

LED DISPLAY**LTC-5899SW-P**
DATA SHEET

Item	Description	By	DATE
1	New Spec.	Reo Lin	08/19/2011
2	2.1 Add Spec. for Iv & Cross talk 2.2 Modify Package Dimension	Reo Lin	10/31/2011
3	3.1 Modify spec.: Continuous Forward Current Per Segment from 20 mA to 10 mA 3.2 Revised Packing Reel dimension	Reo Lin	11/1/2011
4	Revised Hue Spec. in Page 9	Reo Lin	11/17/2011
5	Remove White Chip R21 bin in Page 7 and 8.	Reo Lin	07/23/2012

FEATURES

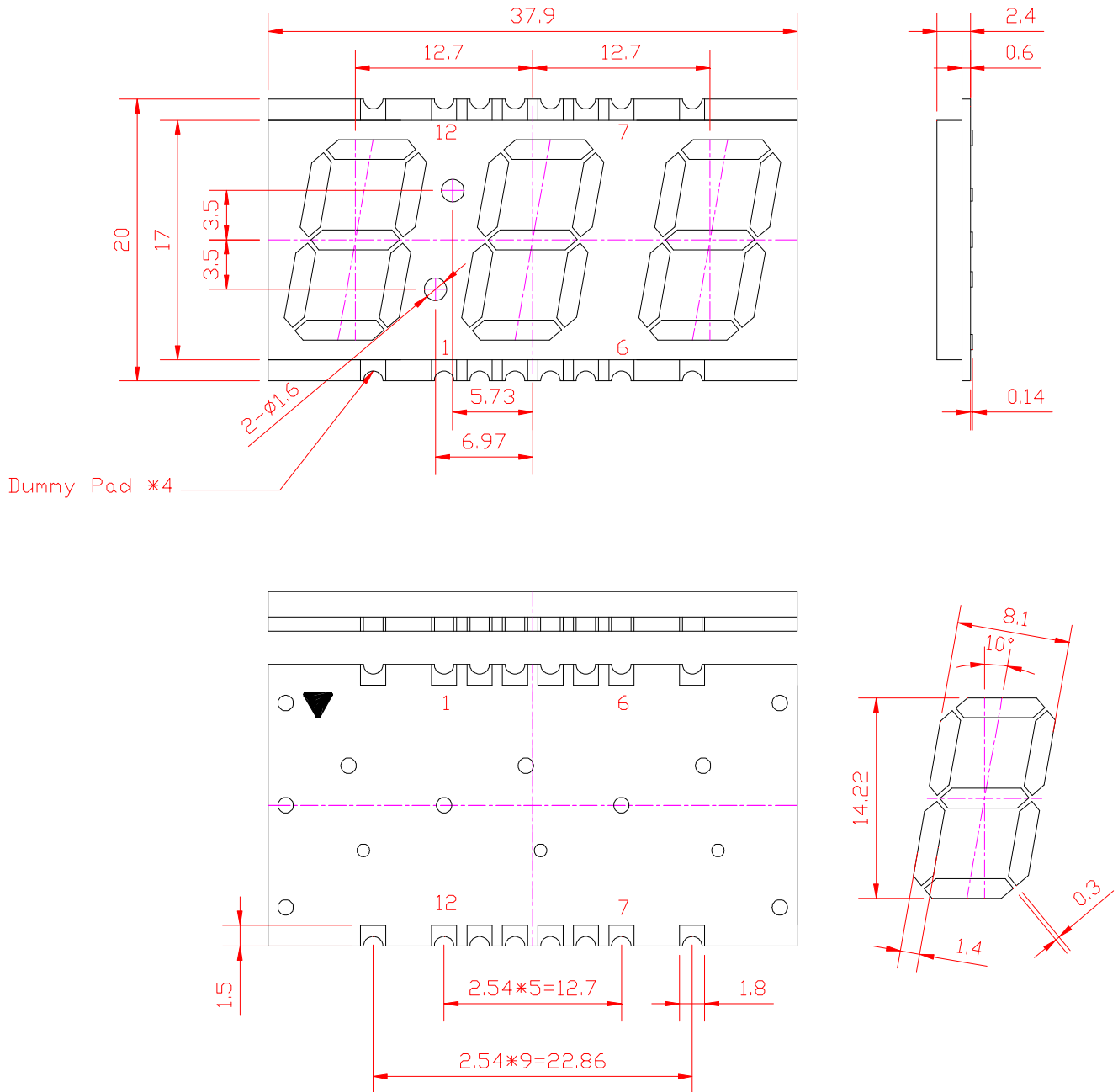
- * 0.56 inch (14.22 mm) DIGIT HEIGHT
- * CONTINUOUS UNIFORM SEGMENTS
- * LOW POWER REQUIREMENT
- * EXCELLENT CHARACTERS APPEARANCE
- * HIGH BRIGHTNESS & HIGH CONTRAST
- * WIDE VIEWING ANGLE
- * SOLID STATE RELIABILITY
- * CATEGORIZED FOR LUMINOUS INTENSITY
- * **LEAD-FREE PACKAGE (ACCORDING TO ROHS)**

DESCRIPTION

The LTC-5899SW-P is a 0.56 inch (14.22 mm) digit height triple digit seven-segment display. This device uses InGaN White LED chips (InGaN on a transparent substrate), and has a gray face and white segments, and suitable for reverse mount assembly.

DEVICE

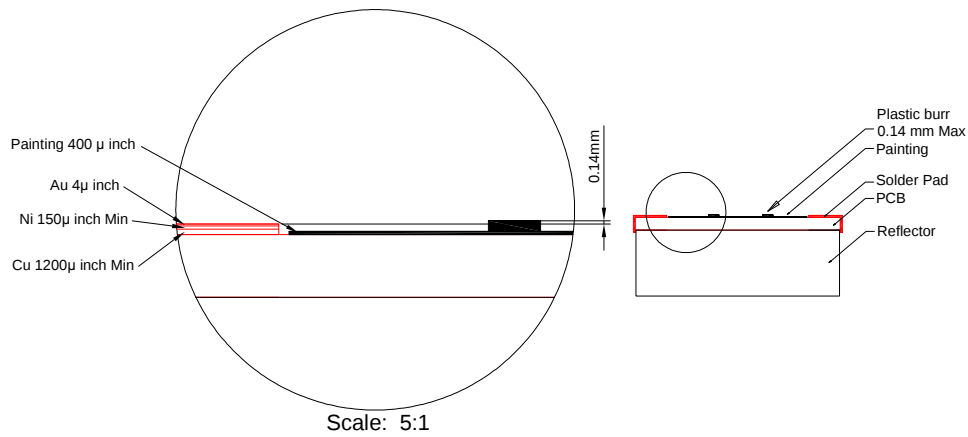
PART NO.	DESCRIPTION
InGaN White	Multiplex Common Anode
LTC-5899SW-P	

PACKAGE DIMENSIONS


NOTES: 1). All dimensions are in millimeters (inches). Tolerance: ± 0.25 mm (0.01") unless otherwise noted.

2). Pin tip's shift tolerance is ± 0.4 mm.

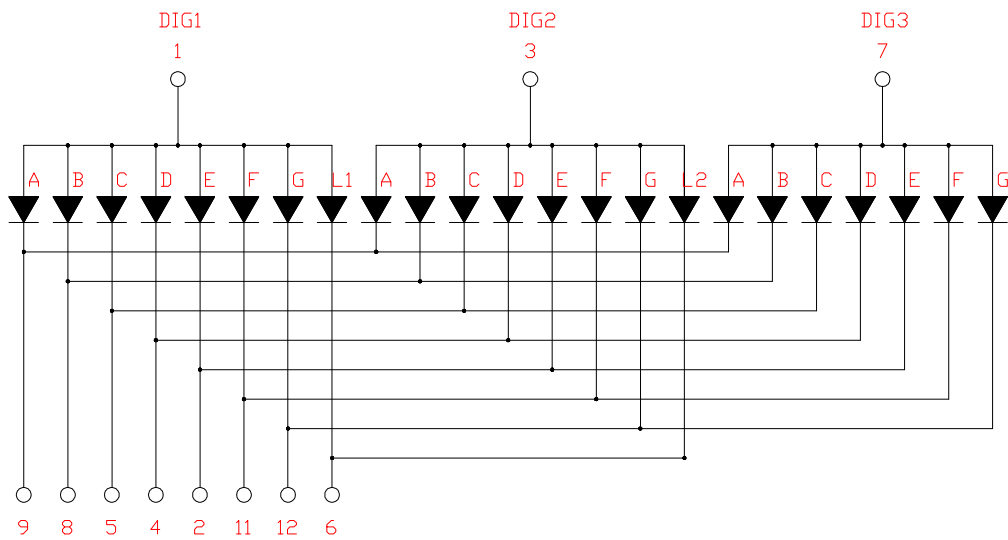
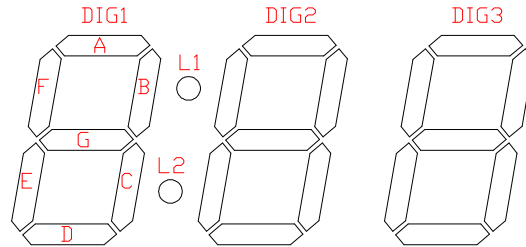
Solder Pad Vs Painting Diagram



Notes:

1. Plastic pins' burr max. 0.14 mm.
2. All dimensions are in millimeters. Tolerances are $\pm 0.25\text{mm}$ (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

No.	CONNECTION
1	Common Anode Digit 1
2	Cathode E
3	Common Anode Digit 2
4	Cathode D
5	Cathode C
6	Cathode L1 , L2
7	Common Anode Digit 3
8	Cathode B
9	Cathode A
10	NO CONNECTION
11	Cathode F
12	Cathode G

CHIP LED ABSOLUTE MAXIMUM RATING

PARAMETER	MAXIMUM RATING	UNIT
Power Dissipation Per Segment	20	mW
Peak Forward Current Per Segment (1/8 Duty Cycle, 0.25ms Pulse Width, 65 °C)	40	mA
Continuous Forward Current Per Segment	10	mA
Forward Current Derating from 25 °C	0.22	mA/°C
Operating Temperature Range	-20 °C to +80 °C	
Storage Temperature Range	-40 °C to +85 °C	

CHIP LED ELECTRICAL / OPTICAL CHARACTERISTICS AT Ta=25°C

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Average Luminous Intensity	I _v	71		146	mcd	IF = 5mA Note 1, 2, 5
Viewing Angle	2 θ 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 _F	2.70		3.2	V	IF = 5mA
Reverse Current Per Segment ⁽⁶⁾	I _R			10	μA	VR=5V
Luminous Intensity Matching Ratio (Similar Light Area)	I _v -m			2:1		IF=5mA

Note :

- Luminous intensity is measured with a light sensor and filter combination that approximates the CIE eye-response curve.
- 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 I_v.
- The chromaticity coordinates (x, y) guarantee should be added ± 0.01 tolerance.
- Reverse voltage is only for I_R test. It can not continue to operate at this situation.
- Cross talk specification ≤ 2.5%

TYPICAL ELECTRICAL / OPTICAL CHARACTERISTIC CURVES

(25°C Ambient Temperature Unless Otherwise Noted)

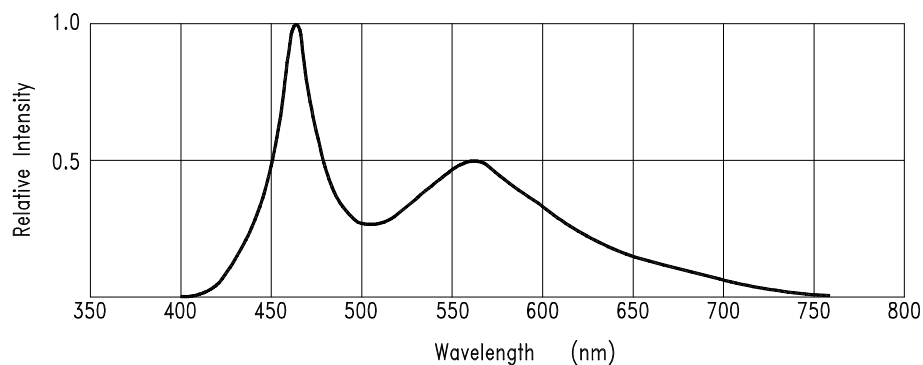


Fig.1 RELATIVE INTENSITY VS. WAVELENGTH

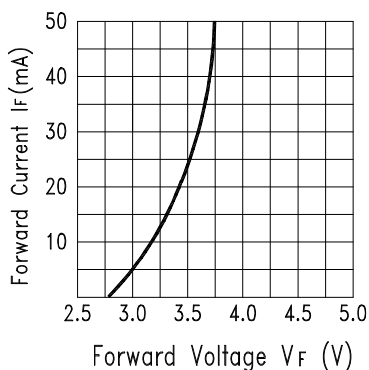


Fig.2 Forward Current vs.
Forward Voltage

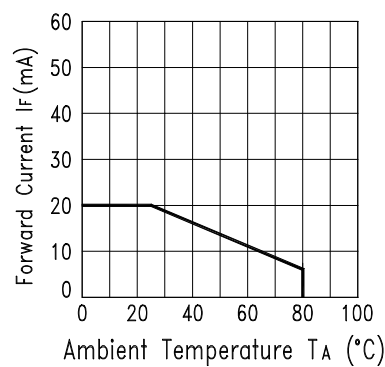


Fig.3 Forward Current
Derating Curve

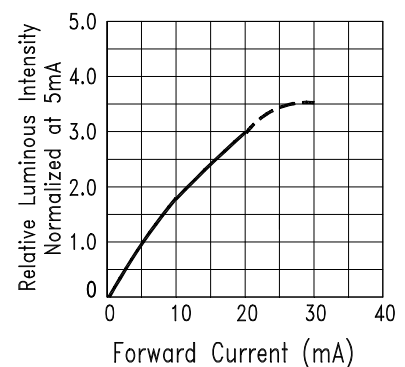


Fig.4 Relative Luminous Intensity
vs. Forward Current

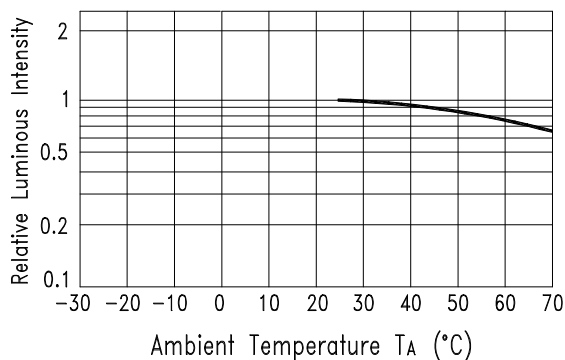


Fig.5 Luminous Intensity vs.
Ambient Temperature

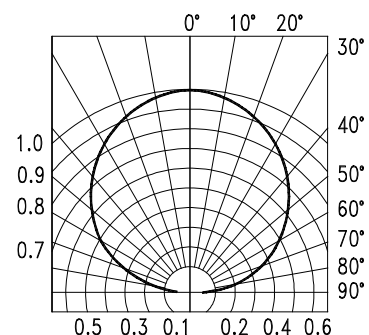


Fig.6 Spatial Distribution

Bin Code List

VF Spec. Table

VF Bin	Forward Voltage (V) at IF = 5mA	
	Min.	Max.
3	2.70	2.80
4	2.80	2.90
5	2.90	3.00
6	3.00	3.10
7	3.10	3.20

Tolerance on each Forward Voltage bin is +/-0.1 volt

IV Spec. Table

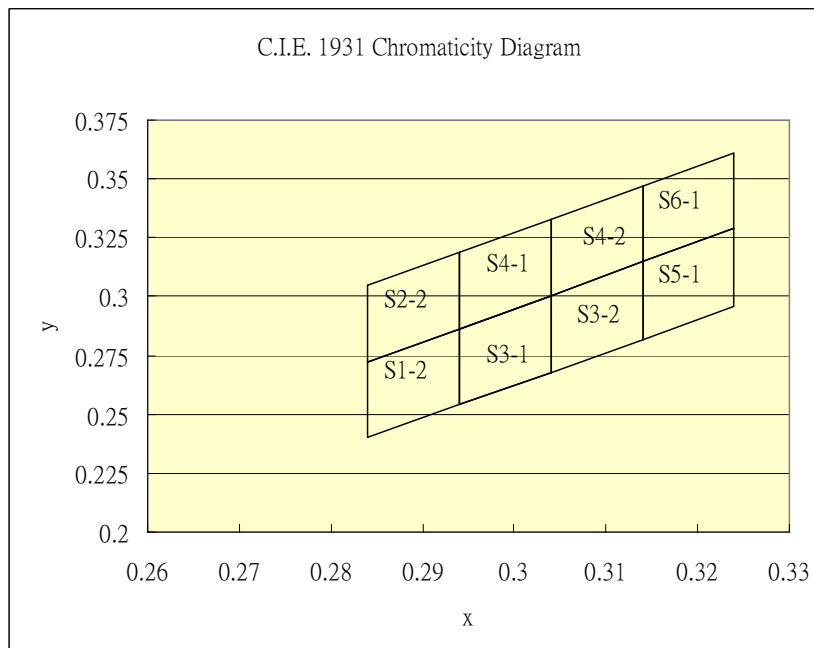
IV Bin	Luminous Intensity (mcd) at IF = 5mA	
	Min.	Max.
Q11	71.0	81.0
Q12	81.0	90.0
Q21	90.0	101.0
Q22	101.0	112.0
R11	112.0	129.0
R12	129.0	146.0

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

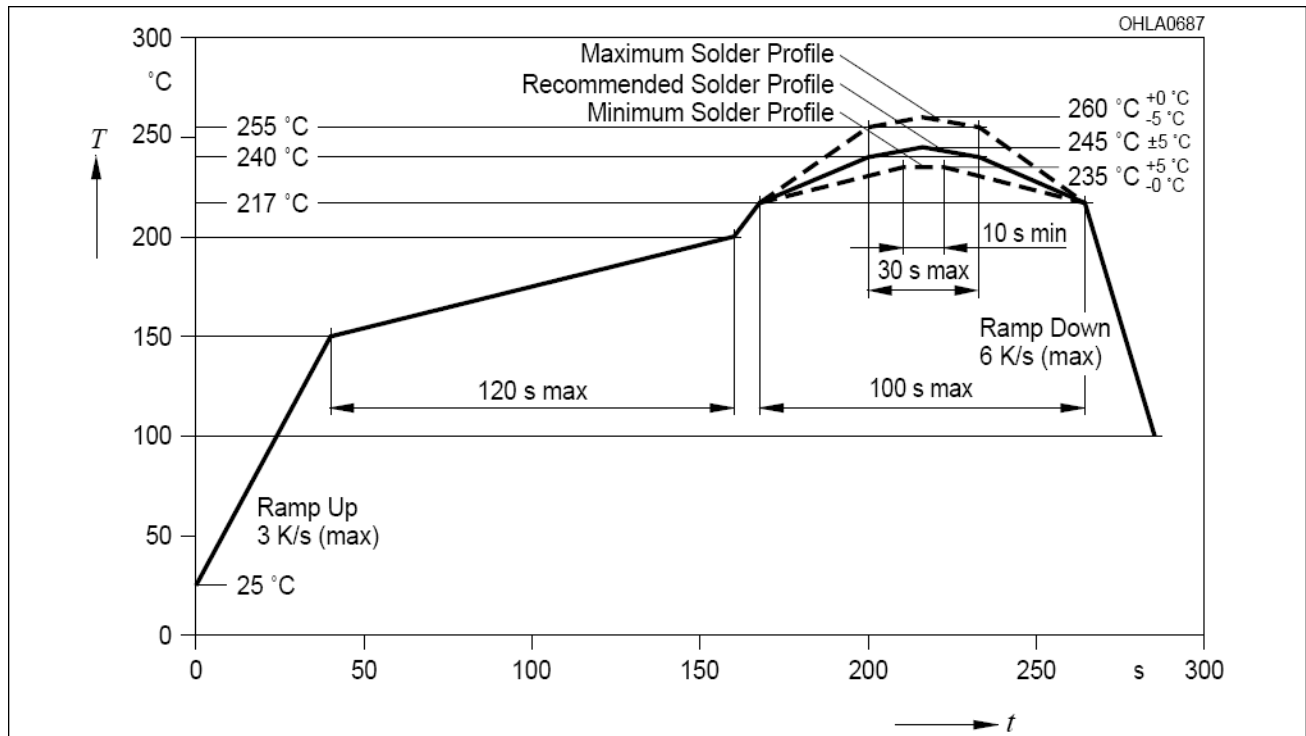
Hue Spec. Table

Hue Bin	Color bin limits at IF = 5mA				
	CIE 1931 Chromaticity coordinates				
S1-2	x	0.284	0.284	0.294	0.294
	y	0.240	0.272	0.286	0.254
S2-2	x	0.284	0.284	0.294	0.294
	y	0.272	0.305	0.319	0.286
S3-1	x	0.294	0.294	0.304	0.304
	y	0.254	0.286	0.300	0.268
S3-2	x	0.304	0.304	0.314	0.314
	y	0.268	0.300	0.315	0.282
S4-1	x	0.294	0.294	0.304	0.304
	y	0.286	0.319	0.333	0.300
S4-2	x	0.304	0.304	0.314	0.314
	y	0.300	0.333	0.347	0.315
S5-1	x	0.314	0.314	0.324	0.324
	y	0.282	0.315	0.329	0.296
S6-1	x	0.314	0.314	0.324	0.324
	y	0.315	0.347	0.361	0.329

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



SMT SOLDERING INSTRUCTION



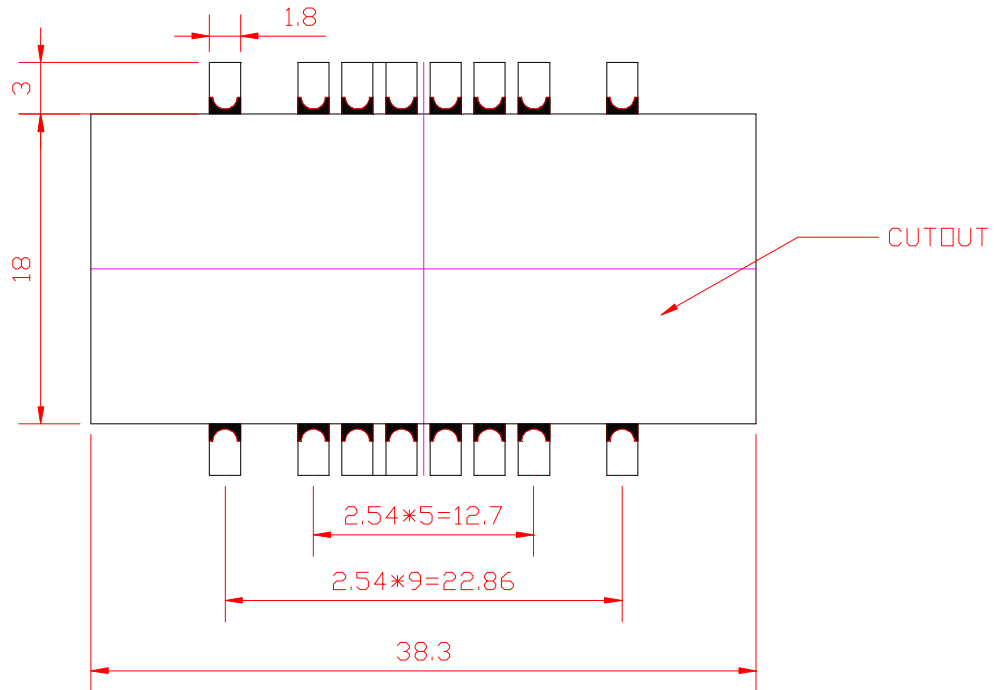
Note:

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.		

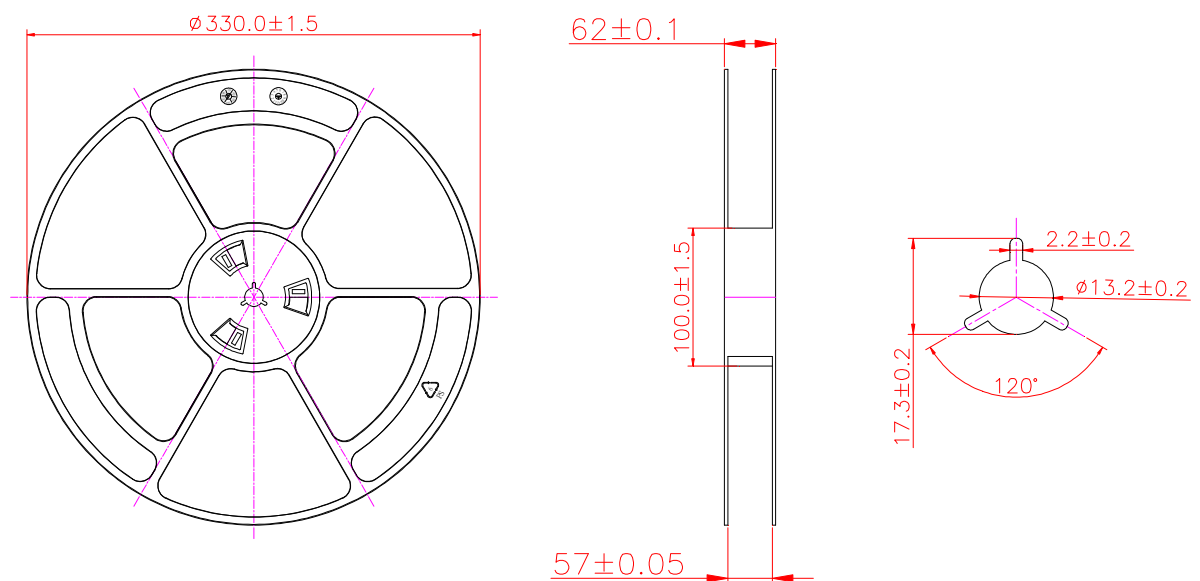
2. Number of reflow process shall be less than 2 times, and cooling process to normal temperature is required between the first and the second soldering process.

RECOMMENDED SOLDERING PATTERN



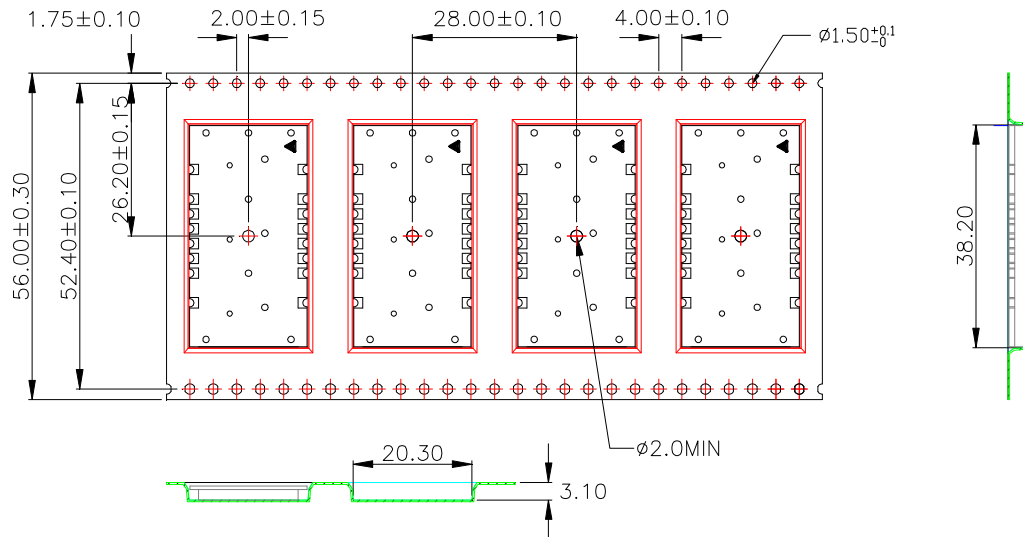
Note: All dimensions are in millimeters.

PACKING REEL DIMENSIONS



PACKING CARRIER DIMENSIONS

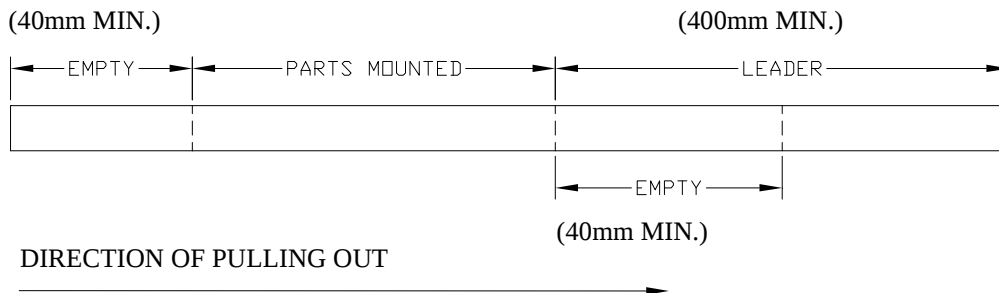
1. Taping parts:



1. 10 sprocket hole pitch cumulative tolerance ± 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 ± 0.05 mm.
6. Packing length per 22" reel : 57.0 Meters.(1:3)
7. Component load per 13" reel : 650 pcs.

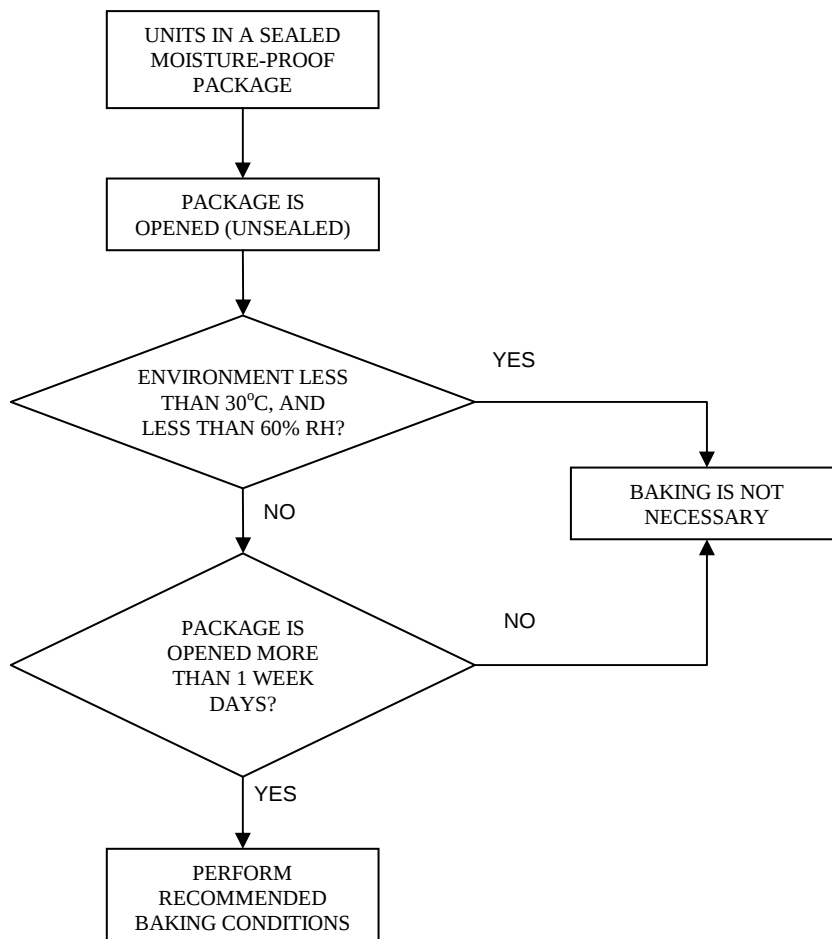
W	56.00±0.30
A0	20.30±0.10
B0	38.20±0.10
K0	3.10±0.10

2. Trailer part/ Leader part:



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.