] Downlight



**Absolute Maximum Ratings (Ta = 25°C)**

If (mA)	Rth j-c (°C/W)	Tj (°C)	Tstg (°C)	Topr (°C)
200	15	125	-40 ~ 100	-40 ~ 100

- Rth j-c : Thermal Resistance from junction to solder point
- Tj : Junction Temperature
- Tstg : Storage temperature range
- Topr : Operating temperature range

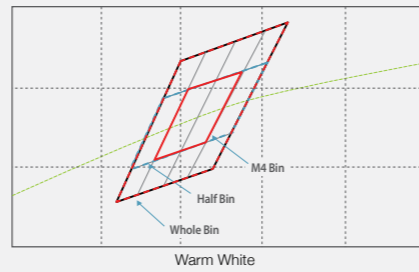
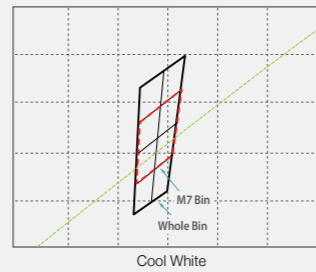
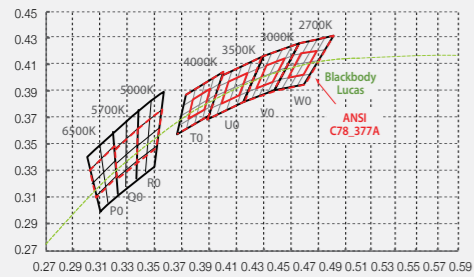
**Forward Voltage (Ta = 25°C)**

Condition	Min.	Typ.	Max.	Unit
If=100mA	5.6	6.0	6.6	V

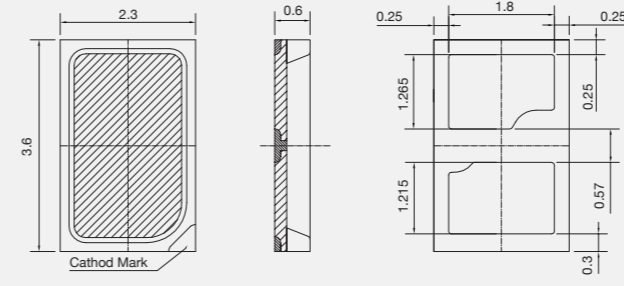
**Color Binning**

CCT	Whole Bin	Half Bin	M7 Bin	M4 Bin
2700K(CRI80+)	SPMWHT325AD5YBW0S0	SPMWHT325AD5YBWH0S0	-	SPMWHT325AD5YBWM0S0
3000K(CRI80+)	SPMWHT325AD5YBV0S0	SPMWHT325AD5YBVH0S0	-	SPMWHT325AD5YBVM0S0
3500K(CRI80+)	SPMWHT325AD5YBU0S0	SPMWHT325AD5YBUH0S0	-	SPMWHT325AD5YBUM0S0
4000K(CRI80+)	SPMWHT325AD5YBT0S0	SPMWHT325AD5YBT0H0	-	SPMWHT325AD5YBTM0H0
5000K(CRI80+)	SPMWHT325AD5YBR0S0	-	SPMWHT325AD5YBRMS0	-
5700K(CRI80+)	SPMWHT325AD5YBQ0S0	-	SPMWHT325AD5YBQMS0	-
6500K(CRI80+)	SPMWHT325AD5YBP0S0	-	SPMWHT325AD5YBPMS0	-
2700K(CRI90+)	SPMWHT325AD7YBW0S0	-	-	-
3000K(CRI90+)	SPMWHT325AD7YBV0S0	-	-	-
3500K(CRI90+)	SPMWHT325AD7YBU0S0	-	-	-
4000K(CRI90+)	SPMWHT325AD7YBT0S0	-	-	-

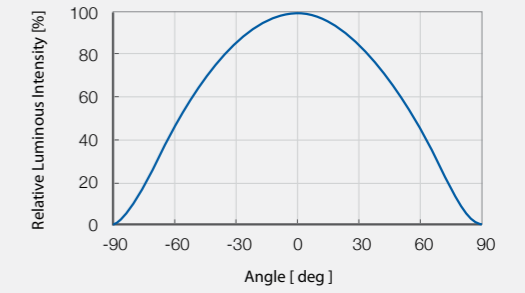
**Chromaticity Region**



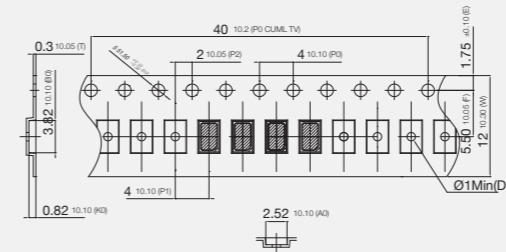
**Package Outline (unit : mm)**



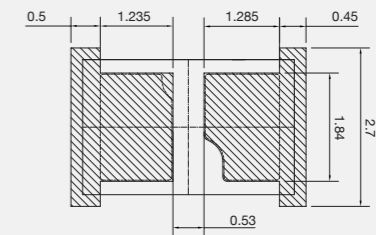
**Beam Distribution**



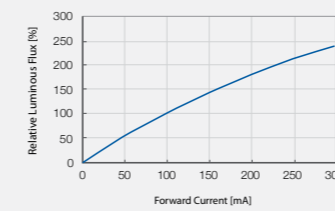
**Carrier Tape (unit : mm)**



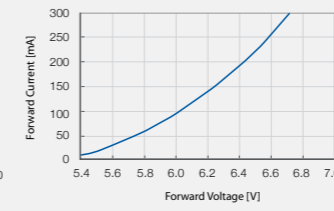
**Recommended Soldering Pattern**



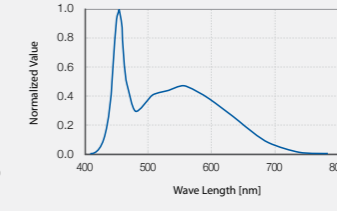
**Optical & Electrical Characteristics**



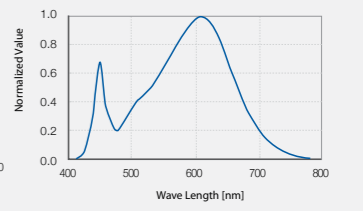
Relative Luminous Flux vs. Forward Current



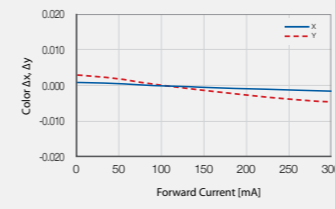
Forward Current vs. Forward Voltage



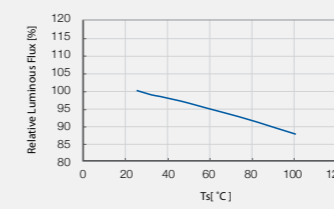
Spectrum Distribution (Cool White)



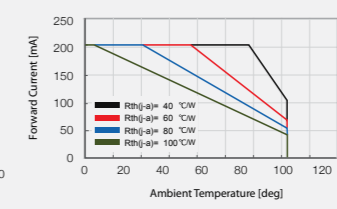
Spectrum Distribution (Warm White)



Chromaticity Coordinate Shift



Tj vs. Relative Luminous Flux



Derating Curve

# Full Lineup [High Power]

## LH351A

Part Number	Color	CCT (K)	CRI	Luminous Flux		Forward Voltage		IF (mA)	Beam Angle(°)
				Min (lm)	Max (lm)	Typ (V)	Max (V)		
SPHWHTL3D305E6W0G4	White	2700	80	100	140	2.95	3.30	350	125
SPHWHTL3D307E6W0E6		2700	90	80	140				
SPHWHTL3D303E6V0H5		3000	70	110	160				
SPHWHTL3D305E6V0G4		3000	80	100	140				
SPHWHTL3D305E6U0G4		3500	80	100	140				
SPHWHTL3D303E6T0K3		4000	70	130	160				
SPHWHTL3D305E6T0G4		4000	80	100	140				
SPHWHTL3D303E6RTJ4		5000	70	120	160				
SPHWHTL3D304E6RTJ4		5000	75	120	160				
SPHWHTL3D303E6QTJ4		5700	70	120	160				
SPHWHTL3D304E6QTJ4		5700	75	120	160				
SPHWHTL3D303E6PTJ4		6500	70	120	160				
SPHWHTL3D303E6N0J4		7600	68	120	160				

## LH351Z

Part Number	Color	CCT (K)	CRI	Luminous flux		Forward Voltage		IF (mA)	Beam Angle (°)	
				Min (lm)	Max (lm)	Typ (V)	Max (V)			
SPHWHTL3D20EE3W0F2	White	2700	80	90	110	2.9	3.0	350	115	
SPHWHTL3D20EE3V0F3		3000	80	90	120	2.9	3.0			
SPHWHTL3D20EE3U0G3		3500	80	100	130	2.9	3.0			
SPHWHTL3D20EE3T0G3		4000	80	100	130	2.9	3.0			
SPHWHTL3D20CE3T0H3		4000	70	110	140	2.9	3.0			
SPHWHTL3D20CE3RTH3		5000	70	110	140	2.9	3.0			
SPHWHTL3D20CE3QTH3		5700	70	110	140	2.9	3.0			
SPHWHTL3D20CE3PTH3		6500	70	110	140	2.9	3.0			
SPHWHTL3D201F3PSJ3		6500	68	120 (@25°C)	-	3.0 (@25°C)	3.1 (@25°C)			120
SPHWHTL3D201F3ASJ3		7000	68	120 (@25°C)	-	3.0 (@25°C)	3.1 (@25°C)			
SPHWHTL3D201F3NSJ3		7600	68	120 (@25°C)	-	3.0 (@25°C)	3.1 (@25°C)			

## LH351B

Part Number	Color	CCT (K)	CRI	Luminous flux		Forward Voltage		IF (mA)	Beam Angle (°)
				Min (lm)	Max (lm)	Typ (V)	Max (V)		
SPHWH1L3D30ED4W0F3	White	2700	80	90	120	2.85	3.00	350	120
SPHWH1L3D30ED4V0G3		3000	80	100	130				
SPHWH1L3D30ED4U0G3		3500	80	100	130				
SPHWH1L3D30CD4T0J3		4000	70	120	150				
SPHWH1L3D30ED4T0G3		4000	80	100	130				
SPHWH1L3D30DD4RTJ3		5000	75	120	150				
SPHWH1L3D30DD4RTK3		5000	75	130	160				
SPHWH1L3D30CD4RTJ3		5000	70	120	150				
SPHWH1L3D30CD4RTK3		5000	70	130	160				
SPHWH1L3D30DD4QTJ3		5700	75	120	150				
SPHWH1L3D30CD4QTJ3		5700	70	120	150				
SPHWH1L3D30CD4PTJ3		6500	70	120	150				

## LC013B

Part Number	Color	CCT (K)	CRI	Luminous flux		Forward Voltage		IF (mA)	Beam Angle (°)
				Min (lm)	Max (lm)	Typ (V)	Max (V)		
SPHWW1HDNA25YHW31F	White	2700	80	1300	1400	36.5	38.5	360	115
SPHWW1HDNA25YHV31F		3000		1350	1450				
SPHWW1HDNA25YHT31F		4000		1430	1540				
SPHCW1HDNA25YHRT1F		5000		1430	1560				

## LC026B

Part Number	Color	CCT (K)	CRI	Luminous flux		Forward Voltage		IF (mA)	Beam Angle (°)
				Min (lm)	Max (lm)	Typ (V)	Max (V)		
SPHWW1HDNC25YHW32F	White	2700	80	2510	2710	36.5	38.5	720	115
SPHWW1HDNC25YHV32F		3000		2680	2890				
SPHWW1HDNC25YHT32F		4000		2850	3080				
SPHCW1HDNC25YHRT3F		5000		2850	3130				

## LC040B

Part Number	Color	CCT (K)	CRI	Luminous flux		Forward Voltage		IF (mA)	Beam Angle (°)
				Min (lm)	Max (lm)	Typ (V)	Max (V)		
SPHWW1HDNE25YHW34J	White	2700	80	3695	4050	36.5	38.5	1080	115
SPHWW1HDNE25YHV34J		3000		3810	4175				
SPHWW1HDNE25YHT34J		4000		4075	4465				
SPHCW1HDNE25YHRT4J		5000		4115	4505				

## Full Lineup [Mid Power]

### LM561B

Part Number	Color	CCT (K)	CRI	Luminous flux		Forward Voltage		IF (mA)	Beam Angle (°)
				Min (lm)	Max (lm)	Typ (V)	Max (V)		
SPMWHT541MD5WAW0S*		2700		24.0	30.0				
SPMWHT541MD5WAV0S*		3000		24.5	30.5				
SPMWHT541MD5WAU0S*		3500		25.0	31.0				
SPMWHT541MD5WAT0S*		4000	80	26.0	32.0				
SPMWHT541MD5WAR0S*		5000		27.0	33.0				
SPMWHT541MD5WAQ0S*	White	5700		26.5	32.5	2.9	3.2	65	120
SPMWHT541MD5WAP0S*		6500		26.0	32.0				
SPMWHT541MD7WAW0S0		2700		20.0	26.0				
SPMWHT541MD7WAV0S0		3000		20.5	26.5				
SPMWHT541MD7WAU0S0		3500	90	22.0	28.0				
SPMWHT541MD7WAT0S0		4000		23.0	29.0				

### LM561A

Part Number	Color	CCT (K)	CRI	Luminous flux		Forward Voltage		IF (mA)	Beam Angle (°)
				Min (lm)	Max (lm)	Typ (V)	Max (V)		
SPMWHT5225D5WAW0S0		2700		14.0	21.8				
SPMWHT5225D5WAV0S0		3000		14.9	22.7				
SPMWHT5225D5WAU0S0		3500		15.3	23.4				
SPMWHT5225D5WAT0S0		4000	80	15.6	24.0				
SPMWHT5225D5WAS0S0	White	4500		15.8	24.0	2.9	3.3	50	120
SPMWHT5225D5WAR0S0		5000		15.9	24.3				
SPMWHT5225D5WAQ0S0		5700		15.6	24.0				
SPMWHT5225D5WAP0S0		6500		15.3	23.6				

### LM231B

Part Number	Color	CCT (K)	CRI	Luminous flux		Forward Voltage		IF (mA)	Beam Angle (°)
				Min (lm)	Max (lm)	Typ (V)	Max (V)		
SPMWHT223MD5WAW0S0		2700		19.8	30.1				
SPMWHT223MD5WAV0S0		3000		19.8	30.1				
SPMWHT223MD5WAU0S0		3500		19.8	30.1				
SPMWHT223MD5WAT0S0		4000	80	20.6	31.2				
SPMWHT223MD5WAR0S0		5000		20.6	31.2				
SPMWHT223MD5WAQ0S0	White	5700		20.6	31.2	2.9	3.2	65	120
SPMWHT223MD5WAP0S0		6500		20.6	31.2				
SPMWHT223MD7WAW0S0		2700		16.5	24.0				
SPMWHT223MD7WAV0S0		3000		17.0	24.5				
SPMWHT223MD7WAU0S0		3500	90	17.5	25.0				
SPMWHT223MD7WAT0S0		4000		18.0	25.5				

### LM231A

Part Number	Color	CCT (K)	CRI	Luminous flux		Forward Voltage		IF (mA)	Beam Angle (°)
				Min (lm)	Max (lm)	Typ (V)	Max (V)		
SPMWHT221MD5WAW0S0		2700		19.8	30.1				
SPMWHT221MD5WAV0S0		3000		19.8	30.1				
SPMWHT221MD5WAU0S0		3500		19.8	30.1				
SPMWHT221MD5WAT0S0		4000	80	20.6	31.2				
SPMWHT221MD5WAS0S0	White	4500		20.6	31.2	2.9	3.2	65	120
SPMWHT221MD5WAR0S0		5000		20.6	31.2				
SPMWHT221MD5WAQ0S0		5700		20.6	31.2				
SPMWHT221MD5WAP0S0		6500		20.6	31.2				

### LM362A

Part Number	Color	CCT (K)	CRI	Luminous flux		Forward Voltage		IF (mA)	Beam Angle (°)
				Min (lm)	Max (lm)	Typ (V)	Max (V)		
SPMWHT325AD5YBW0S0		2700		51.0	78.0				
SPMWHT325AD5YBV0S0		3000		51.0	80.0				
SPMWHT325AD5YBU0S0		3500		51.0	83.0				
SPMWHT325AD5YBT0S0		4000	80	55.0	85.0				
SPMWHT325AD5YBR0S0		5000		55.0	86.0				
SPMWHT325AD5YBQ0S0	White	5700		55.0	85.0	6.0	6.6	100	120
SPMWHT325AD5YBP0S0		6500		55.0	85.0				
SPMWHT325AD7YBW0S0		2700		48.0	63.0				
SPMWHT325AD7YBV0S0		3000	90	50.0	65.0				
SPMWHT325AD7YBU0S0		3500		52.0	67.0				
SPMWHT325AD7YBT0S0		4000		54.0	69.0				