

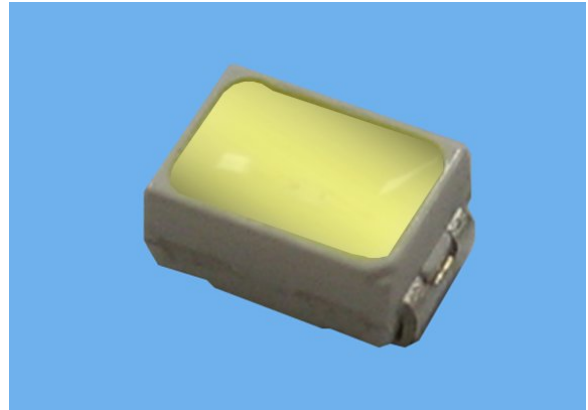
## Technical Data Sheet

### Top View LEDs

#### 45-21/M2C-B5032C4CB2

#### Features

- Top view white LEDs
- White SMT package.
- Lead frame package with individual 2 pins.
- Wide viewing angle.
- Soldering methods: IR reflow soldering.
- Pb-free.
- The product itself will remain within RoHS compliant version.



#### Descriptions

- Due to the package design, 45-21 has wide viewing angle, low power consumption and white LEDs are devices which are materialized by combing Blue LEDs and special phosphors. This feature makes the LED ideal for light guide application.

#### Applications

- General lighting
- Decorative and Entertainment Lighting.
- Indicators.
- Illuminations.
- Switch lights.

#### Device Selection Guide

Chip	Emitted Color	Resin Color
Material		
InGaN	Cool White Warm White	Water Clear



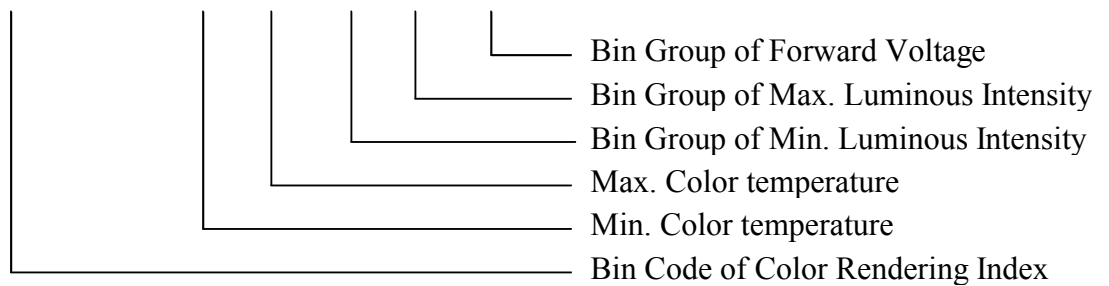
Technical Data Sheet

Top View LEDs

45-21/M2C-B5032C4CB2

Product Number Explanation

45-21 / X 2 C - B XX XX XX XX XX



Notes

Table of Color Rendering Index

Symbol	Description
M	CRI <sub>(min)</sub> : 60
L	CRI <sub>(min)</sub> : 70
K	CRI <sub>(min)</sub> : 80
H	CRI <sub>(min)</sub> : 90

Example:

45-21/L2C-B4556AC2CB2/2T

CRI	Min=70
CCT	4500K~5650K
IV	1800mcd~2200mcd
VF	2.9V~3.6V



Technical Data Sheet

Top View LEDs

**45-21/M2C-B5032C4CB2**

Mass Production list

Product	CRI min.	CCT(K)	I <sub>v</sub> (mcd) Min	I <sub>v</sub> (mcd) Max	Φ(lm) Typ.
45-21/M2C-B5032C4CB2	60	5000K~6300K	2000	2400	6.21
45-21/M2C-B50638BACB2	60	5000K~6300K	1600	2000	5.22
45-21/L2C-B4556AC2CB2	70	4500K~5650K	1800	2200	5.80
45-21/L2C-B45566B8BB2	70	4500K~5650K	1400	1800	4.87
45-21/L2C-B28328BACB2	70	2850K~3250K	1600	2000	4.97
45-21/L2C-B28326B8BB2	70	2850K~3250K	1400	1800	4.17

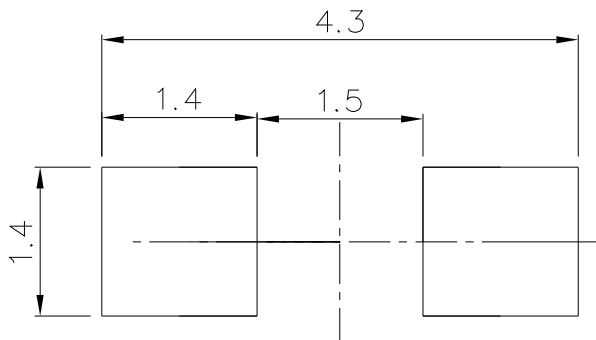
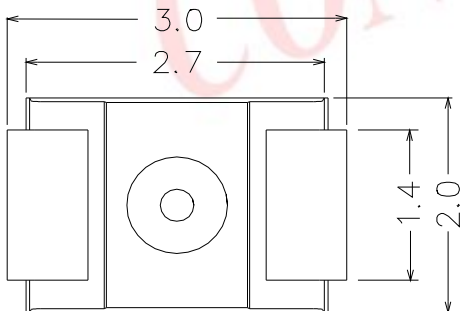
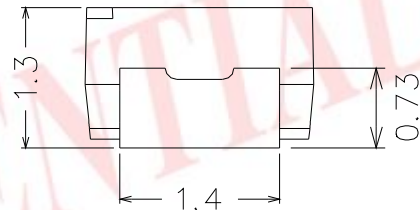
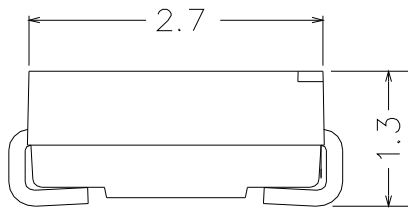
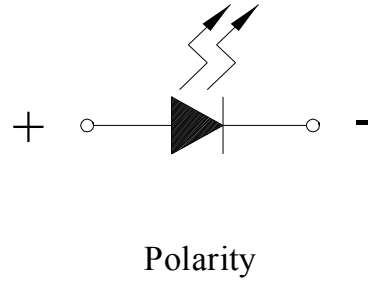
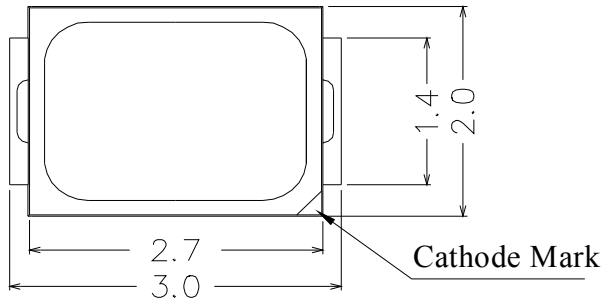
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**Technical Data Sheet**

**Top View LEDs**

**45-21/M2C-B5032C4CB2**

**Package Outline Dimensions**



Recommended soldering pad design

**Note:** Tolerances unless mentioned is  $\pm 0.1\text{mm}$ ; Unit = mm

**Technical Data Sheet****Top View LEDs****45-21/M2C-B5032C4CB2****Absolute Maximum Ratings (Ta=25 )**

Parameter	Symbol	Rating	Unit
Reverse Voltage	V <sub>R</sub>	5	V
Forward Current	I <sub>F</sub>	30	mA
Peak Forward Current (Duty 1/10 @1KHz)	I <sub>FP</sub>	100	mA
Power Dissipation	P <sub>d</sub>	110	mW
Electrostatic Discharge(HBM)	ESD	1000	V
Operating Temperature	Topr	-40 ~ +85	
Storage Temperature	Tstg	-40 ~ +90	
Soldering Temperature	Tsol	Reflow Soldering: 260 for 10 sec. Hand Soldering : 350 for 3 sec.	

**Note:** The products are sensitive to static electricity and must be carefully taken when handling products.

**Electro-Optical Characteristics (Ta=25 )**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Viewing Angle	2θ <sub>1/2</sub>	-----	120	-----	deg	I <sub>F</sub> =20mA
Reverse Current	I <sub>R</sub>	-----	-----	50	μA	V <sub>R</sub> =5V

**Technical Data Sheet****Top View LEDs****45-21/M2C-B5032C4CB2****Bin Range of Luminous Intensity**

Bin Code	Min.	Max.	Unit	Condition
8A	600	800	mcd	I <sub>F</sub> =20mA
AB	800	1000		
2B	1000	1200		
4B	1200	1400		
6B	1400	1600		
8B	1600	1800		
AC	1800	2000		
2C	2000	2200		
4C	2200	2400		
6C	2400	2600		

**Bin Range of Forward Voltage**

Group	Bin Code	Min.	Max.	Unit	Condition	
G		34	2.7	2.8	V	I <sub>F</sub> =20mA
		35	2.8	2.9		
	B2	36	2.9	3		
		37	3	3.1		
		38	3.1	3.2		
		39	3.2	3.3		
		40	3.3	3.4		
		41	3.4	3.5		
		42	3.5	3.6		
		43	3.6	3.7		

**Notes:**

1. Tolerance of Luminous Intensity: ±11%
2. Tolerance of Forward Voltage: ±0.05V



Technical Data Sheet

Top View LEDs

45-21/M2C-B5032C4CB2

Bin Range of Chromaticity Coordinates

I<sub>F</sub>=20mA

CCT	Bin Code	CIE_x	CIE_y	CCT	Bin Code	CIE_x	CIE_y
6300K ~5650K	W5	0.3148	0.3444	3250K ~3050K	P5	0.4312	0.4234
		0.3288	0.3569			0.4456	0.4287
		0.3290	0.3451			0.4376	0.4116
		0.3160	0.3332			0.4240	0.4065
	W6	0.3160	0.3332		0.4240	0.4065	
		0.3290	0.3451		0.4376	0.4116	
		0.3292	0.3313		0.4294	0.3943	
		0.3175	0.3204		0.4165	0.3890	
5650K ~5000K	V5	0.3288	0.3569	3050K ~2850K	N5	0.4456	0.4287
		0.3469	0.3717			0.4614	0.4333
		0.3458	0.3592			0.4525	0.4162
		0.3290	0.3451			0.4376	0.4116
	V6	0.3290	0.3451		0.4376	0.4116	
		0.3458	0.3592		0.4525	0.4162	
		0.3444	0.3442		0.4436	0.3991	
		0.3292	0.3313		0.4294	0.3943	
5000K ~4500K	U5	0.3469	0.3717	/	N6	0.4376	0.4116
		0.3642	0.3829			0.4525	0.4162
		0.3622	0.3716			0.4436	0.3991
		0.3458	0.3592			0.4294	0.3943
	U6	0.3458	0.3592		0.4376	0.4116	
		0.3622	0.3716		0.4525	0.4162	
		0.3594	0.3557		0.4436	0.3991	
		0.3444	0.3442		0.4294	0.3943	

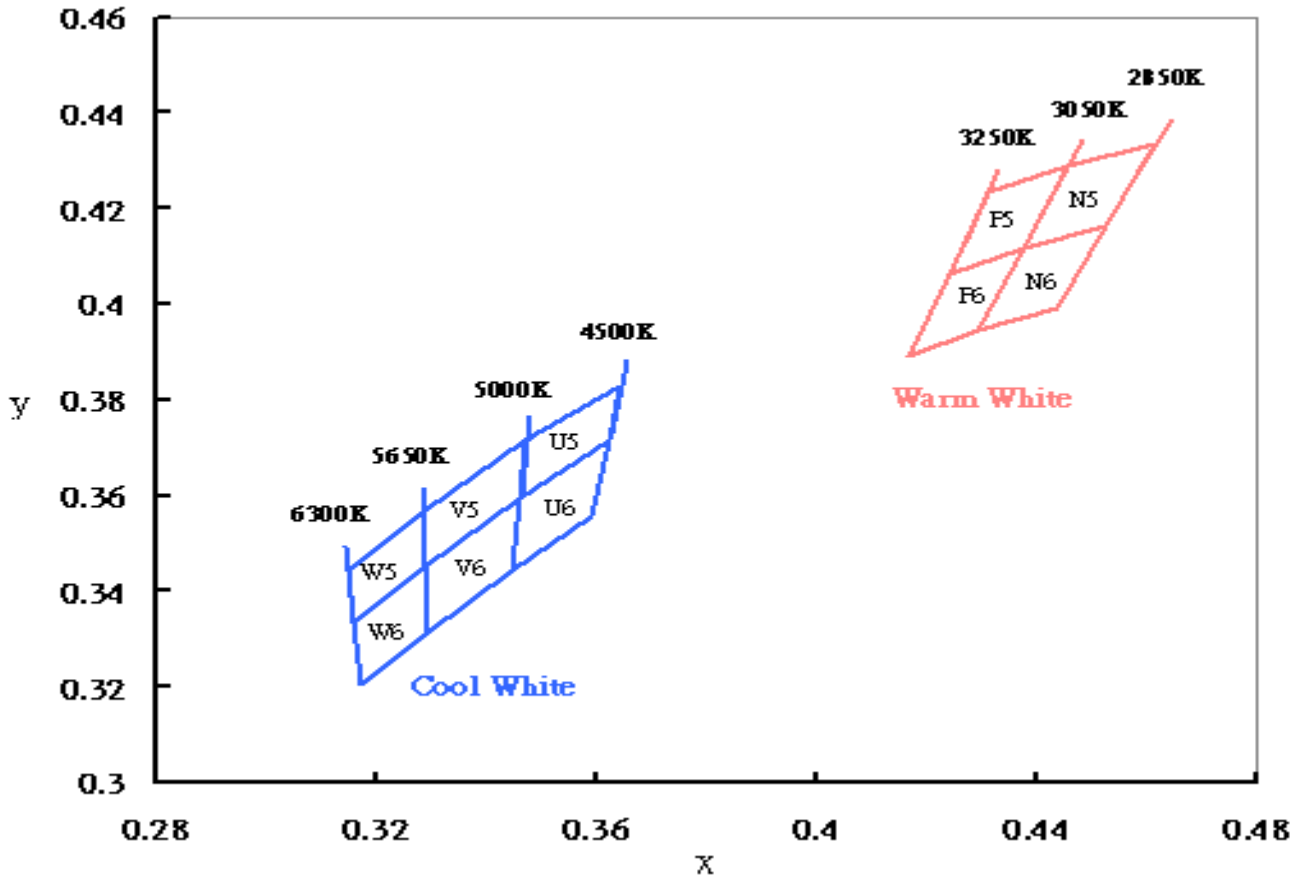
Note: Tolerance of Chromaticity Coordinates: ±0.01

**Technical Data Sheet**

**Top View LEDs**

**45-21/M2C-B5032C4CB2**

**The C.I.E. 1931 Chromaticity Diagram**



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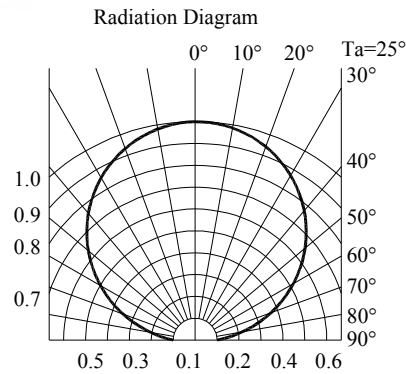
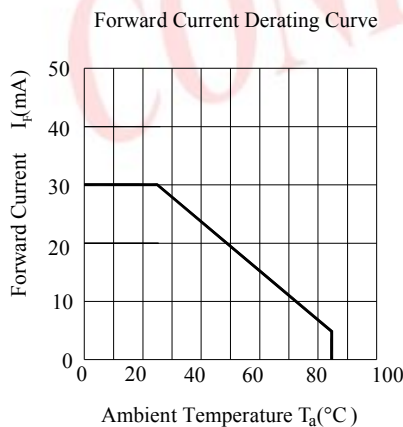
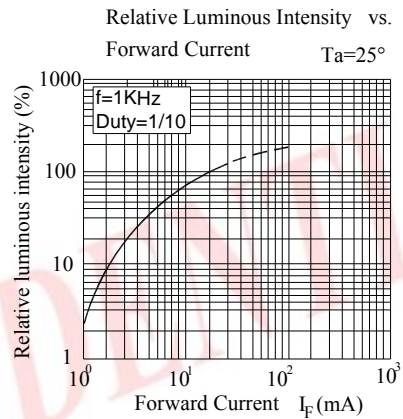
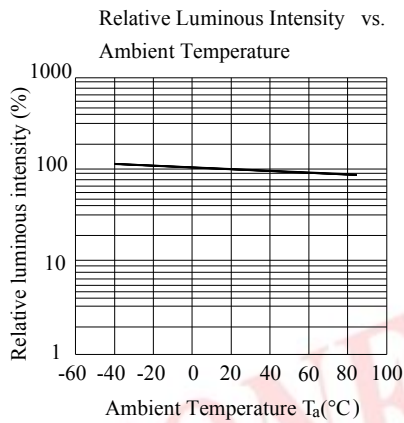
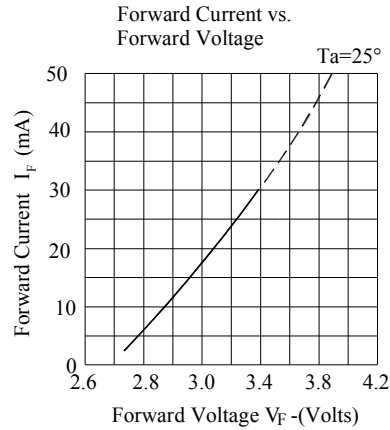
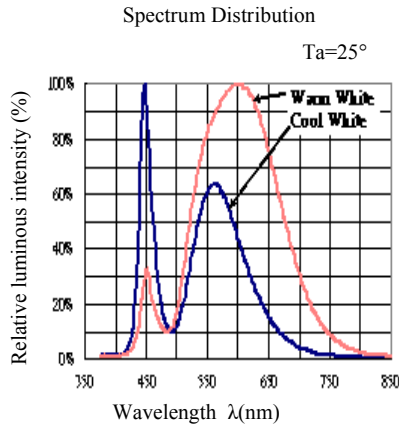


# Technical Data Sheet

## Top View LEDs

### 45-21/M2C-B5032C4CB2

#### Typical Electro-Optical Characteristics Curves





LIGHTING FOREVER

Technical Data Sheet

Top View LEDs

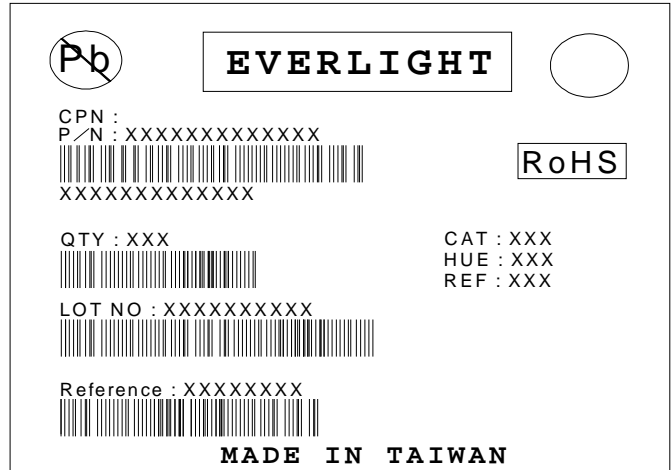
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Label Explanation

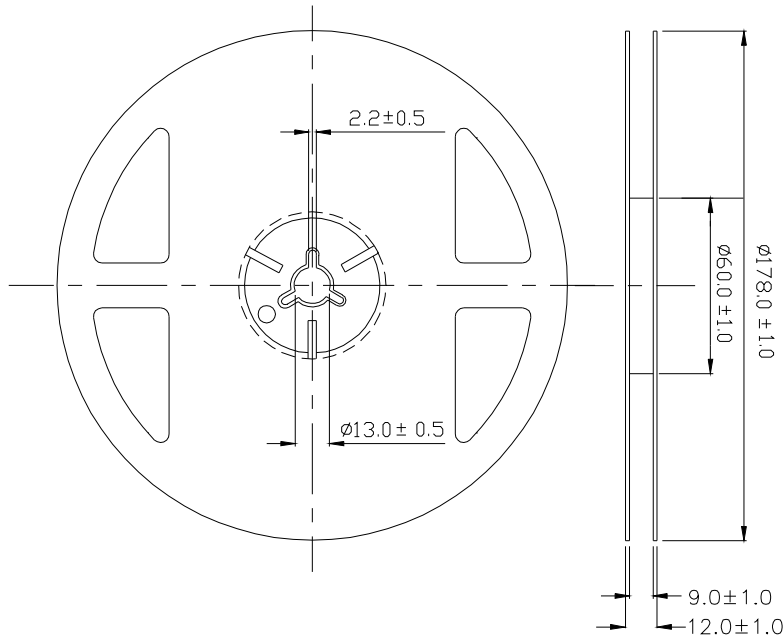
CAT: Luminous Intensity Rank

HUE: Chromaticity Coordinates

REF: Forward Voltage Rank



Reel Dimensions



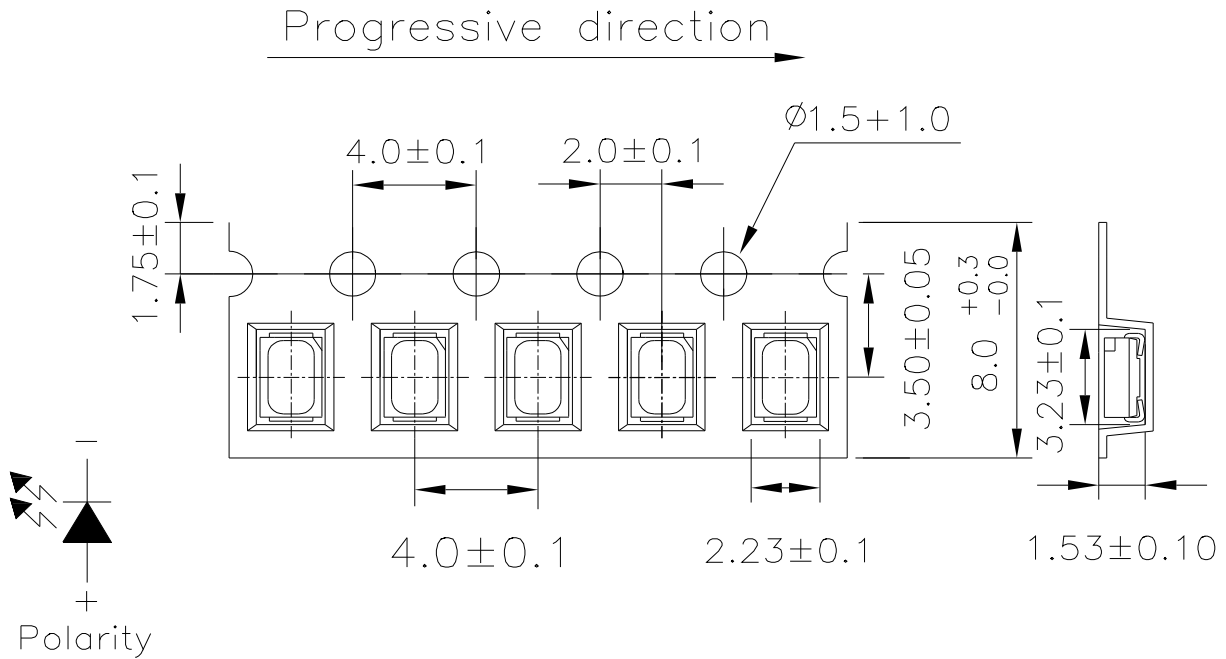
Note: Tolerance unless mentioned is ±0.1mm; Unit = mm

**Technical Data Sheet**

**Top View LEDs**

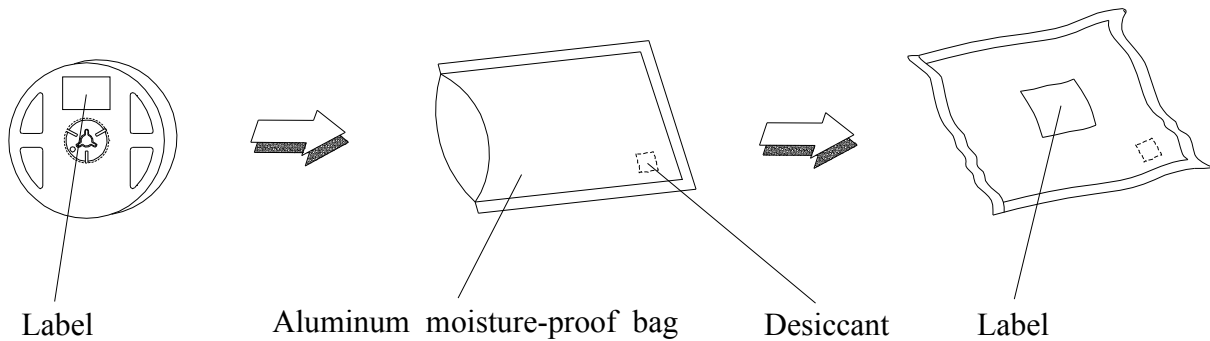
**45-21/M2C-B5032C4CB2**

**Carrier Tape Dimensions: Loaded Quantity 2000 pcs Per Reel**



**Note:** Tolerance unless mentioned is  $\pm 0.1$ mm; Unit = mm

**Moisture Resistant Packaging**



**Technical Data Sheet****Top View LEDs****45-21/M2C-B5032C4CB2****Reliability Test Items and Conditions**

The reliability of products shall be satisfied with items listed below.

Confidence level : 90%

LTPD : 10%

No.	Items	Test Condition	Test Hours/Cycles	Sample Size	Ac/Re
1	Reflow Soldering	Temp. : 260 ±5 Min. 10 sec.	6 Min.	22 PCS	0/1
2	Temperature Cycle	H : +100 15min ↓ 5 min L : -40 15min	300 Cycles	22 PCS.	0/1
3	Thermal Shock	H : +100 5min ↓ 10 sec L : -10 5min	300 Cycles	22 PCS.	0/1
4	High Temperature Storage	Temp. : 100	1000 Hrs.	22 PCS.	0/1
5	Low Temperature Storage	Temp. : -40	1000 Hrs.	22 PCS.	0/1
6	DC Operating Life	I <sub>F</sub> = 20 mA / 25	1000 Hrs.	22 PCS.	0/1
7	High Temperature / High Humidity	85 /85%RH	1000 Hrs.	22 PCS.	0/1

**Technical Data Sheet****Top View LEDs****45-21/M2C-B5032C4CB2****Precautions for Use**

## 1. Over-current-proof

Customer must apply resistors for protection; otherwise slight voltage shift will cause big current change (Burn out will happen).

## 2. Storage

2.1 Do not open moisture proof bag before the products are ready to use.

2.2 Before opening the package: The LEDs should be kept at 30 or less and 90%RH or less.

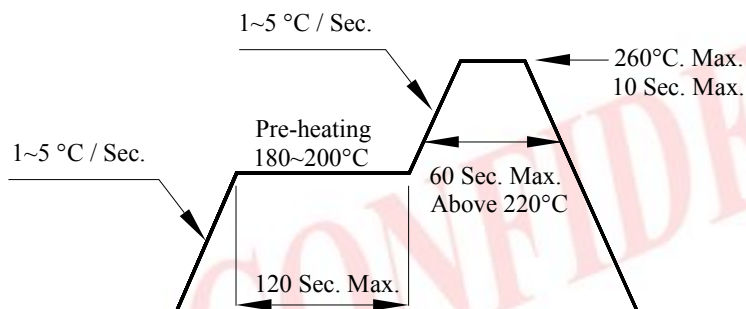
2.3 After opening the package: The LED's floor life are 168 hours under 30 or less and 60% RH or less. If unused LEDs remain, it should be stored in moisture proof packages.

2.4 If the moisture absorbent material (silica gel) has faded away or the LEDs have exceeded the storage time, baking treatment should be performed using the following conditions.

Baking treatment: 60±5 for 24 hours.

## 3. Soldering Condition

## 3.1 Pb-free solder temperature profile



3.2 Reflow soldering should not be done more than two times.

3.3 When soldering, do not put stress on the LEDs during heating.

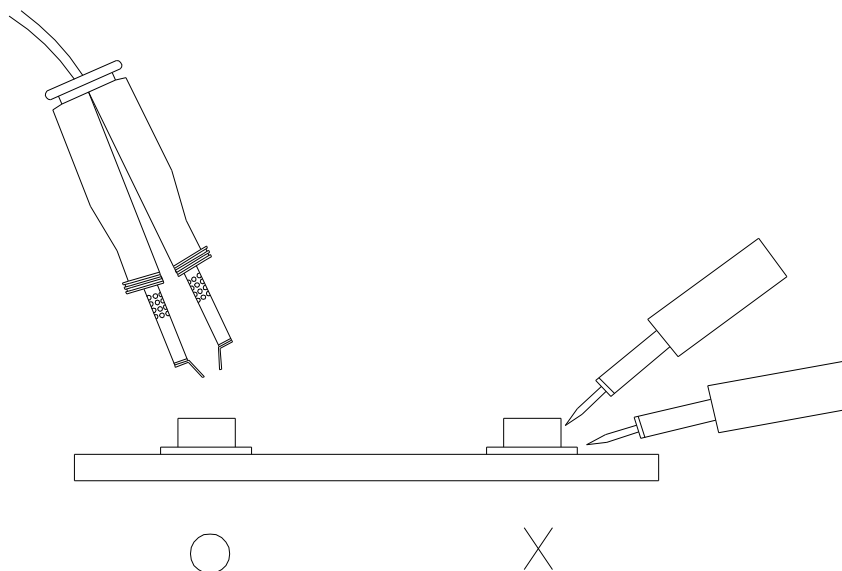
3.4 After soldering, do not warp the circuit board.

**Technical Data Sheet****Top View LEDs****45-21/M2C-B5032C4CB2****4. Soldering Iron**

Each terminal is to go to the tip of soldering iron temperature less than 350 for 3 seconds within once in less than the soldering iron capacity 25W. Leave two seconds and more intervals, and do soldering of each terminal. Be careful because the damage of the product is often started at the time of the hand solder.

**5. Repairing**

Repair should not be done after the LEDs have been soldered. When repairing is unavoidable, a double-head soldering iron should be used (as below figure). It should be confirmed beforehand whether the characteristics of the LEDs will or will not be damaged by repairing.



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