Manufacturing SPECIFICATION

MODEL : (**LMLTP5621CWHZ060-C80**)

LED PKG PART No.
6700K : LMLTP5621C6K7Z060-C80
5900K : LMLTP5621C5K9Z060-C80
5200K : LMLTP5621C5K2Z060-C80
4600K : LMLTP5621C4K6Z060-C80
4100K : LMLTP5621C4K1Z060-C80
3600K : LMLTP5621C3K6Z060-C80
3000K : LMLTP5621C3K1Z060-C80
2800K : LMLTP5621C2K8Z060-C80

Customer Approval		Model	**LMLTP5621CWHZ060-C80**	
		Issued Date	2015 - 09 - 11	
Checked By	Approved By	Description	SMD Type LED	
		Written By	Checked By	Approved by

Contact Point
Tel: 82-31-213-9200
Fax: 82-31-213-9210
Homepage: www.Lumimicro.com

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1. Description

1) Feature

.Built-in One Chip LED

. Wide viewing angle : 120°

. External dimensions: 5.6 x 3.0 x 0.9 t mm

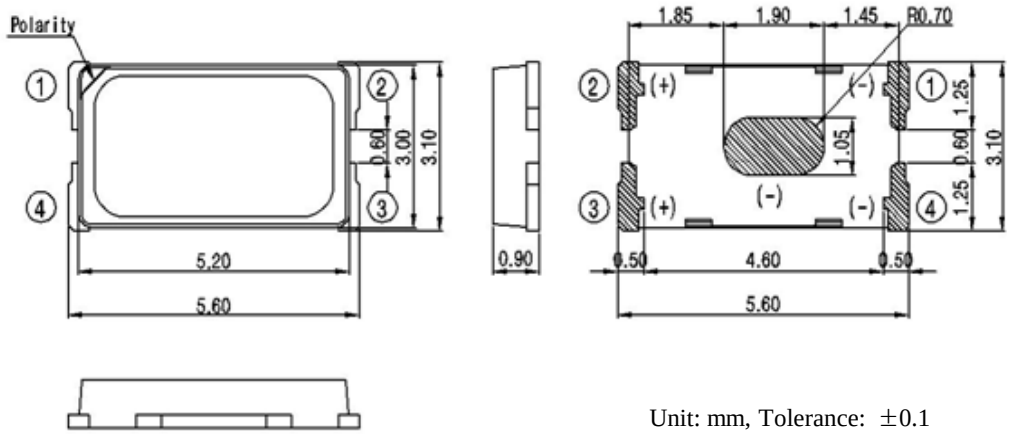
. Lead frame package with individual 2 pin

2) Part No

Part No : LMLTP5621CWHZ060-C80

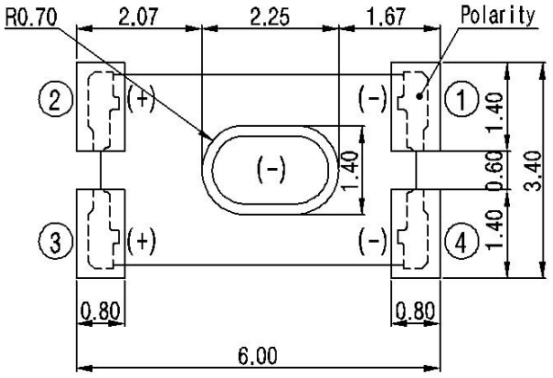
LUMIMICRO LED Part No. Explanation	
LM	: LUMIMICRO.Ltd
L	: Lumimicro.Ltd C.I.E. Standard
TP	: Top View LED(SMD Type)
562	: Package Size (5.6*3.0*0.9T Rev 02)
1	: Chip Quantity
C	: Polarity (A : Anode / C : Cathode)
WH	: White Color - [6700K, 5900K, 5200K, 4600K, 4100K, 3600K, 3000K, 2800K]
Z	: Built in Zener (X : NO ZENER / Z : ZENER)
060	: Forward Current 60mA
C80	: CRI Min. 80

3) Outline Dimension

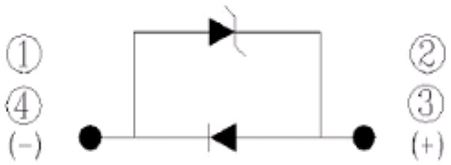


Unit: mm, Tolerance: ±0.1

4) Recommend Solder Pattern



5) LED Circuit Diagram



2. Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Forward Current	I_F	150	mA
Power Dissipation	P_d	500	mW
Forward Pulse Current *1	I_{PF-1}	300	mA
Storage Temperature	T_{stg}	-40 ~ +100	℃
Operating Temperature	T_{opr}	-40 ~ +80	℃
Soldering Temperature	T_{sld}	260 (for 10 sec)	℃
Junction Temperature	T_j	120	℃

*1 : Forward Pulse Current : Pulse Width < 10msec / Duty Ratio < 1/10

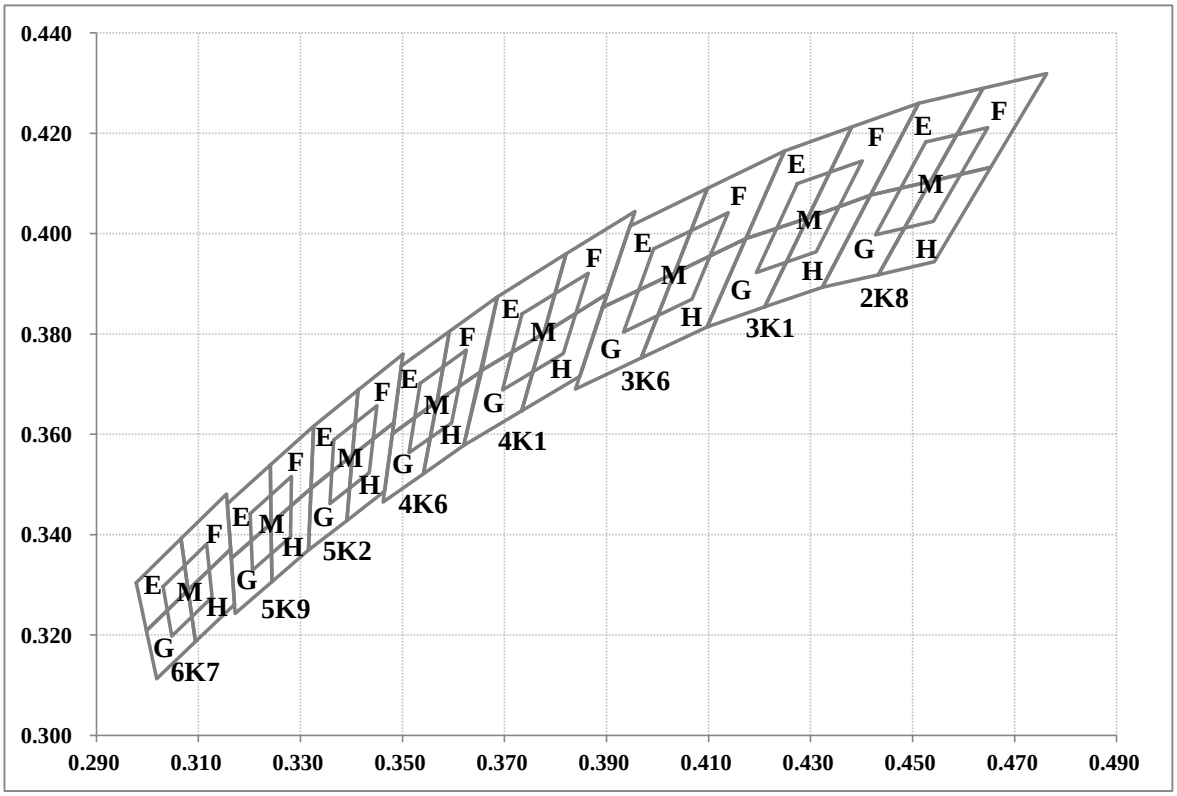
3. Characteristics

1) Electro / Optical Characteristics

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Forward Voltage	V_F	I_F=60mA	2.7	-	3.2	V
Reverse Voltage	Vr	I_F=5mA	0.5	-	1.2	V
Luminous Intensity	Iv	I_F=60mA	6.0	-	11.5	cd
Luminous Flux	Φ_v	I_F=60mA	18.9	-	-	lm
Color Correlated Temperature	CCT	IF=60mA	2800	-	6700	K
Color Rendering Index	Ra	I_F=60mA	80		-	-
Viewing Angle	$2\Theta_{1/2}$	I_F=60mA	-	120	-	deg.
ESD		1.5kΩ,100pF	5	-	-	KV
Thermal Resistance[1]	$R_{th(J-S)}$	I_F=60mA	-	-	30	℃/W

[1] Thermal Resistance : Rth(Junction - Solder) * Tolerance : VF=±0.1V , Iv=±10% , Chromaticity Coordinate=±0.01, CRI=±2

2) Color Coordinates Rank



6K7E		6K7F		6K7G		6K7H		6K7M	
X	Y	X	Y	X	Y	X	Y	X	Y
0.2978	0.3304	0.3066	0.3392	0.2998	0.3209	0.3080	0.3290	0.3031	0.3297
0.2998	0.3209	0.3080	0.3290	0.3018	0.3113	0.3094	0.3187	0.3048	0.3198
0.3080	0.3290	0.3163	0.3371	0.3094	0.3187	0.3171	0.3261	0.3127	0.3275
0.3066	0.3392	0.3155	0.3481	0.3080	0.3290	0.3163	0.3371	0.3116	0.3382

5K9E		5K9F		5K9G		5K9H		5K9M	
X	Y	X	Y	X	Y	X	Y	X	Y
0.3157	0.3462	0.3241	0.3539	0.3165	0.3353	0.3243	0.3423	0.3201	0.3442
0.3165	0.3353	0.3243	0.3423	0.3172	0.3243	0.3244	0.3306	0.3206	0.3329
0.3243	0.3423	0.3321	0.3493	0.3244	0.3306	0.3316	0.3369	0.3281	0.3396
0.3241	0.3539	0.3326	0.3616	0.3243	0.3423	0.3321	0.3493	0.3283	0.3516

5K2E		5K2F		5K2G		5K2H		5K2M	
X	Y	X	Y	X	Y	X	Y	X	Y
0.3413	0.3688	0.3501	0.376	0.3402	0.3558	0.3483	0.3623	0.3366	0.3589
0.3326	0.3616	0.3413	0.3688	0.3321	0.3492	0.3402	0.3558	0.3450	0.3657
0.3321	0.3493	0.3402	0.3558	0.3316	0.3369	0.3391	0.3428	0.3435	0.3524
0.3402	0.3558	0.3483	0.3623	0.3391	0.3428	0.3465	0.3487	0.3358	0.3462

4K6E		4K6F		4K6G		4K6H		4K6M	
X	Y	X	Y	X	Y	X	Y	X	Y
0.3498	0.3736	0.3592	0.3805	0.348	0.3601	0.3568	0.3666	0.3535	0.3702
0.3592	0.3805	0.3686	0.3874	0.3568	0.3666	0.3655	0.3726	0.3625	0.3768
0.3568	0.3666	0.3655	0.3726	0.3541	0.3521	0.362	0.3578	0.3596	0.3623
0.348	0.3601	0.3568	0.3666	0.3462	0.3465	0.3541	0.3521	0.3513	0.3563

4K1E		4K1F		4K1G		4K1H		4K1M	
X	Y	X	Y	X	Y	X	Y	X	Y
0.3653	0.3726	0.3777	0.3801	0.362	0.3578	0.3734	0.3647	0.3734	0.3840
0.3686	0.3874	0.3821	0.396	0.3653	0.3726	0.3777	0.3801	0.3864	0.3921
0.3821	0.396	0.3956	0.4044	0.3777	0.3801	0.3902	0.388	0.3815	0.3761
0.3777	0.3801	0.3902	0.388	0.3734	0.3647	0.3848	0.3716	0.3696	0.3688

3K6E		3K6F		3K6G		3K6H		3K6M	
X	Y	X	Y	X	Y	X	Y	X	Y
0.3946	0.4015	0.4098	0.409	0.3892	0.3853	0.4033	0.3921	0.3992	0.3970
0.4098	0.409	0.4249	0.4165	0.4033	0.3921	0.4173	0.399	0.4138	0.4042
0.4033	0.3921	0.4173	0.399	0.3968	0.3752	0.4097	0.3814	0.4068	0.3869
0.3892	0.3853	0.4033	0.3921	0.3839	0.369	0.3968	0.3752	0.3933	0.3804

3K1E		3K1F		3K1G		3K1H		3K1M	
X	Y	X	Y	X	Y	X	Y	X	Y
0.4294	0.4031	0.4418	0.4077	0.421	0.3854	0.4323	0.3893	0.4274	0.4100
0.4381	0.4213	0.4512	0.426	0.4294	0.4031	0.4418	0.4077	0.4401	0.4145
0.4249	0.4165	0.4381	0.4213	0.4173	0.399	0.4294	0.4031	0.4311	0.3964
0.4173	0.399	0.4294	0.4031	0.4097	0.3814	0.421	0.3854	0.4194	0.3922

2K8E		2K8F		2K8G		2K8H		2K8M	
X	Y	X	Y	X	Y	X	Y	X	Y
0.4417	0.4077	0.4535	0.4104	0.4323	0.3893	0.4433	0.3918	0.4526	0.4183
0.4512	0.426	0.4638	0.429	0.4417	0.4077	0.4535	0.4104	0.4647	0.4211
0.4638	0.429	0.4763	0.4319	0.4535	0.4104	0.4653	0.4132	0.4541	0.4025
0.4535	0.4104	0.4653	0.4132	0.4433	0.3918	0.4543	0.3944	0.4427	0.3998

0.4417	0.4077	0.4535	0.4104	0.4323	0.3893	0.4433	0.3918	0.4526	0.4183
0.4512	0.426	0.4638	0.429	0.4417	0.4077	0.4535	0.4104	0.4647	0.4211
0.4638	0.429	0.4763	0.4319	0.4535	0.4104	0.4653	0.4132	0.4541	0.4025
0.4535	0.4104	0.4653	0.4132	0.4433	0.3918	0.4543	0.3944	0.4427	0.3998

3) VF Rank

Rank	MIN.	MAX.	Unit
2V8	2.7	2.8	[V] @60mA
2V9	2.8	2.9	
3V0	2.9	3.0	
3V1	3.0	3.1	
3V2	3.1	3.2	

4) CRI Rank

Symbol	MIN.	MAX.
Ra	80	_

5) Luminous Intensity Rank

Iv(cd)			Flux(lm)				Unit
Rank	MIN.	MAX.	60mA		65mA		
1L6A	6.0	6.5	18.9	20.5	20.4	22.1	cd @60mA lm @60mA @65mA
1L6B	6.5	7.0	20.5	22.1	22.1	23.7	
1L7A	7.0	7.5	22.1	23.6	23.7	25.4	
1L7B	7.5	8.0	23.6	25.2	25.4	27.1	
1L8A	8.0	8.5	25.2	26.8	27.1	28.8	
1L8B	8.5	9.0	26.8	28.4	28.8	30.5	
1L9A	9.0	9.5	28.4	29.9	30.5	32.2	
1L9B	9.5	10.0	29.9	31.5	32.2	33.9	
1L10A	10.0	10.5	31.5	33.1	33.9	35.6	
1L10B	10.5	11.0	33.1	34.7	35.6	37.3	
1L11A	11.0	11.5	34.7	36.2	37.3	39.0	

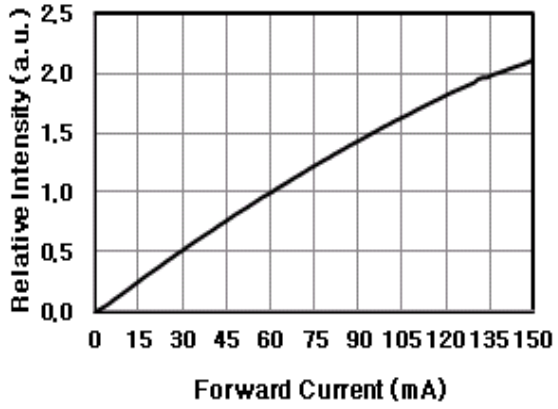
* Luminous Flux : Only reference data.

6) RANK[Bin] Description

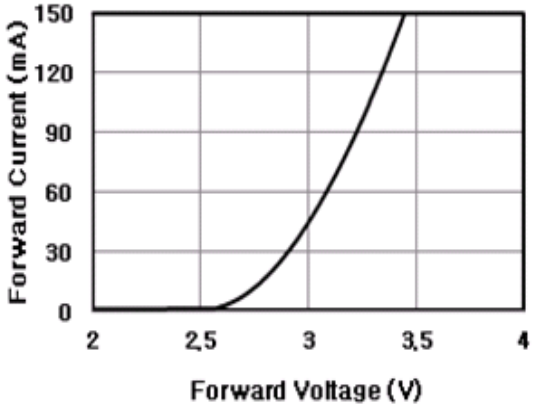
RANK Name		
CCT Rank	Iv Rank	VF Rank
5K2E-	1L9A-	3V0

4. Typical Characteristics

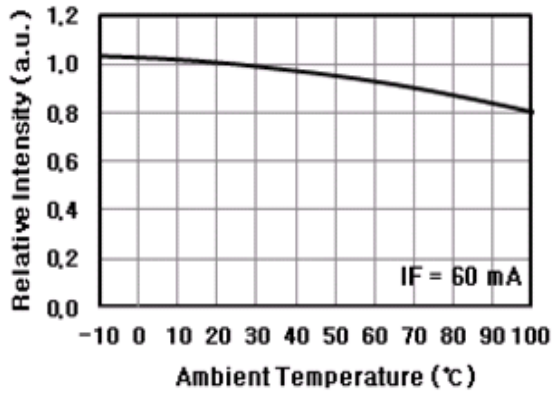
▶ **Forward Voltage vs. Forward Current**



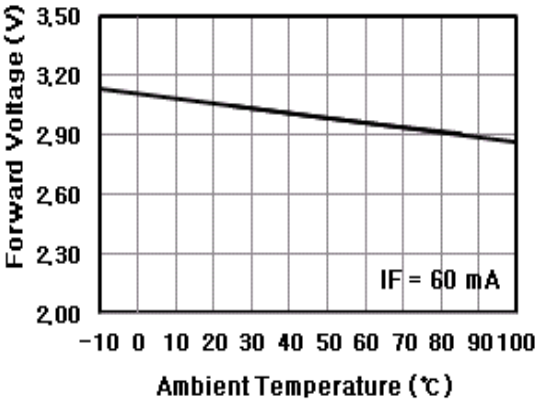
▶ **Forward Current vs. Relative Luminous Intensity**



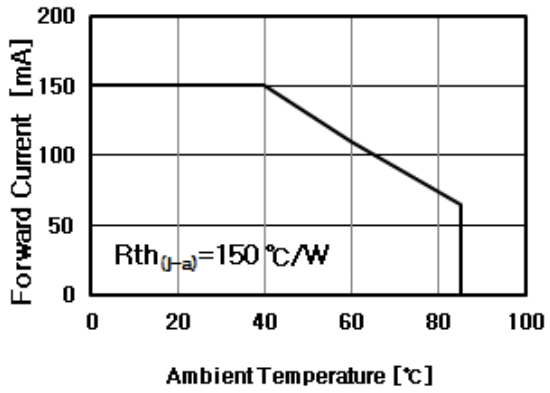
▶ **Ambient Temperature vs. Relative Luminous Intensity**



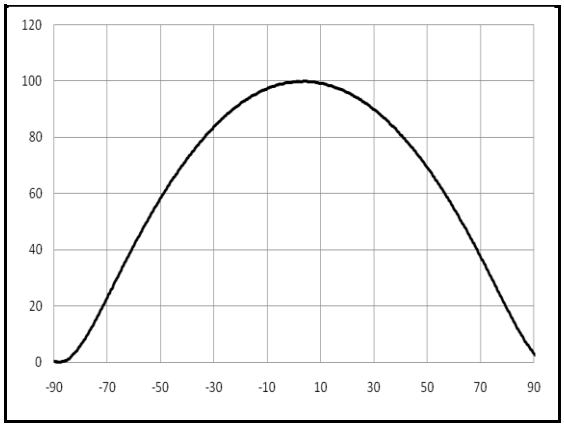
▶ **Ambient Temperature vs. Forward Voltage**



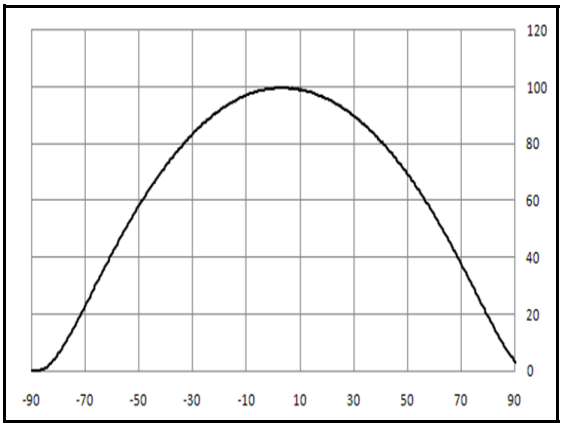
▶ **Ambient Temperature vs. Maximum Forward Current**



▶ **Viewing Angle[X-X']**



▶ **Viewing Angle[Y-Y']**



5. Reliability Test Items & Conditions

▶ Test Item

No	ITEMS	CONDITION	NOTE	Fail /Sample
1	RESISTANCE TO SOLDERING HEAT (REFLOW SOLDERING)	TSID=260℃, 10sec (PRE TREATMENT 30℃, 70%, 168hr)	2TIMES	0/30
2	THERMAL SHOCK	-20℃ ~ 100℃, 15min AT EACH TEMP.	100CYCLES	0/30
3	MOISTURE RESISTANCE CYCLE	25℃ ~ 65℃ ~ -10℃, 90%RH 24hr / 1cycle	500HRS	0/30
4	HIGH TEMPERATURE STORAGE	Ta = 100℃	500HRS	0/30
5	TEMPERATURE HUMIDITY STORAGE	Ta = 60℃, RH = 90%	1,000HRS	0/30
6	LOW TEMPERATURE STORAGE	Ta = -40℃	1,000HRS	0/30
7	ROOM TEMPERATURE LIFE TEST	Ta = 25℃, IF=60mA/chip each*	1,000HRS	0/30
8	HIGH TEMPERATURE HUMIDITY LIFE TEST	60℃, RH=90%, IF=60mA/chip each*	500HRS	0/30
9	LOW TEMPERATURE LIFE TEST	Ta = -30℃, IF=60mA/chip each*	1,000HRS	0/30
10	HIGH TEMPERATURE LIFE TEST	Ta = 85℃, IF=60mA/chip each*	500HRS	0/30

*) ; Tested with LUMIMICRO standard circuit board

▶ Failure Criteria

ITEM	SYMBOL	Failure Criteria	
		MIN	MAX
Forward Voltage	VF	-	U.S.L*)×1.1
C.I.E. x, y	x, y	L.S.L*)×0.8	U.S.L*)×1.2
Luminous Intensity	IV	L.S.L*)×0.7	-

U.S.L*) ; Upper Standard Level

L.S.L*) ; Lower Standard Level

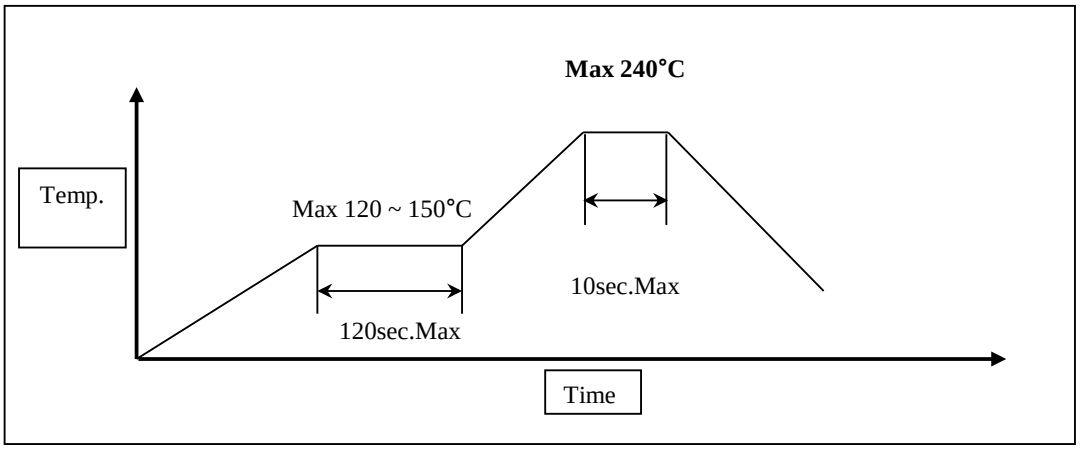
6. Soldering conditions

1) Reflow Conditions (With Pb)

Preliminary heating to be at 150℃ max. for 2 minutes max.

Soldering heat to be at 240℃ max. for 10 seconds max.

Recommended Solder Paste : Alloy- 63Sn/37Pb Model: OL107B,

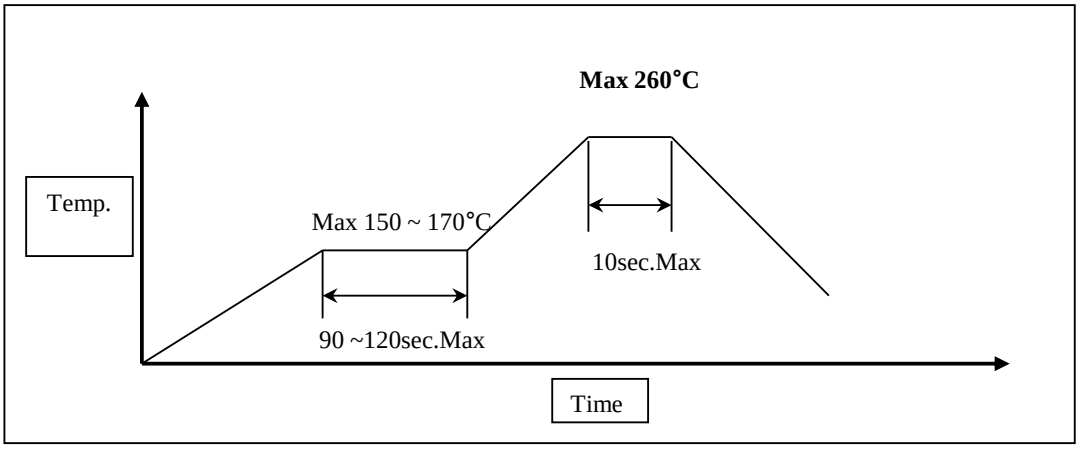


2) Pb free Reflow Conditions

Preliminary heating to be at 170℃ max. for 2 minutes max.

Soldering heat to be at 260℃ max. for 10 seconds max.

Recommended Pb free Paste Alloy: 96.5Sn/3Ag/0.5Cu. - Model: OL204

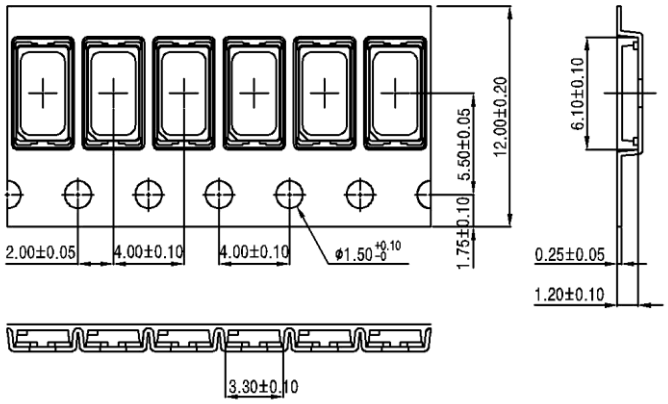


3) For Manual Soldering

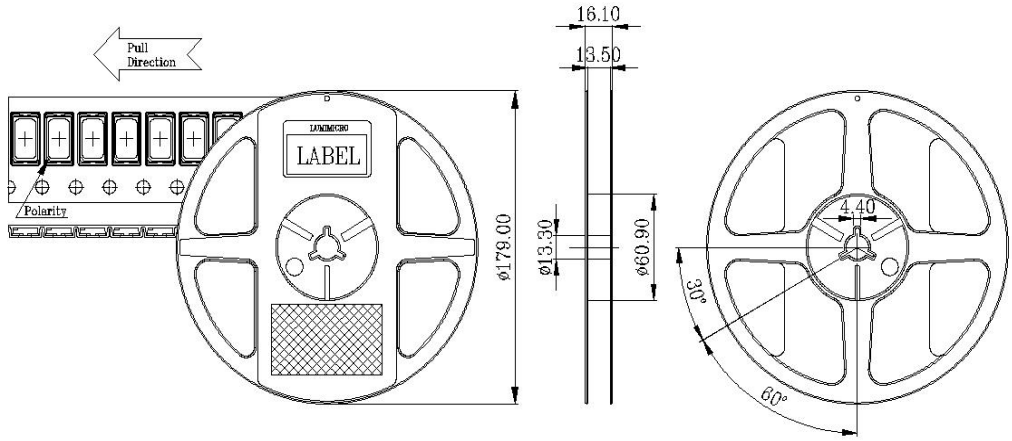
Not more than 5seconds @MAX300℃, under soldering iron

7. Packing

1) Taping pocket Dimension

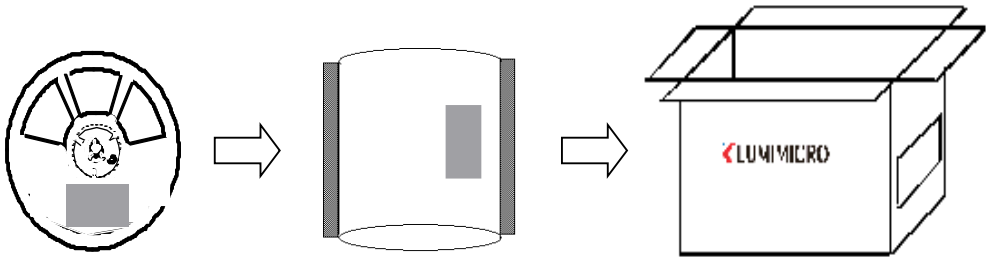


2) Reel Dimensions



One Reel	Unit	Tolerance
Max 3,500 EA	mm	0.1

3) Packing Spec

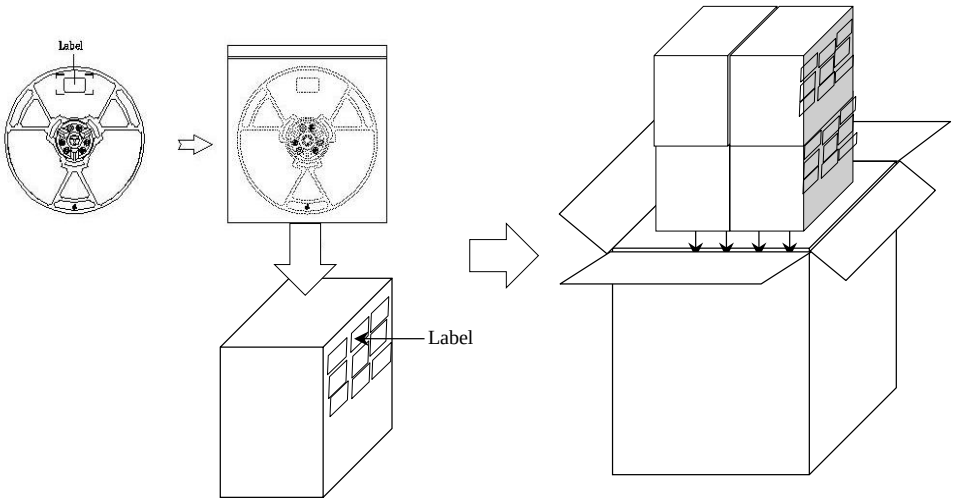


. Aluminum Bag

	Reel in a Bag	Silica in a Bag	Goods QNT in a Bag
Aluminum Bag	1 Reel	1 Silica, 1 Indicator	Max : 3,500ea

. Box Spec

Dimensions(Width/Thickness)	Reels in Box	Goods in QNT in Box
275/ 285/ 200[mm]	10	Max : 35,000ea



<In Box> <Out Box>

4) Label Spec.



8. Precaution For Use

This device should not be used in any type of fluid such as water, oil, organic solvent, etc
When washing is required, IPA should be used. .
When the LEDs are illuminating, operating current should be decided after considering the ambient maximum temperature.
LEDs must be stored to maintain a clean atmosphere. If the LEDs are stored for 3months or more after being shipped from LUMIMICRO, sealed container with a nitrogen atmosphere should be used for storage.
The LEDs must be dip soldered within Two days after opening the moisture-proof packing.
Repack unused Products with anti-moisture packing, fold to close any opening and then store in dry place. The appearance and specifications of the product may be modified for improvement without notice. These LEDs are sensitive to the static electricity and surge. It is recommended to use a wrist band or anti-electrostatic glove when handling the LEDs. If Over voltage which exceeds the absolute maximum rating is applied to LEDs, it will cause damage in LEDs and result in destruction. Damaged LEDs will show some unusual characteristics such as remarkably increased leak current, turn-on voltage becomes lower and the LEDs get unlighted at low current.

9. Hazard Substance Analysis

CTK Co., Ltd.
C-204, Bundang Technopark, 145, Yatap-dong, Bundang-gu,
Seongnam-si, Gyeonggi-do, Korea, 463-760
Tel: +82-31-702-3155~6 Fax: +82-31-702-3158
www.e-ctk.com

Test Report

Applicant Name :	LUMIMICRO
Address :	64-1, Bongmu-ri, Namsa-myeon, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea
Test Report No. :	CTK1211-RS-002306
Date of Issue :	December 10, 2012
Sample Name :	LED (5630 Type)
Sample Received :	November 26, 2012
Test Performing Date :	December 10, 2012
Test Performed :	CTK Co., Ltd. tested the sample and item(s) which were selected by applicant with following result.
Test Results :	Refer to following page.

Tested by

Ho Jung Kim

Reviewed by

Moon-Hee Park / Lab. Manager

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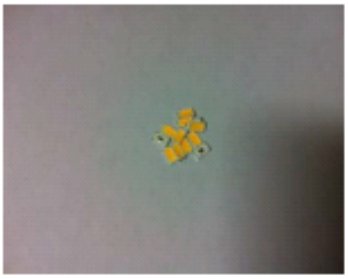
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C-204, Bundang Technopark, 145, Yatap-dong, Bundang-gu,
Seongnam-si, Gyeonggi-do, Korea, 463-760
Tel: +82-31-702-3155~6 Fax: +82-31-702-3158
www.e-ctk.com

1. TEST RESULTS

1) LED (5630 Type)

Heavy Metals

Test Item	Unit	Test Results	MDL	Test Methods
Pb	mg/kg	N.D	5.0	IEC 62321
Cd		N.D	0.5	
Hg		N.D	1.0	
Cr^{6+}		N.D	0.2	



Flame Retardants

Test Item		Unit	Test Results	MDL	Test Methods
PBBs	Bromobiphenyl	mg/kg	N.D	20.0	IEC 62321
	Dibromobiphenyl		N.D	20.0	
	Tribromobiphenyl		N.D	20.0	
	Tetrabromobiphenyl		N.D	20.0	
	Pentabromobiphenyl		N.D	20.0	
	Hexabromobiphenyl		N.D	20.0	
	Heptabromobiphenyl		N.D	20.0	
	Octabromobiphenyl		N.D	20.0	
	Nonabromobiphenyl		N.D	20.0	
	Decabromobiphenyl		N.D	50.0	
PBDEs	Bromodiphenyl ether	mg/kg	N.D	20.0	IEC 62321
	Dibromodiphenyl ether		N.D	20.0	
	Tribromodiphenyl ether		N.D	20.0	
	Tetrabromodiphenyl ether		N.D	20.0	
	Pentabromodiphenyl ether		N.D	20.0	
	Hexabromodiphenyl ether		N.D	20.0	
	Heptabromodiphenyl ether		N.D	20.0	
	Octabromodiphenyl ether		N.D	20.0	
	Nonabromodiphenyl ether		N.D	20.0	
	Decabromodiphenyl ether		N.D	50.0	

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- LED (5630 Type)

Halogen contents				
Test Item	Unit	Test Results	MDL	Test Methods
Fluorine (F)	mg/kg	N.D	50.0	EN 14582
Chlorine (Cl)		N.D	50.0	
Bromine (Br)		N.D	50.0	
Iodine (I)		N.D	50.0	

Others				
Test Item	Unit	Test Results	MDL	Test Methods
Perfluorooctanesulfonate (PFOS) [CAS No. : 1763-23-1]	mg/kg	N.D	1.0	In-House method_ LC/MS/MS

* MDL : Method Detection limit, N.D : Not Detected, N.A : Not Applicable

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2. Flow Chart

Digestion for material_IEC 62321 for Pb, Cd, Hg

- Cutting/ Preparation
- Sample measurement (0.25 g)
- Acid digestion with HNO_3 / HCl
- Filtration
- Residue
- Confirm the tested samples are totally dissolved
- ICP-OES or AAS

Extraction for polymer_IEC 62321 for Cr^{6+}

- Cutting/ Preparation
- Sample measurement (2.5 g)
- Add appropriate amount of digestion reagent
- Heat to appropriate temperature to extract
- Cool, filter digestate through filter
- Add diphenyl-carbazide for color development
- Measure the absorbance at 540 nm by UV/VIS

Extraction for polymer_IEC 62321 for PBBs, PBDEs

- Cutting/ Preparation
- Sample measurement (0.2 g)
- Sample solvent extraction
- Concentration / Dilution of extracted solution
- Filtration
- GC/MS

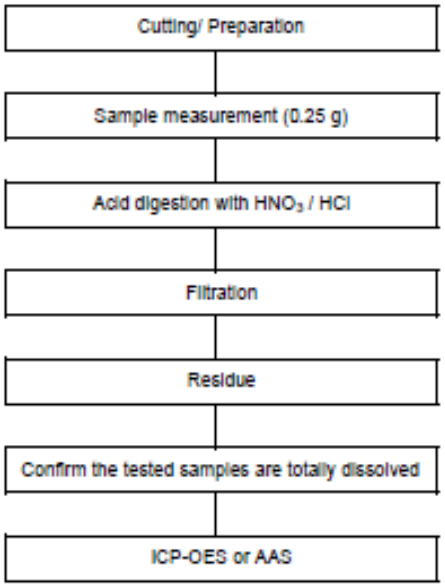
Oxygen bomb for halogen_EN 14582

- Cutting/ Preparation
- Sample measurement (1.0 g)
- Combustion (Oxygen bomb)
- Cooling to room Temperature
- Filtration
- IC

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Extraction for polymer_In-House method for PFOS



- End of Report -

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10. Revision History

Date	Revision History	Writer	
		Drawn	Approved
2012.02.06 [REV.00]	1st Approval	B.Y.Choi	S.H.Kim
2012.02.08 [REV.00.1]	오타 수정	B.Y.Choi	S.H.Kim
2012.03.05 [REV.01]	포장 수량 변경	B.Y.Choi	S.H.Kim
2012.10.24 [REV.02]	IV RANK 추가	B.Y.Choi	S.H.Kim
2013.06.24 [REV.03]	IV RANK High grade 구분 표시	B.Y.Choi	S.I.Lee
2013.07.04 [REV.04]	IV RANK High grade 구분 수정	B.Y.Choi	S.I.Lee
2013.07.08 [REV.05]	IV RANK High grade 구분 수정	B.Y.Choi	S.I.Lee
2015.09.11 [REV.06]	통합 좌표 변경, IV Rank 수정	S.I.Lee	T.G.Kim