No. STSE-CC4082A
<Cat.No.041125>

SPECIFICATIONS FOR NICHIA CHIP TYPE **WHITE** LED

MODEL : **NESWC04T**

NICHIA CORPORATION

1.SPECIFICATIONS

(1) Absolute Maximum Ratings (Ta=25°C)

Item	Symbol	Absolute Maximum Rating	Unit
Forward Current	I_F	10	mA
Pulse Forward Current	I_{FP}	50	mA
Reverse Voltage	V_R	5	V
Power Dissipation	P_D	35	mW
Operating Temperature	T_{opr}	-25 ~ +80	°C
Storage Temperature	T_{stg}	-30 ~ +85	°C
Soldering Temperature	T_{sld}	Reflow Soldering : 260°C for 1sec. Hand Soldering : 300°C for 3sec.	

I_{FP} Conditions : Pulse Width ≦ 10msec. and Duty ≦ 1/10

(2) Initial Electrical/Optical Characteristics (Ta=25°C)

Item		Symbol	Condition	Min.	Typ.	Max.	Unit
Forward Voltage	Rank M	V_F	I_F=10[mA]	3.0	-	3.2	V
	Rank L	V_F	I_F=10[mA]	2.8	-	3.0	V
Reverse Current		I_R	V_R= 5[V]	-	-	50	μA
Luminous Intensity	Rank Q	Iv	I_F=10[mA]	195	-	270	mcd
	Rank P	Iv	I_F=10[mA]	140	-	195	mcd
	Rank O	Iv	I_F=10[mA]	98	-	140	mcd

∗ Forward Voltage Measurement allowance is ± 3%.

∗ Luminous Intensity Measurement allowance is ± 10%.

Color Ranks (I_F=10mA,Ta=25°C)

	Rank a0			
x	0.280	0.264	0.283	0.296
y	0.248	0.267	0.305	0.276

	Rank b3			
x	0.287	0.283	0.304	0.307
y	0.295	0.305	0.330	0.315

	Rank b4			
x	0.307	0.304	0.330	0.330
y	0.315	0.330	0.360	0.339

	Rank b5			
x	0.296	0.287	0.307	0.311
y	0.276	0.295	0.315	0.294

	Rank b6			
x	0.311	0.307	0.330	0.330
y	0.294	0.315	0.339	0.318

	Rank c0			
x	0.330	0.330	0.361	0.356
y	0.318	0.360	0.385	0.351

∗ Color Coordinates Measurement allowance is ± 0.02.

2.TYPICAL INITIAL OPTICAL/ELECTRICAL CHARACTERISTICS

Please refer to figure's page.

3.OUTLINE DIMENSIONS AND MATERIALS

Please refer to figure's page.

Material as follows ;	Package	:	P. C. board : BT Resin
			Resin : Epoxy
	Soldering terminal	:	Cu, Ni, Au

4.PACKAGING

· The LEDs are packed in cardboard boxes after taping.
Please refer to figure's page.
The label on the minimum packing unit shows ; Part Number, Lot Number, Ranking, Quantity

· In order to protect the LEDs from mechanical shock, we pack them in cardboard boxes for transportation.

· The LEDs may be damaged if the boxes are dropped or receive a strong impact against them, so precautions must be taken to prevent any damage.

· The boxes are not water resistant and therefore must be kept away from water and moisture.

· When the LEDs are transported, we recommend that you use the same packing method as Nichia.

5.LOT NUMBER

The first six digits number shows **lot number**.
The lot number is composed of the following characters;

○□××××-△■●

○ - Year (3 for 2003, 4 for 2004)
□ - Month (1 for Jan., 9 for Sep., A for Oct., B for Nov.)
×××× - Nichia's Product Number
△ - Ranking by Color Coordinates
■ - Ranking by Luminous Intensity
● - Ranking by Forward Voltage

6.RELIABILITY

(1) TEST ITEMS AND RESULTS

Test Item	Test Conditions	Note
Resistance to Soldering Heat (Reflow Soldering)	Recommended temperature profile (reflow soldering) × 2, (2^{nd} test must be started after the samples are stabilized thermally.)	2 times
Temperature Cycle	-30°C ~ 85°C 30min. 30min.	5 cycles
High Temperature Storage	Ta=85°C	500hrs.
Temperature Humidity Storage	Ta=60°C, RH=90%	500hrs.
Low Temperature Storage	Ta=-30°C	500hrs.
Steady State Operating Life	Ta=25°C, I_F=10mA	500hrs.

(2) CRITERIA FOR JUDGING THE DAMAGE

Item	Symbol	Test Conditions	Criteria for Judgement	
			Min.	Max.
Forward Voltage	V_F	I_F=10mA	-	U*)× 1.2
Reverse Current	I_R	V_R=5V	-	U*)× 2.0
Luminous Intensity	I_V	I_F=10mA	S**)× 0.5	-

*) U : Upper limit of the spedified characteristics **) S : The initial value

Note: Measurement shall be taken between 2 hours and 24 hours, having returned the test pieces to the normal ambient conditions after the completion of each test.

7.CAUTIONS

(1) Moisture Proof Package

· To prevent moisture absorption during transportation and storage, reels are packed in aluminum envelopes that contain a desiccant with a humidity indicator.

(2) Storage

· To prevent moisture absorption, it is strongly recommended that reels (in bulk or taped) should be stored in the dry box (or the desiccator) with a desiccant as the appropriate storage place.
If not, the following is recommended.

Temperature : 5 ~ 30 °C
Humidity : 60%RH Max.

The devices should be mounted as soon as possible after unpacking. If you store the unpacked reels, please store them in the dry box or seal them into the envelope again.

· If the devices have been stored over 6 months or unpacked over 15 days, it should be baked under the following conditions.

Baking conditions : 60°C × 12 hours or more (reeled one)
100°C × 45 minutes or more (loose one)
150°C × 15 minutes or more (loose one)

· Nichia LED electrode sections are comprised of a gold plated. The gold surface may be affected by environments which contain corrosive gases and so on. Please avoid conditions which may cause the LED to corrode, tarnish or discolor. This corrosion or discoloration may cause difficulty during soldering operations. It is recommended that the User use the LEDs as soon as possible.

· Please avoid rapid transitions in ambient temperature, especially in high humidity environments where condensation can occur.

(3) Heat Generation

· Thermal design of the end product is of paramount importance. Please consider the heat generation of the LED when making the system design. The coefficient of temperature increase per input electric power is affected by the thermal resistance of the circuit board and density of LED placement on the board, as well as other components. It is necessary to avoid intense heat generation and operate within the maximum ratings given in this specification.

· The operating current should be decided after considering the ambient maximum temperature of LEDs.

(4) Soldering Conditions

· The LEDs can be soldered in place using the reflow soldering method. Nichia cannot make a guarantee on the LEDs after they have been assembled using the dip soldering method.

· Recommended soldering conditions

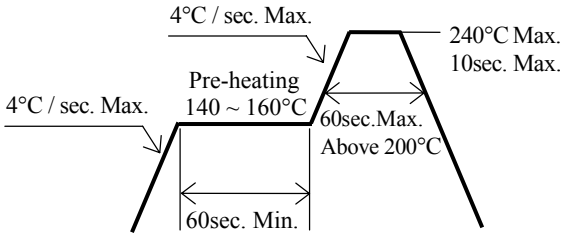
Reflow Soldering			Hand Soldering	
	Lead Solder	Lead-free Solder		
Pre-heat	140 ~ 160°C	160 ~ 180°C	Soldering Iron	25W Max.
Pre-heat time	60 sec. Max.	140 sec. Max.		
Peak temperature	240°C Max.	260°C Max.	Temperature	300°C Max.
Soldering time	10 sec. Max.	1 sec. Max.	Soldering time	3 sec. Max. (one time only)
Condition	refer to Temperature - profile ①.	refer to Temperature - profile ②.		
Recommended soldering paste			Soldering paste composition	
Melting temperature	178 ~ 192°C	216 ~ 220°C		
composition	Sn 63%, Pb 37%	Sn 3.5Ag 0.75Cu		Sn6/Pb4 or solder containing silver (Ag)

∗ After reflow soldering rapid cooling should be avoided.

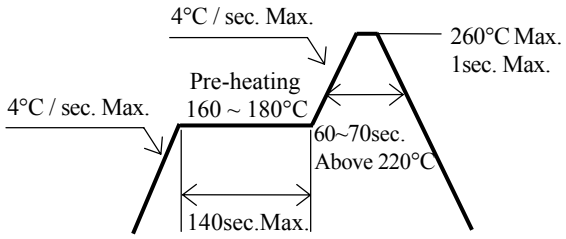
[Temperature-profile (the top surface of the parts)]

Use the conditions shown to the under figure.

<① : Lead Solder>



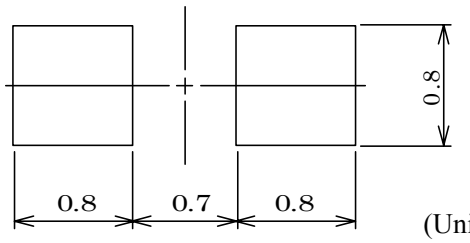
<② : Lead-free Solder>



[Recommended soldering pad design]

The following dimensions do not guarantee the performance of mountability.

Use the following pattern after deep study.



(Unit : mm)

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

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

· Before soldering every time, make baking to units. By manual soldering, there is possibility of crack due to the moisture absorption in the resin portion.

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

· After soldering, do not warp the circuit board.

· Handle the devices only after temperature is cooled down.

(5) Washing

· When washing after soldering is needed, following conditions are requested.

a) Washing solvent: Ak – 225 Alcohol

b) Temperature and time: 50°C or less × 30 seconds Max, or 30°C or less × 3 minutes Max.

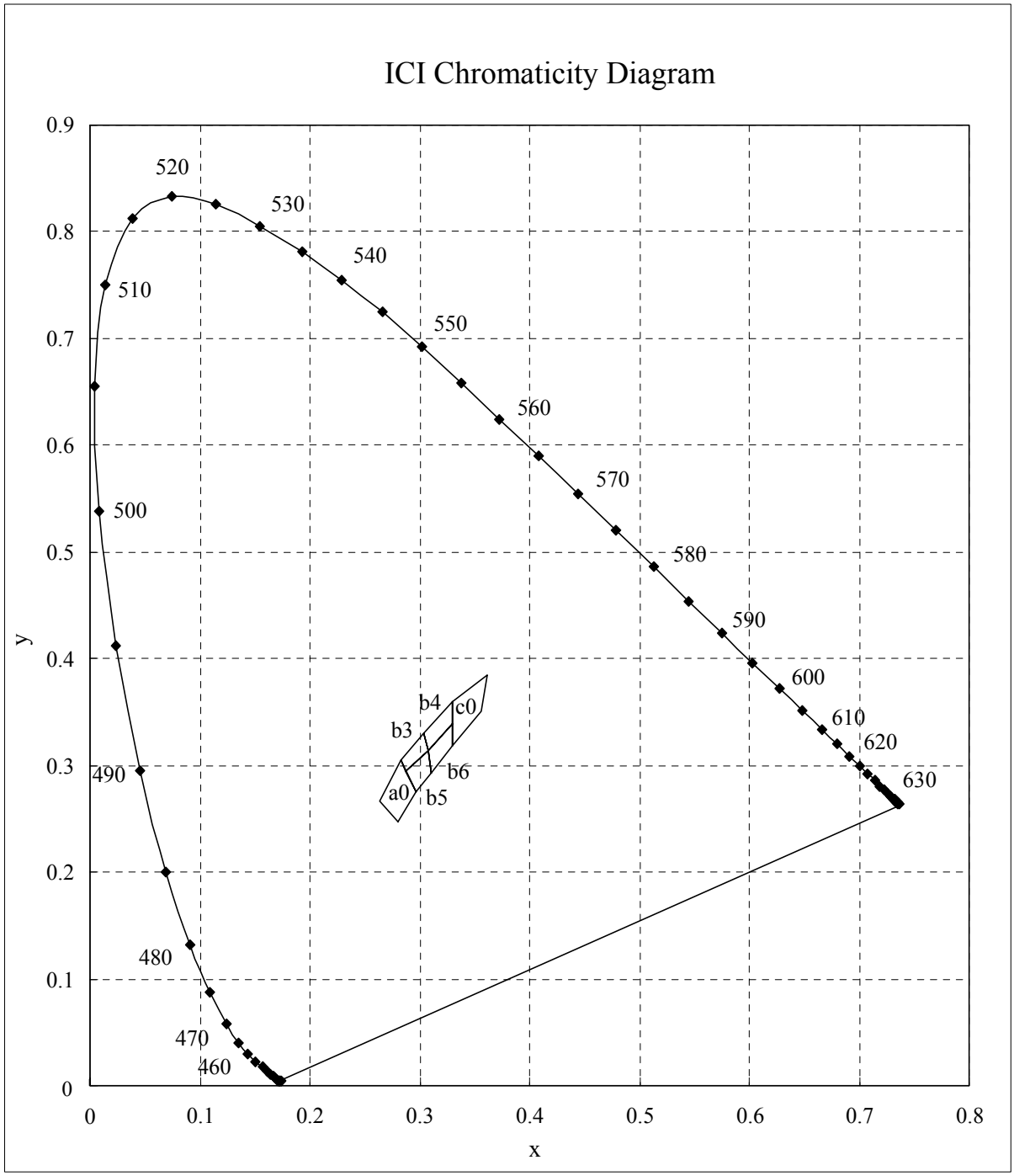
c) Ultrasonic washing: Basically Not accepted.

(6) Static Electricity

· Static electricity or surge voltage damages the LEDs.
It is recommended that a wrist band or an anti-electrostatic glove be used when handling the LEDs.
· All devices, equipment and machinery must be properly grounded.
It is recommended that measures be taken against surge voltage to the equipment that mounts the LEDs.
· When inspecting the final products in which LEDs were assembled, it is recommended to check whether the assembled LEDs are damaged by static electricity or not. It is easy to find static-damaged LEDs by a light-on test or a VF test at a lower current (below 1mA is recommended).
· Damaged LEDs will show some unusual characteristics such as the leak current remarkably increases, the forward voltage becomes lower, or the LEDs do not light at the low current.

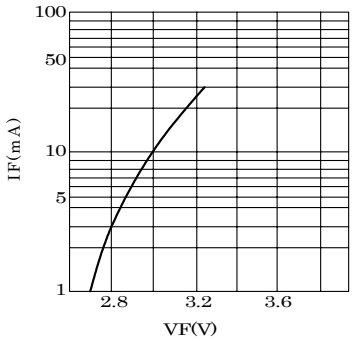
(7) Others

· It is requested to avoid any stress added to the resin portion while it is heated.
· It is requested to avoid any friction by sharp metal nail etc, to the resin portion.
· The current limiting resistor should be placed in the circuit in order for LED to work within its rating. Also avoid reverse voltage (overcurrent) applied instantaneously when ON or OFF.
· When assembling the circuit board into the finished products, care must be taken to avoid the component parts from touching other parts.
· The LED light output is strong enough to injure human eyes. Precautions must be taken to prevent looking directly at the LEDs with unaided eyes for more than a few seconds.
· Flashing lights have been known to cause discomfort in people; you can prevent this by taking precautions during use. Also, people should be cautious when using equipment that has had LEDs incorporated into it.
· The LEDs described in this brochure are intended to be used for ordinary electronic equipment (such as office equipment, communications equipment, measurement instruments and household appliances). Consult Nichia's sales staff in advance for information on the applications in which exceptional quality and reliability are required, particularly when the failure or malfunction of the LEDs may directly jeopardize life or health (such as for airplanes, aerospace, submersible repeaters, nuclear reactor control systems, automobiles, traffic control equipment, life support systems and safety devices).
· User shall not reverse engineer by disassembling or analysis of the LEDs without having prior written consent from Nichia. When defective LEDs are found, the User shall inform Nichia directly before disassembling or analysis.
· The formal specifications must be exchanged and signed by both parties before large volume purchase begins.
· The appearance and specifications of the product may be modified for improvement without notice.

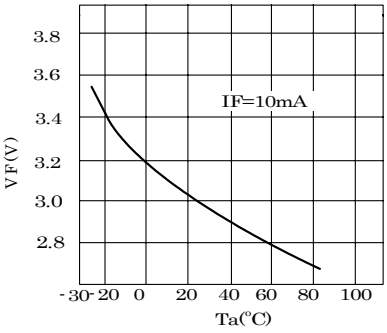


＊ Color Coordinates Measurement allowance is ± 0.02.

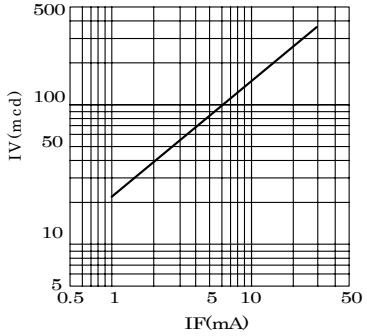
IF-VF Characteristics (Ta=25°C)



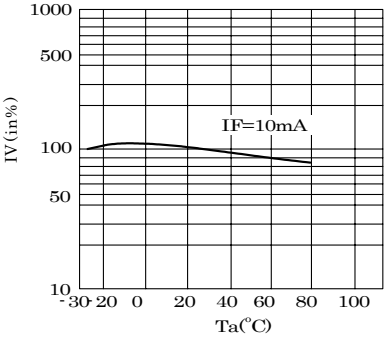
VF-Ta Characteristics



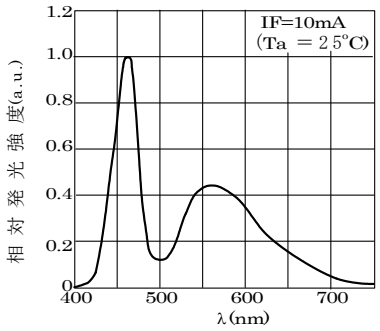
IV-IF Characteristics (Ta=25°C)



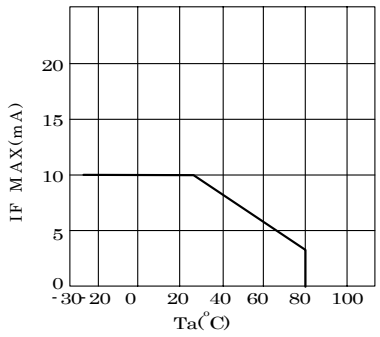
IV-Ta Characteristics



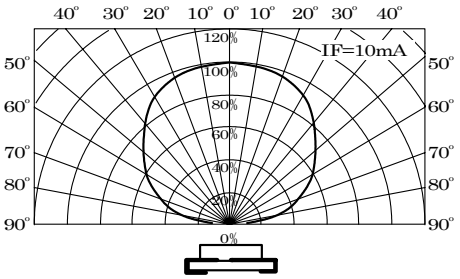
Light emitting spectrum Characteristics



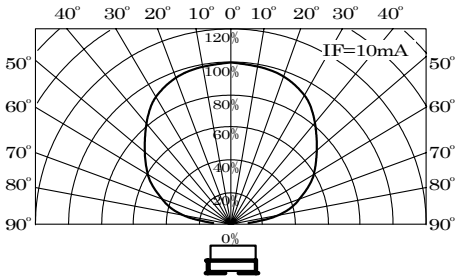
IFMAX-Ta Characteristics



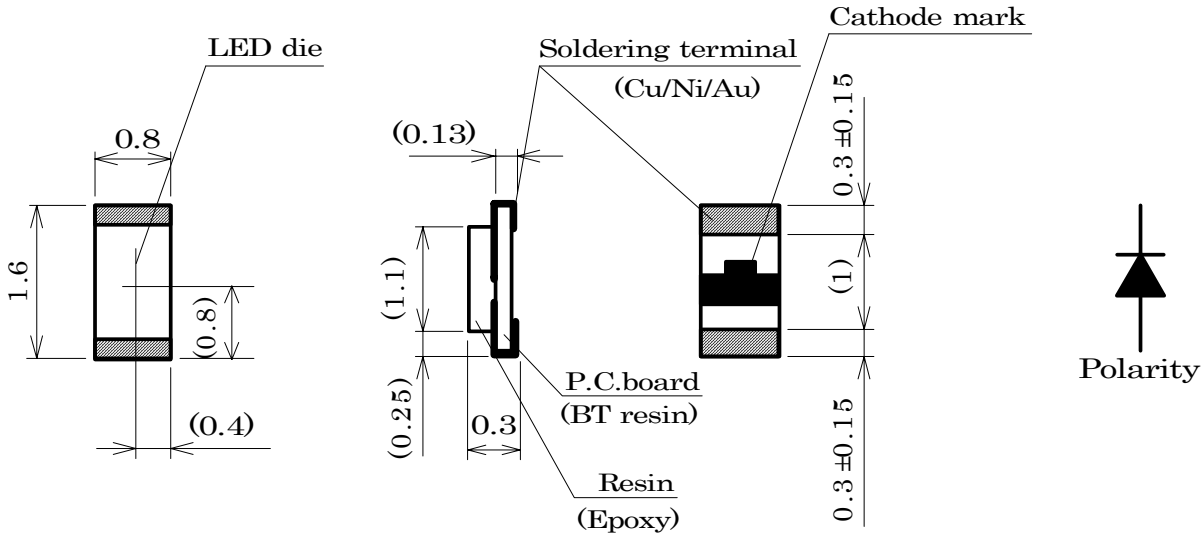
Directive Characteristics (Ta=25°C)



Directive Characteristics (Ta=25°C)

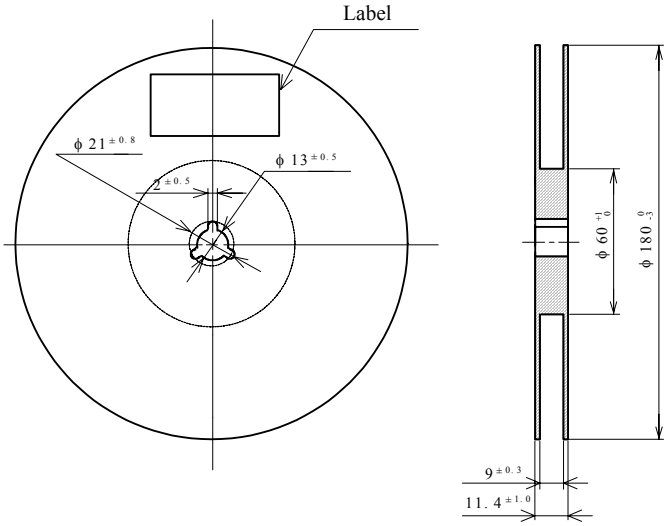


NICHIA CORPORATION	Model NESWC04	
	Title TYP. CHARACTERISTICS	
	No. 041108432901	

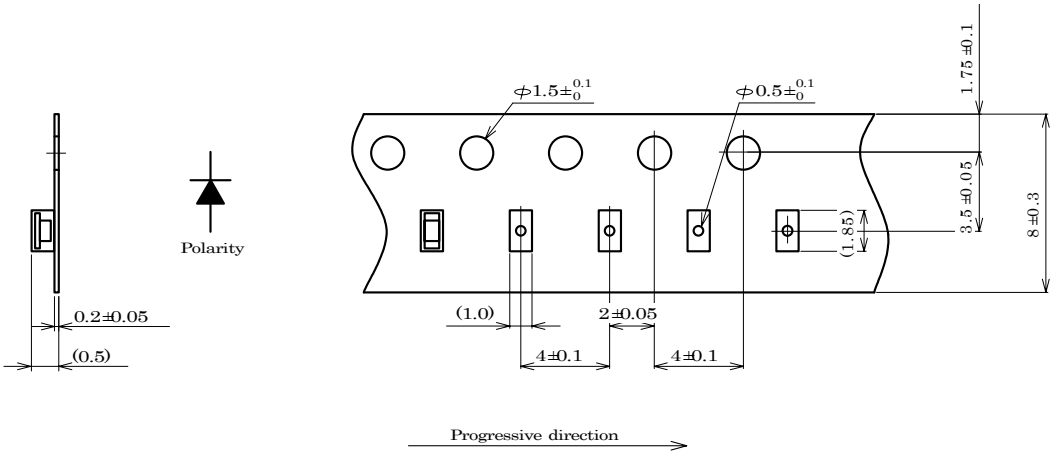


NICHIA CORPORATION	Model NESWC04	Unit mm
	Title OUTLINE DIMENSIONS	
	No. 041108432911	Allow ±0.1

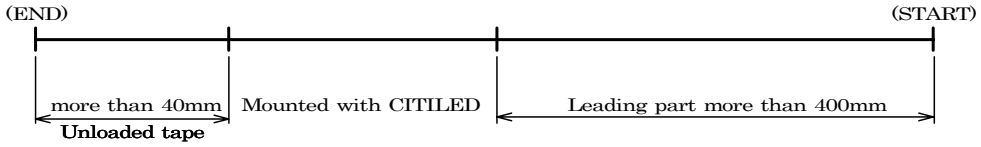
Reel part



Taping part



Reel End of tape

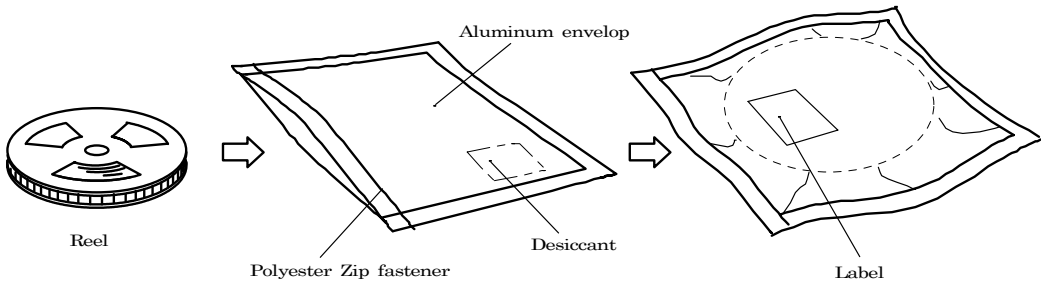


5,000pcs/Reel

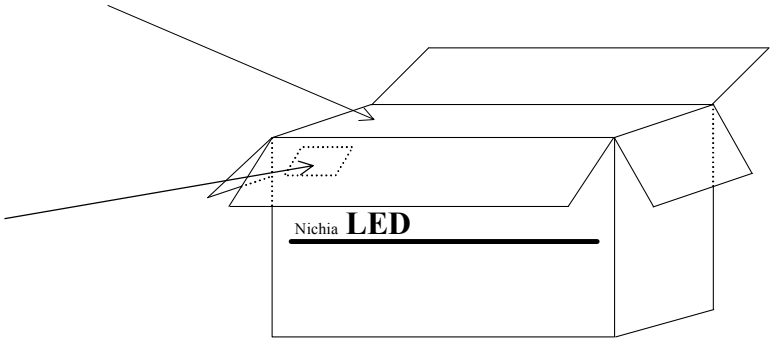
Taping is based on the **JIS C 0806** : Packaging of Electronic Components on Continuous Tapes.

Peel Strength is based on the **JIS C 0806 - 1995**.

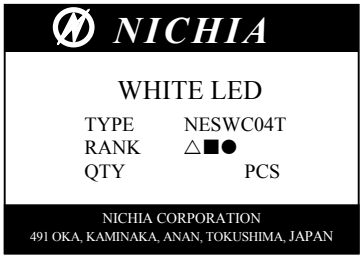
NICHIA CORPORATION	Model NESWC04T	Unit mm
	Title TAPING DIMENSIONS	
	No. 041108432921	Allow



Empty space in the box is filled with cushion material.



Label



Packing unit

	Reel/bag	Quantity/bag (pcs)
Moisture proof foil bag	1reel	5,000 MAX.

Cardboard box	Dimensions (mm)	Reel/box	Quantity/box (pcs)
Cardboard box S	270×280×100×4t	4reel MAX.	20,000 MAX.
Cardboard box M	270×280×200×4t	10reel MAX.	50,000 MAX.
Cardboard box L	270×280×300×4t	16reel MAX.	80,000 MAX.

NICHIA CORPORATION	Model NESWC04T	
	Title PACKING	
	No. 041108432931	