

**SPECIFICATIONS FOR NICHIA CHIP TYPE WHITE LED**

**MODEL : NSSW440TVR**

**NICHIA CORPORATION**

## 1.SPECIFICATIONS

### (1) Absolute Maximum Rating

(Ta=25 )

Item	Symbol	Absolute Maximum Rating	Unit
Forward Current	I <sub>F</sub>	30	mA
Peak Forward Current	I <sub>FP</sub>	100	mA
Reverse Voltage	V <sub>R</sub>	5	V
Power Dissipation	P <sub>D</sub>	120	mW
Operating Temperature	T <sub>opr</sub>	- 30 ~ + 85	
Storage Temperature	T <sub>stg</sub>	- 40 ~ + 100	
Soldering Temperature	T <sub>sol</sub>	Reflow Soldering : 240 Hand Soldering : 300	for 5sec. for 3sec.

I<sub>FP</sub> Conditions : Pulse Width 10msec. and Duty 1/10

### (2) Initial Electrical/Optical Characteristics

(Ta=25 )

Item	Symbol	Condition	Min.	Typ.	Max.	Unit	
Forward Voltage	V <sub>F</sub>	I <sub>F</sub> =20[mA]	-	3.6	4.0	V	
Reverse Current	I <sub>R</sub>	V <sub>R</sub> = 5[V]	-	-	50	μA	
Luminous Intensity	Rank S	I <sub>v</sub>	I <sub>F</sub> =20[mA]	800	940	1120	mcd
	Rank R	I <sub>v</sub>	I <sub>F</sub> =20[mA]	560	660	800	mcd
	Rank Q	I <sub>v</sub>	I <sub>F</sub> =20[mA]	400	470	560	mcd

One delivery will include three different ranks of products.

The quantity-ratio of the three ranks is decided by Nichia. Measurement Uncertainty of the Luminous Intensity : ± 10%

### Color Ranks

(I<sub>F</sub>=20mA, Ta=25 )

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

	Rank b1			
x	0.287	0.283	0.330	0.330
y	0.295	0.305	0.360	0.339

	Rank b2			
x	0.296	0.287	0.330	0.330
y	0.276	0.295	0.339	0.318

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

One delivery will include the consecutive two ranks of products. The quantity-ratio of the two ranks is decided by Nichia.

Measurement Uncertainty of the Color Coordinates : ± 0.02

### Luminous Intensity

Ranking by Luminous Intensity	Q	R	S
Ranking by Color Coordinates			
a0			
b1			
b2			
c0			

Shaded ranks are available.

## 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 ; Resin : Epoxy  
Leadframe : Ag plating Copper alloy

## 4.PACKAGING

Please refer to figure's page.

The label on the minimum packing unit bag shows;

Part Number, Lot Number, Quantity, Ranking

## 5.LOT NUMBER

The first six digits number shows **lot number**.

The lot number is composed of the following characters;

- × × × × -
- Year ( 0 for 2000, 1 for 2001 )
- 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

## 6.RELIABILITY

### (1) TEST ITEMS AND RESULTS

Test Item	Standard Test Method	Test Conditions	Note	Number of Damaged
Resistance to Soldering Heat		Tsol=240 , 5sec. (Reflow Soldering)	1 time	0/100
Heat Shock	JIS C 7021 (1977)A-3	0 ~ 100 5sec. 15sec.	100 cycles	0/100
Temperature Cycle	JIS C 7021 (1977)A-4	-40 ~ 25 ~ 100 ~ 25 30min. 5min. 30min. 5min.	100 cycles	0/100
High Humidity Heat Cycle	JIS C 7021 (1977)A-5	30 ~ 65 ~ -10 90%RH 24hrs./1cycle	10 cycles	0/100
High Temperature Storage	JIS C 7021 (1977)B-10	Ta=100	1000hrs.	0/100
Humidity Heat Load	JIS C 7021 (1977)B-11	Ta=60 , RH=90%	1000hrs.	0/100
Low Temperature Storage	JIS C 7021 (1977)B-12	Ta=-40	1000hrs.	0/100
Life Test	JIS C 7035 (1985)	Ta=25 , IF=20mA	1000hrs.	0/100
High Humidity Heat Life Test		60 , RH=90%, IF=20mA	500hrs.	0/100
Low Temperature Life Test		Ta=-30 , IF=20mA	1000hrs.	0/100

### (2) CRITERIA FOR JUDGING THE DAMAGE

Item	Symbol	Test Conditions	Criteria for Judgement	
			Min.	Max.
Forward Voltage	V <sub>F</sub>	IF=20mA	-	U.S.L.*) × 1.1
Reverse Current	I <sub>R</sub>	VR=5V	-	U.S.L.*) × 2.0
Luminous Intensity	I <sub>V</sub>	IF=20mA	L.S.L.***) × 0.7	-

\*) U.S.L. : Upper Standard Level

\*\*) L.S.L. : Lower Standard Level

## 7.CAUTIONS

White LEDs are devices which are materialized by combining Blue LEDs and special phosphors. Consequently, the color of White LEDs is changed a little by an operating current. Care should be taken after due consideration when using LEDs.

### (1) Moisture Proof Package

- When moisture is absorbed into the SMT package it may vaporize and expand during soldering. There is a possibility that this can cause the exfoliation of the contacts and the damage the optical characteristics of the LEDs. For this reason, the moisture proof package is used to keep moisture to a minimum in the package.
- After opening the package, the LEDs should be kept at 30℃, 70%RH or less. The LEDs should be soldered within 168 hours (7days) after opening the package.
- When storing the LEDs after opening the package, use a sealable away from package with a moisture absorbent material inside.
- If the blue color of the desiccant indicator has faded after storing, a baking treatment should be performed as follows : 65 ± 5℃ for more than 24 hours

### (2) Soldering Conditions

- The LEDs can be soldered in place using the reflow soldering method. Nichia cannot guarantee the LEDs after they have been assembled using the solder dipping method.
- The recommended soldering conditions are as follows :

#### 【Hand Soldering】

Soldering iron : 300℃ Max. 3 seconds (one time only)

A soldering iron with a 20W Max. only must be used.

#### 【Reflow Soldering】

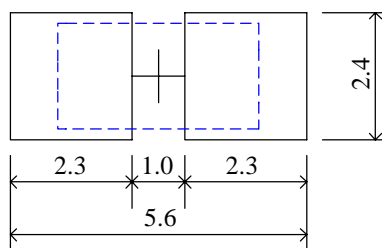
Use the conditions shown to the right figure.

Pre-heating : 120 ~ 150℃ 120 seconds Max.

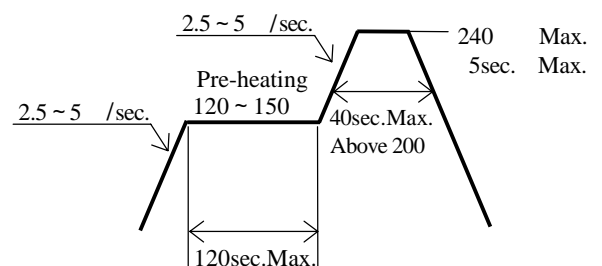
Soldering : 240℃ Max. 5 seconds Max.

(Rapid cooling should be avoided.)

- Recommended installation pattern



#### 【Temperature-Profile】



- When using the chip moulder, it is possibly happens that handling LEDs is difficult in accordance with the machine. For the purpose to ensure this will not cause trouble, pre-test should be performed by using the production machine.
- Modifications should not be done after the LEDs have been soldered. If modifications cannot be avoided, a double-head soldering iron should be used after checking whether the characteristics of the LEDs will not be damaged by modification after soldering.
- Reflow soldering should not be done more than once.
- When soldering, do not apply force to the package during heating.
- After soldering, do not warp the circuit board.

### (3) Cleaning

- Use Isopropyl Alcohol as a solvent for cleaning the LEDs. Using other solvents may dissolve the LED package and the epoxy. Caution is needed.
- Ultrasonic cleaning of the LEDs should not be done.

(4) Heat Generation

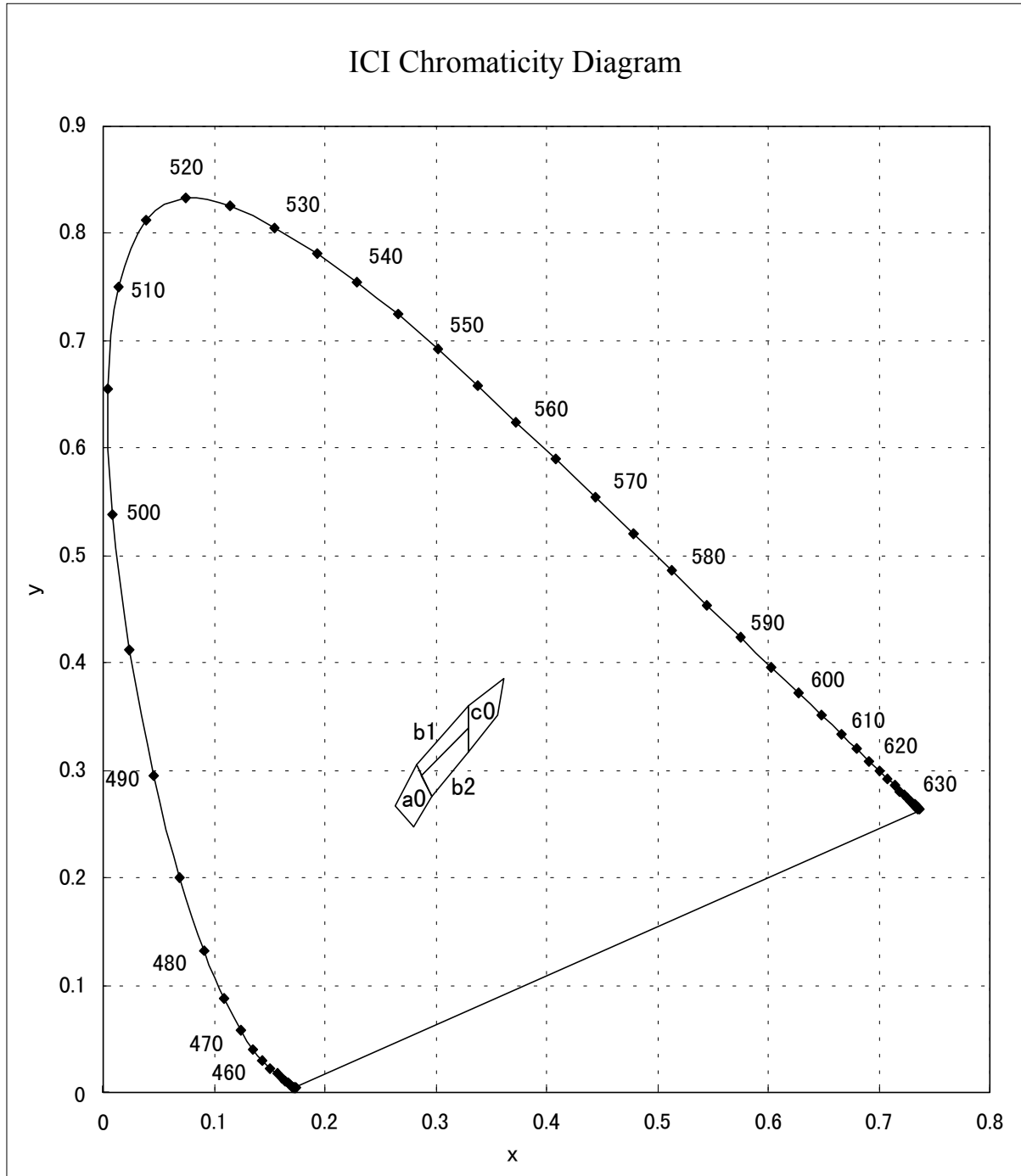
- Heat generation must be taken into design consideration when using the LEDs.  
The coefficient of temperature increase per input electric power is about 0.5 /mW at the LED's active layer. This coefficient will be affected by the heat resistance of the circuit board and by dense mounting of the LEDs. At the same time, precautions must be taken into the design of circuitry to avoid intense heat generation. Proper designs which allow radiation of heat, etc. may be needed.
- The operating current should be decided after considering the ambient maximum temperature when the LEDs are illuminating.

(5) Static Electricity

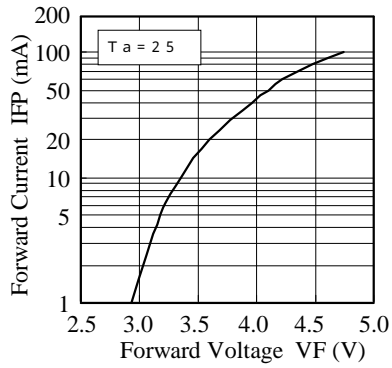
- Static Electricity and surge damages the LEDs.  
It is recommended to use a wrist band or anti-electrostatic glove when handling the LEDs.
- All devices, equipment and machinery must be properly grounded.
- When inspecting own final products on which LEDs were mounted, it is recommended to check also whether the mounted LEDs are damaged by static electricity or not. It is easy to find static-damaged LEDs by light emission test at lower current (below 1mA is recommended). Damaged LEDs will show some unusual characteristics such as leak current remarkably increases, starting forward voltage becomes lower, or the LEDs get unlighted at the low current.

(6) Others

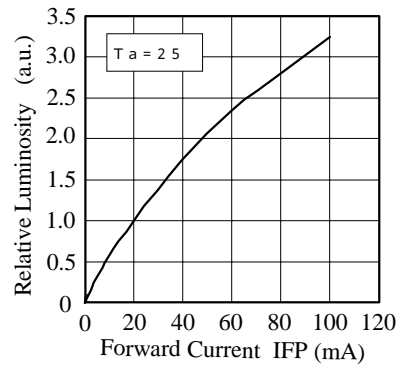
- Care must be taken to ensure that the reverse voltage will not exceed the absolute maximum rating when using the LEDs with matrix drive.
- The electrode sections are plated with silver. Those will become discolored by contact with corroded gas etc. Precautions must be taken to maintain a clean storing atmosphere.
- 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.
- These 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 the prior written consent of Nichia. When defective LEDs are found, User shall inform to 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.



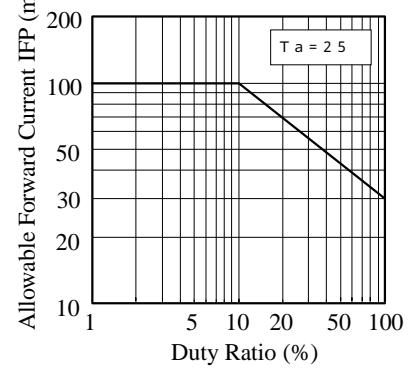
Forward Voltage vs. Forward Current



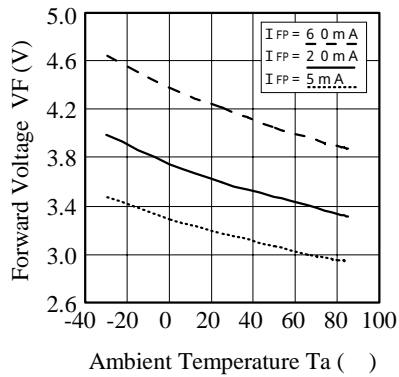
Forward Current vs. Relative Luminosity



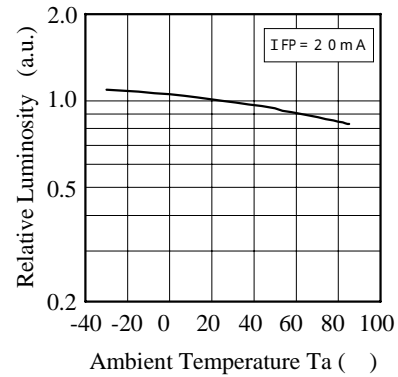
Duty Ratio vs. Allowable Forward Current



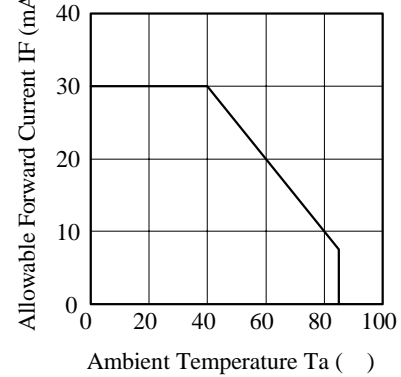
Ambient Temperature vs. Forward Voltage



Ambient Temperature vs. Relative Luminosity

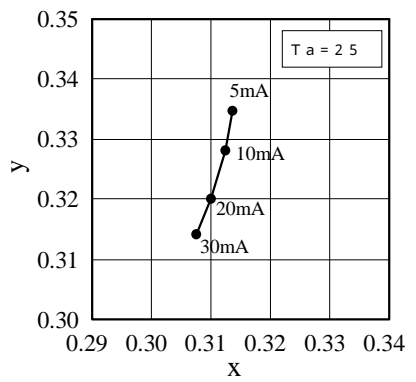


Ambient Temperature vs. Allowable Forward Current

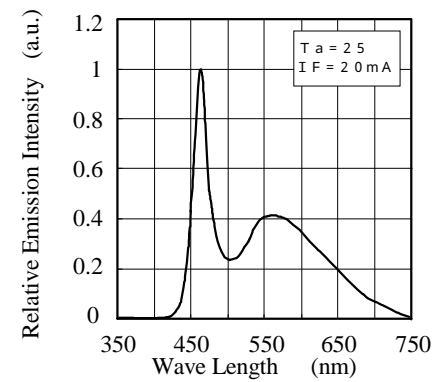


<b>NICHIA CORPORATION</b>	Model	NSSW4xx
	Title	TYP.CHARACTERISTICS
	No.	000701803542

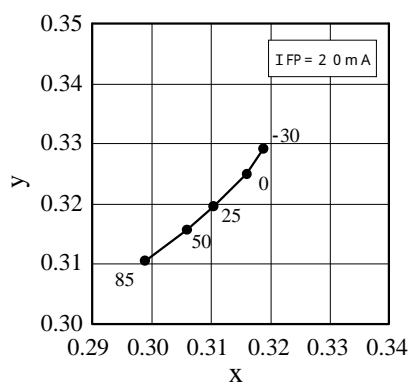
Forward Current vs. Chromaticity diagram



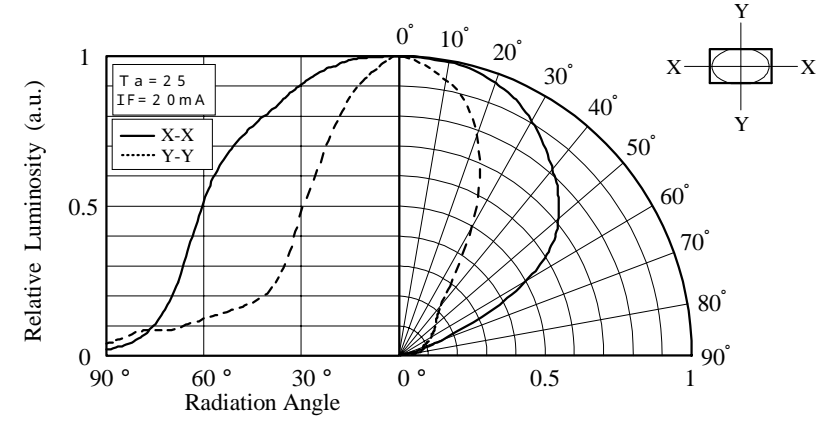
Spectrum



Ambient Temperature vs. Chromaticity diagram

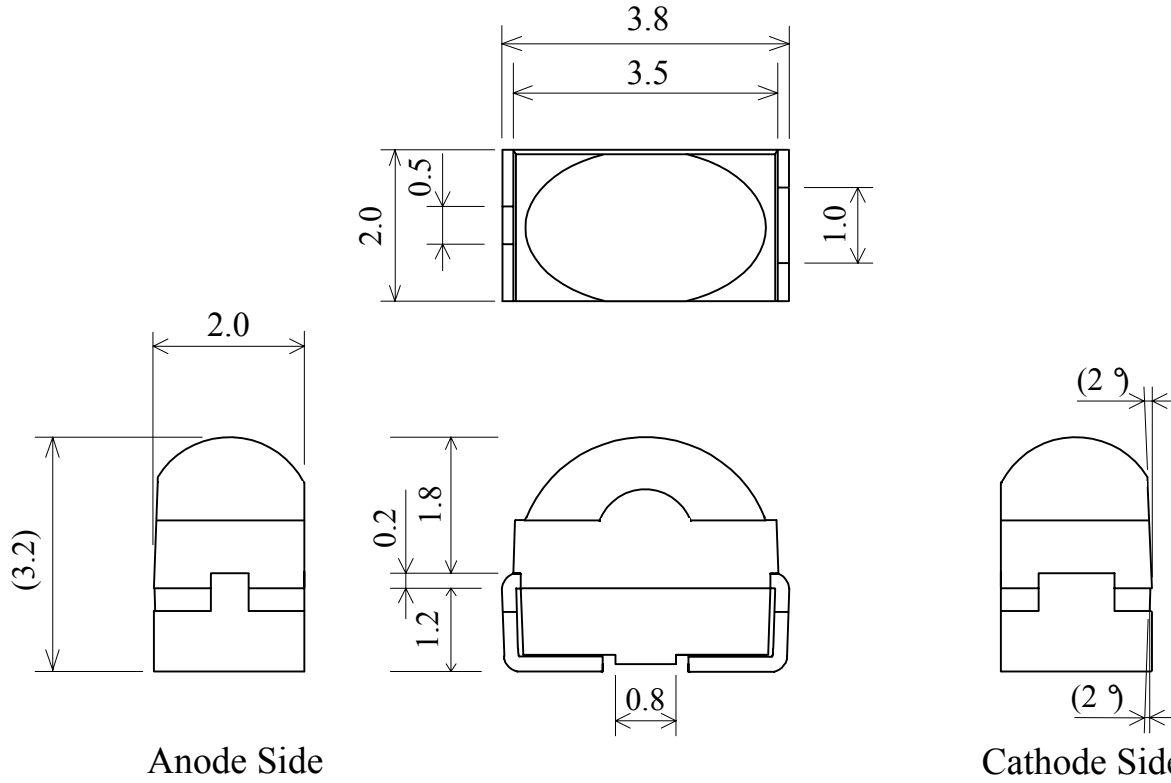


Directivity (NSSW440)



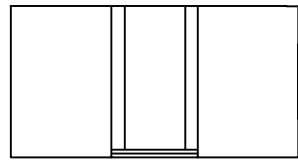
<b>NICHIA CORPORATION</b>	Model	NSSW440
	Title	TYP.CHARACTERISTICS
	No.	000701803563





Anode Side

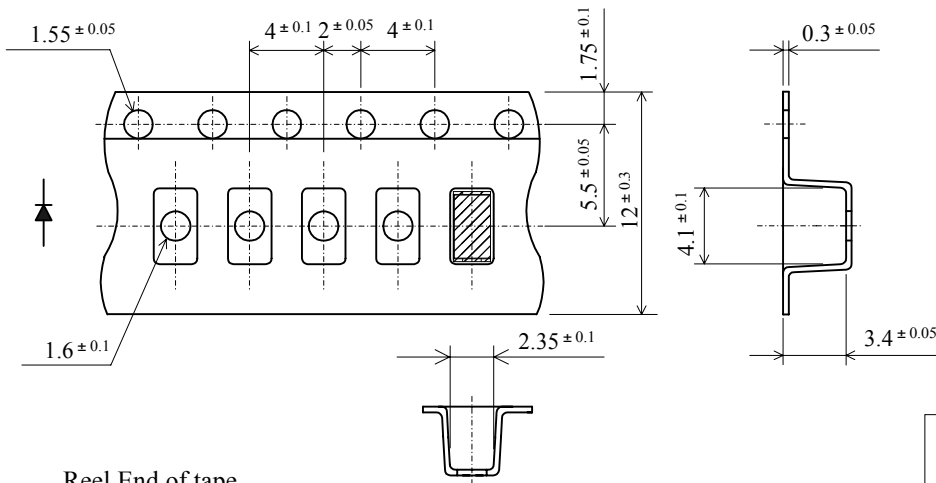
Cathode Side



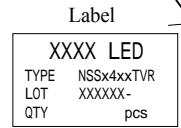
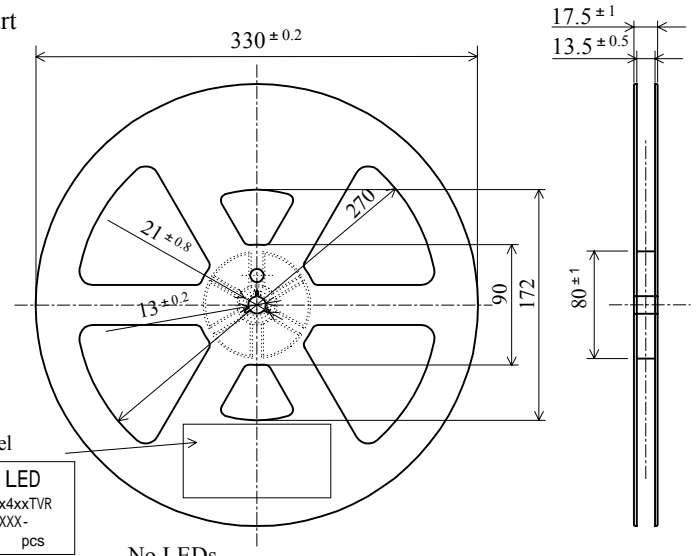
ITEM	MATERIALS
RESIN(MOLD)	Epoxy
LEAD FRAME	Ag Plating Copper alloy

NICHIA CORPORATION	Model	NSSW440	Unit mm
	Title	OUTLINE DIMENSIONS	
	No.	000701906432	Allow ± 0.2

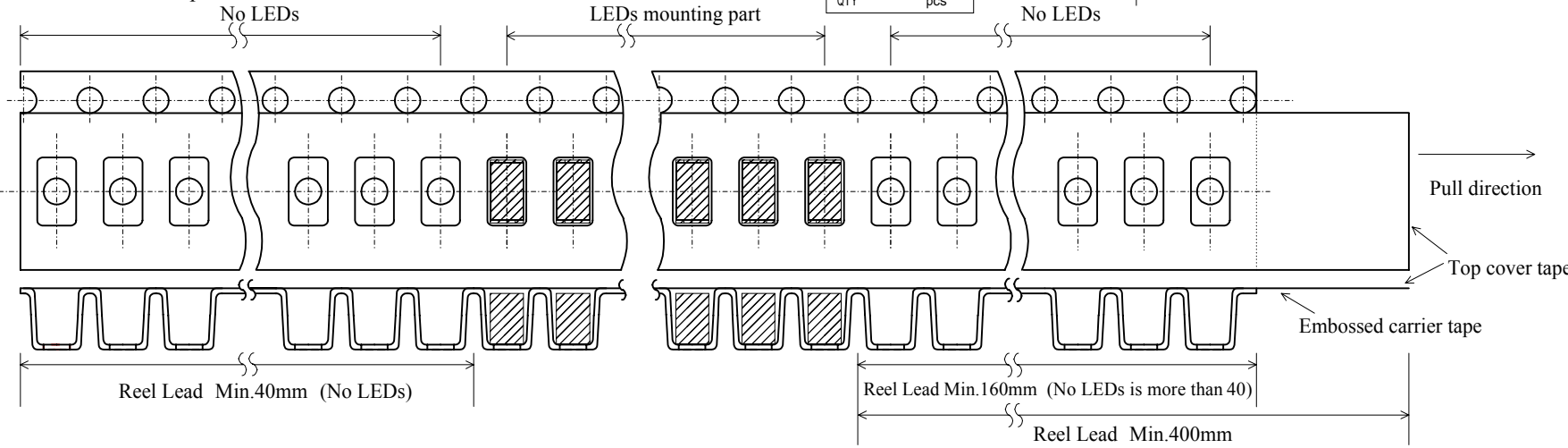
Taping part



Reel part



Reel End of tape

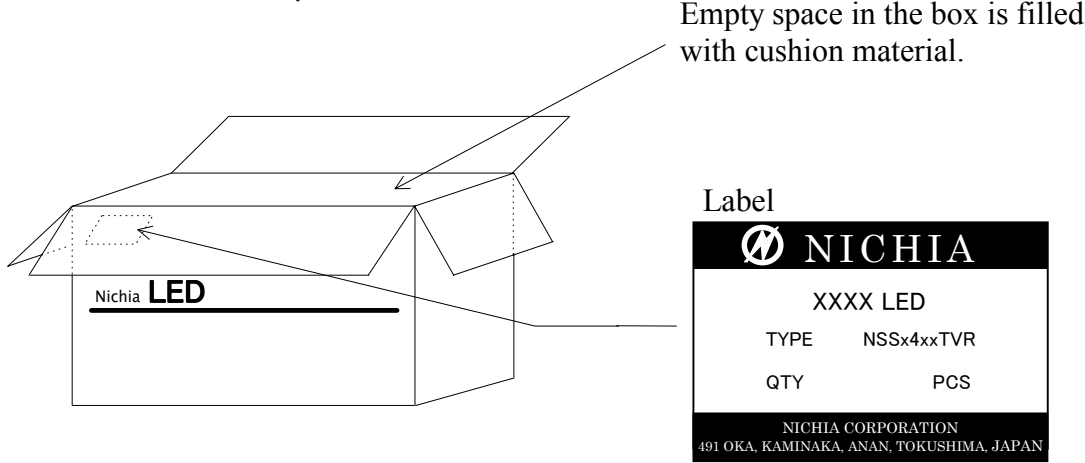
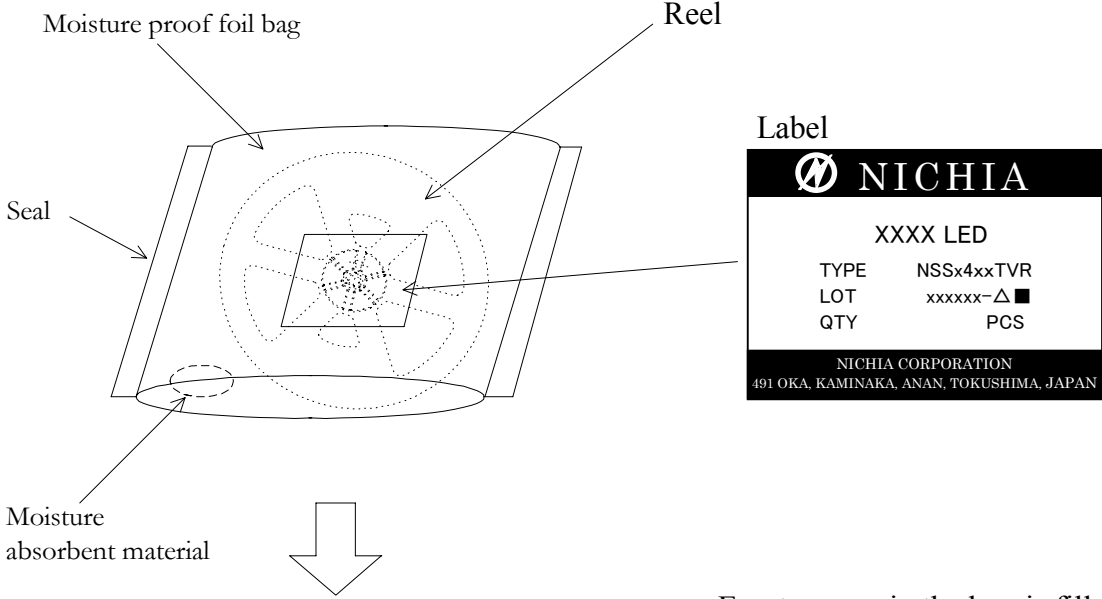


5000pcs/Reel

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

NICHIA CORPORATION	Model	NSSx4xxTVR	Unit mm
	Title	TAPING DIMENSIONS	
	No.	000818801344	Scale Allow

The reel and moisture absorbent material are put in the moisture proof foil bag and then heat sealed.



**Packing unit**

	Reel/bag	Quantity/bag (pcs)
Moisture proof foil bag	1reel	5000 MAX

Cardboard box	Dimensions (mm)	Reel/box	Quantity/box (pcs)
Cardboard box S	380 × 380 × 135 × 4t	4reel MAX	20,000 MAX
Cardboard box L	400 × 400 × 560 × 4t	Cardboard box S × 3 12reel MAX	60,000 MAX

<b>NICHIA CORPORATION</b>	Model	NSSx4xxTVR	/
	Title	PACKING	
	No.	000701801354	