

2013.07.05

Samsung  
LED Lighting

# Discover Samsung SMART Lighting



**SAMSUNG ELECTRONICS**  
LED Business

[www.samsungLED.com](http://www.samsungLED.com)



LED Packages



# Smart partner, Total Solution Samsung LED lighting!

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Why SAMSUNG'S LED BUSINESS

Product Lineup

- High Power

- Mid Power

Full Lineup

Network

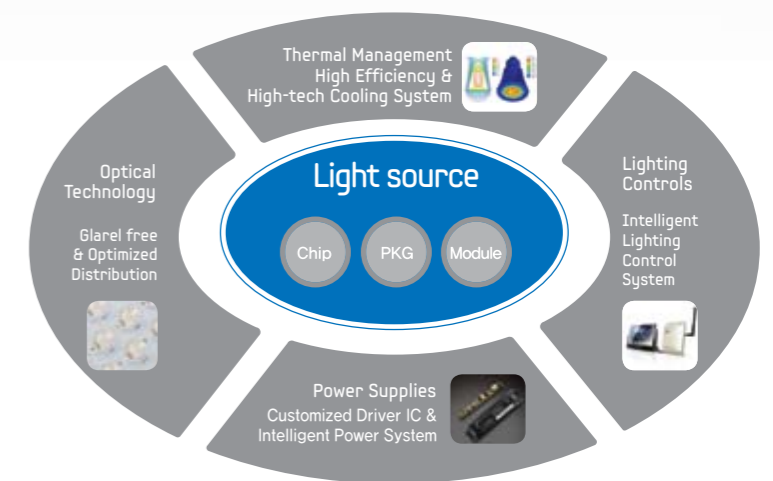
**Samsung's trusted and reliable technology with years of experience in the industry make all the difference.**

Semiconductors from Samsung are world-class. Using the same technology from its semiconductor business, Samsung manufactures world-class, competitive LED products.



## World-class technology and manufacturing capacity to provide a complete solution

Samsung's LED Business manufactures the best quality products available with world-class technology in thermal management, optics, phosphors, and chips. Samsung's LED Business is recognized worldwide for its superb manufacturing capability of LED chips and packages.



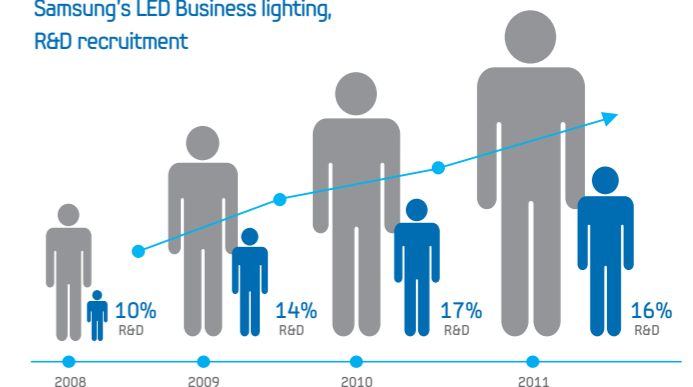
## LEDs with the world's best semiconductor technology! Samsung is the name to trust.

With broad and deep know-how in the semiconductor industry and strong research and development, Samsung produces world-class LED products that light up the future.

## Expanding investment in R&D every year

Samsung's LED Business aggressively invests by recruiting new and experienced experts for its LED business and R&D personnel every year to open up a new future in the bright world of LEDs.

Samsung's LED Business lighting, R&D recruitment



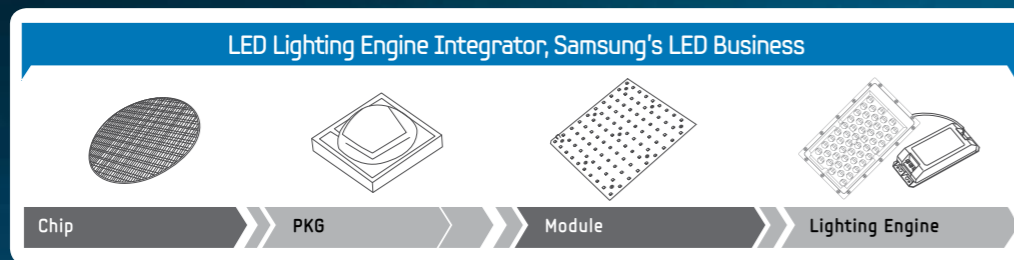
# Samsung's LED Business

## Manufactures all the LED products for your business needs.

Samsung's LED Business has the technology to manufacture custom LED products to suit your specific needs and requirements. Samsung's LED Business operates its own state-of-the-art supply chain system to manufacture LED products that perfectly matches for your business requirements.

## Reliable and stable product supply from basic wafer-LED materials to finished products

Samsung's LED Business has a vertical and integrated manufacturing system from Epi to LED module and a proven track record of reliably supplying LED products to customers worldwide.



## The global network of Samsung's LED Business makes products available according to your needs.

Samsung operates an SCM network to track stock and product information with real-time status updates to provide you with the right products at the right time.



## Samsung's global network provides the best service available.

Samsung's LED Business always delivers the best service with its prompt and effective global service.

Online Service [www.samsungLED.com](http://www.samsungLED.com)



# High Power

LH351A

LC006A

LC013A

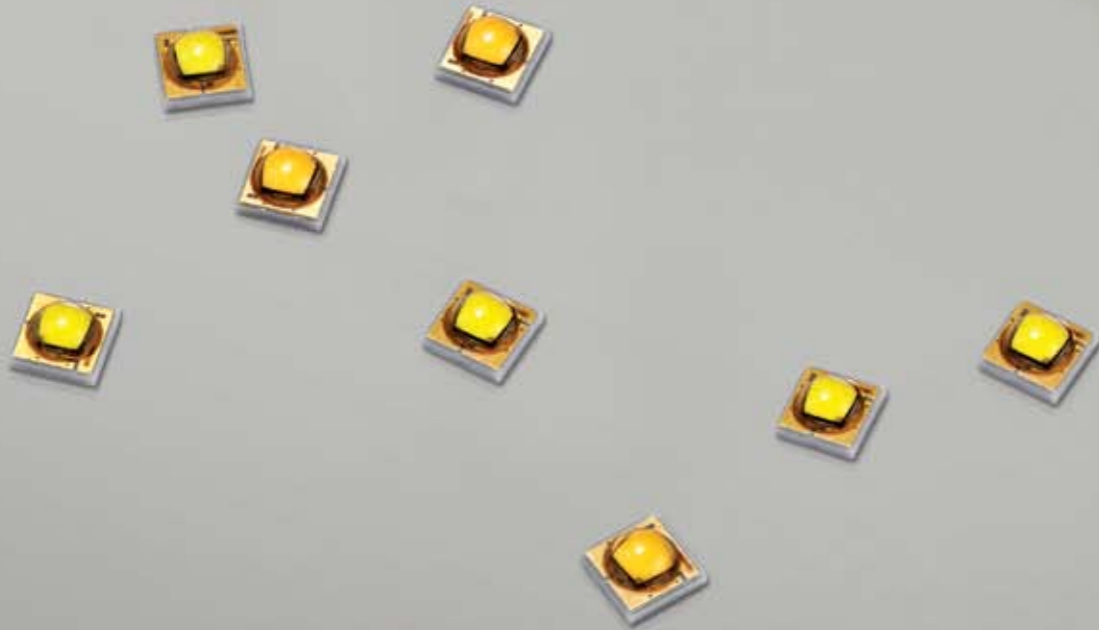
LC026A

# High efficacy (145lm/W @5000K)

and high quality color rendering that is backed by

## LM80-certified reliability

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.

LH351A	Luminous flux	High efficacy
Cool White	150 lm	145 lm/W
Warm White	123 lm	119 lm/W

## High Power LED Lighting

# LH351A Series



### Features

- 3W class LED with 145lm/W efficacy and LM80 certified reliability
- 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)

Ta = 25°C

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

## 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



Spot light



Security light



Retrofit lamp

# High Power LED Lighting LH351A



## Absolute Maximum Ratings

Ta = 25°C

If (mA)	Rth j-c (°C/W)	Tj (°C)	Tstg (°C)	Topt (°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
- Topt : Operating temperature range

## Forward Voltage

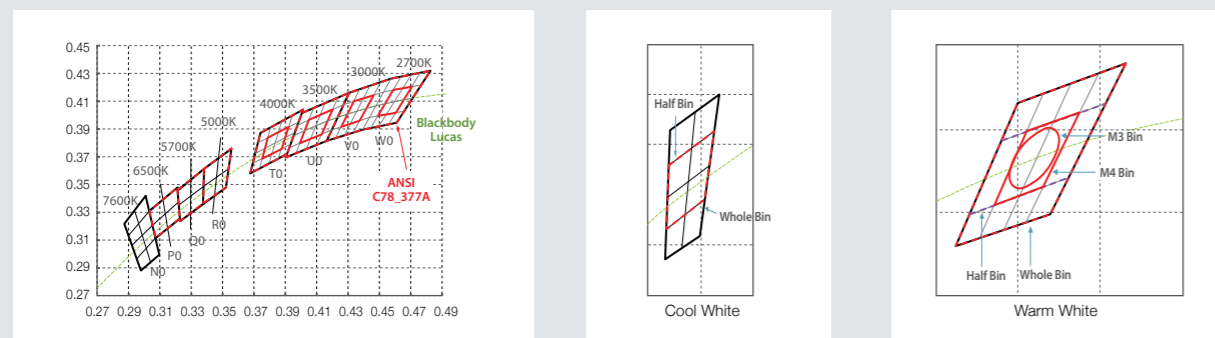
Ta = 25°C

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

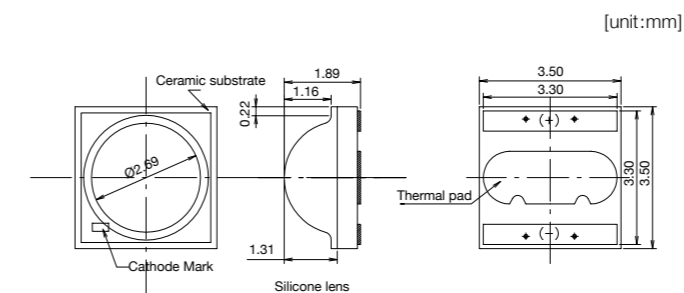
## Color Binning

CCT	Whole Bin	Half Bin	M7 Bin	M4 Bin
2700K (Ra80+)	SPHWHTL3D305E6W0G4	SPHWHTL3D305E6WUG4	SPHWHTL3D305E6WPG4	SPHWHTL3D305E6WVG4
2700K (Ra90+)	SPHWHTL3D307E6W0E6	SPHWHTL3D307E6WUE6	SPHWHTL3D307E6WPE6	SPHWHTL3D307E6WME6
3000K	SPHWHTL3D305E6V0G4	SPHWHTL3D305E6VUG4	SPHWHTL3D305E6VPG4	SPHWHTL3D305E6VVG4
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	-	-	-

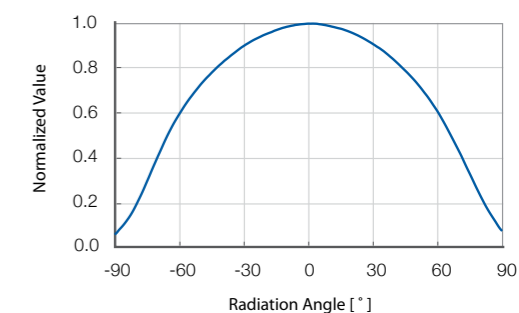
## Chromaticity Region



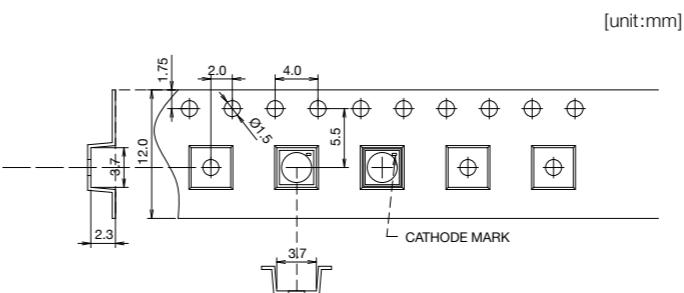
## Package Outline



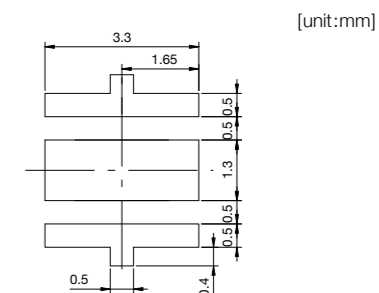
## Beam Distribution



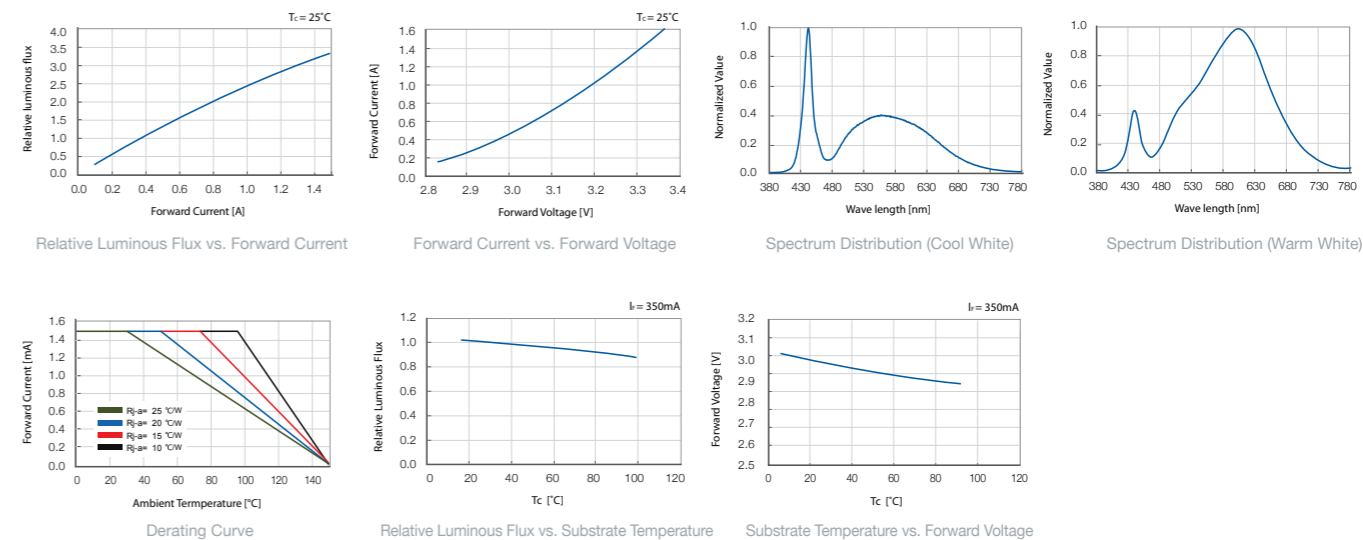
## Tape



## Recommended Soldering Pattern



## Optical & Electrical Characteristics

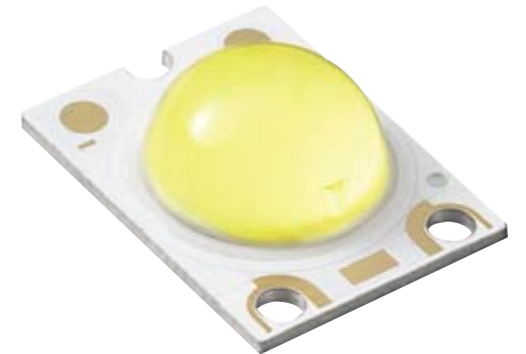




A powerful, compact (11mm) source of illumination with high light output - up to 1,000 lm.

High Power LED Lighting

LC006A Series



Features

- High light efficacy and low thermal resistance
- Simple assembly reduces manufacturing cost
- Lumen Output from 650lm to 1,000lm in a single LED package
- Its compact footprint (11mm) makes lighting design easier

Ta = 25°C

Part Number	Color	Temperature (K)	Luminous flux		Forward Voltage		Beam Angle	I <sub>f</sub> (mA)	CRI Min
			Min (lm)	Max (lm)	Typ (V)	Max (V)			
SPHWWTHDD835YGWTAB	White	2700	550	-	35.5	37.5	120°	175	80
SPHCWTHDD833YGRTCD		5000	650	-	35.5	37.5	120°	175	70

Applications

INDOOR LIGHTING

- Spot light
- Downlight
- High/Low-bay light

OUTDOOR LIGHTING

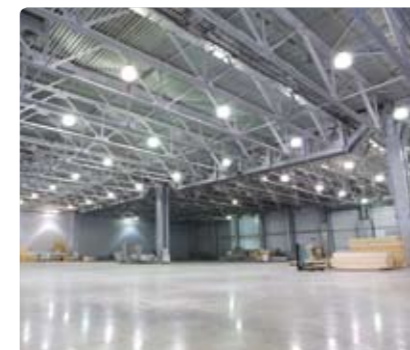
- Security light
- Parking lot light

CONSUMER LIGHTING

- Retrofit lamp



Spot light



Low-bay light



Retrofit lamp

# High Power LED Lighting LC006A



## Absolute Maximum Ratings

Ta = 25°C

If (mA)	Rth j-c (°C/W)	Tj (°C)	Tstg (°C)	Topr (°C)
220	1.9	150	-40 ~ 120	-40 ~ 80

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

## Forward Voltage

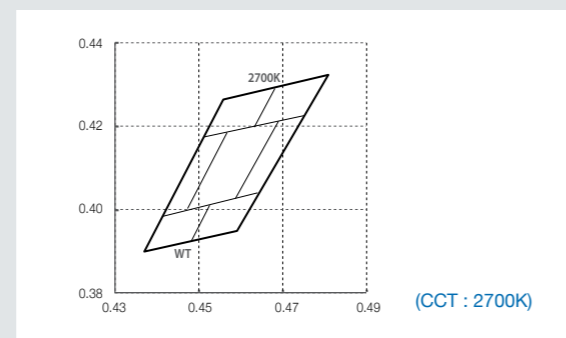
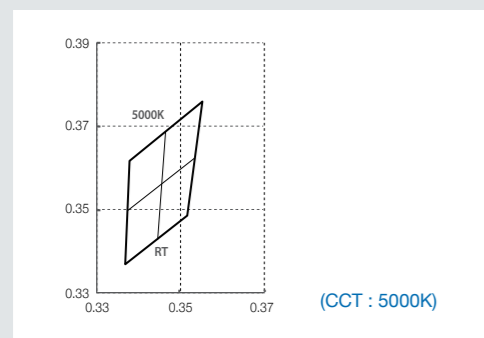
Ta = 25°C

Condition	Min.	Typ.	Max.	Unit
IF = 175mA	34	35.5	37.5	V

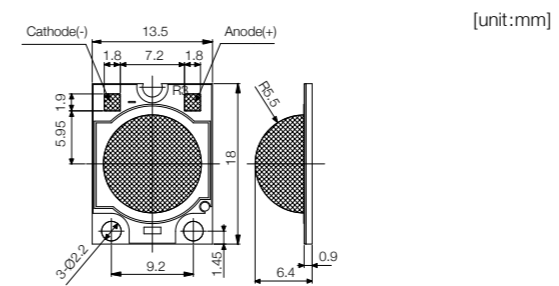
## Color Binning

CCT	Whole Bin
2700K	SPHWWTHDD835YGWTAB
5000K	SPHCWTHDD833YGRTCD

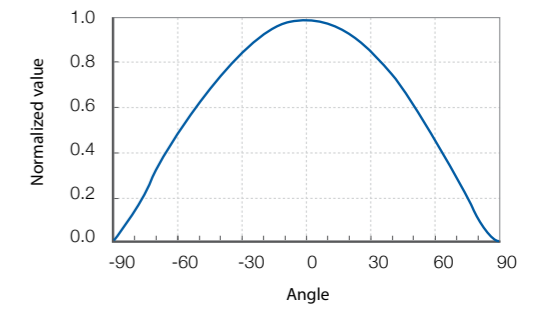
## Chromaticity Region



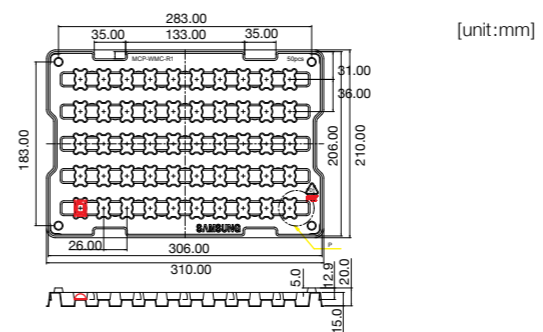
## Package Outline



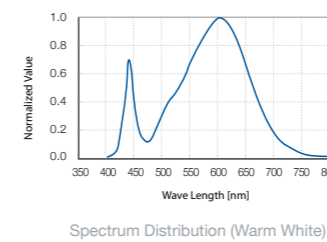
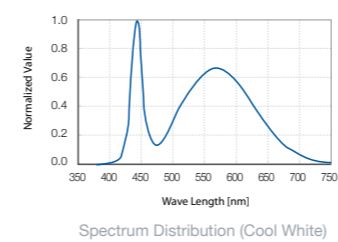
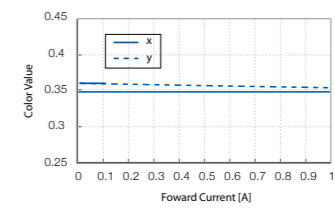
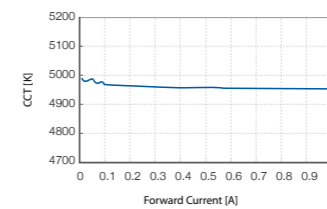
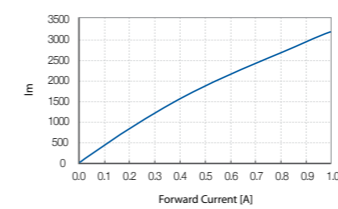
## Beam Distribution



## Tray



## Optical & Electrical Characteristics



High Power LED Lighting

# LC013A Series



### Features

- Chip on Board (COB) solution makes it easy to design in
- Low thermal resistance for high reliability
- Simple assembly reduces manufacturing cost
- Lumen Output from 200lm to 1,400lm in a single LED package
- Its compact footprint (13mm) makes lighting design easier

Ta = 25°C

Part Number	Color	Temperature (K)	Luminous flux		Forward Voltage		Beam Angle	If (mA)	CRI Min
			Min(lm)	Max(lm)	Typ(V)	Max(V)			
SPHWWTHDNA45YHVTJC	White	3000	950	-	36.5	38.5	120°	350	80
SPHCWTHDNA45YHRTMC		5000	1,050	-	36.5	38.5			

### Applications

#### INDOOR LIGHTING

- Spot light
- Downlight
- High/Low-bay light

#### OUTDOOR LIGHTING

- Security light
- Parking lot light

#### CONSUMER LIGHTING

- Retrofit lamp



Downlight



Security light



Retrofit lamp

A powerful, compact (13mm) source of illumination with high light output - up to 1,400 lm.

# High Power LED Lighting LC013A



## Absolute Maximum Ratings

Ta = 25°C

If (mA)	Rth j-c (°C/W)	Tj (°C)	Tstg (°C)	Topr (°C)
450	1.5	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

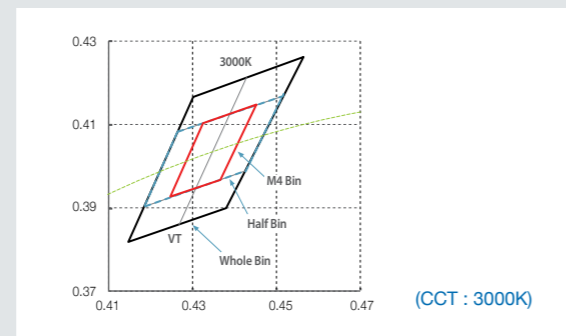
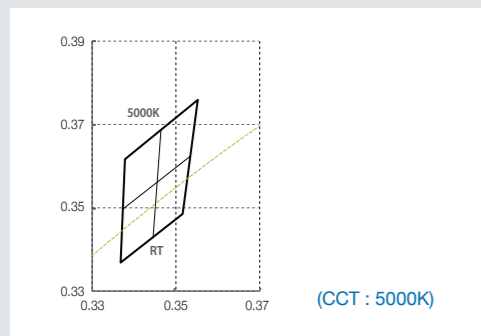
Ta = 25°C

Condition	Min.	Typ.	Max.	Unit
If=350mA	34	36.5	38.5	V

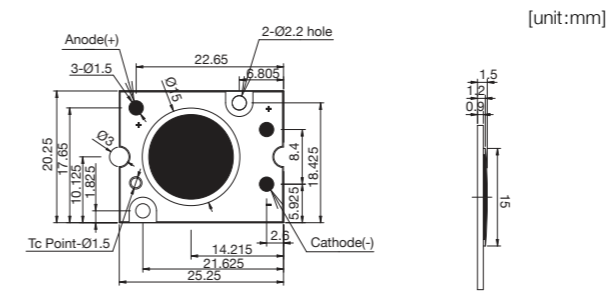
## Color Binning

CCT	Whole Bin	Half Bin	M4 Bin
3000K	SPHWWTHDNA45YHVTJC	SPHWWTHDNA45YHVUJC	SPHWWTHDNA45YHVPJC
5000K	SPHCWTHDNA45YHRTMC	-	-

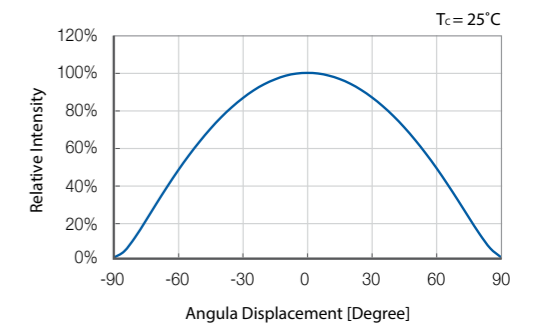
## Chromaticity Region



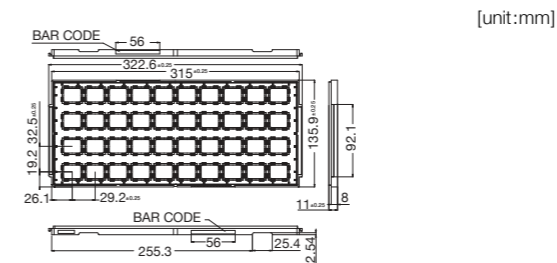
## Package Outline



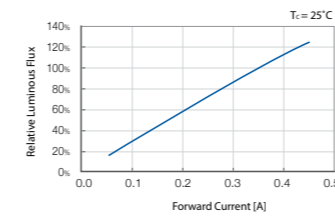
## Beam Distribution



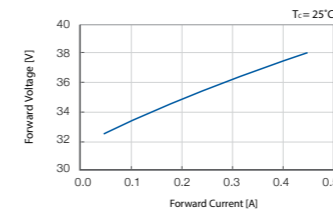
## Tray



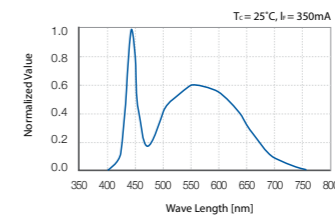
## Optical & Electrical Characteristics



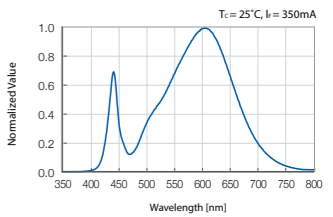
Relative Luminous Intensity vs. Forward Current



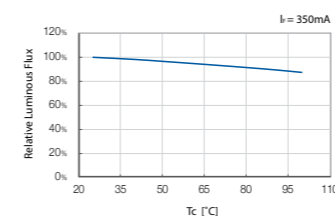
Forward Current vs. Forward Voltage



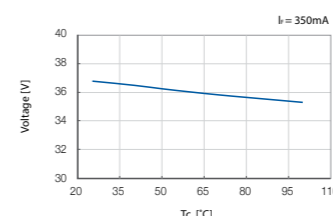
Spectrum Distribution (Cool White)



Spectrum Distribution (Warm White)



Relative Luminous Flux vs. Temperature



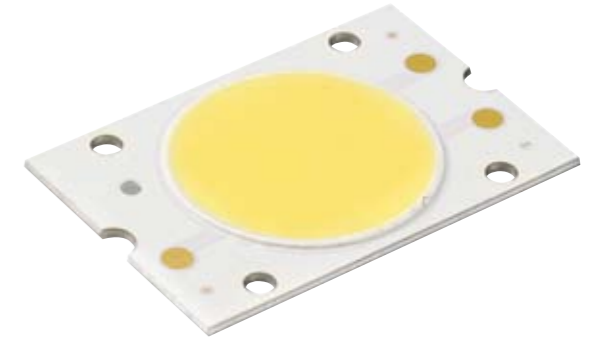
Forward Voltage vs. Temperature

High Power LED Lighting

# LC026A Series

## Features

- Chip on Board (COB) solution makes it easy to design in
- Low thermal resistance for high reliability
- Simple assembly reduces manufacturing cost
- Lumen Output from 400lm to 2,600lm in a single LED package
- Small 17mm diameter light emitting surface makes lighting design easier



Ta = 25°C

Part Number	Color	Temperature (K)	Luminous flux		Forward Voltage		Beam Angle	If (mA)	CRI Min
			Min(lm)	Max(lm)	Typ(V)	Max(V)			
SPHWWTHDNC45YHVT2F	White	3000	1,920	-	36.9	38.5	120°	720	80
SPHCWTHDNC45YHRT2F		5000	2,120	-	36.9	38.5	120°	720	80

## Applications

### INDOOR LIGHTING

Spot light  
Downlight

### INDOOR LIGHTING

High/Low-bay light

### OUTDOOR LIGHTING

Security light  
Parking lot light



Downlight



Low-bay light



Outdoor lighting

A powerful source of illumination with light output of up to 2,600 lm makes LC026A ideal for a variety of high brightness lighting applications.

# High Power LED Lighting LC026A



## Absolute Maximum Ratings

Ta = 25°C

If (mA)	Rth j-c (°C/W)	Tj (°C)	Tstg (°C)	Topt (°C)
840	1.3	150	-40 ~ 120	-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

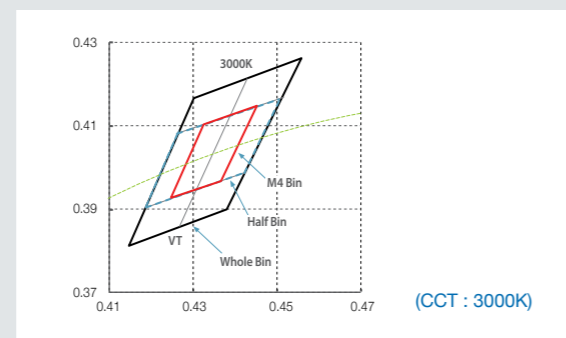
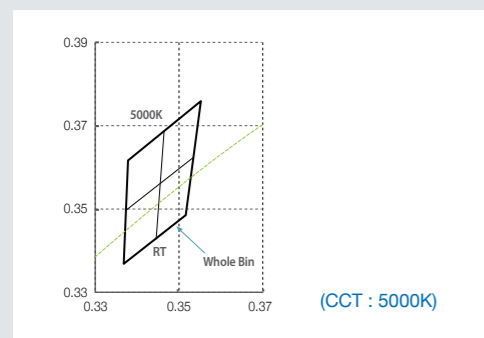
Ta = 25°C

Condition	Min.	Typ.	Max.	Unit
If=720mA	34	36.9	38.5	V

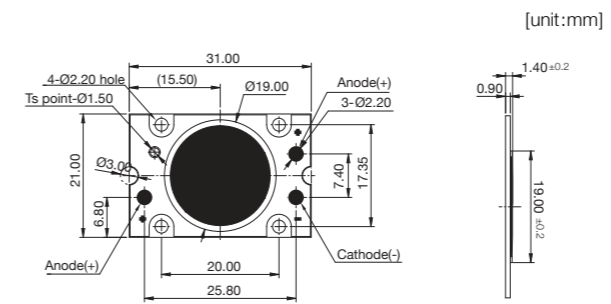
## Color Binning

CCT	Whole Bin	Half Bin	M4 Bin
3000K	SPHWWTHDNC45YHVT2F	SPHWWTHDNC45YHVU2F	SPHWWTHDNC45YHVP2F
5000K	SPHCWTHDNC45YHRT2F	-	-

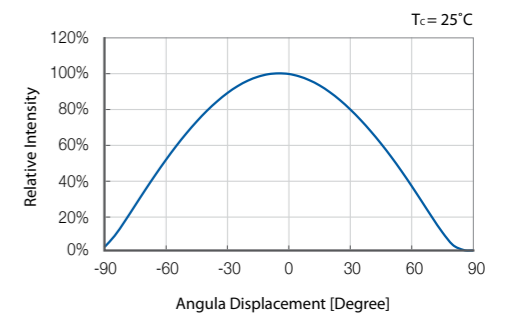
## Chromaticity Region



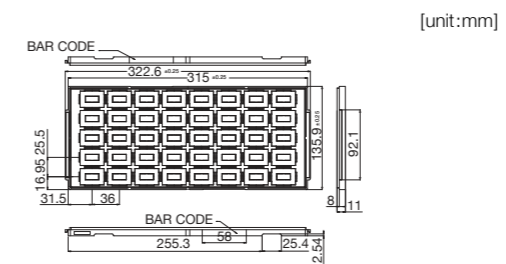
## Package Outline



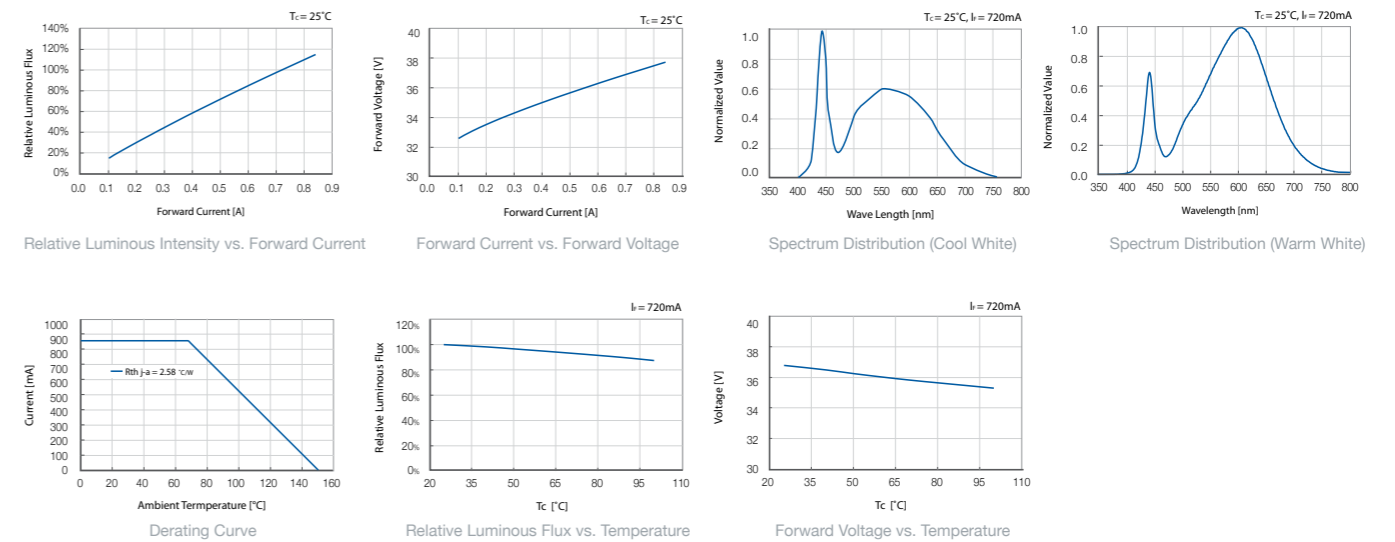
## Beam Distribution



## Tray



## Optical & Electrical Characteristics





## Mid Power

LM561B

LM561A

LM231B

LM231A

LM362A

Mid Power LED Lighting

# LM561B Series

## Features

- Highest efficacy mid-power LED (164lm/W)
- Great for use in premium bulbs, ambient lighting, and LED tubes
- Variety of CIE bin support options - full bin, quarter bin, and kitting bin (for warm white)
- Footprint (5.6mmx3.0mm)



Ta = 25°C

Part Number	Color	Temperature (K)	Luminous flux		Forward Voltage		Beam Angle	If (mA)	CRI Min
			Min (lm)	Max (lm)	Typ (V)	Max (V)			
SPMWH541MD5WAW0SX	White	2700	24.0	30.0	2.9	3.2	120°	65	80
SPMWH541MD5WAV0SX		3000	24.5	30.5					
SPMWH541MD5WAU0SX		3500	25.0	31.0					
SPMWH541MD5WAT0SX		4000	26.0	32.0					
SPMWH541MD5WAR0SX		5000	27.0	33.0					
SPMWH541MD5WAQ0SX		5700	26.5	32.5					
SPMWH541MD5WAP0SX		6500	26.0	32.0					

## Applications

### INDOOR LIGHTING

- LED tube
- Ambient light
- Retrofit lamp

### CONSUMER LIGHTING

- Downlight



Ambient light



Retrofit lamp



LED tube

Highest efficacy available among middle power LED packages worldwide.



# Mid Power LED Lighting LM561B



## Absolute Maximum Ratings

Ta = 25°C

If (mA)	Rth j-c (°C/W)	Tj (°C)	Tstg (°C)	Topt (°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
- Topt : Operating temperature range

## Forward Voltage

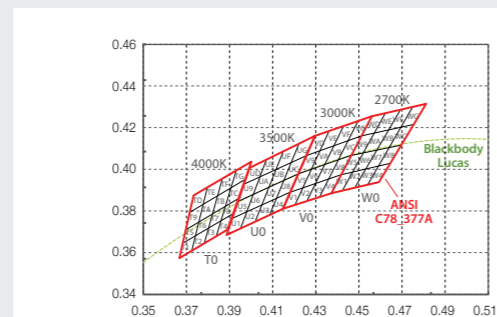
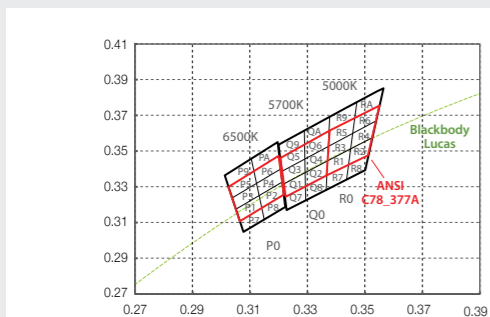
Ta = 25°C

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

## Color Binning

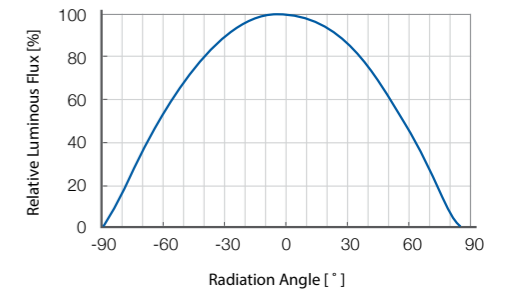
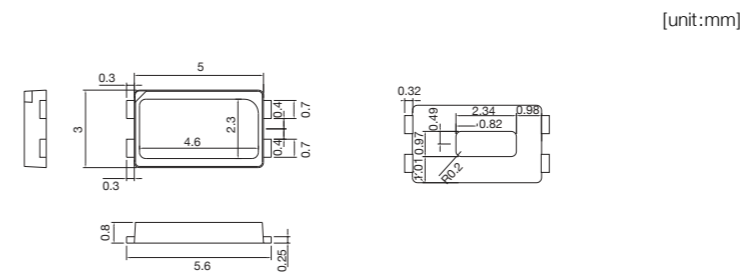
CCT	Whole Bin	Half Bin	M7 Bin	M4 Bin
2700K	SPMWHT541MD5WAW0S2	SPMWHT541MD5WAWHS2	-	SPMWHT541MD5WAWMS2
3000K	SPMWHT541MD5WAR0S2	SPMWHT541MD5WARHS2	-	SPMWHT541MD5WARMS2
3500K	SPMWHT541MD5WAU0S2	SPMWHT541MD5WAUHS2	-	SPMWHT541MD5WAUMS2
4000K	SPMWHT541MD5WAT0S2	SPMWHT541MD5WATHS2	-	SPMWHT541MD5WATMS2
5000K	SPMWHT541MD5WAR0S2	-	SPMWHT541MD5WARMS2	-
5700K	SPMWHT541MD5WAQ0S2	-	SPMWHT541MD5WAQMS2	-
6500K	SPMWHT541MD5WAP0S2	-	SPMWHT541MD5WAPMS2	-

## Chromaticity Region



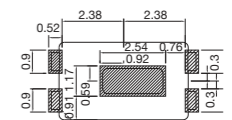
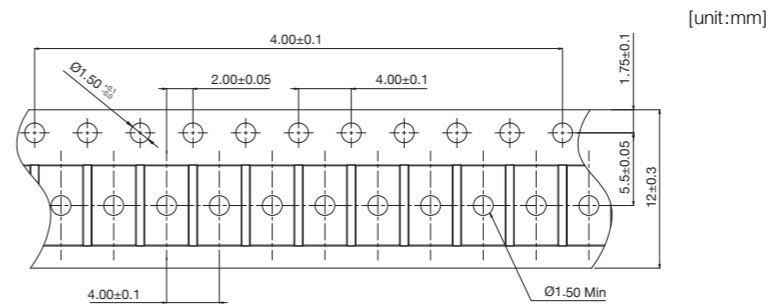
## Package Outline

## Beam Distribution

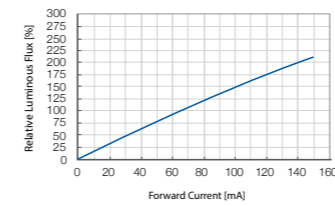


## Carrier Tape

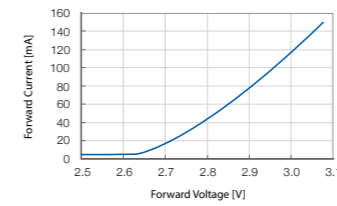
## Recommended Soldering Pattern



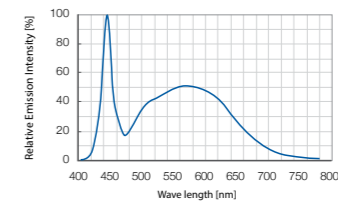
## Optical & Electrical Characteristics



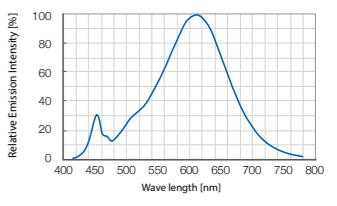
Relative Luminous Flux vs. Forward Current



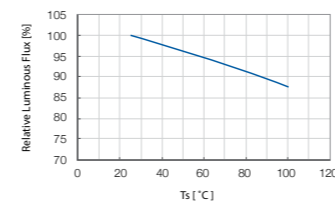
Forward Current vs. Forward Voltage



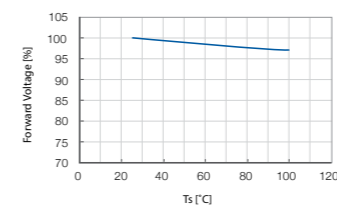
Spectrum Distribution (Cool White)



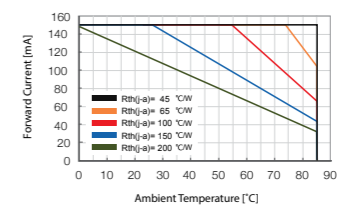
Spectrum Distribution (Warm White)



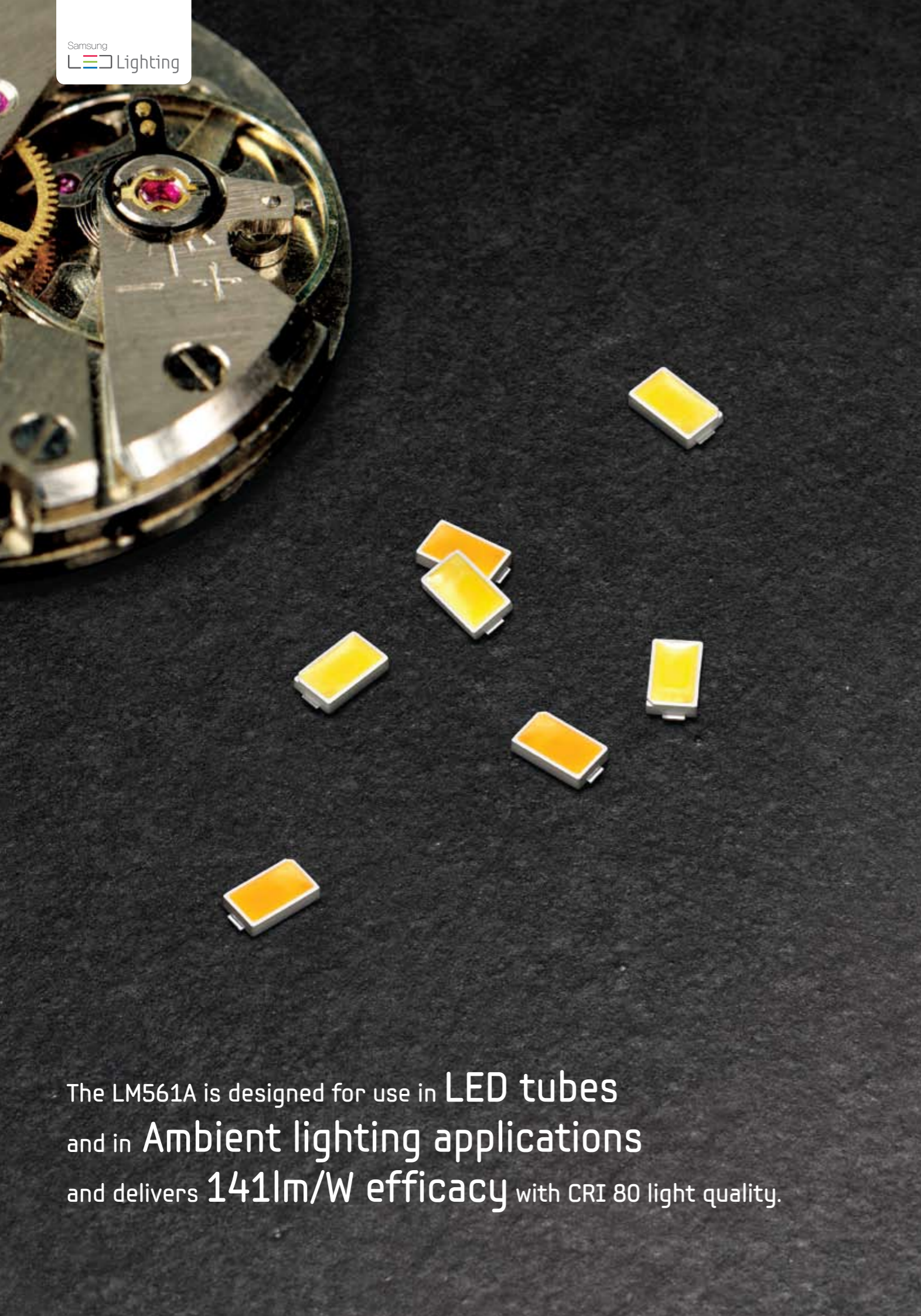
Ts vs. Relative Luminous Flux



Ts vs. Forward Voltage



Derating Curve



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

## Mid Power LED Lighting

# LM561A Series

### Features

- Suitable for use in Ambient lighting and LED tubes
- 141lm/W @5000K
- Available in white (2700K to 6500K CCT @CRI 80)
- Footprint (5.6mmx3.0mm)



Ta = 25°C

Part Number	Color	Temperature (K)	Luminous flux		Forward Voltage		Beam Angle	If (mA)	CRI Min
			Min (lm)	Max (lm)	Typ (V)	Max (V)			
SPMWHT5225D5WAW0S0	White	2700	14.00	21.80	2.9	3.3	120°	50	80
SPMWHT5225D5WAV0S0		3000	14.90	22.70					
SPMWHT5225D5WAU0S0		3500	15.30	23.40					
SPMWHT5225D5WAT0S0		4000	15.60	24.00					
SPMWHT5225D5WAS0S0		4500	15.80	24.00					
SPMWHT5225D5WAR0S0		5000	15.90	24.30					
SPMWHT5225D5WAQ0S0		5700	15.60	24.00					
SPMWHT5225D5WAP0S0		6500	15.30	23.60					

### Applications

#### INDOOR LIGHTING

- LED tube
- Ambient light
- Retrofit lamp



Ambient light



LED tube

# Mid Power LED Lighting LM561A



## Absolute Maximum Ratings

Ta = 25°C

If (mA)	Rth j-c (°C/W)	Tj (°C)	Tstg (°C)	Topt (°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
- Topt : Operating temperature range

## Forward Voltage

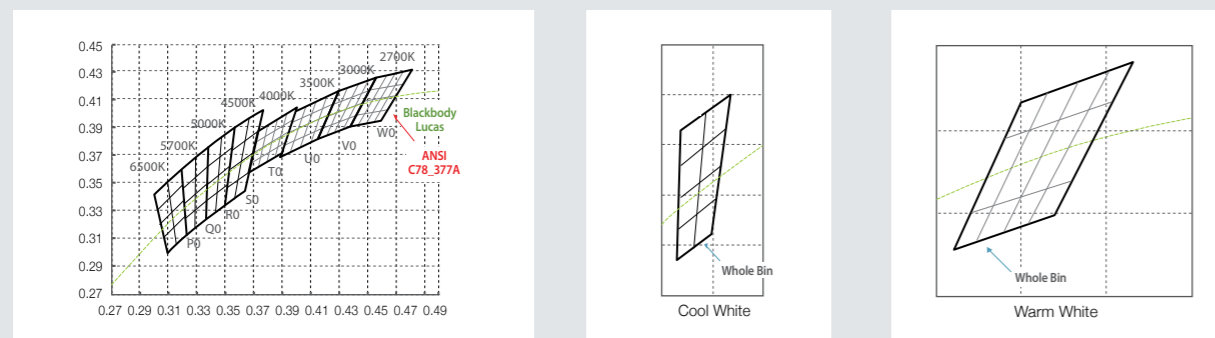
Ta = 25°C

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

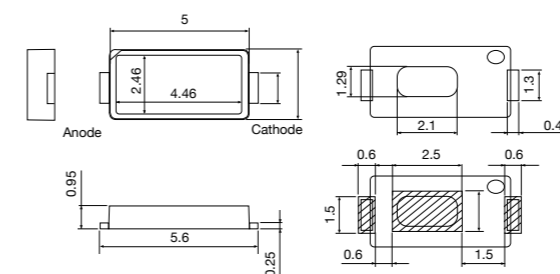
## Color Binning

CCT	Whole Bin	Half Bin	M7 Bin	M4 Bin
2700K	SPMWHT5225D5WAW0S0	-	-	-
3000K	SPMWHT5225D5WAV0S0	-	-	-
3500K	SPMWHT5225D5WU0S0	-	-	-
4000K	SPMWHT5225D5WAT0S0	-	-	-
4500K	SPMWHT5225D5WAS0S0	-	-	-
5000K	SPMWHT5225D5WAR0S0	-	-	-
5700K	SPMWHT5225D5WAQ0S0	-	-	-
6500K	SPMWHT5225D5WAP0S0	-	-	-

## Chromaticity Region

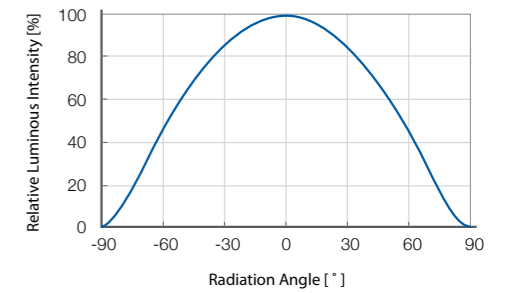


## Package Outline

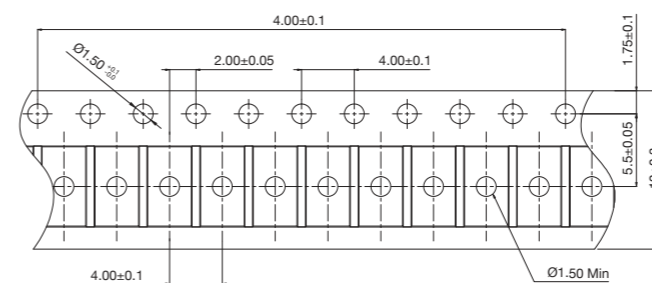


[unit:mm]

## Beam Distribution

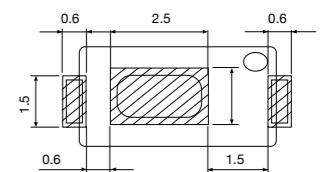


## Carrier Tape

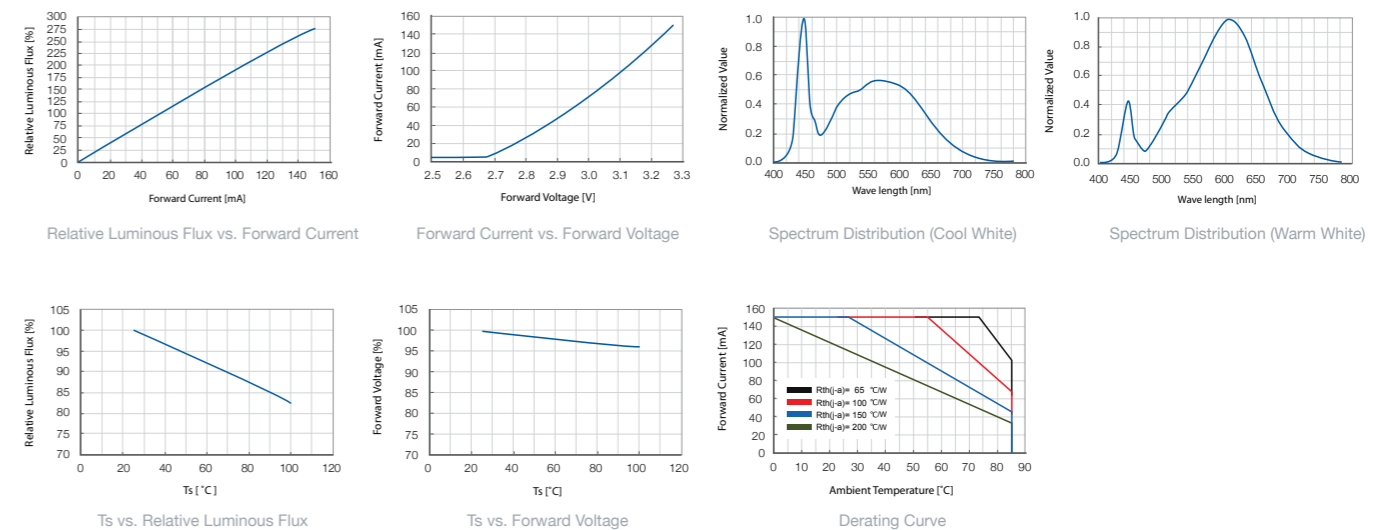


[unit:mm]

## Recommended Soldering Pattern



## Optical & Electrical Characteristics



Mid Power LED Lighting

# LM231B Series

## Features

- Optimized for bulbs, downlights, ambient lighting, and LED Tubes
- Available in white (2700K to 6500K CCT @CRI 80+)
- Smaller footprint than the competition, but able to deliver equivalent light output as competition (130 lm/W)
- Compatible with LM231A
- Compact footprint (2.3mmx2.3mm)



Ta = 25°C

Part Number	Color	Temperature (K)	Luminous flux		Forward Voltage		Beam Angle	If (mA)	CRI Min
			Min (lm)	Max (lm)	Typ (V)	Max (V)			
SPMWHT223MD5WAW0S0	White	2700	19.81	30.13	2.9	3.2	120°	65	80
SPMWHT223MD5WAV0S0		3000	19.81	30.13					
SPMWHT223MD5WAW0S0		3500	19.81	30.13					
SPMWHT223MD5WAT0S0		4000	20.55	31.16					
SPMWHT223MD5WAR0S0		5000	20.55	31.16					
SPMWHT223MD5WAQ0S0		5700	20.55	31.16					
SPMWHT223MD5WAP0S0		6500	20.55	31.16					

## Applications

### INDOOR LIGHTING

- LED bulb
- LED tube
- Ambient light

### CONSUMER LIGHTING

- Downlight



LED bulb

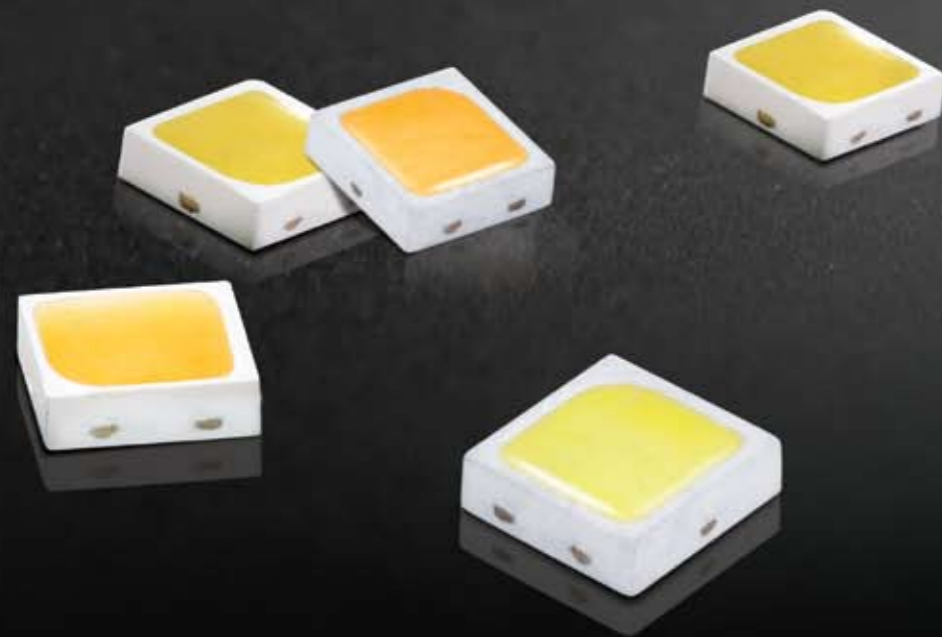


LED tube



Downlight

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.



# Mid Power LED Lighting LM231B



## 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

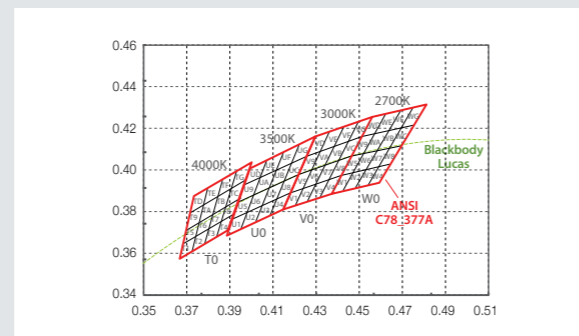
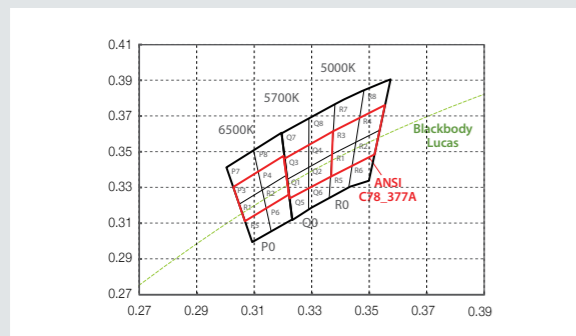
Ta = 25°C

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

## Color Binning

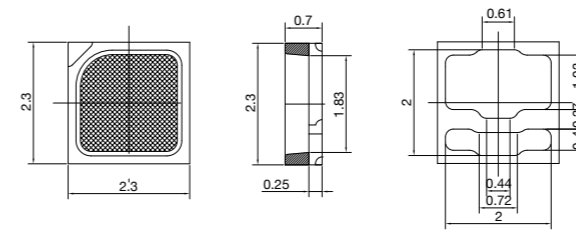
CCT	Whole Bin	Half Bin	M7 Bin	M4 Bin
2700K	SPMWHT223MD5WAW0S0	-	-	-
3000K	SPMWHT223MD5WAV0S0	-	-	-
3500K	SPMWHT223MD5WAW0S0	-	-	-
4000K	SPMWHT223MD5WAT0S0	-	-	-
5000K	SPMWHT223MD5WAR0S0	-	-	-
5700K	SPMWHT223MD5WAQ0S0	-	-	-
6500K	SPMWHT223MD5WAP0S0	-	-	-

## Chromaticity Region

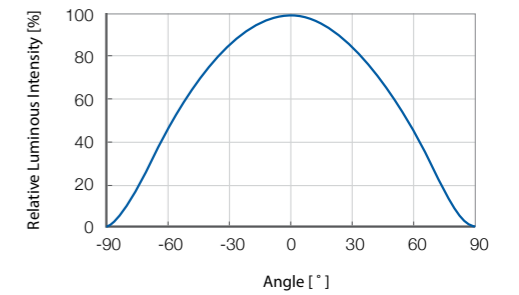


## Package Outline

[unit:mm]

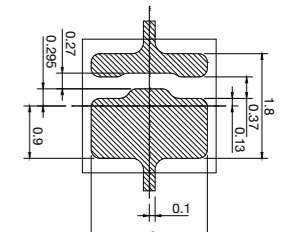
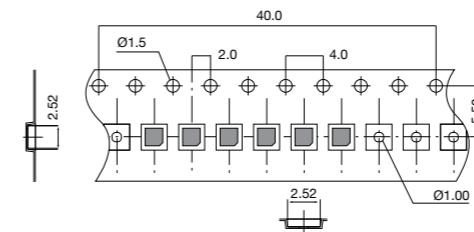


## Beam Distribution

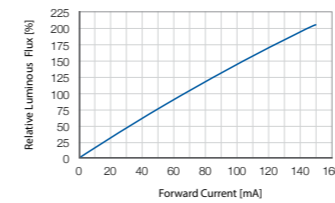


## Carrier Tape

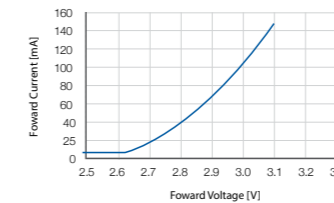
[unit:mm]



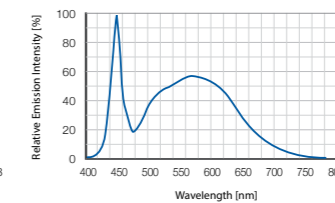
## Optical & Electrical Characteristics



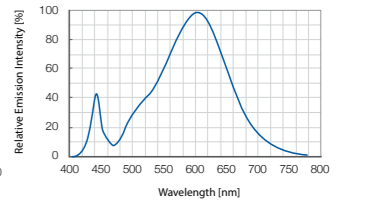
Relative Luminous Flux vs. Forward Current



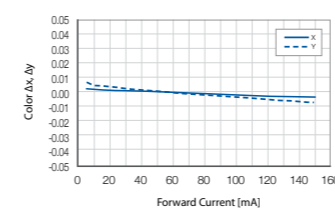
Forward Current vs. Forward Voltage



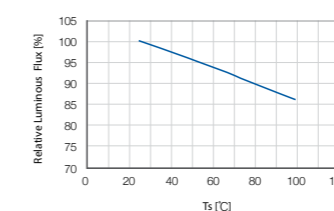
Spectrum Distribution (Cool White)



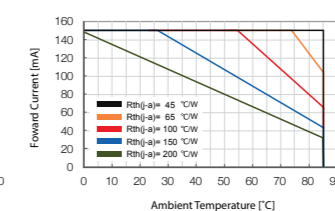
Spectrum Distribution (Warm White)



Forward Current vs. Color Δx, Δy



Ts vs. Relative Luminous Flux



Derating Curve

An LM80 certified,  
reliable LED in a 2.3mm x 2.3mm package  
that delivers superior design flexibility.

2.3  
mm

Reduce system cost  
while increasing  
luminous efficacy



With a luminous efficacy of 133 lm/W and a compact size of 2.3mm x 2.3mm, the LM231A allows you to do more with less ! The smaller form factor allows for PCB optimization - resulting in more uniform light output, reduced overall system cost, and dramatically improved heat dissipation.

## Mid Power LED Lighting

# LM231A Series

### Features

- Suitable for Ambient lighting and LED tubes
- Available in white (2700K to 6500K CCT @CRI 80)
- LM80 certified reliability (100mA 55°C)
- Its small footprint makes it easy to use in downlights and retrofit lamps
- Compact footprint (2.3mmx2.3mm)



Ta = 25°C

Part Number	Color	Temperature (K)	Luminous flux		Forward Voltage		Beam Angle	If (mA)	CRI Min
			Min (lm)	Max (lm)	Typ (V)	Max (V)			
SPMWHT221MD5WAW0S0	White	2700	19.81	30.13	2.9	3.2	120°	65	80
SPMWHT221MD5WAV0S0		3000	19.81	30.13					
SPMWHT221MD5WAW0S0		3500	19.81	30.13					
SPMWHT221MD5WAT0S0		4000	20.55	31.16					
SPMWHT221MD5WAS0S0		4500	20.55	31.16					
SPMWHT221MD5WAR0S0		5000	20.55	31.16					
SPMWHT221MD5WAQ0S0		5700	20.55	31.16					
SPMWHT221MD5WAP0S0		6500	20.55	31.16					

### Applications

#### INDOOR LIGHTING

LED tube  
Ambient light

#### CONSUMER LIGHTING

Downlight



LED tube



Ambient light



Downlight

# Mid Power LED Lighting LM231A



## Absolute Maximum Ratings

Ta = 25°C

If (mA)	Rth j-c (°C/W)	Tj (°C)	Tstg (°C)	Topt (°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
- Topt : Operating temperature range

## Forward Voltage

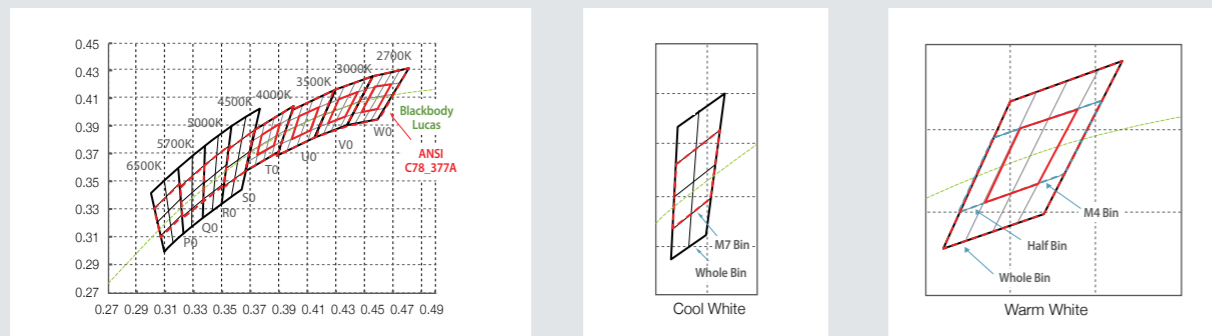
Ta = 25°C

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

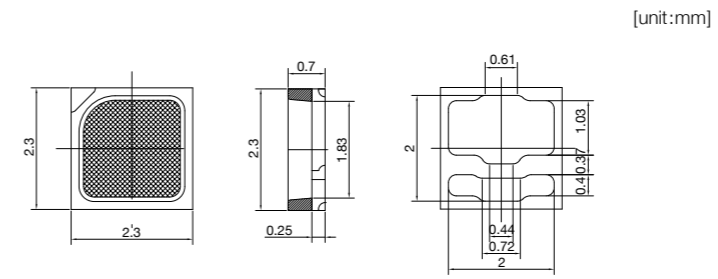
## Color Binning

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	-

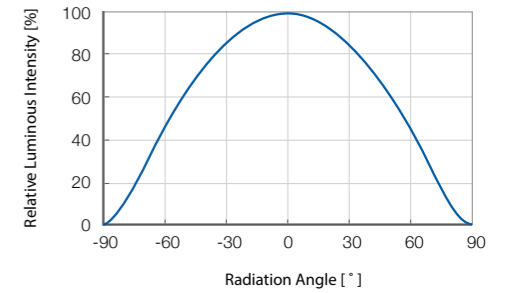
## Chromaticity Region



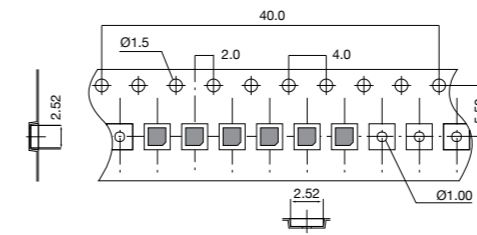
## Package Outline



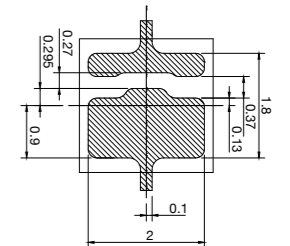
## Beam Distribution



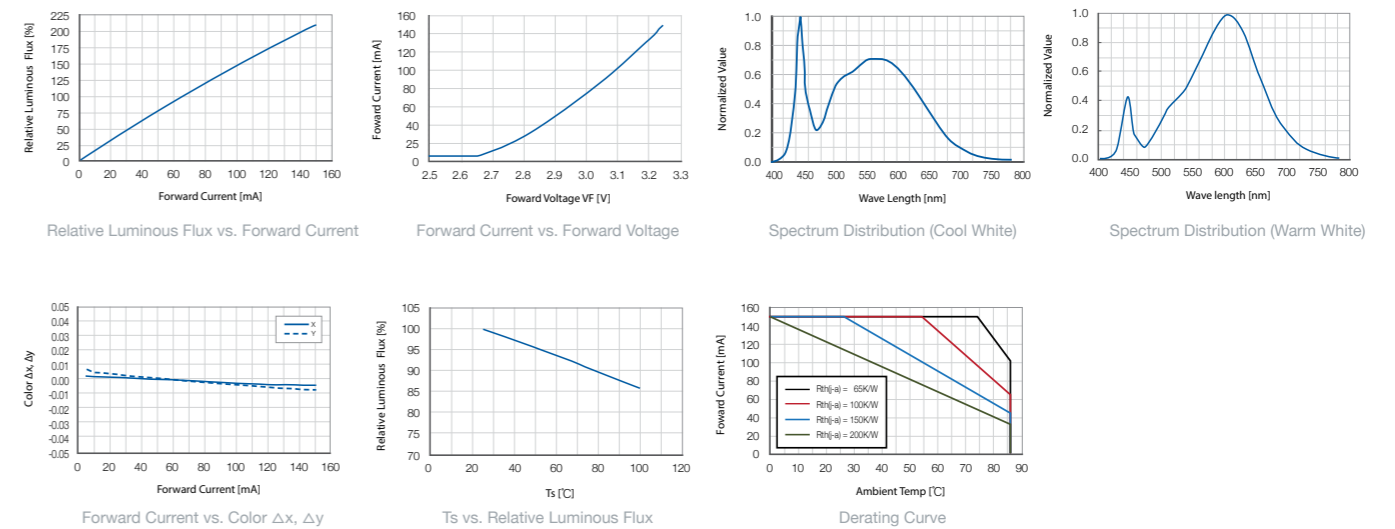
## Carrier Tape



## Recommended Soldering Pattern



## Optical & Electrical Characteristics

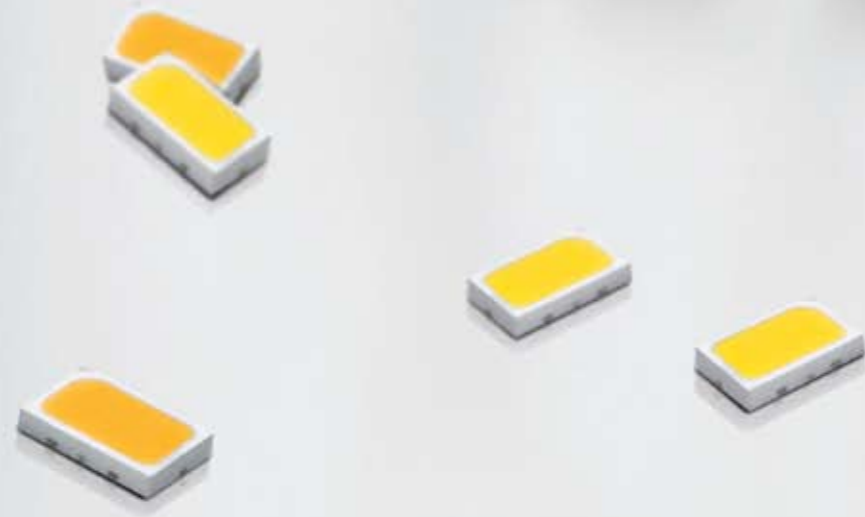


Mid Power LED Lighting

# LM362A Series

Features

- 0.6W Class middle power LED that is suitable for LED Lamps, downlights and ambient lighting
- Available in white (2700K to 6500K CCT @CRI 80+)
- Whole / half binning available
- Footprint (3.6mmx2.3mm)



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

Ta = 25°C

Part Number	Color	Temperature (K)	Luminous flux		Forward Voltage		Beam Angle	If (mA)	CRI Min
			Min (lm)	Max (lm)	Typ (V)	Max (V)			
SPMWHT325AD3Y0R0S0	White	5000	63.0	105.0	6.0	6.6	120°	100	68
SPMWHT325AD5YBW0S0		2700	51.0	78.0					80
SPMWHT325AD5YBV0S0		3000	51.0	80.0					80
SPMWHT325AD5YBU0S0		3500	51.0	83.0					80
SPMWHT325AD5YBT0S0		4000	55.0	85.0					80
SPMWHT325AD5YBR0S0		5000	55.0	86.0					80
SPMWHT325AD5YBQ0S0		5700	55.0	85.0					80
SPMWHT325AD5YBP0S0		6500	55.0	85.0					80

Applications

INDOOR LIGHTING

- Retrofit lamp
- Ceiling light
- Ambient light

CONSUMER LIGHTING

- Downlight



Retrofit lamp



Downlight



# Mid Power LED Lighting LM362A



## Absolute Maximum Ratings

Ta = 25°C

If (mA)	Rth j-c (°C/W)	Tj (°C)	Tstg (°C)	Topt (°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
- Topt : Operating temperature range

## Forward Voltage

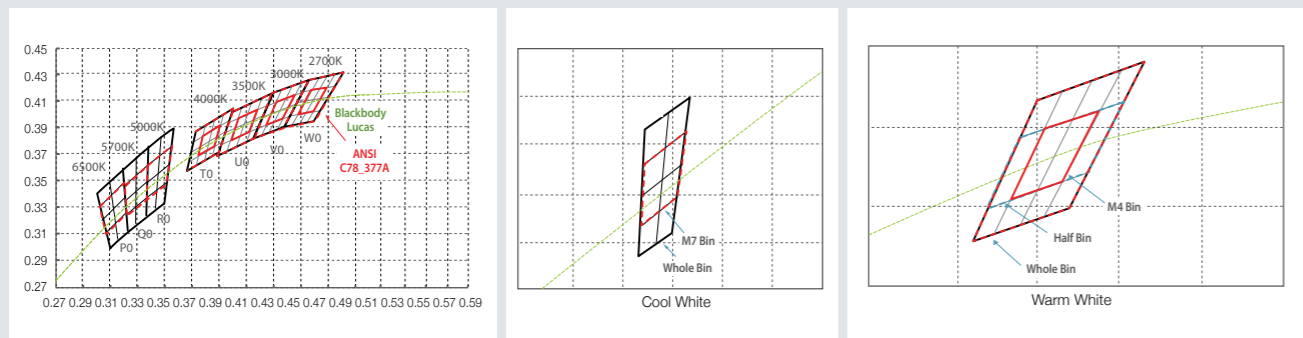
Ta = 25°C

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

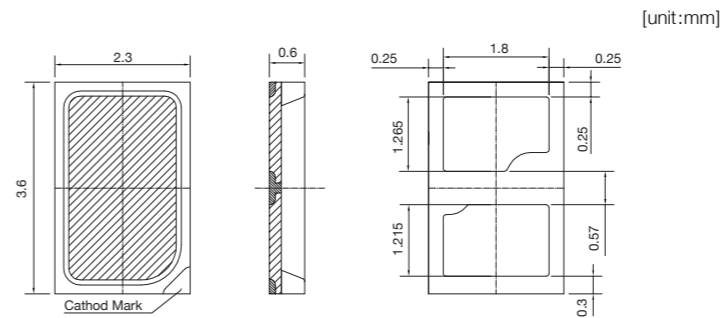
## Color Binning

CCT	Whole Bin	Half Bin	M7 Bin	M4 Bin
5000K	SPMWHT325AD3Y0R0S0	-	SPMWHT325AD3Y0RMS0	-
2700K	SPMWHT325AD5YBW0S0	SPMWHT325AD5YBWHS0	-	SPMWHT325AD5YBWMS0
3000K	SPMWHT325AD5YBV0S0	SPMWHT325AD5YBVHS0	-	SPMWHT325AD5YBVMS0
3500K	SPMWHT325AD5YBU0S0	SPMWHT325AD5YBUHS0	-	SPMWHT325AD5YBUMS0
4000K	SPMWHT325AD5YBT0S0	SPMWHT325AD5YBT0H0	-	SPMWHT325AD5YBTMH0
5000K	SPMWHT325AD5YBR0S0	-	SPMWHT325AD5YBRMS0	-
5700K	SPMWHT325AD5YBQ0S0	-	SPMWHT325AD5YBQMS0	-
6500K	SPMWHT325AD5YBP0S0	-	SPMWHT325AD5YBPMS0	-

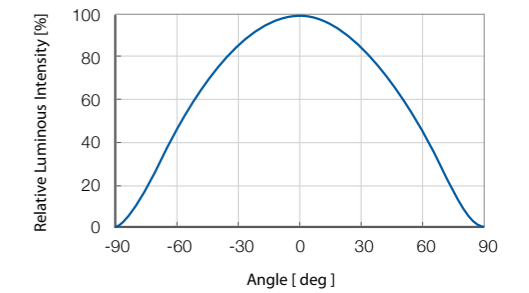
## Chromaticity Region



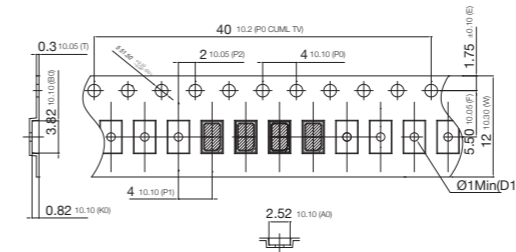
## Package Outline



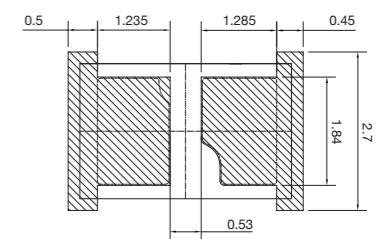
## Beam Distribution



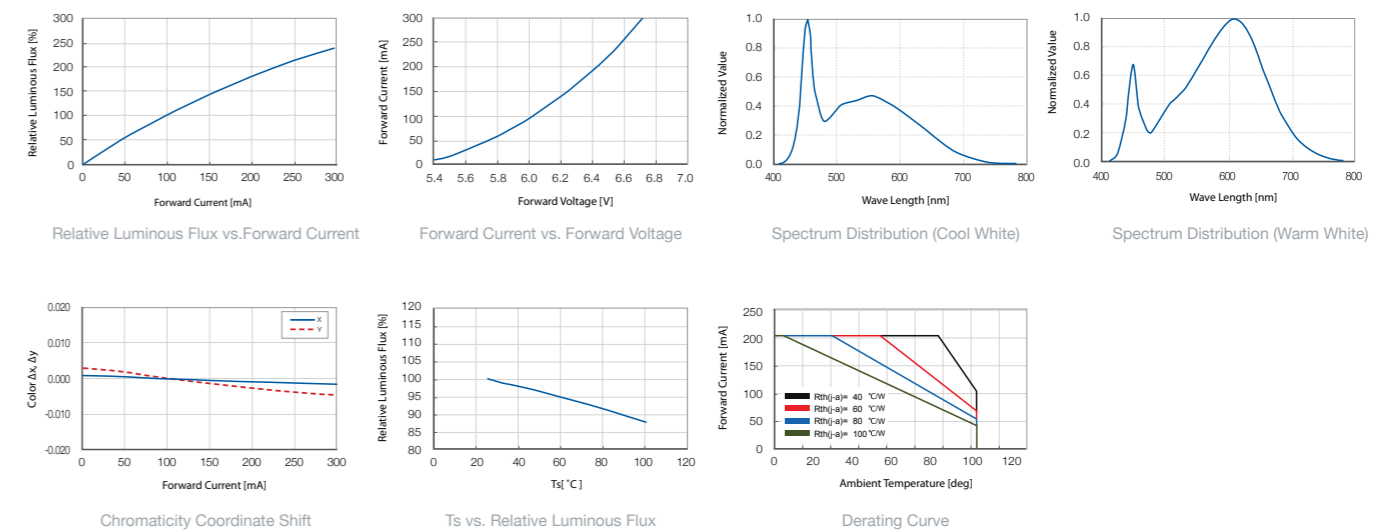
## Carrier Tape



## Recommended Soldering Pattern



## Optical & Electrical Characteristics



# Full Lineup

## High Power

### LH351A

Ta = 25°C

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

### LC006A

Ta = 25°C

Part Number	Color	Temperature (K)	Luminous flux		Forward Voltage		Beam Angle	If (mA)	CRI Min
			Min (lm)	Max (lm)	Typ (V)	Max (V)			
SPHWWTHDD835YGWTAB	White	2700	550	-	35.5	37.5	120°	175	80
SPHCWTHDD833YGRTCD		5000	650	-	35.5	37.5	120°	175	70

### LC013A

Ta = 25°C

Part Number	Color	Temperature (K)	Luminous flux		Forward Voltage		Beam Angle	If (mA)	CRI Min
			Min(lm)	Max(lm)	Typ(V)	Max(V)			
SPHWWTHDNA45YHVTJC	White	3000	950	-	36.5	38.5	120°	350	80
SPHCWTHDNA45YHRTMC		5000	1,050	-	36.5	38.5			

### LC026A

Ta = 25°C

Part Number	Color	Temperature (K)	Luminous flux		Forward Voltage		Beam Angle	If (mA)	CRI Min
			Min(lm)	Max(lm)	Typ(V)	Max(V)			
SPHWWTHDNC45YHVT2F	White	3000	1,920	-	36.9	38.5	120°	720	80
SPHCWTHDNC45YHRT2F		5000	2,120	-	36.9	38.5			

# Full Lineup

## Mid Power

### LM561B

Ta = 25°C

Part Number	Color	Temperature (K)	Luminous flux		Forward Voltage		Beam Angle	If (mA)	CRI Min
			Min (lm)	Max (lm)	Typ (V)	Max (V)			
SPMWHT541MD5WAW0SX	White	2700	24.0	30.0	2.9	3.2	120°	65	80
SPMWHT541MD5WAV0SX		3000	24.5	30.5					
SPMWHT541MD5WAU0SX		3500	25.0	31.0					
SPMWHT541MD5WAT0SX		4000	26.0	32.0					
SPMWHT541MD5WAR0SX		5000	27.0	33.0					
SPMWHT541MD5WAQ0SX		5700	26.5	32.5					
SPMWHT541MD5WAP0SX		6500	26.0	32.0					

### LM561A

Ta = 25°C

Part Number	Color	Temperature (K)	Luminous flux		Forward Voltage		Beam Angle	If (mA)	CRI Min
			Min (lm)	Max (lm)	Typ (V)	Max (V)			
SPMWHT5225D5WAW0S0	White	2700	14.0	26.0	2.7	3.3	120°	50	80
SPMWHT5225D5WAV0S0		3000	14.9	26.5					
SPMWHT5225D5WAU0S0		3500	15.3	27.0					
SPMWHT5225D5WAT0S0		4000	15.6	28.0					
SPMWHT5225D5WAS0S0		4500	15.8	29.0					
SPMWHT5225D5WAR0S0		5000	15.9	28.5					
SPMWHT5225D5WAQ0S0		5700	15.6	28.0					
SPMWHT5225D5WAP0S0		6500	15.3	23.6					

### LM231B

Ta = 25°C

Part Number	Color	Temperature (K)	Luminous flux		Forward Voltage		Beam Angle	If (mA)	CRI Min
			Min (lm)	Max (lm)	Typ (V)	Max (V)			
SPMWHT223MD5WAW0S0	White	2700	19.81	30.13	2.9	3.2	120°	65	80
SPMWHT223MD5WAV0S0		3000	19.81	30.13					
SPMWHT223MD5WAU0S0		3500	19.81	30.13					
SPMWHT223MD5WAT0S0		4000	20.55	31.16					
SPMWHT223MD5WAR0S0		5000	20.55	31.16					
SPMWHT223MD5WAQ0S0		5700	20.55	31.16					
SPMWHT223MD5WAP0S0		6500	20.55	31.16					

### LM231A

Ta = 25°C

Part Number	Color	Temperature (K)	Luminous flux		Forward Voltage		Beam Angle	If (mA)	CRI Min
			Min (lm)	Max (lm)	Typ (V)	Max (V)			
SPMWHT221MD5WAW0S0	White	2700	19.81	30.13	2.9	3.3	120°	65	80
SPMWHT221MD5WAV0S0		3000	19.81	30.13					
SPMWHT221MD5WAU0S0		3500	19.81	30.13					
SPMWHT221MD5WAT0S0		4000	20.55	31.16					
SPMWHT221MD5WAS0S0		4500	20.55	31.16					
SPMWHT221MD5WAR0S0		5000	20.55	31.16					
SPMWHT221MD5WAQ0S0		5700	20.55	31.16					
SPMWHT221MD5WAP0S0		6500	20.55	31.16					

### LM362A

Ta = 25°C

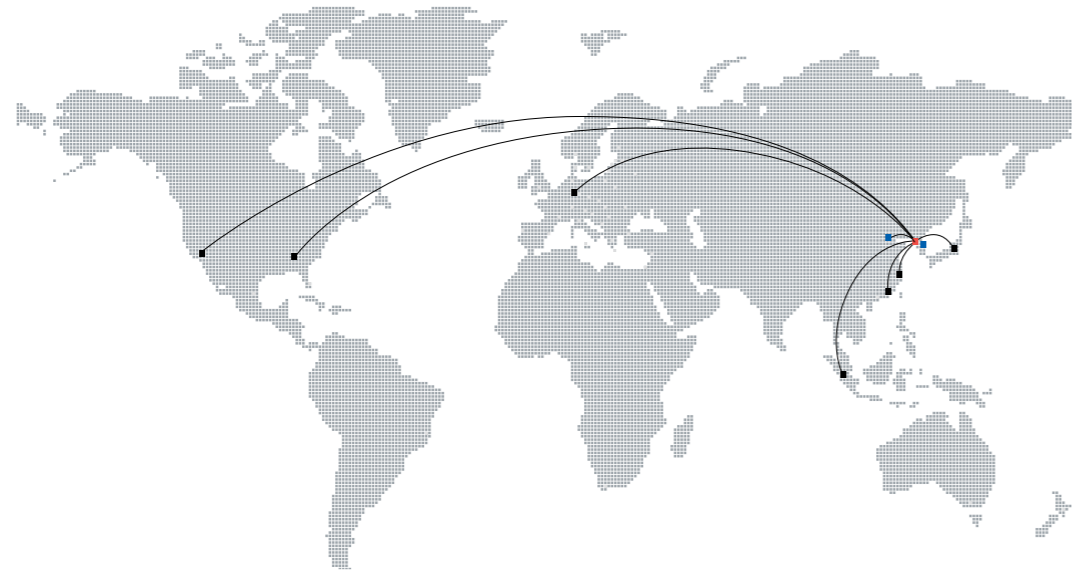
Part Number	Color	Temperature (K)	Luminous flux		Forward Voltage		Beam Angle	If (mA)	CRI Min
			Min (lm)	Max (lm)	Typ (V)	Max (V)			
SPMWHT325AD3Y0R0S0	White	5000	63.0	105.0	6.0	6.6	120°	100	68
SPMWHT325AD5YBW0S0		2700	51.0	78.0					80
SPMWHT325AD5YBV0S0		3000	51.0	80.0					80
SPMWHT325AD5YBU0S0		3500	51.0	83.0					80
SPMWHT325AD5YBT0S0		4000	55.0	85.0					80
SPMWHT325AD5YBR0S0		5000	55.0	86.0					80
SPMWHT325AD5YBQ0S0		5700	55.0	85.0					80
SPMWHT325AD5YBP0S0		6500	55.0	85.0					80

# Network

## Samsung's LED Business global network across the world

With production bases in 2 countries and regional headquarters in 6 countries, the world is getting smaller.

Samsung's LED Business is a global company and we are growing everyday.



## Worldwide Samsung

### ■ Headquarters /

#### Giheung Business Center in Korea

Giheung Business Center (HQ) is responsible for R&D and is the Engineering Center for our entire range of products.

We serve as the center of the integrated global network for Samsung's LED business by using a pilot production line for prototype products and performing diverse HQ functions such as sales, purchasing, research and management support.

### ■ Production Facilities

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#### Tianjin Office in China

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