

## LNM/280X30/4R5W/XXX/230V/C100

- Compatible with most TRIAC dimmers
- High Power Conversion Efficiency (>0.85)
- High Power Factor (>0.99)
- Low THD (<20%)
- 23mA Inrush current
- Energy Class A++
- No photo-biological hazard (RG1)

## 1. Product description

### \* Description

- The LNM series module is designed for the high power operation to get the high flux output applications.
- It incorporates the state of the art SMD LEDs with high reliability and semiconductor AC direct drive ICs.
- It is ideal for the indoor or down light applications.

### \* Features

- High performance, High brightness
- No emission of harmful short wavelength light(No UV radiation)
- High power conversion efficiency(>0.85)
- High power factor (>0.99)
- Low THD(< 20%)
- Low EMI
- Thermal shutdown function embedded(150°C)
- RoHS compliant
- No photo-biological hazard –Group 1 (Low risk) (RG1)

### \* Applications



LUMENS

## 2. Absolute maximum ratings

Parameters	Symbol	Min Value	Max Value	Unit
Maximum power dissipation	Pd	-	4.95	W
Maximum operation voltage	Vop	-	250	V
Operation temperature	Top	-30	+85	°C
Storage temperature	Tst	-40	+100	°C

- Operation temperature is not related to the lifetime.

### 3. Electro-optical characteristics (T<sub>c</sub>=25°C & 55°C.)

Parameters	Symbol	T <sub>c</sub> = 25°C			T <sub>c</sub> = 55°C			Unit	Condition
		Min.	Typ.	Max.	Min.	Typ.	Max.		
Luminous Flux	Φ <sub>v</sub>	356	396	-	339	376	-	lm	V <sub>op</sub> =230V,2700K,CRI80
		405	450	-	385	428	-		V <sub>op</sub> =230V,3000K,CRI80
		413	459	-	392	436	-		V <sub>op</sub> =230V,3500K,CRI80
		421	468	-	400	445	-		V <sub>op</sub> =230V,4000K,CRI80
		433	482	-	412	457	-		V <sub>op</sub> =230V,5000K,CRI80
		331	368	-	315	350	-		V <sub>op</sub> =230V,2700K,CRI90
		356	396	-	339	376	-		V <sub>op</sub> =230V,3000K,CRI90
		364	404	-	345	384	-		V <sub>op</sub> =230V,3500K,CRI90
		371	412	-	352	391	-		V <sub>op</sub> =230V,4000K,CRI90
		381	424	-	362	403	-		V <sub>op</sub> =230V,5000K,CRI90
Efficiency	lm/W	79	88	-	75	84	-	lm/W	V <sub>op</sub> =230V,2700K,CRI80
		90	100	-	86	95	-		V <sub>op</sub> =230V,3000K,CRI80
		92	102	-	87	97	-		V <sub>op</sub> =230V,3500K,CRI80
		94	104	-	89	99	-		V <sub>op</sub> =230V,4000K,CRI80
		96	107	-	91	102	-		V <sub>op</sub> =230V,5000K,CRI80
		74	82	-	70	78	-		V <sub>op</sub> =230V,2700K,CRI90
		79	88	-	75	84	-		V <sub>op</sub> =230V,3000K,CRI90
		81	90	-	77	85	-		V <sub>op</sub> =230V,3500K,CRI90
		82	92	-	78	87	-		V <sub>op</sub> =230V,4000K,CRI90
		85	94	-	81	89	-		V <sub>op</sub> =230V,5000K,CRI90

(1) At 230Vac, T<sub>c</sub> = 25 °C & 55°C

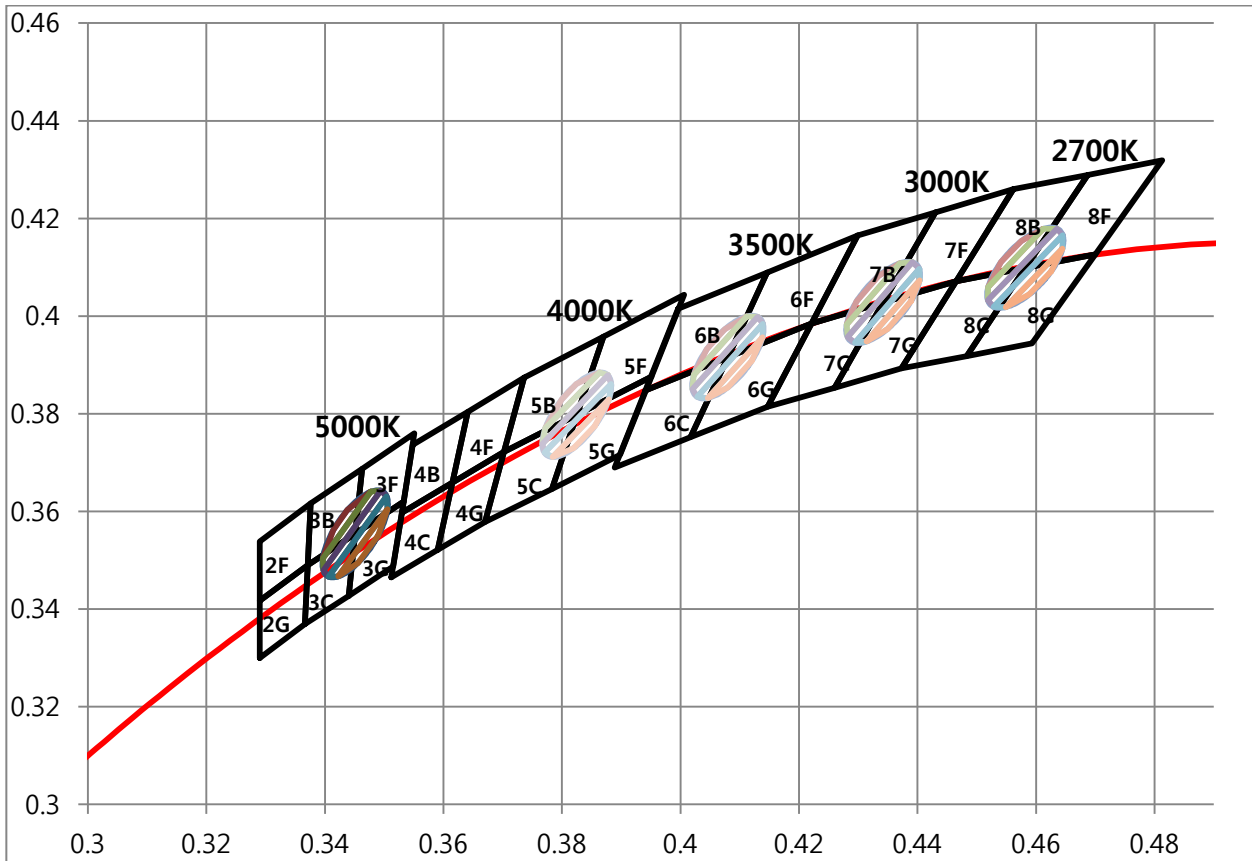
(2) Φ<sub>v</sub> is the total luminous flux output measured with an integrated sphere.

- Measurement accuracy : CRI(±3), Φ<sub>v</sub>(±3%), Vf(±3.0V)

(3) Correlated Color Temperature is derived from the CIE 1931 Chromaticity diagram.

Correlated Color Temperature	CCT	MacAdam 3Step			K	
Color Rendering Index	CRI	80/90	-	-	-	V <sub>op</sub> =230V
Viewing Angle FWHM	2θ1/2	110	120	130	deg	V <sub>op</sub> =230V
Operation Voltage	V <sub>op</sub>	220	230	240	V	
Power Dissipation	P <sub>d</sub>	4.05	4.5	4.95	W	V <sub>op</sub> =230V
Operation Frequency	F <sub>op</sub>	50 / 60			Hz	V <sub>op</sub> =230V
Power Factor	PF	Over 0.99			V	V <sub>op</sub> =230V
Current THD	ATHD	Less than 20%				V <sub>op</sub> =230V

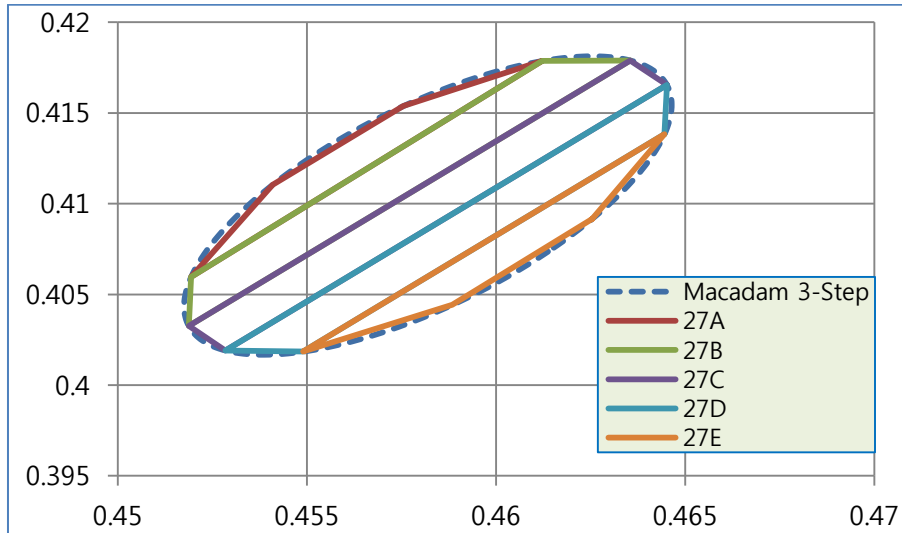
## 4. CIE Chromaticity diagram



(1) Chromaticity coordinate groups are measured with an accuracy of  $\pm 0.01$

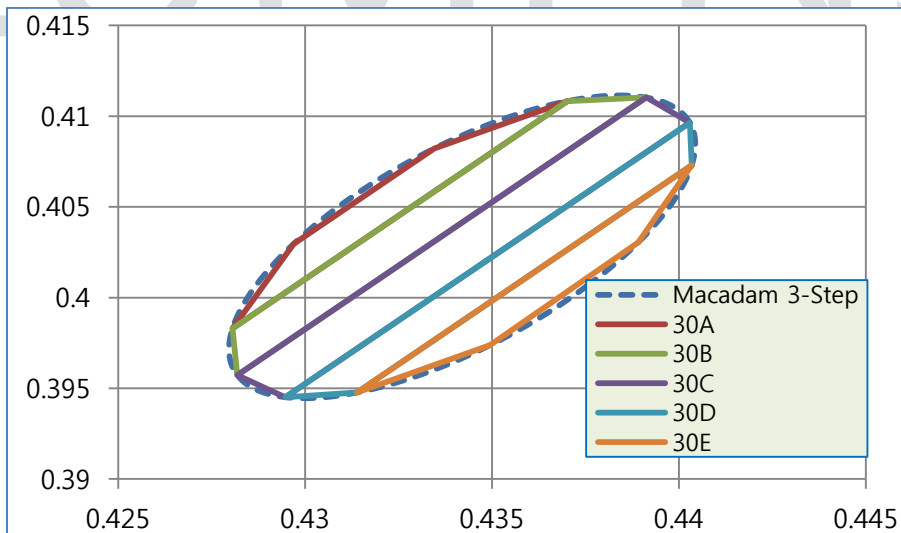
## 5. Chromaticity coordinates

### 5-1. 2700K



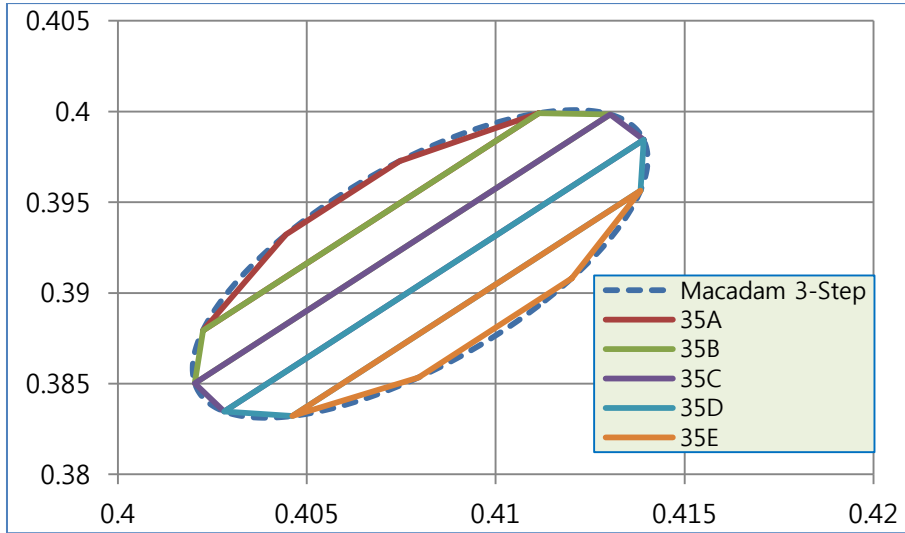
27A		27B		27C		27D		27E	
X	Y	X	Y	X	Y	X	Y	X	Y
0.4612	0.4179	0.4636	0.4179	0.4645	0.4165	0.4645	0.4138	0.4625	0.4092
0.4576	0.4154	0.4612	0.4179	0.4636	0.4179	0.4645	0.4165	0.4645	0.4138
0.4541	0.4110	0.4519	0.4060	0.4519	0.4033	0.4528	0.4019	0.4549	0.4018
0.4519	0.4060	0.4519	0.4033	0.4528	0.4019	0.4549	0.4018	0.4588	0.4044
0.4612	0.4179	0.4636	0.4179	0.4645	0.4165	0.4645	0.4138	0.4625	0.4092

### 5-2. 3000K



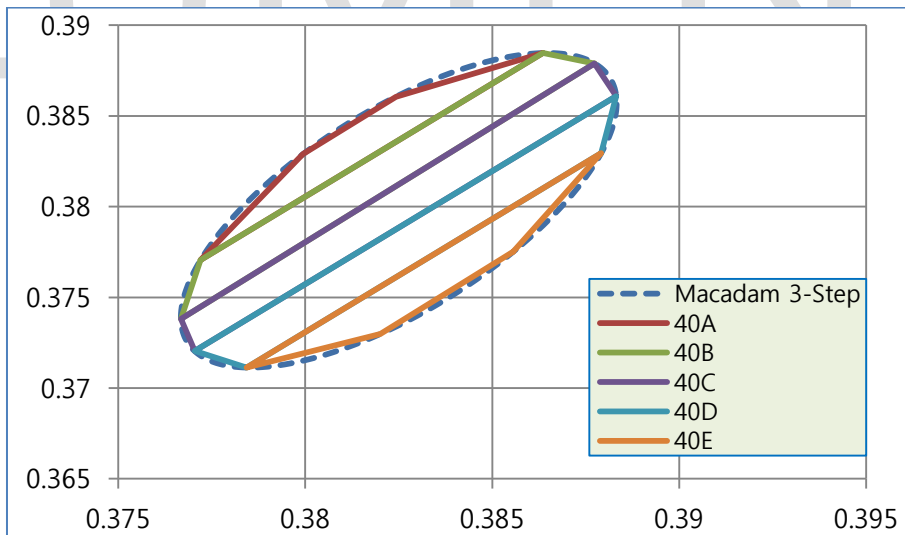
30A		30B		30C		30D		30E	
X	Y	X	Y	X	Y	X	Y	X	Y
0.4370	0.4108	0.4391	0.4110	0.4403	0.4097	0.4403	0.4073	0.4389	0.4031
0.4334	0.4082	0.4370	0.4108	0.4391	0.4110	0.4403	0.4097	0.4403	0.4073
0.4297	0.4030	0.4281	0.3983	0.4282	0.3957	0.4295	0.3945	0.4314	0.3948
0.4281	0.3983	0.4282	0.3957	0.4295	0.3945	0.4314	0.3948	0.4350	0.3974
0.4370	0.4108	0.4391	0.4110	0.4403	0.4097	0.4403	0.4073	0.4389	0.4031

5-3. 3500K



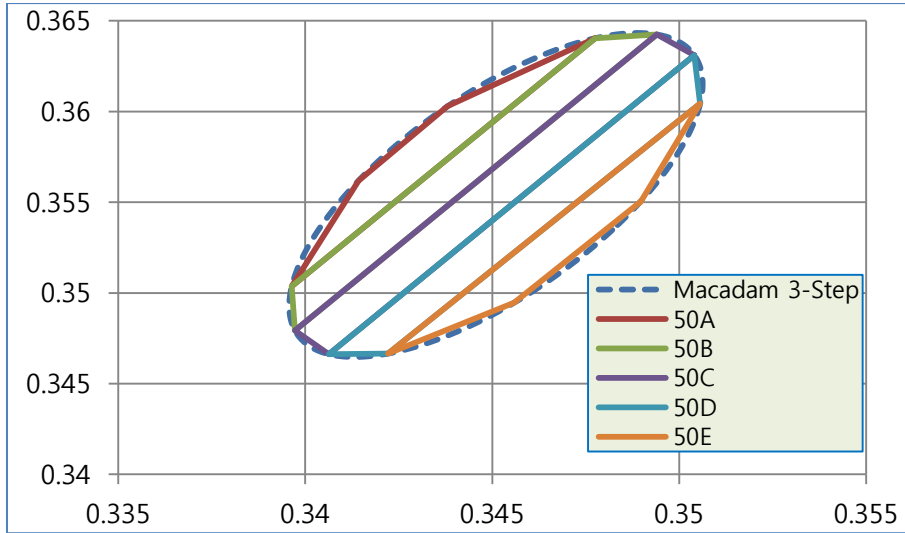
35A		35B		35C		35D		35E	
X	Y	X	Y	X	Y	X	Y	X	Y
0.4111	0.3999	0.4130	0.3998	0.4139	0.3984	0.4138	0.3956	0.4120	0.3908
0.4075	0.3973	0.4111	0.3999	0.4130	0.3998	0.4139	0.3984	0.4138	0.3956
0.4044	0.3932	0.4023	0.3879	0.4020	0.3850	0.4028	0.3835	0.4046	0.3832
0.4023	0.3879	0.4020	0.3850	0.4028	0.3835	0.4046	0.3832	0.4080	0.3853
0.4111	0.3999	0.4130	0.3998	0.4139	0.3984	0.4138	0.3956	0.4120	0.3908

5-4. 4000K

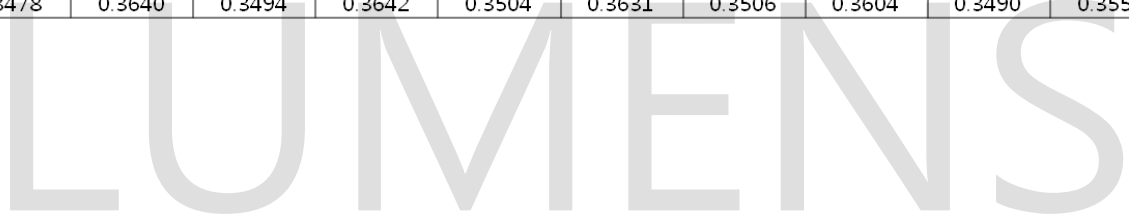


40A		40B		40C		40D		40E	
X	Y	X	Y	X	Y	X	Y	X	Y
0.3864	0.3885	0.3877	0.3879	0.3883	0.3861	0.3879	0.3829	0.3856	0.3775
0.3824	0.3861	0.3864	0.3885	0.3877	0.3879	0.3883	0.3861	0.3879	0.3829
0.3799	0.3829	0.3772	0.3771	0.3767	0.3738	0.3770	0.3720	0.3784	0.3711
0.3772	0.3771	0.3767	0.3738	0.3770	0.3720	0.3784	0.3711	0.3820	0.3730
0.3864	0.3885	0.3877	0.3879	0.3883	0.3861	0.3879	0.3829	0.3856	0.3775

5-5. 5000K

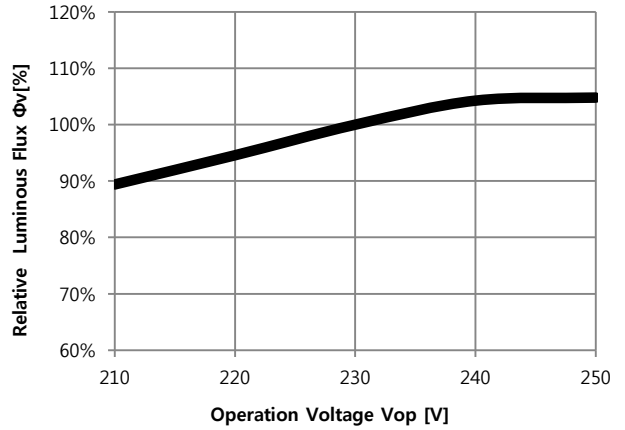
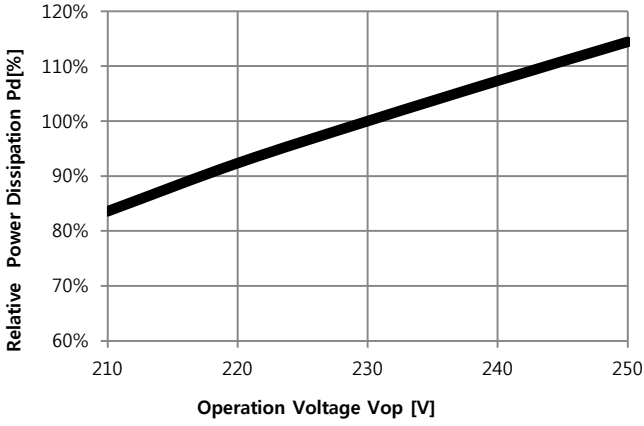


50A		50B		50C		50D		50E	
X	Y	X	Y	X	Y	X	Y	X	Y
0.3478	0.3640	0.3494	0.3642	0.3504	0.3631	0.3506	0.3604	0.3490	0.3550
0.3438	0.3603	0.3478	0.3640	0.3494	0.3642	0.3504	0.3631	0.3506	0.3604
0.3414	0.3562	0.3396	0.3504	0.3397	0.3479	0.3406	0.3466	0.3422	0.3467
0.3396	0.3504	0.3397	0.3479	0.3406	0.3466	0.3422	0.3467	0.3456	0.3495
0.3478	0.3640	0.3494	0.3642	0.3504	0.3631	0.3506	0.3604	0.3490	0.3550



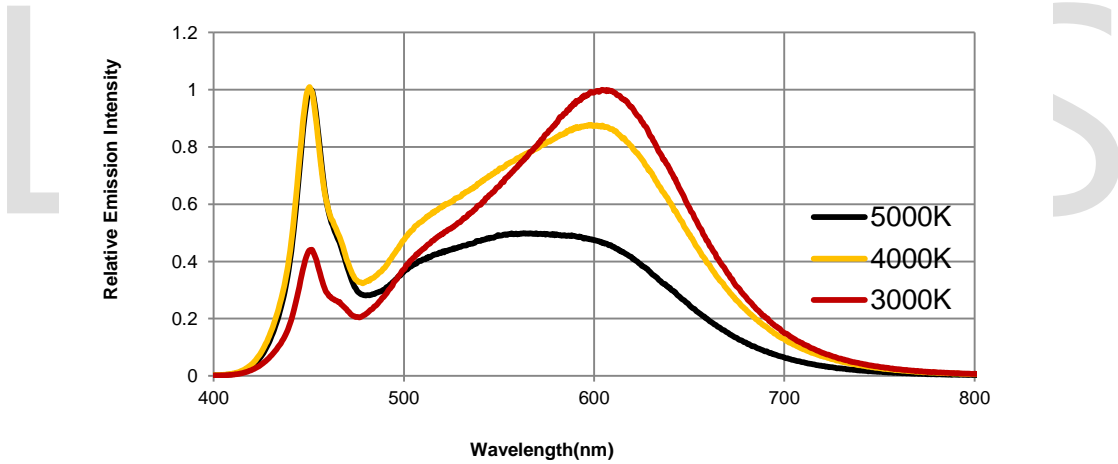
## 6. Characteristic Graphs

### 6-1 Voltage Characteristics(Ta=25°C)

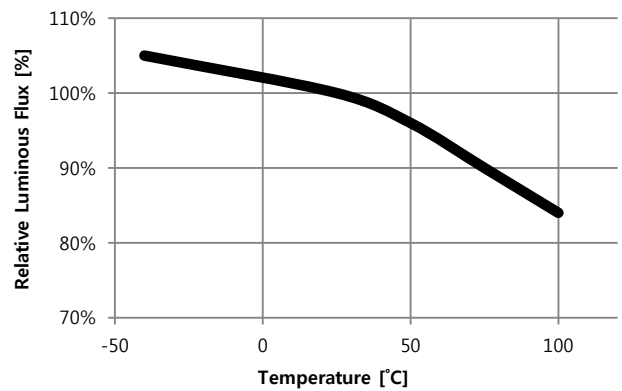
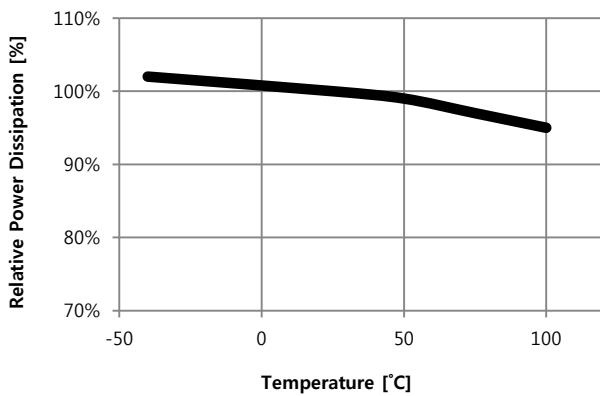


### 6-2 Spectrum Characteristics(Ta=25°C)

Spectral Density vs. Wavelength

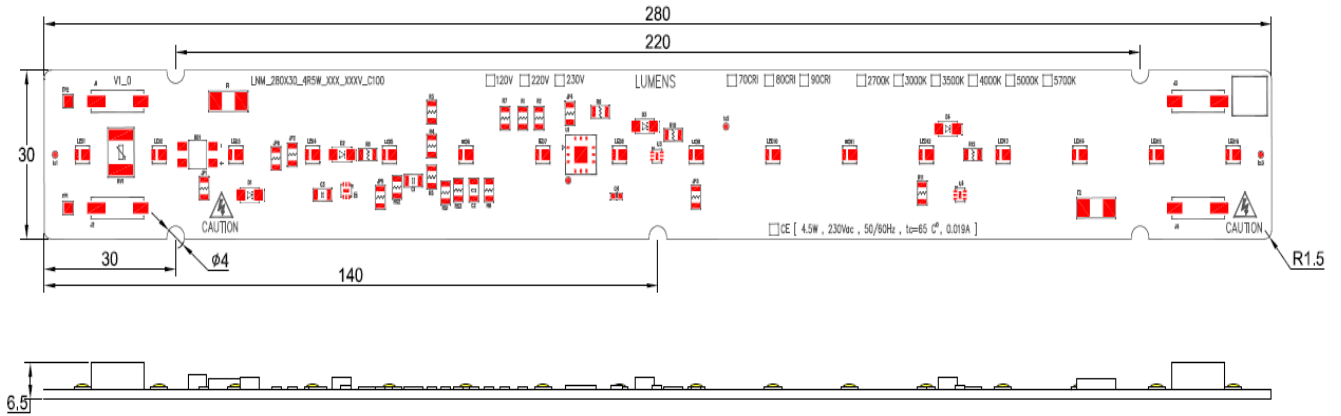


### 6-3 Temperature Characteristics





## 7. Outline Dimensions



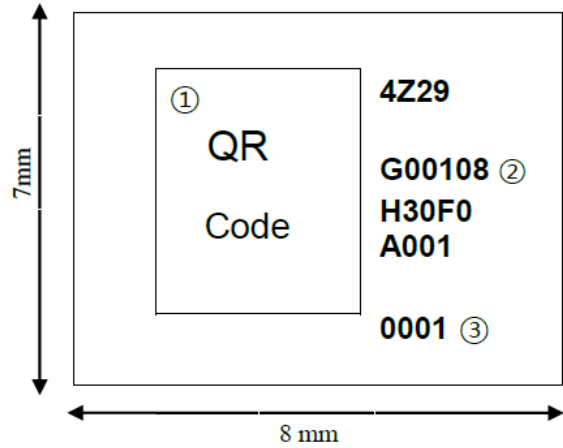
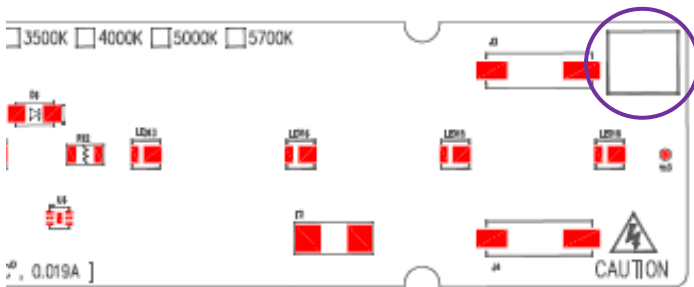
Unit : mm

- 1) Outline Diameter : 280X30mm Height(max) : 6.5mm
- 2) Tolerance - All measurements are  $\pm 0.1$  mm unless otherwise indicated.

# LUMENS

## 8. EDC Module Marking

- A. Information Identification by report on the PCB (Silk)
  - Module Identification Code
- B. LED Module Label



1	QR Code
2	Traceability Code
3	Serial No.

B-1 Traceability Code Table

No	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Marking	4	8	1	5	T	9	9	9	1	8	H	3	0	C	0	A	0	0	1	0	0	0	1
Meaning	SMT Year/Month/Day				SMT Site	Group No.			Watt	CRI	CCT	Volt	Default	LOT Serial No.				SMT Serial No.					
Ciphers	4				1	3			2	1	2	1		4				4					
How to Use	1st: Last No. of Year 2nd: Month (1~9,X,Y,Z) 3rd~4th: Day				T: PST	999			18	H	30	C		A001				0001					

B-2 Traceability Code Marking Table

**SMT Year/Month**

code	Year
4	2014
5	2015
6	2016

Month	1	2	3	4	5	6	7	8	9
Code	1	2	3	4	5	6	7	8	9
Month	10	11	12						
Code	X	Y	Z						

**SMT Day**

Day	1	2	3	4	5	6	7	8	9	10	11
Code	01	02	03	04	05	06	07	08	09	10	11
Day	12	13	14	15	16	17	18	19	20	21	22
Code	12	13	14	15	16	17	18	19	20	21	22
Day	23	24	25	26	27	28	29	30	31		
Code	23	24	25	26	27	28	29	30	31		

**SMT Site**

SMT Site	D	L	B	K	Y	W	H	G	T
Code	1 <sup>st</sup> Vendor	2 <sup>nd</sup> Vendor	3 <sup>rd</sup> Vendor	4 <sup>th</sup> Vendor	5 <sup>th</sup> Vendor	6 <sup>th</sup> Vendor	7 <sup>th</sup> Vendor	8 <sup>th</sup> Vendor	9 <sup>th</sup> Vendor

**Watt**

Watt	1	2	3	4	5	6	7	8	9	10	...	99
Code	01	02	03	04	05	06	07	08	09	10	...	99
Watt	100	101	...	110	111	...	330	331	...	338	339	etc.
Code	A0	A1	...	B0	B1	...	Z0	Z1	...	Z8	Z9	ZZ

\* AO:100, BO:110, CO:120, DO:130, EO:140, FO:150, GO:160, HO:170, JO:180, KO:190, LO:200, MO:210  
 NO:220, PO:230, QO:240, RO:250, SO:260, TO:270, UO:280, VO:290, WO:300, XO:310, YO:320, ZO:330

**CRI**

CRI	Under 70	Min 70	Min 75	Min 80	Min 85	Min 90
Code	L	N	M	H	V	U

**CCT**

CCT	2700K	3000K	3500K	4000K	4500K	5000K	5700K	6500K
Code	27	30	35	40	45	50	57	65

**Volt**

Volt	100V	110V	120V	200V	220V	230V	240V	250V	277V	347V	DC	etc.
Code	A	B	C	D	E	F	G	H	J	K	X	Z

## 9. Package and Marking of Product

### A. Tray Information

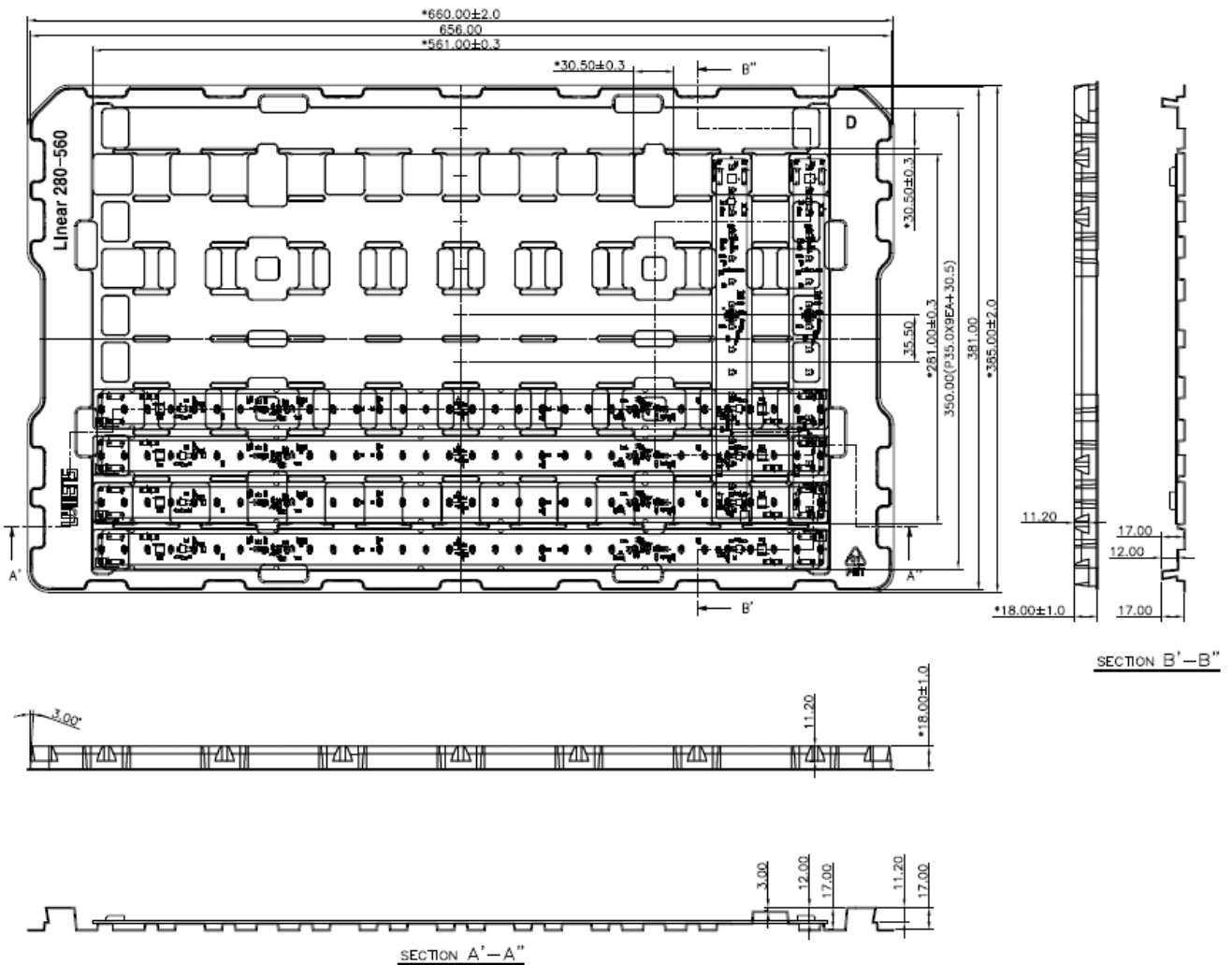
Size : 660mm x 385mm x 18mm

Color : Clear

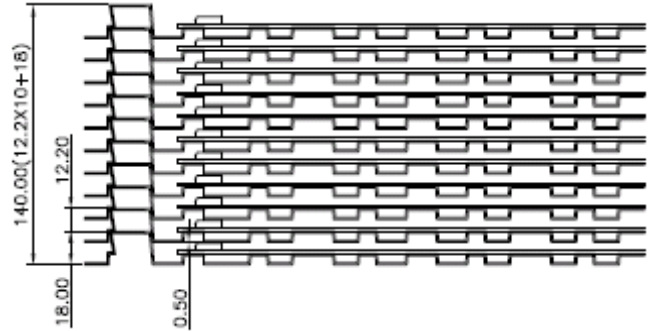
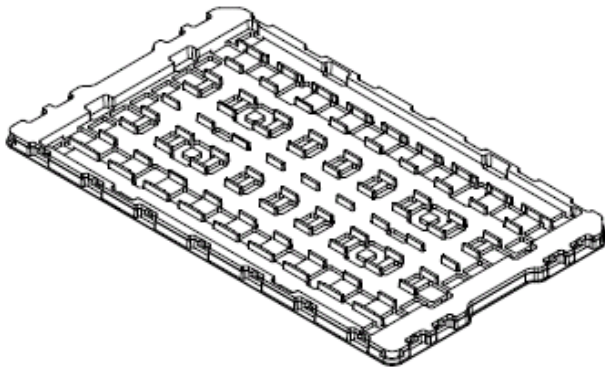
Surface Resistivity :  $10^6 \sim 10^9 \Omega/\text{Sq.}$

### B. Package

10 pcs are packed in one tray.



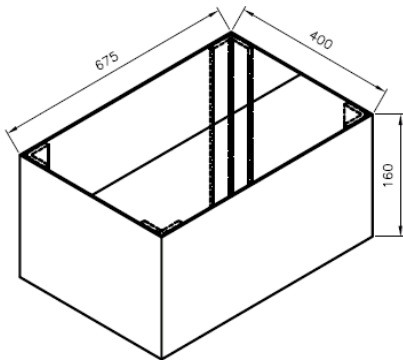
- Top view -



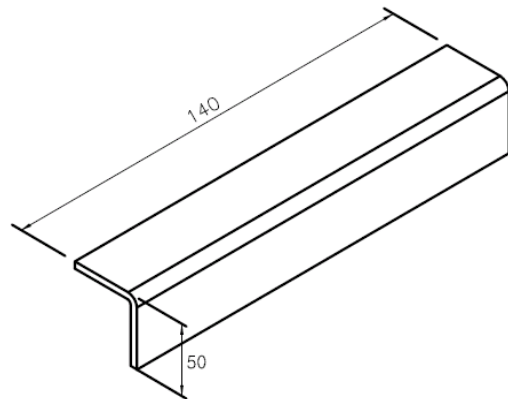
Stack up 11Layers  
 – Packing Tray –

C. Box Packing Specifications

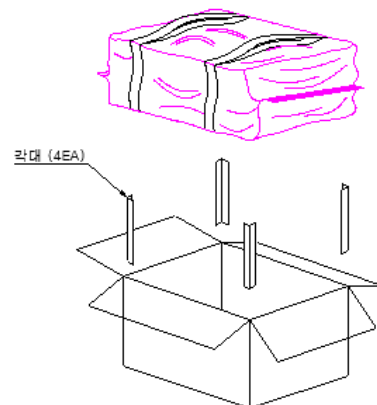
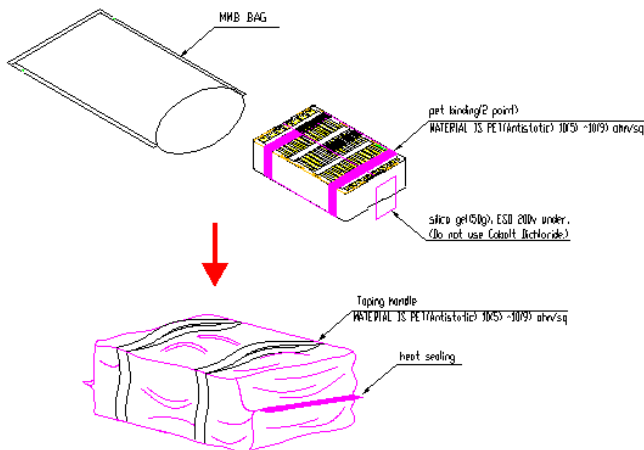
Tray products (numbers of products are 10 pcs) packed.  
 There is no product on the top tray  
 11 Tray (total maximum number of products are 100pcs) packed in a box.



< 675 X 400 X 160 mm >

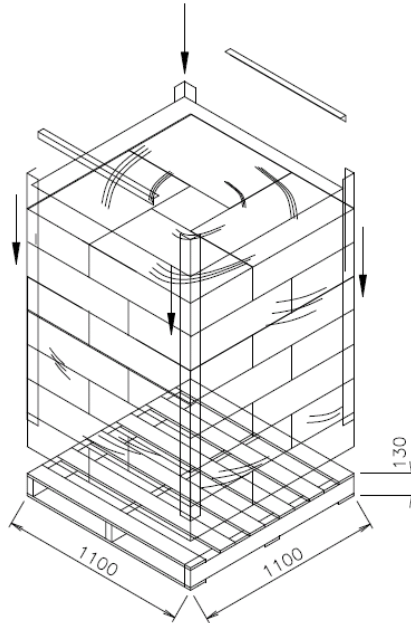


< 50 X 50 X 140 mm >



## D. Pallet Loading

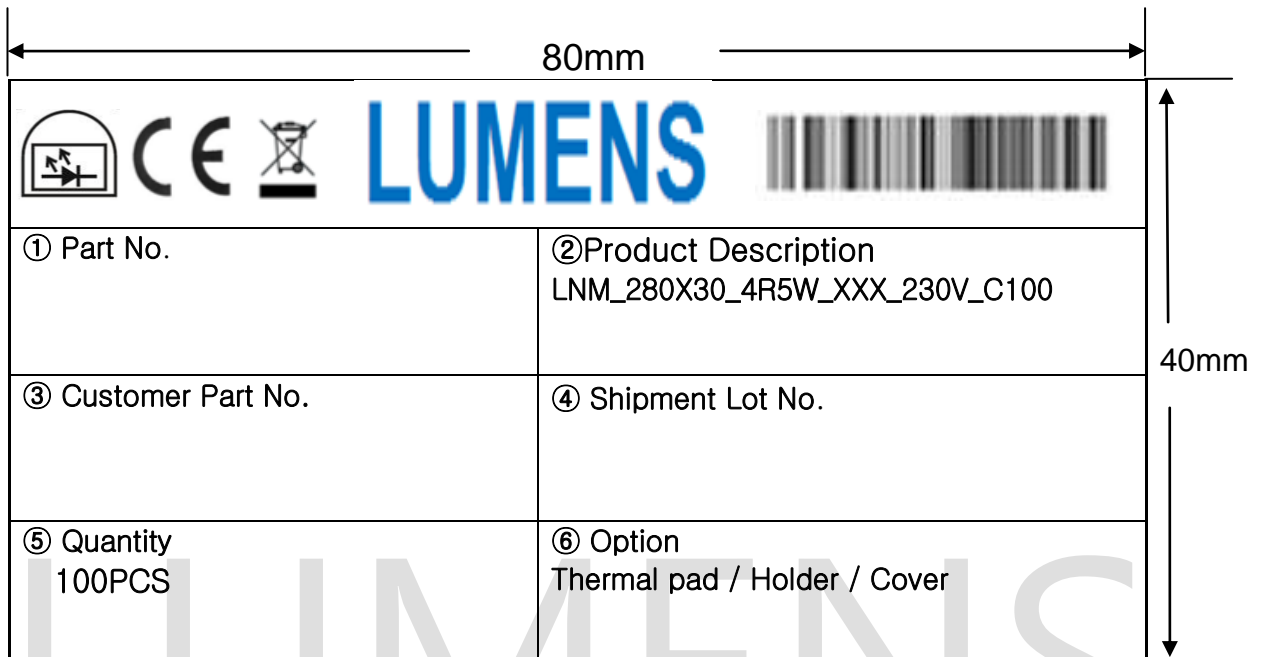
Box is stacked by 7 layers on the Pallet.  
Each layer has 4 boxes



Size : 1,100mm(W) X 1,100mm(L) X 1,145mm(H)

E. BOX Label

Specifying Customer, Model, Customer Part No, Lot No, Quantity  
 On both trays and boxes, the same label is attached.



<Example>

- X : CRI (80CRI=8, 90CRI=9) ,
- XX : CCT (2700K=27, 3000K=30 , 3500K=35, 4000K=40, 5000K=50, 5700K=57)

1. PART No
2. Model Name.
3. Customer Part NO
4. Shipment Lot No.
5. Quantity.

F. Shipment Lot No. Indication

No	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
Marking	C	G	X	-	1	0	0	2	0	2	-	A	0	0	1	
Meaning	COB	SMT Site	Default	Default	Packing Year/Month/Day						Default	Default	Packing serial No.			
Ciphers	1	1			6								3			
How to Use	C : COB	G : K2			1st~2nd : Last two digits of Year 3rd~4th : Month(01~12) 5th~6th : Day(01~31)								001			



## 10. Cautions on use

### 10-1. Storage

When storing this products for al long time ( over one week )

- Store them in a dark place. Do not expose these product to sunlight
- Keep the temperature  $25^{\circ}\text{C} \pm 3^{\circ}\text{C}$  at RH 40%~60% During transportation and storage for a short time
- Keep the temperature under  $100^{\circ}\text{C}$  at normal humidity
- Do not keep it in environment exposed to Sulfur gas or Sulfur-contained material

### 10-2. Operation

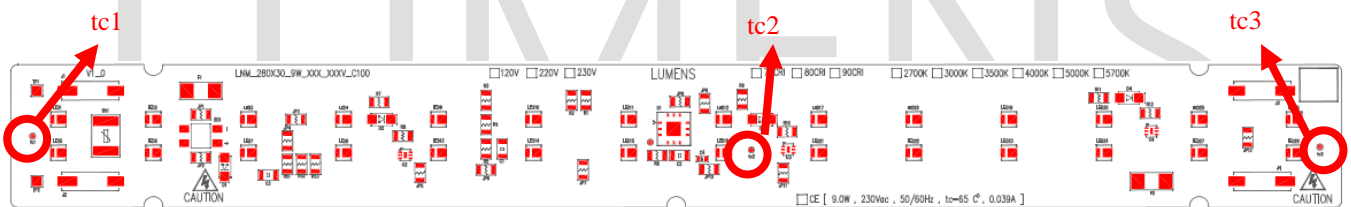
Customer must apply constant voltage and heat sink.

Do not operate it in environment exposed to Sulfur gas or Sulfur-contained material

10-3. LUMENS will not be held responsible for any damage to the user that may result from accidents or any other reasons during operation of the user's unit if use to exceed the absolute maximum ratings, or not keep the matters that demand special attention.

10-4. These modules are designed for built-in use only, so they could be used in class I luminaire or class II luminaire whose protection against electric shock does not rely on basic insulation only, additional safety precautions such as double insulation or reinforced insulation are provided.

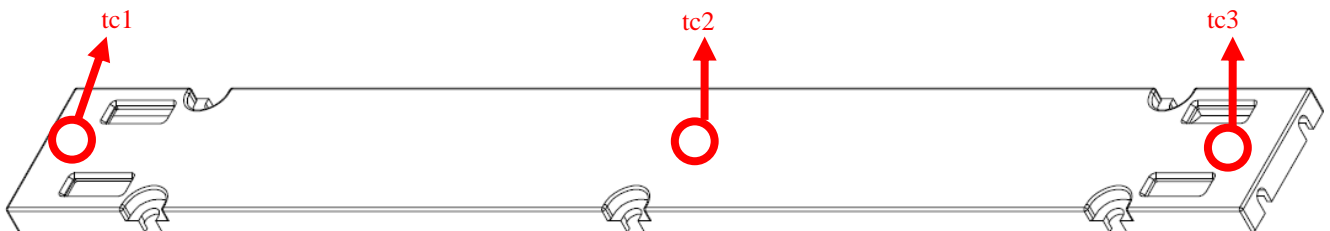
10-5. LUMENS recommends not to exceed  $T_c \text{ Max}(85^{\circ}\text{C})$ .



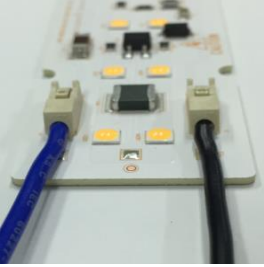

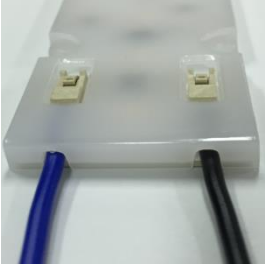
### 10-6 Option

※ Cover

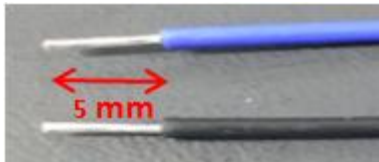
1. Clear Type
2. Unclear Type



## 10-7. Wire connection

Module Type	Module + Cover Assembly Type	
	Clear Type	Unclear Type
		

- Wire open Length : 5mm
- Wire spec. : 0.5~0.75mm<sup>2</sup> (AWG 20~18)
- Insert the wire to the connector.
- Push down the hole with a sharp object to pull the wire from the connector.



## 10-8 Recycling

Processing of electric and electronic equipment at the end of their service life (applicable in member countries of the European Union and other European countries operating a selective waste collection system). This symbol, affixed to the product or its packaging, indicates that the product must not be processed with household waste. It must be brought to an electric and electronic waste collection point for recycling and disposal. By ensuring the appropriate disposal of this product you also help in preventing potentially negative consequences for the environment and human health. The recycling of materials helps preserve our natural resources. For further information regarding the recycling of this product, please contact your municipality, local waste disposal centre or the store where the product was purchased.

