

# LIQUID CRYSTAL DISPLAY MODULE

## Standard Product Specification

<b>PRODUCT NUMBER</b>	<b>LC4307</b>
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INTERNAL APPROVALS				
Product Mgr	Project Leader	Quality Mgr	Electr. Eng	Document Control
Date:	Date:	Date:	Date:	Date:

- Approval for Specification only**
- Approval for Specification and Sample**

Sample no.:

Date:

ISIR no.:

Product No.	LC4307	REV. B
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**REVISION RECORD**

<b>Rev.</b>	<b>Date</b>	<b>Page</b>	<b>Chapt.</b>	<b>Comment</b>	<b>ECN no.</b>
A	09/25/03			New Standard Product Release	E1558
B	12/05/05			Correct typo for O.D. in Section 2.0	E2066
				Update to standard format template.	

## 1 DESCRIPTION & MAIN FEATURES

### 1.1 Description

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Dot matrix display module consisting of a Liquid Crystal Display, CMOS driver and controller LSI, printed circuit board and metal support frame and array type Light Emitting Diode (LED) backlight.

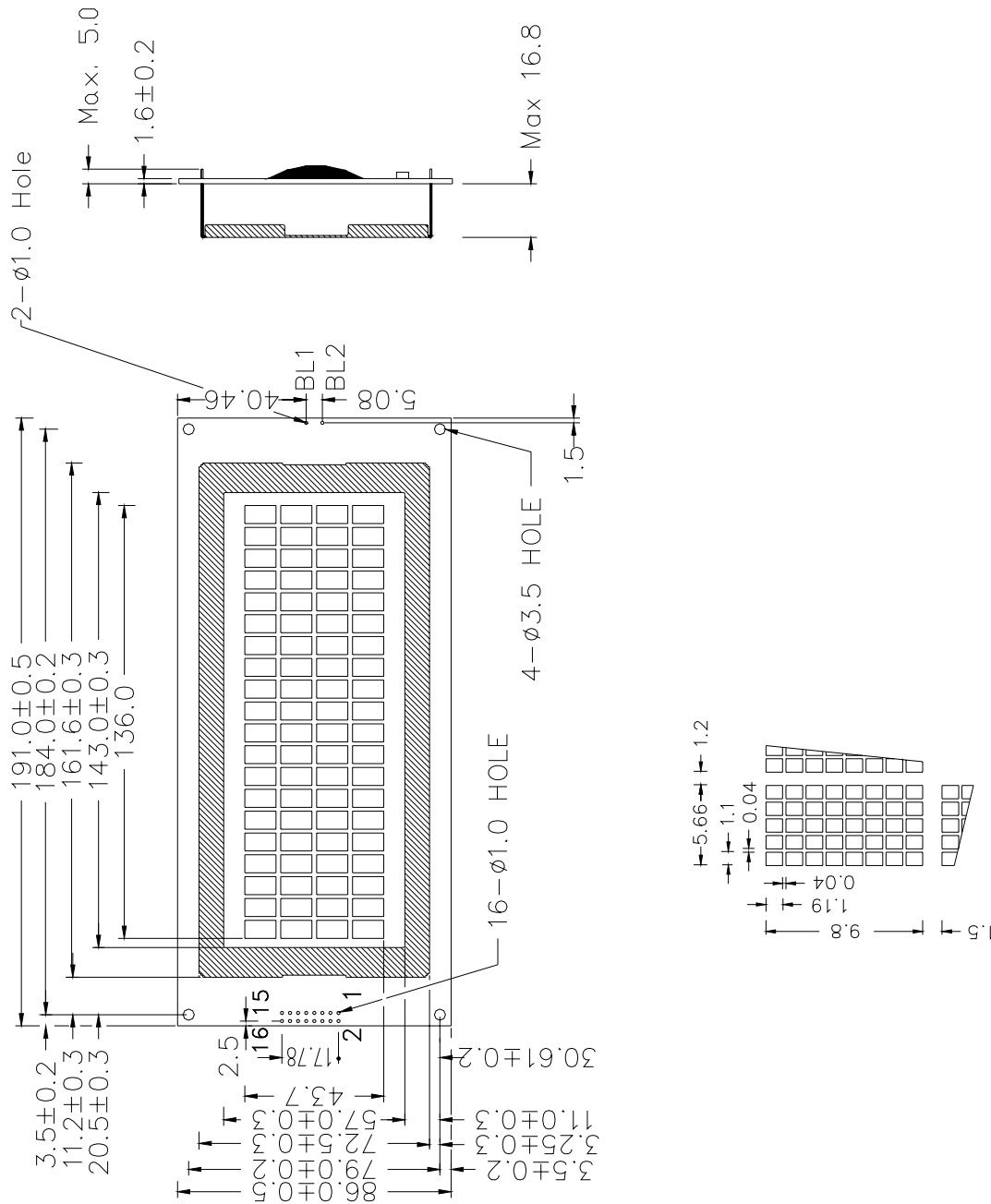
Available LC fluids types are: STN (supertwisted nematic), STN-H (extended temperature range STN).

### 1.2 Mechanical Characteristics

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ITEM	SPECIFICATION	UNIT
Overall Dimensions	191.0 (W) x 86.0 (H) x 21.8 max.(D)	mm
Display Format	4 line x20 characters	
Character Font Format	5 (W) x 7 (H) with attached cursor	
Duty Ratio	1/16	--
Dot Size	1.1 (W) x 1.19 (H)	mm
Dot Pitch	1.14 (W) x 1.23 (H)	mm
Character Size	5.66 (W) x 9.80 (H)	mm
Active Area	136.0 (W) x 43.7 (H)	mm
Viewing Area	143.0 (W) x 57.0 (H)	mm

1.3 MECHANICAL DRAWING



## 2 ELECTRICAL SPECIFICATION

### 2.1 ABSOLUTE MAXIMUM RATINGS

VSS = 0 V, Ta = 25 °C

Item	Symbol	STN		STN-H		Unit	Note
		Min	Max	Min	Max		
Power Supply Voltage	V <sub>DD</sub> -V <sub>SS</sub>	0	7	0	7	V	
LC driver supply voltage	V <sub>DD</sub> -V <sub>O</sub>	0	10	0	10	V	
Operating Temperature	Top	0	+50	-20	+70	°C	Note 3
Storage Temperature	Tst	-20	+70	-30	-80	°C	Note 1
Humidity: Operating (@40°C,	--	--	85%	--	85%		Note 4
Humidity: Non-operating (@40°C.	--	--	90%	--	90%		Note 4

Note 1: Tested to 100 hrs.

Note 2: Refers to non-condensing conditions.

Note 3: With backlight off.

### 2.2 ELECTRICAL CHARACTERISTICS

VSS = 0 V, Ta = 25 °C

Item	Symbol	Condition	Min	Typ	Max	Unit
Input Voltage	V <sub>IH</sub>	Ta = 25 °C	2.2	--	V <sub>DD</sub>	V
	V <sub>IL</sub>	Ta = 25 °C	--	--	0.6	V
Output Voltage	V <sub>OH</sub>	I <sub>OH</sub> =0.205mA	2.4	--	--	V
	V <sub>OL</sub>	I <sub>OL</sub> =1.2mA	--	--	0.4	V
Current Consumption	* I <sub>DD</sub>	V <sub>DD</sub> =5.0V	--	3	--	mA

\*I<sub>DD</sub> measurement condition is for all patterns ON

### 2.3 RECOMMENDED LC DRIVE VOLTAGE (VDD-VO)

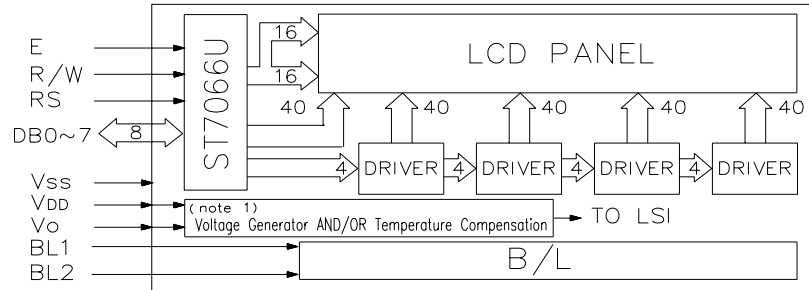
VDD=5.0±0.25V

Temperature	STN	STN-H
Ta = -20°C	-	7.0
Ta = 0°C	5.0	6.9
Ta = 25°C	4.8	6.8
Ta = 50°C	4.6	6.7
Ta = 70°C	-	6.6

### 2.4 INTERFACE PIN ASSIGNMENT

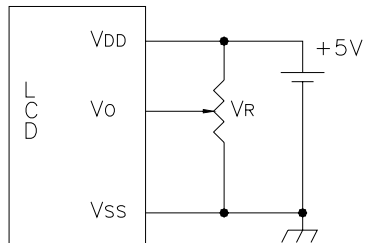
Pin No.	Symbol	I/O	Function
1	V <sub>SS</sub>	-	Ground (0V), LED-
2	V <sub>DD</sub>	-	Logic Supply Voltage
3	V <sub>O</sub>	-	LC Drive voltage for contrast adjustment
4	RS	I	Register Select 0: Instruction Register 1: Data Register
5	R/W	I	Read / Write 0: Data Write (Module←MPU) 1: Data Read (Module→MPU)
6	E	I	Enable Signal Active High (H→L)
7	DB0	I/O	Bi-directional data bus line 0
8	DB1	I/O	Bi-directional data bus line 1
9	DB2	I/O	Bi-directional data bus line 2
10	DB3	I/O	Bi-directional data bus line 3
11	DB4	I/O	Bi-directional data bus line 4
12	DB5	I/O	Bi-directional data bus line 5
13	DB6	I/O	Bi-directional data bus line 6
14	DB7	I/O	Bi-directional data bus line 7
15	N/C (V <sub>EE</sub> )	-(O)	No connection (Negative voltage output for models with on-board negative voltage generator)
16	V <sub>LED+</sub>	-	Supply voltage for backlight (+5V)
BL1	V <sub>LED+</sub>	-	Supply voltage for backlight (+5V)
BL2	V <sub>LED-</sub>	-	Supply voltage for backlight (Ground)

## 2.5 BLOCK DIAGRAM

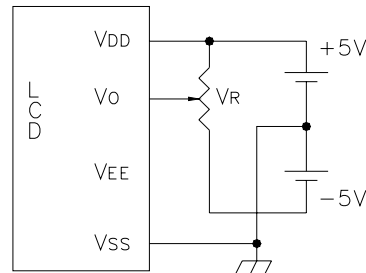


## 2.6 POWER SUPPLY CIRCUIT

- STN



- STN-H without On-board Neg. Voltage

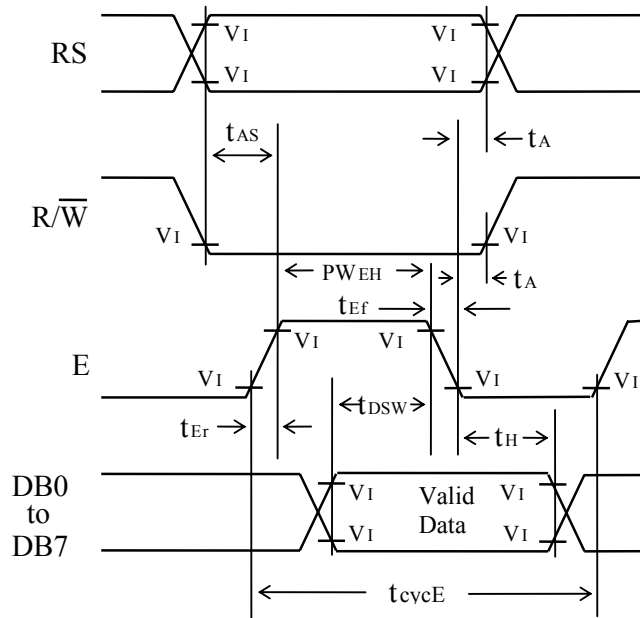




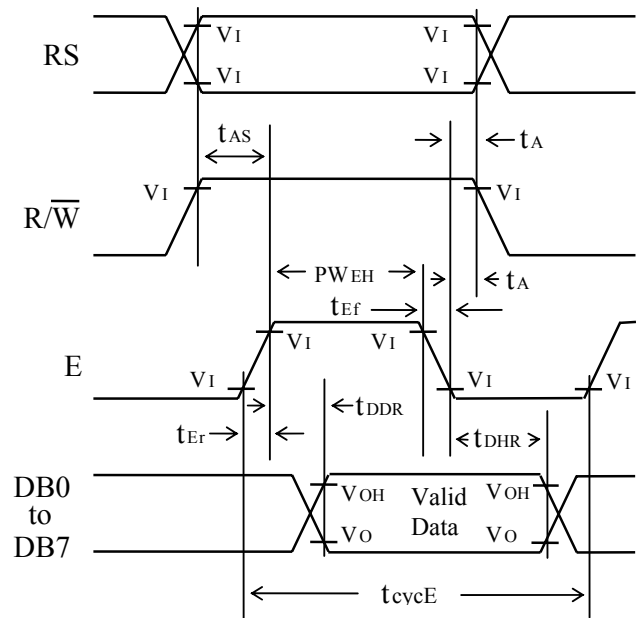
## 2.7 TIMING CHARACTERISTICS

Item	Symbol	Min.	Typ.	Max.	Unit
Enable cycle time	TcycE	1.0	-	-	nS
Enable pulse width	PWEH	450	-	-	nS
Enable rise / fall time	tEr/tEf	-	-	20	nS
Address set-up time	tAS	140	-	-	nS
Address hold time	tAH	10	-	-	nS
Data delay time	tDDR	-	-	320	nS
Data hold time (Write)	tDHW	10	-	-	nS
Data hold time (Read)	tDHR	20	-	-	nS
Data set-up time	tDSW	195	-	-	nS

### WRITE OPERATION



### READ OPERATION



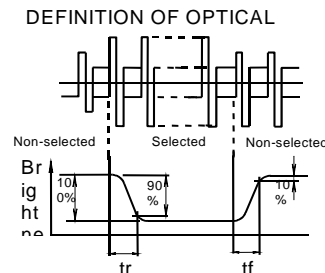
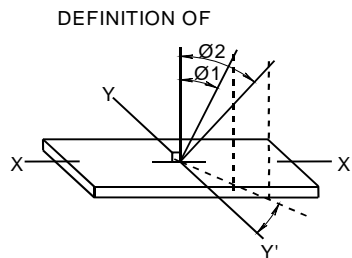
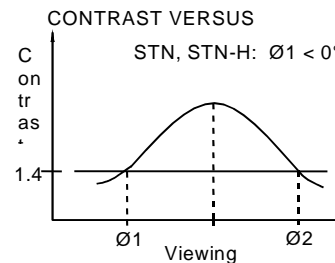
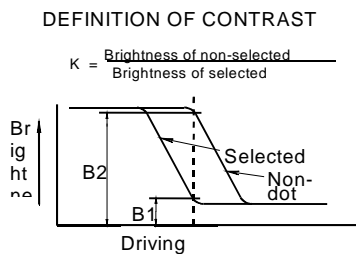
### 3 DD RAM ADDRESS vs. DISPLAY POSITION

Character	1	2	3	4	5	6	7	8	9	10	11	---	18	19	20
Line 1	00	01	02	03	04	05	06	07	08	09	0A	---	11	12	13
Line 2	40	41	42	43	44	45	46	47	48	49	4A	---	51	52	53
Line 3	14	15	16	17	18	19	1A	1B	1C	1D	1E	---	25	26	27
Line 4	54	55	56	57	58	59	5A	5B	5C	5D	5E	---	65	66	67

## 4 OPTICAL SPECIFICATION

### 4.1 OPTICAL CHARACTERISTICS

Item	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Contrast ratio STN	K	$\varnothing=20^\circ \theta=0^\circ$	4	-	-	-
Contrast ratio STN-H	K	$\varnothing=20^\circ \theta=0^\circ$	5	-	-	-
Viewing angle STN	$\varnothing 2-\varnothing 1$ $\theta$	$\theta=0^\circ K_{\geq 1.4}$	40	-	-	Deg.
		$\varnothing=20^\circ K=1.4$	$\pm 30$	-	-	Deg.
Viewing angle STN-H	$\varnothing 2-\varnothing 1$ $\theta$	$\theta=0^\circ K_{\geq 1.4}$	40	-	-	Deg.
		$\varnothing=20^\circ K=1.4$	$\pm 40$	-	-	Deg.
Response time	Rise	$\varnothing=20^\circ \theta=0^\circ$	-	150	250	mS
	Fall	$\varnothing=20^\circ \theta=0^\circ$	-	150	250	mS

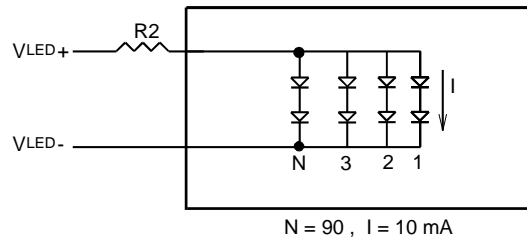


## 5 BACKLIGHT SPECIFICATION

### 5.1 BACKLIGHT CHARACTERISTICS

Ta=20°C,60%RH,Darkroom.

Item	Symbol	Typ.	Max.	Unit
LED lamp input voltage	VLED+	5	6	VDC
LED lamp input current	ILED	900	990	mA
Build-in current limiting resistor	R1	-	-	Ohms, W
External current limiting resistor (recommended)	R2	1 Ohms, 2W	-	Ohms, W
Number of nodes	N	90	-	-



## 6 QUALITY ASSURANCE SPECIFICATION

### 6.1 CONFORMITY

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The performance, function and reliability of the shipped products conform to the Product Specification.

### 6.2 DELIVERY ASSURANCE

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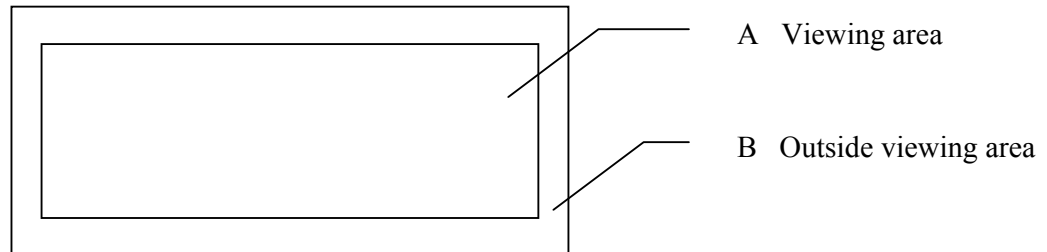
#### 6.2.1 Delivery inspection standards

- MIL-STD-105E, general inspection level II, single sampling level;
- IPC-AA610 rev. C, class 2 electronic assemblies standard

The quality assurance levels are shown below:

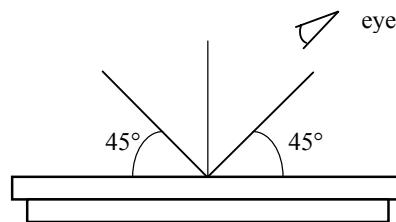
Class	AQL (%)
Critical defect	0.5%
Major defect	1.0%
Minor defect	1.5%
TOTAL	2.0%

### 6.2.2 Zone definition



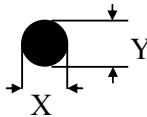
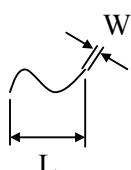
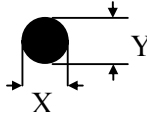
### 6.2.3 Visual inspection

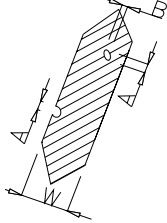
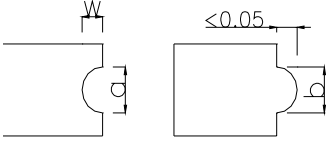
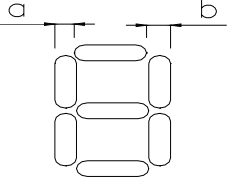
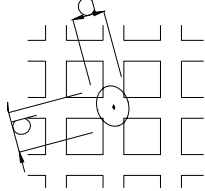
- Inspect under 2x20W or 40W fluorescent lamp (approximately 3000 lux) leaving 25 to 30 cm between the module and the lamp and 30 cm between the module and the eye (measuring position).
- Appearance is inspected at the best contrast voltage (best contrast is adjusted considering clearness and crosstalk on screen).
- Inspect the module at 45° right and left, top and bottom.
- Use the optimum viewing angle during the contrast inspection.




### 6.2.3.1 Standard of appearance inspection

Units: mm

Class	Item	Criteria																																				
Minor	Packing & Label	Outside & inside package   Presence of product no., lot no., quantity																																				
Critical		Product must not be mixed with others and quantity must not be different from that indicated on the label																																				
Major	Dimension	Product dimensions must be according to specification and drawing																																				
Major	Electrical	Product electrical characteristics must be according to specification																																				
Critical	LCD Display	Missing lines or wrong patterns on LCD display are not allowed																																				
Minor	Black spot, white spot, dust	<p>Round type: as per following drawing  <math>\varnothing = (X+Y)/2</math></p>  <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="3">Acceptable quantity</th> </tr> <tr> <th>Size</th> <th>Zone A</th> <th>Zone B</th> </tr> </thead> <tbody> <tr> <td><math>\varnothing &lt; 0.1</math></td> <td>Any number</td> <td rowspan="4">Any number</td> </tr> <tr> <td><math>0.1 &lt; \varnothing &lt; 0.2</math></td> <td>2</td> </tr> <tr> <td><math>0.2 &lt; \varnothing &lt; 0.25</math></td> <td>1</td> </tr> <tr> <td><math>0.25 &lt; \varnothing</math></td> <td>0</td> </tr> </tbody> </table> <p>Line type: as per following drawing</p>  <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="4">Acceptable quantity</th> </tr> <tr> <th>Length</th> <th>Width</th> <th>Zone A</th> <th>Zone B</th> </tr> </thead> <tbody> <tr> <td>--</td> <td><math>W \leq 0.02</math></td> <td>Any number</td> <td rowspan="4">Any number</td> </tr> <tr> <td><math>L \leq 3.0</math></td> <td><math>0.02 &lt; W \leq 0.03</math></td> <td>2</td> </tr> <tr> <td><math>L \leq 2.5</math></td> <td><math>0.03 &lt; W \leq 0.05</math></td> <td>2</td> </tr> <tr> <td>--</td> <td><math>0.05 &lt; W</math></td> <td>As round type</td> </tr> </tbody> </table> <p style="text-align: center;">Total acceptable quantity: 3</p>	Acceptable quantity			Size	Zone A	Zone B	$\varnothing < 0.1$	Any number	Any number	$0.1 < \varnothing < 0.2$	2	$0.2 < \varnothing < 0.25$	1	$0.25 < \varnothing$	0	Acceptable quantity				Length	Width	Zone A	Zone B	--	$W \leq 0.02$	Any number	Any number	$L \leq 3.0$	$0.02 < W \leq 0.03$	2	$L \leq 2.5$	$0.03 < W \leq 0.05$	2	--	$0.05 < W$	As round type
Acceptable quantity																																						
Size	Zone A	Zone B																																				
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$0.25 < \varnothing$	0																																					
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$L \leq 3.0$	$0.02 < W \leq 0.03$	2																																				
$L \leq 2.5$	$0.03 < W \leq 0.05$	2																																				
--	$0.05 < W$	As round type																																				
Minor	Polariser scratch	Scratch on protective film is permitted Scratch on polariser: same as No. 1																																				
Minor	Polariser bubble	<p><math>\varnothing = (X+Y)/2</math></p>  <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="3">Acceptable quantity</th> </tr> <tr> <th>Size</th> <th>Zone A</th> <th>Zone B</th> </tr> </thead> <tbody> <tr> <td><math>\varnothing &lt; 0.2</math></td> <td>Any number</td> <td rowspan="4">Any number</td> </tr> <tr> <td><math>0.2 &lt; \varnothing &lt; 0.5</math></td> <td>2</td> </tr> <tr> <td><math>0.5 &lt; \varnothing &lt; 1.0</math></td> <td>1</td> </tr> <tr> <td><math>1.0 &lt; \varnothing</math></td> <td>0</td> </tr> </tbody> </table> <p style="text-align: center;">Total acceptable quantity: 3</p>	Acceptable quantity			Size	Zone A	Zone B	$\varnothing < 0.2$	Any number	Any number	$0.2 < \varnothing < 0.5$	2	$0.5 < \varnothing < 1.0$	1	$1.0 < \varnothing$	0																					
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$0.5 < \varnothing < 1.0$	1																																					
$1.0 < \varnothing$	0																																					

Class	Item	Criteria																												
Minor	Segment deformation	<p>1.a. Pin hole on segmented display</p> <p>W: segment width  <math>\varnothing = (A+B)/2</math></p>  <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="2">Acceptable quantity</th> </tr> <tr> <th>Width</th> <th><math>\varnothing</math></th> </tr> </thead> <tbody> <tr> <td><math>W \leq 0.4</math></td> <td><math>\varnothing \leq 0.2</math> and <math>\varnothing \leq 1/2W</math></td> </tr> <tr> <td><math>W &gt; 0.4</math></td> <td><math>\varnothing \leq 0.25</math> and <math>\varnothing \leq 1/3W</math></td> </tr> </tbody> </table> <p>Total acceptable quantity: 1 defect per segment  Pin holes with <math>\varnothing</math> under 0.10 mm are acceptable</p>	Acceptable quantity		Width	$\varnothing$	$W \leq 0.4$	$\varnothing \leq 0.2$ and $\varnothing \leq 1/2W$	$W > 0.4$	$\varnothing \leq 0.25$ and $\varnothing \leq 1/3W$																				
Acceptable quantity																														
Width	$\varnothing$																													
$W \leq 0.4$	$\varnothing \leq 0.2$ and $\varnothing \leq 1/2W$																													
$W > 0.4$	$\varnothing \leq 0.25$ and $\varnothing \leq 1/3W$																													
Minor	Segment deformation	<p>1b. Pin hole on dot matrix display</p>  <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="2">Acceptable quantity</th> </tr> <tr> <th>Size</th> <th></th> </tr> </thead> <tbody> <tr> <td>a,b&lt;0.1</td> <td>Any number</td> </tr> <tr> <td><math>(a+b)/2 \leq 0.1</math></td> <td>Any number</td> </tr> <tr> <td><math>0.5 &lt; \varnothing &lt; 1.0</math></td> <td>3</td> </tr> </tbody> </table> <p>Total acceptable quantity: 7</p> <p>2. Segments / dots with different width</p>  <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="2">Acceptable</th> </tr> </thead> <tbody> <tr> <td><math>a \geq b</math></td> <td><math>a/b \leq 4/3</math></td> </tr> <tr> <td><math>a &lt; b</math></td> <td><math>a/b &gt; 4/3</math></td> </tr> </tbody> </table> <p>3. Alignment layer defect</p> <p><math>\varnothing = (a+b)/2</math></p>  <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="2">Acceptable quantity</th> </tr> <tr> <th>Size</th> <th></th> </tr> </thead> <tbody> <tr> <td><math>\varnothing \leq 0.4</math></td> <td>Any number</td> </tr> <tr> <td><math>0.4 &lt; \varnothing \leq 1.0</math></td> <td>5</td> </tr> <tr> <td><math>1.0 &lt; \varnothing \leq 1.5</math></td> <td>3</td> </tr> <tr> <td><math>1.5 &lt; \varnothing \leq 2.0</math></td> <td>2</td> </tr> </tbody> </table> <p>Total acceptable quantity: 7</p>	Acceptable quantity		Size		a,b<0.1	Any number	$(a+b)/2 \leq 0.1$	Any number	$0.5 < \varnothing < 1.0$	3	Acceptable		$a \geq b$	$a/b \leq 4/3$	$a < b$	$a/b > 4/3$	Acceptable quantity		Size		$\varnothing \leq 0.4$	Any number	$0.4 < \varnothing \leq 1.0$	5	$1.0 < \varnothing \leq 1.5$	3	$1.5 < \varnothing \leq 2.0$	2
Acceptable quantity																														
Size																														
a,b<0.1	Any number																													
$(a+b)/2 \leq 0.1$	Any number																													
$0.5 < \varnothing < 1.0$	3																													
Acceptable																														
$a \geq b$	$a/b \leq 4/3$																													
$a < b$	$a/b > 4/3$																													
Acceptable quantity																														
Size																														
$\varnothing \leq 0.4$	Any number																													
$0.4 < \varnothing \leq 1.0$	5																													
$1.0 < \varnothing \leq 1.5$	3																													
$1.5 < \varnothing \leq 2.0$	2																													
Minor	Colour uniformity	Level of sample for approval set as limit sample																												
Critical	Backlight	The backlight colour should correspond to the product specification																												
Critical		Flashing and or unlit backlight is not allowed																												
Minor		Dust larger than 0.25 mm is not allowed																												
Major	COB	Exposed wire bond pad is not allowed																												
Major		Insufficient covering with resin is not allowed (wire bond line exposed)																												
Minor		Dust or bubble on the resin are not allowed																												

Class	Item	Criteria													
Major		No unmelted solder paste should be present on PCB													
Critical		Cold solder joints, missing solder connections, or oxidation are not allowed													
Minor		No residue or solder balls on PCB are allowed													
Critical		Short circuits on components are not allowed													
Minor	Tray particles	<table border="1"> <thead> <tr> <th></th> <th>Size</th> <th>Quantity</th> </tr> </thead> <tbody> <tr> <td rowspan="2">On tray</td> <td><math>\varnothing &lt; 0.2</math></td> <td>Any number</td> </tr> <tr> <td><math>\varnothing &gt; 0.25</math></td> <td>4</td> </tr> <tr> <td rowspan="2">On display</td> <td><math>\varnothing \geq 0.25</math></td> <td>2</td> </tr> <tr> <td>L = 3</td> <td>1</td> </tr> </tbody> </table>		Size	Quantity	On tray	$\varnothing < 0.2$	Any number	$\varnothing > 0.25$	4	On display	$\varnothing \geq 0.25$	2	L = 3	1
	Size	Quantity													
On tray	$\varnothing < 0.2$	Any number													
	$\varnothing > 0.25$	4													
On display	$\varnothing \geq 0.25$	2													
	L = 3	1													



## **6.3 DEALING WITH CUSTOMER COMPLAINTS**

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### **6.3.1 Non-conforming analysis**

Purchaser should supply Densitron with detailed data of non-conforming sample. After accepting it, Densitron should complete the analysis in two weeks from receiving the sample.

If the analysis cannot be completed on time, Densitron must inform the purchaser.

### **6.3.2 Handling of non-conforming displays**

If any non-conforming displays are found during customer acceptance inspection which Densitron is clearly responsible for, return them to Densitron.

Both Densitron and customer should analyse the reason and discuss the handling of non-conforming displays when the reason is not clear.

Equally, both sides should discuss and come to agreement for issues pertaining to modification of Densitron quality assurance standard.

## 7 RELIABILITY SPECIFICATION

### 7.1 RELIABILITY TESTS

Test Item	Test Condition	Evaluation and assessment
Operation at high temperature and humidity	40°C±2°C 90% RH for 240 hours	No abnormalities in function* and appearance**
Operation at high temperature	70°C±2°C for 240 hours	No abnormalities in function* and appearance**
Low temperature	-20°C±2°C for 240 hours	No abnormalities in function* and appearance**
Heat Shock	-20~+70°C Left for 1 hour at each temperature, transition time 5 minutes repeated 10 times.	No abnormalities in function* and appearance**
Vibration	Sweep for 1 minute at 10Hz, 55Hz, 10Hz, amplitude 1.5mm for 2 hours in the X, Y and Z directions.	No abnormalities in function* and appearance**
Drop Shock	Drop Shock	No abnormalities in function* and appearance**

### 7.2 LIFE TIME

Item	Description
1	Function, performance, appearance, etc. shall be free from remarkable deterioration within 50,000 hours under ordinary operating and storage conditions of room temperature (25±10 °C), normal humidity (45±20% RH), and in area not exposed to direct sunlight.

## 8 PART NUMBER DESCRIPTIONS FOR AVAILABLE OPTIONS

# LC4307①②4C20③④⑤

- ① **Polarizer Type**  
B = Transflective: light background with LED backlight
- ② **Backlight Color**  
G = Yellow-green (standard)
- ③ **Fluid Type and Power Supply**  
S = STN with +5VDC operation  
H = STN-H with ±5VDC operation
- ④ **Fluid Type Viewing Direction**  
N = STN, STN-H
- ⑤ **Background Color for STN Temperature Range**  
G = Gray background  
Y = Yellow background

## 9 HANDLING PRECAUTIONS

### *Safety*

If the LCD panel breaks, be careful not to get the liquid crystal fluid in your mouth or in your eyes. If the liquid crystal touches your skin or clothes, wash it off immediately using soap and plenty of water.

### *Mounting and Design*

Place a transparent plate (e.g. acrylic, polycarbonate or glass) on the display surface to protect the display from external pressure. Leave a small gap between the transparent plate and the display surface.

When assembling with a zebra connector, clean the surface of the pads with alcohol and keep the surrounding air very clean.

Design the system so that no input signal is given unless the power supply voltage is applied.

### *Caution during LCD cleaning*

Lightly wipe the display surface with a soft cloth soaked with Isopropyl alcohol, Ethyl alcohol or Trichlorotrifluoroethane.

Do not wipe the display surface with dry or hard materials that will damage the polariser surface.

Do not use aromatic solvents (toluene and xylene), or ketonic solvents (ketone and acetone).

### *Caution against static charge*

As the display uses C-MOS LSI drivers, connect any unused input terminal to VDD or VSS. Do not input any signals before power is turned on. Also, ground your body, work/assembly table and assembly equipment to protect against static electricity.

### *Packaging*

Displays use LCD elements, and must be treated as such. Avoid strong shock and drop from a height. To prevent displays from degradation, do not operate or store them exposed directly to sunshine or high temperature/humidity.

### *Caution during operation*

It is indispensable to drive the display within the specified voltage limit since excessive voltage shortens its life. Direct current causes an electrochemical reaction with remarkable deterioration of the display quality. Give careful consideration to prevent direct current during ON/OFF timing and during operation. Response time is extremely delayed at temperatures lower than the operating temperature range while, at high temperatures, displays become dark. However, this phenomenon is reversible and does not mean a malfunction or a display that has been permanently damaged. If the display area is pushed on hard during operation, some graphics will be abnormally displayed but returns to a normal condition after turning off the display once. Even a small amount of condensation on the contact pads (terminals) can cause an electro-chemical reaction which causes missing rows and columns. Give careful attention to avoid condensation.

### *Storage*

Store the display in a dark place where the temperature is  $25^{\circ}\text{C} \pm 10^{\circ}\text{C}$  and the humidity below 50%RH. Store the display in a clean environment, free from dust, organic solvents and corrosive gases. Do not crash, shake or jolt the display (including accessories).

Product No.	LC4307	REV. B
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