Doc. No: LUMI 3228-2P- 10 02 26- SPEC

2PIN-SMD LED

WHITE COLOR LED

PRELIMINARY

Customer Approval		Model	LMTP2P32A1WHZ03	
		Issued Date	2010 – 02 - 26	
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

◆ **Lumimicro TOP VIEW LED P/N**

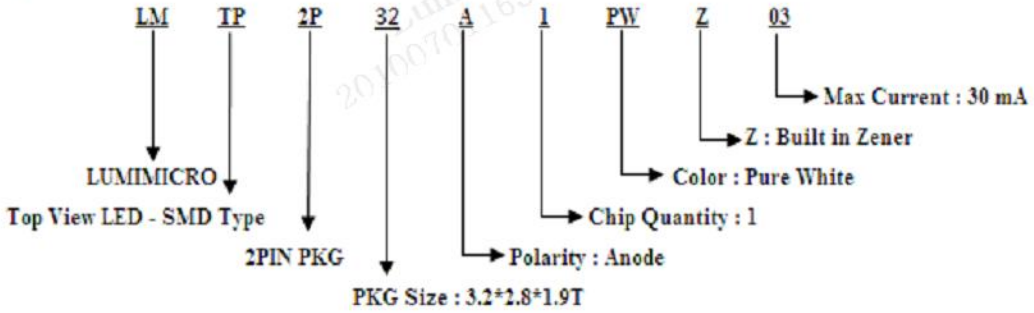
LUMIMICRO Top View LED Part No. Explantion

LM	: LUMIMICRO. Ltd
TP	: Top View LED - SMD Type
2P	: 2 PIN PKG
32	: Package Size (3.2*2.8*1.9T)
A	: Polarity Mark (C : Cathode / A : Anode)
1	: Chip Quantity (One Chip [1], Two Chip [2], Three Chip [3])
WH	: White Color

BW	PW	YW	RW	AW	WW
Bluish White	Pure White	Yellow White	Reddish White	Amber white	Warm White

Z	: Built in Zener (X : NO ZENER / Z : ZENER)
03	: Max. Current : 30mA

[EX]



◆ Features

[1] Built-in 1 chip Super-luminosity Chip LED

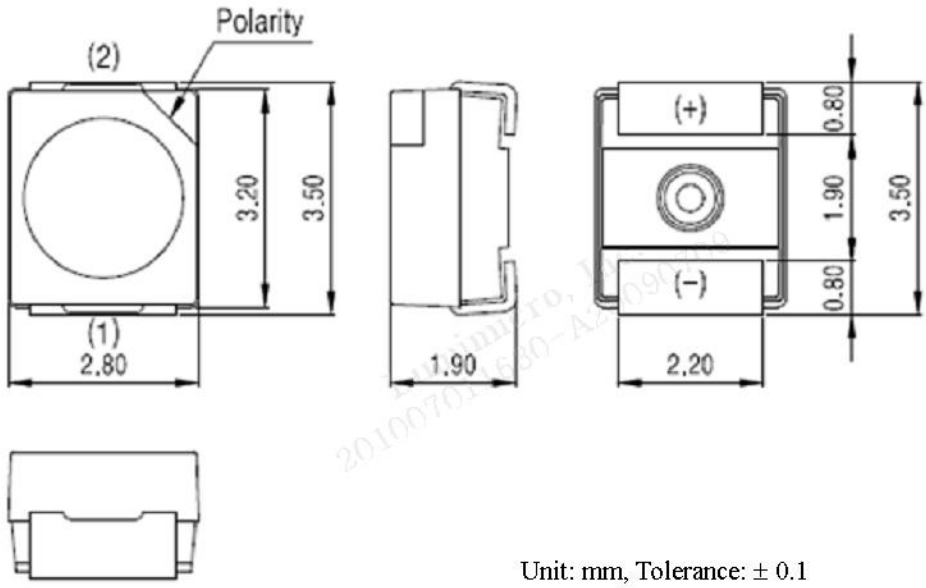
[2] Super-luminosity chip LED

[3] Wide viewing angle

[4] External dimensions: 3.2 x 2.8 x 1.9t mm

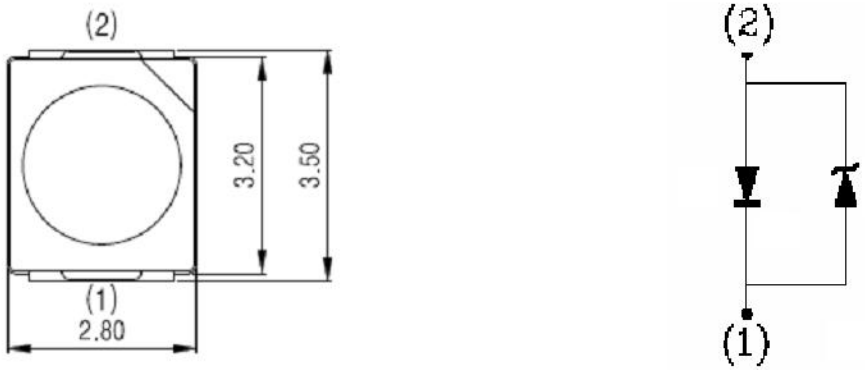
[5] Lead frame package with individual 2 pin

◆ Outline Dimensions



Unit: mm, Tolerance: ± 0.1

◆ LED Circuit Diagram



◆ Absolute Maximum Rating

Parameter	Color	Symbol	Rating Value	Unit
Forward DC Current	White	IF-1	30	m A
Power Dissipation	White	PD	100	mW
Forward Pulse Current *1	White	IPF-1	60	m A
Reverse Voltage	White	VF	5	V
ESD Voltage	White	ESD-1	HBM 12,000	V
Storage Temperature	White	TST	-40 to + 120	°C
Operating Temperature	White	TOT	-30 to + 85	°C
Soldering Temperature	White	TSD	260°C for 10 Seconds	°C

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

◆ Forward Voltage Characteristics [Condition : 20mA – Ta = 25°C]

Color	Item	Rank	Luminous Intensity			Unit
			MIN.	TYP.	MAX.	
White	Forward Voltage	3V0	2.9	2.95	3.0	V
	Forward Voltage	3V1	3.0	3.05	3.1	V
	Forward Voltage	3V2	3.1	3.15	3.2	V
	Forward Voltage	3V3	3.2	3.25	3.3	V
	Forward Voltage	3V4	3.3	3.35	3.4	V
	Forward Voltage	3V5	3.4	3.45	3.5	V

Measurement Tolerance: ± 0.05 V

◆ **Peak Luminous Intensity Characteristics [Condition : 20mA – Ta = 25°C]**

Color	Part No.	Item	Rank	Luminous Intensity			Unit
				MIN.	TYP.	Max.	
Bluish White	LMTP2P32A1BWZ03	Luminous Intensity	1L1	1	_	2	cd
			1L2	2	_	3	cd
Pure White	LMTP2P32A1PWZ03	Luminous Intensity	1L1	1	_	2	cd
			1L2	2	_	3	cd
			1L3	3	_	4	cd
Yellowish White	LMTP2P32A1YWZ03	Luminous Intensity	1L1	1	_	2	cd
Reddish White	LMTP2P32A1RWZ03		1L2	2	_	3	cd
			1L3	3	_	4	cd
Warm White	LMTP2P32A1WWZ03	Luminous Intensity	1L1	1	_	2	cd
Amber White	LMTP2P32A1AWZ03		1L2	2	_	3	cd

Measurement Tolerance: ± 0.5cd

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◆ **Peak Luminous Flux Characteristics [Condition : 20mA – Ta = 25°C]**

Color	Part No.	Item	Rank	Luminous Intensity			Unit
				MIN.	TYP.	Max.	
Bluish White	LMTP2P32A1BWZ03	Luminous Flux	1L1	6	_	8	lm
			1L2	8	_	10	lm
Pure White	LMTP2P32A1PWZ03	Luminous Flux	1L1	6	_	8	lm
			1L2	8	_	10	lm
			1L3	10	_	12	lm
Yellowish White	LMTP2P32A1YWZ03	Luminous Flux	1L1	6	_	8	lm
Reddish White	LMTP2P32A1RWZ03		1L2	8	_	10	lm
			1L3	10	_	12	lm
Warm White	LMTP2P32A1WWZ03	Luminous Flux	1L1	6	_	8	lm
Amber White	LMTP2P32A1AWZ03		1L2	8	_	10	lm

Measurement Tolerance: ± 0.5 lm

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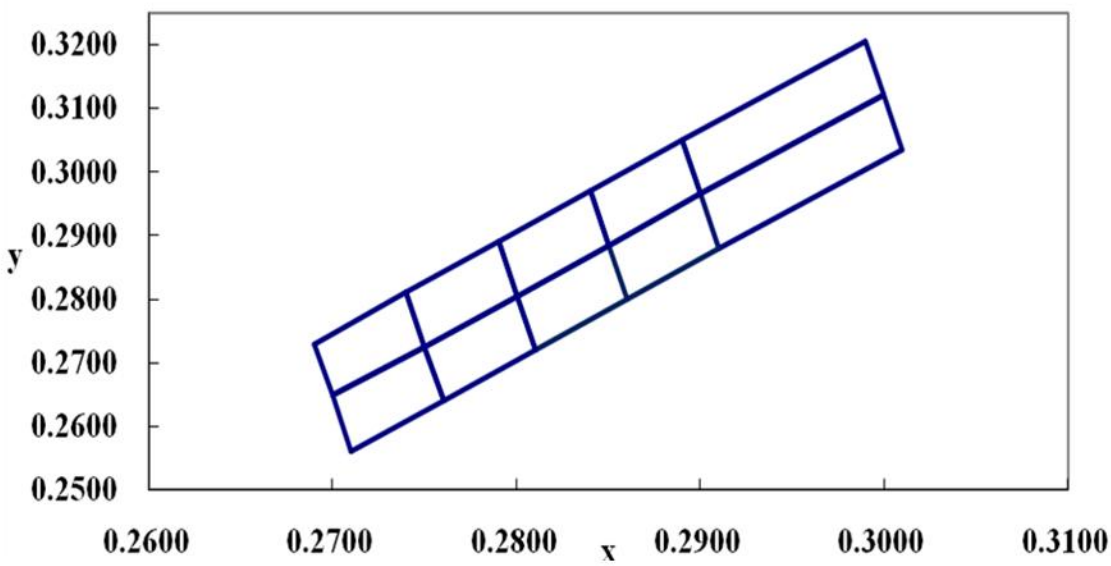
◆ White Color C.I.E Characteristics [Condition : 20mA – Ta = 25°C]

☞ Bluish White Color C.I.E

14K0H		12K0H		11K0H		9K5H		8K3H	
X	Y	X	Y	X	Y	X	Y	X	Y
0.2700	0.2650	0.2750	0.2725	0.2800	0.2805	0.2850	0.2885	0.2900	0.2965
0.2690	0.2730	0.2740	0.2810	0.2790	0.2890	0.2840	0.2970	0.2890	0.3050
0.2740	0.2810	0.2790	0.2890	0.2840	0.2970	0.2890	0.3050	0.2990	0.3205
0.2750	0.2725	0.2800	0.2805	0.2850	0.2885	0.2900	0.2965	0.3000	0.3120
14K0L		**12K0L**		**11K0L**		**9K5L**		**8K3L**	
x	y	x	y	x	y	x	y	x	y
0.2710	0.2560	0.2760	0.2640	0.2810	0.2720	0.2860	0.2800	0.2910	0.2880
0.2700	0.2650	0.2750	0.2725	0.2800	0.2805	0.2850	0.2885	0.2900	0.2965
0.2750	0.2725	0.2800	0.2805	0.2850	0.2885	0.2900	0.2965	0.3000	0.3120
0.2760	0.2640	0.2810	0.2720	0.2860	0.2800	0.2910	0.2880	0.3010	0.3035

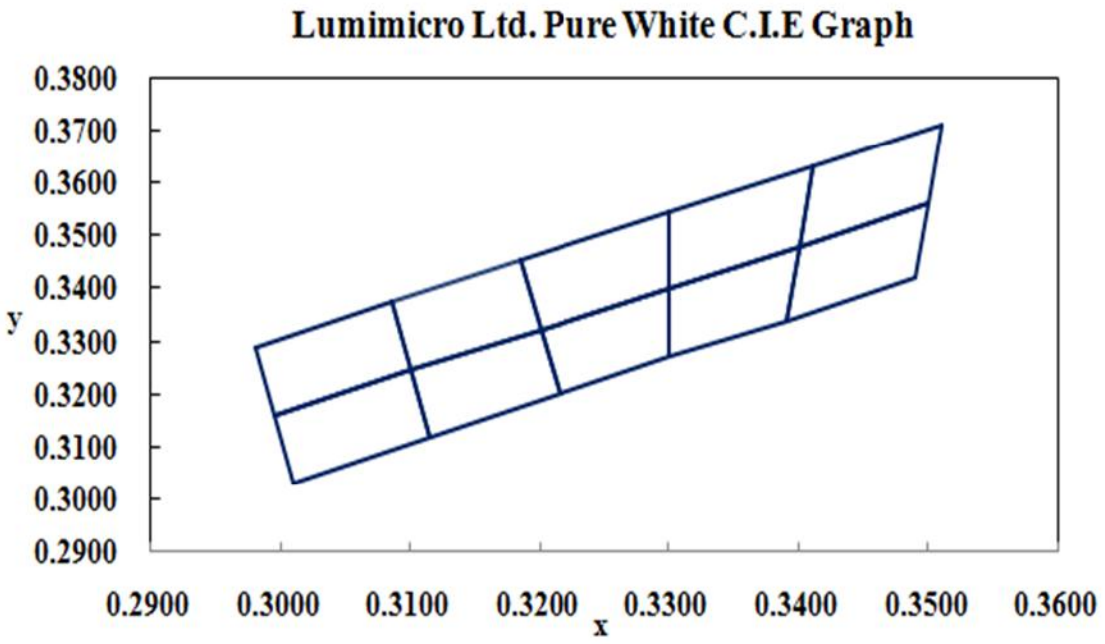
Lumimicro Ltd. Bluish White C.I.E Graph



◆ White Color C.I.E Characteristics [Condition : 20mA – Ta = 25°C]

☞ Pure White Color C.I.E

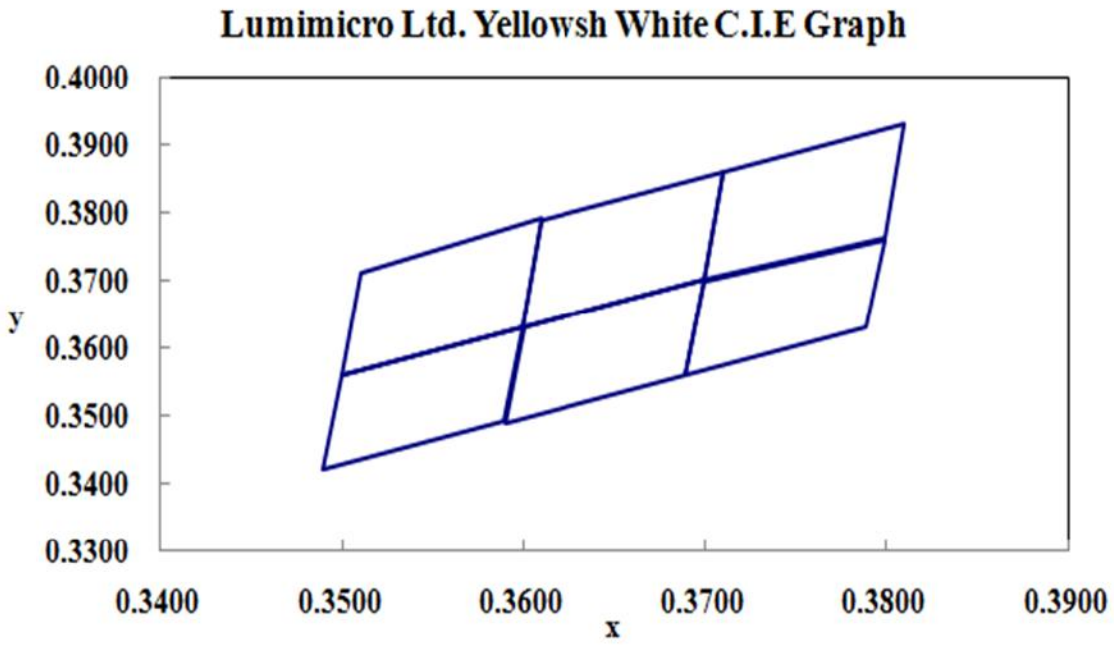
7K0H		6K3H		5K7H		5K3H		5K0H	
x	y	x	y	x	y	x	y	x	y
0.2980	0.3290	0.3085	0.3375	0.3185	0.3455	0.3300	0.3545	0.3410	0.3630
0.3085	0.3375	0.3185	0.3455	0.3300	0.3545	0.3410	0.3630	0.3510	0.3710
0.3100	0.3245	0.3200	0.3320	0.3300	0.3400	0.3400	0.3480	0.3500	0.3560
0.2995	0.3160	0.3100	0.3245	0.3200	0.3320	0.3300	0.3400	0.3400	0.3480
7K0L		**6K3L**		**5K7L**		**5K3L**		**5K0L**	
x	y	x	y	x	y	x	y	x	y
0.2995	0.3160	0.3100	0.3245	0.3200	0.3320	0.3300	0.3400	0.3400	0.3480
0.3100	0.3245	0.3200	0.3320	0.3300	0.3400	0.3400	0.3480	0.3500	0.3560
0.3115	0.3120	0.3215	0.3200	0.3300	0.3270	0.3390	0.3340	0.3490	0.3420
0.3010	0.3030	0.3115	0.3120	0.3215	0.3200	0.3300	0.3270	0.3390	0.3340



◆ White Color C.I.E Characteristics [Condition : 20mA – Ta = 25°C]

☞ **Yellowish White Color C.I.E**

4K7H		4K5H		4K0H	
x	y	x	y	x	y
0.3500	0.3560	0.3600	0.3630	0.3700	0.3700
0.3510	0.3710	0.3610	0.3790	0.3710	0.3860
0.3610	0.3790	0.3710	0.3860	0.3810	0.3930
0.3600	0.3630	0.3700	0.3700	0.3800	0.3760
4K7L		**4K5L**		**4K0L**	
x	y	x	y	x	y
0.3490	0.3420	0.3590	0.3490	0.3690	0.3560
0.3500	0.3560	0.3600	0.3630	0.3700	0.3700
0.3600	0.3630	0.3700	0.3700	0.3800	0.3760
0.3590	0.3490	0.3690	0.3560	0.3790	0.3630



◆ **White Color C.I.E Characteristics [Condition : 20mA – Ta = 25°C]**

☞ **Reddish White Color C.I.E**

3K8H		3K6H		3K4H	
x	y	x	y	x	y
0.3800	0.3760	0.3900	0.3840	0.4000	0.3910
0.3810	0.3930	0.3910	0.4000	0.4010	0.4070
0.3910	0.4000	0.4010	0.4070	0.4110	0.4140
0.3900	0.3840	0.4000	0.3910	0.4100	0.3980
3K8L		**3K6L**		**3K4L**	
x	y	x	y	x	y
0.3790	0.3630	0.3890	0.3700	0.3990	0.3770
0.3800	0.3760	0.3900	0.3840	0.4000	0.3910
0.3900	0.3840	0.4000	0.3910	0.4100	0.3980
0.3890	0.3700	0.3990	0.3770	0.4090	0.3840

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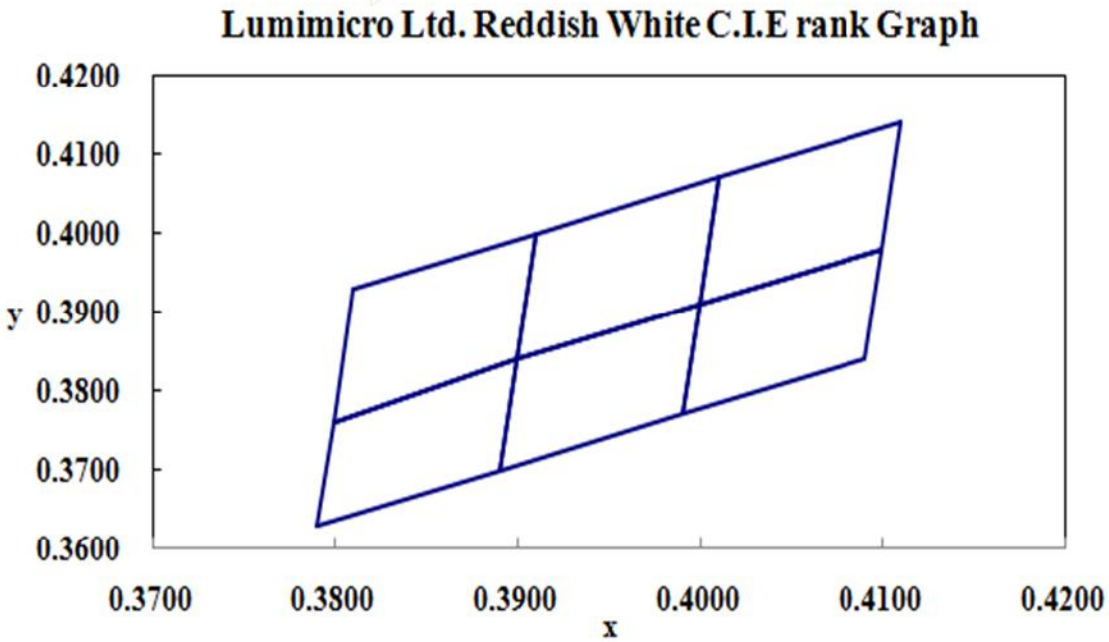
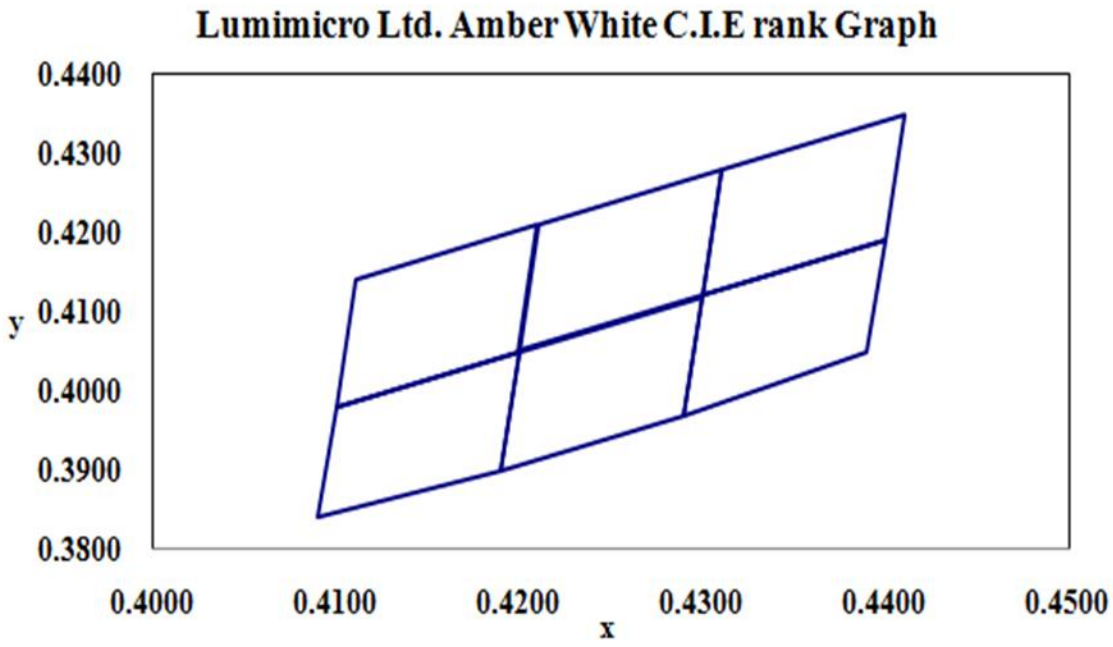


◆ **White Color C.I.E Characteristics [Condition : 20mA – Ta = 25°C]**

☞ **Amber White Color C.I.E**

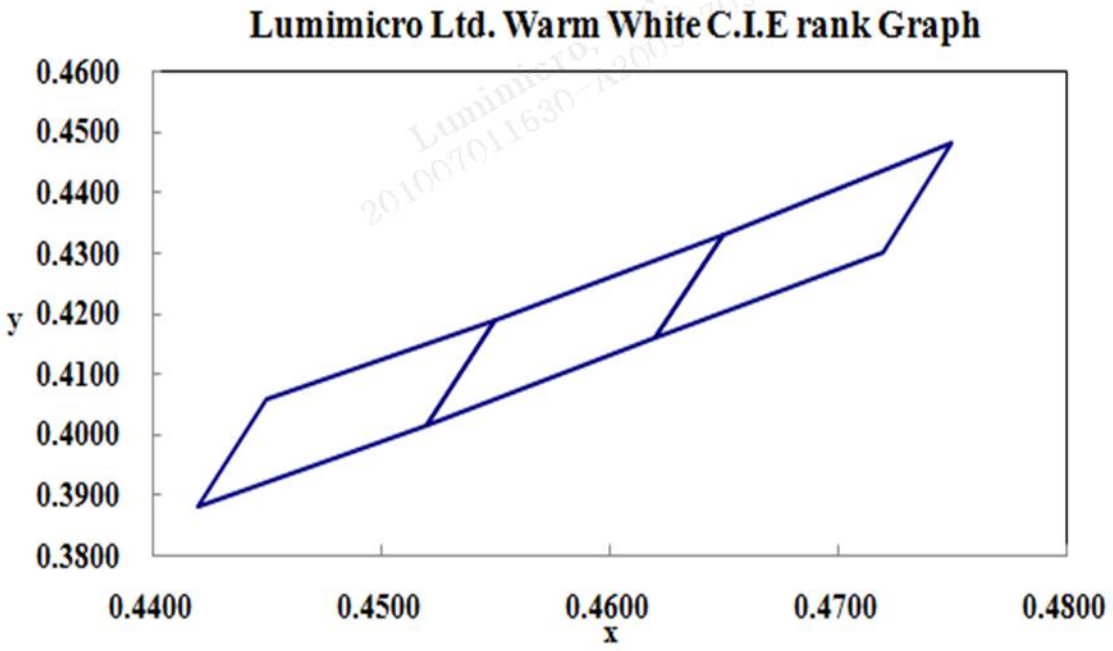
3K2H		3K0H		2K9H	
x	y	x	y	x	y
0.4100	0.3980	0.4200	0.4050	0.4300	0.4120
0.4110	0.4140	0.4210	0.4210	0.4310	0.4280
0.4210	0.4210	0.4310	0.4280	0.4410	0.4350
0.4200	0.4050	0.4300	0.4120	0.4400	0.4190
3K2L		**3K0L**		**2K9L**	
x	y	x	y	x	y
0.4090	0.3840	0.4190	0.3900	0.4290	0.3970
0.4100	0.3980	0.4200	0.4050	0.4300	0.4120
0.4200	0.4050	0.4300	0.4120	0.4400	0.4190
0.4190	0.3900	0.4290	0.3970	0.4390	0.4050



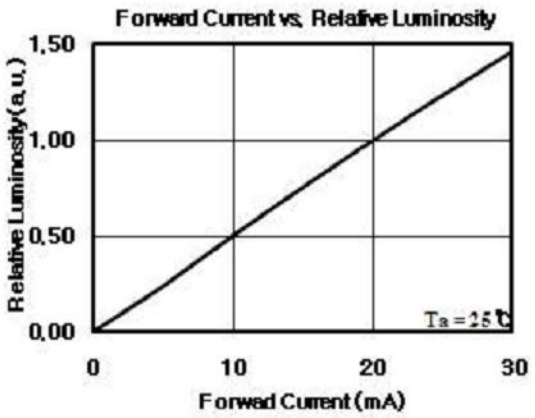
◆ White Color C.I.E Characteristics [Condition : 20mA – Ta = 25°C]

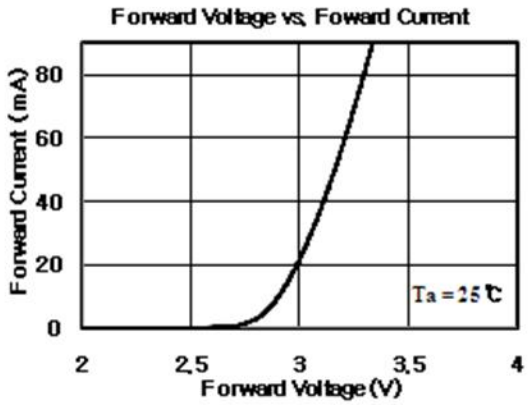
☞ Warm White Color C.I.E

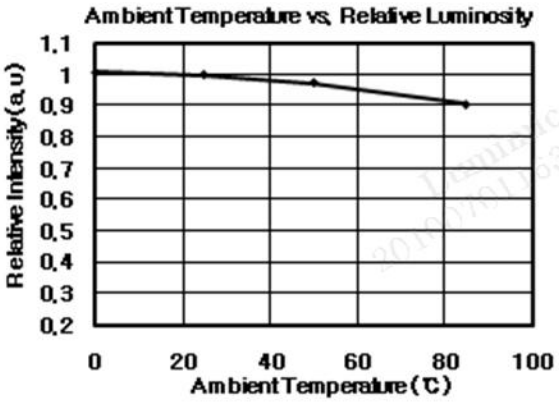
2K8		2K7		2K6	
X	Y	X	Y	X	Y
0.4420	0.3880	0.4520	0.4015	0.4620	0.4160
0.4450	0.4060	0.4550	0.4190	0.4650	0.4330
0.4550	0.4190	0.4650	0.4330	0.4750	0.4480
0.4520	0.4015	0.4620	0.4160	0.4720	0.4300

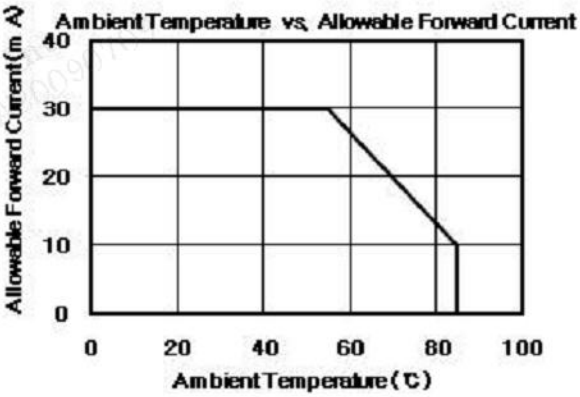


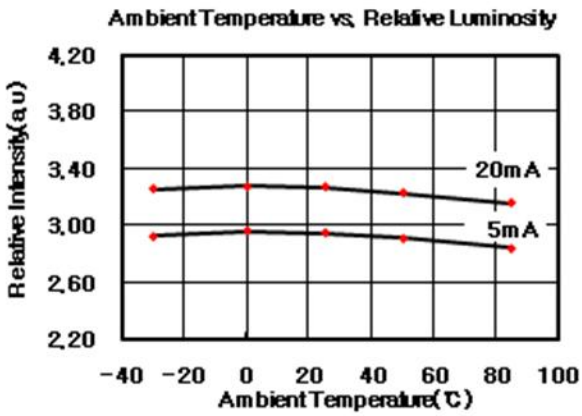
◆ Electrical & Optical Characteristics











◆ **Directivity**

X-Direction

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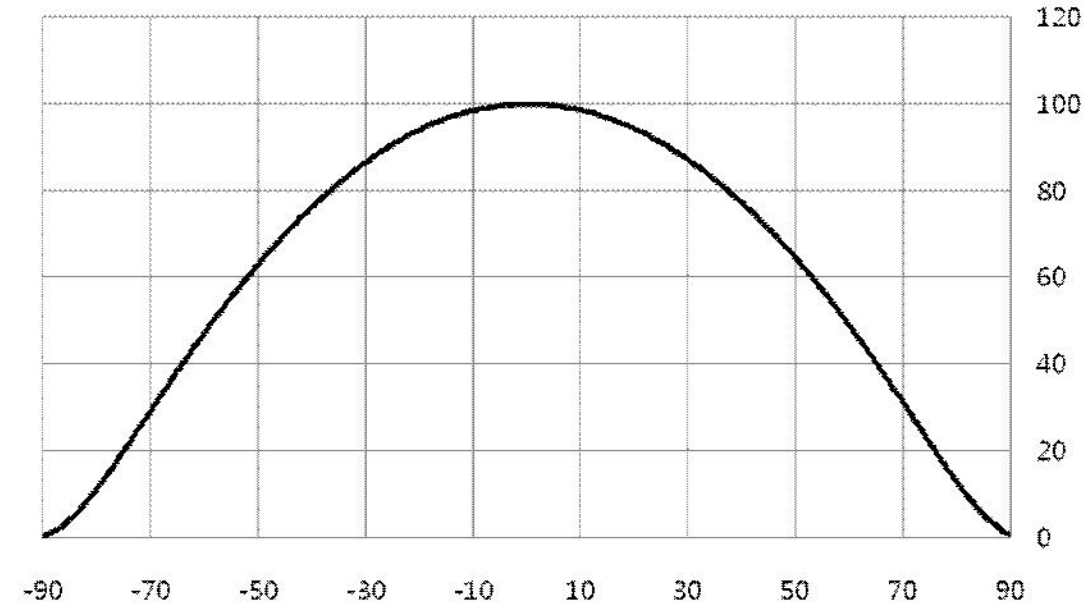
Y-Direction



◆ Reliability Results

	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=20mA/chip each*	1,000HRS	0/30
8	HIGH TEMPERATURE HUMIDITY LIFE TEST	60℃, RH=90%, IF=15mA/chip each*	500HRS	0/30
9	LOW TEMPERATURE LIFE TEST	Ta = -40℃, IF=20mA/chip each*	1,000HRS	0/30
10	HIGH TEMPERATURE LIFE TEST	Ta = 85℃, IF=20mA/chip each*	500HRS	0/30

*) ; Tested with Lumimicro standard circuit board

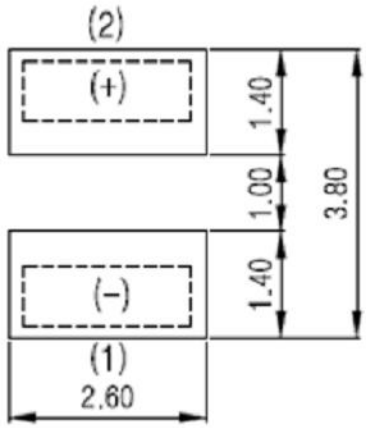
◆ Failure Criteria

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**	-

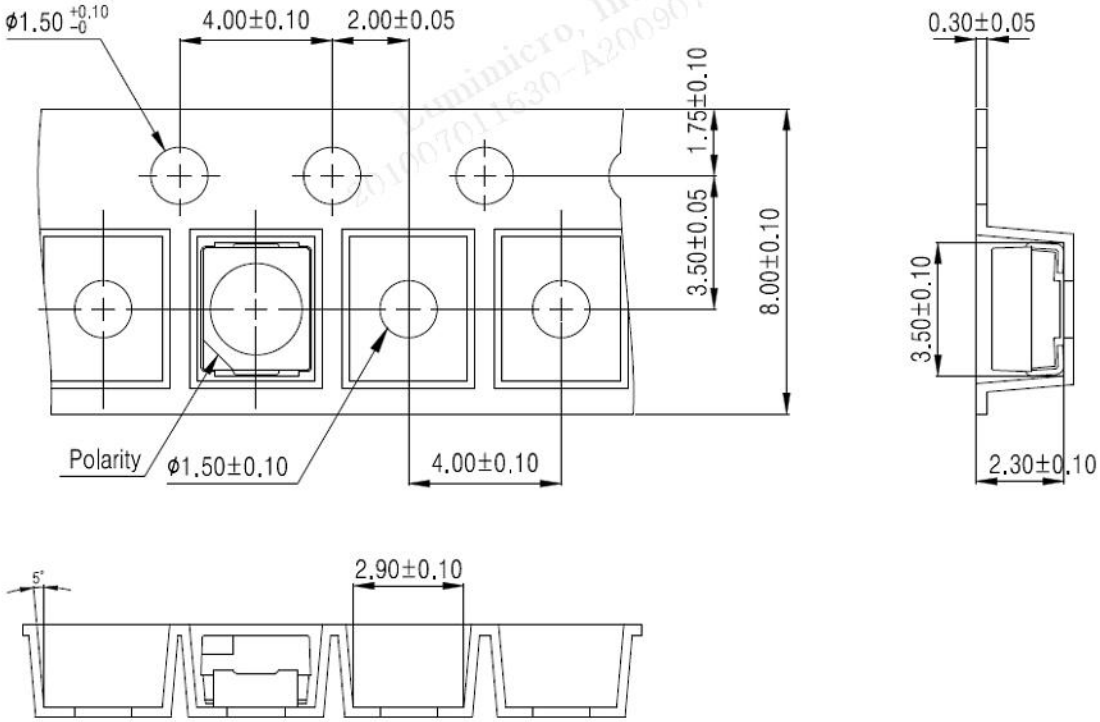
U.S.L*) ; Upper Standard Level

L.S.L*) ; Lower Standard Level

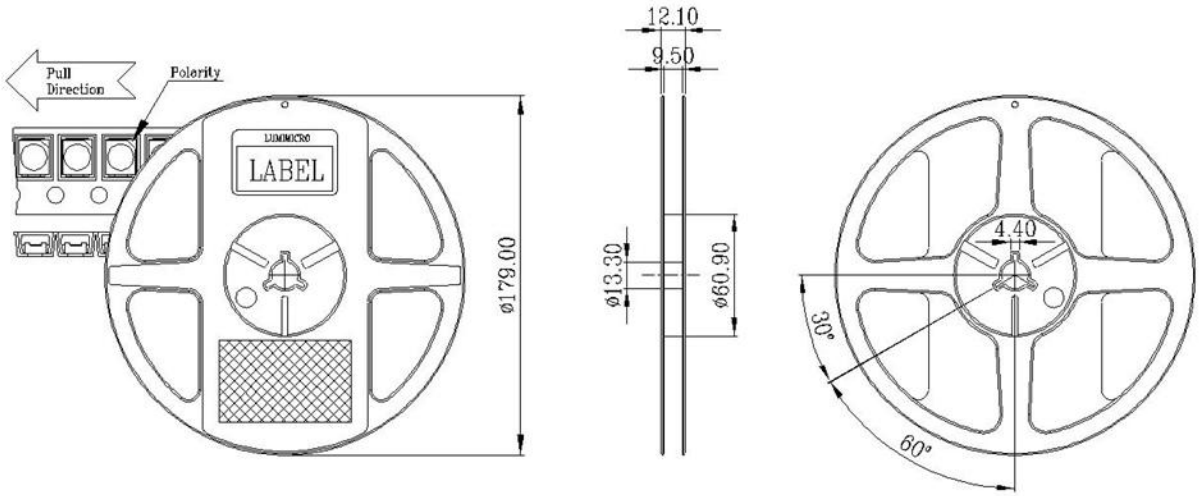
◆ **Recommended Pad Pattern**



◆ **Taping pocket Dimension**



◆ Reel Dimensions



One Reel	Unit	Tolerance
Max 1,500EA	mm	0.1

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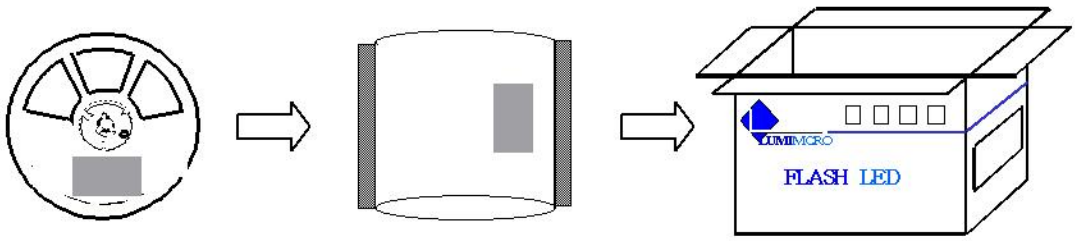
◆ Packing Spec



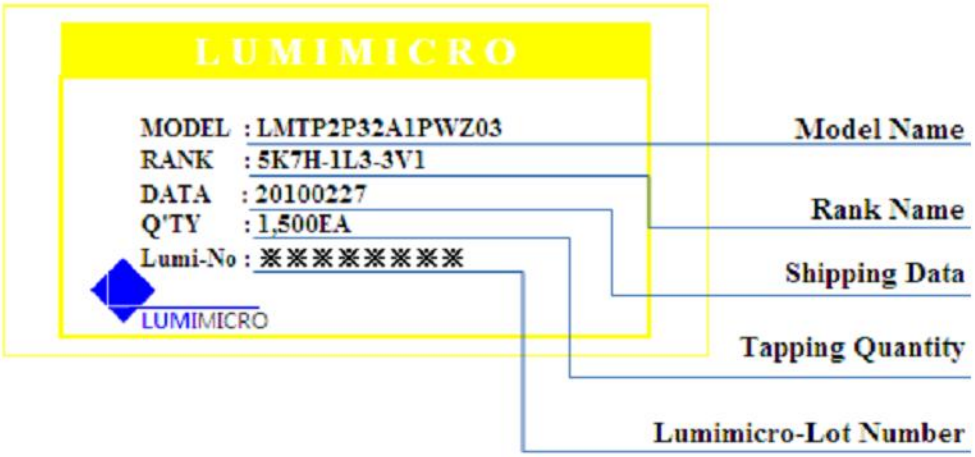
- **Aluminum Bag**

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

- **Box Spec.**

	Dimensions(Width/Thickness) Unit : mm	Reels in Box	Goods in QNT in Box
Box	275/ 285/ 200	10	Max : 15,000ea

◆ **Label Spec**



◆ **Precautions 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.

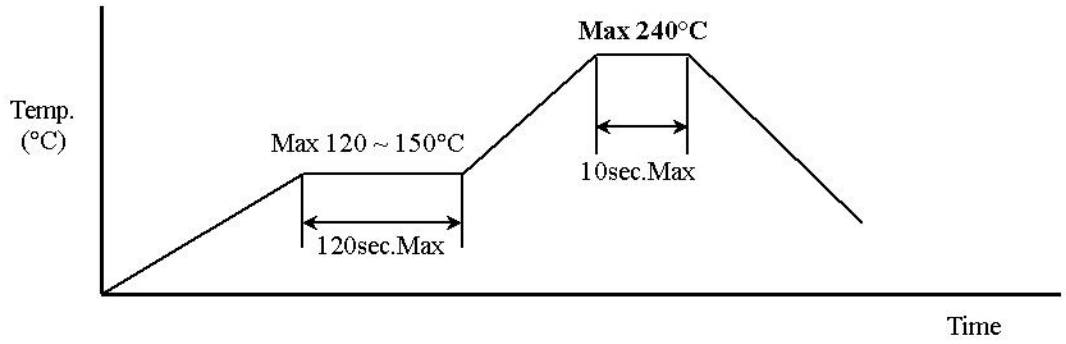
The LEDs must be dip soldered within seven days after opening the moisture-proof packing. Repack unused Products with anti-moisture packing, fold to close any opening and then store in dry place. The appearance and specifications of the product may be modified for improvement without notice. These LEDs 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.

◆ Soldering Condition

1. Reflow Conditions (With Pb)

Preliminary heating to be at 150°C max. for 2 minutes max.

Soldering heat to be at 240°C max. for 10 seconds max.

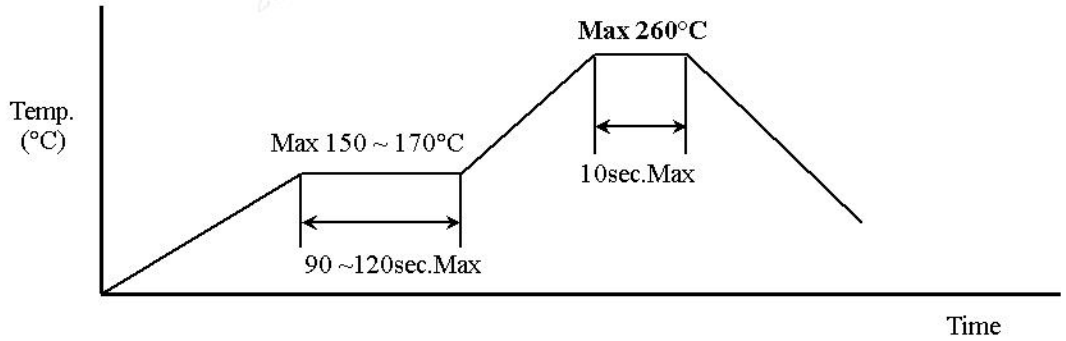


Recommended Solder Paste : Alloy- 63Sn/37Pb Model: OL107B,

2. Pb free Reflow Conditions

Preliminary heating to be at 150°C max. for 2 minutes max.

Soldering heat to be at 260°C 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°C, under soldering iron.

◆ **Test Certification**

CTK Co., Ltd.
386-1, Ho-dong, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea 449-100
Tel: +82-31-339-9970 Fax: +82-31-339-9855
www.e-ctk.com

Test Report

Applicant Name:	LUMIMICRO
Address:	2F 685, Buk-ri, Namsa-myeon, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea
Test Report No.:	CTK0911-RS-000406
Date of Issue:	Nov. 17, 2009
Sample Name:	LED (3228, 3528 SIZE)
Receipt Date:	Nov. 04, 2009
Test Performing Date:	Nov. 17, 2009
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	Jae Won Park, Assistant Manager Dae Soon Kim

CTK Co., Ltd.

Yongjun Jo / Lab. Manager

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Report Form No : CTK-RF-RS-002 (Rev. 04)

◆ Test Certification

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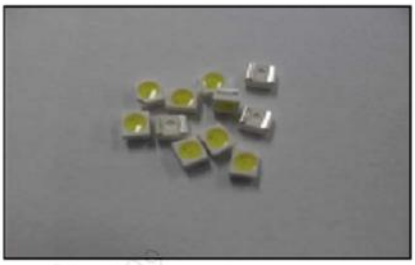
1. TEST RESULTS

1) LED (3228, 3528 SIZE)



Heavy Metals

Test Items	Unit	Test Results	MDL	Test Methods
Pb	mg/kg	N.D	5.0	IEC 62321_ AAS
Cd		N.D	0.5	IEC 62321_ ICP-OES
Hg		N.D	1.0	
Cr^{6+}		N.D	0.2	IEC 62321_ UV/Vis Spectrometer

Flame Retardants

Test Items		Unit	Test Results	MDL	Test Methods
PBB_s	Bromobiphenyl	mg/kg	N.D	20.0	IEC 62321_ GC/MS
	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	
$PBDE_s$	Bromodiphenyl ether	mg/kg	N.D	20.0	IEC 62321_ GC/MS
	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	

Test Report No : CTK0911-RS-000406 page 2 of 3
Date : 11. 17. 2009

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- LED (3228, 3528 SIZE)

Halogen Contents				
Test Items	Unit	Test Results	MDL	Test Methods
Fluorine (F)	mg/kg	N.A	50	EN 14582_IC
Chlorine (Cl)		N.D	50	EN 14582_IC
Bromine (Br)		N.D	50	EN 14582_IC
Iodine (I)		N.A	50	EN 14582_IC

Test Items	Unit	Test Results	MDL	Test Methods
Perfluorooctyl acid (PFOA) [CAS No.: 335-67-1]	mg/kg	N.A	-	-
Perfluorooctanesulfonate (PFOS) [CAS No. : 1763-23-1]		N.D	1.0	In-House method _LC/MS/MS

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

Test Report No : CTK0911-RS-000406 page 3 of 3
Date : 11. 17. 2009

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Test Report

Applicant Name:	LUMIMICRO
Address:	2F 685, Buk-ri, Namsa-myeon, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea
Test Report No.:	CTK0911-RS-000401
Date of Issue:	Nov. 17, 2009
Sample Name:	LED (3228, 3528 SIZE)
Receipt Date:	Nov. 04, 2009
Test Performing Date:	Nov. 17, 2009
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	Seung Hyup Baek Dae Soon Kim

CTK Co., Ltd.

Yongjun Jo / Lab. Manager

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1. TEST RESULTS

1) LED (3228, 3528 SIZE)

SVHC					
Test Items	Unit	Test Results	MDL	Test Methods	
Cobalt dichloride (Co) [1] (CAS No.: 007646-79-9)	mg/kg	N.D	5.0	US EPA 3052_ ICP-OES	
Diarsenic pentaoxide (As) [2] (CAS No.: 001303-28-2)		N.D	10.0	US EPA 3052_ ICP-OES	
Diarsenic trioxide (As) [2] (CAS No.: 001327-53-3)		N.D			
Triethyl arsenate (As) [2] (CAS No.: 015606-95-8)		N.D			
lead hydrogen arsenate (Pb) [2] (CAS No.: 007784-40-9)		N.D	5.0	US EPA 3052_ ICP-OES	
Sodium dichromate, dihydrate [2] (CAS No.: 007789-12-0)		N.D	0.5	ISO 3613_ UV-Vis	
Anthracene (CAS No.: 000120-12-7)	mg/kg	N.D	0.2	ZEK01.2-08_GC/MS	
4,4'-Diaminodiphenylmethane (CAS No.:000101-77-9)	mg/kg	N.D	5.0	KS K 0147 : 1999_GC/MS	
Dibutyl phthalate (DBP) (CAS No.:000084-74-2)	mg/kg	N.D	5.0	KS M 1991_GC/MS	
Bis (2-ethyl(hexyl)phthalate) (DEHP) (CAS No.:000117-81-7)	mg/kg	N.D			
Benzyl butyl phthalate (BBP) (CAS No.:000085-68-7)	mg/kg	N.D			
5-tert-buty-2,4,6-trinitro-m-xylene (musk xylene) (CAS No.:000081-15-2)	mg/kg	N.D	10.0	US EPA 3550C_GC/MS	
Hexabromocyclododecane (HBCDD) (CAS No.:025637-99-4)	mg/kg	N.D	5.0	US EPA 3540C_GC/MS	
Alkanes, C10-13, chloro (Short Chain Chlorinated Paraffins) (CAS No.:085535-84-8)	mg/kg	N.D	50	US EPA 3540C _GC/MS	
Bis (tributyltin)oxide [3] (CAS No.:000056-35-9)	mg/kg	N.D	50	US EPA 3052_ICP-OES	

* MDL : Method Detection Limit , N.D : Not Detected
[1] Calculated concentration of cobalt dichloride is based on the identified heavy metal and anion result.
[2] Calculated concentration of diarsenic pentaoxide, diarsenic trioxide, triethyl arsenate, lead hydrogen arsenate and sodium dichromate are based on the identified heavy metal result.
[3] Calculated concentration of Bis (tributyltin)oxide [3]) are based on the identified heavy metal result.

Test Report No : CTK0911-RS-000401 page 2 of 2
Date : 11. 17. 2009

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