



# LED Display Product Data Sheet LTD-2404SW-P

Spec No.: DS30-2012-0095

Effective Date: 02/22/2013

Revision: A

**LITE-ON DCC**

**RELEASE**

BNS-OD-FC001/A4

**LED DISPLAY****LTD-2404SW-P**  
**DATA SHEET**

<b><u>ITEM</u></b>	<b><u>Description</u></b>	<b><u>By</u></b>	<b><u>DATE</u></b>
1	New Spec	Reo Lin	2012/08/31
2	2.1 Modify Package Dimensions In Page 3 2.2 Add Packing Drawing In Page 11	Reo Lin	2012/10/03
3	Modify plastic's burr spec. from 0.14 mm to 0.05 mm in Page 3	Reo Lin	2012/12/26

**FEATURES**

- \* 0.2 inch (5.08 mm) DIGIT HEIGHT
- \* CONTINUOUS UNIFORM SEGMENTS
- \* LOW POWER REQUIREMENT
- \* EXCELLENT CHARACTERS APPEARANCE
- \* HIGH BRIGHTNESS & HIGH CONTRAST
- \* WIDE VIEWING ANGLE
- \* SOLID STATE RELIABILITY
- \* CATEGORIZED FOR LUMINOUS INTENSITY
- \* SMD DISPLAY
- \* **LEAD FREE PACKAGE (ACCORDING TO ROHS)**

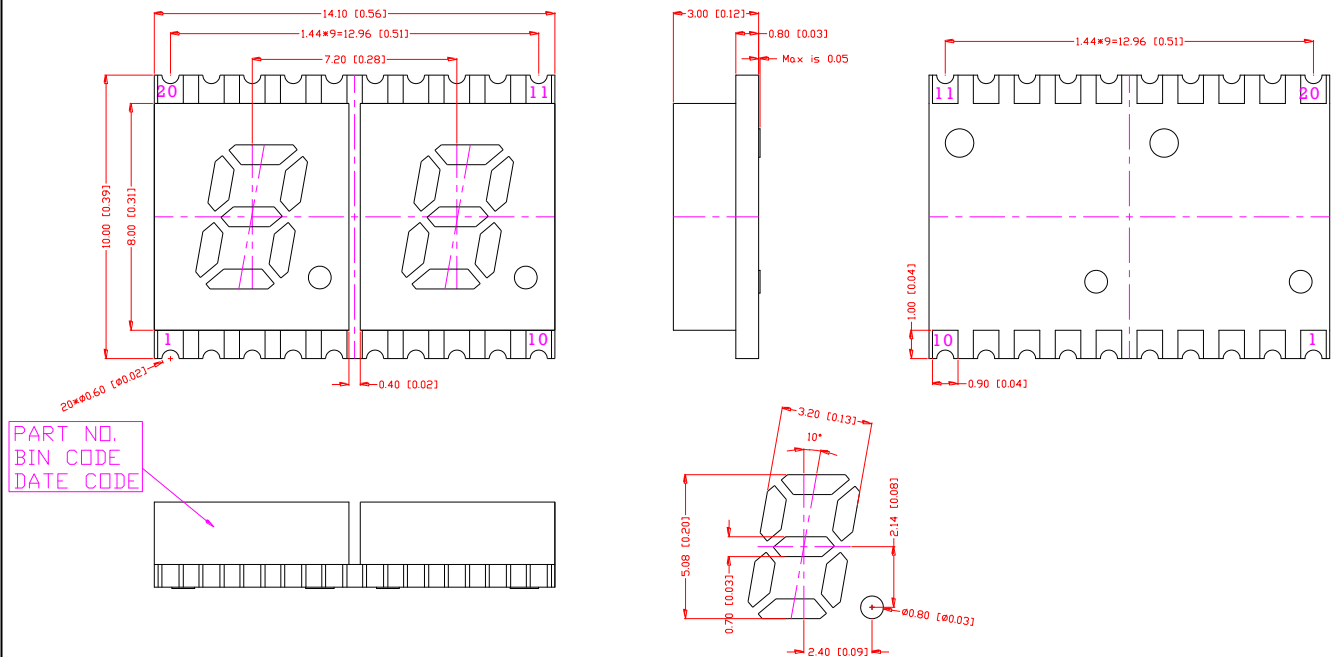
**DESCRIPTION**

The LTD-2404SW-P is a 0.2 inch (5.08 mm) digit height dual digit SMD display. This device uses InGaN White LED chips (InGaN on a transparent substrate) and has a gray face and white segments.

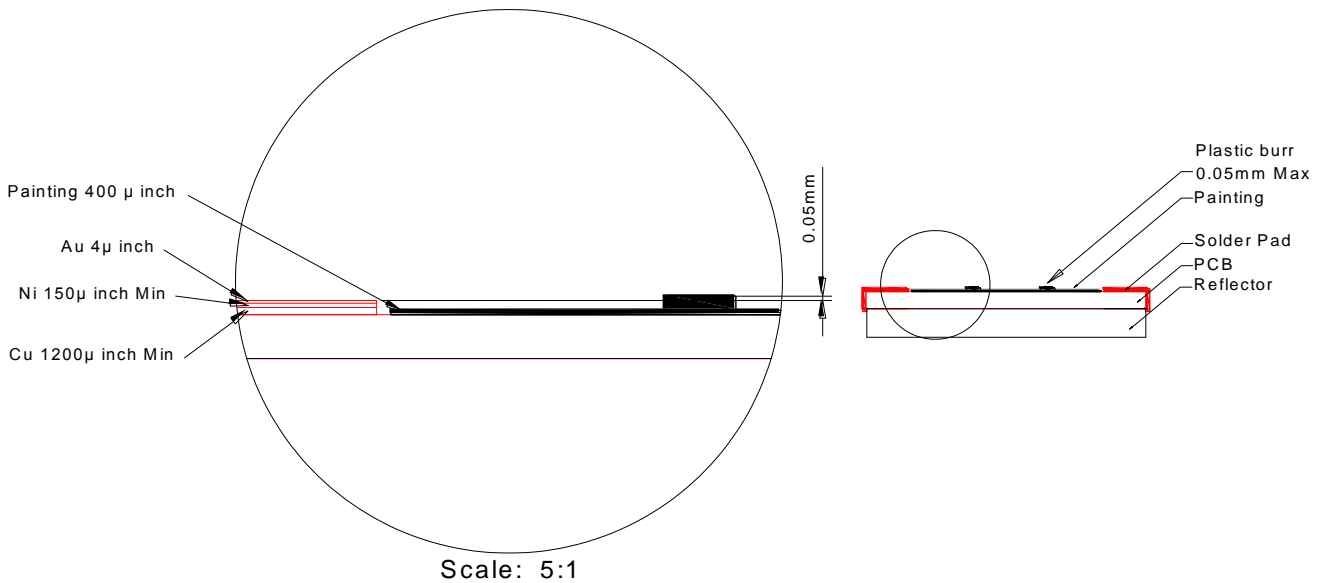
**DEVICE**

<b>PART NO.</b>	<b>DESCRIPTION</b>
InGaN White	Common Anode
LTD-2404SW-P	Rt. Hand Decimal

**PACKAGE DIMENSIONS**



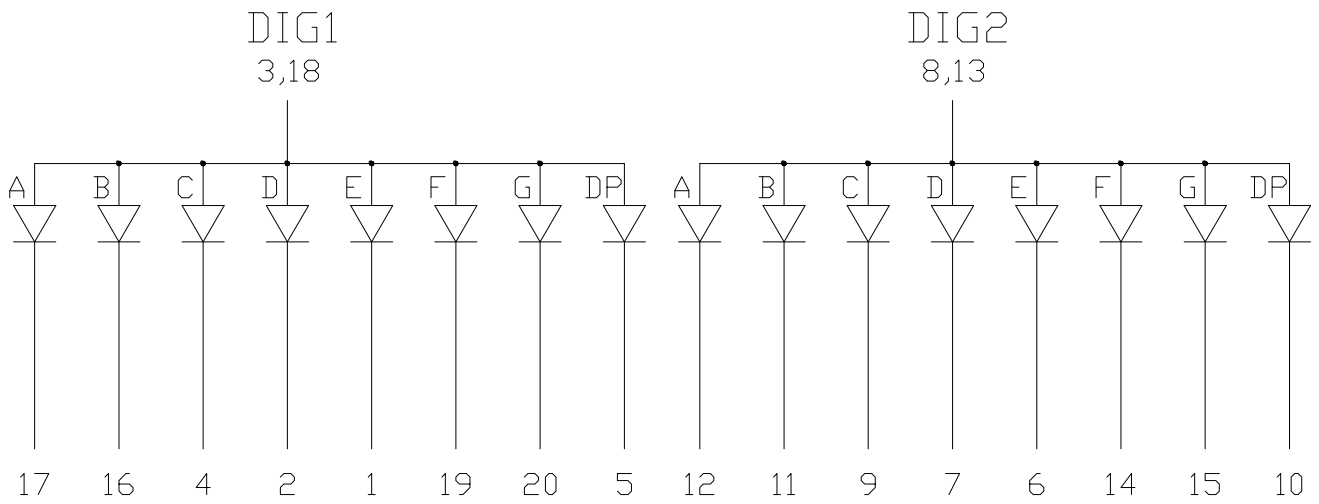
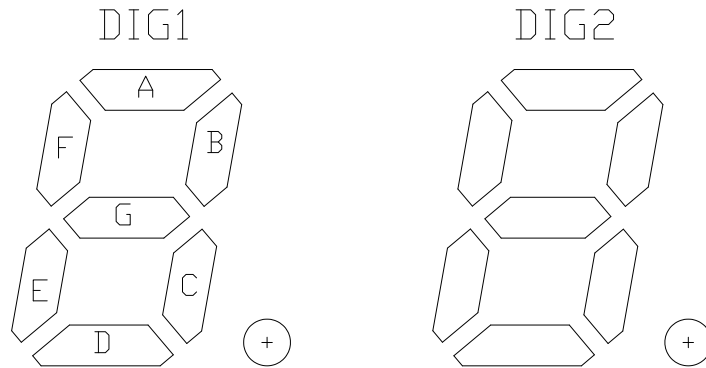
**Solder Pad Vs Painting Diagram**



**NOTES:**

1. Plastic pins' burr max. 0.05mm
2. All dimensions are in millimeters. Tolerances are ± 0.25mm (0.01") unless otherwise noted.
3. Solder pad materials and thickness: Cu: 1200 μ inch Ni: Min 150 μ inch Au: 4 μ inch

**INTERNAL CIRCUIT DIAGRAM**



**PIN CONNECTION**

<b>No.</b>	<b>CONNECTION</b>
1	CATHODE E1
2	CATHODE D1
3	COMMON ANODE DIG1
4	CATHODE C1
5	CATHODE DP1
6	CATHODE E2
7	CATHODE D2
8	COMMON ANODE DIG2
9	CATHODE C2
10	CATHODE DP2
11	CATHODE B2
12	CATHODE A2
13	COMMON ANODE DIG2
14	CATHODE F2
15	CATHODE G2
16	CATHODE B1
17	CATHODE A1
18	COMMON ANODE DIG1
19	CATHODE F1
20	CATHODE G2

## CHIP LED ABSOLUTE MAXIMUM RATING

PARAMETER	MAXIMUM RATING	UNIT
Power Dissipation Per Segment	35	mW
Peak Forward Current Per Segment ( Frequency 1Khz, 10% duty cycle)	50	mA
Continuous Forward Current Per Segment	10	mA
Forward Current Derating from 25 <sup>0</sup> C	0.28	mA/ <sup>0</sup> C
Operating Temperature Range	-20 <sup>0</sup> C to +80 <sup>0</sup> C	
Storage Temperature Range	-40 <sup>0</sup> C to +85 <sup>0</sup> C	
Soldering Conditions: 1/16 inch below seating plane for 3 seconds at 260 <sup>0</sup> C.		

## CHIP LED ELECTRICAL / OPTICAL CHARACTERISTICS AT Ta=25<sup>0</sup>C

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Average Luminous Intensity	I <sub>v</sub>	45		180	mcd	IF = 5mA Note 1, 2, 5
Viewing Angle	2θ 1/2		130		deg	Fig.6
Chromaticity Coordinates	x		0.294			IF = 5mA Note 3, 5 Fig.1
	y		0.286			
Forward Voltage Per Segment	V <sub>F</sub>	2.55		3.15	V	IF = 5mA
Reverse Current Per Segment <sup>(7)</sup>	I <sub>R</sub>			100	μA	VR=5V
Luminous Intensity Matching Ratio (Similar Light Area)	I <sub>v</sub> -m			2:1		IF=5mA

Note :

- Luminous intensity is measured with a light sensor and filter combination that approximates the CIE eye-response curve.
- I<sub>v</sub> classification code is marked on each packing bag.
- The chromaticity coordinates (x, y) is derived from the 1931 CIE chromaticity diagram.
- Caution in ESD:  
Static Electricity and surge damages the LED. It is recommend to use a wrist band or anti-electrostatic glove when handling the LED. All devices, equipment and machinery must be properly grounded.
- Tester:

CAS140B is for the chromaticity coordinates (x, y) and Iv.

6. The chromaticity coordinates (x, y) guarantee should be added  $\pm 0.01$  tolerance
7. Reverse voltage is only for IR test. It can not continue to operate at this situation.



**TYPICAL ELECTRICAL / OPTICAL CHARACTERISTIC CURVES**

(25°C Ambient Temperature Unless Otherwise Noted)

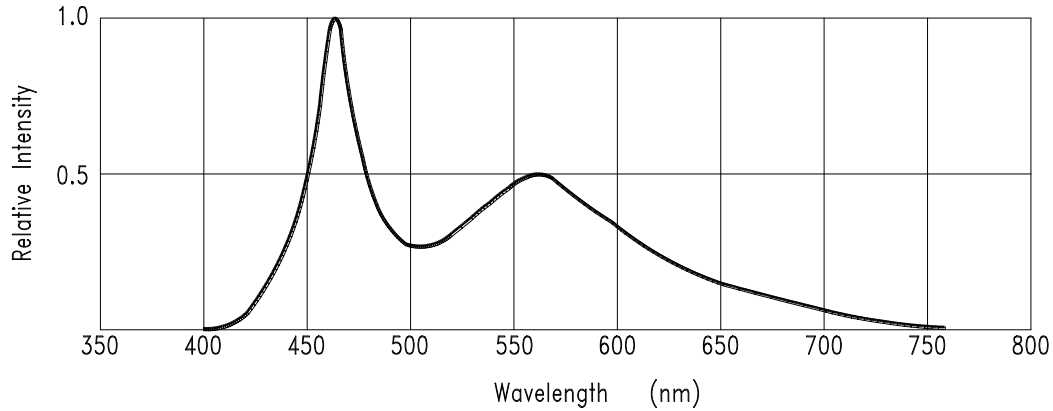


Fig.1 RELATIVE INTENSITY VS. WAVELENGTH

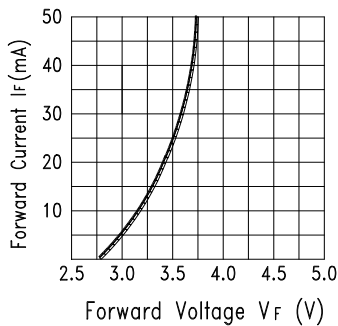


Fig.2 Forward Current vs. Forward Voltage

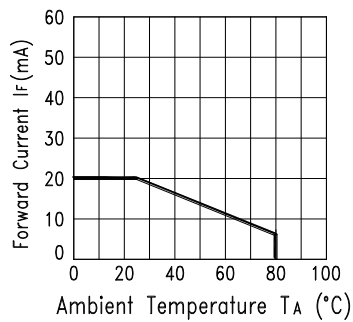


Fig.3 Forward Current Derating Curve

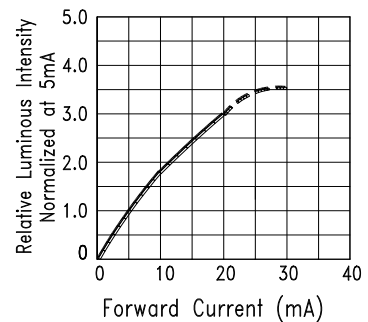


Fig.4 Relative Luminous Intensity vs. Forward Current

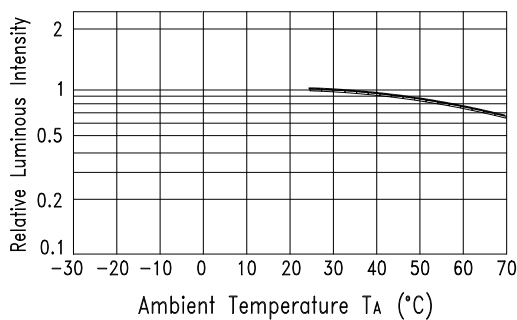


Fig.5 Luminous Intensity vs. Ambient Temperature

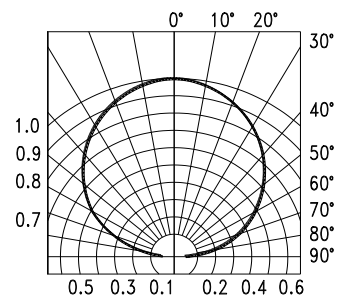


Fig.6 Spatial Distribution

**Bin Code List**

VF Spec. Table

VF Bin	Forward Voltage (V) at IF = 5mA	
	Min.	Max.
V1	2.55	2.65
V2	2.65	2.75
V3	2.75	2.85
V4	2.85	2.95
V5	2.95	3.05
V6	3.05	3.15

Tolerance on each Forward Voltage bin is +/-0.05 volt

IV Spec. Table

IV Bin	Luminous Intensity (mcd) at IF = 5mA	
	Min.	Max.
P	45.0	71.0
Q	71.0	112.0
R	112.0	180.0

Tolerance on each Luminous Intensity bin is +/- 15%.

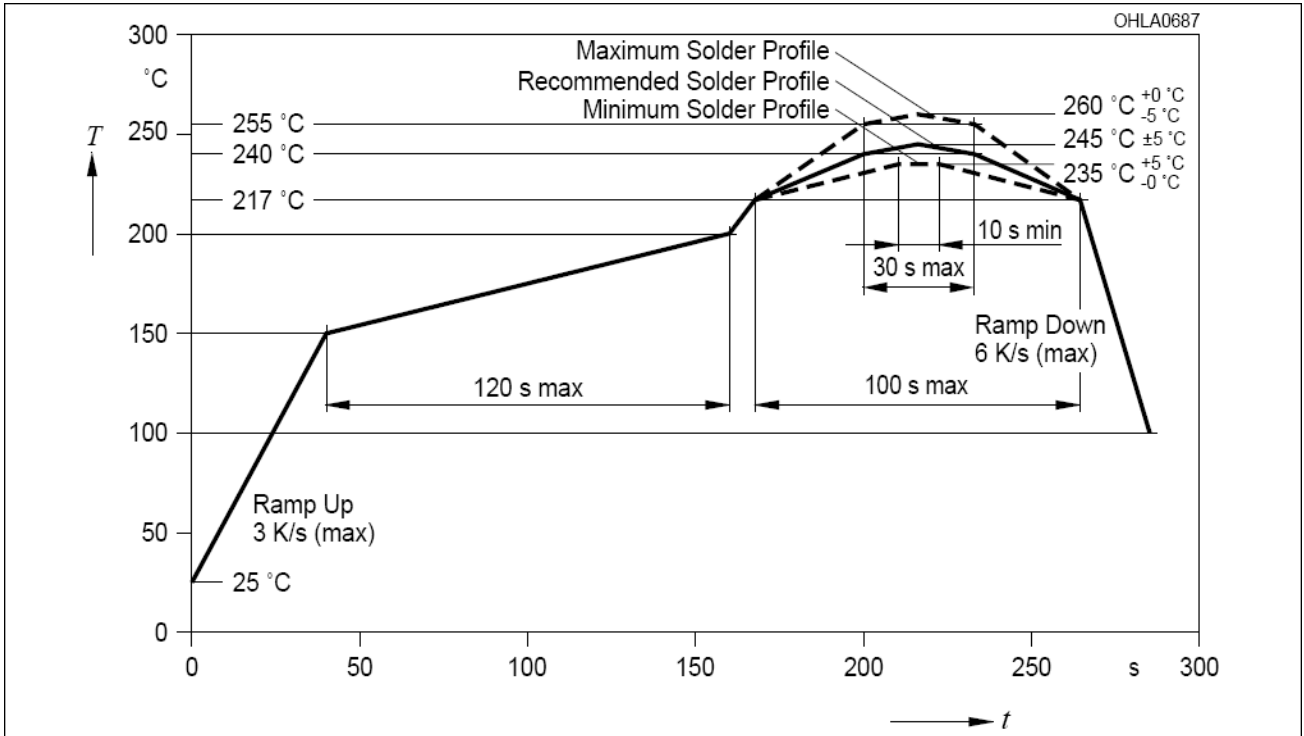
Hue Spec. Table

Hue Bin	Color bin limits at IF = 5mA				
	CIE 1931 Chromaticity coordinates				
S1	x	0.274	0.274	0.294	0.294
	y	0.226	0.258	0.286	0.254
S2	x	0.274	0.274	0.294	0.294
	y	0.258	0.291	0.319	0.286
S3	x	0.294	0.294	0.314	0.314
	y	0.254	0.286	0.315	0.282
S4	x	0.294	0.294	0.314	0.314
	y	0.286	0.319	0.347	0.315
S5	x	0.314	0.314	0.334	0.334
	y	0.282	0.315	0.343	0.311
S6	x	0.314	0.314	0.334	0.334
	y	0.315	0.347	0.376	0.343

Tolerance on each Hue (x, y) bin is +/- 0.01.

**SMT SOLDERING INSTRUCTION**

(Number of reflow process shall be less than 2 times, and cooling process to normal temperature is required between the first and the second soldering process)



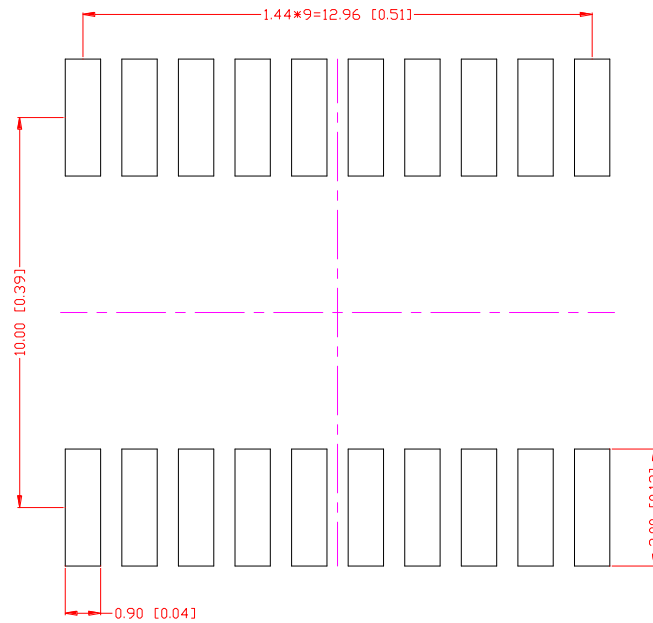
Note:

1. Recommended soldering condition:

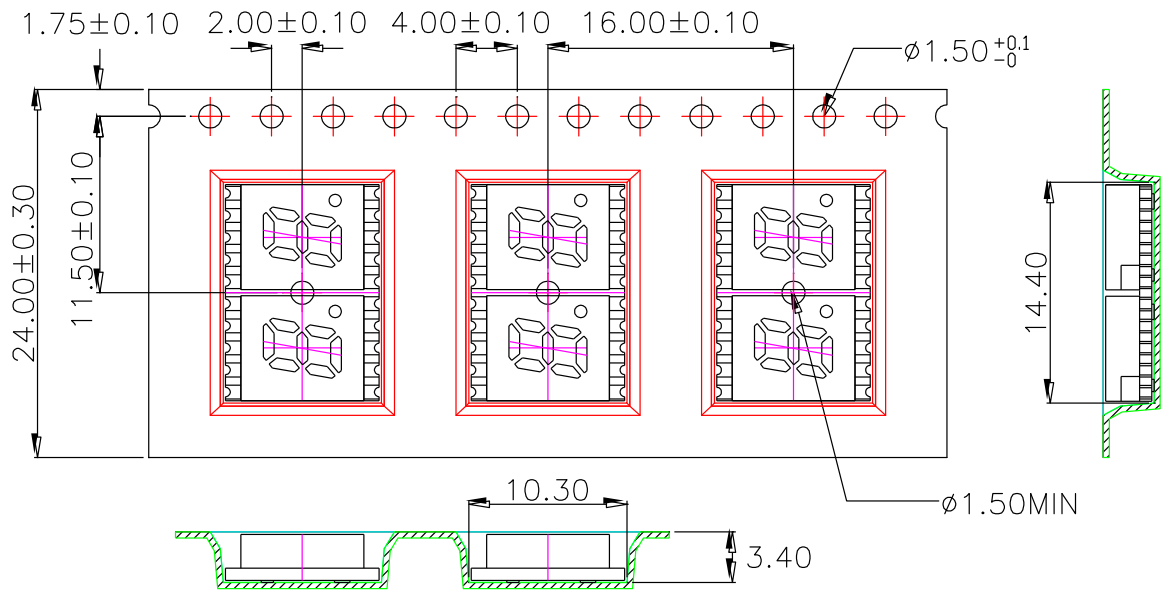
Reflow Soldering (Two times only)		Soldering Iron (One time only)	
Pre-heat:	120~150°C.	Temperature	300°C Max.
Pre-heat time:	120sec. Max.	Soldering time	3sec. Max.
Peak temperature:	260°C Max.		
Soldering time:	5sec. Max.		

2. Number of reflow process shall be less than 2 times, and cooling process to normal temperature is required between the first and the second soldering process.

**RECOMMENDED SOLDERING PATTERN (UNIT: mm):**

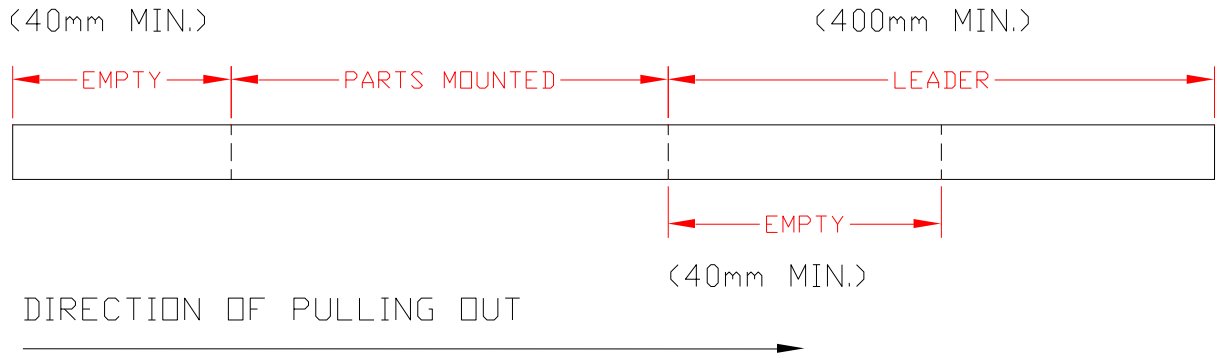


**PACKING DIMENSIONS:**

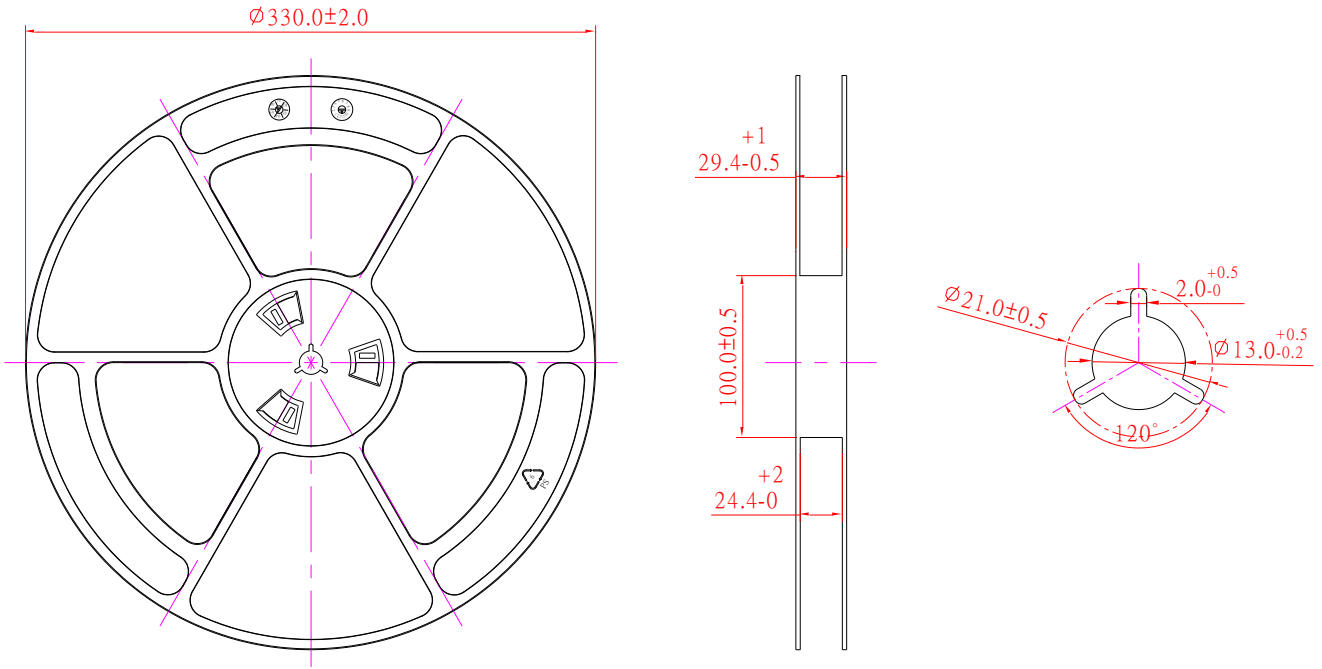


1. 10 sprocket hole pitch cumulative tolerance  $\pm 0.20$ .
2. Carrier camber is within 1 mm in 250 mm.
3. Material : Black Conductive Polystyrene Alloy.
4. All dimensions meet EIA-481-D requirements.
5. Thickness :  $0.30 \pm 0.05$  mm.
6. Packing length per 22" reel : 50.5 Meters.
7. Component load per 13" reel : 1000 pcs.

**CONFIGURATION OF TAPE**

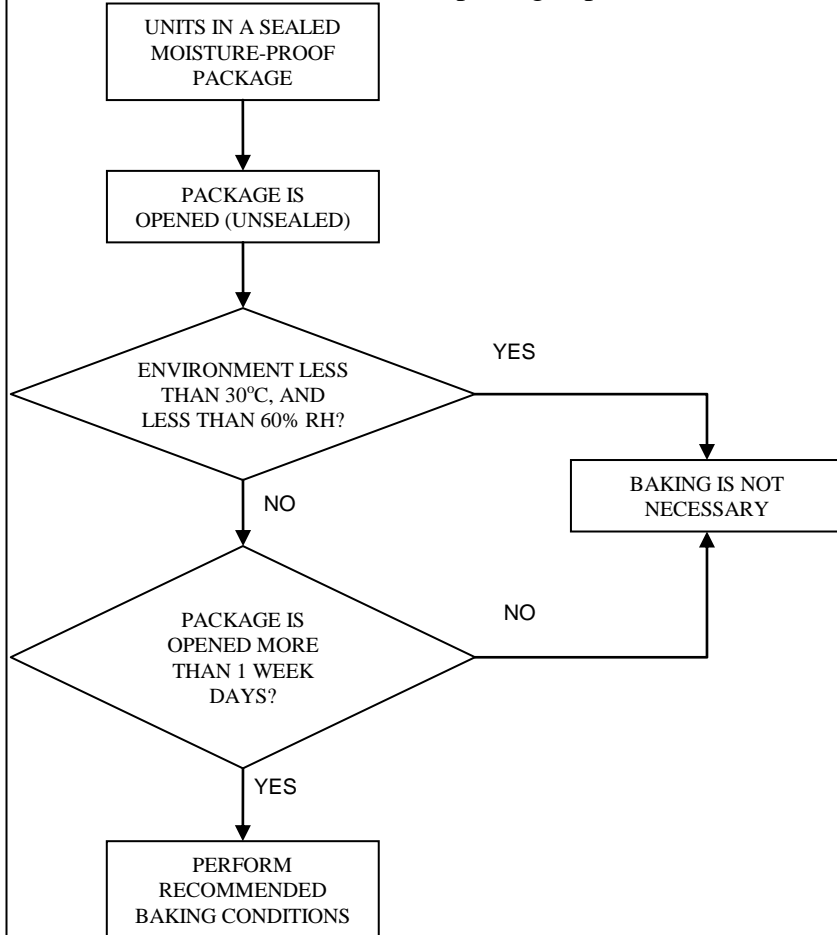


**REEL DIMENSIONS :**



**Moisture Proof Packaging**

All N/D SMD displays are shipped in moisture proof package. The displays should be stored at 30°C or less and 90% RH or less. Once the package opened, moisture absorption begins.



**Baking Conditions**

If the parts are not stored in dry conditions, they must be baked before reflow to prevent damage to the parts.

Package	Temperature	Time
In Reel	60°C	≥ 48hours
In Bulk	100°C	≥ 4hours
	125°C	≥ 2hours

**Baking should only be done once.**