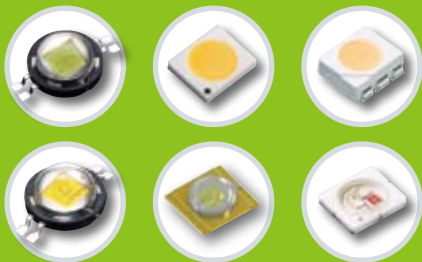




**SEOUL SEMICONDUCTOR**



# Catalogue

Light Emitting Diodes

# A global leader in LED manufacturing, Seoul Semiconductor...

Challenges to be Global No.1 beyond Korea No.1

Is the center of global attention with cutting edge LED technology for the next generation lighting.

Considers the value of customers as their top priority designs sustainable future for happiness of human beings.

Seoul Semiconductor LED technology, the future now.

## Contents

LED Applications .....	1
History In Brief .....	2
Competitive Strategies & Secured Patent .....	4
Highlight Products .....	6
Product Technology Data .....	8
Acriche .....	9
Z-Power LED .....	13
Top View LED .....	19
Side View LED .....	27
Chip LED .....	32
Lamp LED .....	42
High Flux LED .....	49
Dot Matrix .....	51
Custom Module .....	53
Sensor .....	54
Solution Partner .....	55
Optic Solution .....	56
Thermal Resistance .....	57
Precautions for use .....	58
Global Sales Network .....	59

# LED Applications

	<p><b>Illumination</b></p>  <p><b>Acrich</b></p>		<p><b>Sign</b></p>  <p><b>Z-Power LED</b></p>
 <p><b>SEOUL SEMICONDUCTOR</b></p>			<p><b>Home appliance &amp; Display</b></p>  <p><b>Lamp LED</b> <b>High Flux LED</b></p>
			
	<p><b>BLU</b></p>  <p><b>Side View LED</b></p>		<p><b>Mobile Phone</b></p>  <p><b>Chip LED</b></p>

# History In Brief

**2009** ● Chung Hoon Lee who is the CEO of Seoul Semiconductor got the Order of Industrial Service Merit for 44th Anniversary of Invention day

Z-Power LED P7 series named "Product of the Year" for 2009 by Elektronik

**2008** ● Acriche awarded in Newtech Korea 2008 and named as Korea Ten Best New Technologies of 2008

Acriche receives RU Mark from UL

Flash LED named "Product of the Year" for 2008 by Elektronik

Introduced Z-Power P7 Series, the World highest brightness of 900 lumens at 10-watt

Succeeded in Raising the efficiency of Acriche to 80lm/W



2007

Acriche, awarded "Best Product Award 2007" by E&E

Acriche named as "EDN Hot 100 products of 2007" by EDN

Introduced the world's thinnest high-brightness Chip-LED at 0.17mm

Acriche received the CE marking and German TUV certification

Top 5 main industrial player in solid-state-lighting in the world by MONA

Acriche Named product of the year for 2006 by Elektronik

2006

The world's first semiconductor lighting source, "Acriche" launched in volume production

Selected as one of Asia's 100 Hot Growth Companies By BusinessWeek

Selected as one of Asia's Annual Best Under A Billion By Forbes

Achieved ISO/TS-16949 certificate

2005

Achieved ISO-14001 certificate

2004

R&D center was awarded by the president of KOREA for its contribution

2002

Listed on the Korean Stock Market(KOSDAQ)

2001

Achieved QS-9000 certificate

1992

Reshuffled management by president Chung Hoon Lee



# Competitive Strategies

- 
1. From chip to package/ module  
EPI growth → FAB (Fabrication) → PKG → Custom module
  2. Cost competitiveness
  3. Full line up
  4. World production platform
- SEOUL Semiconductor

## From chip to package/module

**Growth → Fabrication → Packaging → Custom module**

- Subsidiary company Seoul Optodevice produces chips with its own EPI (Epitaxy) and FAB (Fabrication) technology.
- Seoul Semiconductor does packaging.

## Cost competitiveness

- Volume production (0.5 Billion Chips per Month)  
Effective management (Slim Org.)
- Global sourcing (USA, China, Korea)

## Broad Product Portfolio

- Acriche, Z-Power LED, Side View LED, Top View LED, Lamp LED, Chip LED, High Flux LED, Dot Matrix, Custom Display, Deep UV, Near UV

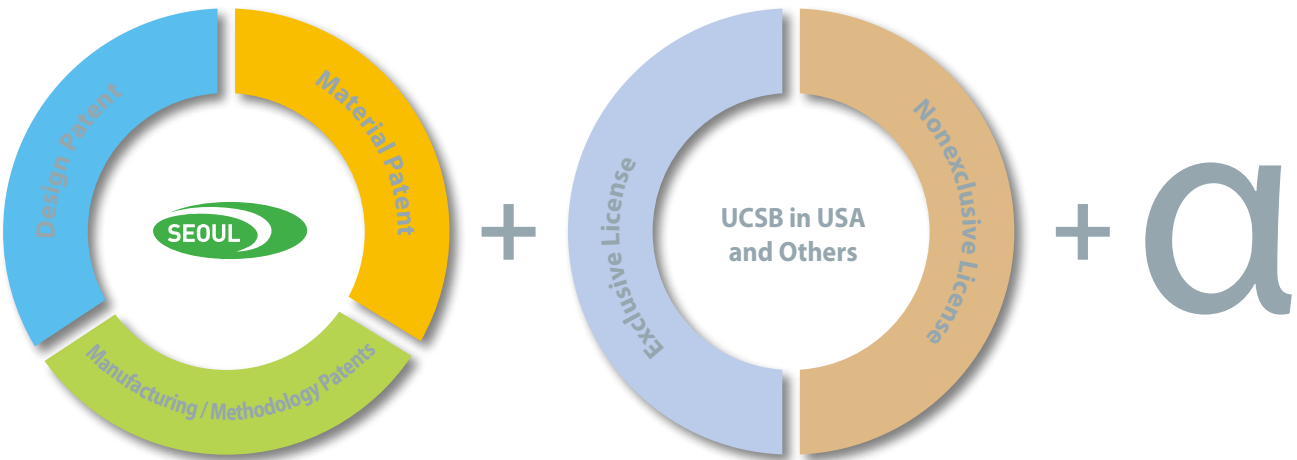
## World production platform

- Technology center & factory in Korea, USA, China

# Secured Patent



Over 5,000 patents filed or registered



**SSC R&D Strategy: 10% of sales revenue invested in R&D and strategic cooperation**

Maintain the top position securing patents and developing applications

# Highlight Products



100lm/W  
(A4 Series)

## 1. Acriche

The first product operated with AC power without any additional devices.

### • Efficiency

- No conversion energy lost
- High efficiency

### • Lifetime

- Long life time : 35,000 hrs
- No capacitor, No Inductor

### • Safety

- Not fragile
- Resistant to vibrations and shock

### • Design

- Convenient design for AC current applications

### • Environment

- Environment friendly
- RoHS compliant
- Pb free

### • Circuit

- Direct AC connection AC
- No AC-DC converter
- Simple circuit design



Acriche has been named "Product of the Year" for 2006 by Elektronik



Acriche has been named "EDN Hot 100 Products of 2007"

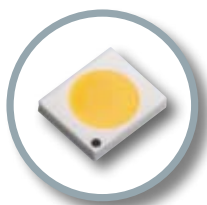


CE, TÜV : Approved in Nov.2007



UL : Approved in May.2008

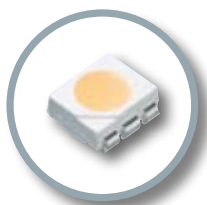




## 2. Ultra Slim Z-Power LED Z1

1.2 thickness : Z-Power LED Z1

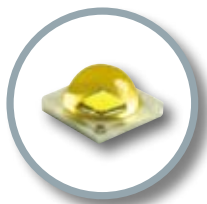
Better color uniformity (Pure white : 120lm, Warm White : 95lm)



## 3. High CRI Top View LED

CRI 96 : Top View LED C9WT728

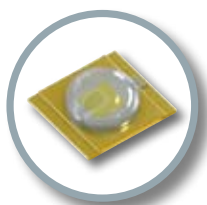
Natural color reveal closest to sunshine



## 4. Compact Size Power LED Z5

Typ 110lm : Z-Power LED Z5(1w)

Better color uniformity and reliability



## 5. Outstanding Efficiency Chip LED

120lm/W : LCW100Z1

For General Illumination



## 6. Full Color Z-Power LED P5-II

R, G, B Full color 6 pin : Z-Power LED P5-II

Super power & Full color, Better uniformity

# Product Technology Data

Page  
27



**Side View LED**

Page  
13



**Z-Power LED**

Page  
19



**Top View LED**

Page  
42



**Lamp LED**

Page  
09



**Acriche**

Page  
32



**Chip LED**

Page  
49



**High Flux LED**

Page  
51



**Dot Matrix**

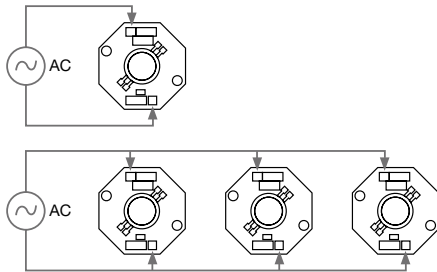
## The World's First AC-driven Semiconductor Lighting Source

### How to use Acriche

#### 1. Connection

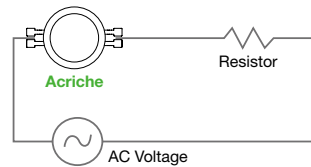
##### PCB Type

Connect AC Source directly to electrodes on PCB.



##### A3 Series (Emitter Type)

Use proper resistor according to  $V_F$  rank.



##### AW 3200

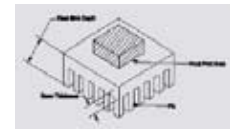
$V_F$ Bin Code	100V	110V	120V
A	300 $\Omega$	500 $\Omega$	750 $\Omega$
B	250 $\Omega$	450 $\Omega$	700 $\Omega$
C	200 $\Omega$	400 $\Omega$	650 $\Omega$
D	-	350 $\Omega$	600 $\Omega$

##### AW 3220

$V_F$ Bin Code	220V	230V	240V
A	2.2K $\Omega$	2.6K $\Omega$	3K $\Omega$
B	1.9K $\Omega$	2.35K $\Omega$	2.75K $\Omega$
C	1.63K $\Omega$	2.1K $\Omega$	2.55K $\Omega$
D	1.36K $\Omega$	1.85K $\Omega$	2.35K $\Omega$

#### 2. Thermal management

Proper thermal management must be considered. Keep temperature of board below 70°C



##### Acriche 2W

Parameter	Value	Unit
$R_{\theta JS}$	9~10	°C / W
$T_{J \max}$	125	°C
$T_B \max$	100	°C

Size	$T_B$ (°C)	$R_{\theta BA}$ (°C/W)
44x44mm, 20t	54.6	10

Size	$T_B$ (°C)	$R_{\theta BA}$ (°C/W)
50x50mm, 25t	46.1	5

##### Acriche 4W

Parameter	Value	Unit
$R_{\theta JS}$	6~7	°C / W
$T_{J \max}$	125	°C
$T_B \max$	100	°C

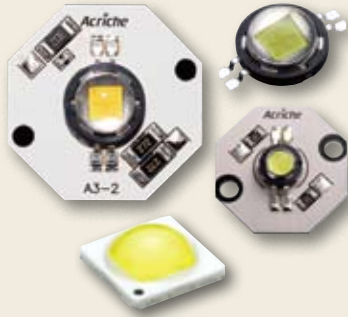
  

Size	$T_B$ (°C)	$R_{\theta BA}$ (°C/W)
44x44mm, 20t	73.8	10

Size	$T_B$ (°C)	$R_{\theta BA}$ (°C/W)
50x50mm, 25t	56.2	5

# Acriche



## Nomenclature

A	X2	X3	X4	X5	X6	
Acriche	Color		Acriche Series Number	Lens Type	Operating Voltage	Type of PCB
	W	Pure White	2 A2	0 Flat Type	0 100	0 Emitter
	S	Natural White	3 A3	2 Dome Type	1 110	1 4W PCB
	N	Warm White			2 220	2 2W PCB
					3 230	4 2W PCB

45000~10000K      2650~3500K

## Features

- Direct AC Operation without additional equipment or circuit
- Operating voltage : 100V, 110V, 220V, 230V
- Long life time : more than 35,000 hrs
- Zero energy conversion loss
- Operating frequency : 50/60Hz

## Application

- General lighting
- Architectural lighting
- Street lighting
- Residential lighting (Under-cabinet)
- Decorative lighting
- Sign lighting

## Absolute Maximum Ratings(at $T_A=25^{\circ}\text{C}$ )

Parameter	Symbol	Value				Unit
		100V	110V	220V	230V	
Operating Voltage	$V_{opt}^{*1}$	115	127	253	256	V[RMS]
Power Dissipation	$P_d$	3.7[2W Emitter], 4.3[2W PCB], 6.4[4W Emitter], 7.5[4W PCB]				W
Junction Temperature	$T_j$	125				$^{\circ}\text{C}$
Operating Temperature	$T_{opr}$	-30~+85				$^{\circ}\text{C}$
Storage Temperature	$T_{stg}$	-40~+120				$^{\circ}\text{C}$
ESD Sensitivity	-	$\pm 2,000$ (HBM) <sup>*2</sup>				V

\*1. Operating Voltage doesn't indicate the maximum voltage which customers use, but it means tolerable voltage according to the voltage variation rate by one's country.

\*2. HBM : Human body model

## Electro-Optical Characteristics

### A5 series New Product

Part No.	Color	Operating Current [mA]	Luminous Flux [lm]	Illuminance [lx]	Forward Voltage [V]	Viewing Angle [°]	Remark
AW5200	Pure White	20/10	80	-	110/220	134	Emitter, CRI=70
AN5200	Warm White	20/10	60	-	110/220	134	Emitter, CRI=80

### A4 series

Part No.	Color	Operating Current [mA]	Luminous Flux [lm]	Illuminance [lx]	Forward Voltage [V]	Viewing Angle [°]	Remark
AN4211	Warm White	40	200	-	110	-	PCB(70*23mm)
AN4212	Warm White	40	200	-	110	-	PCB(30*30mm)
AN4213	Warm White	40	200	-	110	-	PCB(120*21mm)
AN4214	Warm White	80	400	-	110	-	PCB ( $\phi$ 48)
AN4221	Warm White	20	200	-	220	-	PCB(70*23mm)
AN4222	Warm White	20	200	-	220	-	PCB(30*30mm)
AN4223	Warm White	20	200	-	220	-	PCB(120*21mm)
AN4224	Warm White	40	400	-	220	-	PCB ( $\phi$ 48)
AN4240	Warm White	20	50	100	55	134	Emitter, CRI=85
AN4252	Warm White	40	200	-	120	-	PCB(30*30mm)

## Electro-Optical Characteristics

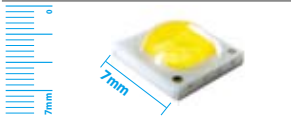
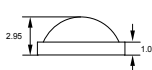
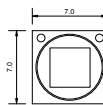
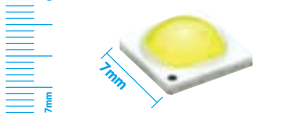
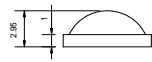
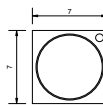

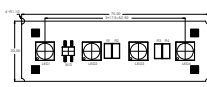
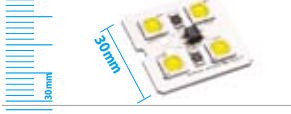


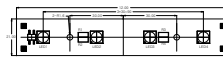

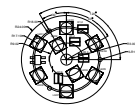
### A3 series

Part No.	Color	Operating Current [mA]	Luminous Flux [lm]	Illuminance [lux]	Forward Voltage [V]	Viewing Angle [°]	Remark
AW3200	Pure White	40	215	240	100,110,120	130	Emitter
AW3201	Pure White	40	215	240	100	130	PCB
AW3211	Pure White	40	215	240	110	130	PCB
AW3220	Pure White	20	215	240	220,230	130	Emitter
AW3221	Pure White	20	215	240	220	130	PCB
AW3231	Pure White	20	215	240	230	130	PCB
AW3241	Pure White	40	215	240	120	130	PCB
AN3200	Warm White	40	145	160	100,110,120	130	Emitter
AN3201	Warm White	40	145	160	100	130	PCB
AN3211	Warm White	40	145	160	110	130	PCB
AN3220	Warm White	20	145	160	220,230	130	Emitter
AN3221	Warm White	20	145	160	220	130	PCB
AN3231	Warm White	20	145	160	230	130	PCB
AN3241	Warm White	40	145	160	120	130	PCB

### A2 series

Part No.	Color	Operating Current [mA]	Luminous Flux [lm]	Illuminance [lux]	Forward Voltage [V]	Viewing Angle [°]	Remark
AW2200	Pure White	20	80	91	100	120	Emitter
AW2204	Pure White	20	80	91	100	110	PCB
AW2214	Pure White	20	80	91	110	110	PCB
AN2200	Warm White	20	65	73	100	120	Emitter
AN2204	Warm White	20	65	73	100	110	PCB
AN2214	Warm White	20	65	73	110	110	PCB

## Outline Dimensions

Over View	Part No.	Front View	Top View
	AW5200 AN5200		
	AN4240		
	AN4211 AN4221		
	AN4212 AN4222 AN4252		
	AN4213 AN4223		
	AN4214 AN4224		









The specifications of products may be changed without a notice. When you design, you have to check specifications on the website.



# Z-Power LED



## Nomenclature

X1	X2	X3	X4	X5	X6
<b>PKG Color</b>	<b>Z-Power LED Series</b>	<b>Lens Type</b>	<b>Chip Quantity</b>	<b>PKG Outline Size</b>	<b>Metal PCB Type</b>
<b>W</b> Pure White <b>S</b> Natural White <b>N</b> Warm White <b>R</b> Red <b>A</b> Amber <b>G</b> Green <b>B</b> Blue <b>D</b> Royal Blue		<b>0</b> Without Lens <b>2</b> Dome <b>9</b> Narrow Lens			<b>0</b> Without Metal PCB <b>2</b> With Star Type
 45000-10000K	 3500-4500K	 2650-3500K	 618-632nm	 585-595nm	
 520-535nm	 455-475nm	 455-465nm			

## Features

- Large output/High luminous flux
- Low thermal resistance
- No poisonous materials
- RoHS compliant

## Application

- General lighting
- Decoration lighting
- Portable lighting
- Traffic signal
- Architectural lighting
- Torch
- Reading lighting
- Automotive lighting

## Absolute Maximum Ratings(at $T_A=25^{\circ}\text{C}$ )

### P4 Series

Parameter	Symbol	Value								Unit	
		Pure White	Natural White	Warm White	Red	Amber	Green	Blue	Royal Blue		
Power Dissipation	$P_d$	4	3.2	3.2	2.4	2.4	4	4	4	W	
Forward Current	$I_F$	1000(@ $T_j=90^{\circ}\text{C}$ ), 1800(@1KHz, 1/10duty)	800	800	800	800	1000	1000	1000	mA	
Junction Temperature	$T_j$	145(@ $I_F \leq 700\text{mA}$ )	145							$^{\circ}\text{C}$	
Operating Temperature	$T_{opr}$	-40 ~ +85									$^{\circ}\text{C}$
Storage Temperature	$T_{stg}$	-40 ~ +100									$^{\circ}\text{C}$
ESD Sensitivity	-	$\pm 10,000(\text{HBM})^{*1}$									V

\*1. HBM : Human body model

## Z1 Series

Parameter	Symbol	Value	Unit
Power Dissipation	$P_d$	2.12	W
Forward Current	$I_F$	450(@ $T_J = 90\text{ }^\circ\text{C}$ ), 800(@ Pulse width 10ms, 1/10 duty)	mA
Junction Temperature	$T_J$	125	$^\circ\text{C}$
Operating Temperature	$T_{opr}$	-30 ~ +85	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-40 ~ +100	$^\circ\text{C}$
ESD Sensitivity	-	$\pm 10,000(\text{HBM})^{*1}$	V

\*1. HBM : Human body model

## Z2 Series

Parameter	Symbol	Value	Unit
Power Dissipation	$P_d$	6.3	W
Forward Current	$I_F$	500(@ $T_J = 90\text{ }^\circ\text{C}$ ), 800(@ Pulse width 10ms, 1/10 duty)	mA
Junction Temperature	$T_J$	125	$^\circ\text{C}$
Operating Temperature	$T_{opr}$	-20 ~ +85	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-30 ~ +100	$^\circ\text{C}$
ESD Sensitivity	-	$\pm 10,000(\text{HBM})^{*1}$	V

\*1. HBM : Human body model

## P3-II Series

Parameter	Symbol	Value					Unit
		White	Red	Amber	Green	Blue	
Power Dissipation	$P_d$	2	1.2	1.2	2.05	2	W
Forward Current	$I_F$	500	400	400	500	500	mA
Junction Temperature	$T_J$	145	100	100	145	145	$^\circ\text{C}$
Operating Temperature	$T_{opr}$	-40 ~ +85					$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-40 ~ +100					$^\circ\text{C}$
ESD Sensitivity	-	$\pm 10,000(\text{HBM})^{*1}$					V

\*1. HBM : Human body model

## P5-II Series

Parameter	Symbol	Value			Unit
		Red	Green	Blue	
Power Dissipation	$P_d$	1.2	1.68	1.64	W
Forward Current	$I_F$	400	400	400	mA
Junction Temperature	$T_J$	125	145	145	$^\circ\text{C}$
Operating Temperature	$T_{opr}$	-30 ~ +85			$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-40 ~ +100			$^\circ\text{C}$
ESD Sensitivity	-	$\pm 10,000(\text{HBM})^{*1}$			V

\*1. HBM : Human body model



**P7 Series**

Parameter	Symbol	Value	Unit
Power Dissipation	$P_d$	11.8	W
Forward Current	$I_F$	2800	mA
Junction Temperature	$T_j$	140	°C
Operating Temperature	$T_{opr}$	-40 ~ +85	°C
Storage Temperature	$T_{stg}$	-40 ~ +100	°C
ESD Sensitivity	-	±20,000(HBM) <sup>*1</sup>	V

**P9 Series**

Parameter	Symbol	Value	Unit
Power Dissipation	$P_d$	0.82	W
Forward Current	$I_F$	200	mA
Junction Temperature	$T_j$	125	°C
Operating Temperature	$T_{opr}$	-30 ~ +85	°C
Storage Temperature	$T_{stg}$	-40 ~ +120	°C
ESD Sensitivity	-	±15,000(HBM) <sup>*1</sup>	V

\*1. HBM : Human body model

**Electro-Optical Characteristics(at  $T_A=25^\circ\text{C}$ )****P4 Series**

Part No.	Color	Operating Current [mA]	Luminous Flux [lm]	CCT [K]	CRI	Forward Voltage [V]	Viewing Angle [°]	Type
W42180	Pure White	350	Urank:100	6300	75	3.25	127	Emitter
W42182	Pure White	350	Urank:100	6300	75	3.25	127	Star
W49180	Pure White	350	105	6300	75	3.25	93	Narrow, Emitter
S42180	Natural White	350	72	4000	93	3.25	124	Emitter
S42180H	Natural White	350	84	4000	80	3.25	124	Emitter
S42182	Natural White	350	72	4000	93	3.25	124	Star
S42182H	Natural White	350	84	4000	80	3.25	124	Star
N42180	Warm White	350	66	3000	93	3.25	124	Emitter
N42180H	Warm White	350	77	3000	80	3.25	124	Emitter
N42182	Warm White	350	66	3000	93	3.25	124	Star
N42182H	Warm White	350	77	3000	80	3.25	124	Star
R42180	Red	350	48	625	-	2.3	130	Emitter
R42182	Red	350	48	625	-	2.3	130	Star
A42180	Amber	350	48	590	-	2.3	130	Emitter
A42182	Amber	350	48	590	-	2.3	130	Star
G42180	Green	350	70	525	-	3.25	130	Emitter
G42182	Green	350	70	525	-	3.25	130	Star
B42180	Blue	350	22	465	-	3.25	130	Emitter
B42182	Blue	350	22	465	-	3.25	130	Star
D42180	Royal Blue	350	468mW	457	-	3.25	130	Emitter
D42182	Royal Blue	350	468mW	457	-	3.25	130	Star

## Z1 Series

Part No.	Color	Operating Current [mA]	Luminous Flux [lm]	CCT [K]	Forward Voltage [V]	Viewing Angle [°]	Type
WZ10150	Pure White	400	100	6300	3.6	120	Emitter
NZ10150	Warm White	400	76	3000	3.6	120	Emitter

## Z2 Series

Part No.	Color	Operating Current [mA]	Luminous Flux [lm]	CCT [K]	Forward Voltage [V]	Viewing Angle [°]	Type
WZ20360	Pure White	350	260	6300	11	120	Emitter
SZ20360	Natural White	350	210	4000	11	120	Emitter
NZ20360	Warm White	350	200	3000	11	120	Emitter

## Z5 Series

Part No.	Color	Operating Current [mA]	Luminous Flux [lm]	CCT [K] Wavelength [nm]	Forward Voltage [V]	Viewing Angle [°]	Type
SZW05A0A	Pure White	350	110	6300	3.3	122	Emitter
SZN05A0A	Warm White	700	75	3000	3.3	120	Emitter
SZR05A0A	Red	700	50	625	2.4	123	Emitter
SZA05A0A	Amber	700	42	592	2.5	123	Emitter
SZG05A0A	Green	700	70	525	3.5	128	Emitter
SZB05A0A	Blue	700	18	460	3.5	128	Emitter

## P3-II Series

Part No.	Color	Operating Current [mA]	Luminous Flux [lm]	CCT [K] Wavelength [nm]	Forward Voltage [V]	Viewing Angle [°]	Type
WS2180	Pure White	350	70	6300	3.5	120	Emitter
WS2182	Pure White	350	70	6300	3.5	120	Star
NS2180	Warm White	350	64	3000	3.5	130	Emitter
NS2182	Warm White	350	64	3000	3.5	130	Star
RS2180	Red	350	38	622	2.5	130	Emitter
RS2182	Red	350	38	622	2.5	130	Star
AS2180	Amber	350	37	590	2.5	130	Emitter
AS2182	Amber	350	37	590	2.5	130	Star
GS2180	Green	350	62	525	3.5	130	Emitter
GS2182	Green	350	62	525	3.5	130	Star
BS2180	Blue	350	15	460	3.5	130	Emitter
BS2182	Blue	350	15	460	3.5	130	Star

## P5-II Series

Part No.	Color	Operating Current [mA]	Luminous Flux [lm]	Wavelength [nm]	Forward Voltage [V]	Viewing Angle [°]	Type
F50360	Red	350	35	625	2.5	120	Emitter
	Green		57	525	3.8		
	Blue		13	460	3.6		

## P9 Series

Part No.	Color	Operating Current [mA]	Luminous Flux [lm]	CCT [K]	Forward Voltage [V]	Viewing Angle [°]	Type
W92050C	Pure White	150	28	6300	3.65	123	Emitter

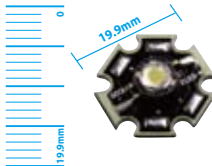
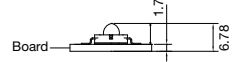
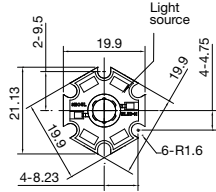
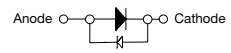
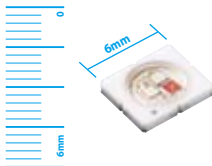
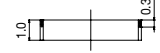
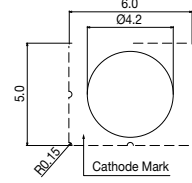
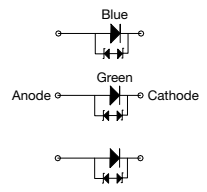
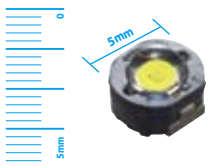
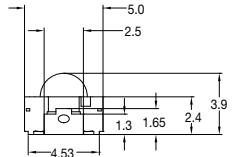
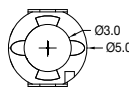
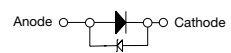
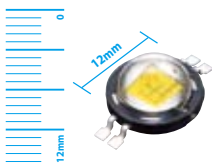
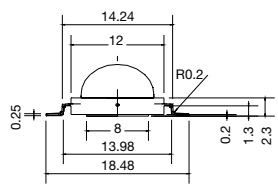
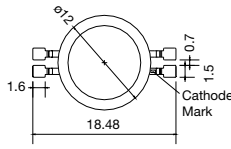
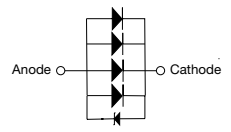
## P7 Series

Part No.	Color	Operating Current [mA]	Luminous Flux [lm]	CCT [K]	Forward Voltage [V]	Viewing Angle [°]	Type
W724C0	Pure White	2800	740	6300	3.6	130	Emitter

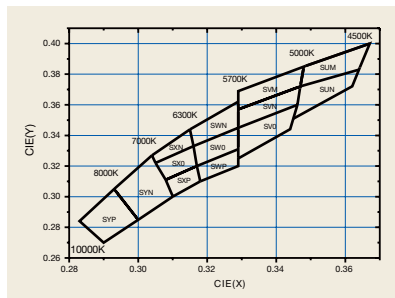
## Outline Dimensions

Over View	Part No.	Front View	Top View	Circuit
	W42180 S42180 N42180 R42180 A42180 G42180 B42180 D42180			
	W42182 S42182 N42182 R42182 A42182 G42182 B42182 D42182			
	W49180			
	WZ10150 NZ10150			
	WZ20360 SZ20360 NZ20360			
	SZW05A0A SZN05A0A SZR05A0A SZA05A0A SZG05A0A SZB05A0A			
	WS2180 NS2180 RS2180 AS2180 GS2180 BS2180			

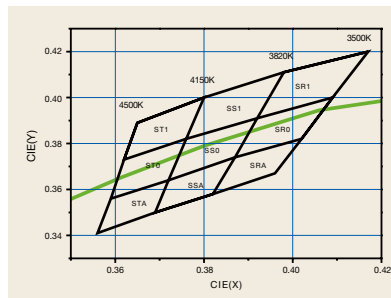
## Outline Dimensions

Over View	Part No.	Front View	Top View	Circuit
	WS2182 NS2182 RS2182 AS2182 GS42182 BS42182			
	F50360			
	W92050C			
	W724C0			

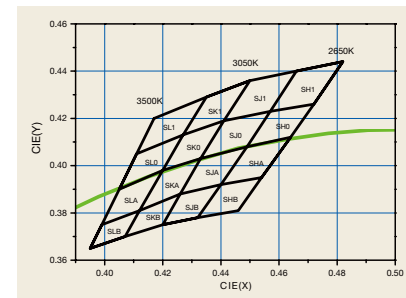
## White Binning



Pure White



Natural White



Warm White

The specifications of products may be changed without a notice. When you design, you have to check specifications on the website.

# Top View LED



## Nomenclature

X1	X2	X3	X4	X5	X6	X7	X8
Chip Grade	PKG Color	Top View LED	Package Type	Chip quantity (Real Quantity-1)	Package Version	Package upper surface color	Internal Number
	W White AW Warm White R Red G Green B Blue F Full Color CW High CRI, White CAW High CRI, Warm White ZW High Gamut, White		7 Big Top View LED 8 General Top View LED			None White Surface BS Black Surface	None Epoxy Type S Silicone Type
	4800-12000K	2500-4600K	620-645nm	600-612nm			
	584-596nm	565-576nm	519-566nm	455-476nm			

## Features

- Various color : Red, Green, Yellow, Blue, White, Dual color, Full color
- Ultra slim size : Fit for slim design
- High intensity : Customized intensity ranks available
- High reliability

## Application

- Lighting : General & decorative light
- Indicator for electrical parts
- Automotive lighting source

## Absolute Maximum Ratings(at $T_A=25^\circ\text{C}$ )

### White

Parameter	Symbol	Value					Unit
		KWT806-S	SWT805-S	KWT803-S	KWT824	KWT801-S	
Power Dissipation	$P_d$	120	120	120	333	120	mW
Forward Current	$I_F$	30	30	30	90	30	mA
Peak Forwards Current	$I_{FM}$	100 <sup>*1</sup>	90 <sup>*1</sup>	90 <sup>*1</sup>	100 <sup>*1</sup>	90 <sup>*1</sup>	mA
Reverse Voltage	$V_R$	5	5	5	5	5	V
Operating Temperature	$T_{opr}$	-30~+85	-40~+85	-40~+100	-30~+85	-40~+100	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-40~+100	-40~+100	-40~+100	-40~+100	-40~+100	$^\circ\text{C}$

\*1.  $I_{FM}$  conditions : Pulse width  $T_w \leq 1\text{ms}$ , Duty ratio  $\leq 1/10$ ,

\*2.  $I_{FM}$  conditions : Pulse width  $T_w \leq 300\text{ms}$ , Duty ratio  $\leq 1/10$ ,

Parameter	Symbol	Value					Unit
		MWT801-S	SWT821-S	KWT733	KWT728-S	KWT722	
Power Dissipation	$P_d$	120	342	420	315	350	mW
Forward Current	$I_F$	30	90	120	90	90	mA
Peak Forwards Current	$I_{FM}^{*1}$	90	100	100	270	270	mA
Reverse Voltage	$V_R$	5	5	5	5	5	V
Operating Temperature	$T_{opr}$	-40~+100	-40~+85	-30~+85	-40~+85	-30~+85	°C
Storage Temperature	$T_{stg}$	-40~+100	-40~+100	-40~+100	-40~+100	-40~+100	°C

\*1.  $I_{FM}$  conditions : Pulse width  $T_w \leq 1ms$ , Duty ratio  $\leq 1/10$  (Per Die)

Parameter	Symbol	Value				Unit
		AWT803-S	AWT801-S	C9WT728	C8WT728-S	
Power Dissipation	$P_d$	111	120	315	315	mW
Forward Current	$I_F$	30	30	90	90	mA
Peak Forwards Current	$I_{FM}^{*1}$	90	90	270	270	mA
Reverse Voltage	$V_R$	5	5	5	5	V
Operating Temperature	$T_{opr}$	-40~+100	-40~+100	-40~+85	-40~+85	°C
Storage Temperature	$T_{stg}$	-40~+100	-40~+100	-40~+100	-40~+100	°C

\*1.  $I_{FM}$  conditions : Pulse width  $T_w \leq 1ms$ , Duty ratio  $\leq 1/10$  (Per Die)

### Single Color

Parameter	Symbol	Value						Unit
		ERT801	SRT801	UHPT801	VRT801	WRT801	UHPT722	
Power Dissipation	$P_d$	80	78	90	78	90	234	mW
Forward Current	$I_F$	30	30	30	30	30	90	mA
Peak Forwards Current	$I_{FM}^{*1}$	90	60	100	100	100	100	mA
Reverse Voltage	$V_R$	5	5	5	5	5	5	V
Operating Temperature	$T_{opr}$	-40~+100	-40~+100	-40~+100	-40~+100	-40~+100	-30~+85	°C
Storage Temperature	$T_{stg}$	-40~+100	-40~+100	-40~+100	-40~+100	-40~+100	-40~+100	°C

\*1.  $I_{FM}$  conditions : Pulse width  $T_w \leq 1ms$ , Duty ratio  $\leq 1/10$  (Per Die)

Parameter	Symbol	Value						Unit
		FAT801	LUYT801	SUYT801	HYT722	UYGT801	MGT801	
Power Dissipation	$P_d$	85	90	90	252	75	123	mW
Forward Current	$I_F$	30	30	30	90	30	30	mA
Peak Forwards Current	$I_{FM}^{*1}$	100	60	90	100	90	90	mA
Reverse Voltage	$V_R$	5	5	5	5	5	5	V
Operating Temperature	$T_{opr}$	-40~+100	-40~+100	-40~+100	-30~+85	-30~+85	-30~+85	°C
Storage Temperature	$T_{stg}$	-40~+100	-40~+100	-40~+100	-40~+100	-40~+100	-40~+100	°C

\*1.  $I_{FM}$  conditions : Pulse width  $T_w \leq 1ms$ , Duty ratio  $\leq 1/10$  (Per Die)

Parameter	Symbol	Value					Unit
		UPGT801	MGT722	MBT801	MBT801-S	MBT722	
Power Dissipation	$P_d$	123	369	120	120	360	mW
Forward Current	$I_F$	30	90	30	30	90	mA
Peak Forwards Current	$I_{FM}^{*1}$	90	100	90	90	100	mA
Reverse Voltage	$V_R$	5	5	5	5	5	V
Operating Temperature	$T_{opr}$	-30~+85	-30~+85	-40~+100	-40~+100	-30~+85	°C
Storage Temperature	$T_{stg}$	-40~+100	-40~+100	-40~+100	-40~+100	-40~+100	°C

\*1.  $I_{FM}$  conditions : Pulse width  $T_w \leq 1ms$ , Duty ratio  $\leq 1/10$  (Per Die)

### Dual Color

Parameter	Symbol	Value		Unit
		YGURHT811-BS		
		Yellow-Green	Red	
Power Dissipation	$P_d$	90	90	mW
Forward Current	$I_F$	30	30	mA
Peak Forwards Current	$I_{FM}^{*1}$	90	90	mA
Reverse Voltage	$V_R$	5		V
Operating Temperature	$T_{opr}$	-30~+85		°C
Storage Temperature	$T_{stg}$	-40~+100		°C

\*1.  $I_{FM}$  conditions : Pulse width  $T_w \leq 1ms$ , Duty ratio  $\leq 1/10$  (Per Die)

### Full Color

Parameter	Symbol	Value									Unit
		SFT825N-S			SFT825Z-S			SFT722N-S			
		Red	Green	Blue	Red	Green	Blue	Red	Green	Blue	
Power Dissipation	$P_d^{*1}$	81	120	114	81	120	114	81	120	114	mW
Forward Current	$I_F$	30	30	30	30	30	30	30	30	30	mA
Peak Forwards Current	$I_{FM}^{*2}$	100	100	100	100	100	100	100	100	100	mA
Reverse Voltage	$V_R$	5			5			5			V
Operating Temperature	$T_{opr}$	-40~+100			-40~+100			-40~+100			°C
Storage Temperature	$T_{stg}$	-40~+100			-40~+100			-40~+100			°C

\*1. The Value for one LED device.(Single Color)

\*2.  $I_{FM}$  conditions : Pulse width  $T_w \leq 1ms$ , Duty ratio  $\leq 1/10$  (Per Die)

## Electro-Optical Characteristics(at T<sub>A</sub>=25°C)

### White

Part No.	Color	Size [mm]	Operating Current [mA]	Luminous Intensity Typ [mcd]	Luminous Intensity Max [mcd]	CCT <sup>*2</sup> [K]	Forward Voltage [V]	Viewing Angle [°]	Type
EWT806	White	3.0×1.4×1.2	20	1900	2400	6,300-30,000	3.1	120	
SWT805-S	White	3.0×2.0×0.8	20	1900	2500	6,300-30,000	3.2	115	
KWT803-S	White	3.0×2.0×1.2	20	2100	2500	5,300-8,900	3.2	115	
C9WT803	White	3.0×2.0×1.2	20	1500	2000	2,600-7,000	3.2	115	CRI=90
C8WT803	White	3.0×2.0×1.2	20	1800		2,600-7,000	3.2	115	CRI=80
KWT824	White	3.2×2.8×1.3	60 90	4000 5500		4,500-10,000	3.2	120	Flash
MWT801-S	White	3.2×2.8×1.9	20	500 min.	1200	4,500-10,000	4.0 max.	120	
SWT821-S	White	3.2×2.8×1.9	60	5500	6500	4,800-12,000	3.2	120	
AWT811-S	White	3.2×2.8×1.9	40	3000		2,500-4,600	3.2	120	
AWT801-S	White	3.2×2.8×1.9	20	1600		2,700-4,500	3.3	120	
KWT801-S	White	3.2×2.8×1.9	20	1200 min.	2100	4,500-10,000	4.0 max.	120	
C9WT821	White	3.2×2.8×1.9	60	4500		2,600-7,000	3.3	120	
KWT728-S	White	5.0×5.0×1.4	60	6200		4,700-7,000	3.2	120	CRI=68
C8WT728	White	5.0×5.0×1.4	60	5200		2,600-7,000	3.2	120	CRI=83
C9WT728	White	5.0×5.0×1.4	60	4800		2,600-10,000	3.2	120	CRI=95
KWT733	White	5.3×5.0×1.63	80	5500	8000	4,800-12,000	3.7 max.	120	Flash
KWT722	White	6.0×5.0×2.5	60	4500	6000	4,800-12,000	3.2	120	
STW8Q2PA	White	5.6×3.0×0.9	100	8800	9600	2,600-7,000	3.2	120	CRI=80

\*1 Per die

\*2 CCT: Warm white(from less than 2,700K to 4,000K), Pure white(from 4,000K to more than 10,000K)

CCT range may differ by each product

### Single Color

Part No.	Color	Size [mm]	Operating Current [mA]	Luminous Intensity Typ [mcd]	Luminous Intensity Max [mcd]	Forward Voltage [V]	Wavelength [nm]	Viewing Angle [°]
ERT801	Red	3.2×2.8×1.9	20	90	130	2.0	635	120
SRT801	Red	3.2×2.8×1.9	20	200		2.1	625	120
UHPT801	Red	3.2×2.8×1.9	20	320	500	2.2	630	120
VRT801	Red	3.2×2.8×1.9	20	320		2.2	625	120
WRT801	Red	3.2×2.8×1.9	20	520	650	2.2	626	120
UHPT722	Red	6.0×5.0×2.5	60	1000		2.2	630	120
FAT801	Amber	3.2×2.8×1.9	20	220	320	2.2	606	120
LUYT801	Yellow	3.2×2.8×1.9	20	130	210	2.1	587	120
SUYT801	Yellow	3.2×2.8×1.9	20	350	500	2.1	589	120
HYT722	Yellow	6.0×5.0×2.5	60	1400	1700	2.2	590	120
UYGT801	Yellow Green	3.2×2.8×1.9	20	90	105	2.1	572	120
MGT801	Green	3.2×2.8×1.9	20	525	690	3.4	527	120
UPGT801	Green	3.2×2.8×1.9	20	17	36	2.2	562	120
MGT722	Green	6.0×5.0×2.5	60	1800		3.3	527	120
MBT801	Blue	3.2×2.8×1.9	20	70 min.	600	3.3	470	120
MBT801-S	Blue	3.2×2.8×1.9	20	335	600	3.2	465	120
MBT722	Blue	6.0×5.0×2.5	60	580	860	3.3	470	120



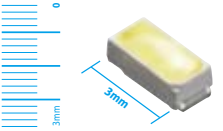
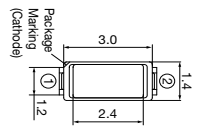
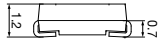

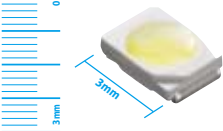
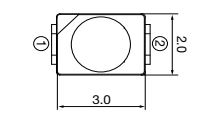


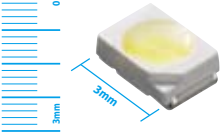
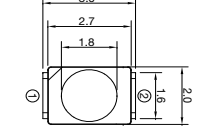
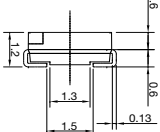

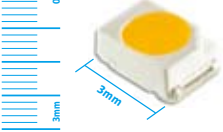
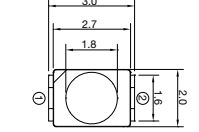
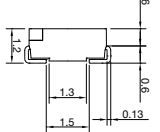

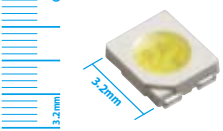
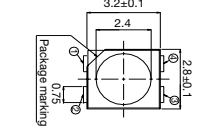
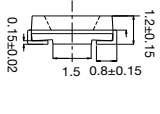
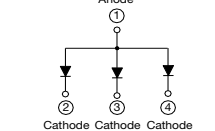
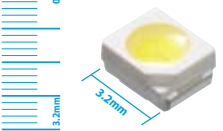
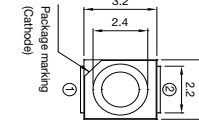
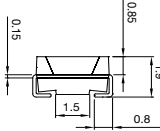

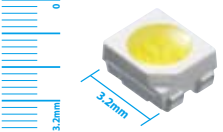
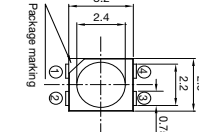
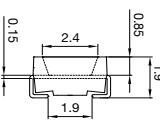

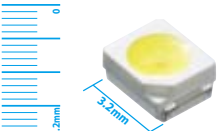
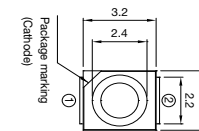
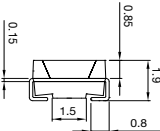

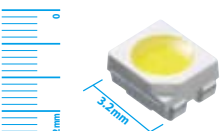
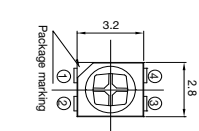
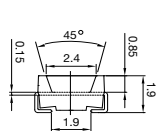
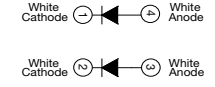
**Dual Color**

Part No.	Color	Size [mm]	Operating Current [mA]	Luminous Intensity Typ [mcd]	Luminous Intensity Max [mcd]	Forward Voltage [V]	Wavelength [nm]	Viewing Angle [°]
YGURHT811-BS	Yellow Green	3.2×2.8×1.9	20	50	70	2.1	570	120
	Red		20	30	40	1.9	640	

**Full Color**

Part No.	Color	Size [mm]	Operating Current [mA]	Luminous Intensity Typ [mcd]	Luminous Intensity Max [mcd]	Forward Voltage [V]	Wavelength [nm]	Viewing Angle [°]
SFT825N-S	Red	3.5×2.8×1.4	20	700	1100	2.1	623	120
	Green		20	1200	1600	3.2	527	
	Blue		20	400	560	3.2	460	
SFT825Z-S	Red	3.5×2.8×1.4	20	700	1100	2.1	623	120
	Green		20	1200	1600	3.2	527	
	Blue		20	400	560	3.2	460	
SFT722N-S	Red	6.0×5.0×2.5	20	700	1100	2.1	623	120
	Green		20	1200	1600	3.2	527	
	Blue		20	400	560	3.2	460	

## Outline Dimensions

Over View	Part No.	Front View	Side View	Circuit
	EWT806			
	SWT805-S			
	KWT803-S			
	C9WT803 C8WT803			
	KWT824			
	KWT801-S			
	SWT821-S			
	MWT801-S			
	AWT811-S			

## Outline Dimensions

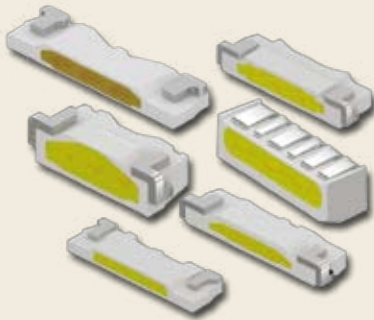
Over View	Part No.	Front View	Side View	Circuit
	C9WT821			
	KWT728-S C8WT728 C9WT728			
	KWT733			
	KWT722			
	STW8Q2PA			
	ERT801 SRT801 UHPT801 FAT801 LUYT801 UYGT801 MGT801 UPGT801 MBT801 MBT801-S			
	UHPT722			
	VRT801 WRT801 SUY801			
	HYT722			

## Outline Dimensions






Over View	Part No.	Front View	Side View	Circuit
	MGT722			
	MBT722			
	YGURHT811-BS			
	SFT825N-S			
	SFT825Z-S			
	SFT722N-S			

The specifications of products may be changed without a notice. When you design, you have to check specifications on the website.

# Side View LED



## Nomenclature

X1	X2	X3	X4	X5 X6
Side View LED	<b>Color</b>	<b>PKG Version</b>	<b>Identification Code</b>	<b>PKG Size</b>
	<b>W</b> Nomal White <b>Z</b> New White <b>H</b> New White	<b>A</b> A Type <b>B</b> B Type	<b>F</b> F Type <b>K</b> K Type	<b>3L</b> 1.9T <b>0N</b> 1.1T <b>05</b> 0.8T <b>07</b> 0.6T <b>09</b> 0.5T <b>0H</b> 0.4T+0.1T <b>0B</b> 0.4T <b>0J</b> 0.32T
 5600-14000K	 5600-14000K (New White)	 620-625nm	 525-535nm	 455-460nm

## Features

- Suitable for small applications like mobile phone BLU
- High luminous flux
- High CRI

## Application

- BLU light source
- Mobile phone, digital camera, midsize LCD like PDA, etc
- Mobile keypad light source

## Absolute Maximum Ratings(at $T_A=25^\circ\text{C}$ )

### 1.9T White

Parameter	Symbol	Value	Unit
Power Dissipation	$P_d$	280	mW
Forward Current	$I_F$	80	mA
Peak Forwards Current	$I_{FM}^{*1}$	200	mA
Reverse Voltage	$V_R$	5	V
Operating Temperature	$T_{opr}$	-40~+85	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-40~+100	$^\circ\text{C}$

\*1.  $I_{FM}$  conditions : Pulse width  $T_w \leq 0.1\text{ms}$ , Duty ratio  $\leq 1/10$ , Care is to be taken that Power Dissipation does not exceed the Absolute Maximum Rating of the product.

### 1.9T Full Color

Parameter	Symbol	Value			Unit
		Red	Green	Blue	
Power Dissipation	$P_d$	72	204	102	mW
Forward Current	$I_F$	30	60	30	mA
Peak Forwards Current	$I_{FM}^{*1}$	100	180	100	mA
Reverse Voltage	$V_R$	5			V
Operating Temperature	$T_{opr}$	-30~+85			$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-40~+100			$^\circ\text{C}$

\*1.  $I_{FM}$  conditions : Pulse width  $T_w \leq 0.1\text{ms}$ , Duty ratio  $\leq 1/10$ , Care is to be taken that Power Dissipation does not exceed the Absolute Maximum Rating of the product.

## 1.1T / 0.8T / 0.6T / 0.5T / 0.4T+0.1T(Asymmetry) / 0.4T / 0.32T

Parameter	Symbol	Value	Unit
Power Dissipation	$P_d$	120	mW
Forward Current	$I_F$	30	mA
Peak Forwards Current	$I_{FM}^{*1}$	100	mA
Reverse Voltage	$V_R$	5	V
Operating Temperature	$T_{opr}$	-30~+85	°C
Storage Temperature	$T_{stg}$	-40~+100	°C

\*1.  $I_{FM}$  conditions : Pulse width  $T_w \leq 0.1ms$ , Duty ratio  $\leq 1/10$ , Care is to be taken that Power Dissipation does not exceed the Absolute Maximum Rating of the product.

## Electro-Optical Characteristics(at $T_A=25^\circ C$ )

### 1.9T

Part No.	Color	Size [mm]	Forward Voltage Min [V]	Forward Voltage Max [V]	Luminous Intensity Min [mcd]	Luminous Intensity Max [mcd]	CIE	Operating Current [mA]	Viewing Angle [°]
SWAF3L	White	7.0×2.0×1.9	2.7	3.7	-	5900	X : 0.304, Y : 0.301	60	120
SFAF3L	Full Color	7.0×2.0×1.9	1.8	2.4	-	760	620min., 625max.	20	120
			2.8	3.6	-	3100	525min., 535max.	40	
			2.8	3.6	-	260	455min., 460max.	20	

### 1.1T

Part No.	Color	Size [mm]	Forward Voltage Min [V]	Forward Voltage Max [V]	Luminous Intensity Min [mcd]	Luminous Intensity Max [mcd]	CIE	Operating Current [mA]	Viewing Angle [°]
SWAFON <sup>Ⓢ</sup>	White	3.8×1.0×1.1	2.7	3.7	-	2300 2200	X : 0.300, Y : 0.295 X : 0.281, Y : 0.275	20	120

\*<sup>Ⓢ</sup> : Underdevelopment

### 0.8T

Part No.	Color	Size [mm]	Forward Voltage Min [V]	Forward Voltage Max [V]	Luminous Intensity Min [mcd]	Luminous Intensity Max [mcd]	Operating Current [mA]	Viewing Angle [°]
SWAF05	White	2.8×1.2×0.8	3.0	3.4	1000	2000	20	120
SWBF05	White	2.8×1.2×0.8	3.0	3.4	1600	2200	20	120
SWBK05	White	2.8×1.2×0.8	3.0	3.4	1700	2300	20	120

### 0.6T

Part No.	Color	Size [mm]	Forward Voltage Min [V]	Forward Voltage Max [V]	Luminous Intensity Min [mcd]	Luminous Intensity Max [mcd]	Operating Current [mA]	Viewing Angle [°]
SWAF07	White	3.8×1.05×0.6	3.0	3.4	1100	1400	20	120
SWBF07	White	3.8×1.05×0.6	2.8	3.4	1400	2200	20	120
SWBK07	White	3.8×1.05×0.6	2.8	3.4	1700	2400	20	120
AWTS907AN	New White	3.8×1.05×0.6	2.7	3.7	900	1450 1400	20	120
SZAF07	New White	3.8×1.05×0.6	2.7	3.7	-	1400 1300	20	120
SZBK07	New White	3.8×1.05×0.6	2.7	3.7	-	1550 1500	20	120
SHBK07	New White	3.8×1.05×0.6	2.7	3.7	-	1650 1600	20	120

## 0.5

Part No.	Color	Size [mm]	Forward Voltage Min [V]	Forward Voltage Max [V]	Luminous Intensity Min [mcd]	Luminous Intensity Max [mcd]	Operating Current [mA]	Viewing Angle [°]
SWAF09	White	3.8×0.95×0.5	2.7	3.7	-	1500 1400	20	120

## 0.4T + 0.1T(Asymmetry)

Part No.	Color	Size [mm]	Forward Voltage Min [V]	Forward Voltage Max [V]	Luminous Intensity Min [mcd]	Luminous Intensity Max [mcd]	CIE	Operating Current [mA]	Viewing Angle [°]
SWAF0H	White	3.8×0.95×0.5	2.7	3.7	-	1450 1350	X : 0.300, Y : 0.295 X : 0.281, Y : 0.275	20	120
SWAK0H	White	3.8×0.95×0.5	2.7	3.7	-	1550 1450	X : 0.300, Y : 0.295 X : 0.281, Y : 0.275	20	120

## 0.4T

Part No.	Color	Size [mm]	Forward Voltage Min [V]	Forward Voltage Max [V]	Luminous Intensity Min [mcd]	Luminous Intensity Max [mcd]	CIE	Operating Current [mA]	Viewing Angle [°]
SWAF0B	White	3.7×0.9×0.4	2.7	3.7	1100	1600	X : 0.300, Y : 0.295 X : 0.281, Y : 0.275	20	120
SWAK0B	White	3.7×0.9×0.4	2.7	3.7	1500	1900	X : 0.300, Y : 0.295 X : 0.281, Y : 0.275	20	120
AWTS100BAN	New White	3.7×0.9×0.4	2.7	3.7	800	1200	X : 0.281, Y : 0.275	20	120
SZAF0B	New White	3.7×0.9×0.4	2.7	3.7	-	1100	X : 0.281, Y : 0.275	20	120

## 0.32T

Part No.	Color	Size [mm]	Forward Voltage Min [V]	Forward Voltage Max [V]	Luminous Intensity Min [mcd]	Luminous Intensity Max [mcd]	CIE	Operating Current [mA]	Viewing Angle [°]
SWAF0J <sup>Ⓢ</sup>	White	3.2×0.87×0.32	2.7	3.7	-	1400 1200	X : 0.300, Y : 0.290 X : 0.280, Y : 0.270	20	120

\* <sup>Ⓢ</sup> : Underdevelopment

## Outline Dimensions

Over View	Part No.	Front View	Top View	Bottom View	Circuit
	SWAF3L				
	SFAF3L				
	SWAF0N <sup>Ⓞ</sup>				
	SWAF05				
	SWBF05 SWBK05				
	SWAF07				
	SWBF07 SZBK07 SHBK07				



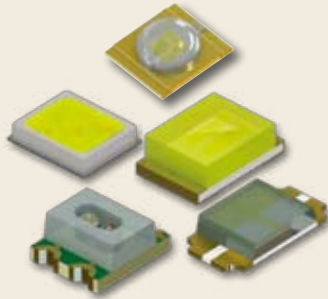
## Outline Dimensions

Over View	Part No.	Front View	Top View	Bottom View	Circuit
	AWTS907AN SZAF07				
	SWAF09				
	SWBF09Ⓢ SWBK09Ⓢ				
	SWAF0H SWAK0H				
	SWAF0B SWAK0B AWTS100BAN SZAF0B				
	SWAF0JⓈ				

\*Ⓢ : Underdevelopment

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# Chip LED



## Nomenclature

X1	X2	X3	X4	X5	X6	X7 X8 X9
<b>Blue Color &amp; Grade</b>	<b>Green Color &amp; Grade</b>	<b>Red Color &amp; Grade</b>	<b>Package Size [W×L]</b>	<b>Number of Chip</b>	<b>Thickness</b>	<b>Number for Controlling in SCC</b>
5500~8000K	615~670nm	582~615nm	584~598nm	566~577nm		
515~573nm	460~475nm					

## Features

- Ultra slim size : Fit for compact size applications
- Various color : Provide not only general colors but also pastel tone color

## Application

- Mobile phone keypad
- Indicator for home appliance
- Indicator for various switch

## Absolute Maximum Ratings(at $T_A=25^{\circ}\text{C}$ )

### White

Parameter	Symbol	Value		Unit
		FCW100		
Power Dissipation	$P_d$	560		mW
Forward Current	$I_F$	175		mA
Peak Forwards Current	$I_{FM}$	600 <sup>*4</sup>		mA
Reverse Voltage	$V_R$	5		V
Operating Temperature	$T_{opr}$	-30~+85		$^{\circ}\text{C}$
Storage Temperature	$T_{stg}$	-40~+100		$^{\circ}\text{C}$

\*1  $I_{FM}$  conditions : Pulse width  $T_w \leq 0.1\text{ms}$ , Duty ratio  $\leq 1/10$ ,

\*2  $I_{FM}$  conditions : Pulse width  $T_w \leq 2\text{ms}$ , Duty ratio  $\leq 1/10$ ,

\*3  $I_{FM}$  conditions : Pulse width  $T_w \leq 10\text{ms}$ , Duty ratio  $\leq 1/10$ ,

\*4  $I_{FM}$  conditions : Pulse width  $T_w \leq 300\text{ms}$ , Duty ratio  $\leq 1/10$ ,

Parameter	Symbol	Value						Unit
		FCW300Z	FCW301Z	LCW100Z	TWH104-H	WH104-C	WH104L-H	
Power Dissipation	$P_d$	800	960	175	70	70	70	mW
Forward Current	$I_F$	250	300	50	20	20	30	mA
Peak Forwards Current	$I_{FM}$	750 <sup>*2</sup>	1000 <sup>*2</sup>	100 <sup>*1</sup>	60 <sup>*1</sup>	60 <sup>*1</sup>	60 <sup>*1</sup>	mA
Reverse Voltage	$V_R$	5	5	-	5	5	5	V
ESD Sensitivity		-	-	$\pm 10,000(\text{HBM})$	-	-	-	V
Operating Temperature	$T_{opr}$	-30~+80	-30~+80	-30~+95	-30~+80	-30~+80	-30~+80	$^{\circ}\text{C}$
Storage Temperature	$T_{stg}$	-40~+100	-40~+100	-40~+100	-40~+100	-40~+100	-40~+100	$^{\circ}\text{C}$
Junction Temperature	$T_{stg}$	-	-	125	-	-	-	$^{\circ}\text{C}$

\*1  $I_{FM}$  conditions : Pulse width  $T_w \leq 0.1\text{ms}$ , Duty ratio  $\leq 1/10$ ,

\*2  $I_{FM}$  conditions : Pulse width  $T_w \leq 300\text{ms}$ , Duty ratio  $\leq 1/10$ ,

Parameter	Symbol	Value		Unit
		WH603R		
Power Dissipation	$P_d$	90		mW
Forward Current	$I_F$	30		mA
Peak Forwards Current	$I_{FM}^{*1}$	50		mA
Reverse Voltage	$V_R$	5		V
Operating Temperature	$T_{opr}$	-30~+85		°C
Storage Temperature	$T_{stg}$	-40~+100		°C

\*1  $I_{FM}$  conditions : Pulse width  $T_w \leq 0.1$ ms, Duty ratio  $\leq 1/10$ ,

### Single Color

Parameter	Symbol	Value				Unit
		FR104-II1	UR101	UR201	UR202	
Power Dissipation	$P_d$	69	63	66	66	mW
Forward Current	$I_F$	30	30	30	30	mA
Peak Forwards Current	$I_{FM}^{*1}$	50	50	50	50	mA
Reverse Voltage	$V_R$	5	5	5	5	V
Operating Temperature	$T_{opr}$	-30~+85	-30~+85	-30~+85	-30~+85	°C
Storage Temperature	$T_{stg}$	-40~+100	-40~+100	-40~+100	-40~+100	°C

\*1  $I_{FM}$  conditions : Pulse width  $T_w \leq 0.1$ ms, Duty ratio  $\leq 1/10$ , \*Ⓢ : Underdevelopment

Parameter	Symbol	Value			Unit
		AM101-DP	UY101-IE1	YG101-IC1	
Power Dissipation	$P_d$	65	72	72	mW
Forward Current	$I_F$	30	30	30	mA
Peak Forwards Current	$I_{FM}^{*1}$	50	50	50	mA
Reverse Voltage	$V_R$	5	5	5	V
Operating Temperature	$T_{opr}$	-30~+85	-30~+85	-30~+85	°C
Storage Temperature	$T_{stg}$	-40~+100	-40~+100	-40~+100	°C

\*1  $I_{FM}$  conditions : Pulse width  $T_w \leq 0.1$ ms, Duty ratio  $\leq 1/10$ ,

Parameter	Symbol	Value				Unit
		YG104-IC1	GR101	GR202	TG104Ⓢ	
Power Dissipation	$P_d$	69	72	75	70	mW
Forward Current	$I_F$	30	30	30	20	mA
Peak Forwards Current	$I_{FM}^{*1}$	50	50	50	100	mA
Reverse Voltage	$V_R$	5	5	5	5	V
Operating Temperature	$T_{opr}$	-30~+85	-30~+85	-30~+85	-30~+85	°C
Storage Temperature	$T_{stg}$	-40~+100	-40~+100	-40~+100	-40~+100	°C

\*1  $I_{FM}$  conditions : Pulse width  $T_w \leq 0.1$ ms, Duty ratio  $\leq 1/10$ , \*Ⓢ : Underdevelopment

Parameter	Symbol	Value					Unit
		HB1701	HB601	NB104	NB104-S	THB105-69	
Power Dissipation	$P_d$	64	72	64	64	64	mW
Forward Current	$I_F$	20	20	20	20	20	mA
Peak Forwards Current	$I_{FM}^{*1}$	50	60	50	50	50	mA
Reverse Voltage	$V_R$	5	5	5	5	5	V
Operating Temperature	$T_{opr}$	-30~+85	-30~+85	-30~+85	-30~+85	-30~+85	°C
Storage Temperature	$T_{stg}$	-40~+100	-40~+100	-40~+100	-40~+100	-40~+100	°C

\*1 In<sub>v</sub> conditions : Pulse width  $T_w \leq 0.1$ ms, Duty ratio  $\leq 1/10$ ,

### Dual Color

Parameter	Symbol	Value					Unit
		YGFR411-H	YGHR411-H	YGUR302TM	THBFR411		
					Red	Blue	
Power Dissipation	$P_d$	78	72	66	72	72	mW
Forward Current	$I_F$	30	30	30	30	20	mA
Peak Forwards Current	$I_{FM}^{*1}$	60	60	60	60	50	mA
Reverse Voltage	$V_R$	5	5	5	5		V
Operating Temperature	$T_{opr}$	-30~+85	-30~+85	-30~+85	-30~+85		°C
Storage Temperature	$T_{stg}$	-40~+100	-40~+100	-40~+100	-40~+100		°C

\*1 In<sub>v</sub> conditions : Pulse width  $T_w \leq 0.1$ ms, Duty ratio  $\leq 1/10$ ,

### Full Color

Parameter	Symbol	Value									Unit
		THBTGFR421			HBTGFR421-S			THBTGFR421			
		Red	Green	Blue	Red	Green	Blue	Red	Green	Blue	
Power Dissipation	$P_d$	72	76	70	72	68	68	72	72	72	mW
Forward Current	$I_F$	30	20	20	30	20	20	30	20	20	mA
Peak Forwards Current	$I_{FM}^{*1}$	50	35	35	50	35	35	50	35	35	mA
Reverse Voltage	$V_R$	5			5			5			V
Operating Temperature	$T_{opr}$	-30~+85			-30~+85			-30~+85			°C
Storage Temperature	$T_{stg}$	-40~+100			-40~+100			-40~+100			°C

\*1 In<sub>v</sub> conditions : Pulse width  $T_w \leq 0.1$ ms, Duty ratio  $\leq 1/10$ ,

Parameter	Symbol	Value						Unit
		THBTGFR5210			THBTGFR5210-CE			
		Red	Green	Blue	Red	Green	Blue	
Power Dissipation	$P_d$	60	90	90	60	90	90	mW
Forward Current	$I_F$	25	25	25	25	25	25	mA
Peak Forwards Current	$I_{FM}^{*1}$	100	100	100	100	100	100	mA
Reverse Voltage	$V_R$	5			5			V
Operating Temperature	$T_{opr}$	-30~+85			-40~+100			°C
Storage Temperature	$T_{stg}$	-40~+100			-40~+100			°C

\*1 In<sub>v</sub> conditions : Pulse width  $T_w \leq 0.1$ ms, Duty ratio  $\leq 1/10$ ,

## Electro-Optical Characteristics (at T<sub>A</sub>=25°C)

### White

Part No.	Size [mm]	Operating Current [mA]	Luminous Flux [lm]	Luminous Intensity [mcd]	Forward Voltage [V]	Viewing Angle [°]	Remark
FCW100	2.0×1.5×0.5	175 320	17 -	5500 9000 <sup>*1</sup>	3.0 3.2	130	Flash
FCW300Z	3.5×2.8×0.6	250 400 750	41.7 - -	16000 23000 <sup>*2</sup> 34000 <sup>*4</sup>	3.2 3.45 3.75	120	Flash
FCW301Z	3.5×2.8×0.6	300 400 1000	55 - -	20000 26000 <sup>*2</sup> 53000 <sup>*4</sup>	3.2 3.48 4	120	Flash
FCW302	3.5×2.8×0.85	300 1000 300 1000	60 160 79 190	-	-	120	FCW302A FCW302A FCW302B FCW302B
TWH104-H	1.6×0.8×0.4	5	-	150	2.9	160	1608
WH104-C	1.6×0.8×0.4	5	-	150	3.0	160	1608
WH104L-H	1.6×0.8×0.4	5	-	240	2.9	160	1608
WH603R	1.8×0.3×1.0	5	-	70	3.0	130	Side view

\*1 Flash mode : Pulse width Tw = 1sec, Duty ratio = 2/7

\*2 Flash mode : Pulse width Tw = 2sec, Duty ratio = 2/7

\*3 Peak Current : Pulse width Tw = 10msec, Duty ratio = 1/20

\*4 Peak Current : Pulse width Tw = 300msec, Duty ratio = 1/10

### White

Part No.	Size [mm]	Operating Current [mA]	Luminous Flux [lm]	Luminous Intensity [mcd]	Forward Voltage [V]	Viewing Angle [°]	Type
LCW100Z1	3.5×2.8×1.6	20	6.6	2100	3.1	120	For Lighting

## Single Color

Part No.	Color	Size [mm]	Operating Current [mA]	Luminous Intensity [mcd]	Forward Voltage [V]	Wavelength [nm]	Viewing Angle [°]
FR104-II1	Red	1.6×0.8×0.4	5	28	1.95	625	120
UR101	Red	1.6×0.8×0.8	20	80	1.8	660	120
UR201	Red	3.0×1.5×1.4	20	70	1.9	640	120
UR202	Red	3.0×1.5×1.4	20	120	1.9	640	70
AM101-DP	Amber	1.6×0.8×0.8	20	120	2.0	606	120
UY101-IE1	Yellow	1.6×0.8×0.8	20	80	2.1	593	120
YG101-IC1	Yellow Green	1.6×0.8×0.8	20	40	2.1	572	120
YG104-IC1	Yellow Green	1.6×0.8×0.4	20	40	2.1	572	120
GR101	Green	1.6×0.8×0.8	20	25	2.4 max.	570	120
GR202	Green	3.0×1.5×1.4	20	60 max.	2.1	570	70
TG104 <sup>Ⓢ</sup>	Green	1.6×0.8×0.4	20	250	-	525	120
HB1701	Blue	2.1×0.6×0.9	5	17	3.05	465	150
HB601	Blue	2.1×0.6×1.0	5	24	2.9	470	150
NB104	Blue	1.6×0.8×0.4	5	35	3.05	472	120
NB104-S	Blue	1.6×0.8×0.4	5	35	3.05	470	120
THB105-69	Blue	1.6×0.8×0.4	5	30	3.05	470	120

\*<sup>Ⓢ</sup> : Underdevelopment

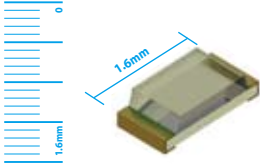
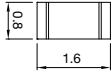
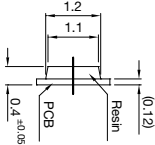

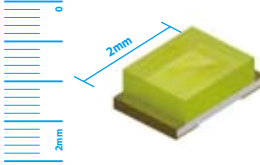

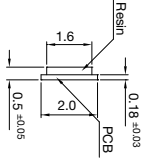

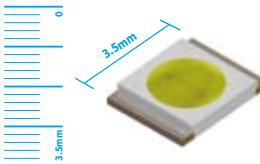
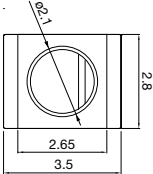
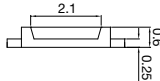

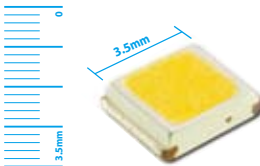
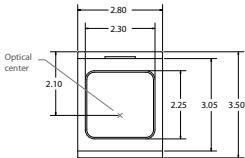

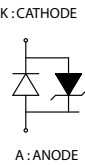
## Dual Color

Part No.	Color	Size [mm]	Operating Current [mA]	Luminous Intensity [mcd]	Forward Voltage [V]	Wavelength [nm]	Viewing Angle [°]
YGFR411-H	Red	1.6×1.5×0.5	20	56	2.0	635	150
	Yellow Green			35	2.1	573	
YGHR411-H	Red	1.6×1.5×0.5	20	50 min.	2.1	620	150
	Yellow Green			30 min.	2.1	572	
YGUR302TM	Red	3.0×2.5×1.4	20	50 min.	1.7	638	60
	Yellow Green			60 min.	2.0	571	
THBFR411	Red	1.6×1.5×0.5	20	90	1.95	625	150
	Blue			65	3.2	473	

## Full Color

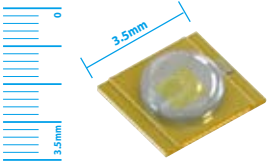
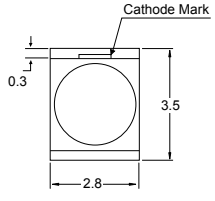
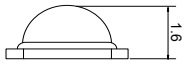
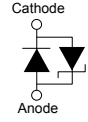
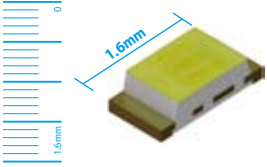
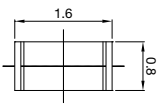
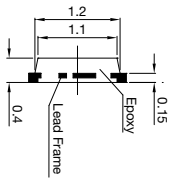

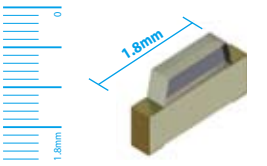
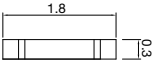
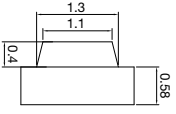

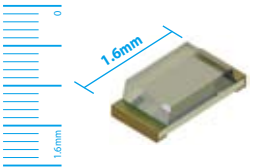
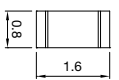
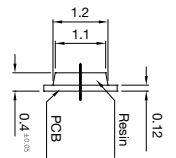

Part No.	Color	Size [mm]	Operating Current [mA]	Luminous Intensity [mcd]	Forward Voltage [V]	Wavelength [nm]	Viewing Angle [°]
BGR2022-W	Red	3.5×2.8×0.6	20	440	2.0	625	130
	Green			880	3.15	527	
	Blue			180	3.05	467	
THBTGFR421	Red	1.6×1.5×0.5	10	65	1.9	625	150
	Green			220	3.0	525	
	Blue			65	3.0	474	
HBTGFR421-KR	Red	1.6×1.5×0.5	10	65	1.9	625	150
	Green			160	3.0	525	
	Blue			60	3.0	470	
HBTGFR421-S	Red	1.6×1.5×0.5	10	70	2.2	625	150
	Green			140	3.1	525	
	Blue			50	3.1	470	
HBTGFR421-W	Red	1.6×1.5×0.5	10	80	1.9	530	150
	Green			220	3.1	625	
	Blue			85	3.0	472	
THBTGFR5210	Red	3.0×1.35×1.0	10	50	2.1	625	150
	Green			170	3.1	525	
	Blue			45	3.0	470	
THBTGFR5210-CE	Red	3.0×1.35×1.0	10	170	1.9	625	150
	Green			300	3.0	530	
	Blue			80	2.9	472	

## Outline Dimensions

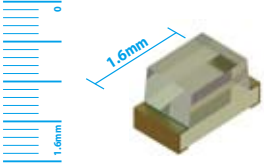
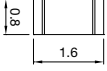
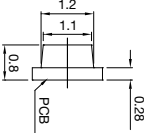
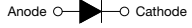
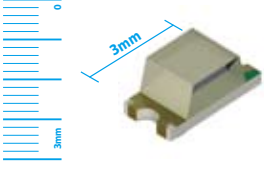
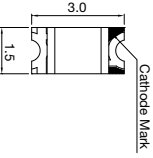
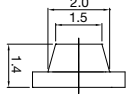

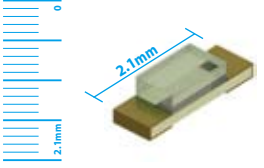
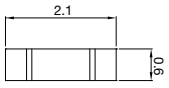
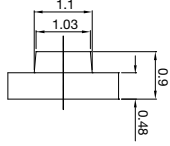

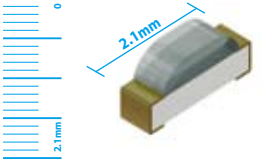
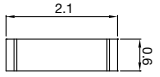
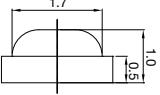

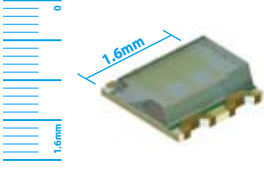
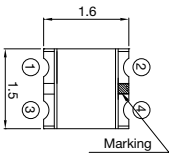
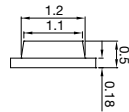
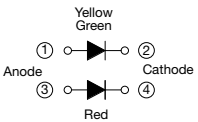
Over View	Part No.	Front View	Side View	Circuit
	TWH104-H WH104-C			
	FCW100			
	FCW300Z FCW301Z			
	FCW302			



## Outline Dimensions

Over View	Part No.	Front View	Side View	Circuit
	LCW100Z1			
	WH104L-H			
	WH603R			
	FR104-II YG104-IC1 NB104 NB104-S THB105-69 TG104@			

## Outline Dimensions

Over View	Part No.	Front View	Side View	Circuit
	UR101 AM101-DP UY101-IE1 YG101-IC1 GR101			
	UR201 UR202 GR202			
	HB1701			
	HB601			
	YGFR411-H YGHR411-H			










# Lamp LED



## Nomenclature

X1	X2	X3	X4	X5	X6	X7	X8	X9
Lamp LED	Color	If the Products have 2 or 3 Chips	Outline Type	Half Angle	1 <sup>st</sup> Development According to a Chip	2 <sup>nd</sup> Development [Other Material]	Stand Off Type	Pastel Color A IIV B WD C VF

	4600-15000K		2500-3175K		619-641nm		583-596nm		518-536nm
	463-477nm		IR	870nm					

## Features

- Reliability (up to 100,000 hours)
- Brightness (25,000 mcd)
- Form factor (3mm round, 5mm round, oval, and cylinder type)
- Robust Package Design High Temperature
- Various colors : Single color through full colors

## Application

- Lighting
- Traffic signals
- Signs
- Automotive interior lighting
- Torch

## Absolute Maximum Ratings(at $T_A=25^{\circ}\text{C}$ )

### Ø5 Round

Parameter	Symbol	Value							Unit
		LW510	LW514	LW520A	LW520AS	LW540A	LW540AS	LM520A	
Power Dissipation	$P_d$	114	114	114	114	114	114	114	mW
Forward Current	$I_F$	30	30	30	30	30	30	30	mA
Forward Peak Pulse Current	$I_{FP}^{*1}$	100	100	100	100	100	100	100	mA
Reverse Voltage	$V_R$	5	5	5	5	5	5	5	V
Operating Temperature	$T_{opr}$	-30~+85	-30~+85	-30~+85	-30~+85	-35~+85	-35~+85	-35~+85	$^{\circ}\text{C}$
Storage Temperature	$T_{stg}$	-40~+100	-40~+100	-40~+100	-40~+100	-40~+100	-40~+100	-40~+100	$^{\circ}\text{C}$
Solder Temperature	$T_s^{*2}$	260 $^{\circ}\text{C}$ for 10 seconds							$^{\circ}\text{C}$

\*1  $I_{FP}$  conditions : Pulse width  $T_w \leq 0.1\text{ms}$ , Duty ratio  $\leq 1/10$ ,

\*2 No lower than 3mm from the base of the epoxy bulb

Parameter	Symbol	Value							Unit
		LM560A	LR521	LR530	LY521	LY530	LT520	LB520	
Power Dissipation	$P_d$	114	78	78	78	78	125	114	mW
Forward Current	$I_F$	30	30	30	30	30	30	30	mA
Forward Peak Pulse Current	$I_{FP}^{*1}$	100	100	100	100	100	100	100	mA
Reverse Voltage	$V_R$	5	5	5	5	5	5	5	V
Operating Temperature	$T_{opr}$	-35~+85	-40~+100	-40~+100	-40~+100	-40~+100	-30~+85	-30~+85	°C
Storage Temperature	$T_{stg}$	-40~+100	-50~+105	-50~+105	-50~+105	-50~+105	-40~+100	-40~+100	°C
Solder Temperature	$T_s^{*2}$	260°C for 10 seconds							°C

\*1  $I_{FP}$  conditions : Pulse width  $T_w \leq 0.1$ ms, Duty ratio  $\leq 1/10$ ,

\*2 No lower than 3mm from the base of the epoxy bulb

### Ø5 Oval

Parameter	Symbol	Value						Unit
		LR700D	LR770D	LT700D	LT770D	LB700D	LB770D	
Power Dissipation	$P_d$	75	81	125	125	125	125	mW
Forward Current	$I_F$	30	30	30	30	30	30	mA
Forward Peak Pulse Current	$I_{FP}^{*1}$	100	100	100	100	100	100	mA
Reverse Voltage	$V_R$	5	5	5	5	5	5	V
Operating Temperature	$T_{opr}$	-40~+100	-40~+100	-30~+85	-30~+85	-30~+85	-30~+85	°C
Storage Temperature	$T_{stg}$	-50~+105	-50~+105	-40~+100	-40~+100	-40~+100	-40~+100	°C
Solder Temperature	$T_s^{*2}$	260°C for 10 seconds						°C

\*1  $I_{FP}$  conditions : Pulse width  $T_w \leq 0.1$ ms, Duty ratio  $\leq 1/10$ ,

\*2 No lower than 3mm from the base of the epoxy bulb

### Ø5 Cylinder

Parameter	Symbol	Value					Unit
		LW500AM	LR580A	LY580A	LT580A	LB580A	
Power Dissipation	$P_d$	114	81	81	125	114	mW
Forward Current	$I_F$	30	30	30	30	30	mA
Forward Peak Pulse Current	$I_{FP}^{*1}$	100	100	100	100	100	mA
Reverse Voltage	$V_R$	5	5	5	5	5	V
Operating Temperature	$T_{opr}$	-30~+85	-40~+100	-40~+100	-30~+85	-30~+85	°C
Storage Temperature	$T_{stg}$	-40~+100	-50~+105	-50~+105	-40~+100	-40~+100	°C
Solder Temperature	$T_s^{*2}$	260°C for 10 seconds					°C

\*1  $I_{FP}$  conditions : Pulse width  $T_w \leq 0.1$ ms, Duty ratio  $\leq 1/10$ ,

\*2 No lower than 3mm from the base of the epoxy bulb

## Ø5 IR

Parameter	Symbol	Value		Unit
		LI521		
Power Dissipation	$P_d$	150		mW
Forward Current	$I_F$	100		mA
Forward Peak Pulse Current	$I_{FP}^{*1}$	1000		mA
Reverse Voltage	$V_R$	5		V
Operating Temperature	$T_{opr}$	-40~+100		°C
Storage Temperature	$T_{stg}$	-40~+105		°C
Solder Temperature	$T_s^{*2}$	260°C for 10 seconds		°C

\*1  $I_{FP}$  conditions : Pulse width  $T_w \leq 0.1$ ms, Duty ratio  $\leq 1/10$ ,

\*2 No lower than 3mm from the base of the epoxy bulb

## Ø3 Round

Parameter	Symbol	Value					Unit
		LW330A	LW340A	LW340AS	LW360A	LR340	
Power Dissipation	$P_d$	114	114	114	114	69	mW
Forward Current	$I_F$	30	30	30	35	30	mA
Forward Peak Pulse Current	$I_{FP}^{*1}$	100	100	100	100	100	mA
Reverse Voltage	$V_R$	5	5	5	5	5	V
Operating Temperature	$T_{opr}$	-35~+85	-35~+85	-35~+85	-35~+85	-40~+100	°C
Storage Temperature	$T_{stg}$	-40~+100	-40~+100	-40~+100	-40~+100	-50~+105	°C
Solder Temperature	$T_s^{*2}$	260°C for 10 seconds					°C

\*1  $I_{FP}$  conditions : Pulse width  $T_w \leq 0.1$ ms, Duty ratio  $\leq 1/10$ ,

\*2 No lower than 3mm from the base of the epoxy bulb

Parameter	Symbol	Value					Unit
		LY320	LY350	LT370	LB340	LB370	
Power Dissipation	$P_d$	81	78	120	123	123	mW
Forward Current	$I_F$	30	30	30	30	30	mA
Forward Peak Pulse Current	$I_{FP}^{*1}$	100	100	100	100	100	mA
Reverse Voltage	$V_R$	5	5	5	5	5	V
Operating Temperature	$T_{opr}$	-40~+100	-40~+100	-30~+85	-30~+85	-30~+85	°C
Storage Temperature	$T_{stg}$	-50~+105	-50~+105	-40~+100	-40~+100	-40~+100	°C
Solder Temperature	$T_s^{*2}$	260°C for 10 seconds					°C

\*1  $I_{FP}$  conditions : Pulse width  $T_w \leq 0.1$ ms, Duty ratio  $\leq 1/10$ ,

\*2 No lower than 3mm from the base of the epoxy bulb

## Electro-Optical Characteristics (at T<sub>A</sub>=25°C)

### Ø5 Round

Part No.	Color	Operating Current [mA]	Luminous Intensity [mcd]	Forward Voltage [V]	CIE / Wavelength [nm]	Viewing Angle [°]
LW510	White	20	21000	3.3	0.31,0.31	14
LW514	White	20	26000	3.2	0.31,0.31	15
LW520A	White	20	14000	3.2	0.31,0.31	22
LW520AS	White	20	14000	3.2	0.31,0.31	22
LW540A	White	20	6000	3.3	0.31,0.31	40
LW540AS	White	20	6000	3.3	0.31,0.31	40
LM520A	Warm White	20	12000	3.3	0.45,0.41	20
LM560A	Warm White	20	2500	3.3	0.45,0.41	60
LR521	Red	20	7500	2.0	625	22
LR530	Red	20	6500	2.2	625	30
LY521	Yellow	20	7500	2.0	590	22
LY530	Yellow	20	6000	2.2	590	30
LT520	Green	20	7000	3.4	525	22
LB520	Blue	20	3500	3.2	470	22

### Ø5 Oval

Part No.	Color	Operating Current [mA]	Luminous Intensity [mcd]	Forward Voltage [V]	Wavelength [nm]	Viewing Angle X [°]	Viewing Angle Y [°]
LR700D	Red	12	500	1.9	625	50	100
LR770D	Red	20	700	2.2	625	70	40
LT700D	Green	20	2200	3.6	525	50	100
LT770D	Green	20	1300	3.6	525	70	40
LB700D	Blue	20	500	3.6	470	50	100
LB770D	Blue	20	300	3.6	470	70	40

### Ø5 Cylinder

Part No.	Color	Operating Current [mA]	Luminous Intensity [mcd]	Forward Voltage [V]	CIE / Wavelength [nm]	Viewing Angle [°]
LW500AM	White	20	700	3.2	0.31,0.31	100
LR580A	Red	20	400	1.9	625	80
LY580A	Yellow	20	360	2.2	590	80
LT580A	Green	20	700	3.4	525	80
LB580A	Blue	20	250	3.6	470	80

**Ø5 IR**

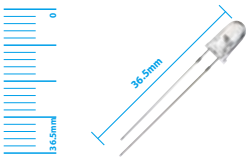
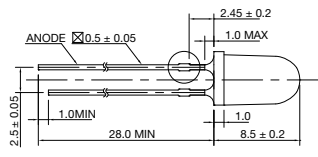
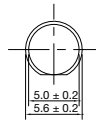
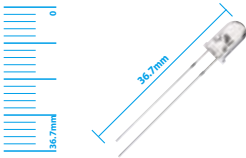
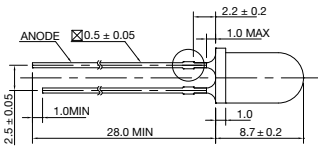
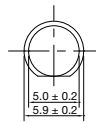
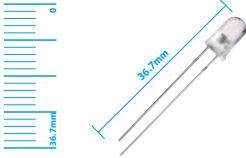
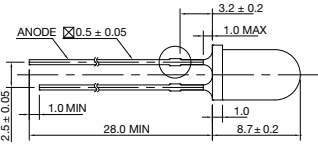
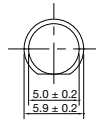
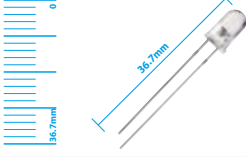
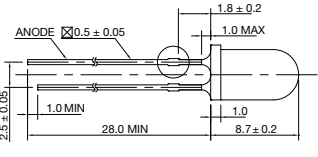
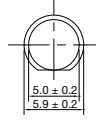
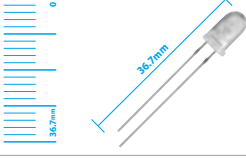
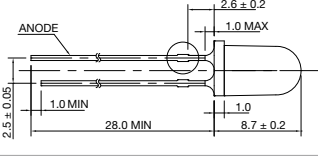
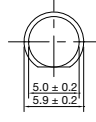
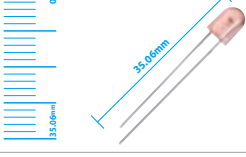
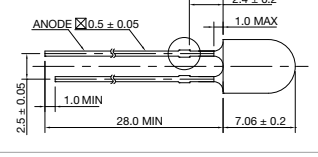
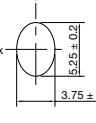
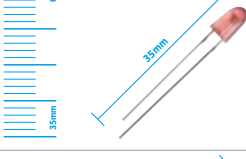
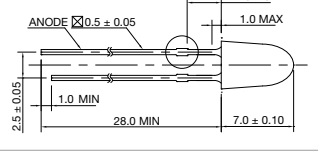
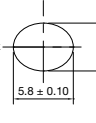
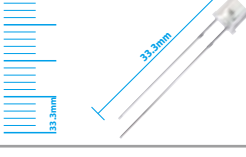
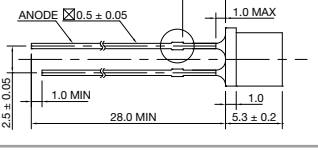
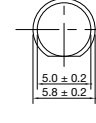
Part No.	Color	Operating Current [mA]	Luminous Intensity [mcd]	Forward Voltage [V]	Wavelength [nm]	Viewing Angle [°]
LI521	IR	50	120	1.5	870	20

**Ø3 Round**

Part No.	Color	Operating Current [mA]	Luminous Intensity [mcd]	Forward Voltage [V]	CIE / Wavelength [nm]	Viewing Angle [°]
LW330A	White	20	7000	3.3	0.31,0.31	34
LW340A	White	20	5500	3.3	0.31,0.31	44
LW340AS	White	20	5500	3.3	0.31,0.31	44
LW360A	White	20	4000	3.2	0.31,0.31	60
LR340	Red	20	450	1.8	641	44
LY320	Yellow	20	850	2.1	590	16
LY350	Yellow	20	2500	2.2	590	45
LT370	Green	20	1200	3.6	525	70
LB340	Blue	20	800	3.6	470	40
LB370	Blue	20	400	3.6	470	70



## Outline Dimensions

Over View	Part No.	Front View	Side View
	LW510 LW514 LW520A LW520AS		
	LW540A LW540AS		
	LM520A LR521 LY521 LT520 LB520		
	LM560A		
	LR530 LY530		
	LR700D LT700D LB700D		
	LR770D LT770D LB770D		
	LW500AM LR580A LY580A LT580A LB580A		

## Outline Dimensions

Over View	Part No.	Front View	Side View
	LI521		
	LW330A		
	LW340A LW340AS LR340 LY350 LT370 LB370		
	LW360A		
	LY320		
	LB340		

The specifications of products may be changed without a notice. When you design, you have to check specifications on the website.

# High Flux LED



## Nomenclature

X1	X2	X3	X4	X5	X6	X7	X8	X9	
High Flux LED	Color	If the Products have 2 or 3 Chips	Outline Type	Half Angle	1 <sup>st</sup> Development According to a Chip	2 <sup>nd</sup> Development [Other Material]	Stand Off Type	Pastel Color	
								A IIV B WD C VF	
	4600~5000K		615~630nm		584~600nm		516~532nm		464~476nm

## Features

- High Power, brightness
- Uniform color
- Low thermal resistance

## Application

- Exterior lighting
- Signage
- Task lighting

## Absolute Maximum Ratings(at $T_A=25^\circ\text{C}$ )

Parameter	Symbol	Value					Unit
		HW321A	HW331A	HW941A	HR310	HR330	
Power Dissipation	$P_D$	120	120	120	224	224	mW
Forward Current	$I_F$	30	30	30	70	70	mA
Forward Peak Pulse Current	$I_{FP}^{*1}$	100	100	100	100	100	mA
Reverse Voltage	$V_R$	5	5	5	5	5	V
Operating Temperature	$T_{opr}$	-40~+100	-40~+100	-40~+100	-40~+100	-40~+100	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-40~+100	-40~+100	-40~+100	-50~+105	-50~+105	$^\circ\text{C}$
Solder Temperature	$T_s^{*2}$	260 $^\circ\text{C}$ for 5 seconds					$^\circ\text{C}$

\*1  $I_{FP}$  conditions : Pulse width  $T_w \leq 0.1\text{ms}$ , Duty ratio  $\leq 1/10$ ,

\*2 No closer than stopper

Parameter	Symbol	Value					Unit
		HR335	HY310	HY330	HT300	HB320	
Power Dissipation	$P_D$	224	224	238	184	176	mW
Forward Current	$I_F$	70	70	70	40	40	mA
Forward Peak Pulse Current	$I_{FP}^{*1}$	100	100	100	100	100	mA
Reverse Voltage	$V_R$	5	5	5	5	5	V
Operating Temperature	$T_{opr}$	-40~+100	-40~+100	-40~+100	-30~+85	-30~+85	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-50~+105	-50~+105	-50~+105	-40~+100	-40~+100	$^\circ\text{C}$
Solder Temperature	$T_s^{*2}$	260 $^\circ\text{C}$ for 5 seconds					$^\circ\text{C}$

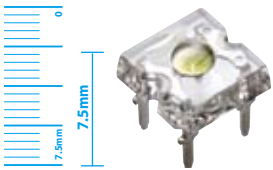
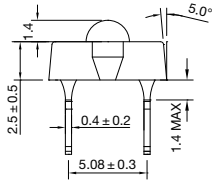
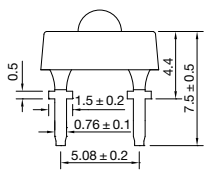
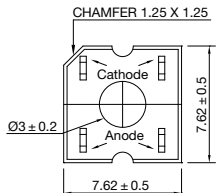

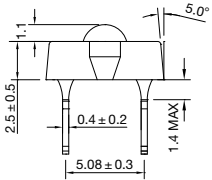
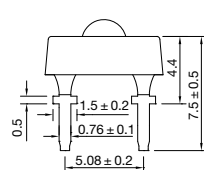
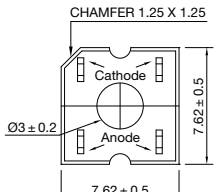
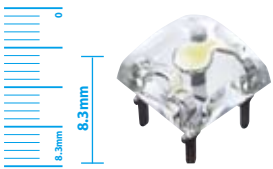
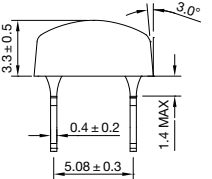
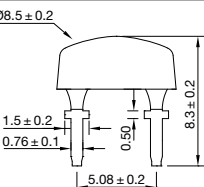
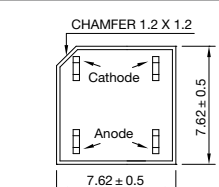
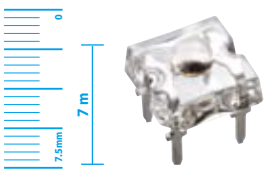
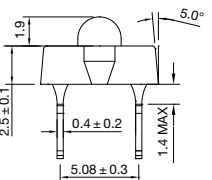
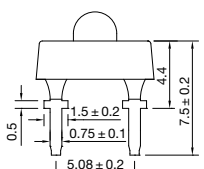
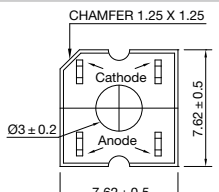
\*1  $I_{FP}$  conditions : Pulse width  $T_w \leq 0.1\text{ms}$ , Duty ratio  $\leq 1/10$ ,

\*2 No closer than stopper

## Electro-Optical Characteristics (at $T_A=25^{\circ}\text{C}$ )

Part No.	Color	Operating Current [mA]	Luminous Flux [lm]	Forward Voltage [V]	Forward Voltage Max[V]	CIE / Wavelength [nm]	Viewing Angle [°]
HW321A	White	30	6.0	3.4	4.0	0.31,0.31	70
HW331A	White	30	6.0	3.4	4.0	0.31,0.31	110
HW941A	White	30	6.0	3.4	4.0	0.31,0.31	130
HR310	Red	70	6.0	2.6	3.0	625	40
HR330	Red	70	6.0	2.6	3.2	625	90
HR335	Red	70	6.0	2.6	3.4	625	110
HY310	Yellow	70	6.0	2.6	3.4	590	40
HY330	Yellow	70	6.0	2.6	3.4	590	90
HT300	Green	40	3.0	3.6	4.6	526	30
HB320	Blue	40	1.4	3.8	4.4	470	60

## Outline Dimensions

Over View	Part No.	Front View	Side View	Top View
	HW321A HR330 HY330 HB320			
	HW331A HR335			
	HW941A			
	HR310 HY310 HT300			

The specifications of products may be changed without a notice. When you design, you have to check specifications on the website.

# Dot Matrix



## Features

- Package types : COB and SMD
- Colors : single, dual, and full color available
- Drivers and memory circuits are selected by customers
- Effective thermal design

## Application

- Indoor and outdoor notice boards and billboards
- Signboard in subway station

## Electro-Optical Characteristics (at $T_A=25^\circ\text{C}$ )

### LED Type

Part No.	Color	Size [mm]	Luminous Intensity [mcd]	Operating Current [mA]	Remarks
D3232SL-88	Red	32×32	32	20	COB Molding
D4848DL	Red	48×48	8	20	COB Molding
	Green		10		
D6464SLMH-R	Red	64×64	32	20	COB Molding
D6464SLMH-YG	Yellow Green	64×64	50	20	COB Molding
D9696DL(M)	Red	96×96	8	20	COB Molding
	Green		10		

### Module Type

Part No.	Color	Size [mm]	Luminous Intensity [cd/m <sup>2</sup> ]	Duty	Remarks
D9696TDM	Red	96×96	160	1/16	SMT Module
	Green		267		
D50100CDM	Red	50×100	225	1/16	SMT Module
	Green		225		
D64128CDM	Red	64×128	460	1/16	SMT Module
	Green		350		

## Outline Dimensions

Part No.	Front View	Side View	Top View
D3232SL-88			
D4848DL			
D6464SLMH-R D6464SLMH-YG			
D9696DL(M)			
D9696TDM			
D50100CDM			
D64128CDM			

The specifications of products may be changed without a notice. When you design, you have to check specifications on the website.

# Custom Module



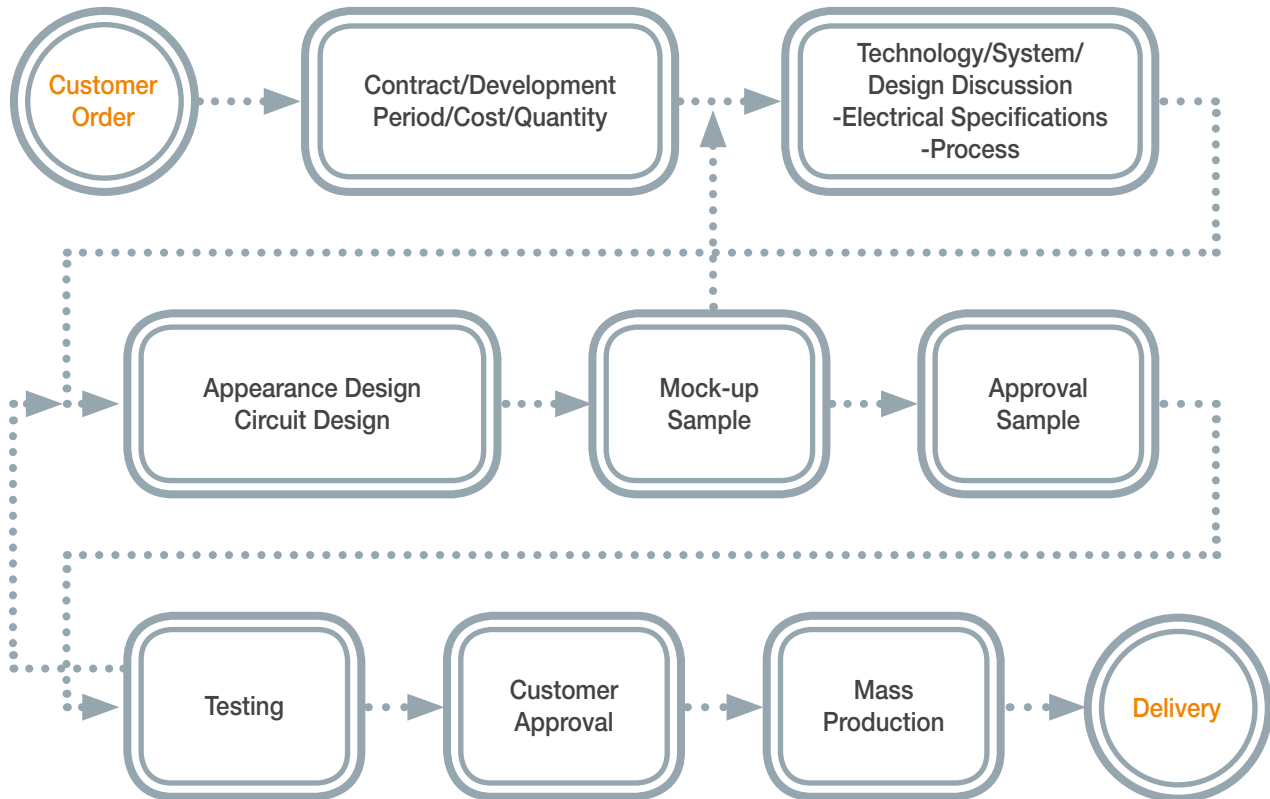
## Features

- Competitive price : LED total solution (EPI→ Module)
- Stereoscopic design
- Customized module : Analysis of customer needs

## Application

- Channel letter
- Signs
- Home appliance and display

Customized LED Graphic Module Development flow Chart



# Sensor



## Features

- Surface mount type
- Package : 3.0×1.5×1.4mm
- Inner lens type
- Peak Sensitive Wavelength : 800nm

## Application

- Optical counter
- Optoelectronic switches
- Infrared applied systems

## Absolute Maximum Ratings(at $T_A=25^\circ\text{C}$ )

Parameter	Symbol	Value	Unit
Power Dissipation	$P_c$	100	mW
Forward Current	$I_F$	30	V
Peak Forwards Current	$V_{ECO}$	5	V
Reverse Voltage	$I_c$	30	mA
Operating Temperature	$T_{opr}$	-40~+85	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-40~+100	$^\circ\text{C}$

\*1  $I_{sv}$  conditions : Pulse width  $T_w \leq 0.1\text{ms}$ , Duty ratio  $\leq 1/10$ ,

## Electro-Optical Characteristics(at $T_A=25^\circ\text{C}$ )

Part No.	Collector Dark Current $I_{CEO}[\mu\text{A}]$		Light Current $I_c[\text{mA}]$			Rise/Fall Time $T_r/T_f[\mu\text{s}]$				Peak sensitivity Wavelength $\lambda_p[\text{nm}]$
	Max.	$V_{CEO}[\text{V}]$	Typ.	$V_{CE}[\text{V}]$	$E[\text{lux}]$	Typ.	$V_{CE}[\text{V}]$	$I_c[\text{mA}]$	$R_c[\Omega]$	Typ.
PTR202-IX0	100	5	2.5	10	1000	15/15	5	1	1000	800

## Outline Dimension

Part No.	Front View	Side View	Circuit
PTR202-IX0			

The specifications of products may be changed without a notice. When you design, you have to check specifications on the website.



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# Optic Solution

## Single Lens

Company Beam Angle[°]	Carclo	Donghwa IND	Fraen	Khatod	LEDIL	Polymer Optics	Sekonix
1~10	P4	P4	P4	P4 P9	P4		
11~20	P4	P4			P4	P4	A2 P7
21~30	P4	P4	P4	P4 P9	P4 P7	P4	A2 A3 P7
31~40			P4	P4 P9	P7		A3
41~50	P4	P4					A3
51~60		P4			P4 P7 P4		
64							
80.9	P4						
360				P4			
6x25						P4	
7.5x33	P4						
10.7x48	P4						
14x36					P4		
14x46					P4		
14x49	P4						
15x90				P9			
20x35			P4				A3
33x7.5	P4						
36x24					P4		
44x15	P4						
45x9.9	P4						

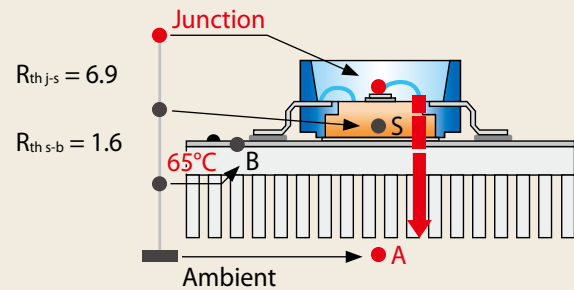
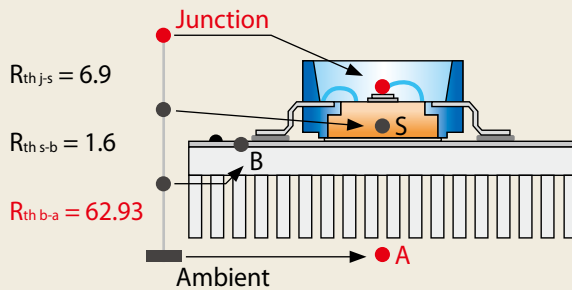
## Multi Lens

Company Beam Angle[°]	Khatod	LEDIL	Polymer Optics
1~10	P4 P9	P4	P4
21~30	P4 P9	P4	
31~40	P4 P9		
41~50		P4	P4
12~90			P4

# Thermal Resistance

## Thermal Resistance Application

The central circle pad at the bottom face of the package provides the main path for heat dissipation from the LED to the heat sink(heat sink contact)



$$R_{thJA} = R_{thJS} + R_{thSB} + R_{thBA} = 71.43^{\circ}\text{C/W}$$

$$T_j = T_b + R_{th-b} \times P_{el}$$

$$= 65 + (8.5 \times 0.35 \times 3.2) = 65 + 9.52 = 74.52^{\circ}\text{C}$$

## Example

What is the required heat sink of P4 PKG ? (condition,  $I_v$ :350mA, ambient temperature:max. 65°C, forward voltage:3.2V, thermal resistance:8.5, junction temperature:145°C)

1. Total thermal resistance on system  $R_{thj-a}$  :

$$R_{thj-a} = \Delta T_{J-A} / P_{el} = (145^{\circ}\text{C} - 65^{\circ}\text{C}) / 1.12\text{W} = 71.43^{\circ}\text{C/W}$$

$T_j = 145^{\circ}\text{C}$  (Junction temperature)  
 $T_A = 65^{\circ}\text{C}$  (Ambient temperature)  
 $P_d = V_f \times I_f = 3.2\text{V} \times 0.350\text{A} = 1.12\text{W}$  (LED power consumption)

2. Decide thermal resistance of heat sink  $R_{th-b-a}$  :

$$R_{thJA} = R_{thJ-B} + R_{thB-A}$$

$$R_{thB-A} = R_{thJA} - R_{thJ-B}$$

$$= 71.43^{\circ}\text{C/W} - 8.5^{\circ}\text{C/W} \text{ (Thermal resistance)}$$

$$= 62.93^{\circ}\text{C/W} \text{ (Thermal resistance of heat sink what want to use)}$$

# Precautions for use

## 1. Storage

In order to avoid absorption of moisture it is recommended that the products are stored in the dry box (or dessicator) with a desiccator. Alternatively the following environment is recommended :

Storage temperature(5°C~30°C) , Humidity(60% HR max.)

## 2. Handling of product after opening

For SMD products, when the LED is dip soldered, interfacial separation may effect the light transmission efficiency, leading to a reduction in luminous intensity. The following should be noted :

a. After opening the product should be used as quickly as possible.

b. Storage of unused quantities from an opened pack Storage temperature(5°C~40°C), Humidity(30% HR max.)

## 3. Handling of unused quantities from an opened pack

If stored for more than 1 week or if the colour of the indicator material in the dessicant has changed, components should be dried for 10~12 hrs at 60°C+/-5°C

## 4. Storage in high humidity

If the storage conditions are of high humidity the product should be dried before use.

Recommended drying conditions : 100hrs at 80°C+/-5°C or 12hrs at 100°C+/-5°C

5. Any mechanical force or any excess vibration should be avoided during the cooling process after soldering.

6. Rapid cooling should be avoided

7. Components should not be mounted on distorted Printed Circuit Boards

8. Devices should not be used in any type of fluid such as water, oil, organic solvents etc.

When cleaning is required, IPA should be used

9. The maximum ambient temperature should be taken into consideration when determining the operating current

10. LEDs should be stored in a clean atmosphere. If the devices are stored for 3 months or more after shipment from Seoul Semiconductor ,a sealed container with a nitrogen atmosphere should be used for storage.

11. Repack unused product in anti-moisture packing, fold to close any opening and store in a dry place.

12. The appearance and specifications of devices may be modified for improvement without notice.

## 13. ESD Precautions. Static Electricity and surge damages LEDs

It is recommended that anti-electrostatic wrist bands or gloves be used when handling the LEDs.

All devices, equipment and machinery should be properly grounded

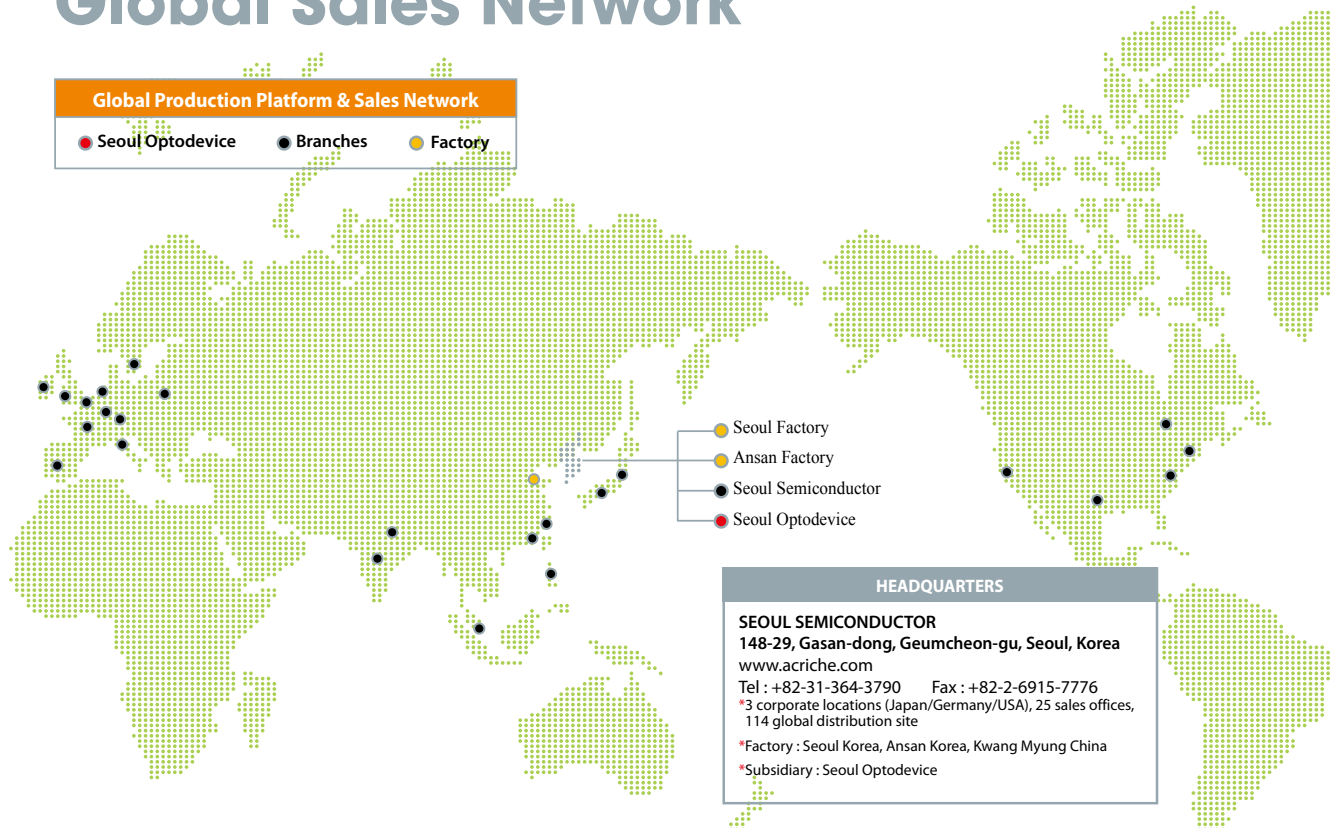
14. It is recommended to use individual resistors when LEDs are used in parallel circuits in order to improve performance.



# Global Sales Network

## Global Production Platform & Sales Network

- Seoul Optodevice
- Branches
- Factory



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