



Specification for TFT

AFI240240A0R-1.3INTM

Revision V0



A	Orient Display
FI	TFT Display
240240	Resolution 240 x 240
A0	Serial A0
R	Round
1.3	1.3", Module Dimension 35.60x38.10x1.57 mm
I	IPS Display
N	Top: -20~+70°C; Tstr: -30~+80°C
T	Transmissive
M	Medium Brightness, 500cd/m2
/	GC9A01 OR COMPATIBLE
/	MCU-8Bit / SPI Interface



RECORD OF REVISION

[illegible]

TABLE OF CONTENTS

List	Description	Page No.
	Cover	1
	Revision Record	2
	Table of Contents	3
1	Scope	4
2	General Information	4
3	External Dimensions	5
4	Interface Description	6
5	Absolute Maximum Ratings	7
6	Electrical Specifications	8
7	Timing Characteristics	9-11
8	Backlight Characteristics	12
9	Optical Characteristics	13-15
10	Reliability Test Conditions and Methods	16
11	Inspection Standard	17-21
12	Handling Precautions	22-23
13	Precaution for Use	24

1. Scope

This specification defines general provisions as well as inspection standards for TFT module supplied by ODNA

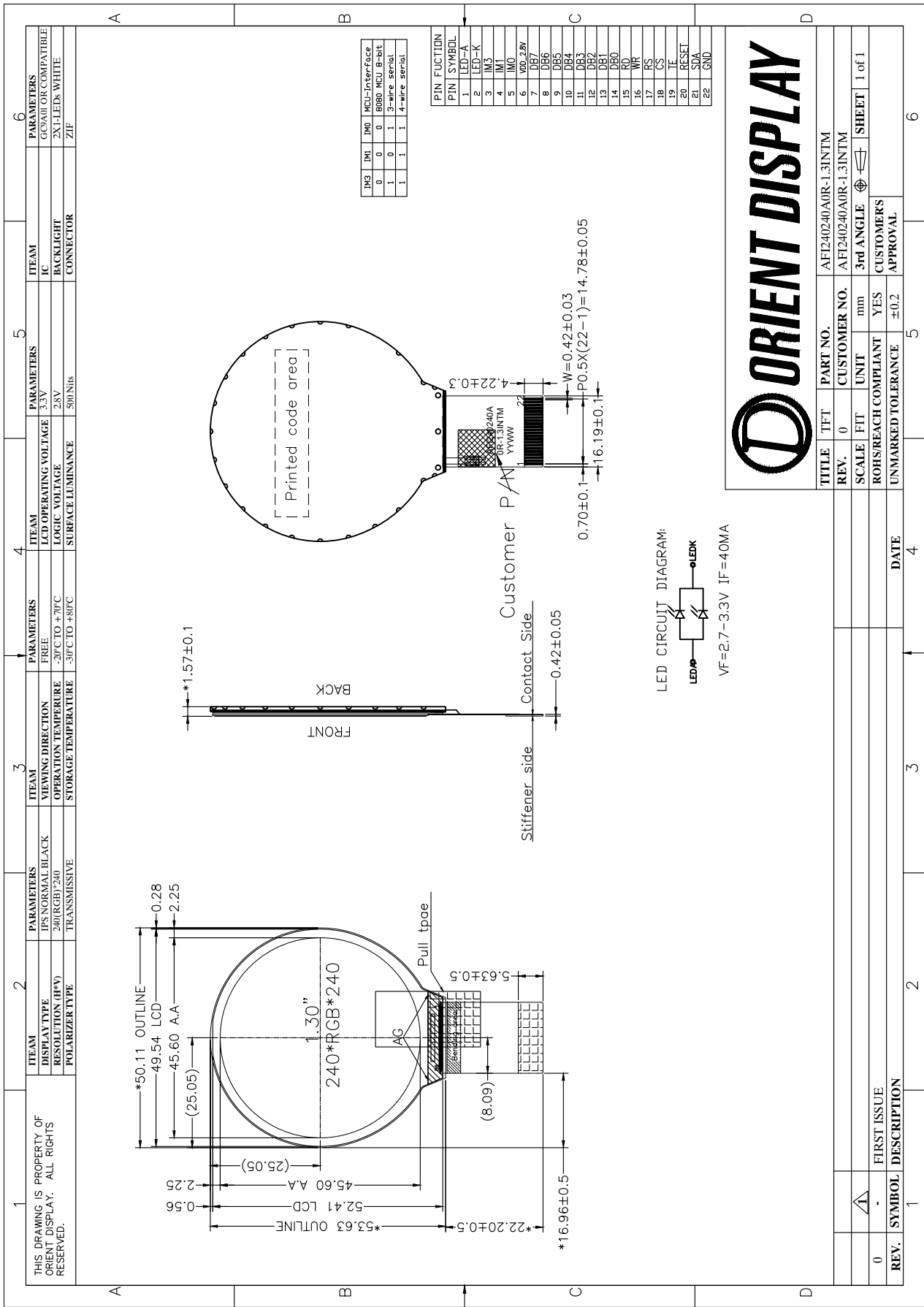
If the event of unforeseen problem or unspecified items may occur, naturally shall negotiate and agree to solution.

2. General Specifications

2.1 LCD Parameter

Item	Contents	Unit	Note
LCD Type	IPS	-	
Display color	262K		
Viewing Direction	ALL	O'clock	
Operating temperature	-20~+70	°C	
Storage temperature	-30~+80	°C	
Module size	1.3	inch	
Active Area(W×H)	32.40*32.40	mm	
Number of Dots	240*RGB*240	dots	
Controller	GC9A01	-	
Power Supply Voltage	2.8	V	
Outline Dimensions	35.60x38.10x1.57	mm	
Backlight	2X1-LEDs (white)	pcs	
Weight	---	g	
Interface	MCU-8Bit / SPI	-	

3.Outline Drawing



4.Interface Description

Pin No.	Symbol	I/O	Function			
1	LED-A	P	LED back light(Anode)			
2	LED-K	P	LED back light(Cathode)			
3	IM3	I	IM3	IM1	IM0	MCU-Interface
			0	0	0	8080 MCU 8-bit
4	IM1	I	1	0	1	3-wire serial
5	IM0	I	1	1	1	4-wire serial
6	VDD_2.8V	P	Power Supply for logic			
7-14	DB7-DB0	I	Data input.Fix to VSSR level when not in use.			
15	RD	I	Read enable in MCU parallel interface.Fix to IOVCC level when not in use.			
16	WR	I	Write enable in MCU parallel interface. 4-line (D/CX): Serves as command or parameter select.			
17	RS	I	MCU : Data/Command select pin. H: Data; L: Command. SPI : Serial interface clock.			
18	CS	I	Chip select input pin.			
19	TE	O	Frame head pulse signal			
20	RESET	I	Reset signal,Signal is active low			
21	SDA	I/O	Serial Data input/output pin,If not used, fix this pin at IOVCC or VSSR.			
22	GND	P	Ground			

5. Absolute Maximum Ratings($T_a=25^{\circ}\text{C}$)

5.1 Electrical Absolute Maximum Ratings.($V_{SS}=0\text{V}$, $T_a=25^{\circ}\text{C}$)

Item	Symbol	Min.	Max.	Unit	Note
Power Supply Voltage	VDD	-0.3	4.6	V	1, 2

Notes:

1. If the module is above these absolute maximum ratings. It may become permanently damaged. Using the module within the following electrical characteristic conditions are also exceeded, the module will malfunction and cause poor reliability.
2. $V_{DD} > V_{SS}$ must be maintained.

5.2 Environmental Absolute Maximum Ratings.

Item	Storage		Operating		Note
	MIN.	MAX.	MIN.	MAX.	
Ambient Temperature	-30°C	80°C	-20°C	70°C	1,2
Humidity	-	-	-	-	3

1. The response time will become lower when operated at low temperature.
2. Background color changes slightly depending on ambient temperature.

The phenomenon is reversible.

3. $T_a \leq 40^{\circ}\text{C}$:85%RH MAX.

$T_a > 40^{\circ}\text{C}$:Absolute humidity must be lower than the humidity of 85%RH at 40°C .

6. Electrical Specifications and Instruction Code

6.1 Electrical characteristics(V_{ss}=0V ,Ta=25°C)

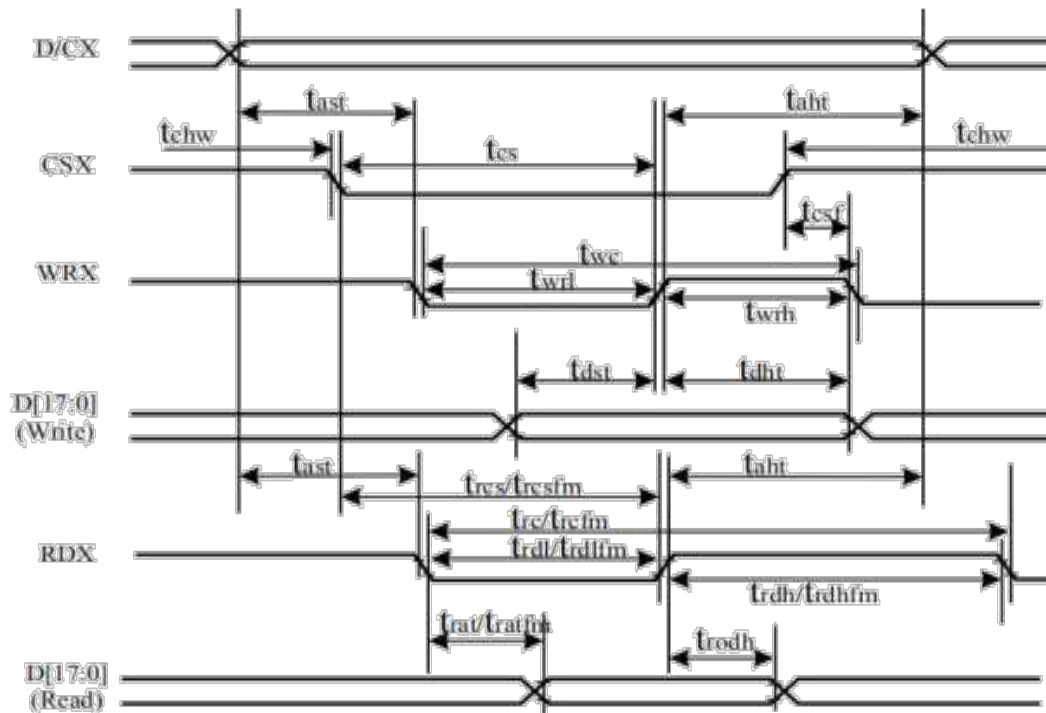
Parameter		Symbol	Condition	Min	Typ	Max	Unit	Note
Power supply		VDD	Ta=25°C	2.5	2.8	3.3	V	
Input voltage	‘H’	V _{IH}	VDD=3.3V	0.7*VDD	-	VDD	V	
	‘L’	V _{IL}	VDD=3.3V	0	-	0.3*VDD	V	

7. Timing Characteristics

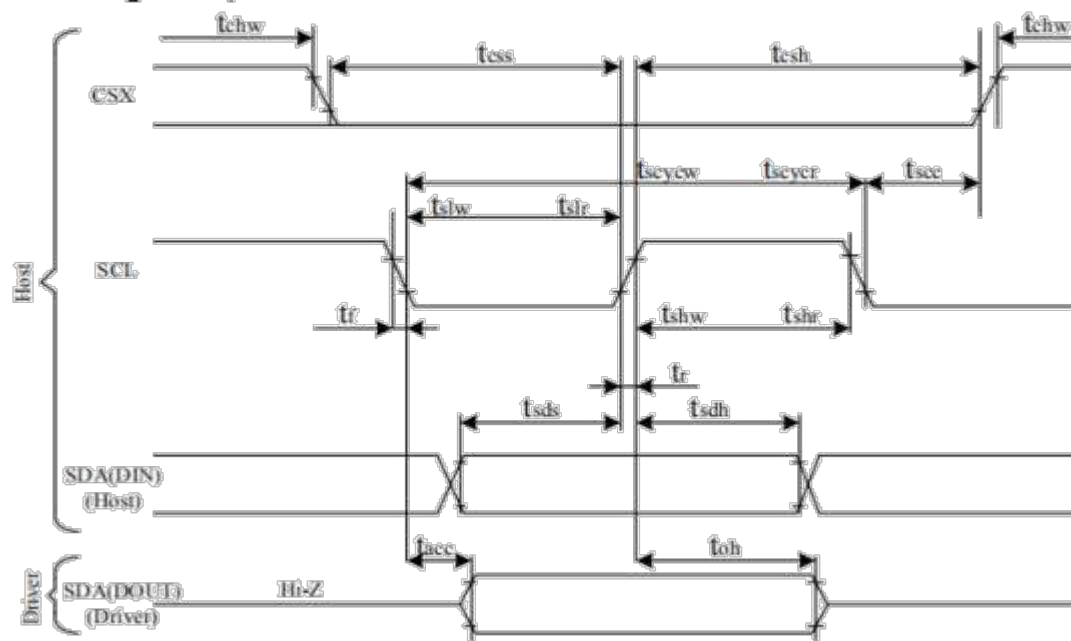
7.1 Input Timing Chart

Parallel Interface Characteristics: 8-bit Bus (8080 Series MCU Interface)

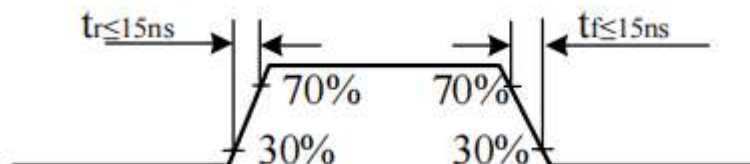
Signal	Symbol	Parameter	min	max	Unit	Description
DCX	tast	Address setup time	0	∞	ns	
	taht	Address hold time(Write/Read)	0	∞	ns	
CSX	tch _w	CSX "H" pulse width	0	∞	ns	
	tcs	Chip Select setup time(Write)	15	∞	ns	
	trcs	Chip Select setup time(Read/ID)	45	∞	ns	
	trcsfm	Chip Select setup time(Read/EM)	355	∞	ns	
	tcsf	Chip Select Wait time (Write/Read)	10	∞	ns	
WRX	twe	Write Cycle	66	∞	ns	
	twrh	Write Control pulse H duration	15	∞	ns	
	twr _l	Write Control pulse L duration	15	∞	ns	
RDX(FM)	trcfm	Read Cycle (FM)	380	∞	ns	
	trdh _{fm}	Read Control H duration(FM)	180	∞	ns	
	trdl _{fm}	Read Control L duration(FM)	200	∞	ns	
RDX(ID)	trc	Read Cycle (ID)	160	∞	ns	
	trdh	Read Control pulse H duration	90	∞	ns	
	trdl	Read Control pulse L duration	70	∞	ns	
D[17:0], D[17:10]	tdst	Write data setup time	10	∞	ns	For maximum CL=30pF For minimum CL=8pF
&D[8:1], D[17:10]	tdht	Write data hold time	10	∞	ns	
D[17:10]	trat	Read access time	∞	40	ns	
D[17:9]	tra _{fm}	Read access time	∞	340	ns	
	trod	Read output disable time	20	80	ns	



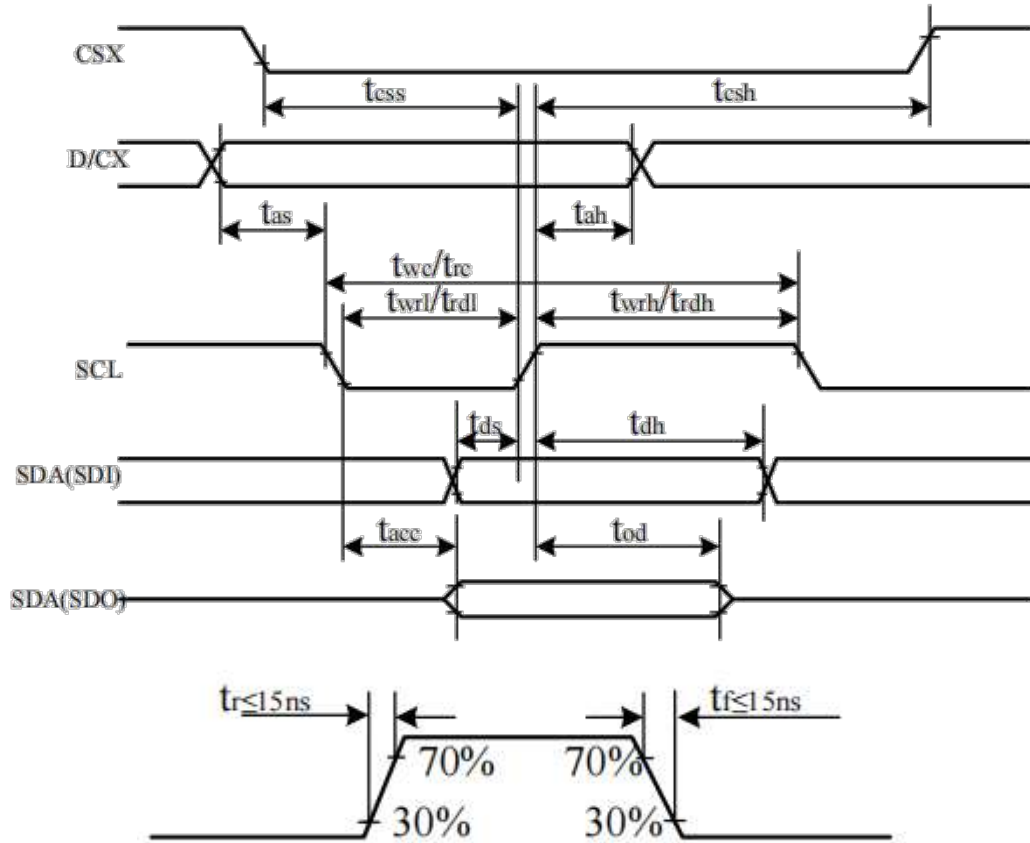
7.2 Serial Interface Characteristics (3-line Serial)



Signal	Symbol	Parameter	min	max	Unit	Description
SCL	tscyew	Serial Clock Cycle (Write)	10	-	ns	
	tshw	SCL "H" Pulse Width (Write)	5	-	ns	
	tslw	SCL "L" Pulse Width (Write)	5	-	ns	
	tseyer	Serial Clock Cycle (Read)	150	-	ns	
	tshr	SCL "H" Pulse Width (Read)	60	-	ns	
	tslr	SCL "L" Pulse Width (Read)	60	-	ns	
SDA/SDI (Input)	tsds	Data setup time (Write)	5	-	ns	
	tsdh	Data hold time (Write)	5	-	ns	
SDA/SDO(Outp)	tace	Access time (Read)	10	-	ns	
CSX	tsce	SCL-CSX	10	-	ns	
	tchwh	CSX "H" Pulse Width	10	-	ns	
	tcss	CSX-SCL Time	20	-	ns	
	tesh		40	-	ns	

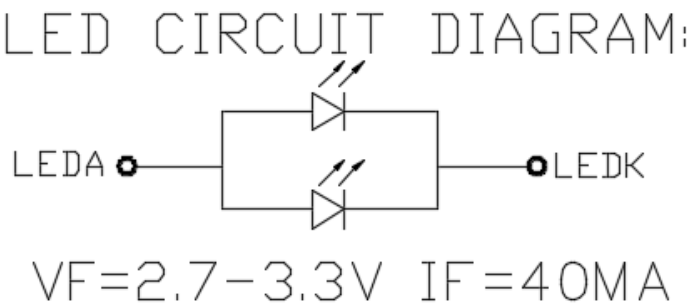


7.3 Serial Interface Characteristics (4-line Serial)



Signal	Symbol	Parameter	min	max	Unit	Description
CSX	t_{css}	Chip select time (Write)	20	-	ns	
	t_{csh}	Chip select hold time (Read)	40	-	ns	
SCL	t_{wc}	Serial Clock Cycle (Write)	10	-	ns	
	t_{wrh}	SCL "H" Pulse Width (Write)	5	-	ns	
	t_{wrl}	SCL "L" Pulse Width (Write)	5	-	ns	
	t_{rc}	Serial Clock Cycle (Read)	150	-	ns	
	t_{rdh}	SCL "H" Pulse Width (Read)	60	-	ns	
	t_{rdl}	SCL "L" Pulse Width (Read)	60	-	ns	
D/CX	t_{as}	D/CX setup time	10	-	ns	
	t_{ah}	D/CX hold time (Write/Read)	10	-	ns	
SDA/SDI (Input)	t_{ds}	Data setup time (Write)	5	-	ns	
	t_{dh}	Data hold time (Write)	5	-	ns	
SDA/SDO (Output)	t_{acc}	Access time (Read)	10	-	ns	

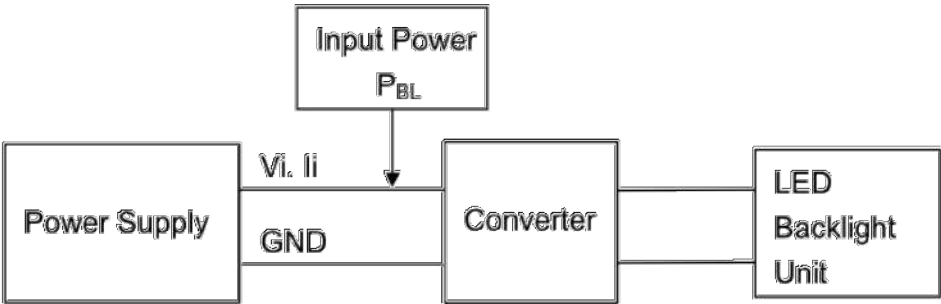
8.0 Backlight Characteristic



Item	Symbol	Min	Typ	Max	Unit	Test Condition
Supply Voltage	Vf	2.7	3.0	3.3	V	Note 1
Supply Current	If	-	40	-	mA	Note 2
Power dissipation	P _{BL}	-	0.12	-	W	
Life Time	-	-	30K	-	Hr	Note 3,4
Backlight Color	White					

Note 1: The LED Supply Voltage is defined by the number of LED at Ta=25°C and If =40mA.

Note 2: LED current is measured by utilizing a high frequency current meter as shown below:



Note 3: The “LED life time” is defined as the module brightness decrease to 50% original brightness at Ta=25°C and If =40mA. The LED lifetime could be decreased if operating If is larger than 40mA.

Note 4: LED light bar circuit:

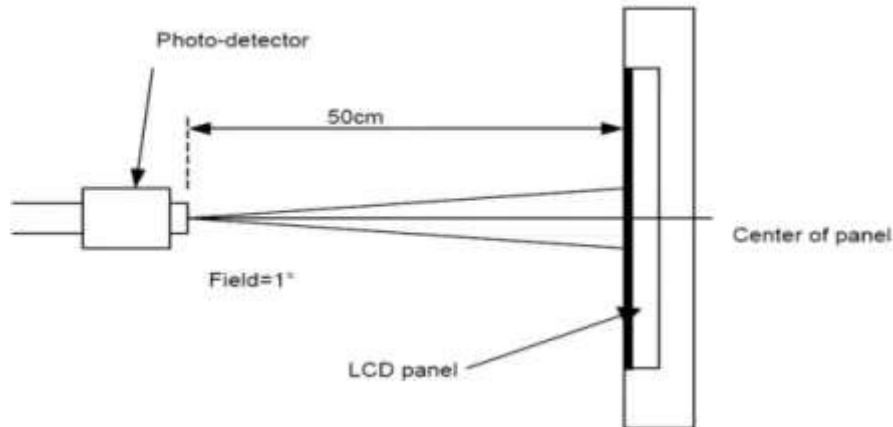
9. Optical Characteristics

Item	Symbol		Condition	Min.	Typ.	Max.	Unit	Note
Brightness	Bp		If=40mA	400	500	-	Cd/m²	1
Uniformity	ΔBp			-	80	-	%	1,2
Viewing Angle	3:00		Cr≥10	-	80	-	Deg	1,2
	6:00			-	80	-		
	9:00			-	80	-		
	12:00			-	80	-		
Contrast Ratio	Cr		θ=0°	900	1000	-	-	3,4
Response Time	T _r +T _f		Φ=0°	-	30	35	ms	4,5
Color of CIE Coordinate	W	x	θ=0° Φ=0°	Typ -0.05	0.2979	Typ +0.05	-	1,6
		y			0.3051		-	
	R	x			0.6354		-	
		y			0.3345		-	
	G	x			0.3887		-	
		y			0.5670		-	
	B	x			0.1340		-	
		y			0.0870		-	
NTSC Ratio	S			55	60	-	%	

*The parameter is slightly changed by temperature, driving voltage and materiel

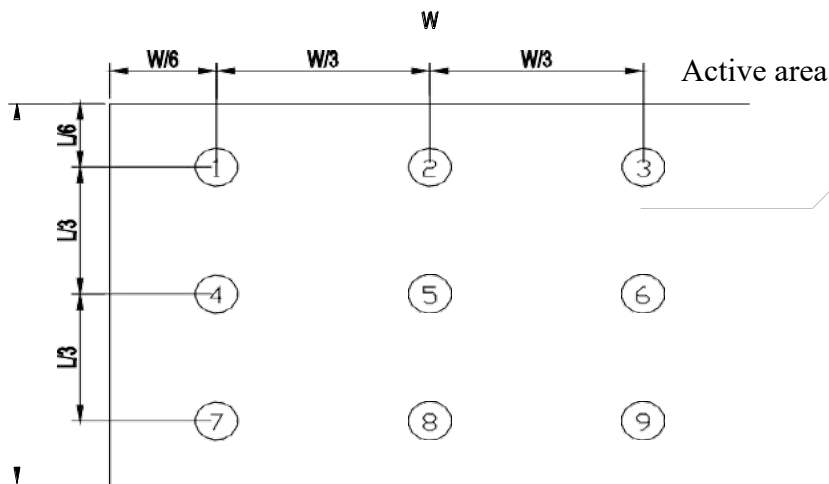
Note 1: The data are measured after LEDs are turned on for 5 minutes. LCM displays full white. The brightness is the average value of 9 measured spots. Measurement equipment CA310 Measuring condition:-Measuring surroundings: Dark room.-Measuring temperature: Ta=25°C.-Adjust operating voltage to get optimum contrast at the center of the display.

The measured value is more than 5 minutes at the center point of the LCD panel, and the backlight is turned on at the same time.

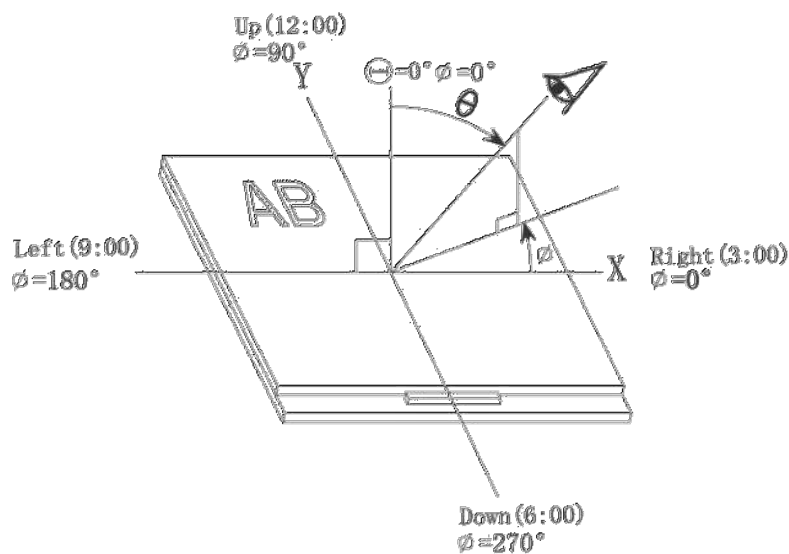


Note 2: The luminance uniformity is calculated by using following formula.

$\Delta Bp = Bp \text{ (Min.)} / Bp \text{ (Max.)} \times 100 \text{ (\%)}; Bp \text{ (Max.)} = \text{Maximum brightness in 9 measured spots}$
 $Bp \text{ (Min.)} = \text{Minimum brightness in 9 measured spots.}$



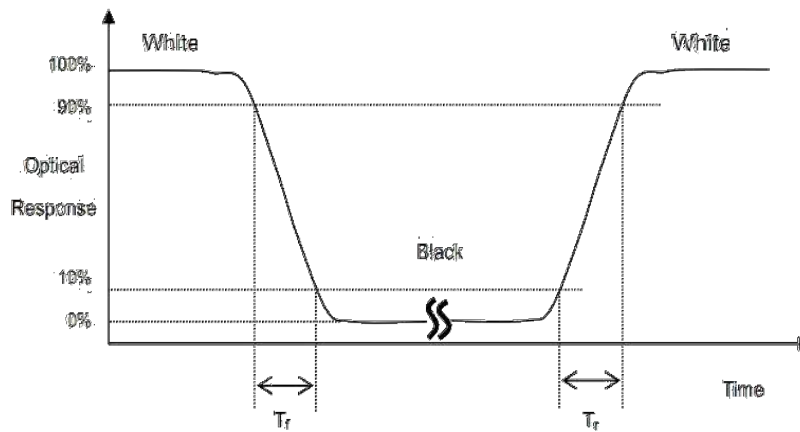
Note 3: The definition of viewing angle: Refer to the graph below marked by θ and Φ



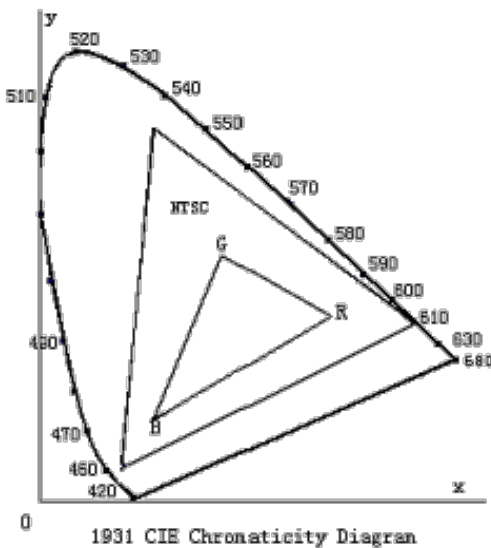
Note 4: Definition of contrast ratio Contrast measurements shall be made at viewing angle of $\Theta = 0$ and at the center of the LCD surface. Luminance shall be measured with all pixels in the view field set first to white, then to the dark (black) state.

$$CR = \frac{\text{Luminance when displaying a white raster}}{\text{Luminance when displaying a black raster}}$$

Note 5: Definition of Response time The output signals of photo detector are measured when the input signals are changed from “white” to “black”(Tf) and from “black” to “white”(Tr), respectively. The response time is defined as the time interval between the 10% and 90% of amplitudes. Refer to figure as below.



Note 6: Definition of Color of CIE Coordinate and NTSC Ratio.



Color gamut:

$$S = \frac{\text{area of RGB triangle}}{\text{area of NTSC triangle}} \times 100\%$$

10. Reliability Test Conditions and Methods

No.	Test Items	Test Condition	Inspection After Test
①	High Temperature Storage	80°C±2°C×96Hours	Inspection after 2~4hours storage at room temperature, the samples should be free from defects: 1, Air bubble in the LCD. 2, Seal leak. 3, Non-display. 4, Missing segments. 5, Glass crack. 6, Current IDD is twice higher than initial value. 7, The surface shall be free from damage. 8, The electric characteristic requirements shall be satisfied. 9.Brightness reduction more than 50%.
②	Low Temperature Storage	-30°C±2°C×96Hours	
③	High Temperature Operating	70°C±2°C×96Hours	
④	Low Temperature Operating	-20°C±2°C×96Hours	
⑤	Temperature Cycle(Storage)	-30°C (30min) 80°C (30min) 	

11. Inspection Standard

11.1 Scope

Specifications contain

- 11.1.1 Display Quality Evaluation
- 11.1.2 Mechanics Specification

11.2 Sampling Plan

Unless there is other agreement, the sampling plan for incoming inspection shall follow MIL-STD-105E.

- 11.2.1 Lot size: Quantity per shipment as one lot (different model as different lot).
- 11.2.2 Sampling type: Normal inspection, single sampling.
- 11.2.3 Sampling level: Level II.
- 11.2.4 AQL: Acceptable Quality Level
- Major defect: AQL=0.65
- Minor defect: AQL=1.5

11.3 Panel Inspection Condition

- 11.3.1 Environment:
 - Room Temperature: 25±5°C.
 - Humidity: 65±5% RH.
 - Illumination for Visual Inspection : 800 ~ 1000 Lux.
 - Illumination for Display :260~300 lux

- 11.3.2 Inspection Distance:
 - 35±5 cm

- 11.3.3 Inspection Angle:
 - The vision of inspector should be perpendicular to the surface of the Module.

- 11.3.4 Inspection time :
 - Perceptibility Test Time: 20 seconds max.

11.4 Inspection Plan

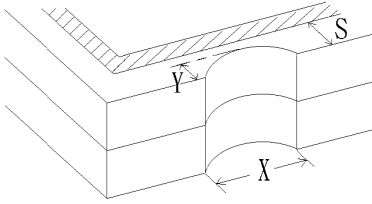
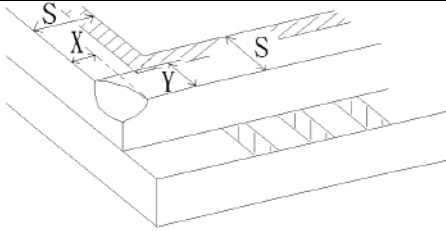
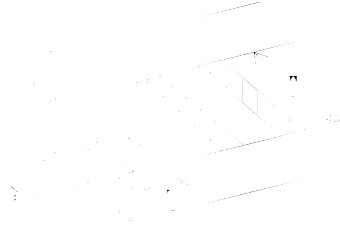
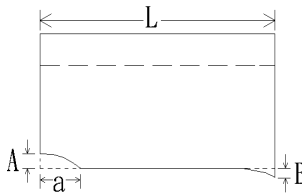
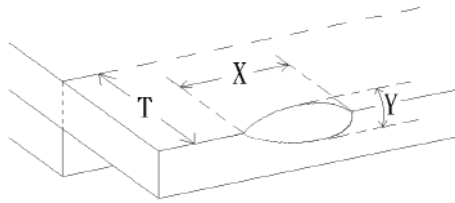
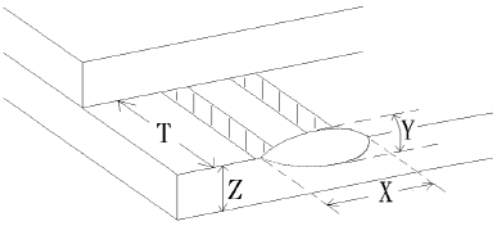
Class	Item	Judgment	Class
-------	------	----------	-------

Packing & Indicate	1. Outside and inside package.	"MODEL NO.", "LOT NO." and "QUANTITY" should indicate on the package.	Minor
	2. Model mixed and quantity.	Other model mixed Quantity short or over	Major
	3. Product indication.	"MODEL NO." should indicate on the product.	Major
Assembly	4. Dimension, LCD glass scratch and scribe defect.	According to specification or drawing.	Major
Appearance	5. Viewing area.	Polarizer edge or LCD's sealing line is visible in the viewing area.....Rejected.	Minor
	6. Blemish, black spot, white spot in the LCD and LCD glass cracks.	According to standard of visual inspection.(inside viewing area)	Minor
	7. Blemish, black spot, white spot and scratch on the polarizer.	According to standard of visual inspection.(inside viewing area)	Minor
	8. Bubble in polarizer.	According to standard of visual inspection.(inside viewing area)	Minor
	9. LCD's rainbow color.	Strong deviation color (or newton ring) of LCD.....Rejected. Or according to limited sample.(if needed, and inside viewing area)	Minor
Electrical	10. Electrical and optical characteristics.(contrast Vop chromaticity....etc)	According to specification or drawing.(inside viewing area)	Major
	11. Missing line.	Missing dot line character	Major
	12.Short circuit. Wrong pattern display.	No display, wrong pattern display, current consumption. Out of specification	Major
	13. Dot defect.(for color and TFT)	According to standard of visual inspection.	Minor

11.5 Standard Of Visual Inspection

NO.	CLASS	ITEM	JUDGMENT
-----	-------	------	----------

11.5.1	Minor	Black and white spot. Foreign materiel. Dust. Blemish. Scratch.	(A) Round type:Unit: mm<table><tr><th>Diameter (mm.)</th><th>Acceptable Q'ty</th></tr><tr><td>$\Phi \leq 0.1$</td><td>Disregard</td></tr><tr><td>$0.1 < \Phi \leq 0.15$</td><td>2(Distance>10mm)</td></tr><tr><td>$0.15 \leq \Phi < 0.2$</td><td>1</td></tr></table>Note: $\Phi = (\text{length}+\text{width})/2$ (B) Linear type:Unit: mm<table><tr><th>Length</th><th>Width (mm.)</th><th>Acceptable Q'ty</th></tr><tr><td>--</td><td>$W \leq 0.03$</td><td>Disregard</td></tr><tr><td>$L \leq 2.0$</td><td>$0.03 < W \leq 0.05$</td><td>1(Distance>5mm)</td></tr><tr><td>--</td><td>$0.05 < W$</td><td>Not allow</td></tr></table>	Diameter (mm.)	Acceptable Q'ty	$\Phi \leq 0.1$	Disregard	$0.1 < \Phi \leq 0.15$	2(Distance>10mm)	$0.15 \leq \Phi < 0.2$	1	Length	Width (mm.)	Acceptable Q'ty	--	$W \leq 0.03$	Disregard	$L \leq 2.0$	$0.03 < W \leq 0.05$	1(Distance>5mm)	--	$0.05 < W$	Not allow
Diameter (mm.)	Acceptable Q'ty																						
$\Phi \leq 0.1$	Disregard																						
$0.1 < \Phi \leq 0.15$	2(Distance>10mm)																						
$0.15 \leq \Phi < 0.2$	1																						
Length	Width (mm.)	Acceptable Q'ty																					
--	$W \leq 0.03$	Disregard																					
$L \leq 2.0$	$0.03 < W \leq 0.05$	1(Distance>5mm)																					
--	$0.05 < W$	Not allow																					
11.5.2	Minor	Dent on polarizer.	Unit: mm.<table><tr><th>Diameter</th><th>Acceptable Q'ty</th></tr><tr><td>$\Phi \leq 0.1$</td><td>Disregard</td></tr><tr><td>$0.1 < \Phi \leq 0.15$</td><td>2(Distance>10mm)</td></tr><tr><td>$0.15 \leq \Phi < 0.2$</td><td>1</td></tr></table>	Diameter	Acceptable Q'ty	$\Phi \leq 0.1$	Disregard	$0.1 < \Phi \leq 0.15$	2(Distance>10mm)	$0.15 \leq \Phi < 0.2$	1												
Diameter	Acceptable Q'ty																						
$\Phi \leq 0.1$	Disregard																						
$0.1 < \Phi \leq 0.15$	2(Distance>10mm)																						
$0.15 \leq \Phi < 0.2$	1																						
11.5.3	Minor	Bubble in polarizer.	Unit: mm.<table><tr><th>Diameter</th><th>Acceptable Q'ty</th></tr><tr><td>$\Phi \leq 0.1$</td><td>Disregard</td></tr><tr><td>$0.1 < \Phi \leq 0.2$</td><td>2(Distance>10mm)</td></tr><tr><td>$0.2 < \Phi$</td><td>0</td></tr></table>	Diameter	Acceptable Q'ty	$\Phi \leq 0.1$	Disregard	$0.1 < \Phi \leq 0.2$	2(Distance>10mm)	$0.2 < \Phi$	0												
Diameter	Acceptable Q'ty																						
$\Phi \leq 0.1$	Disregard																						
$0.1 < \Phi \leq 0.2$	2(Distance>10mm)																						
$0.2 < \Phi$	0																						
11.5.4	Minor	Dot defect	<table><tr><th>Items</th><th>Acceptable Q'ty</th></tr><tr><td>Bright dot</td><td>$N \leq 2$</td></tr><tr><td>Dark dot</td><td>$N \leq 3$</td></tr><tr><td>Total dot</td><td>$N \leq 3$</td></tr><tr><td>Partial Dot $\leq 1/2$ Dot</td><td>$N \leq 3$</td></tr></table> Pixel define : R G B ← → ← Dot Dot Dot Note1: The definition of dot: The size of a defective dot over 1/2 of whole dot is regarded as one defective dot. Note 2: Bright dot: Dots appear bright and unchanged in size in which LCD panel is displaying under black pattern. Note 3: The bright dot defect must be visible through 2% ND filter Note 4: Dark dot: Dots appear dark and unchanged in size in which	Items	Acceptable Q'ty	Bright dot	$N \leq 2$	Dark dot	$N \leq 3$	Total dot	$N \leq 3$	Partial Dot $\leq 1/2$ Dot	$N \leq 3$										
Items	Acceptable Q'ty																						
Bright dot	$N \leq 2$																						
Dark dot	$N \leq 3$																						
Total dot	$N \leq 3$																						
Partial Dot $\leq 1/2$ Dot	$N \leq 3$																						

11.5.5	Minor	LCD glass chipping.	 $Y > S$ Reject
11.5.6	Minor	LCD glass chipping.	 X or $Y > S$ Reject
11.5.7	Major	LCD glass crack.	 $Y > (1/2) T$ Reject
11.5.8	Major	LCD glass scribe defect.	 1. $a > L/3$, $A > 1.5\text{mm}$ Reject 2. B : According to dimension
11.5.9	Minor	LCD glass chipping. (on the terminal area)	 $\Phi = (x+y)/2 > 2.5\text{mm}$ Reject
11.5.10	Minor	LCD glass chipping. (on the terminal surface)	 $Y > (1/3)T$ Reject
11.5.11	Minor	LCD glass chipping.	 $Y > T$ Reject
11.5.12	Minor	Circular White Mura, Lumination Mura, Black/White Mura, etc	5% ND Filter in 50%Of total gray pattern

11.5.13	Minor	Flicker/Crosstalk	follow LCD spec Follow LCD spec
---------	-------	-------------------	------------------------------------

Note:

- 1.Defects on the side or back of the product that do not affect assembly and functionality will not be considered as non-conforming products
- 2.Defects outside the outer border area 1/2 of the display area are not considered as non-conforming products

12. Handling Precautions

12.1 Mounting method

The LCD panel of **ODNA** TFT module consists of two thin glass plates with polarizers which easily be damaged. And since the module is so constructed as to be fixed by utilizing fitting holes in the printed circuit board.

Extreme care should be needed when handling the LCD modules.

12.2 Caution of LCD handling and cleaning

When cleaning the display surface, Use soft cloth with solvent

[Recommended below] and wipe lightly.

- Isopropyl alcohol.
- Ethyl alcohol.

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

Do not use the following solvent:

- Water.
- Aromatics.

Do not wipe ITO pad area with the dry or hard materials that will damage the ITO patterns

Do not use the following solvent on the pad or prevent it from being contaminated:

- Soldering flux.
- Chlorine (Cl) , Sulfur (S).

If goods were sent without being silicon coated on the pad, ITO patterns could be damaged due to the corrosion as time goes on.

If ITO corrosion happens by miss-handling or using some materials such as Chlorine (Cl), Sulfur (S) from customer, Responsibility is on customer.

12.3 Caution against static charge

The LCD module uses C-MOS LSI drivers, so we recommend that you:

Connect any unused input terminal to POWER or GROUND, do not input any signals before power is turned on, and ground your body, work/assembly areas, and assembly equipment to protect against static electricity.

12.4 Packing

- Module employs LCD elements and must be treated as such.
- Avoid intense shock and falls from a height.
- To prevent modules from degradation, do not operate or store them exposed direct to sunshine or high temperature/humidity.

12.5 Caution for operation

- It is an indispensable condition to drive LCD's within the specified voltage limit since the higher voltage than the limit causes the shorter LCD life.
- An electro chemical reaction due to direct current causes LCD's undesirable deterioration, so that the use of direct current drive should be avoided.
- Response time will be extremely delayed at lower temperature than the operating temperature range and on the other hand at higher temperature LCD's show dark color in them. However those phenomena do not mean malfunction or out of order with LCD's, which will come back in the specified operation temperature.
- If the display area is pushed hard during operation, some font will be abnormally displayed but it resumes normal condition after turning off once.
- Slight dew depositing on terminals is a cause for electro-chemical reaction resulting in terminal open circuit.

Usage under the maximum operating temperature, 50%Rh or less is required.

12.6 Storing

In the case of storing for a long period of time for instance, for years for the purpose of replacement use, the following ways are recommended.

- Storage in a polyethylene bag with the opening sealed so as not to enter fresh air outside in it. And with no desiccant.
- Placing in a dark place where neither exposure to direct sunlight nor light's keeping the storage temperature range.
- Storing with no touch on polarizer surface by anything else.

[It is recommended to store them as they have been contained in the inner container at the time of delivery from us.]

12.7 Safety

- It is recommendable to crush damaged or unnecessary LCD's into pieces and wash off liquid crystal by either of solvents such as acetone and ethanol, which should be burned up later.
- When any liquid leaked out of a damaged glass cell comes in contact with your hands, please wash it off well with soap and water.

13. Precaution for Use

13.1

A limit sample should be provided by the both parties on an occasion when the both parties agreed its necessity. Judgment by a limit sample shall take effect after the limit sample has been established and confirmed by the both parties.

13.2

On the following occasions, the handing of problem should be decided through discussion and agreement between responsible of the both parties.

- When a question is arisen in this specification
- When a new problem is arisen which is not specified in this specifications
- When an inspection specifications change or operating condition change in customer is reported to **ODNA TFT** , and some problem is arisen in this specification due to the change
- When a new problem is arisen at the customer's operating set for sample evaluation in the customer site.