DATA IMAGE CORPORATION

LCD Module Specification

ITEM NO.: **TX123221GFSYA-G2**

Table of Contents

Customer Companies	R&D Dept.	Q.C. Dept.	Eng. Dept.	Prod. Dept.
Approved by	Version:	Issued Date:	Sheet Code:	Total Pages:
	A	2005/4/21		20

2. RECORD OF REVISION

Rev	Date	Item	Page	Comment
A	21/APR/05			New Release.

3. GENERAL SPECIFICATION

Display Format :	120dots (W)	×	32dots (H)	
Dots Size :	0.3 (W)	×	0.34 (H)	mm
View Area :	44.8 (W)	×	17.7 (H)	MIN mm
General Dimensions :	59 (W)	×	28.5 (H) ×	6.0 (T) mm Max.

Weight : 77.5 g max.

LCD Type & Background Color : [V] STN Blue Gray [ ] STN Yellow Green [ ] FSTN Dark Gray

Polarizer mode : [ ] Reflective [V] Transflective

[ ] Transmissive [ ] Negative

View Angle : [V] 6 O' clock [ ] 12 O' clock [ ] Others

Backlight : [V] LED [ ] EL [ ] CCFL

Backlight Color : [V] Yellow green [ ] Amber [ ] Blue Green

[ ] White [ ] Others

Controller / Driver : HT0610

Temperature Range : [V] Normal [ ] Wide Temperature

Operating	0 to 50°C	Operating	-20 to 70°C
Storage	-20 to 70°C	Storage	-30 to 80°C

REMARK:
Our components and processes are compliant to RoHS standard

4. ABSOLUTE MAXIMUM RATINGS

4.1 ELECTRICAL ABSOLUTE MAXIMUM RATINGS

V_{SS}= 0V, Ta = 25°C

Item	Symbol	Min.	Max.	Unit
Supply Voltage (Logic)	V_{DD}-V_{SS}	-0.3	3.5	V
Supply Voltage (LCD Driver)	V_{EE}-V_{SS}	-0.3	10.5	V
Input Voltage	V_I	V_{SS}-0.3	V_{DD}+0.3	V
Operating Temperature	TOP	0	50	°C
Storage Temperature	TSTG	-20	70	°C

4.2 ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS

Item	Operating		Storage		Comment
	(Min.)	Max.)	(Min.)	(Max.)	
Ambient Temp	0	50	-20	70	Note (1)
Humidity	Note (2)		Note(2)		Without Condensation
Vibration	--	4.9M/S^2	--	19.6M/S^2	XYZ Direction
Shock	--	29.4M/S^2	--	490M/S^2	XYZ Direction

Note(1) Ta = 0°C : 50Hr Max.

Note(2) Ta ≤ 40°C : 90% RH Max.

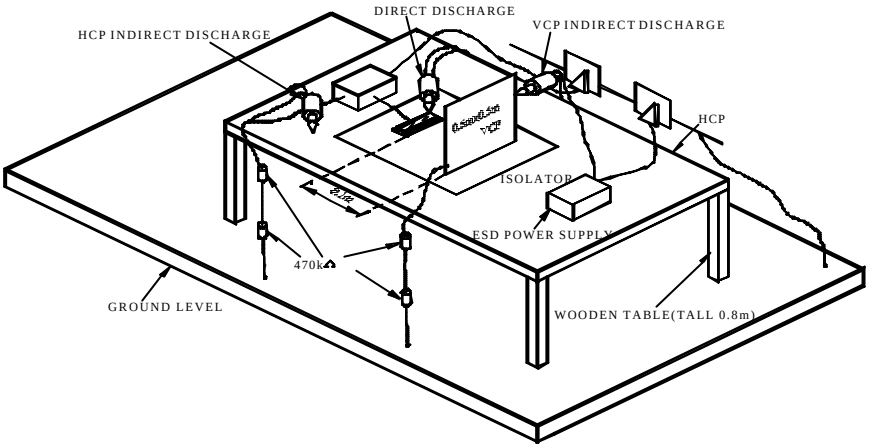
Ta ≥ 40°C : Absolute humidity must be lower than the humidity of 90% RH at 40°C.

4.3 Electronic Static Discharge maximum rating

ESD test method : IEC1000-4-2

Item	Description	
Testing environment	Ambient temperature :15°C to 35 °C Humidity: 30% to 60 % LCM (E.U.T) : Power up	
Testing equipment	Manufacture: Noise Ken, Model No. ESD-100L	
Testing condition	See drawing 1	
Direct discharge	0 to ± 6 KV	Discharge point, see drawing 2
Indirect discharge	0 to ± 12KV	Discharge point, see drawing 1
Pass condition	No malfunction of unit. Temporary malfunction of unit which can be recovered by system reset	
Fail condition	Non. Recoverable malfunction of LCM or system	

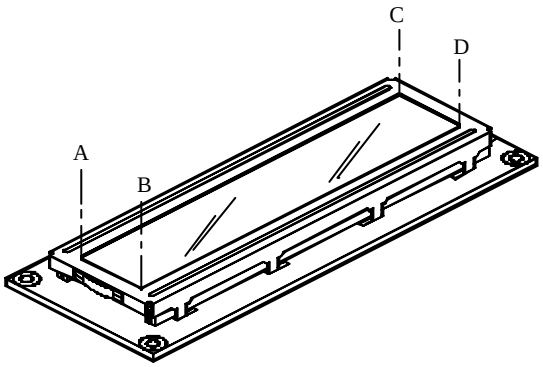
FIG 1 ESD TESTING EQUIPMENT



(1)

DIRECT CONTACT DISCHARGE

CONTACT POINT : A.B.C.D



(2)

5. ELECTRICAL CHARACTERISTICS

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Supply Voltage (Logic)	V_{DD}-V_{SS}	--	2.4	3.15	3.5	V
Supply Voltage (LCD)	V_{DD}-V_{EE}	0°C	--	--	--	V
		25°C	5.3	5.8	6.3	
		50°C	--	--	--	
Input Voltage	V_{IH}	--	V_{SS}+2.0	--	V_{DD}	V
	V_{IL}		V_{SS}	--	V_{SS}+0.8	
Logic Supply Current	I_{DD}	V_{DD}-V_{SS}=3.15V		0.1	--	mA

6. ELECTRO-OPTICAL CHARACTERISTICS

ITEM	Symbol	Condition	Min.	Typ.	Max.	Unit	Ref.
Rise Time	Tr	0℃	–	--	--	ms	Note (1)
		25°C		80	95		
Fall Time	Tf	0℃	–	--	--	ms	
		25°C		140	160		
Contrast	CR	25°C	–	5.5	--		Note (3)
View Angle	θ1~θ2 ∅1, ∅2	25°C & CR≧2	–	80	--		Note (2)
			-30	--	30		
Frame Frequency	Ff	25°C	–	64	--	Hz	

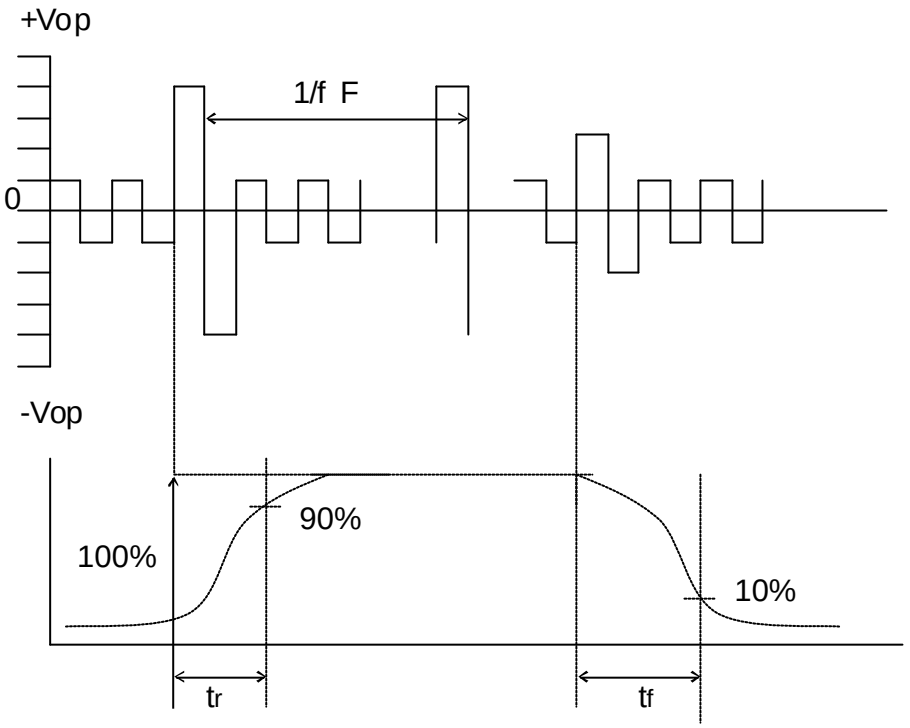
Note (1) & (2) : See next page

Note (3) : Contrast ratio is defined under the following condition:

$$CR = \frac{\text{Brightness of non-selected condition}}{\text{Brightness of selected condition}}$$

(a). Temperature ---------- 25°C
(b). Frame frequency ---- 64Hz
(c). Viewing angle -------- θ=0°, ∅=0°
(d). Operating voltage --- 5.8V

Note (1) Response time is measured as the shortest period of time possible between the change in state of an LCD segment as demonstrated below:

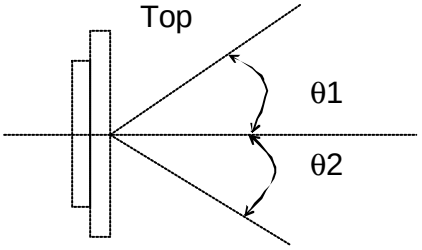


Condition:

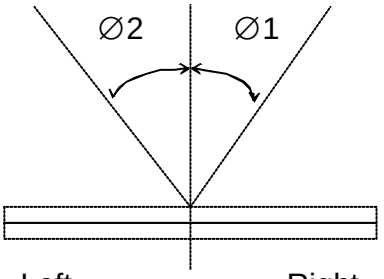
(a) . Temperature ----------25°C
(b) . Frame frequency --------- 64Hz
(c) . View Angle ---------- θ = 0°, ∅=0°
(d) . Operating voltage -------- 5.8V

Note (2) Definition of View Angle

Top – Bottom direction



Right -- Left direction



6.1 LED ELECTRO-OPTICAL CHARACTERISTIC

Ta = 25°C

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Forward Voltage	V_F	IF = 80mA Yellow Green	--	2.1	2.3	V
Luminous Intensity	I_V	IF = 80mA Yellow Green	12	15	--	cd/m^2
Peak Emission	λ_P	IF = 80mA Yellow Green	--	570	--	nm
Spectrum Radiation	$\Delta\lambda$	IF = 80mA Yellow Green	--	30	--	nm
Reverse Current	IR	VR =4V Yellow Green	--	--	0.2	mA

Note : Measured at the bared LED backlight unit.

6.2 LED MAXIMUM OPERATING RANGE

Item	Symbol	Yellow Green	Unit
Power Dissipation	P_{AD}	0.5	W
Forward Current	I_{AF}	200	mA
Reverse Voltage	VR	4	V

7. IC CONTENTS ATTACHMENT:

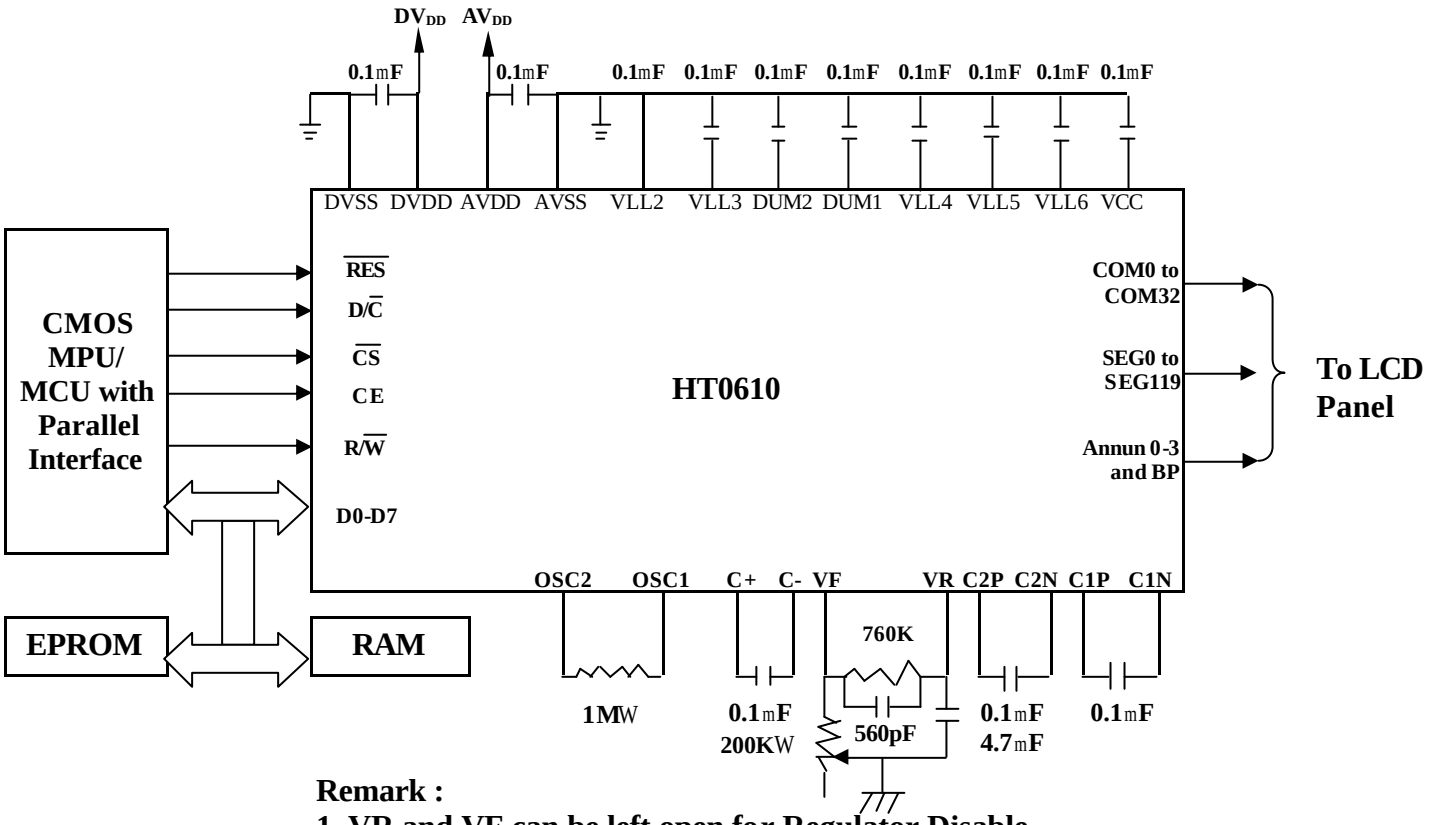
Reference Documents From **HOLTEK** HT0610 LCD DRIVER With

contents

HOLTEK HT0610 **Series (REV1.0)** **page**

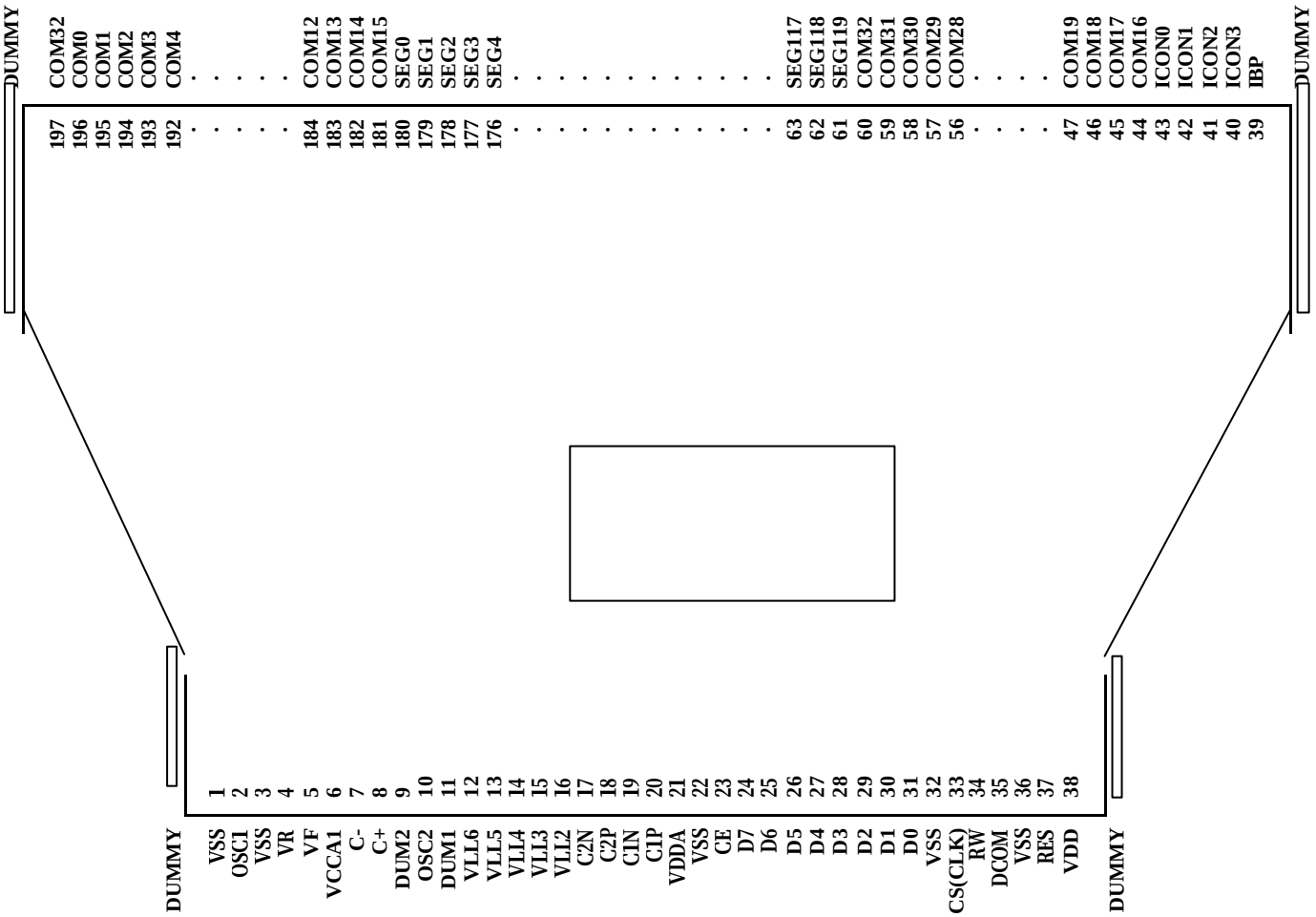
*LCD Controller' s Timing and Function .Please
Refer to theHT0610.PDF SPEC.

32/33 MUX Display with Analog Circuitry enabled, Tripler enabled and 1/7 bias

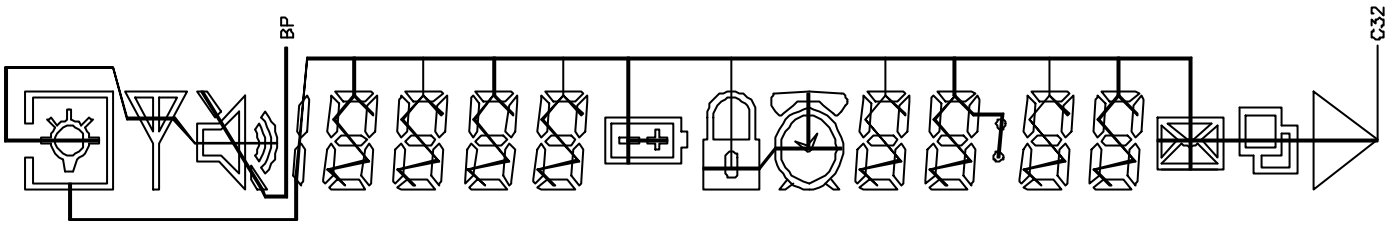


Remark :
1. VR and VF can be left open for Regulator Disable.
2. CS pin low at Standby Mode.

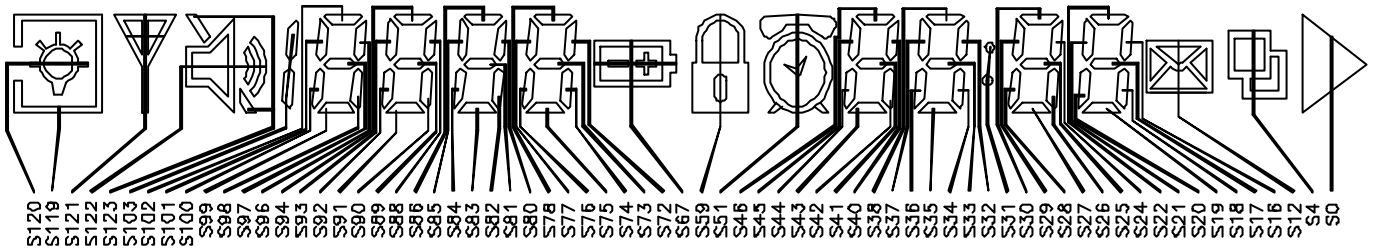
8. HT0610 PIN ASSIGNMENT (COPPER VIEW)



9. LCD ICON Position COM &SEG



COM



SEG

10. QUALITY ASSURANCE

10.1 Test Condition

10.1.1 Temperature and Humidity (Ambient Temperature)

Temperature : 20 ± 5°C

Humidity : 65 ± 5%

10.1.2 Operation

Unless specified otherwise, test will be conducted with LCM in operation.

10.1.3 Container

Unless specified otherwise, vibration test will be conducted on module only.

10.1.4 Test Frequency

Single cycle.

10.1.5 Test Method

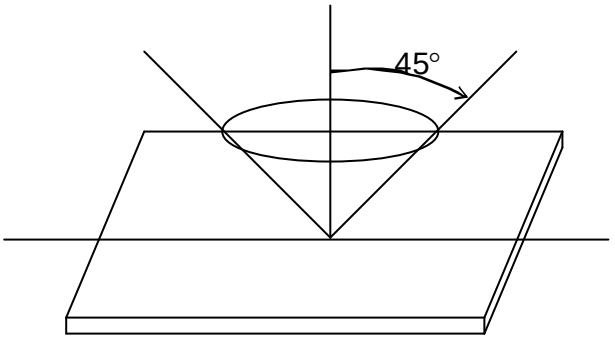
No.	Parameter	Conditions	Regulations
1	High Temperature Operating	50 ± 2 °C	Note 3
2	Low Temperature Operating	0 ± 2 °C	Note 3
3	High Temperature Storage	70 ± 2 °C	Note 3
4	Low Temperature Storage	-20 ± 2 °C	Note 3
5	Vibration Test (Non-operation state)	Total fixed amplitude : 1.5mm Vibration Frequency : 10 ~ 55Hz One cycle 60 seconds to 3 directions of X.Y.Z. for each 15 minutes	Note 3
6	Damp Proof Test (Non-operation state)	40°C ± 2°C, 90~95%RH, 96h	Note 1,2
7	Shock Test (Non-operation state)	To be measured after dropping from 60cm high once concrete surface in packing state	Note 3

Note 1: Returned under normal temperature and humidity for 4 hrs.
Note 2: No dew condensation to be observed.
Note 3: No change on display and in operation under the test condition

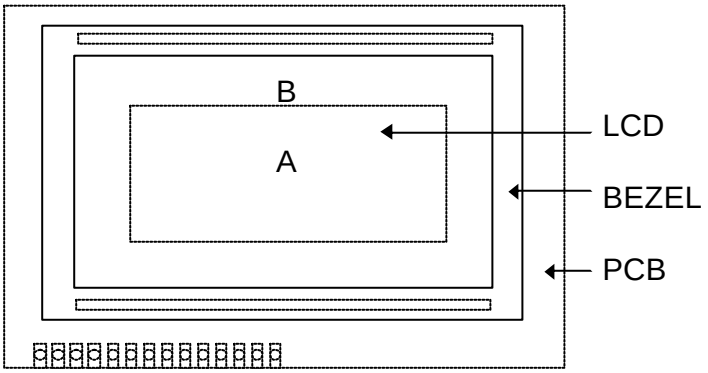
10.2 Inspection condition

10.2.1 Inspection conditions

The LCD shall be inspected under 40W white fluorescent light.

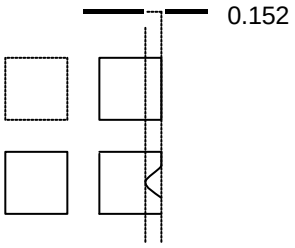


10.2.2 Definition of applicable Zones

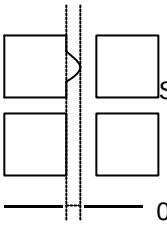


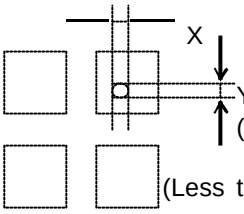
A : Display Area
B : Non-Display Area

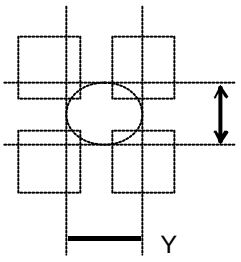
10.2.3 Inspection Parameters

<table>
<tr><th>No.</th><th>Parameter</th><th>Criteria</th></tr>
<tr><td>1</td><td>Black or White spots</td><td>
<table>
<tr><th rowspan="2">Zone / Dimension</th><th colspan="2">Acceptable number</th><th rowspan="2">Class Of Defects</th><th rowspan="2">AQL Level</th></tr>
<tr><th>A</th><th>B</th></tr>
<tr><td>D < 0.15</td><td>*</td><td>*</td><td rowspan="4">Minor</td><td rowspan="4">2.5</td></tr>
<tr><td>0.15≤ D< 0.2</td><td>4</td><td>4</td></tr>
<tr><td>0.2 ≤ D ≤ 0.25</td><td>2</td><td>2</td></tr>
<tr><td>D ≤ 0.3</td><td>0</td><td>1</td></tr>
</table>
D = (Long + Short) / 2 * : Disregard
</td></tr>
<tr><td>2</td><td>Scratch, Substances</td><td>
<table>
<tr><th rowspan="2">X (mm) \ Zone Y(mm)</th><th colspan="2">Acceptable number</th><th rowspan="2">Class Of Defects</th><th rowspan="2">AQL Level</th></tr>
<tr><th>A</th><th>B</th></tr>
<tr><td>*</td><td>0.04 ≥ W</td><td>*</td><td>*</td><td rowspan="3">Minor</td><td rowspan="3">2.5</td></tr>
<tr><td>3.0 ≥ L</td><td>0.06 ≥ W</td><td>4</td><td>4</td></tr>
<tr><td>2.0 ≥ L</td><td>0.08 ≥ W</td><td>2</td><td>3</td></tr>
<tr><td>—</td><td>0.1 < W</td><td>0</td><td>1</td><td></td><td></td></tr>
</table>
X : Length Y : Width * : Disregard
Total defects should not exceed 4/module
</td></tr>
<tr><td>3</td><td>Air Bubbles
(between glass & polarizer)</td><td>
<table>
<tr><th rowspan="2">Zone / Dimension</th><th colspan="2">Acceptable number</th><th rowspan="2">Class of Defects</th><th rowspan="2">AQL Level</th></tr>
<tr><th>A</th><th>B</th></tr>
<tr><td>D ≤ 0.15</td><td>*</td><td>*</td><td rowspan="3">Minor</td><td rowspan="3">2.5</td></tr>
<tr><td>0.15 < D ≤ 0.25</td><td>2</td><td>*</td></tr>
<tr><td>0.25 < D</td><td>0</td><td>1</td></tr>
</table>
* : Disregard
Total defects shall not excess 3/module.
</td></tr>
<tr><td>4</td><td>Uniformity of Pixel</td><td>(1) Pixel shape (with Dent)
 

</td></tr>
</table>

<table>
<tr><td>4</td><td>Uniformity of Pixel</td><td colspan="2">(2) Pixel shape (with Projection)
 

(3) Pin hole
 

(Less than 0.1 mm is no counted)
(4) Deformation
 

Total acceptable number : 1/pixel, 5/cell</td></tr>
<tr><td rowspan="4">Class of defects</td><td rowspan="2">Major</td><td>AQL 0.65%</td><td>Definition</td></tr>
<tr><td>AQL 1.00%</td><td>It is a defect that is likely to result in failure or to reduce materially the usability of the product for the intended function.
It is a defect that is likely to assembly size and not result in functioning problem.</td></tr>
<tr><td>Minor</td><td>AQL 2.5%</td><td>It is a defect that will not result in functioning problem with deviation classified.</td></tr>
</table>

10.3 Sampling Condition

Unless otherwise agree in written, the sampling inspection shall be applied to the incoming inspection of customer.

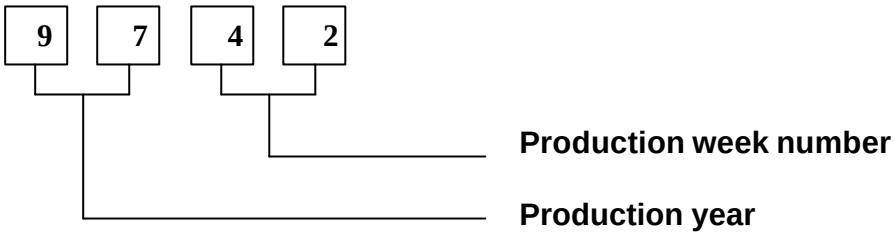
Lot size: Quantity of shipment lot per model.

Sampling type: normal inspection, single sampling

Sampling table: MIL -STD-105E

Inspection level: Level II

11. LOT NUMBERING SYSTEM



12. LCM NUMBERING SYSTEM

TX 123221 G F S Y A – G2

Special code:G2

View direction & Temp.Range
A–Bottom view 6H & Normal temp.
B–Bottom view 6H & Wide temp.
C–Top View & Normal temp.
D–Top View & Wide temp.

Backlight Color
B –Blue
W –White
Y – Yellow

Backlight
S –edge light LED B/L
E –EL
C-CCFL

MODE
M – transmissive R – Reflective
F – transflective N - Negative

LCD type
P – FSTN Paper white
F – FSTN
S – STN Yellow
G –STN Gray

Series code
123**221**– Dot number =120 Dots X 32 Dot, **2** LCD Type, **1**PCB Type

Model type
CM – Character Module
GM – Graphic Module
TG –Slim TAB/COG/COF Module
TX–Custom Slim TAB/COG/COF Module

13. PRECAUTION FOR USING LCM

1. LIQUID CRYSTAL DISPLAY (LCD)

LCD is made up of glass, organic sealant, organic fluid, and polymer based polarizers. The following precautions should be taken when handing,

(1). Keep the temperature within range of use and storage. Excessive temperature and humidity could cause polarization degredation, polarizer peel off or bubble.

(2). Do not contact the exposed polarizers with anything harder than an HB pencil lead. To clean dust off the display surface, wipe gently with cotton, chamois or other soft material soaked in petroleum benzin.

(3). Wipe off saliva or water drops immediately. Contact with water over a long period of time may cause polarizer deformation or color fading, while an active LCD with water condensation on its surface will cause corrosion of ITO electrodes.

(4). Glass can be easily chipped or cracked from rough handling, especially at corners and edges.

(5). Do not drive LCD with DC voltage.

2. Liquid Crystal Display Modules

2.1 Mechanical Considerations

LCM are assembled and adjusted with a high degree of precision. Avoid excessive shocks and do not make any alterations or modifications. The following should be noted.

(1). Do not tamper in any way with the tabs on the metal frame.

(2). Do not modify the PCB by drilling extra holes, changing its outline, moving its components or modifying its pattern.

(3). Do not touch the elastomer connector, especially insert an backlight panel (for example, EL).

(4). When mounting a LCM make sure that the PCB is not under any stress such as bending or twisting . Elastomer contacts are very delicate and missing pixels could result from slight dislocation of any of the elements.

(5). Avoid pressing on the metal bezel, otherwise the elastomer connector could be deformed and lose contact, resulting in missing pixels.

2.2. Static Electricity

LCM contains CMOS LSI's and the same precaution for such devices should apply, namely

(1). The operator should be grounded whenever he/she comes into contact with the module. Never touch any of the conductive parts such as the LSI pads, the copper leads on the PCB and the interface terminals with any parts of the human body.

(2). The modules should be kept in antistatic bags or other containers resistant to static for storage.

(3). Only properly grounded soldering irons should be used.

(4). If an electric screwdriver is used, it should be well grounded and shielded from commutator sparks.

(5) The normal static prevention measures should be observed for work clothes and working benches; for the latter conductive (rubber) mat is recommended.

(6). Since dry air is inductive to static, a relative humidity of 50-60% is recommended.

2.3 Soldering

(1). Solder only to the I/O terminals.

(2). Use only soldering irons with proper grounding and no leakage.

(3). Soldering temperature : 280°C ± 10°C

(4). Soldering time: 3 to 4 sec.

(5). Use eutectic solder with resin flux fill.

(6). If flux is used, the LCD surface should be covered to avoid flux spatters. Flux residue should be removed after wards.

2.4 Operation

(1). The viewing angle can be adjusted by varying the LCD driving voltage V0.

(2). Driving voltage should be kept within specified range; excess voltage shortens display life.

(3). Response time increases with decrease in temperature.

(4). Display may turn black or dark blue at temperatures above its operational range; this is (however not pressing on the viewing area) may cause the segments to appear "fractured".

(5). Mechanical disturbance during operation (such as pressing on the viewing area) may cause the segments to appear "fractured".

2.5 Storage

If any fluid leaks out of a damaged glass cell, wash off any human part that comes into contact with soap and water. Never swallow the fluid. The toxicity is extremely low but caution should be exercised at all the time.

2.6 Limited Warranty

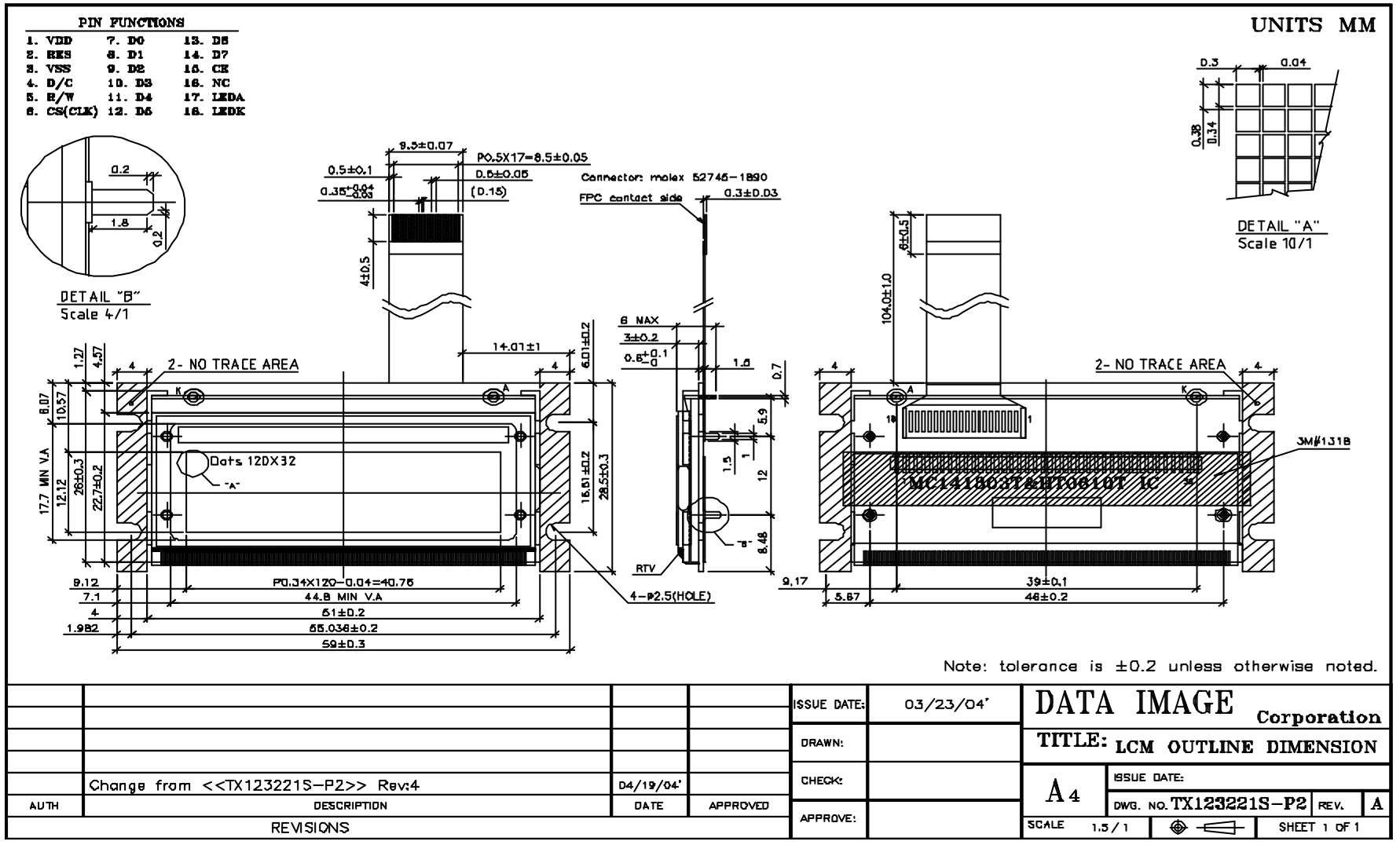
Unless otherwise agreed between DATA IMAGE and customer, DATA IMAGE will replace or repair any of its LCD and LCM which is found to be defective electrically and visually when inspected in accordance with DATA IMAGE acceptance standards, for a period on one year from date of shipment. Confirmation of such date shall be based on freight documents. The warranty liability of DATA IMAGE is limited to repair and/or replacement on the terms set forth above. DATA IMAGE will not responsib le for any subsequent or consequential events.

14. B.O.M

2212322121220G2 TX123221GFSYA-G2

Material NO.	Description	PCS	Location
5601212322100	PCB PY123211	1	
5100100501201	R SMD 1M 5%(0603)	1	R1,
5100330401201	R SMD 330K 5%(0603)	1	R2,
5100160401201	R SMD 160K 5%(0603)	1	R3,
5110475010201	C SMD 4.7u/16V(1206)	1	C1,
5110561040001	C SMD 560P/50V(0603)	1	C2,
5110104040001	C SMD 0.1uF/50V(0603)	13	C3,C4,C5,C6,C7,C8,C9, C10,C11,C12,C13,C14,C15,
4002212322110	**LCD TJDMS-790 SZ3 120*32**	1	
5200806100000	IC HT0610T	1	
5301112325001	LED LG1232C	1	
5650501800007	FPC SB123221	1	

15 OUTLINE DRAWING



AUTH	DESCRIPTION	DATE	APPROVED
	Change from <<TX123221S-P2>> Rev:4	04/19/04'	

REVISIONS

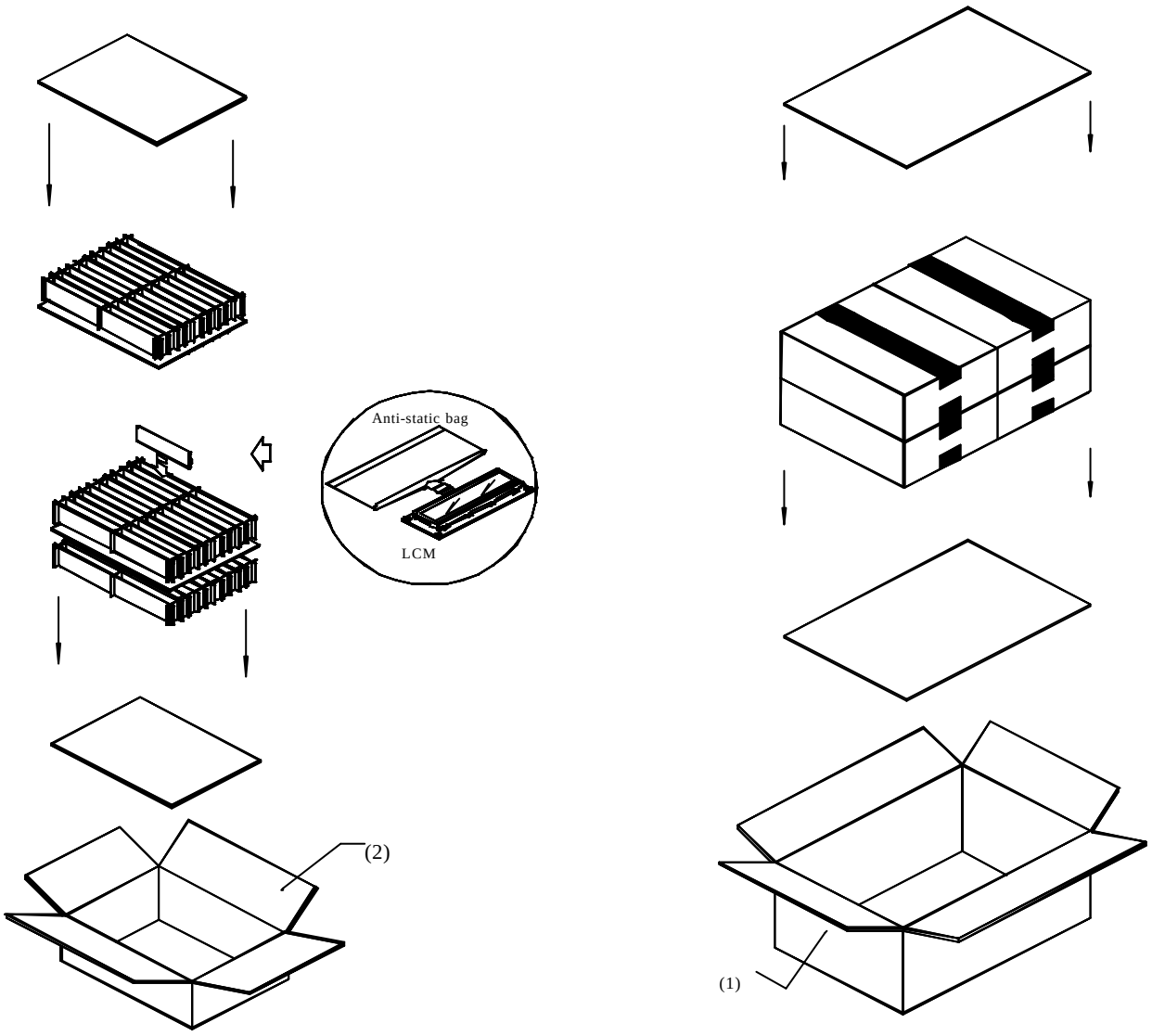
ISSUE DATE:	03/23/04'
DRAWN:	
CHECK:	
APPROVE:	

DATA IMAGE Corporation

TITLE: LCM OUTLINE DIMENSION

A4 | ISSUE DATE: | DWG. NO. TX123221S-P2 | REV. A | SCALE 1.5/1 | SHEET 1 OF 1

16 . PACKAGE INFORMATION



Item	Size(L*W*H)	Quantity	Note
1.Master Carton	482*282*279	1	
2.Inner Carton	267*224*115	4	

Quantity Per Inner Carton	60	Quantity Per Master Carton	240
N . W	8.16 (kg)	G . W	9.16 (kg)