Doc . No : LUMI 3528-2P- 05 08 17- SPEC

3528-2PIN-SMD LED

White LED

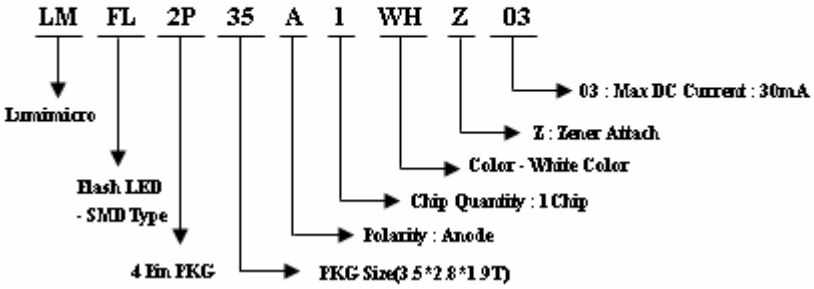
Customer Approval		Model	LMFL2P35A1WHZ03	
		Issued Date	2005 – 08 - 17	
Checked By	Approved By	Description	SMD Type LED	
		Written By	Checked By	Approved by

◆ **Lumimicro FLASH LED P/N**

LUMIMICRO 3528 FLASH LED Part No. - Explanation

LM	: LUMIMICRO
FL	: FLASH LED - SMD Type
2P	: 2 Pin PKG
35	: Package Size(3.5*2.8*1.9T)
A	: Polarity Mark(A : Anode, C : Cathode
1	: Chip Quantity
WH	: Color - White Color
Z	: ZENER (Z : ZENER, X : NO ZENER)
0 3	: Max DC Current -30mA (03 : 30mA, 06 : 60mA.....)

[EX]



◆ Features

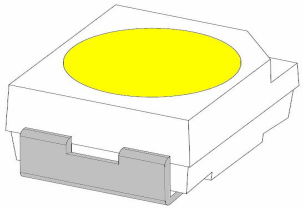
[1] Built-in 1 chip Super-luminosity Chip LED

[2] Super-luminosity chip LED

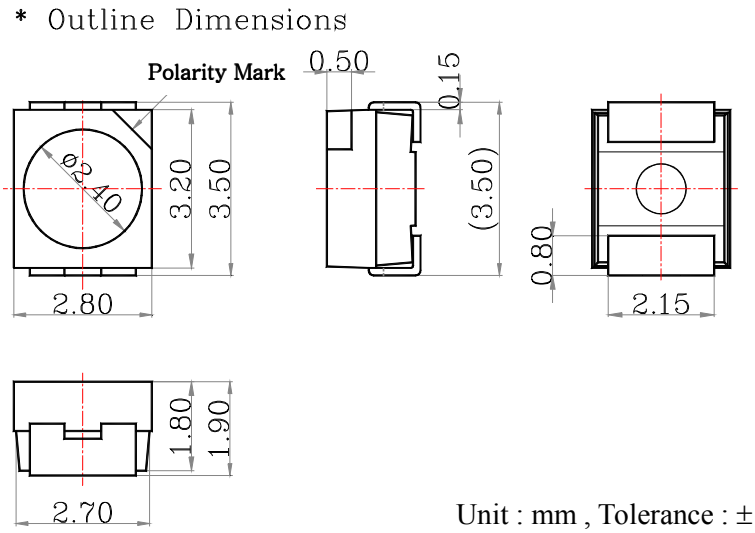
[3] Wide viewing angle

[4] External dimensions: 3.5 x 2.8 x 1.9t mm

[5] Lead frame package with individual 2 pin

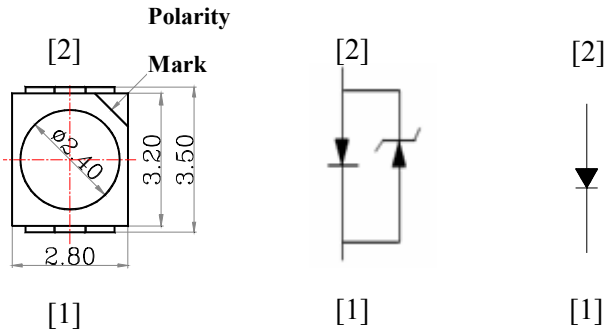


◆ Outline Dimensions



Unit : mm , Tolerance : ± 0.1

◆ LED Circuit Diagram



◆ **Absolute Maximum Rating**

Parameter	Color	Symbol	Rating Value	Unit
Forward DC Current	All Color	IF-1	30	m A
Forward Pulse Current *1	All Color	IPF-1	100	m A
Reverse Voltage	All Color	VR-1	5	V
ESD Voltage	All Color	ESD-1	HBM 16000	V
Storage Temperature	All Color	TST	-40 to + 120	°C
Soldering Temperature	All Color	TSD	260C for 5 Seconds	°C

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

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

Color	Part No.	Item	Symbol	Luminous Intensity			Unit
				MIN.	TYP.	Max	
White	LMFL2P35A1WHZ03	Luminous Intensity	IV	1000	1500	2000	mcd
White	LMFL2P35A1WHX03	Luminous Intensity	IV	1000	1500	2000	mcd
Warm White	LMFL2P35A1WWZ03	Luminous Intensity	IV	700	900	-	mcd

Measurement Tolerance : + / - 10%

◆ **CCT Characteristics [Condition : 20mA – Ta = 25°C]**

Color	P/N	Item	Symbol	CCT			Unit
				MIN.	TYP.	Max	
White	LMFL2P35A1WHZ03	Color Temperature	CCT	4500.0	6500.0	10000.0	K
	LMFL2P35A1WHX03	Color Temperature	CCT	4500.0	6500.0	10000.0	K
Warm White	LMFL2P35A1WWZ03	Color Temperature	CCT	2800.0	3200.0	3800.0	K

Measurement Tolerance : + / - 10%

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

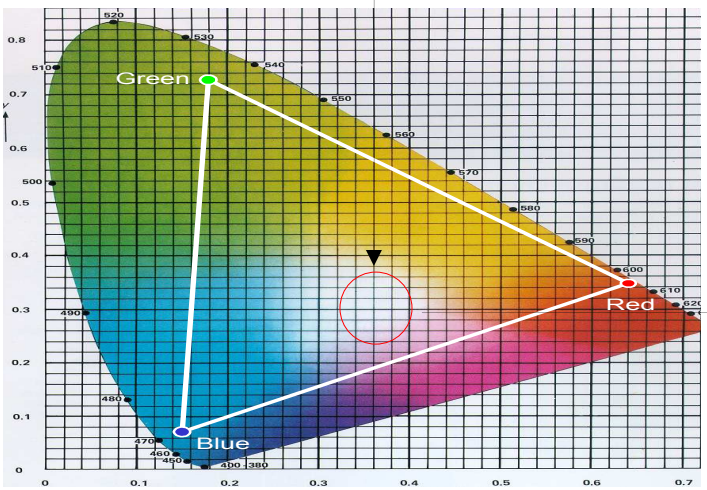
Color	Item	Symbol	Forward Voltage			Unit
			MIN.	TYP.	Max	
All White	Forward Voltage	VF	3.0	3.4	3.8	V

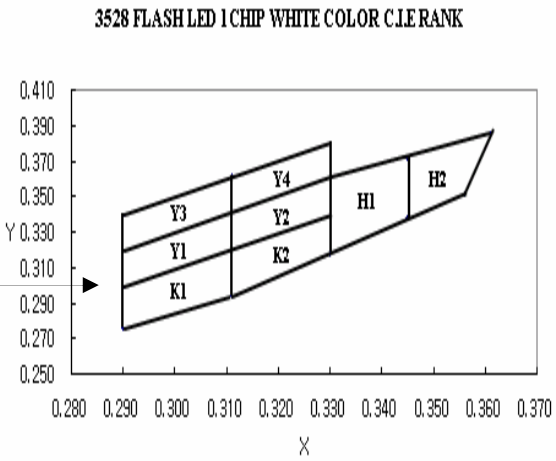
Measurement Tolerance : + / - 10%

◆ **White CIE Bin Spec [Condition : 20mA – Ta = 25°C]**

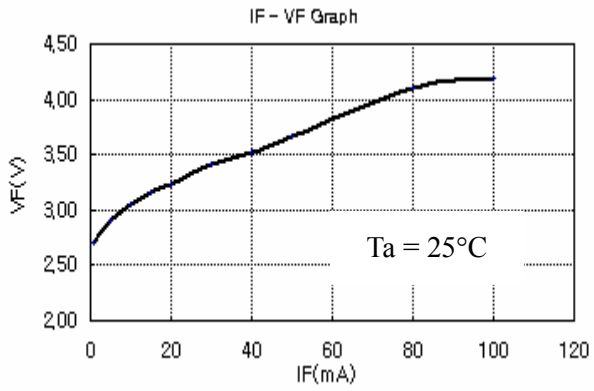
K1		K2		H1		H2	
X	Y	X	Y	X	Y	X	Y
0.290	0.298	0.311	0.294	0.330	0.360	0.345	0.372
0.311	0.320	0.330	0.339	0.345	0.372	0.361	0.385
0.311	0.294	0.330	0.318	0.345	0.338	0.356	0.351
0.290	0.276	0.311	0.320	0.330	0.318	0.345	0.338

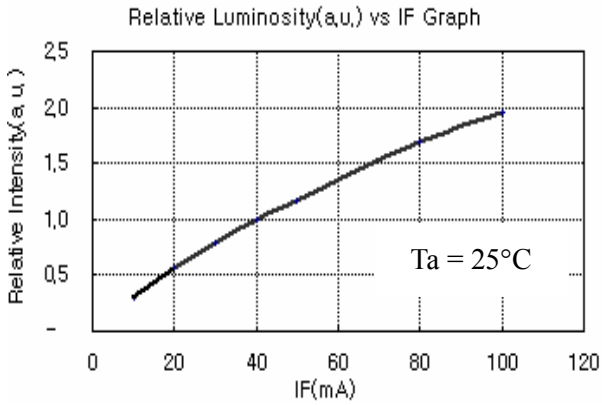
Y1		Y2		Y3		Y4	
X	Y	X	Y	X	Y	X	Y
0.290	0.320	0.311	0.341	0.290	0.339	0.311	0.361
0.311	0.341	0.330	0.360	0.311	0.361	0.330	0.380
0.311	0.320	0.330	0.339	0.311	0.341	0.330	0.360
0.290	0.298	0.311	0.320	0.290	0.320	0.311	0.341

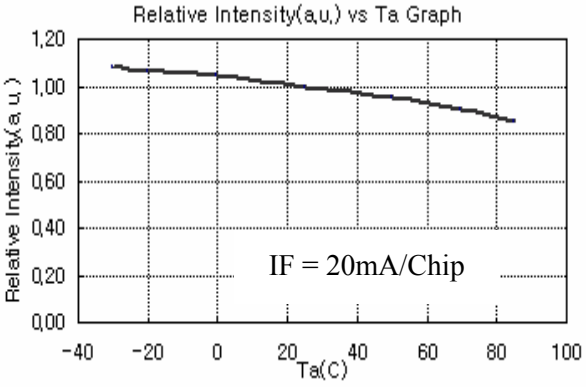


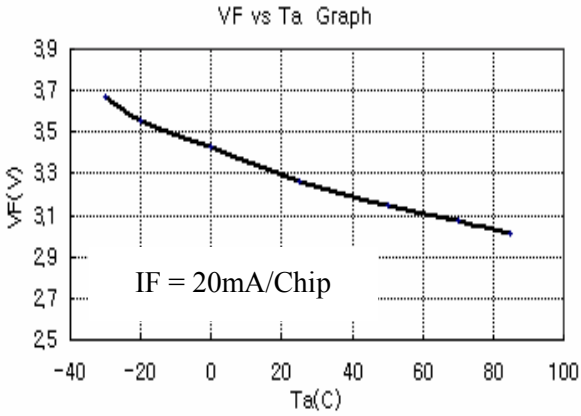


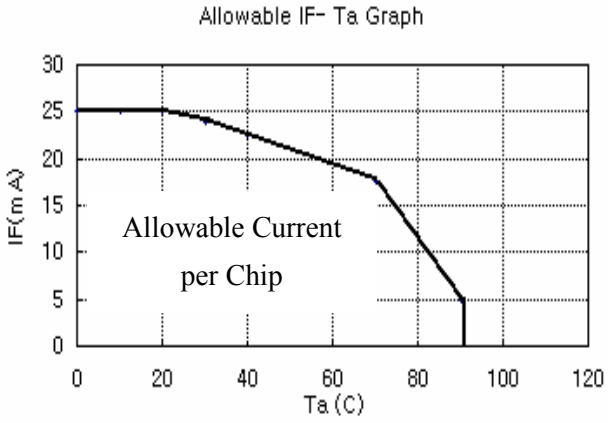
◆ Optical & Electrical Characteristics



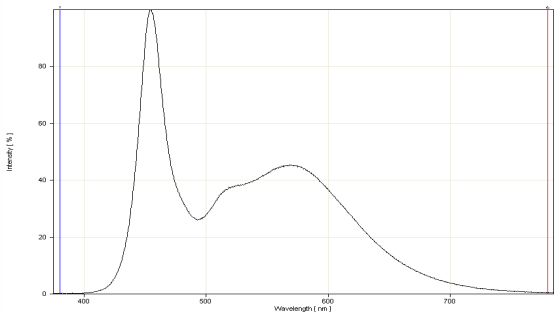








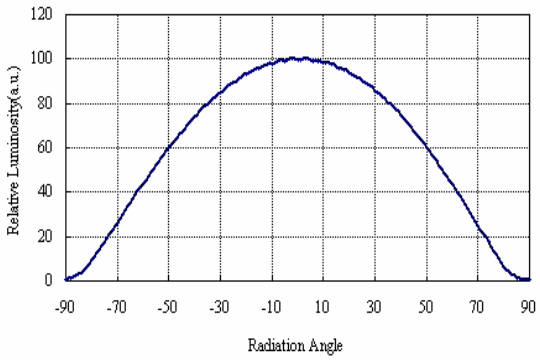
Spectrum Graph



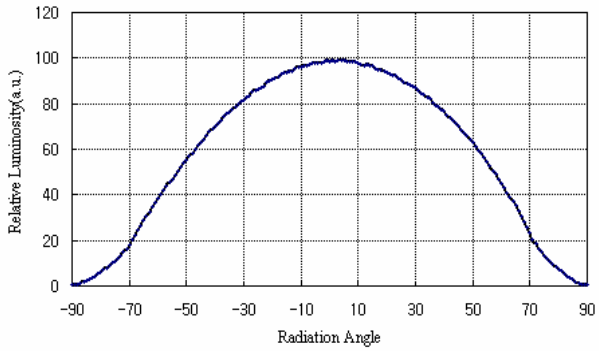
- VF : Forward Voltage(V), IF : Forward Current(m A), Ta : Ambient Temperature(°C)

◆ **Directivity**

X-Direction



Y-Direction



◆ Reliability Results

	ITEMS	CONDITION	NOTE	Fail/sample
1	RESISTANCE TO SOLDERING HEAT (REFLOW SOLDERING)	TSID=240℃, 10SEC (PRE TREATMENT 30℃, 70%, 168hrs)	2 TIMES	0/20
2	SOLDERBILITY (REFLOW SOLDERING)	TSID=215℃ ± 5 ℃, 3 SEC (LEAD SOLDER)	TIME OVER 95	0/20
3	THERMAL SHOCK	-20℃ ~ 100℃ , 15min AT EACH TEMP.	20CYCLES	0/20
4	MOISTURE RESISTANCE CYCLE	25℃ ~ 65℃ ~ -10℃, 90%RH 24hrs/1cycle	500 HRS	0/20
5	HIGH TEMPERATURE STORAGE	Ta = 100 ℃	500 HRS	0/20
6	TEMPERATURE HUMIDITY STORAGE	Ta = 60 ℃ , RH=90%	500 HRS	0/20
7	LOW TEMPERATURE STORAGE	Ta = -40 ℃	500 HRS	0/20
8	LIFE TIME 1	20mA @ ROOM TEMP.	500 HRS	0/20
9	LIFE TIME 2	15mA @ 60℃ , 90%RH	300 HRS	0/20
10	LIFE TIME 3	20mA @ -40 ℃	500 HRS	0/20
11	ON / OFF TEST	IF = 60mA , Pulse Width 0.2sec, Duty Ratio 1/2	200,000Cycles	0/20

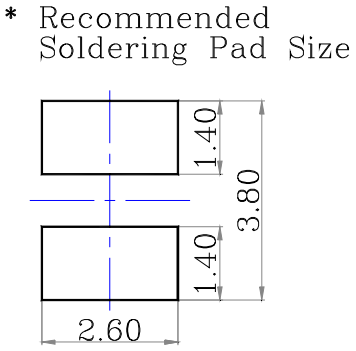
* Criteria For Failure

Item	Stmbol	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*)×0.5	_

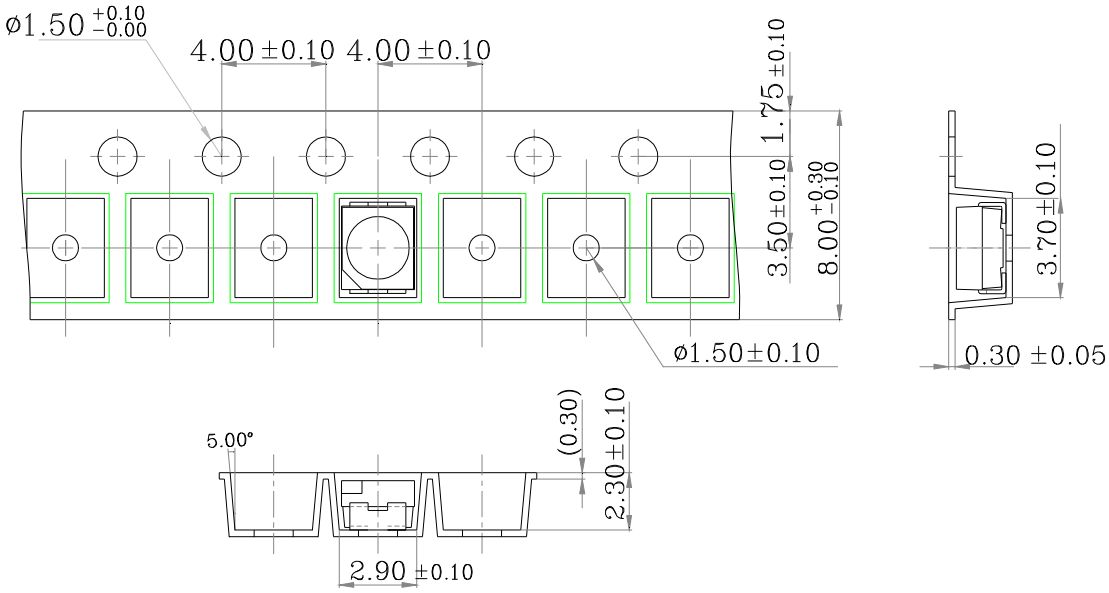
U.S.L*) : Upper Standard Level

L.S.L*) : Lower Standard Level

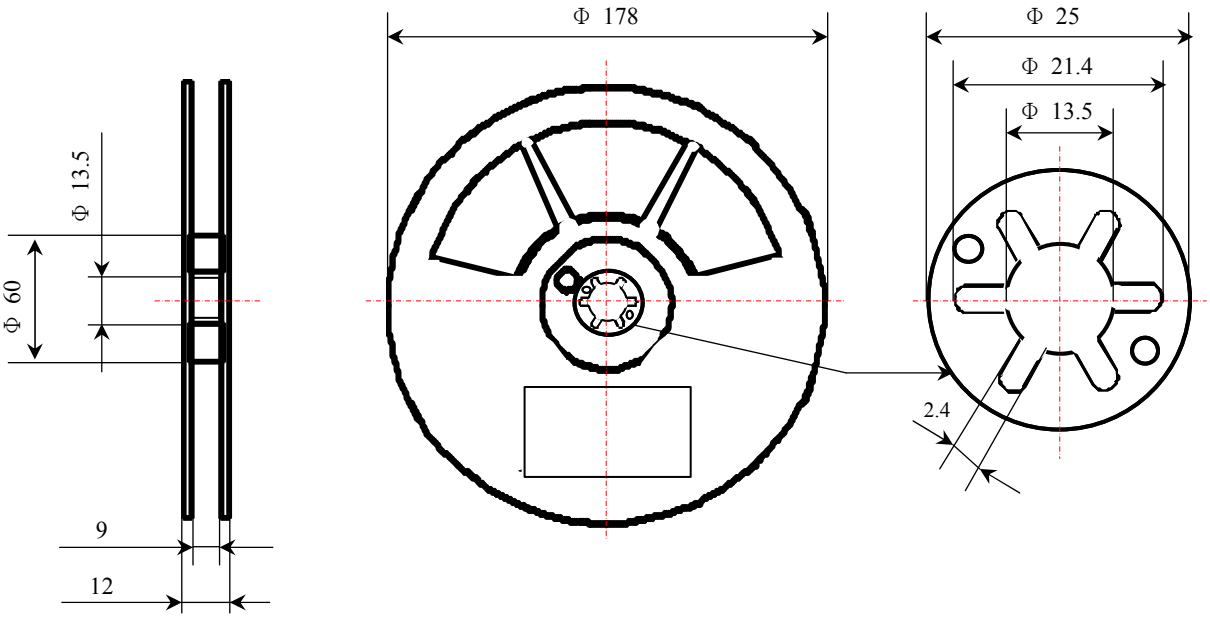
◆ Recommended Pad Pattern



◆ Taping pocket Dimension

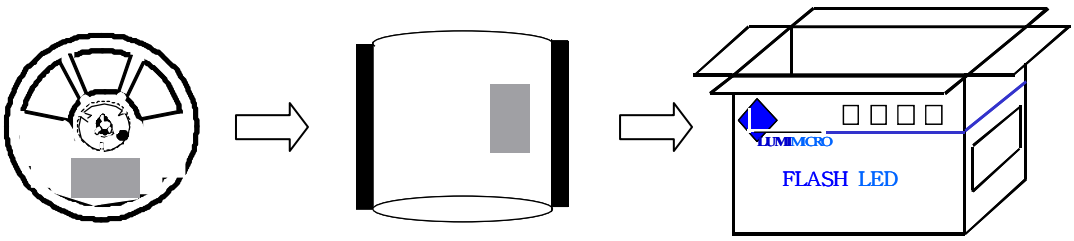


◆ Reel Dimensions



One Reel	Unit	Tolerance
Max 1,500EA	mm	0.1

◆ Packing Spec.



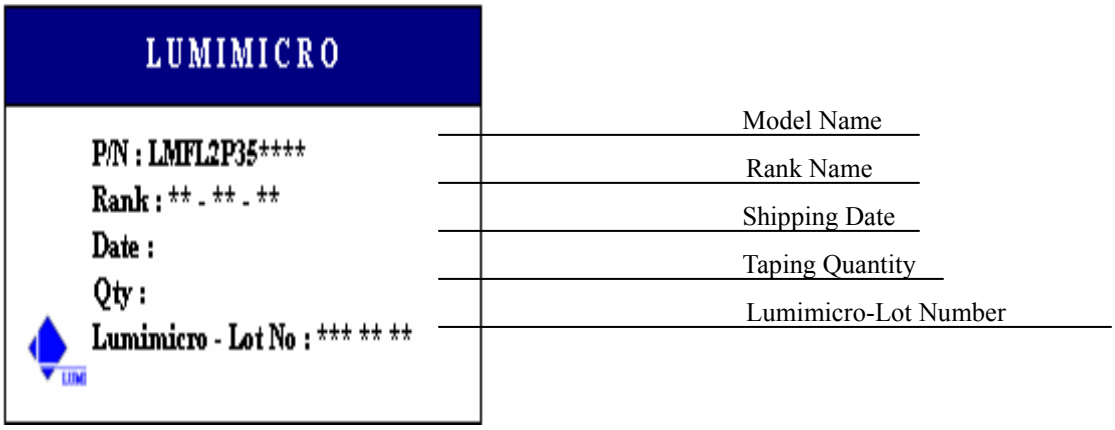
- Aluminum Bag

	Reel in a Bag	Silica in a Bag	Goods QNT in a Bag
Aluminum Bag	1 Reel	1 Silica	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**

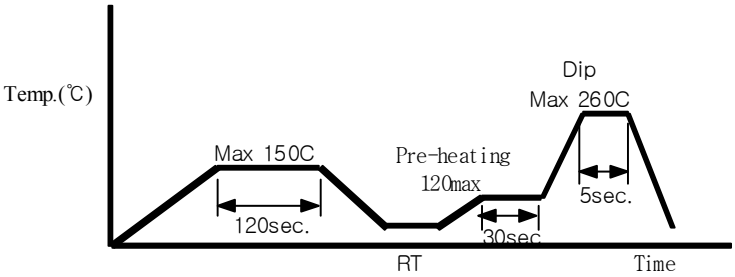
This device should not be used in any type of fluid such as water, oil, organic solvent, etc. When washing is required, IPA should be used.

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.

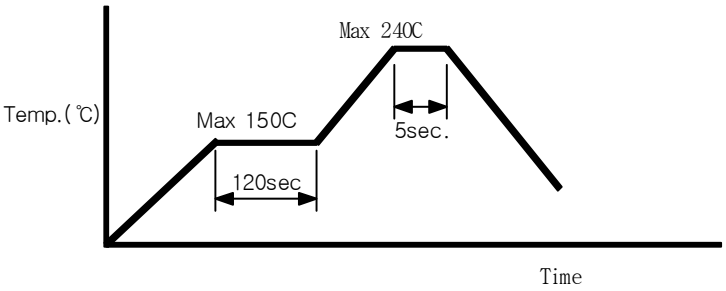
The LEDs must be dip soldered within seven days after opening the moisture-proof packing. Repack unused Products with anti-moisture packing, fold to close any opening and then store in dry place. The appearance and specifications of the product may be modified for improvement without notice. This LEDs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

The Immersion of leads into a solder bath @MAX260℃ shall be to 5 seconds max.



② Reflow Conditions

Preliminary heating to be at 150 ℃ max. for 2 minutes max. Soldering heat to be at 240℃ max. for 5 seconds max.

③ For Manual Soldering

Not more than 5 seconds @MAX300℃, under Soldering iron.

3528 1.9T Warm White 1Chip LED - Room Temperture [Ta = 25℃] Operating Life Time Data										
IV Unit : cd	**Time**	**0**	**1000**	**5000**	**10000**	**20000**	**40000**	**60000**	**80000**	**100000**
	Current=10mA	1.168	1.158	1.132	1.088	1.040	1.004	0.988	0.936	0.879
	Current=20mA	1.142	1.119	1.086	1.053	1.019	0.971	0.938	0.881	0.824
Percent Unit : %	**Time**	**0**	**1000**	**5000**	**10000**	**20000**	**40000**	**60000**	**80000**	**100000**
	Current=10mA	100	99.17	96.92	93.10	88.99	85.97	84.62	80.10	75.27
	Current=20mA	100	97.97	95.09	92.25	89.21	85.04	82.17	77.13	72.15