ACLAVIS 7.0"

Master Data Sheet

Compliant with RoHS directive 2011/65/EU

Description:

LCD:	17.8 cm [7.0"] TFT Display
Resolution:	800 x 480 pixel
Cover Glass:	2 mm glass
Dimension:	193.5 x 132.5 mm (cover lens)
Max. Thickness:	14.5 mm (complete unit)

Available types (part numbers):

GETM0700G0EDH6GLYN01 = chemically strengthened, anti-glare

GETM0700G0EDH6GLYN02 = chemically strengthened, anti-reflective, anti-finger print

GETM0700G0EDH6GLYN03 = standard float glass, glossy
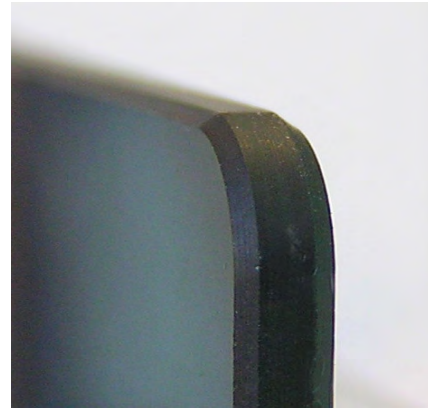
Table of Content:

Appendix:

- Technical Drawings (cover glass and complete unit). The drawings show the dimensions of the Anti-Glare version **GETM0700G0EDH6GLYN01,** which is representative for all types.

Your Benefit

Cover Glass Design

- ➢ Corners are rounded (R4)
- ➢ Edges are smoothened and chamfered
- ➢ Double silk-screen printing for increased opacity (deep black RAL 9005)

Surface Treatment (Anti-Glare, Anti-Reflection, Anti-Finger Print)

Anti-glare (etching) used for **GETM0700G0EDH6GLYN01**.
The smooth surface is ideal for touch application.

- ➢ Anti-smudge effect
- ➢ Easy to clean
- ➢ Pleasant feel for fingers
- ➢ Diffused light-reflection

Anti-Glare is no coating but an etching of the surface. Therefore, it is not susceptible to abrasion.
Anti-Reflection and Anti-Finger Print coating used for the
GETM0700G0BDH6GLYN02.
In contrast to the anti-glare treatment this coating does NOT diffuse light but reduces reflections. An additional anti-finger print coating makes it robust and easy to clean. Regarding abrasion see Schott's technical data sheet (CONTURAN® DARO). **GETM0700G0BDH6GLYN03** has no surface treatment.

Chemically strengthened

> Up to 5 times higher bending and breaking strength

Used for GETM0700G0EDH6GLYN01 and GETM0700G0EDH6GLYN02.

Optical Bonding

The cover lens and LCD unit optically bonded (full-faced).
This provides exceptionally high adhesion.

> No humidity or foreign particles can get in between
> Best possible touch sensor performance
> Reduction of light reflection
> Increased stability

True Multi-Touch

Thanks to EDT's PolyTouch technology, this product offers **simultaneous 5-finger** recognition.

The integrated controller offers a **standard I²C interface**. Sensitivity of the touch sensor can easily be changed via standard register addresses.

GLYN TFT Family Concept

This 7" LCD offers the **same interface** as our standard GLYN family 3.5", 4.3", 5.0" and 5.7" products (without cover glass). The main features of this family are:

- ➢ -20 to 70°C (operating)
- ➢ Integrated voltage generation for LED backlight and TFT driving
- ➢ 3.3V single power supply
- ➢ One connector (touch and backlight integrated)
- ➢ PWM dimming control (backlight brightness)

1.0. General Specification

Weight: ~400 g

Brightness: ca. 10% less compared to LCD without cover glass

Color Tolerance: **Δ**E ≤1.0 (this applies to the silk-screen print of the cover glass)

2.0. Inspection and Handling Standards

2.1. Bonding Glue

Due to the "Bonding" process slight amounts of glue may leak beyond the bonding area. Glue residue may be visible on the glass print up to 5 mm outside the touch sensor area.
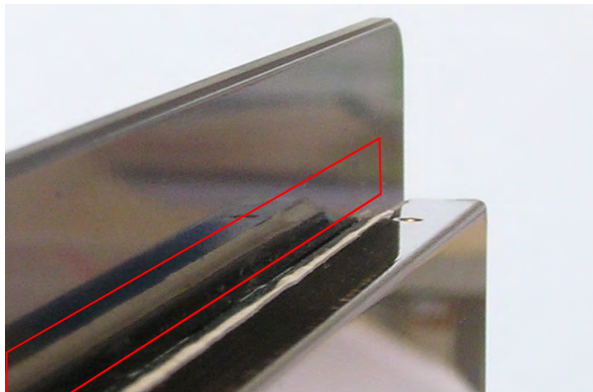
2.2. Use of Cleaning and Adhesive Products

The **front side** has no special coating (except for the anti-reflection version which needs to be handled with slightly more care). Therefore, it is **not** particularly sensitive to cleaning agents. Standard glass cleaning products may be used. In rare cases, de-ionised (demineralized) water in combination with high temperature can cause a reaction. This chemical reaction may cause stains to be visible on the surface.

The **rear side** is covered with a silk-screen print. This print is susceptible to mechanical impact and abrasion. Aggressive cleaning agents should **not** be used. For more information on the paint please take a look at the Technical Data (appendix of this document).

The usability of any glue or cleaning agent (front side, rear side) has to be tested and approved by the customer.

2.3. Cosmetic Quality Inspection Criteria

Our cosmetic quality inspection is aimed at insuring high quality. The following components are prone to contain potential defects:

-       Display glass panel (surface)
-       Display polarization film
-       Air gap between polarizer and touch sensor
-       Touch sensor bonding (inside touch sensor)
-       Touch sensor glass (surface)
-       Optical bonding between touch sensor and cover glass
-       Cover glass (including printing)

Glass is a raw material which <u>always</u> contains micro-impurities. Most of them cannot be seen with the naked eye. The following specification defines the maximum allowed number and size of scratches, digs and foreign matter. Non-specified impurities/defects or <u>a combination of a few minor ones in the cover glass</u> need to be handled <u>on an individual basis</u>. For more information please contact our **QM department**.

2.3.1. Scratches (scratch-like impurities) and foreign material (e.g. long fibers)
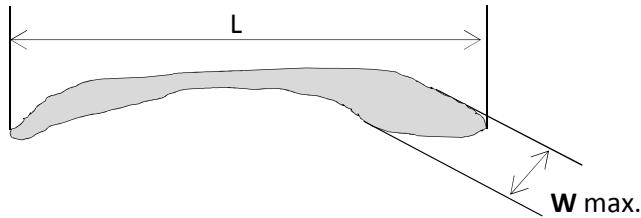
W = W max.

Length: L (in mm)	Width: W (in mm)	Allowed number
L ≤ 0.3	W ≤ 0.05	Ignore
0.3 < L ≤ 2.5	0.05 < W ≤ 0.1	4
2.5 < L ≤ 4.0	0.05 < W ≤ 0.1	1
> 4.0	> 0.1	Not allowed
The **total number** must not exceed 4 (e.g. 1 x up to 4.0 mm plus 3 x up to 2.5 mm)		

2.3.2. Digs, bubbles, stains, dents, pinholes (in printing), foreign material (e.g. near round-shaped or rectangular-shaped particles)
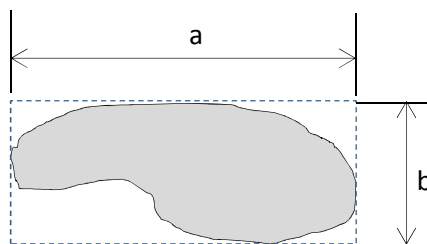
A = a*b

Area = (a*b) (in mm)	Allowed number
A ≤ 0.1	Ignore
0.1 < A ≤ 0.36	4
> 0.36	**Not allowed**

a) Long defects (2.3.1.) and spots/digs (2.3.2.) are regarded as cumulative. 2 x long defects and 2 x spots/digs at the same time are acceptable.

b) A concentration of defects is not allowed

c) Removable stains or marks are not regarded as defects

d) Edge chips: 5 x 0.4 mm (e.g. size = 0.4 x 0.4 mm) are acceptable

e) Defects like clouds/stains (mura) exist in a great variety and are sometimes observed only under special conditions (light, angle, reflection etc.).Therefore, they are not specified because these effects have to be discussed and specified based on bad/good limit samples. Clearly visible clouds/stains (mura) which can immediately be seen under all conditions (see below specified time, distance and angle) are not allowed.

Condition of Inspection

Inspection in transmission, reflection, printed glasses, always from the viewer's side.

Inspection angle 45° to 90°
Inspection time: max. 10 sec.
Distance: 500 mm
Max. 1000 Lux in front of black background
Colour temperature: D65 (CIE standard)

2.4. Silk-screen print

The printing process is set up in a way that there is no paint overflow at the edge. Therefore, a safety distance has to be kept to the edge. This may lead to a small area without paint.
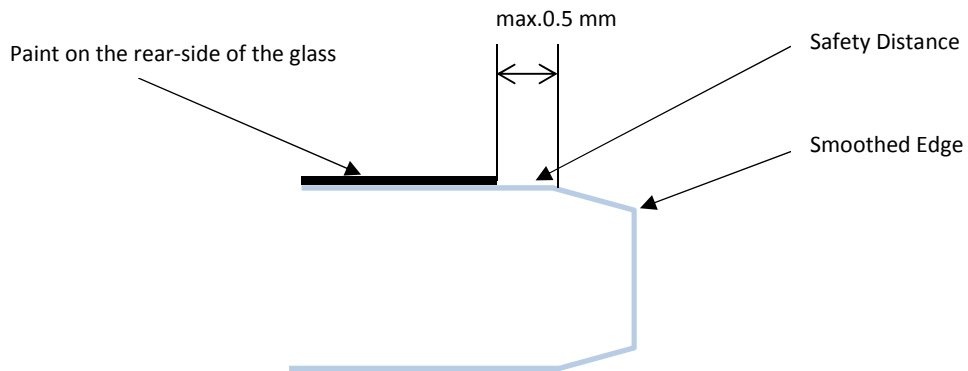
3.0. Revision History

Date	Version	Section	Remark
15.03.2016	1.0	-	First release
04.05.2016	1.1	-	Two versions added with AR coating (GLYN02) and without treatment (GLYN03).

HRANA MATNÁ / MATT EDGE

4x R4

132,5 ±0,2

193,5 ±0,2

LEPTANÁ STRANA
SIDE WITH US GLOSS 70/60°

0,5x45°

0,5x45°

2 ±0,2

A (5 : 1)

A

KONTROLNÍ ROZMĚR
KEY CHARACTERISTIC

04			
03			
02			
01			
Index	Popis / Description	Kreslil / Drawn by	Datum / Date

4x R4 (GLASS)

PRINTED AREA

152,4 ±0,3 (DISPLAY A.A.)

(20)

LEPTANÁ STRANA
SIDE WITH US GLOSS 70/60°

0,55 ±0,4 △ 4

132,5 ±0,2 (GLASS) 6

0,55 ±0,4 △ 1

91,44 ±0,3 (DISPLAY A.A.)

92,5 ±0,3 (PRINT)

0,55 ±0,4 △ 2

0,55 ±0,4 △ 3

A

// 0,8 A

20 ±0,3

20 ±0,3

153,5 ±0,3 (PRINT)

(20)

193,5 ±0,2 (GLASS)

5

0,5x45°

0,5x45°

2 ±0,2

A (5 : 1)

A

14,15 MAX. ◁ 7

VŠECHNY CHYBĚJÍCÍ ROZMĚRY V 3D SOUBORU.
ALL MISSING DIMENSIONS ARE IN THE 3D DATA.

KONTROLNÍ ROZMĚR
KEY CHARACTERISTIC

INDEX	POPIS / DESCRIPTION		DATUM / DATE	JMÉNO / NAME
MATERIÁL / MATERIAL:		VŠECHNY ROZMĚRY V MILIMETRECH (mm) / ALL DIMENSIONS IN MILIMETERS (mm)		
POVRCH. ÚPRAVA / SURF. FINISH:		NÁZEV SOUBORU: / FILE NAME:		

VYPRACOVAL / DRAWN:	**P. POHAN**	TOLERANCE:	**ISO 2768 mK**	FORMÁT: / ORIGINAL SIZE:	**A3**	PROMÍTÁNÍ: / PROJECTION: ◁⊕ MĚŘÍTKO: / SCALE: **1:1**
TECHNOLOG / CHECKED:		DATUM / DATE:	**22.2.2016**			

Tolerance : ISO 2768 - m	
0 - 6	+/-0,1
6 - 30	+/-0,2
30 - 120	+/-0,3
120 - 400	+/-0,5
400 - 1000	+/-0,8

11	4	1	Etiketa S/N	Etikette 2
10	3	1	Etiketa Artikelnummer	Etikette 1
9	2	1	Display G-ETM0700G0EDH6	1007374000292
8	1	1	Sklo/Glass AG 193,5 x 132,5 x 2	HT 4691-01-00; HT 4691-09-00
	Pozice / Position	Množství / Quantity	Popis / Description	Poznámka / Notes

AKI ELECTRONIC
spol. s r.o.
Znojemská 94
586 01 Jihlava
Czech Republic

NÁZEV: / TITLE: **KONTROLNÍ PLÁN**
INSPECTION PLAN

ČÍSLO VÝKRESU: / DRAWING NUMBER: **HT 4808-00-00**

LIST / LISTŮ: / SHEET / SHEETS: **1/2**

Reprodukování, šíření a poskytnutí tohoto dokumentu, jeho částí nebo obsahu třetí osobě je bez výslovného souhlasu zakázáno. Porušení zákazu vede k odpovědnosti za vzniklou škodu. Všechna práva jsou vyhrazena rovněž v případech registrovaného patentu, průmyslového vzoru nebo výtvarného návrhu. / The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization is prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

Elektronický originál v IS Helios. Papírové kopie jsou neplatné pro výrobu, pokud nejsou označeny číslem kopie a datem.

ZADNÍ STRANA / REAR VIEW

(16,05)

(16,89)

2,5 ±2

3

2,5 ±2

1800-0001

4

2,5 ±2

VŠECHNY CHYBĚJÍCÍ ROZMĚRY V 3D SOUBORU.
ALL MISSING DIMENSIONS ARE IN THE 3D DATA.

KONTROLNÍ ROZMĚR
KEY CHARACTERISTIC

INDEX	POPIS DESCRIPTION		DATUM DATE	JMÉNO NAME
MATERIÁL / MATERIAL:		VŠECHNY ROZMĚRY V MILIMETRECH (mm) / ALL DIMENSIONS IN MILIMETERS (mm)		
POVRCH. ÚPRAVA / SURF. FINISH:		NÁZEV SOUBORU: FILE NAME:		

Tolerance : ISO 2768 - m	
0 - 6	+/-0,1
6 - 30	+/-0,2
30 - 120	+/-0,3
120 - 400	+/-0,5
400 - 1000	+/-0,8

VYPRACOVAL / DRAWN: **P. POHAN**
TECHNOLOG / CHECKED:
TOLERANCE: **ISO 2768 mK**
DATUM / DATE: **22.2.2016**

FORMÁT:
ORIGINAL SIZE: **A3**
PROMÍTÁNÍ:
PROJECTION:
MĚŘÍTKO:
SCALE: **1:1**

AKI ELECTRONIC
spol. s r.o.
Znojemská 94
586 01 Jihlava
Czech Republic
aki

NÁZEV:
TITLE: **KONTROLNÍ PLÁN**
INSPECTION PLAN

ČÍSLO VÝKRESU:
DRAWING NUMBER: **HT 4808-00-00**

LIST / LISTŮ:
SHEET / SHEETS: **2/2**

RAL 9005

Transparent / Glas

Tolerance : ISO 2768 - m	
0 - 6	+/-0,1
6 - 30	+/-0,2
30 - 120	+/-0,3
120 - 400	+/-0,5
400 - 1000	+/-0,8

INDEX	xx	xx	POPIS DESCRIPTION		DATUM DATE	JMÉNO NAME
					xx	xx

MATERIÁL / MATERIAL:	2 mm Weißglas NFT Gloss 70			VŠECHNY ROZMĚRY V MILIMETRECH (mm) / ALL DIMENSIONS IN MILIMETERS (mm)	
POVRCH. ÚPRAVA / SURF. FINISH:	chemicky zpevněno / chemically strenghtened			NÁZEV SOUBORU: FILE NAME:	HT 4691-01-00 Design.cdr
VYPRACOVAL / DRAWN:	L.Mlateček	TOLERANCE:	ISO 2768 mK	FORMÁT: ORIGINAL SIZE:	PROMÍTÁNÍ: PROJECTION:	MĚŘÍTKO: SCALE:
TECHNOLOG / CHECKED:		DATUM / DATE:	07.12. 2015			

AKI ELECTRONIC
spol. s r.o.
Znojemská 94
586 01 Jihlava
Czech Republic

NÁZEV: TITLE: **Design**

ČÍSLO VÝKRESU: DRAWING NUMBER:

HT 4691-01-00

LIST / LISTŮ: SHEET / SHEETS: **1/1**

Elektronický originál v IS Helios. Papírové kopie jsou neplatné pro výrobu, pokud nejsou označeny číslem kopie a datem.

Durable Anti-Fingerprint Coating on Anti-Reflective Cover Glass

DARO* coating minimizing fingerprints – the breakthrough for any professional touch application – now available on CONTURAN®

SCHOTT has developed a new coating combination with durable anti-reflective, anti-fingerprint, easy to clean and anti-smudge (oleo- & hydrophobic) characteristics, a breakthrough for any professional touch application.

Anti-reflective coatings are significantly enhancing the contrast of today's high resolution displays, but their usage in touch applications suffers from the issue of fingerprint visibility on the surface of such low-reflective glass.

The availability of a super tough and super durable anti-fingerprint coating, along with an anti-reflective coating has been requested for a long time and is now being offered by SCHOTT on its well known material CONTURAN®, now available as CONTURAN® DARO.

SCHOTT is well equipped to deliver cut-to-size materials with complex edge-processing, screen-printing (organic and ceramic colors are available) and tempering or chemical hardening. We're looking forward to support your products with our expertise.

THE NEW GENERATION OF GLASS
▶ Anti-fingerprint
▶ Anti-reflective
▶ Easy-to-clean

Applications
- Touch-screen displays
- Ruggedized displays
- Command and control displays
- Medical displays
- GPS displays (e. g. automotive)
- Kiosks / Public displays
- Gaming displays

Advantages
- Anti-reflective
- Anti-fingerprint
- Durable
- Easy-to-clean
- Water repellant
- Great haptics

Long-term Durability

In order to use an AR coating in a touch application it must have an oleophobic coating that can withstand hundreds of thousands of finger touches and rubs. CONTURAN® DARO fulfills this demand and maintains its properties such as reduced visibility of fingerprints, easy-to-clean properties and good haptics even if subjected to harsh mechanical and chemical stress.

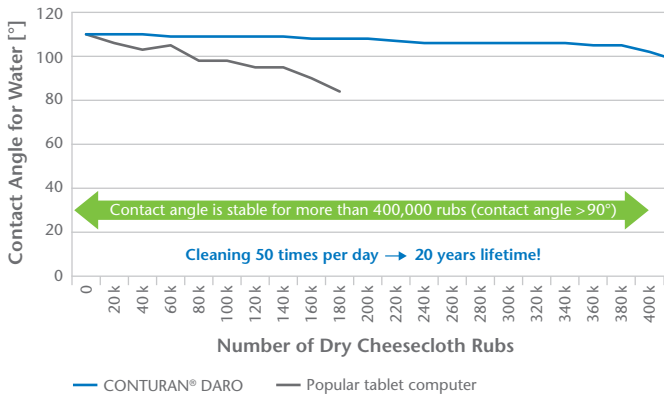## Proof of Durability for Touch Applications
- Inherently resistant to salt spray environments; more than 90 days
- Rub resistance greater than 400,000 rubs per MIL-C-675C (equals > 20 years lifetime based on 10 cleaning cycles per day with 5 rubs/cycle)

CONTURAN® DARO   AR coating without DARO
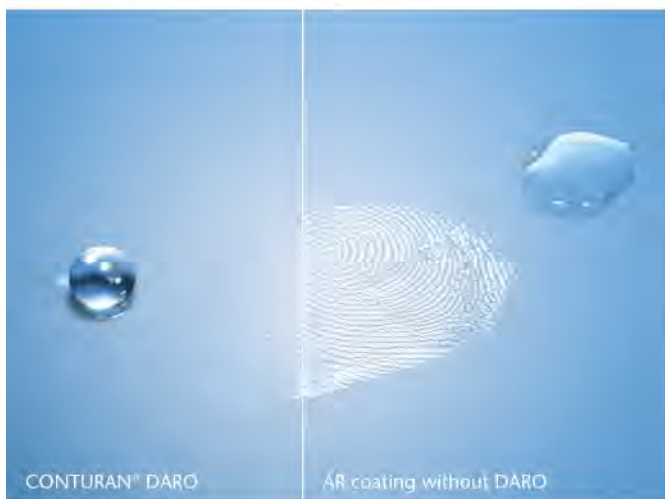
*DARO stands for Durable Anti-Reflective Oleophobic

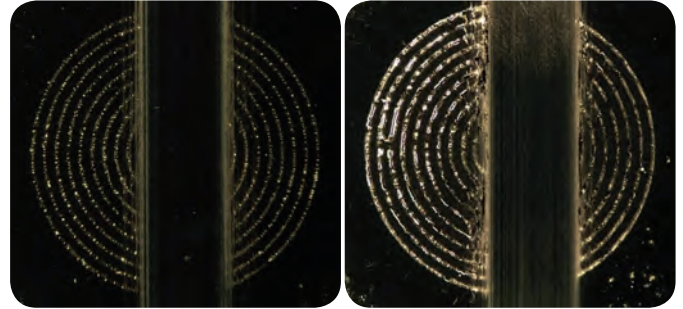## SCHOTT
glass made of ideas

CONTURAN® DARO

Surfaces of touch-screens need to withstand hundreds of thousands of finger touches. Touching the surface leads to mechanical abrasion and to chemical wear because of salt in the sweat on our fingers. In order to prove the durability of CONTURAN® DARO we perform mechanical abrasive tests (cheesecloth rubs) as well as chemical resistance tests (salt spray):

In addition SCHOTT's R&D has developed a method to characterize the fingerprint adhesion on untreated and treated glass sheets. With this test procedure it is possible to get reproducible and quantitative results of the amount of fingerprint transfer onto defined substrates.

Equal applied imprint on CONTURAN® DARO respectively AR-Glass (both glasses wiped dry 3 times)

Chart 1: Contact Angle for Water [°] vs Number of Dry Cheesecloth Rubs

Contact angle is stable for more than 400,000 rubs (contact angle >90°)

Cleaning 50 times per day → 20 years lifetime!

Legend: — CONTURAN® DARO   — Popular tablet computer

Chart 2: Contact Angle for Water [°] vs Number of Days

Stability of contact angle in harsh salt spray environment > 100 days

Compare:
21 days: Outdoor rating for architectural glasses

DIN EN1096

Legend: — CONTURAN® DARO

Specifications (Dimensions & product range)

Specifications (Dimensions & product range)
Glass thickness from 1.1 mm up to 6.0 mm
Available in sizes up to 990 mm x 1,770 mm (72'' diagonal)
CONTURAN® Standard
CONTURAN® Magic
CONTURAN® Grey
CONTURAN® BOROFLOAT®
Can be combined with all necessary processing as screen printing, tempering, laminating etc.

ABREX® test:

A combination of mechanical and chemical wear is simulated by the ABREX® test commonly used in the automotive industry, tested using artificial sweat. CONTURAN® DARO slightly surpasses the performance of painted plastic parts in automotive industry (e. g. for gear selectors) according to DIN EN 60068-2-70 / IEC 68-2-70. CONTURAN® DARO can be used on the gear selector in your car and the oleophobic coating will stand the lifetime of your vehicle.

SCHOTT
glass made of ideas

EXAMINED BY : *Lucica Lu*	**EMERGING DISPLAY** TECHNOLOGIES CORPORATION	FILE NO . CAS-0008203
		ISSUE : APR.06, 2016
APPROVED BY: *Vincent Uh*		TOTAL PAGE : 30
		VERSION : 3

CUSTOMER   ACCEPTANCE   SPECIFICATIONS

MODEL   NO. :

E T M 0 7 0 0 G 0 E D H 6
(RoHS)

FOR   MESSRS :

_____

CUSTOMER'S APPROVAL

DATE :

_____

BY :

_____

02101300-01-02

	DOC. FIRST ISSUE	
RECORDS OF REVISION		DEC.16, 2015

DATE	REVISED PAGE NO.	SUMMARY
JAN.18, 2016	14	10.1 IF1 : PIN 26~28：ADD DE MODE：HSYNC, VSYNC CONNECTED TO VDD. SYNC MODE：ENB CONNECTED TO GROUND.
APR.06, 2016	7	5.4 CAPACITIVE TOUCH PANEL I2C INTERFACE TIMING CHARACTERISTICS SCL FREQUENCY：MIN.=0→ —
	9	6.1 OPTICAL CHARACTERISTICS

6.1 OPTICAL CHARACTERISTICS

ITEM		SYMBOL	CONDITION		MIN.	TYP.	MAX.	UNIT	REMARK
VIEWING ANGLE		θ_y	CR ≥ 10	$\theta_x=0°$	(70)	(80)	—	deg.	NOTE (2) NOTE (3)
		θ_y			(70)	(80)	—		
		θ_x		$\theta_y=0°$	(70)	(80)	—		
		θ_x			(70)	(80)	—		
CONTRAST RATIO		CR	$\theta x=0°$, $\theta y=0°$		(300)	(350)	—	—	NOTE (3)
COLOR OF CIE COORDINATE	WHITE	Wx	$\theta x=0°$, $\theta y=0°$ IF = 160 mA NTSC : 72 %		(0.25)	(0.30)	(0.35)	—	NOTE (5)
		Wy			(0.29)	(0.34)	(0.39)		
	RED	Rx			(0.59)	(0.64)	(0.69)	—	
		Ry			(0.30)	(0.35)	(0.40)		
	GREEN	Gx			(0.27)	(0.32)	(0.37)	—	
		Gy			(0.60)	(0.65)	(0.70)		
	BLUE	Bx			(0.11)	(0.16)	(0.21)	—	
		By			(0.02)	(0.07)	(0.12)		
THE BRIGHTNESS OF MODULE		B	$\theta x=0°$, $\theta y=0°$ IF = 160mA		(308)	(352)		cd/m²	NOTE (6)

↓

ITEM		SYMBOL	CONDITION		MIN.	TYP.	MAX.	UNIT	REMARK
VIEWING ANGLE		θ_y	CR ≥ 10	$\theta_x=0°$	65	70	—	deg.	NOTE (2) NOTE (3)
		θ_y			70	75	—		
		θ_x		$\theta_y=0°$	70	75	—		
		θ_x			70	75	—		
CONTRAST RATIO		CR	$\theta x=0°$, $\theta y=0°$		675	900	—	—	NOTE (3)
COLOR OF CIE COORDINATE	WHITE	Wx	$\theta x=0°$, $\theta y=0°$ IF = 160 mA NTSC : 72 %		0.255	0.305	.0355	—	NOTE (5)
		Wy			0.275	0.325	0.375		
	RED	Rx			0.585	0.635	0.685	—	
		Ry			0.295	0.345	0.395		
	GREEN	Gx			0.265	0.315	0.365	—	
		Gy			0.595	0.645	0.695		
	BLUE	Bx			0.115	0.165	0.215	—	
		By			0.020	0.070	0.120		
THE BRIGHTNESS OF MODULE		B	$\theta x=0°$, $\theta y=0°$ IF = 160mA		308	352		cd/m²	NOTE (6)

DATE	REVISED PAGE NO.	SUMMARY
	14	10.1 IF1

PIN NO.	SYMBOL	I/O/P	FUNCTION
25	/WAKE	I	EXTERNAL INTERRUPT FROM THE HOST TOUCH PANEL

↓

PIN NO.	SYMBOL	I/O/P	FUNCTION
25	NC	—	NON CONNECTION

02101300-01-02

T A B L E   O F   C O N T E N T S

02101300-01-02

1. GENERAL SPECIFICATIONS

1.1 DATA SHEETS FOR LCD MODULE CONTROLLER/DRIVER
PLEASE REFER TO :

HIMAX   HX8262-A
HIMAX   HX8678-A

1.2 DATA SHEET FOR CAPACITIVE TOUCH PANEL CONTROLLER/DRIVER
PLEASE REFER TO：

HYCON   HY4614

1.3 MATERIAL SAFETY DESCRIPTION
ASSEMBLIES SHALL COMPLY WITH EUROPEAN ROHS REQUIREMENTS,
INCLUDING PROHIBITED MATERIALS/COMPONENTS CONTAINING LEAD,
MERCURY, CADMIUM, HEXAVALENT CHROMIUM, POLYBROMINATED
BIPHENYLS (PBB) AND POLYBROMINATED
DIPHENYL ETHERS (PBDE)

2. MECHANICAL SPECIFICATIONS

2.1 LCD MODULE MECHANICAL SPECIFICATIONS

(1) DIAGONALS -- 7 inch
(2) NUMBER OF DOTS --------------------------- 800W * (RGB) * 480H DOTS
(3) MODULE SIZE ----------------------------------- 166W * 105.44H *11.6D (MAX.) mm
(WITHOUT FPC & LED BL'S CABLE)
(4) EFFECTIVE AREA -------------------------------- 154.4W * 93.44H mm
(5) ACTIVE AREA ------------------------------------ 152.4W * 91.44H mm
(6) DOT SIZE --- 0.0635W * 0.1905H mm
(7) PIXEL --- 0.1905W * 0.1905H mm
         SIZE
(8) LCD TYPE -- TFT , TRANSMISSIVE , ANTI-GLARE
(9) COLOR -- 262K
(10) VIEWING DIRECTION ----------------------- 6 O'CLOCK (GRAY LEVEL INVERSION)
(11) BACK LIGHT ----------------------------------- LED , COLOR : WHITE
(12) INTERFACE MODE ------------------------------ RGB 18BIT PARALLEL
(DE/SYNC MODE)

2.2 CAPACITIVE TOUCH PANEL MECHANICAL SPECIFICATIONS

(1) TOUCH PANEL SIZE ------------------------------ 7.0 inch
(2) OUTER DIMENSION ------------------------------ 164W * 104H * 1.4D mm
(WITHOUT FPC)
(3) EFFECTIVE AREA --------------------------------- 155W * 94.045H mm
(4) ACTIVE AREA ------------------------------------- 154W * 93.05H mm
(5) INPUT TYPE -- MULTI TOUCH
(6) NUMBER OF TOUCH SENSOR -------------------- 28 * 16 SENSORS
(7) RESOLUTION -------------------------------------- 1792 * 1024
(8) INTERFACE MODE --------------------------------- I2C

3. ABSOLUTE MAXIMUM RATINGS

3.1 ELECTRICAL ABSOLUTE MAXIMUM RATINGS

ITEM	SYMBOL	MIN.	MAX.	UNIT	REMARK
POWER SUPPLY VOLTAGE	VDD-VSS	-0.3	3.6	V	
INPUT VOLTAGE	VIN-VSS	-0.3	VDD+0.3	V	
STATIC ELECTRICITY	—	—	—	V	NOTE (1)
LED BACKLIGHT POWER DISSIPATION	PD	—	2592	mW	
LED BACKLIGHT FORWARD CURRENT	IF	—	240	mA	

NOTE (1) : LCM SHOULD BE GROUNDED DURING HANDLING LCM.

3.2 ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS

ITEM	OPERATING		STORAGE		REMARK
	MIN.	MAX.	MIN.	MAX.	
AMBIENT TEMPERATURE	-20°C	70°C	-30°C	80°C	NOTE (1) , (2)
HUMIDITY	NOTE (3)		NOTE (3)		WITHOUT CONDENSATION
VIBRATION	—	2.45 m/s^2 (0.25 G)	—	11.76 m/s^2 (1.2 G)	5~20Hz , 1HR 20~500Hz(20Hz) , 1HR 20~500Hz(500Hz) , 1HR X,Y,Z TOTAL 3HRS
SHOCK	—	29.4 m/s^2 (3 G)	—	490.0 m/s^2 (50 G)	10ms XYZ DIRECTIONS 1 TIME EACH
CORROSIVE GAS	NOT ACCEPTABLE		NOT ACCEPTABLE		

NOTE (1) : Ta AT -30°C : WILL BE 48HRS MAX .
         80°C : WILL BE 168HRS MAX .
NOTE (2) : BACKGROUND COLOR CHANGES SLIGHTLY DEPENDING ON AMBIENT TEMPERATURE
         THIS PHENOMENON IS REVERSIBLE.
NOTE (3) : Ta ≤ 60°C : 90%RH MAX (96HRS MAX).
         Ta > 60°C : ABSOLUTE HUMIDITY MUST BE LOWER THAN THE HUMIDITY
            OF 90%RH AT 60°C(96HRS MAX).

02101300-01-02

4. ELECTRICAL CHARACTERISTICS

Ta = 25 °C

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	REMARK
POWER SUPPLY VOLTAGE	VDD-VSS	—	3.2	3.3	3.6	V	
POWER SUPPLY VOLTAGE FOR LED DRIVER	VCC-VSS	—	3.0	3.3	3.6	V	
HIGH LEVEL INPUT VOLTAGE	VIH	—	0.7*VDD	—	VDD	V	NOTE (1)
LOW LEVEL INPUT VOLTAGE	VIL	—	0	—	0.3*VDD	V	NOTE (1)
POWER SUPPLY CURRENT	IDD	VDD-VSS=3.3V	—	240	300	mA	NOTE (2)
POWER SUPPLY CURRENT FOR LED DRIVER	ICC	VCC-VSS=3.3V LED B/L=ON	—	600	780	mA	
POWER SUPPLY FOR LED BACKLIGHT	V_{BL+}-V_{BL-}	IF=160mA	8.4	9.9	10.8	V	NOTE (3)
LED LIFE TIME	—		30K	40K	—	HRS	

NOTE (1) : APPLIED TO TERMINALS B5~B0 , G5~G0 , R5~R0 , DCLK , HSYNC ,VSYNC , ENB.
NOTE (2) : THE DISPLAY PATTERN IS ALL "WHITE"..
NOTE (3) : INTERNAL CIRCUIT DIAGRAM OF BACKLIGHT

24 LED CHIPS
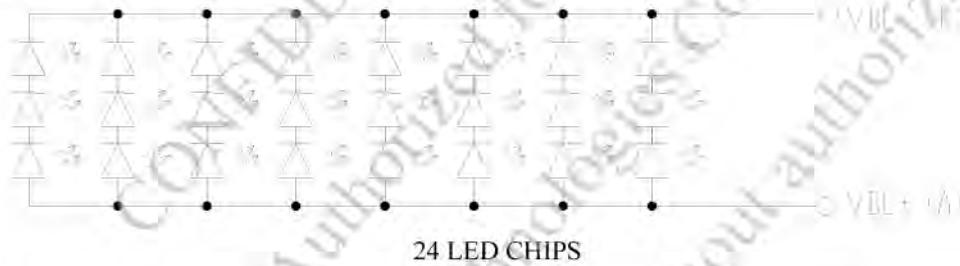
NOTE (4) : AMBIENT TEMP. VS. ALLOWABLE FORWARD CURRENT. (PER. LED)

Ambient Temperature vs. Allowable Forward Current
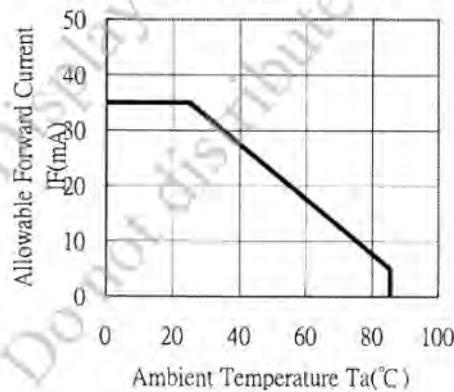
5. TIMING CHARACTERISTICS

5.1 LCD MODULE AC ELECTRICAL CHARACTERISTICS

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT
HSYNC SETUP TIME	T_{hst}	6	—	—	ns
HSYNC HOLD TIME	T_{hhd}	6	—	—	ns
VSYNC SETUP TIME	T_{vst}	6	—	—	ns
VSYNC HOLD TIME	T_{vhd}	6	—	—	ns
DATA SETUP TIME	T_{dsu}	6	—	—	ns
DATA HOLD TIME	T_{dhd}	6	—	—	ns
ENB SETUP TIME	T_{esu}	6	—	—	ns
SOURCE OUTPUT SETTLING TIME	T_{ST}	—	—	15	µs
SOURCE OUTPUT LOADING R	R_{SL}	—	2	—	K ohm
SOURCE OUTPUT LOADING C	C_{SL}	—	60	—	pF

02101300-01-02
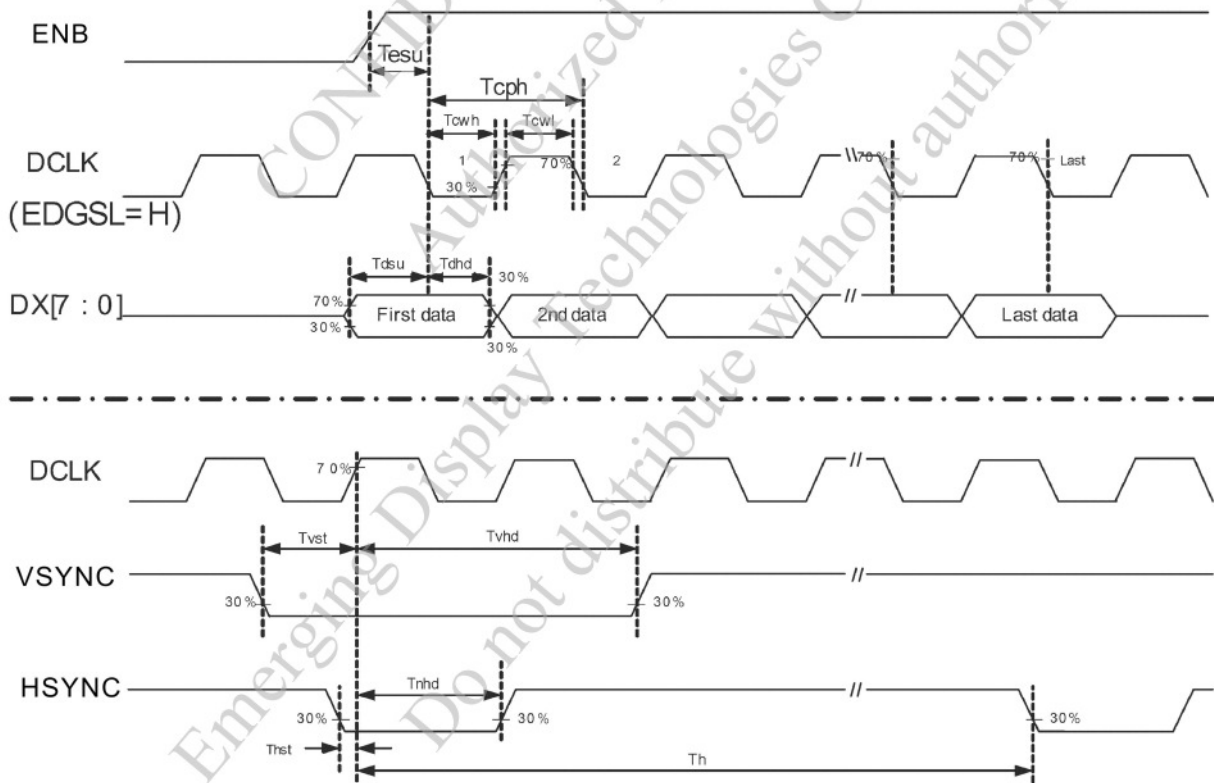
5.2 LCD MODULE SYNC MODE SIGNAL CHARACTERISTICS

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT
DCLK FREQUENCY	F_{CPH}	—	33.26	—	MHz
DCLK PERIOD	T_{CPH}	—	30.06	—	ns
DCLK PULSE DUTY	T_{CWH}	40	50	60	%
HSYNC PERIOD	T_H	930	1056	1057	T_{CPH}
HSYNC PULSE WIDTH	T_{WH}	1	128	—	T_{CPH}
HSYNC -FIRST HORIZONTAL DATA TIME	T_{HS}	—	216	—	T_{CPH}
HSYNC ACTIVE TIME	T_{HA}	—	800	—	T_{CPH}
VSYNC PERIOD	T_V	—	525	—	T_H
VSYNC PULSE WIDTH	T_{WV}	1	2	—	T_H
VSYNC -DE TIME	T_{VS}	—	35	—	T_H
VSYNC ACTIVE TIME	T_{VA}	—	480	—	T_H

(EDGSL=H)
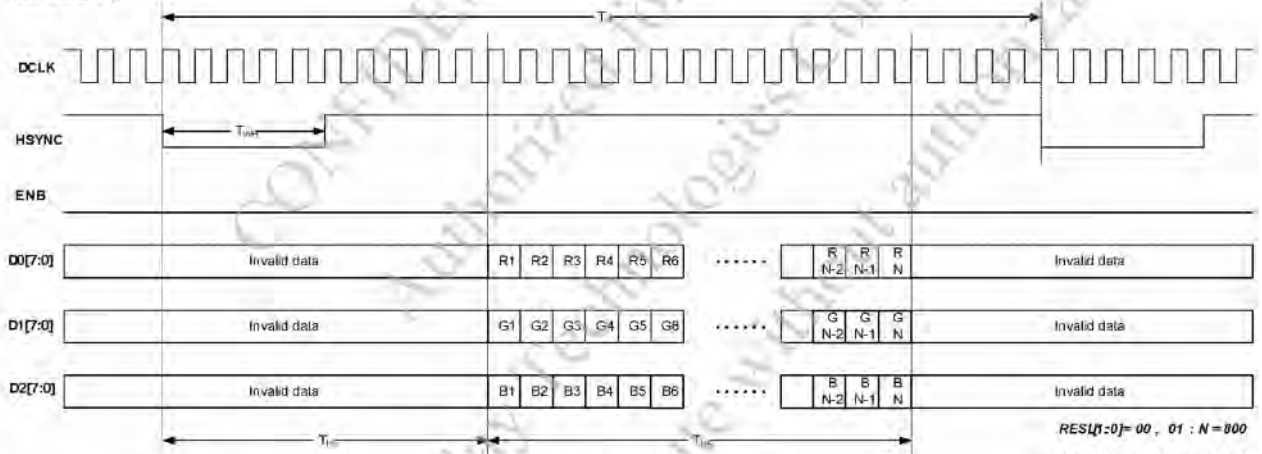
SYNC Mode Horizontal Data Format

RESL[1:0]= 00 , 01 : N = 800
RESL[1:0]= 1x : N = 400
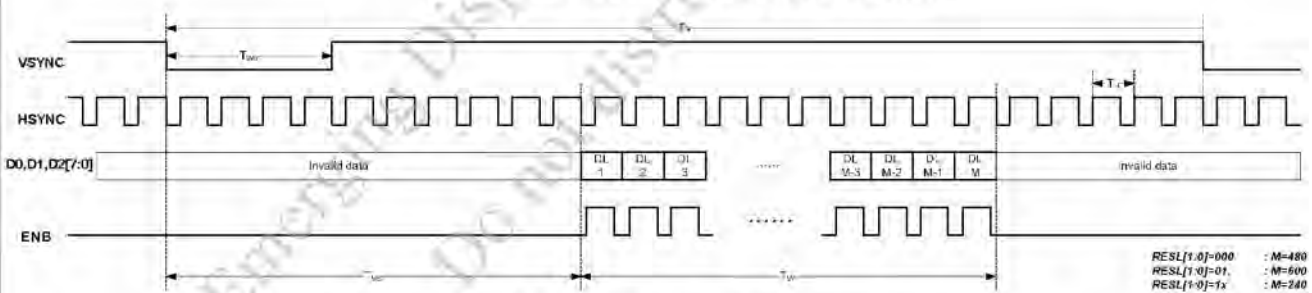
SYNC Mode Vertical Data Format

RESL[1:0]=000 : M=480
RESL[1:0]=01 : M=600
RESL[1:0]=1x : M=240

02101300-01-02

5.3 LCD MODULE DE MODE SIGNAL CHARACTERISTICS

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT
DCLK FREQUENCY	F_{CPH}	—	33.26	—	MHz
DCLK PERIOD	T_{CPH}	—	30.06	—	ns
DCLK PULSE DUTY	T_{CWH}	40	50	60	%
ENB PERIOD	$T_{DEH}+T_{DEL}$	1000	1056	1200	T_{CPH}
ENB PULSE WIDTH	T_{DEH}	—	800	—	T_{CPH}
ENB FRAME BLANKING	T_{DEB}	10	45	110	$T_{DEH}+T_{DEL}$
ENB FRAME WIDTH	T_{DE}	—	480	—	$T_{DEH}+T_{DEL}$
OEV PULSE WIDTH	T_{OEV}	—	150	—	T_{CPH}
CKV PULSE WIDTH	T_{CKV}	—	133	—	T_{CPH}
ENB(INTERNAL)-STV TIME	T_1	—	4	—	T_{CPH}
ENB(INTERNAL)-CKV TIME	T_2	—	40	—	T_{CPH}
ENB(INTERNAL)-OEV TIME	T_3	—	23	—	T_{CPH}
ENB(INTERNAL)-POL TIME	T_4	—	157	—	T_{CPH}
STV PULSE WIDTH	—	—	1	—	T_H

NOTE (1) : $T_{HS}+T_{HA}<T_H$
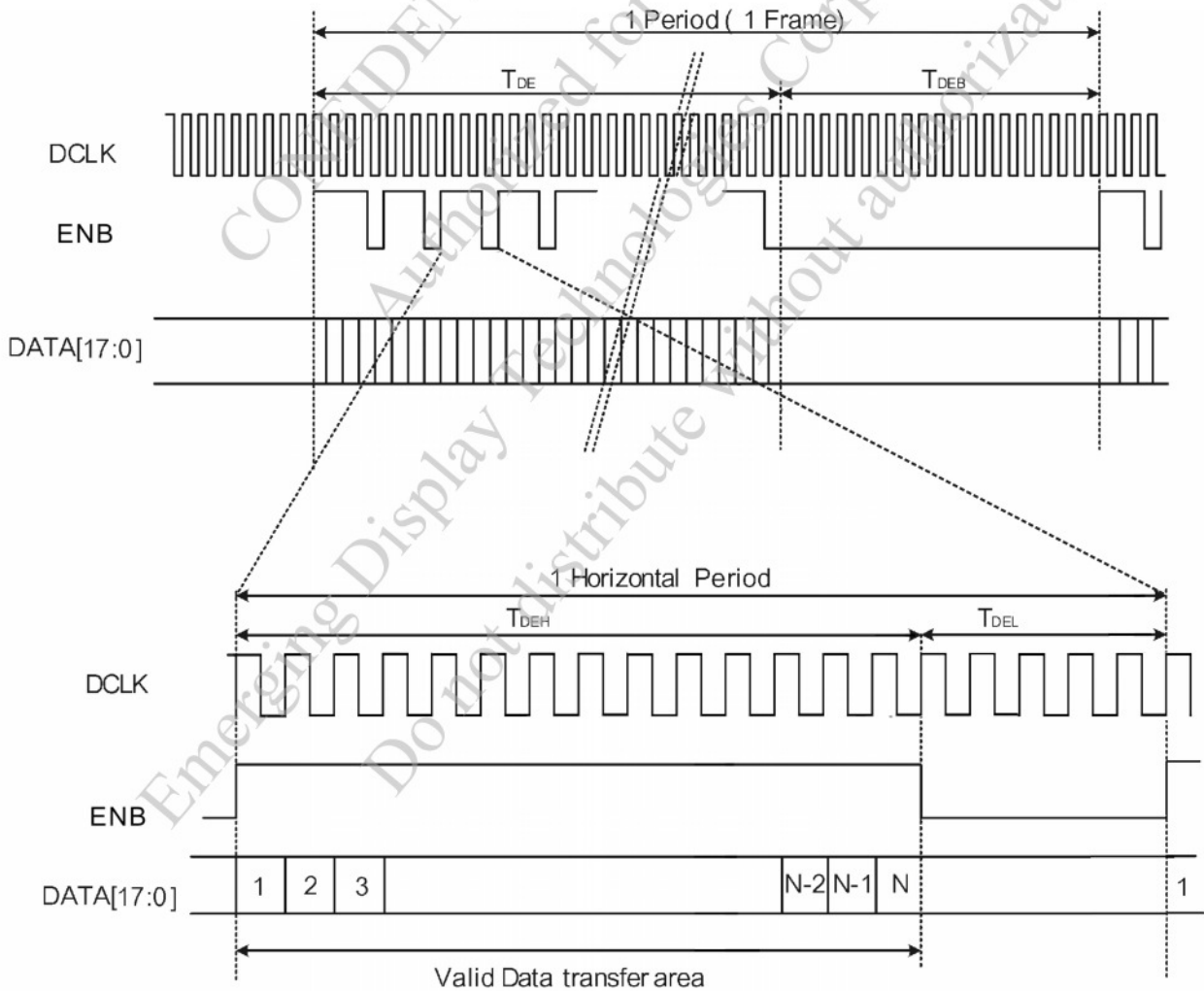
5.4 CAPACITIVE TOUCH PANEL I2C INTERFACE TIMING CHARACTERISTICS

ITEM	MIN.	TYP.	MAX.	UNIT
SCL FREQUENCY	—	—	400	KHz
BUS FREE TIME BETWEEN A STOP AND START CONDITION	1.3	—	—	us
HOLD TIME (REPEATED) START CONDITION	0.6	—	—	us
DATA SETUP TIME	100	—	—	ns
SETUP TIME FOR A REPEATED START CONDITION	0.6	—	—	us
SETUP TIME FOR STOP CONDITION	0.6	—	—	us
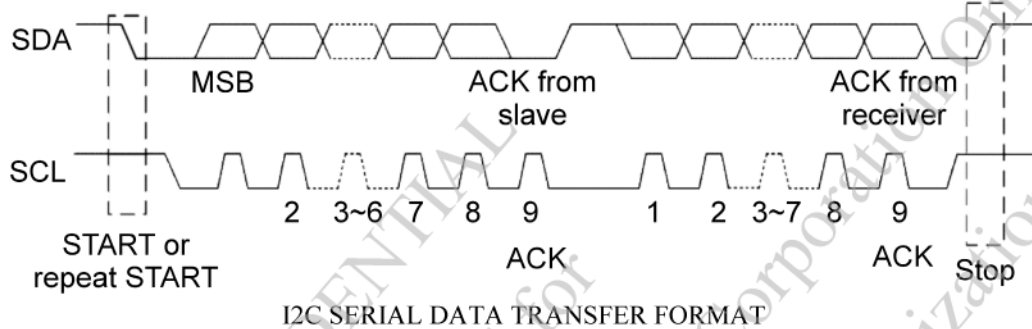
I2C SERIAL DATA TRANSFER FORMAT

02101300-01-02

E M E R G I N G   D I S P L A Y
TECHNOLOGIES CORPORATION

MODEL NO.
ETM0700G0EDH6

VERSION
3

PAGE
8

5.5 CAPACITIVE TOUCH PANEL POWER SEQUENCE

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT
RISE TIME FROM 0.1VDD TO 0.9VDD	Tris	—	—	5	ms
TIME OF RESETTING TO BE LOW BEFORE POWERING ON	Trtp	100	—	—	us
TIME OF STARTING TO REPORT POINT AFTER POWERING ON	Tpon	200	—	—	ms
RESET TIME AFTER VDD POWERING ON	Tvdr	1	—	—	ms
TIME OF STARTING TO REPORT POINT AFTER RESETTING	Trsi	200	—	—	ms
RESET TIME	Trst	2	—	—	ms

POWER RISE TIMING
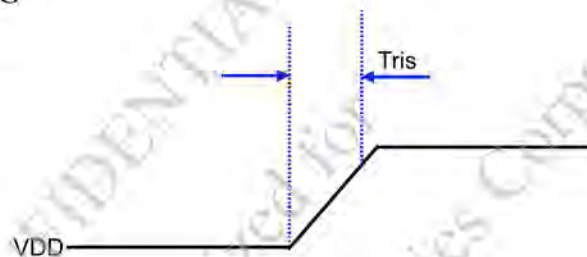
POWER ON / OFF TIMING

RESET SEQUENCE

02101300-01-02
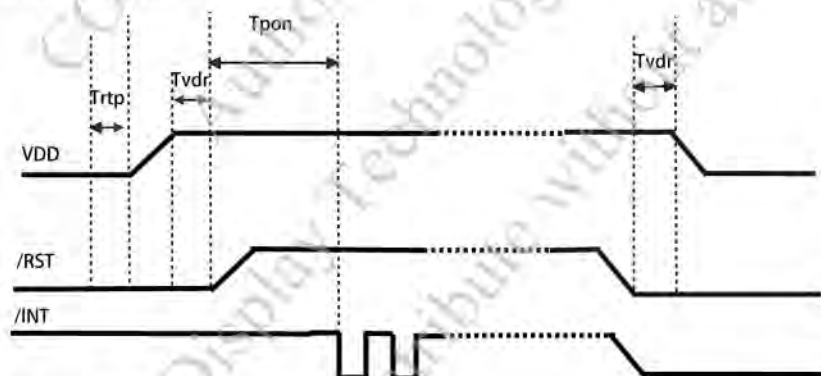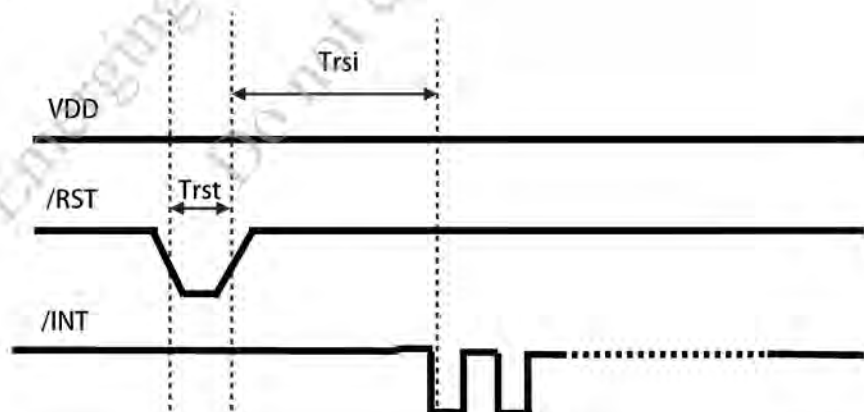
6. OPTICAL CHARACTERISTICS (NOTE 1)

6.1 OPTICAL CHARACTERISTICS

Ta = 25 ± 2 °C

ITEM		SYMBOL	CONDITION		MIN.	TYP.	MAX.	UNIT	REMARK
VIEWING ANGLE		θ_{y+}	CR $\geq$ 10	$\theta_x=0°$	65	70	—	deg.	NOTE (2) NOTE (3)
		θ_{y-}			70	75	—		
		θ_{x+}		$\theta_y=0°$	70	75	—		
		θ_{x-}			70	75	—		
CONTRAST RATIO		CR	$\theta x=0°$, $\theta y=0°$		675	900	—	—	NOTE (3)
RESPONSE TIME		T_R (rise)	$\theta x=0°$, $\theta y=0°$		—	5	10	msec	NOTE (4)
		T_F (fall)			—	15	20		
COLOR OF CIE COORDINATE	WHITE	Wx	$\theta x=0°$, $\theta y=0°$ IF = 160 mA NTSC : 72 %		0.255	0.305	.0355	—	NOTE (5)
		Wy			0.275	0.325	0.375		
	RED	Rx			0.585	0.635	0.685	—	
		Ry			0.295	0.345	0.395		
	GREEN	Gx			0.265	0.315	0.365	—	
		Gy			0.595	0.645	0.695		
	BLUE	Bx			0.115	0.165	0.215	—	
		By			0.020	0.070	0.120		
THE BRIGHTNESS OF MODULE		B	$\theta x=0°$, $\theta y=0°$ IF = 160mA		308	352	—	cd/m^2	NOTE (6)
THE UNIFORMITY OF MODULE		—			75	80	—	%	

NOTE (1) : TEST EQUIPMENT SETUP :

AFTER STABILIZING AND LEAVING THE PANEL ALONE AT A GIVEN TEMPERATURE FOR 30 MINUTES, THE MEASUREMENT SHOULD BE EXECUTED. MEASUREMENT SHOULD BE EXECUTED IN A STABLE, WINDLESS, AND DARK ROOM. OPTICAL SPECIFICATIONS ARE MEASURED BY TOPCON BM-7 (FAST) WITH A VIEWING ANGLE OF 1° AT A DISTANCE OF 50cm AND NORMAL DIRECTION.

02101300-01-02
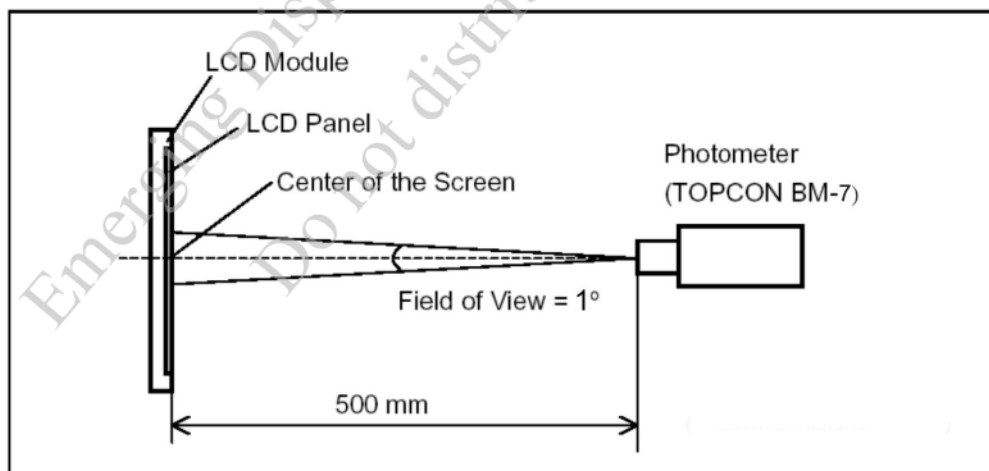
NOTE (2) : DEFINITION OF VIEWING ANGLE :
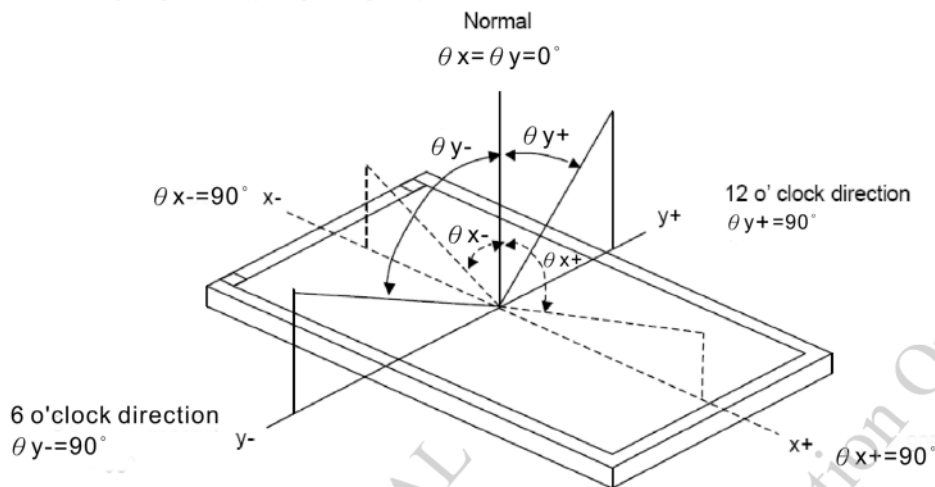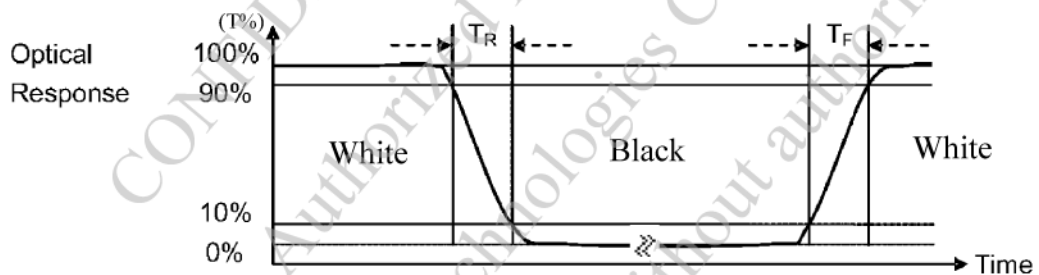

NOTE (3) : DEFINITION OF CONTRAST RATIO :

$$CONTRAST\ RATIO(CR) = \frac{BRIGHTNESS\ MEASURED\ WHEN\ LCD\ IS\ AT\ "WHITE\ STATE"}{BRIGHTNESS\ MEASURED\ WHEN\ LCD\ IS\ AT\ "BLACK\ STATE"}$$

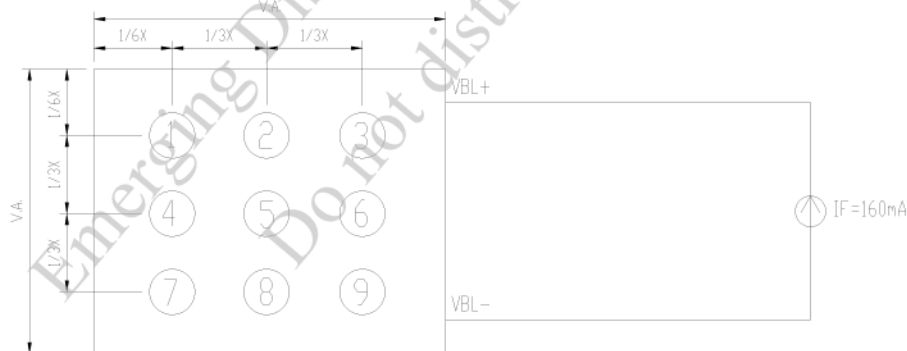NOTE (4) : DEFINITION OF RESPONSE TIME : T_R AND T_F
THE FIGURE BELOW IS THE OUTPUT SIGNAL OF THE PHOTO DETECTOR.

NOTE (5) : THE 100% TRANSMISSION IS DEFINED AS THE TRANSMISSION OF LCD PANEL WHEN ALL
THE INPUT TERMINALS OF MODULE ARE ELECTRICALLY OPENED.

NOTE (6) : BRIGHTNESS MEASURED WHEN LCD IS AT "WHITE STATE"
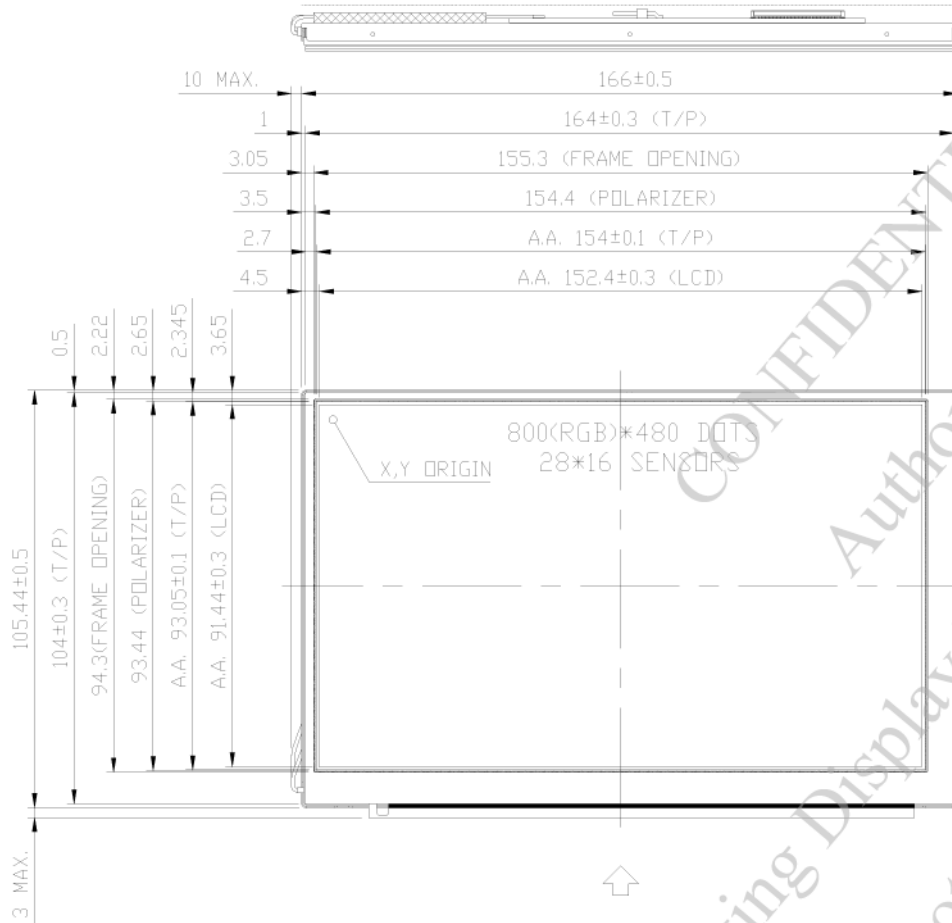
6.2 THE TEST METHOD OF BRIGHTNESS AND UNIFORMITY

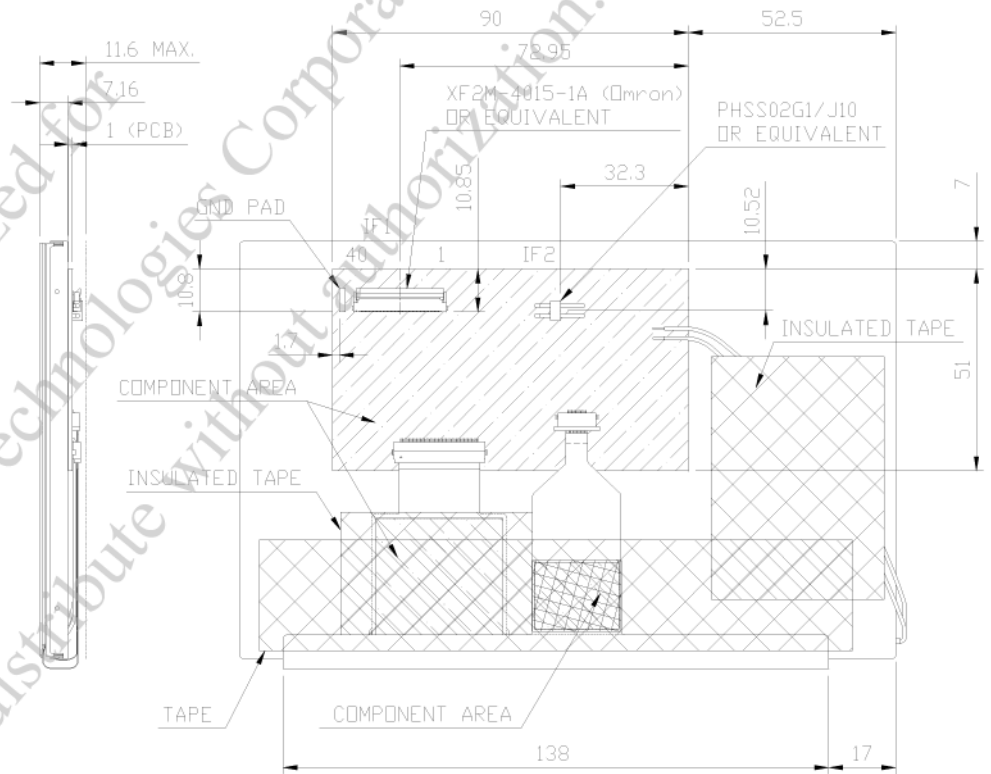UNIT：mm

6.3 THE CALCULATING METHOD OF UNIFORMITY

$$UNIFORMITY : \left[1 - \frac{MAXIMUM\ BRIGHTNESS - MINIMUM\ BRIGHTNESS}{AVERAGE\ BRIGHTNESS} \right] \times 100\%$$

02101300-01-02

7. OUTLINE DIMENSIONS

10 MAX.
166±0.5
164±0.3 (T/P)
155.3 (FRAME OPENING)
154.4 (POLARIZER)
A.A. 154±0.1 (T/P)
A.A. 152.4±0.3 (LCD)

1
3.05
3.5
2.7
4.5

0.5
2.22
2.65
2.345
3.65

105.44±0.5
104±0.3 (T/P)
94.3(FRAME OPENING)
93.44 (POLARIZER)
A.A. 93.05±0.1 (T/P)
A.A. 91.44±0.3 (LCD)

3 MAX.

800(RGB)*480 DOTS
28*16 SENSORS

X,Y ORIGIN

VIEWING DIRECTION
Best Contrast but with Gray Level Inversion

11.6 MAX.
7.16
1 (PCB)

90
72.95
XF2M-4015-1A (Omron)
OR EQUIVALENT

52.5
PHSS02G1/J10
OR EQUIVALENT

32.3
10.52
7

10.85

GND PAD
IF1
40   1   IF2

INSULATED TAPE

51

COMPONENT AREA

INSULATED TAPE

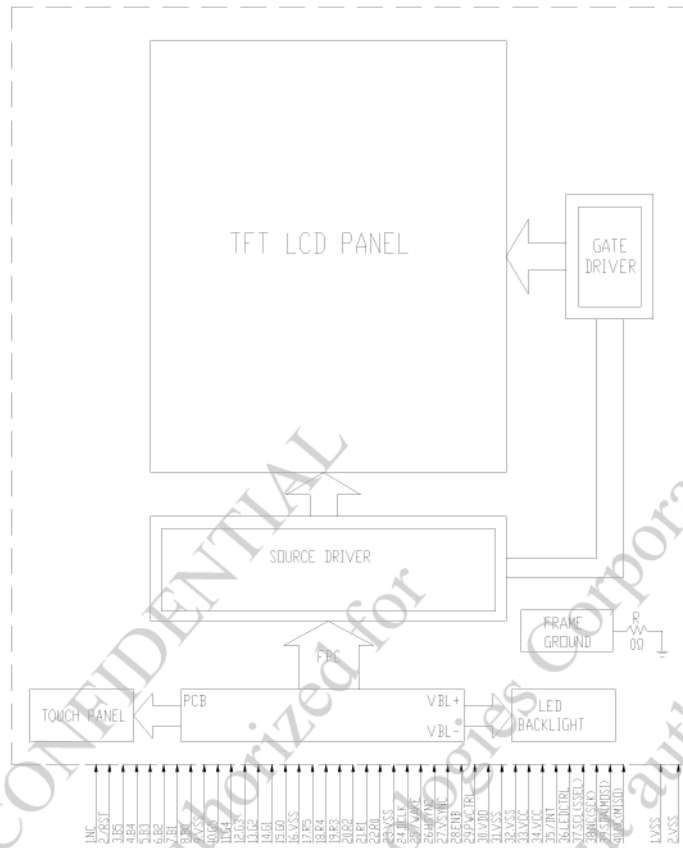TAPE   COMPONENT AREA

138   17
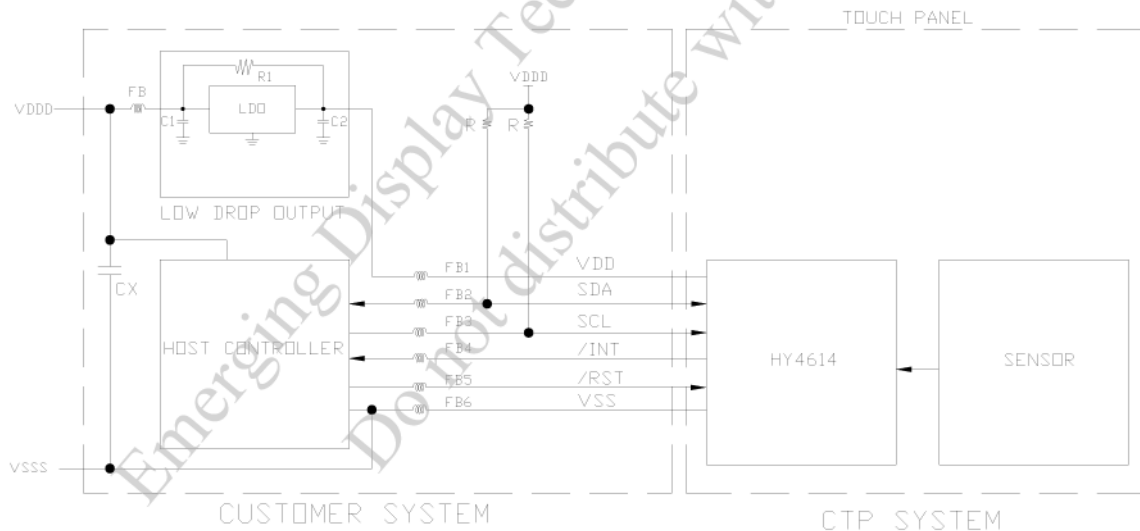
UNIT : mm
SCALE : NTS
NOT SPECIFIED TOLERANCE IS ± 0.5
NOTE : REAR BEZEL MATERIAL: SUS430 1D ANTI-GLARE

02101300-01-02

8. BLOCK DIAGRAM

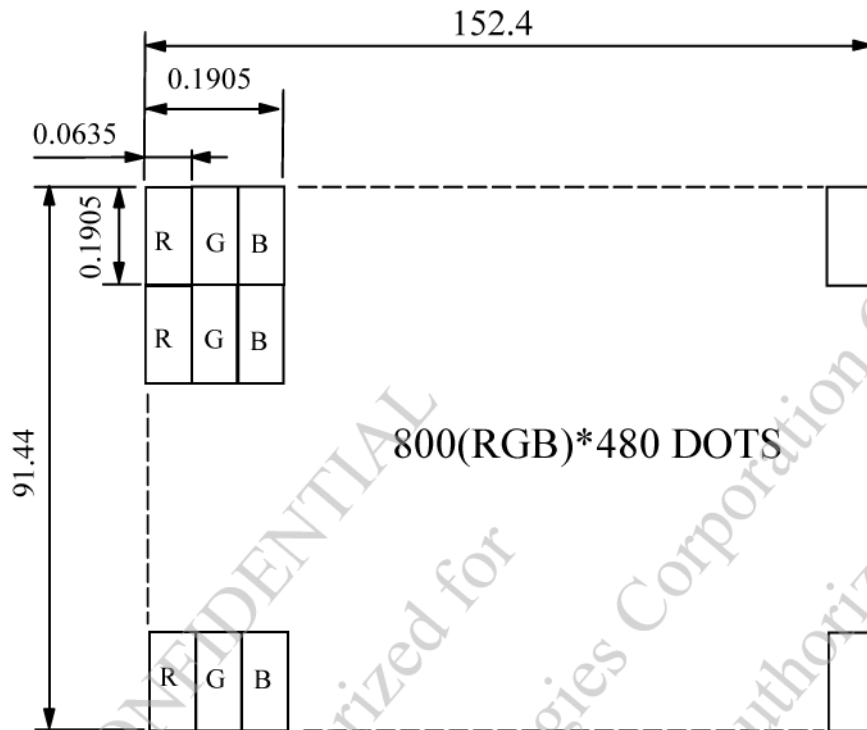

NOTE : UD = "H" LEVEL : OUT1→480   ；   LR = "H" LEVEL : OUT1→800(DEFAULT)
         "L" LEVEL : OUT480→1 (DEFAULT)   "L" LEVEL : OUT800→1

NOTE (1)：THE STANDARD IIC COMMUNICATION INTERFACE, SUPREME SCL CLOCK
            IS 400 KHz, SLAVE ADDRESS CAN BE SET UP, SUPPORTS VDD LEVEL POWER,
            NEEDS PULL HIGH RESISTANCE AND WE RECOMMEND THE PULL HIGH
            RESISTANCE IS 2.0K OHM.
NOTE (2)：POWER SUPPLY SHALL BE CLEAN AND NOISE FREE. ADDITIONAL
            FILTERING OR A SEPARATE LDO (LOW DROP OUT) REGULATOR CAN BE
            REQUIRED. C1 AND C2 CAPACITORS RECOMMENDATION：4.7μF OR 10 μF

02101300-01-02

9. DETAIL DRAWING OF DOT MATRIX

152.4

0.1905

0.0635

0.1905

R	G	B
R	G	B

91.44

800(RGB)*480 DOTS

R	G	B

UNIT : mm
SCALE : NTS
NOT SPECIFIED TOLERANCE IS ± 0.1
DOTS MATRIX TOLERANCE IS ± 0.01

02101300-01-02

10. INTERFACE SIGNALS

10.1 IF1 :

| PIN NO.	SYMBOL	I/O/P	FUNCTION	
1	NC	—	NON CONNECTION	
2	/RST	I	EXTERNAL RESET, LOW IS ACTIVE	TOUCH PANEL
3	B5	I	BLUE DATA BIT 5	
4	B4	I	BLUE DATA BIT 4	
5	B3	I	BLUE DATA BIT 3	
6	B2	I	BLUE DATA BIT 2	
7	B1	I	BLUE DATA BIT 1	
8	B0	I	BLUE DATA BIT 0	
9	VSS	P	GROUND (VSS IS CONNECTED TO METAL HOUSING WITH CONDUCTIVE TAPE)	
10	G5	I	GREEN DATA BIT 5	
11	G4	I	GREEN DATA BIT 4	
12	G3	I	GREEN DATA BIT 3	
13	G2	I	GREEN DATA BIT 2	
14	G1	I	GREEN DATA BIT 1	
15	G0	I	GREEN DATA BIT 0	
16	VSS	P	GROUND (VSS IS CONNECTED TO METAL HOUSING WITH CONDUCTIVE TAPE)	
17	R5	I	RED DATA BIT 5	
18	R4	I	RED DATA BIT 4	
19	R3	I	RED DATA BIT 3	
20	R2	I	RED DATA BIT 2	
21	R1	I	RED DATA BIT 1	
22	R0	I	RED DATA BIT 0	
23	VSS	P	GROUND (VSS IS CONNECTED TO METAL HOUSING WITH CONDUCTIVE TAPE)	
24	DCLK	I	DOT DATA CLOCK	
25	NC	—	NON CONNECTION	
26	HSYNC	I	HORIZONTAL SYNC INPUT. INTERNALLY PULL HIGH.	DE MODE：HSYNC, VSYNC CONNECTED TO VDD. SYNC MODE：ENB CONNECTED TO GROUND.
27	VSYNC	I	VERTICAL SYNC INPUT. INTERNALLY PULL HIGH.	
28	ENB	I	INPUT DATA ENABLE CONTROL. INTERNALLY PULLED LOW.	

02101300-01-02

PIN NO.	SYMBOL	I/O/P	FUNCTION			
29	PWCTRL	I	LOGIC LEVEL H=3.3V L=0V	PWCTRL		REMARK
				H		POWER ON
				L		SHUTDOWN
30	VDD	P	POWER SUPPLY VOLTAGE			
31	VSS	P	GROUND (VSS IS CONNECTED TO METAL HOUSING WITH CONDUCTIVE TAPE)			
32	VSS	P	GROUND (VSS IS CONNECTED TO METAL HOUSING WITH CONDUCTIVE TAPE)			
33	VCC	P	POWER SUPPLY FOR LED DRIVER CIRCUIT			
34	VCC	P	POWER SUPPLY FOR LED DRIVER CIRCUIT			
35	/INT	O	EXTERNAL INTERRUPT TO THE HOST			TOUCH PANEL
36	LEDCTRL	I	BRIGHTNESS CONTROL FOR LED BACKLIGHT			
37	SCL	I	I2C CLOCK INPUT			TOUCH PANEL
38	NC	—	NON CONNECTION			
39	SDA	I/O	I2C DATA INPUT AND OUTPUT			
40	NC	—	NON CONNECTION			

10.2 IF2 :

PIN NO.	SYMBOL	I/O/P	FUNCTION
1	VSS	P	GROUND (VSS IS CONNECTED TO METAL HOUSING WITH CONDUCTIVE TAPE)
2	VSS	P	GROUND (VSS IS CONNECTED TO METAL HOUSING WITH CONDUCTIVE TAPE)

11. POWER SUPPLY

11.1 POWER SUPPLY FOR LCM
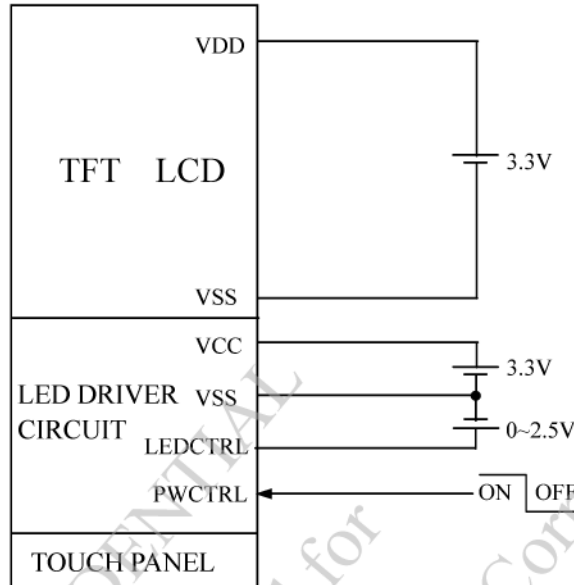
11.2 THE BRIGHTNESS CONTROLLED BY BACKLIGHT CURRENT OF LEDCTRL
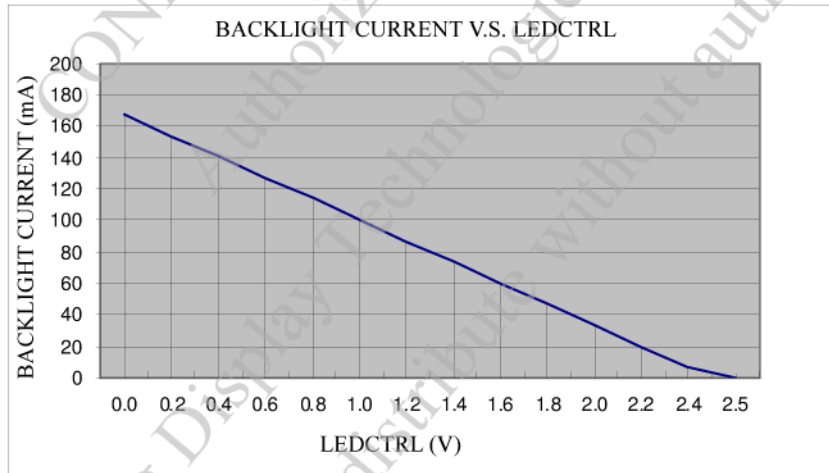
12. CAPACITIVE TOUCH PANEL SPECIFICATION

12.1 OPTICAL CHARACTERISTICS

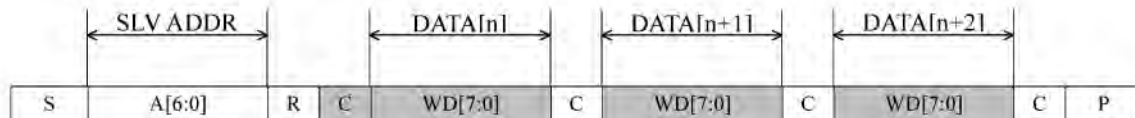| ITEM	CONDITION	MIN.	TYP.	MAX.	UNIT
TRANSPARENCY NOTE (1)	Ta = 25°C	85	—	—	%

NOTE (1) : OPTICAL MEASUREMENT SHOULD BE EXECUTED AFTER PANEL IS SECURED. MEASUREMENT PROCESS SHOULD BE EXECUTED IN A STABLE, WINDLESS, AND DARK ROOM. OPTICAL SPECIFICATIONS SHOULD BE MEASURED BY SPECTROPHOTOMETER.

12.2 HARDNESS

ITEM	DESCRIPTION
SURFACE HARDNESS	7H (MIN.)

12.3 PROTOCOL

12.3.1 I2C READ

CHARACTER	DESCRIPTION
S	I2C START OR I2C RESTART
A[6:0]	SLAVE ADDRESS, THE VALUE CAN BE CUSTOMIZED
R	OPERATOR BYTE, SHOULD BE 1'b1, STANDS FOR READ
C	ACK SIGNAL
P	STOP SIGNAL (STOP SIGNAL IS OPTIONAL, RESTART SIGNAL IS ALSO OK FOR NEXT PACKET)

SLAVE ADDRESS=0x38

12.3.2 INTERRUPT SIGNAL FOR CTPM TO HOST
AS FOR STANDARD CTPM, HOST NEED TO USE BOTH INTERRUPT CONTROL SIGNAL AND SERIAL DATA INTERFACE TO GET THE TOUCH DATA.
HERE IS THE TIMING TO GET TOUCH DATA
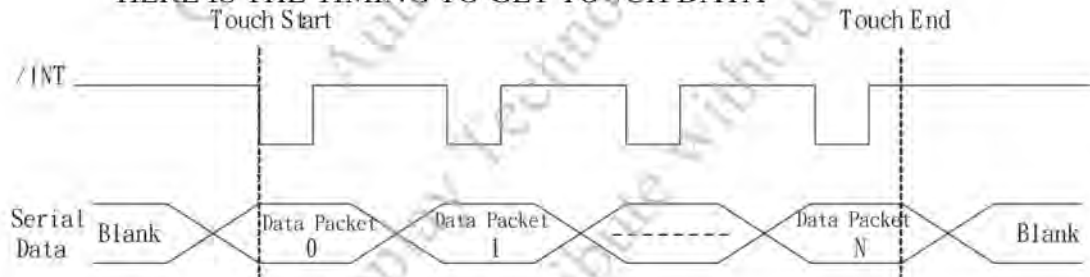
12.3.3 READ TOUCH DATA PACKET
WE DEFINED A CTPM PERIOD AS EACH CAPACITANCE DATA GATHERING AND DATA PROCESS, IN EACH CTPM, IF THERE IS A TOUCH DETECTS, THERE WILL WE A FAME OF TOUCH DATA. HOST CAN GET THE SPECIFIED FORMAT TOUCH DATA BY SERIAL DATA INTERFACE.

TOUCH DATA FORMAT
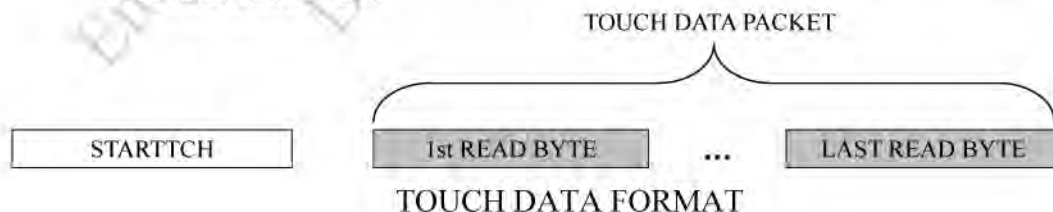
TOUCH DATA READ PROTOCOL
IN THIS MODE THE CTP IS FULLY FUNCTIONAL AS A TOUCH SCREEN CONTROLLER. READ AND WRITE ACCESS ADDRESS IS JUST LOGICAL ADDRESS WHICH IS NOT ENFORCED BY HARDWARE OR FIRMWARE. HERE IS THE OPERATING MODE REGISTER MAP.

ADDRESS	NAME	BIT7	BIT6	BIT5	BIT4	BIT3	BIT2	BIT1	BIT0	HOST ACCESS
02h	TD_STATUS					NUMBER OF TOUCH POINTS[3:0]				R
03h	TOUCH1_XH	1st EVENT FLAG				1st TOUCH X POSITION[11:8]				R
04h	TOUCH1_XL	1st TOUCH X POSITION[7:0]								R
05h	TOUCH1_YH	1st TOUCH ID[3:0]				1st TOUCH Y POSITION[11:8]				R
06h	TOUCH1_YL	1st TOUCH Y POSITION[7:0]								R
07h										
08h										
09h	TOUCH2_XH	2nd EVENT FLAG				2nd TOUCH X POSITION[11:8]				R
0Ah	TOUCH2_XL	2nd TOUCH X POSITION[7:0]								R
0Bh	TOUCH2_YH	2nd TOUCH ID[3:0]				2nd TOUCH Y POSITION[11:8]				R
0Ch	TOUCH2_YL	2nd TOUCH Y POSITION[7:0]								R
0Dh										R
0Eh										R
0Fh	TOUCH3_XH	3rd EVENT FLAG				3rd TOUCH X POSITION[11:8]				R
10h	TOUCH3_XL	3rd TOUCH X POSITION[7:0]								R
11h	TOUCH3_YH	3rd TOUCH ID[3:0]				3rd TOUCH Y POSITION[11:8]				R
12h	TOUCH3_YL	3rd TOUCH Y POSITION[7:0]								R
13h										R
14h										R
15h	TOUCH4_XH	4th EVENT FLAG				4th TOUCH X POSITION[11:8]				R
16h	TOUCH4_XL	4th TOUCH X POSITION[7:0]								R
17h	TOUCH4_YH	4th TOUCH ID[3:0]				4th TOUCH Y POSITION[11:8]				R
18h	TOUCH4_YL	4th TOUCH Y POSITION[7:0]								R
19h										R
1Ah										R
1Bh	TOUCH5_XH	5th EVENT FLAG				5th TOUCH X POSITION[11:8]				R
1Ch	TOUCH5_XL	5th TOUCH X POSITION[7:0]								R
1Dh	TOUCH5_YH	5th TOUCH ID[3:0]				5th TOUCH Y POSITION[11:8]				R
1Eh	TOUCH5_YL	5th TOUCH Y POSITION[7:0]								R
1Fh										R
20h										R
A6h	ID_G_FIRMID	FIRMWARE ID								R

TD_STATUS
THIS REGISTER IS THE TOUCH DATA STATUS REGISTER.

ADDRESS	BIT ADDRESS	REGISTER NAME	DESCRIPTION
02h	3:0	NUMBER OF TOUCH POINTS [3:0]	HOW MANY POINTS DETECTED. 1-5 IS VALID.
	7:4	NONE	NONE

TOUCHn_XH (n:1-5)
THIS REGISTER DESCRIBES MSB OF THE X COORDINATE OF THE NTH TOUCH POINT AND THE CORRESPONDING EVENT FLAG.

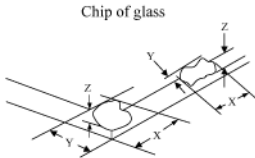| ADDRESS	BIT ADDRESS	REGISTER NAME	DESCRIPTION
03h ~ 1Bh	7:6	EVENT FLAG	00b: PUT DOWN 01b: PUT UP 10b: CONTACT 11b: RESERVED
	5:4	NONE	RESERVED
	3:0	TOUCH X POSITION [11:8]	MSB OF TOUCH X POSITION IN PIXELS

TOUCHn_XL (n:1-5)
THIS REGISTER DESCRIBES LSB OF THE X COORDINATE OF THE NTH TOUCH POINT.

ADDRESS	BIT ADDRESS	REGISTER NAME	DESCRIPTION
04h ~ 1Ch	7:0	TOUCH X POSITION [7:0]	LSB OF THE TOUCH X POSITION IN PIXELS

TOUCHn_YH (n:1-5)
THIS REGISTER DESCRIBES MSB OF THE Y COORDINATE OF THE NTH TOUCH POINT AND CORRESPONDING TOUCH ID.

ADDRESS	BIT ADDRESS	REGISTER NAME	DESCRIPTION
05h ~ 1Dh	7:4	TOUCH ID [3:0]	TOUCH ID OF TOUCH POINT
	3:0	TOUCH X POSITION [11:8]	MSB OF TOUCH Y POSITION IN PIXELS

TOUCHn_YL (n:1-5)
THIS REGISTER DESCRIBES LSB OF THE Y COORDINATE OF THE NTH TOUCH POINT.
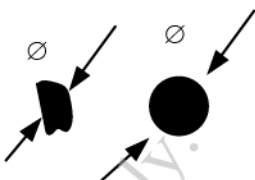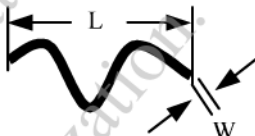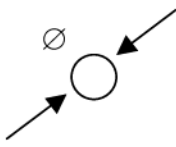
ADDRESS	BIT ADDRESS	REGISTER NAME	DESCRIPTION
06h ~ 1Eh	7:0	TOUCH X POSITION [7:0]	LSB OF THE TOUCH Y POSITION IN PIXELS

ID_G_ FIRMWARE_ID
THIS REGISTER DESCRIBES THE FIRMWARE ID OF THE APPLICATION

ADDRESS	BIT ADDRESS	REGISTER NAME	DESCRIPTION
A6h	7:0	ID_G_FIRMWARE_ID	FIRMWARE VERSION

02101300-01-02

12.4 INSPECTION STANDARDS

INSPECTION ITEMS	CRITERIA	REMARK
BLACK/WHITE SPOT	THE FOLLOWING BLACK/WHITE SPOT ARE WITHIN THE VIEWING AREA. AVERAGE DIAMETER：D (mm) | SIZE D	PERMISSIBLE NO. | |---|---|
D≤0.1mm	IGNORE
0.1mm<D≤0.3mm	5
0.3mm<D≤0.5mm	5
D>0.5 mm	0 | NOTE (1) : THE DISTANCE BETWEEN DOT DEFECTS SHOULD BE MORE THAN 10mm APART.	
SCRATCH	THE FOLLOWING BLACK LINE, WHITE LINE IS WITHIN THE VIEWING AREA. WIDTH：W (mm) , LENGH : L (mm) | SIZE W & L	PERMISSIBLE NO. | |---|---|
W≤0.05mm	IGNORE
0.05mm<W≤0.07mm, L≤5mm	1
W>0.07mm	0		
LINEAR TYPE / FOREIGN FIBER	THE FOLLOWING BLACK LINE, WHITE LINE IS WITHIN THE VIEWING AREA. WIDTH：W (mm) , LENGH : L (mm) | SIZE W & L	PERMISSIBLE NO. | |---|---|
W≤0.05mm	IGNORE
0.05mm<W≤0.07mm, L≤5mm	1
W>0.07mm	0		
BUBBLE / DENT	BUBBLES WITHIN VIEWING AREA. AVERAGE DIAMETER：D (mm) | SIZE D	PERMISSIBLE NO. | |---|---|
D≤0.2mm	IGNORE
0.2mm<D≤0.3mm	3
0.3mm<D≤0.5mm	1
D>0.5mm	0 | NOTE (1) : THE DISTANCE BETWEEN DOT DEFECTS SHOULD BE MORE THAN 10mm APART.	
CHIP DAMAGE ON GLASS		CORNER	$X \le 3mm$ 、$Y \le 3mm$、$Z \le t$ (t : THICKNESS) | |---|---|
EDGE	$X \le 6mm$, $Y \le 1mm$, $Z \le t$ (t : THICKNESS)	Chip of glass

NOTE:
1. FOR ANY SPOTS OR LINES, WHICH ARE NOT OBSERVED UNDER APPROPRIATE PANEL OPERATING CONDITION ARE DEEMED ACCEPTABLE.
2. THE FOREIGN MATERIALS THAT CAN BE BLOWN OUT BY AIR AND REMOVED BY WET CLEANING ARE NOT REGARDED AS DEFECTS.

02101300-01-02

13. INSPECTION CRITERION

13.1 APPLICATION

THIS INSPECTION STANDARD IS TO BE APPLIED TO THE LCD MODULE DELIVERED FROM EMERGING DISPLAY TECHNOLOGIES CORP.(E.D.T) TO CUSTOMERS
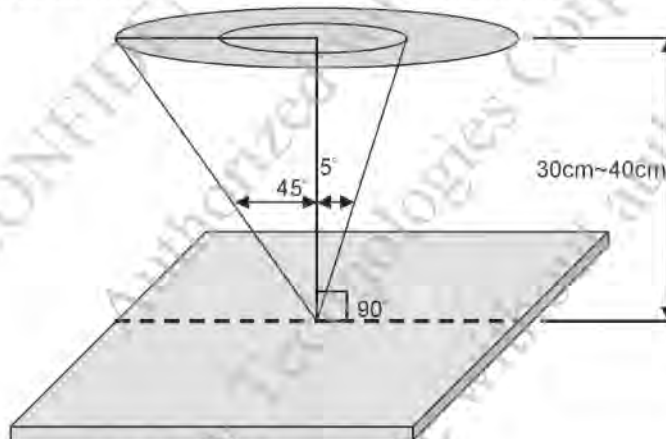
13.2 INSPECTION CONDITIONS

13.2.1 (1)OBSERVATION DISTANCE：35±5cm
(2)VIEW ANGLE：
NON-OPERATION CONDITION： ±5°
(PERPENDICULAR TO LCD PANEL SURFACE)
OPERATION CONDITION：±45°
(PERPENDICULAR TO LCD PANEL SURFACE)

13.2.2 ENVIRONMENT CONDITIONS：

AMBIENT TEMPERATURE		25±5°C
AMBIENT HUMIDITY		65±20%RH
AMBIENT ILLUMINATION	COSMETIC INSPECTION	MORE THAN 600Lux
	FUNCTIONAL INSPECTION	300~500 Lux

13.2.3 INSPECTION LOT
QUANTITY PER DELIVERY LOT FOR EACH MODEL

13.2.4 INSPECTION METHOD
A SAMPLING INSPECTION SHALL BE MADE ACCORDING TO THE FOLLOWING PROVISIONS TO JUDGE THE ACCEPTABILITY
(a)APPLICABLE STANDARD：MIL-STD-105E
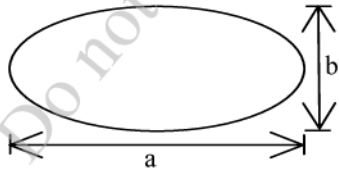NORMAL INSPECTION, SINGLE SAMPLING
LEVEL Ⅱ
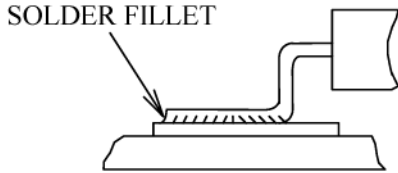(b)AQL : MAJOR DEFECT：AQL 0.65
MINOR DEFECT：AQL 1.0
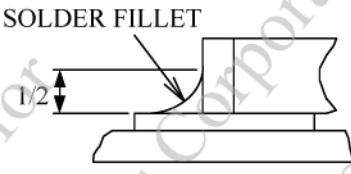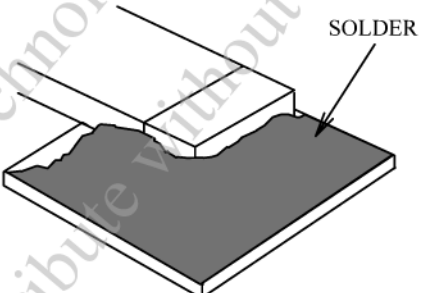
13.3 INSPECTION STANDARDS
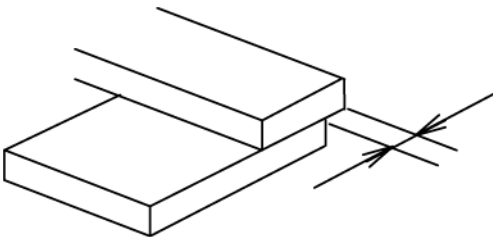
13.3.1 VISUAL DEFECTS CLASSIFICATION
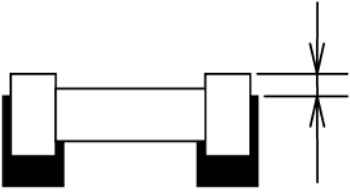
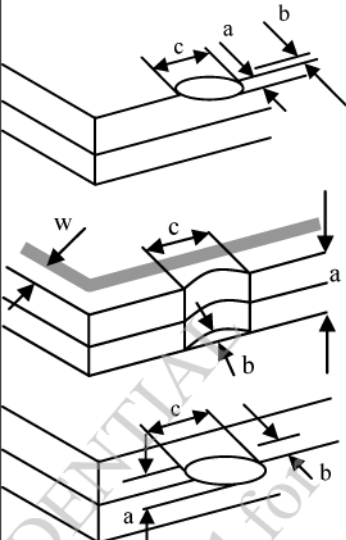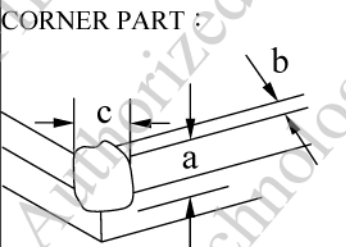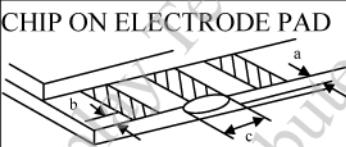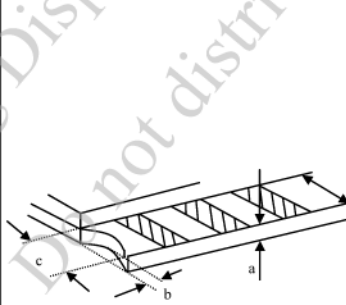| TYPE OF DEFECT	INSPECTION ITEM	DEFECT FEATURE	AQL
MAJOR DEFECT	1.DISPLAY ON	• DEFECT TO MISS SPECIFIED DISPLAY FUNCTION, FOR ALL AND SPECIFIED DOTS EX: DISCONNECTION, SHORT CIRCUIT ETC	0.65
	2.BACKLIGHT	• NO LIGHT • FLICKERING AND OTHER ABNORMAL ILLUMINATION	
	3.DIMENSIONS	• SUBJECT TO INDIVIDUAL ACCEPTANCE SPECIFICATIONS	
MINOR DEFECT	1.DISPLAY ZONE	• BLACK/WHITE SPOT • BUBBLES ON POLARIZER • NEWTON RING • BLACK/WHITE LINE • SCRATCH • CONTAMINATION • LEVER COLOR SPREED	1.0
	2.BEZEL ZONE	• STAINS • SCRATCHES • FOREIGN MATTER	
	3.SOLDERING	• INSUFFICIENT SOLDER • SOLDERED IN INCORRECT POSITION • CONVEX SOLDERING SPOT • SOLDER BALLS • SOLDER SCRAPS	
	4.DISPLAY ON (ALL ON)	• LIGHT LINE	

13.3.2 MODULE DEFECTS CLASSIFICATION

NO.	ITEM	CRITERIA
1	DISPLAY ON INSPECTION	(1)INCORRECT PATTERN (2)MISSING SEGMENT (3)DIM SEGMENT (4)OPERATING VOLTAGE BEYOND SPEC
2	OVERALL DIMENSIONS	(1)OVERALL DIMENSION BEYOND SPEC
3	DOT DEFECT	(1)INSPECTION PATTERN: FULL WHITE, FULL BLACK, RED, GREEN AND BLUE SCREENS. (2) ITEMS / ACCEPTABLE COUNT: BRIGHT DOT — $N \le 4$ DARK DOT — $N \le 5$ TOTAL BRIGHT AND DARK DOTS — $N \le 5$ NOTE : 1. THE DEFINITION OF DOT : THE SIZE OF A DEFECTIVE DOT OVER 1/2 OF WHOLE DOT IS REGARDED AS ONE DEFECTIVE DOT. 2. BRIGHT DOT : DOTS APPEAR BRIGHT AND UNCHANGED IN SIZE IN WHICH LCD PANEL IS DISPLAYING UNDER BLACK PATTERN. 3. DARK DOT : DOTS APPEAR DARK AND UNCHANGED IN SIZE IN WHICH LCD PANEL IS DISPLAYING UNDER PURE RED, GREEN, BLUE PICTURE.
4	FOREIGN BLACK/WHITE/ BRIGHT LINE/ SCRATCH OF VIEWING AREA	LENGTH : L / WIDTH : W / PERMISSIBLE NO.: $L \le 0.3$ / $W \le 0.05$ / IGNORE $0.3 < L \le 2.5$ / $0.05 < W \le 0.1$ / 4 $2.5 < L$ / $0.1 < W$ / NONE WIDTH：W mm, LENGH：L mm
5	FOREIGN MATTER \ BLACK SPOTS \ WHITE SPOTS \ DENT (INCLUDING LIGHT LEAKAGE DUE TO POLARIZING PLATES PINHOLES, ETC.)	AVERAGE DIAMETER (mm): D / NUMBER OF PIECES PERMITTED: $D \le 0.15$ / IGNORE $0.15 < D \le 0.5$ / 4 $0.5 < D$ / NONE NOTE ：DIAMETER $D=(a+b)/2$

NO.	ITEM	CRITERIA		
6	BUBBLES OF POLARIZER /DIRT/CF FAIL /SURFACE STAINS		AVERAGE DIAMETER (mm)：D	NUMBER OF PIECES PERMITTED
		BUBBLE ON THE POLARIZER	D ≤ 0.25	IGNORE
			0.25 < D ≤ 0.5	N ≤ 5
			0.5 < D	NONE
		SURFACE STAINS	D < 0.1	IGNORE
			0.1 < D ≤ 0.3	N ≤ 3
		CF FAIL / SPOT	D < 0.1	IGNORE
			0.1 < D ≤ 0.3	N ≤ 3

NOTE : (1)POLARIZER BUBBLE IS DEFINED AS THE BUBBLE APPEARS ON ACTIVE DISPLAY AREA. THE DEFECT OF POLARIZER BUBBLE SHALL BE IGNORED IF THE POLARIZER BUBBLE APPEARS ON THE OUTSIDE OF ACTIVE DISPLAY AREA.
(2)THE EXTRANEOUS SUBSTANCE IS DEFINED AS IT CAN BE OBSERVED WHEN THE MODULE IS POWER ON.
(3)THE DEFINITION OF AVERAGE DIAMETER, D IS DEFINED AS FOLLOWING.
AVERAGE DIAMETER (D)=(a+b)/2

NO.	ITEM	CRITERIA
7	LINE DEFECT ON DISPLAY	OBVIOUS VERTICAL OR HORIZONTAL LINE DEFECT IS NOT ALLOWED
8	MURA ON DISPLAY	IT'S OK IF MURA IS SLIGHT VISIBLE THROUGH 6% ND FILTER
9	UNEVEN COLOR SPREAD, COLORATION	(1)TO BE DETERMINED BASED UPON THE STANDARD SAMPLE.
10	BEZEL APPEARANCE	(1)BEZEL MAY NOT HAVE RUST, BE DEFORMED OR HAVE FINGER PRINTS STAINS OF OTHER CONTAMINATION. (2)BEZEL MUST COMPLY WITH JOB SPECIFICATIONS.
11	PCB	(1)THERE MAY NOT BE MORE THAN 2mm OF SEALANT OUTSIDE THE SEAL AREA ON THE PCB, AND THERE SHOULD BE NO MORE THAN THREE PLACES. (2)NO OXIDATION OR CONTAMINATION PCB TERMINALS. (3)PARTS ON PCB MUST BE THE SAME AS ON THE PRODUCTION CHARACTERISTIC CHART. THERE SHOULD BE NO WRONG PARTS, MISSING PARTS OR EXCESS PARTS. (4)THE JUMPER ON THE PCB SHOULD CONFORM TO THE PRODUCT CHARACTERISTIC CHART. (5)IF SOLDER GETS ON BEZEL TAB PADS, LED PAD, ZEBRA PAD OR SCREW HOLD PAD; MAKE SURE IT IS SMOOTHED DOWN.

02101300-01-02

NO.	ITEM	CRITERIA

12	SOLDERING	(1)NO SOLDERING FOUND ON THE SPECIFIED PLACE
		(2)INSUFFICENT SOLDER
		  (a)LSI, IC
		    A POOR WETTING OF SOLDER IS BETWEEN LOWER BEND OR
		    "HEEL" OF LEAD AND PAD
		
		SOLDER FILLET
		
		  (b)CHIP COMPONENT
		    · SOLDER IS LESS THAN 50% OF SIDES AND FRONT FACE
		    WETTING
		
		SOLDER FILLET
		1/2
		
		    · SOLDER WETS 3 SIDES OF TERMINAL, BUT LESS THAN 25% OF
		    SIDES AND FRONT SURFACE AREA ARE COVERED
		
		SOLDER
		
		(3)PARTS ALIGMENT
		  (a)LSI, IC
		    LEAD WIDTH IS MORE THAN 50% BEYOND PAD OUTLINE

02101300-01-02

E M E R G I N G   D I S P L A Y

TECHNOLOGIES CORPORATION

MODEL NO .

ETM0700G0EDH6

VERSION

3

PAGE

26

NO.	ITEM	CRITERIA
12	SOLDERING	(b)CHIP COMPONENT 　COMPONENT IS OFF CENTER, AND MORE THAN 50% OF THE LEADS IS OFF THE PAD OUTLINE (4)NO UNMELTED SOLDER PASTE MAY BE PRESENT ON THE PCB. (5)NO COLD SOLDER JOINTS, MISSING SOLDER CONNECTIONS, OXIDATION OR ICICLE. (6)NO RESIDUE OR SOLDER BALLS ON PCB. (7)NO SHORT CIRCUITS IN COMPONENTS ON PCB.
13	BACKLIGHT	(1)NO LIGHT (2)FLICKERING AND OTHER ABNORMAL ILLUMINATION (3)SPOTS OR SCRATCHES THAT APPEAR WHEN LIT MUST BE JUDGED USING LCD SPOT, LINES AND CONTAMINATION STANDARDS. (4)BACKLIGHT DOESN'T LIGHT OR COLOR IS WRONG.
14	GENERAL APPEARANCE	(1)NO OXIDATION, CONTAMINATION, CURVES OR, BENDS ON INTERFACE PIN (OLB) OF TCP. (2)NO CRACKS ON INTERFACE PIN (OLB) OF TCP. (3)NO CONTAMINATION, SOLDER RESIDUE OR SOLDER BALLS ON PRODUCT. (4)THE IC ON THE TCP MAY NOT BE DAMAGED, CIRCUITS. (5)THE UPPERMOST EDGE OF THE PROTECTIVE STRIP ON THE INTERFACE PIN MUST BE PRESENT OR LOOK AS IF IT CAUSE THE INTERFACE PIN TO SEVER. (6)THE RESIDUAL ROSIN OR TIN OIL OF SOLDERING (COMPONENT OR CHIP COMPONENT) IS NOT BURNED INTO BROWN OR BLACK COLOR. (7)SEALANT ON TOP OF THE ITO CIRCUIT HAS NOT HARDENED. (8)PIN TYPE MUST MATCH TYPE IN SPECIFICATION SHEET. (9)LCD PIN LOOSE OR MISSING PINS. (10)PRODUCT PACKAGING MUST THE SAME AS SPECIFIED ON PACKAGING SPECIFICATION SHEET. (11)PRODUCT DIMENSION AND STRUCTURE MUST CONFORM TO PRODUCT SPECIFICATION SHEET. (12)THE APPEARANCE OF HEAT SEAL SHOULD NOT ADMIT ANY DIRT AND BREAK.

NO.	ITEM	CRITERIA
15	CRACKED GLASS	(see below)

THE LCD WITH EXTENSIVE CRACK IS NOT ACCEPTABLE

GENERAL GLASS CHIP :

a	b	c
≤ t/2	< VIEWING AREA	≤ 1/8X
t/2 > , ≤ 2t	≤ W/2	≤ 1/8X

*W=DISTANCE BETWEEN
   SEALANT AREA AND LCD
   PANEL EDGE
 X = LCD SIDE LENGTH
 t = GLASS THICKNESS

CORNER PART :

a	b	c
≤ t/2	< VIEWING AREA	≤ 1/8X
> t/2 , ≤ 2t	≤ W/2	≤ 1/8X

*W=DISTANCE BETWEEN
   SEALANT AREA AND LCD
   PANEL EDGE
 X = LCD SIDE LENGTH
 t = GLASS THICKNESS

CHIP ON ELECTRODE PAD

a	b	c
≤ t	≤ 0.5mm	≤ 1/8X

* X=LCD SIDE WIDTH
 t =GLASS THICKNESS

a	b	c
≤ t	≤ 1/8X	≤ L

*X=LCD SIDE WIDTH
 t = GLASS THICKNESS
 L=ELECTRODE PAD LENGTH
①IF GLASS CHIPPING THE ITO
  TERMINAL,
  OVER 2/3 OF THE ITO MUST REMAIN
  AND BE, INSPECTED ACCORDING TO
  ELECTRODE TERMINAL
  SPECIFICATIONS
②IF THE PRODUCT WILL BE HEAT
  SEALED BY THE CUSTOMER,
  THE ALIGNMENT MARK MUST NOT
  BE DEMAGED

13.4 RELIABILITY TEST

13.4.1 STANDARD SPECIFICATIONS FOR RELIABILITY OF LCD MODULE

NO.	ITEM	DESCRIPTION
1	HIGH TEMPERATURE OPERATION	THE SAMPLE SHOULD BE ALLOWED TO STAND AT +70°C FOR 240 HRS
2	LOW TEMPERATURE OPERATION	THE SAMPLE SHOULD BE ALLOWED TO STAND AT -20°C FOR 240 HRS
3	HIGH TEMPERATURE STORAGE	THE SAMPLE SHOULD BE ALLOWED TO STAND AT +80°C FOR 240 HRS
4	LOW TEMPERATURE STORAGE	THE SAMPLE SHOULD BE ALLOWED TO STAND AT -30°C FOR 240 HRS
5	HIGH TEMPERATURE /HUMIDITY TEST STORAGE	THE SAMPLE SHOULD BE ALLOWED TO STAND AT 60°C, 90% RH 240 HRS
6	THERMAL SHOCK (NOT OPERATED)	THE SAMPLE SHOULD BE ALLOWED TO STAND THE FOLLOWING 10 CYCLES OF OPERATION: +80°C -30°C ... -30°C 30 min / 3 min / 30 min / 3 min 1CYCLE
7	ESD (ELECTROSTATIC DISCHARGE) (NOT OPERATED)	AIR DISCHARGE ± 12KV CONTACT DISCHARGE ± 8KV (ACCORDING TO IEC-61000-4-2)

NOTE (1) : THE TEST SAMPLES HAVE RECOVERY TIME FOR 2 HOURS AT ROOM TEMPERATURE BEFORE THE FUNCTION CHECK. IN THE STANDARD CONDITIONS, THERE IS NO DISPLAY FUNCTION NG ISSUE OCCURRED.

13.5 TESTING CONDITIONS AND INSPECTION CRITERIA

FOR THE FINAL TEST THE TESTING SAMPLE MUST BE STORED AT ROOM TEMPERATURE FOR 24 HOURS, AFTER THE TESTS LISTED IN TABLE 13.5, STANDARD SPECIFICATIONS FOR RELIABILITY HAVE BEEN EXECUTED IN ORDER TO ENSURE STABILITY.

NO.	ITEM	TEST MODEL	INSPECTION CRITERIA
1	CURRENT CONSUMPTION	REFER TO SPECIFICATION	THE CURRENT CONSUMPTION SHOULD CONFORM TO THE PRODUCT SPECIFICATION.
2	CONTRAST	REFER TO SPECIFICATION	AFTER THE TESTS HAVE BEEN EXECUTED, THE CONTRAST MUST BE LARGER THAN HALF OF ITS INITIAL VALUE PRIOR TO THE TESTS.
3	APPEARANCE	VISUAL INSPECTION	DEFECT FREE

13.6 OPERATION

13.6.1 DO NOT CONNECT OR DISCONNECT MODULES TO OR FROM THE
MAIN SYSTEM WHILE POWER IS BEING SUPPLIED .

13.6.2 USE THE MODULE WITHIN SPECIFIED TEMPERATURE ; LOWER
TEMPERATURE CAUSES THE RETARDATION OF BLINKING SPEED OF
THE DISPLAY ; HIGHER TEMPERATURE MAKES OVERALL DISPLAY
DISCOLOR . WHEN THE TEMPERATURE RETURNS TO NORMALITY,
THE DISPLAY WILL OPERATE NORMALLY.

13.6.3 ADJUST THE LC DRIVING VOLTAGE TO OBTAIN THE OPTIMUM
CONTRAST .

13.6.4 POWER ON SEQUENCE INPUT SIGNALS SHOULD NOT BE SUPPLIED
TO LCD MODULE BEFORE POWER SUPPLY VOLTAGE IS APPLIED AND
REACHES THE SPECIFIED VALUE.
IF ABOVE SEQUENCE IS NOT FOLLOWED , CMOS LSIS OF LCD
MODULES MAY BE DAMAGED DUE TO LATCH - UP PROBLEM.

13.6.5 NOT ALLOWED TO INFLICT ANY EXTERNAL STRESS AND TO CAUSE
ANY MECHANICAL INTERFERENCE ON THE BENDING AREA OF FPC
DURING THE TAIL BENDING BACKWARDS!
DO NOT STRESS FPC AND IC ON THE MODULE!
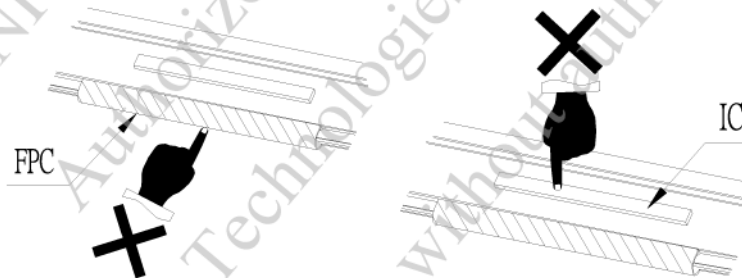
13.7 NOTICE

13.7.1 USE A GROUNDED SOLDERING IRON WHEN SOLDERING CONNECTOR I/O TERMINALS . FOR SOLDERING OR REPAIRING, TAKE PRECAUTION AGAINST THE TEMPERATURE OF THE SOLDERING IRON AND THE SOLDERING TIME TO PREVENT PEELING OFF THE THROUGH-HOLE-PAD .

13.7.2 DO NOT DISASSEMBLE . EDT SHALL NOT BE HELD RESPONSIBLE IF THE MODULE IS DISASSEMBLED AND UPON THE REASSEMBLY THE MODULE FAILED.

13.7.3 DO NOT CHARGE STATIC ELECTRICITY, AS THE CIRCUIT OF THIS MODULE CONTAINS CMOS LSIS. A WORKMAN'S BODY SHOULD ALWAYS BE STATIC-PROTECTED BY USE OF AN ESD STRAP. WORKING CLOTHES FOR SUCH PERSONNEL SHOULD BE OF STATIC-PROTECTED MATERIAL.

13.7.4 ALWAYS GROUND THE ELECTRICALLY-POWERED DRIVER BEFORE USING IT TO INSTALL THE LCD MODULE. WHILE CLEANING THE WORK STATION BY VACUUM CLEANER, DO NOT BRING THE SUCKING MOUTH NEAR THE MODULE ; STATIC ELECTRICITY OF THE ELECTRICALLY-POWERED DRIVER OR THE VACUUM CLEANER MAY DESTROY THE MODULE.

13.7.5 DON'T GIVE EXTERNAL SHOCK.

13.7.6 DON'T APPLY EXCESSIVE FORCE ON THE SURFACE.

13.7.7 LIQUID IN LCD IS HAZARDOUS SUBSTANCE. MUST NOT LICK AND SWALLOW.
WHEN THE LIQUID IS ATTACHED TO YOUR, SKIN, CLOTH ETC. WASH IT OUT THOROUGHLY AND IMMEDIATELY.

13.7.8 DON'T OPERATE IT ABOVE THE ABSOLUTE MAXIMUM RATING.

13.7.9 STORAGE IN A CLEAN ENVIRONMENT, FREE FROM DUST, ACTIVE GAS AND SOLVENT.

13.7.10 STORE WITHOUT ANY PHYSICAL LOAD.

13.7.11 REWIRING: NO MORE THAN 3 TIMES.