OPTOELECTRONICS

LED Display

Product Data Sheet

LTS-4301SW

Spec No.: DS30-2008-0011

Effective Date: 02/22/2008

Revision: -

LITE-ON DCC

RELEASE

BNS-OD-FC001/A4

LED DISPLAY

LTS-4301SW
DATASHEET

Rev	Description	By
01	ORIGINAL (Refer to contour drawing Revision (-))	WARIN 07/19/07
02	Change pin length from 3.9 to 3.5+/-0.5mm And gray face to black face	WARIN 12/25/07
03	Revise operation temperature	WARIN 1/10/2008
Above date for PD and customer tracking only		
-	NPPR Received and Upload on OPNC	WARIN 1/18/2008

SPEC. NO.: DS30-2008-0011

D A T E : 1/18/2008

REV. NO. : -

PAGE NO. : 0 OF 10

FEATURES

* 0.4 inch (10.0 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)**

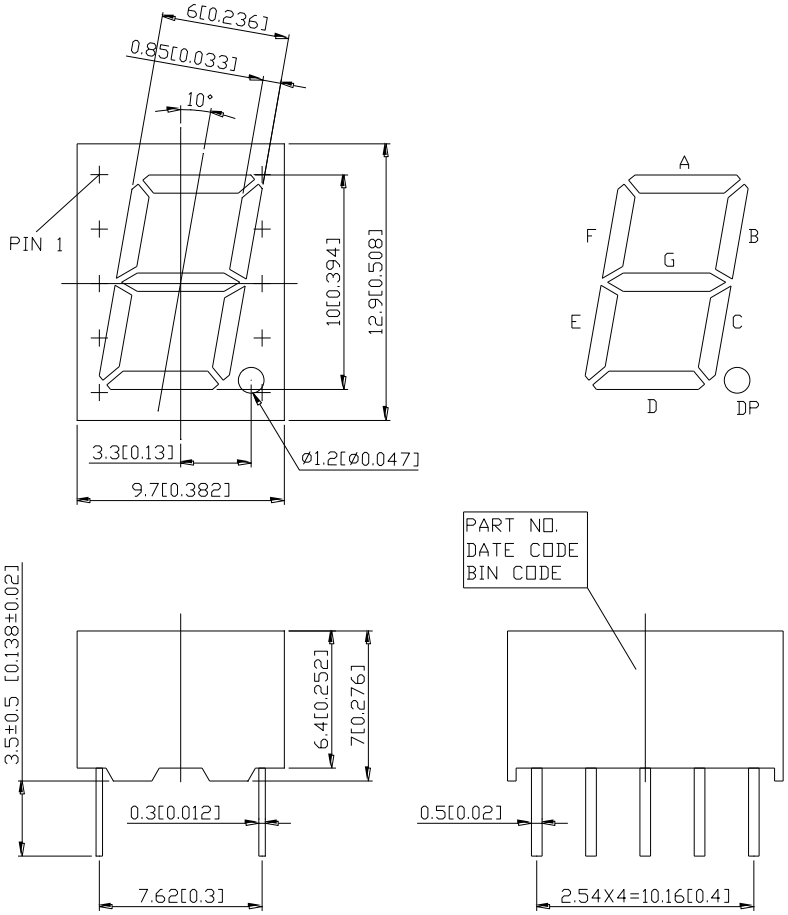
DESCRIPTION

The LTS-4301SW is a 0.4 inch (10.0 mm) digit height single digit seven-segment display. This device is the white-color display uses InGaN White LED chips. The display has a black face and white segments.

DEVICE

PART NO.	DESCRIPTION
WHITE-COLOR	Common Cathode
LTS-4301SW	Rt. Hand Decimal

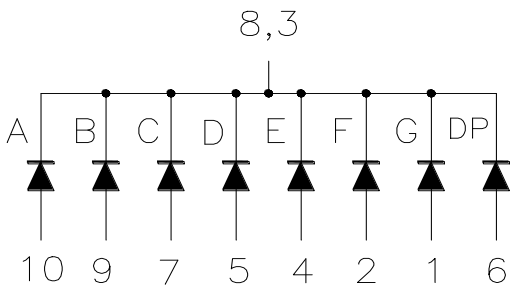
PACKAGE DIMENSIONS



NOTES: 1.All dimensions are in millimeters. Tolerances are ± 0.25 mm (0.01“) unless otherwise noted.

2. Pin tip’s shift tolerance is $\pm$ 0.4 mm.

INTERNAL CIRCUIT DIAGRAM



PIN CONNECTION

No.	CONNECTION
1	ANODE G
2	ANODE F
3	COMMON CATHODE
4	ANODE E
5	ANODE D
6	ANODE D.P.
7	ANODE C
8	COMMON CATHODE
9	ANODE B
10	ANODE A

ABSOLUTE MAXIMUM RATING

PARAMETER	MAXIMUM RATING	UNIT
Power Dissipation Per Segment	115	mW
Peak Forward Current Per Segment (Frequency 1Khz, 10% duty cycle)	60	mA
Continuous Forward Current Per Segment Forward Current Derating from 25^0C	20 0.25	mA mA/℃
Reverse Voltage Per Segment	5	V
Operating Temperature Range	-35℃ to +105℃	
Storage Temperature Range	-35℃ to +105℃	
Soldering Condition:1/16 inch below seating plane for 3 seconds at 260℃., or temperature of unit (during assembly) not over max. temperature rating above		

ELECTRICAL / OPTICAL CHARACTERISTICS AT Ta=25°C

InGaN WHITE

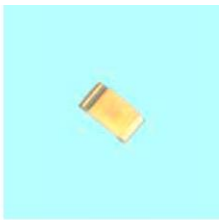
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Average Luminous Intensity Per Chip	I_V	13700		28000	mcd	I_F=10mA
View Angle	2ϕ1/2		130		deg	Fig6
Chromaticity coordinates	x		0.294		nm	I_F=5mA
	y		0.286			
Forward Voltage Per Chip	V_F	2.70		3.15	V	I_F=5mA
Reverse Current Per Chip	I_R			10	μA	V_R=5V
Luminous Intensity Matching Ratio (Similar Light Area)				2:1		I_F=10mA

Note: Luminous intensity is measured with a light sensor and filter combination that approximates the CIE (Commision Internationale De L'Eclairage) eye-response curve.

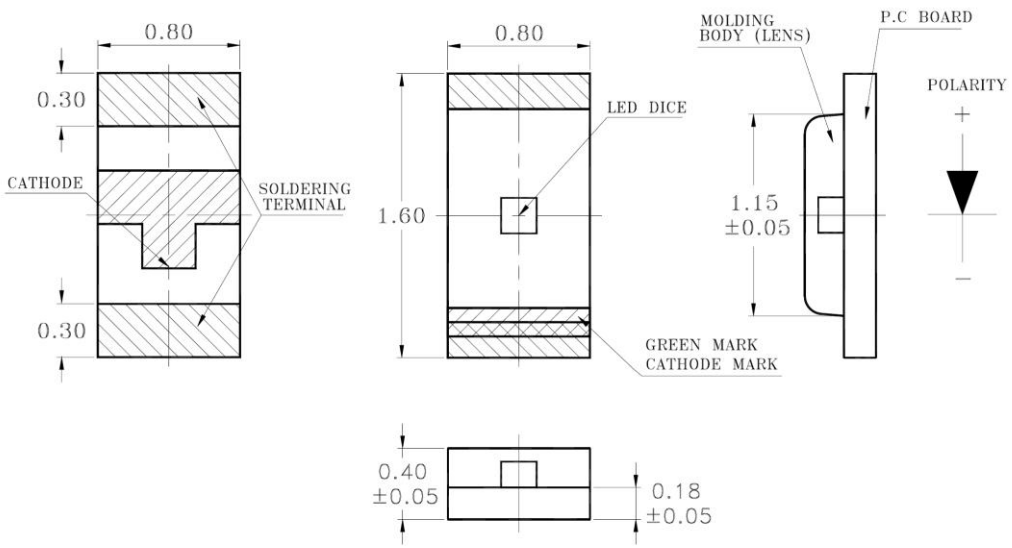
WHITE LED SPEC

Features

* Super thin (0.40H mm) Chip LED.
* Ultra bright InGaN White Chip LED.
* Package in 8mm tape on 7" diameter reels.
* Compatible with automatic placement equipment.
* Compatible with infrared and vapor phase reflow solder process.
* EIA STD package.
* I.C. compatible.



Package Dimensions



Part No.	Lens	Emitted Color
LTW-C193TS5	Yellow	InGaN White

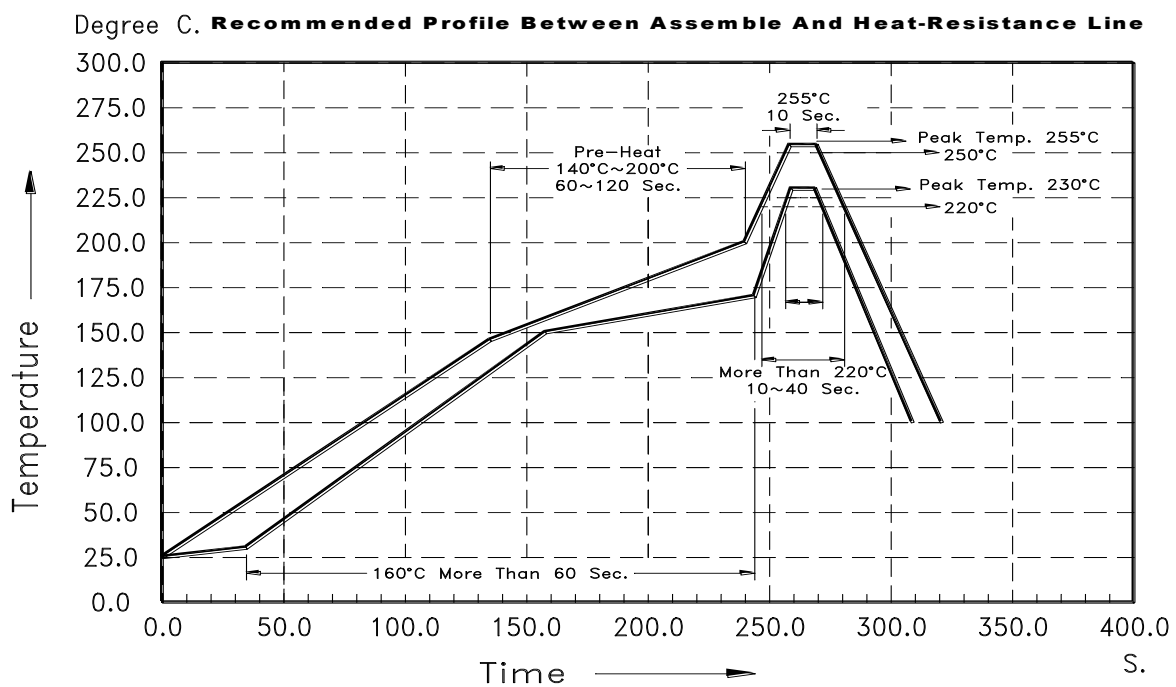
Notes:

1. All dimensions are in millimeters (inches).
2. Tolerance is ± 0.10 mm (.004") unless otherwise noted.

Absolute Maximum Ratings At Ta=25°C

Parameter	LTW-C193TS5	Unit
Power Dissipation	70	mW
Peak Forward Current (1/10 Duty Cycle, 0.1ms Pulse Width)	100	mA
DC Forward Current	20	mA
Derating Linear From 25°C	0.25	mA/°C
Reverse Voltage	5	V
Operating Temperature Range	-35°C to + 105°C	
Storage Temperature Range	-55°C to + 105°C	
Soldering Temperature	260°C For 5 Seconds	

Suggest IR Reflow Condition :



The Profile is available that must to use SnAg $_{(x=3.3\sim3.8)}$ Cu $_{(y=0.2\sim0.7)}$ solder paste

Electrical Optical Characteristics At Ta=25℃

Parameter	Symbol	Part No. LTW-	Min.	Typ.	Max.	Unit	Test Condition
Luminous Intensity	IV	C193TS5	28.0		112.0	mcd	IF = 5mA Note 1, 2, 5
Viewing Angle	2θ 1/2	C193TS5		130		deg	Fig.6
Chromaticity Coordinates	x	C193TS5		0.294			IF = 5mA Note 3, 5 Fig.1
	y			0.286			
Forward Voltage	VF	C193TS5	2.70		3.15	V	IF = 5mA
Reverse Current	IR	C193TS5			10	μA	VR = 5V

Note : 1. Luminous intensity is measured with a light sensor and filter combination that approximates the CIE eye-response curve.

2. Iv classification code is marked on each packing bag.

3. The chromaticity coordinates (x, y) is derived from the 1931 CIE chromaticity diagram.

4. 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.

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

6. The chromaticity coordinates (x, y) guarantee should be added ± 0.01 tolerance.

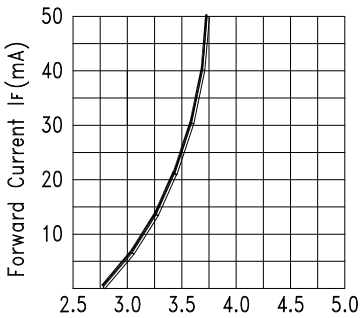


Fig.2 Forward Current vs. Forward Voltage

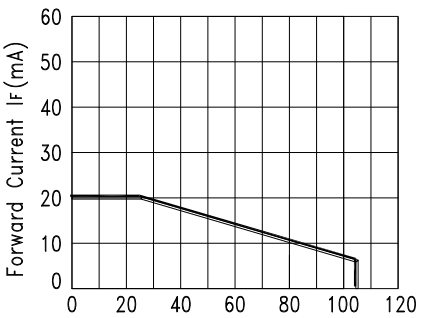


Fig.3 Forward Current Derating Curve

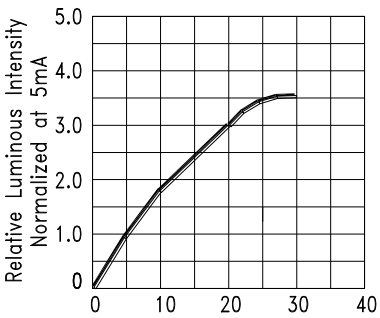


Fig.4 Relative Luminous Intensity vs. Forward Current

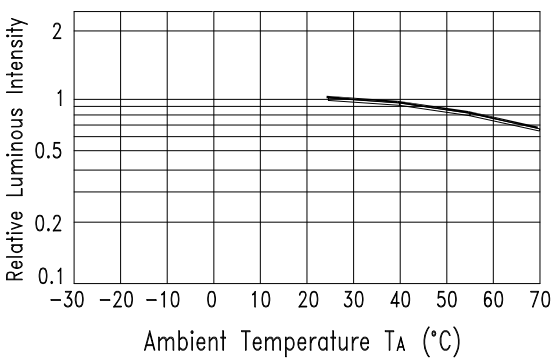


Fig.5 Luminous Intensity vs. Ambient Temperature

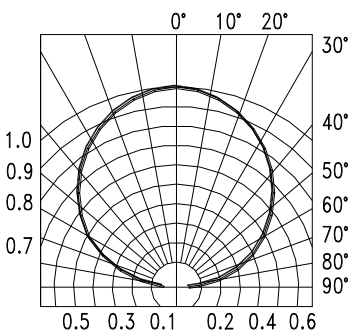


Fig.6 Spatial Distribution

NOTE : SMD

Bin Code List

VF Spec. Table

VF Bin	Forward Voltage (V) at IF = 5mA	
	Min.	Max.
A	2.70	2.85
B	2.85	3.00
C	3.00	3.15

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

IV Spec. Table

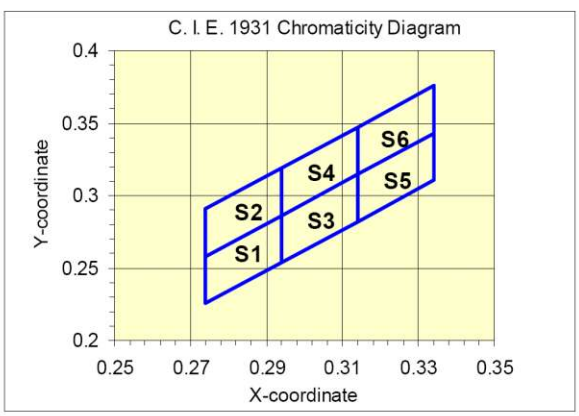
IV Bin	Luminous Intensity (mcd) at IF = 5mA	
	Min.	Max.
N	28.0	45.0
P	45.0	71.0
Q	71.0	112.0

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

Hue Spec. Table

Hue Bin	Color bin limits at IF = 5mA				
	CIE 1931Chromaticity 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.



CAUTIONS

1. Application

The LEDs described here are intended to be used for ordinary electronic equipment (such as office equipment, communication equipment and household applications).Consult Liteon's Sales in advance for information on applications in which exceptional reliability is required, particularly when the failure or malfunction of the LEDs may directly jeopardize life or health (such as in aviation, transportation, traffic control equipment, medical and life support systems and safety devices).

2. Storage

The storage ambient for the LEDs should not exceed 30°C temperature or 70% relative humidity.
It is recommended that LEDs out of their original packaging are IR-reflowed within one week.
For extended storage out of their original packaging, it is recommended that the LEDs be stored in a sealed container with appropriate desiccant, or in a desiccators with nitrogen ambient.
LEDs stored out of their original packaging for more than a week should be baked at about 60 deg C for at least 24 hours before solder assembly.

3. Cleaning

Use alcohol-based cleaning solvents such as isopropyl alcohol to clean the LED if necessary.

4. Soldering

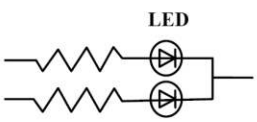
Recommended soldering conditions:

Reflow soldering		Wave Soldering		Soldering iron	
Pre-heat	120~150°C	Pre-heat	100°C Max.	Temperature	300°C Max.
Pre-heat time	120 sec. Max.	Pre-heat time	60 sec. Max.	Soldering time	3 sec. Max.
Peak temperature	240°C Max.	Solder wave	260°C Max.		(one time only)
Soldering time	10 sec. Max.	Soldering time	10 sec. Max.		

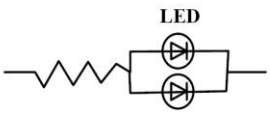
5. Drive Method

An LED is a current-operated device. In order to ensure intensity uniformity on multiple LEDs connected in parallel in an application, it is recommended that a current limiting resistor be incorporated in the drive circuit, in series with each LED as shown in Circuit A below.

Circuit model A



Circuit model B



(A) Recommended circuit.
(B) The brightness of each LED might appear different due to the differences in the I-V characteristics of those LEDs.

6. ESD (Electrostatic Discharge)

Static Electricity or power surge will damage the LED.
Suggestions to prevent ESD damage:

- Use of a conductive wrist band or anti-electrostatic glove when handling these LEDs.
- All devices, equipment, and machinery must be properly grounded.
- Work tables, storage racks, etc. should be properly grounded.
- Use ion blower to neutralize the static charge which might have built up on surface of the LED's plastic lens as a result of friction between LEDs during storage and handling.