Winstar Display Co., LTD
華凌光電股份有限公司
WEB: http://www.winstar.com.tw E-mail: winstar@winstar.com.tw

SPECIFICATION

CUSTOMER : _____

MODULE NO.: WF35GTIICDNN0#

APPROVED BY: **(FOR CUSTOMER USE ONLY)**	**PCB VERSION: DATA:**

SALES BY	APPROVED BY	CHECKED BY	PREPARED BY
			葉虹蘭
ISSUED DATE: 2014/10/24			

TFT Display Inspection Specification: http://www.winstar.com.tw/service.php

Winstar Display Co., LTD 華凌光電股份有限公司	MODLE NO：
RECORDS OF REVISION	**DOC. FIRST ISSUE**

VERSION	DATE	REVISED PAGE NO.	**SUMMARY**
0	2013/01/11		First issue
A	2014/10/24		Updata Rev.

Contents

1.Module Classification Information

W	F	35	G	T	I	I	C	D	N	N	0	#
①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬

①	Brand：WINSTAR DISPLAY CORPORATION		
②	Display Type：F→TFT Type, J→Custom TFT		
③	Display Size：3.5” TFT		
④	Model serials no.		
⑤	Backlight Type：	F→CCFL, White S→LED, High Light White	T→LED, White
⑥	LCD Polarize Type/ Temperature range/ Gray Scale Inversion Direction	I→Transmissive, W. T, 6:00 L→Transmissive, W.T,12:00 Z→Transmissive, W.T, Wide Viewing Angle for O-FILM Y→Transmissive, W.T, Wide View	
⑦	A：TFT LCD B：TFT+FR+CONTROL BOARD C：TFT+FR+A/D BOARD D：TFT+FR+A/D BOARD+CONTROL BOARD E：TFT+FR+POWER BOARD F：TFT+CONTROL BOARD	G：TFT+FR H：TFT+D/V BOARD I：TFT+FR+D/V BOARD J：TFT+POWER BD	

⑧	Solution:						
	A: 128160	B:320234	C:320240	D:480234	E:480272	F: 640480	G: 800480
	H:1024600	I:320480	J:240320	K:800600	L:240400	M :1024768	P :1280800
⑨	D: Digital L：LVDS						
⑩	Interface： N：without control board A：8Bit B：16Bit						
⑪	TS： N：Without TS T：resistive touch panel C：capacitive touch panel						
⑫	Version						
⑬	Special Code	#:Fit in with ROHS directive regulations					

2.Summary

This technical specification applies to 3.45’ color TFT-LCD panel. The 3.45’ color TFT-LCD panel is designed for camcorder, digital camera application and other electronic products which require high quality flat panel displays. This module follows RoHS.

3.General Specifications

Item	Dimension	Unit
Size	3.5	inch
Dot Matrix	320 x RGBx240(TFT)	dots
Module dimension	93.5 X 66.44 X 6.5	mm
Active area	70.08 X 52.56	mm
Dot pitch	0.219 x 0.073	mm
LCD type	TFT, Normally White, Transmissive	
View Direction	12 o'clock	
Gray Scale Inversion Direction	6 o'clock	
Backlight Type	LED,Normally White	
With /Without TP	Without TP	
Surface	Anti-Glare	

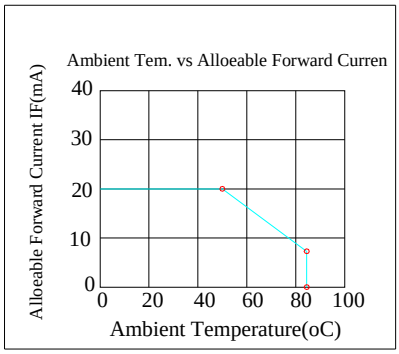
*Color tone slight changed by temperature and driving voltage.

4.Absolute Maximum Ratings

Item	Symbol	Min	Typ	Max	Unit
Operating Temperature	TOP	-20	—	+70	℃
Storage Temperature	TST	-30	—	+80	℃

Note: Device is subject to be damaged permanently if stresses beyond those absolute maximum ratings listed above

1. Temp. ≦60℃, 90% RH MAX. Temp.＞60℃, Absolute humidity shall be less than 90% RH at 60℃



5.Electrical Characteristics

5.1. Recommended Operating Conditions

		MIN	NOM	MAX	UNIT
VCC	Digital supply voltage	3.0	3.3	3.6	V
ICC	Digital supply current		250		mA
BLE	Digital supply voltage	3.0	3.3	3.6	V
GP10	Analog PLL supply voltage	3.0	3.3	3.6	V

5.2. Clocks, Video Data, Sync Timing

PARAMETER		TEST CONDITIONS(1)	MIN	TYP	MAX	UNIT
Duty cycle, PCLK/SCLK			47	50	53	%
t1	PCLK high time	≥90%		18.5		ns
t2	PCLK low time	≤10%		18.5		ns
t3	PCLK fall time	90% to 10%			5	ns
t4	PCLK rise time	10% to 90%			5	ns
t5	Propagation delay time		3	8		ns

(1) Measured with 22-Ω series termination resistors and 10-pF load.

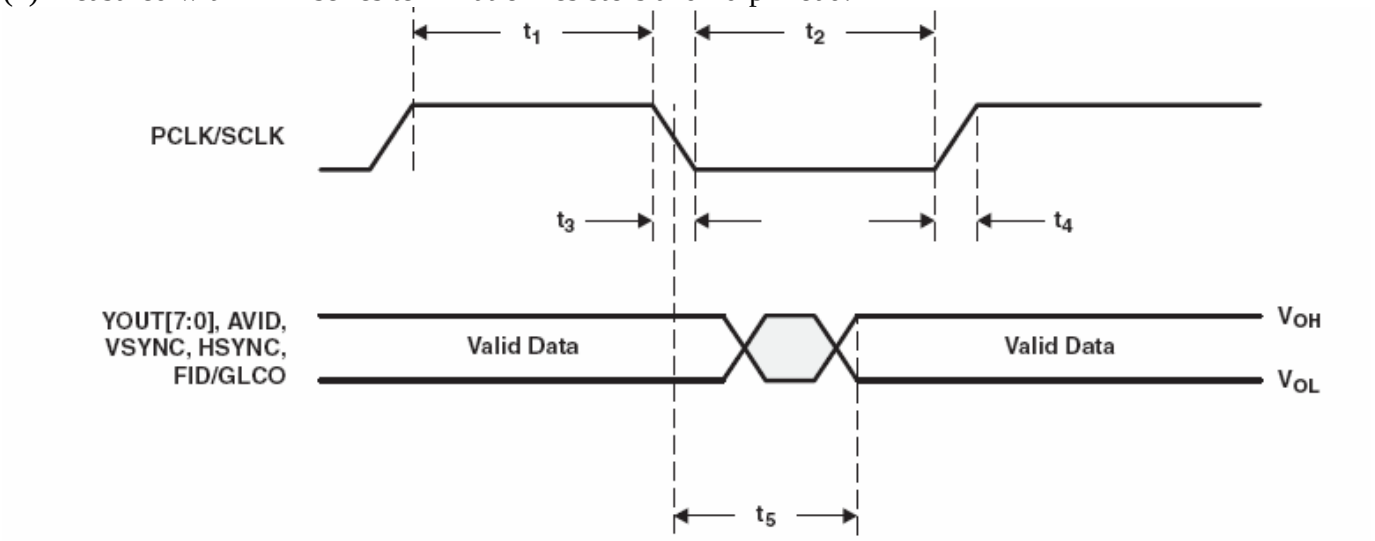


Figure 2-1 Clocks, Video Data, and Sync Timing

5.3. I2C Host Interface Timing

NO.	PARAMETER	MIN	TYP	MAX	UNIT
t1	Bus free time between STOP and START	1.3			µs
t2	Data Hold time	0		0.9	µs
t3	Data Setup time	100			ns
t4	Setup time for a (repeated) START condition	0.6			µs
t5	Setup time for a STOP condition	0.6			ns
t6	Hold time (repeated) START condition	0.6			µs
t7	Rise time SDA and SCL signal			250	ns
t8	Fall time SDA and SCL signal			250	ns
Cb	Capacitive load for each bus line			400	pF
fI2C	I2C clock frequency			400	kHz

(1) Specified by design

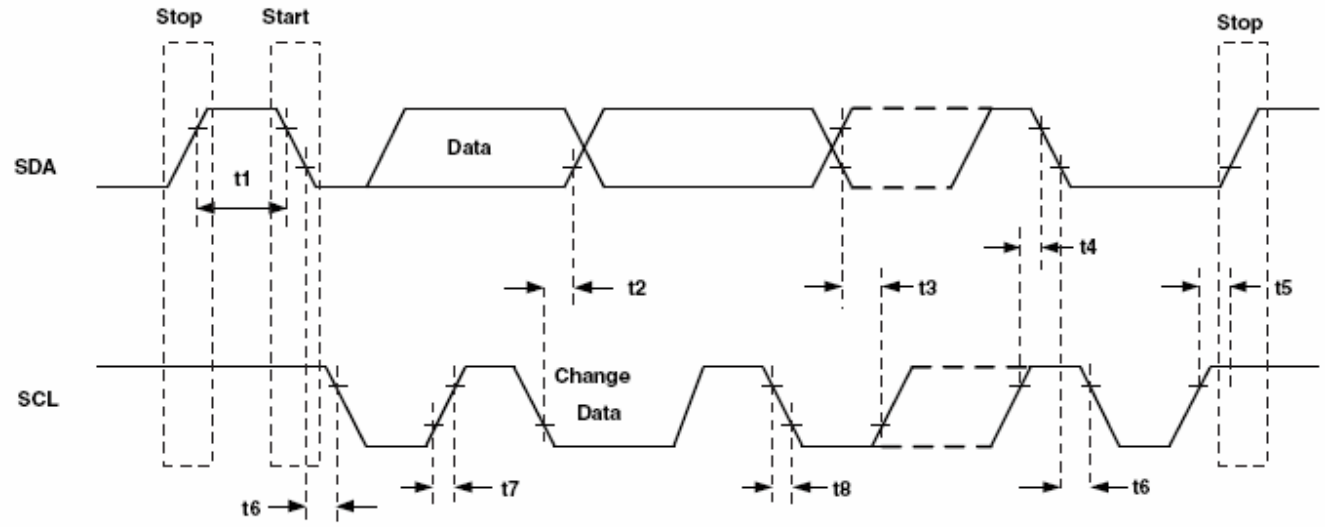
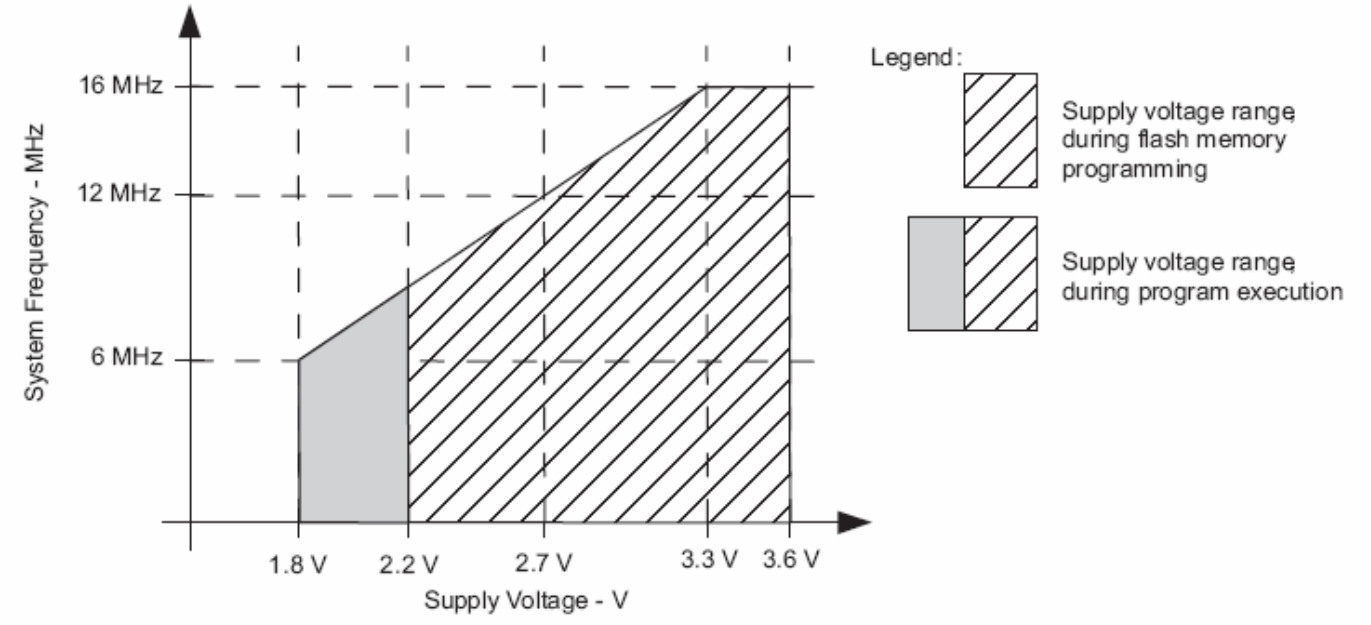


Figure 2-2 I²C Host Interface Timing

6.Recommended Operating Conditions

			MIN	NOM	MAX	UNIT
VCC	Supply voltage	During program execution	3.0	3.3	3.6	V
VSS	Supply voltage			0		V
TA	Operating free-air temperature	I version	–20		70	°C
fSYSTEM	Processor frequency (maximum MCLK frequency)(1) (2)	VCC = 1.8 V, Duty cycle = 50% ± 10%	dc		4.15	MHz
		VCC = 2.7 V, Duty cycle = 50% ± 10%	dc		12	
		VCC = 3.3 V, Duty cycle = 50% ± 10%	dc		16	

(1) The MSP430 CPU is clocked directly with MCLK. Both the high and low phase of MCLK must not exceed the pulse width of the
specified maximum frequency.
(2) Modules might have a different maximum input clock specification. See the specification of the respective module in this data sheet.



Note: Minimum processor frequency is defined by system clock. Flash program or erase operations require a minimum VCC of 2.2 V.
Figure 3.1 Safe Operating Area

7.Optical Characteristics

Item		Symbol	Condition.	Min	Typ.	Max.	Unit	Remark
Response time		Tr	θ =0°、Φ =0°	-	10	-	ms	Note 3,5
		Tf		-	15	-	ms	
Contrast ratio		CR	At optimized viewing angle	300	400	-	-	Note 4,5
Color Chromaticity	White	Wx	θ =0°、Φ =0	0.26	0.31	0.36	-	Note 2,6,7
		Wy		0.28	0.33	0.38	-	-
Viewing angle (Gray Scale Inversion Direction)	Hor.	ΘR	CR≧10	50	60	-	Deg.	Note 1
		ΘL		50	60	-		
	Ver.	ΦT		40	50	-		
		ΦB		45	55	-		
Brightness		-	-	200	300	-	cd/㎡	Center of display

Ta=25±2℃, IL=20mA

Note 1: Definition of viewing angle range

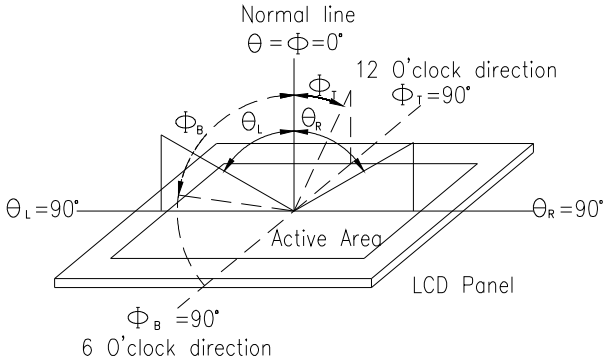


Fig. 7.1. Definition of viewing angle

Note 2: Test equipment setup:

After stabilizing and leaving the panel alone at a driven temperature for 10 minutes, the measurement should be executed. Measurement should be executed in a stable, windless, and dark room. Optical specifications are measured by Topcon BM-7orBM-5 luminance meter 1.0° field of view at a distance of 50cm and normal direction.

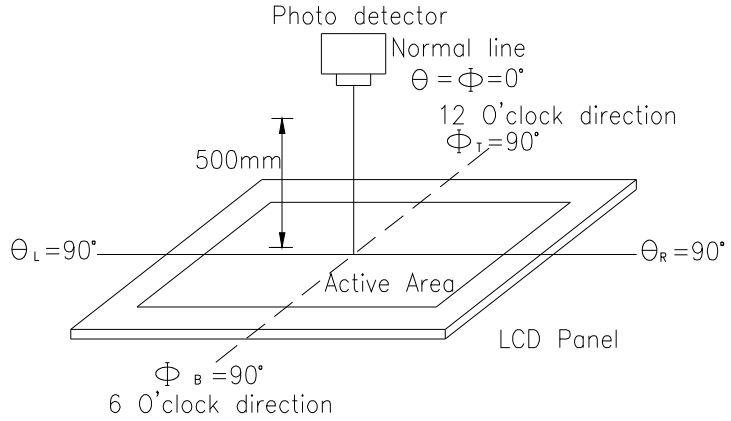
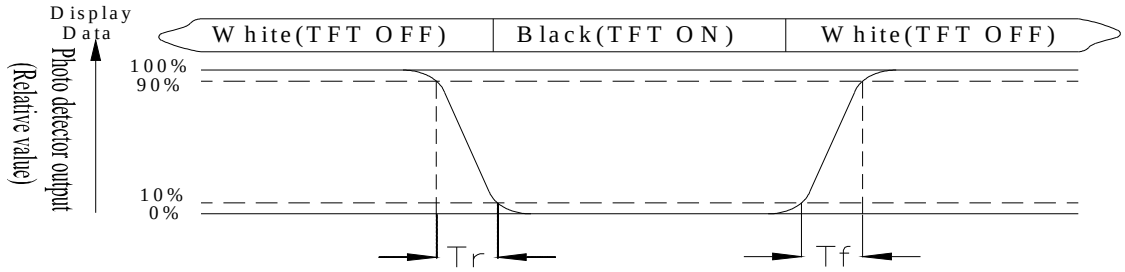


Fig. 7.2. Optical measurement system setup

Note 3: Definition of Response time:
The response time is defined as the LCD optical switching time interval between “White” state and “Black” state. Rise time, Tr, is the time between photo detector output intensity changed from 90%to 10%. And fall time, Tf, is the time between photo detector output intensity changed from 10%to 90%



Note 4: Definition of contrast ratio:
The contrast ratio is defined as the following expression.

$$\text{Contrast ratio (CR)} = \frac{\text{Luminance measured when LCD on the "White" state}}{\text{Luminance measured when LCD on the "Black" state}}$$

Note 5: White Vi = Vi50 ± 1.5V
Black Vi = Vi50 ± 2.0V
“±” means that the analog input signal swings in phase with VCOM signal.
“±” means that the analog input signal swings out of phase with VCOM signal.
The 100% transmission is defined as the transmission of LCD panel when all the input terminals of module are electrically opened.

Note 6: Definition of color chromaticity (CIE 1931)
Color coordinates measured at the center point of LCD

Note 7: Measured at the center area of the panel when all the input terminals of LCD panel are electrically opened.

8.Interface

CON1

Pin No.	Symbol	Description
1	VCC	Digital supply voltage 3.3V.
2	DGND	Digital GND.
3	BLE	Back Light control pin, High enable, Low disable.
4	GP10	AV signal option pin. High=Channel1, Low=Channel2.

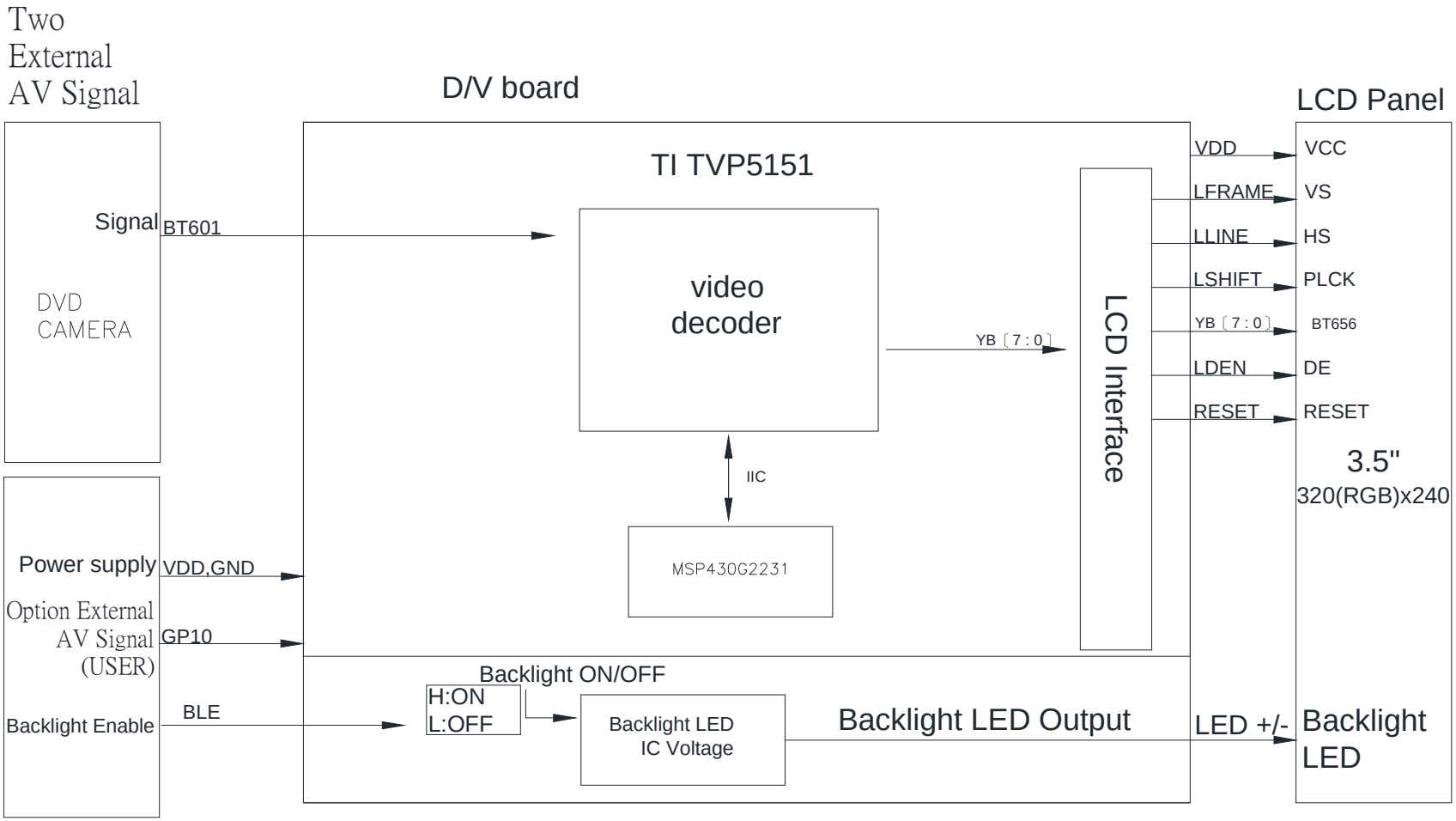
CH1

Pin No.	Symbol	Description
1	Channel1	External AV Signal 1.
2	Channel2	External AV Signal 2.

Data Types Supported by VDP

NAME	DESCRIPTION
WST SECAM	Teletext, SECAM
WST PAL B	Teletext, PAL, System B
WST PAL C	Teletext, PAL, System C
WST, NTSC B	Teletext, NTSC, System B
NABTS, NTSC C	Teletext, NTSC, System C
NABTS, NTSC D	Teletext, NTSC, System D (Japan)
CC, PAL	Closed caption PAL
CC, NTSC	Closed caption NTSC
WSS/CGMS-A	Wide-screen signaling/Copy Generation Management System-Analog, PAL
WSS/CGMS-A	Wide-screen signaling/Copy Generation Management System-Analog, NTSC
VITC, PAL	Vertical interval timecode, PAL
VITC, NTSC	Vertical interval timecode, NTSC
VPS, PAL	Video program system, PAL
Gemstar 2x Custom 1	Electronic program guide
Reserved	Reserved
Active Video	Active video/full field

9.BLOCK DIAGRAM



10.Reliability

Content of Reliability Test (Wide temperature, -20℃~70℃)

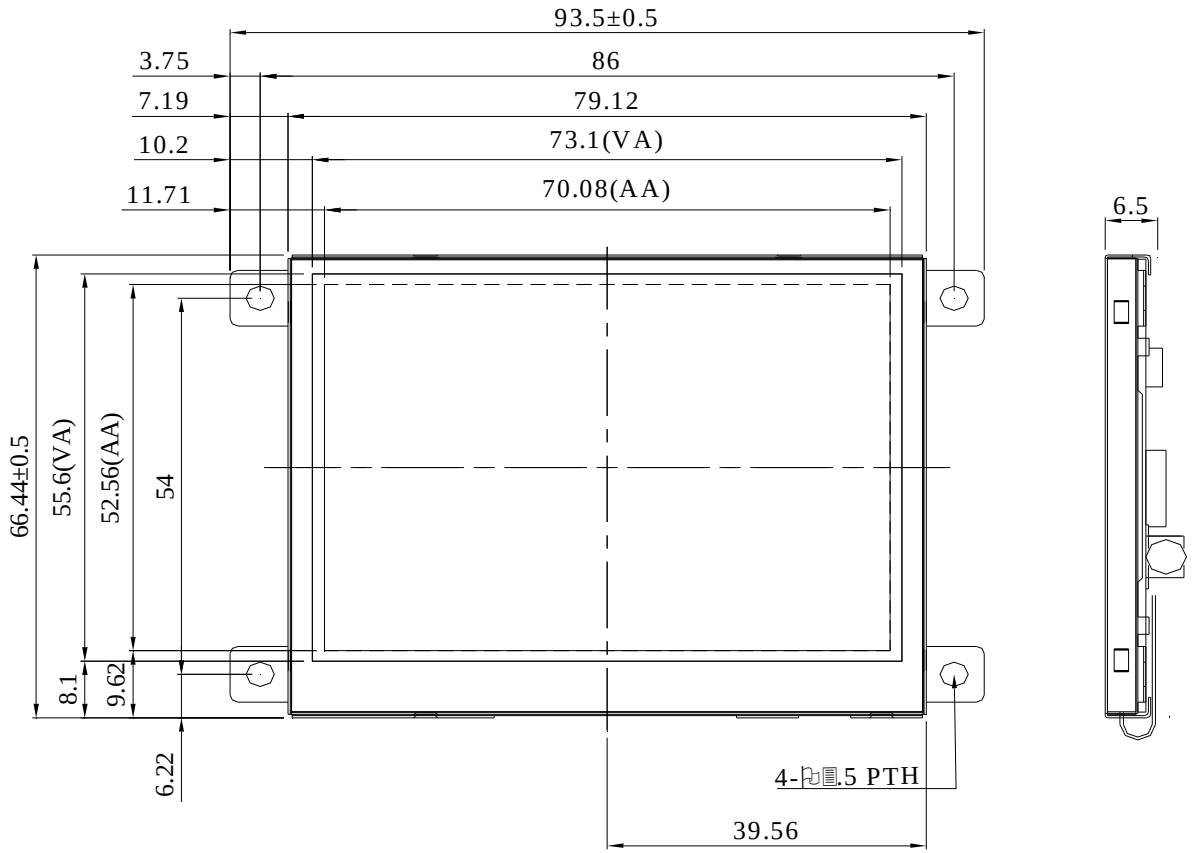
Environmental Test			
Test Item	**Content of Test**	**Test Condition**	**Note**
High Temperature storage	Endurance test applying the high storage temperature for a long time.	80℃ 200hrs	2
Low Temperature storage	Endurance test applying the low storage temperature for a long time.	-30℃ 200hrs	1,2
High Temperature Operation	Endurance test applying the electric stress (Voltage & Current) and the thermal stress to the element for a long time.	70℃ 200hrs	——
Low Temperature Operation	Endurance test applying the electric stress under low temperature for a long time.	-20℃ 200hrs	1
High Temperature/ Humidity Operation	The module should be allowed to stand at 60 ℃,90%RH max For 96hrs under no-load condition excluding the polarizer, Then taking it out and drying it at normal temperature.	60℃,90%RH 96hrs	1,2
Thermal shock resistance	The sample should be allowed stand the following 10 cycles of operation -20℃ 25℃ 70℃ 30min 5min 30min 1 cycle	-20℃/70℃ 10 cycles	——
Vibration test	Endurance test applying the vibration during transportation and using.	Total fixed amplitude : 15mm Vibration Frequency : 10~55Hz One cycle 60 seconds to 3 directions of X,Y,Z for Each 15 minutes	3
Static electricity test	Endurance test applying the electric stress to the terminal.	VS=800V, RS=1.5kΩ CS=100pF 1 time	——

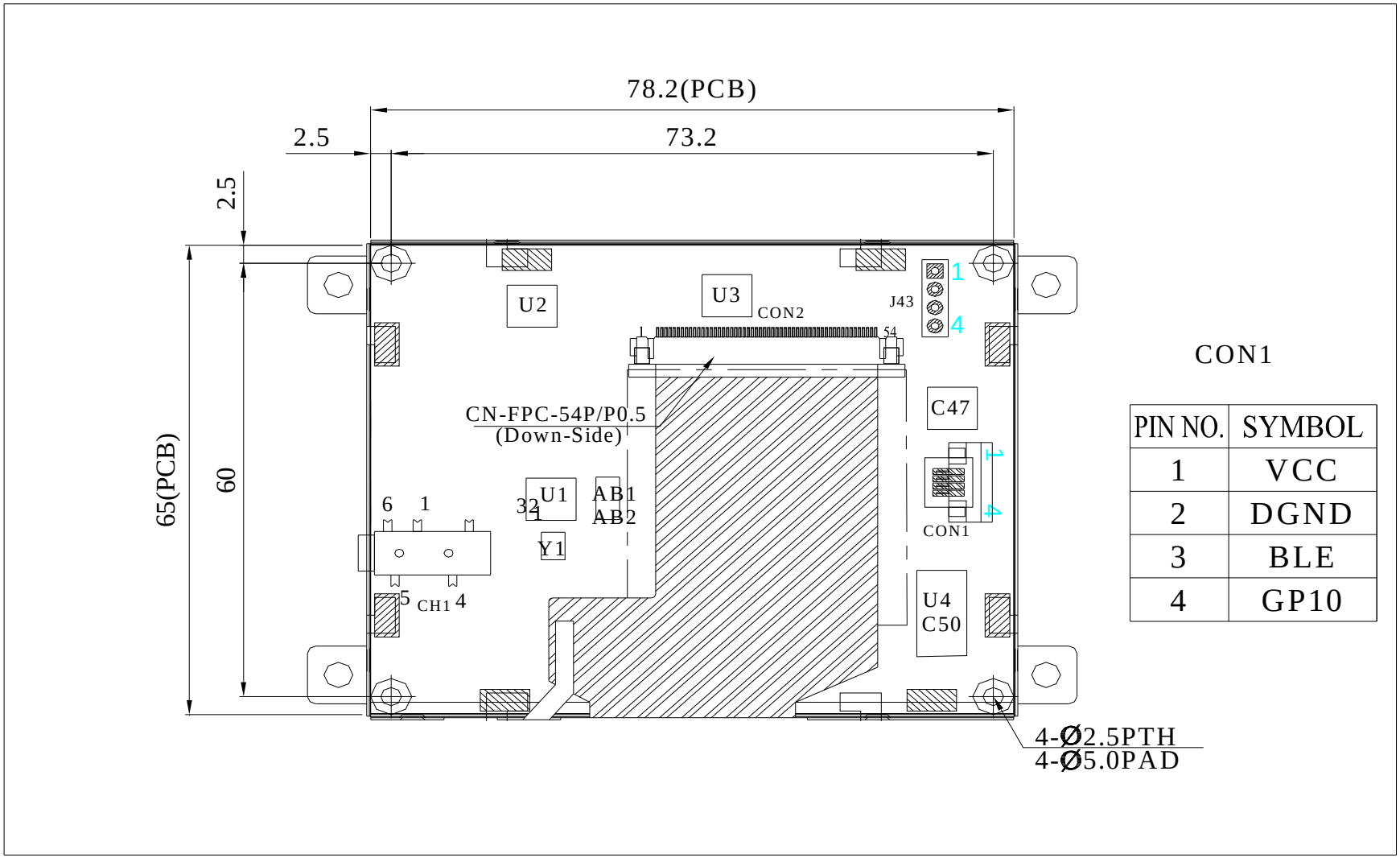
Note1: No dew condensation to be observed.

Note2: The function test shall be conducted after 4 hours storage at the normal Temperature and humidity after remove from the test chamber.

Note3: The packing have to including into the vibration testing.

11.Contour Drawing





CON1

PIN NO.	SYMBOL
1	VCC
2	DGND
3	BLE
4	GP10

12.PACKAGE SPECIFICATION

LCM Model	WF35GTIICDNN0#
Drawing NO.	

LCM 包裝規格書

LCM Packaging Specifications

Approve	Check	Contact
DATE	初版	版次 Ver
02/05/14’	02/05/14’	0

1.包裝材料規格表（Packaging Material）:(per carton)

NO.	Item	Model	Dimensions	Quantity
1	成品（LCM）	WF35GTIICDNN0#		216
2	TRAY 盤 (2)	PKCA1XXXXXXXXXXX0355	315*265mm	36
3	BP01 內盒(3)Product Box	PK3Y1XXXXXXXXXXX0001	332*280*100mm	6
4	泡棉(4)Foam	-----	-	6
5	外紙箱(5)Carton	PK4X1XXXXXXXXXXX0000	565*340*320mm	1
6				
7				
8				
9				

2.單箱數量規格表(Packaging Specifications and Quantity) :

(1)LCM quantity per box : no per tray 6 x no of tray 6 = 36

(2)Total LCM quantity in carton : quantity per box 36 x no of boxes 6 = 216

特 記 事 項 (REMARK)

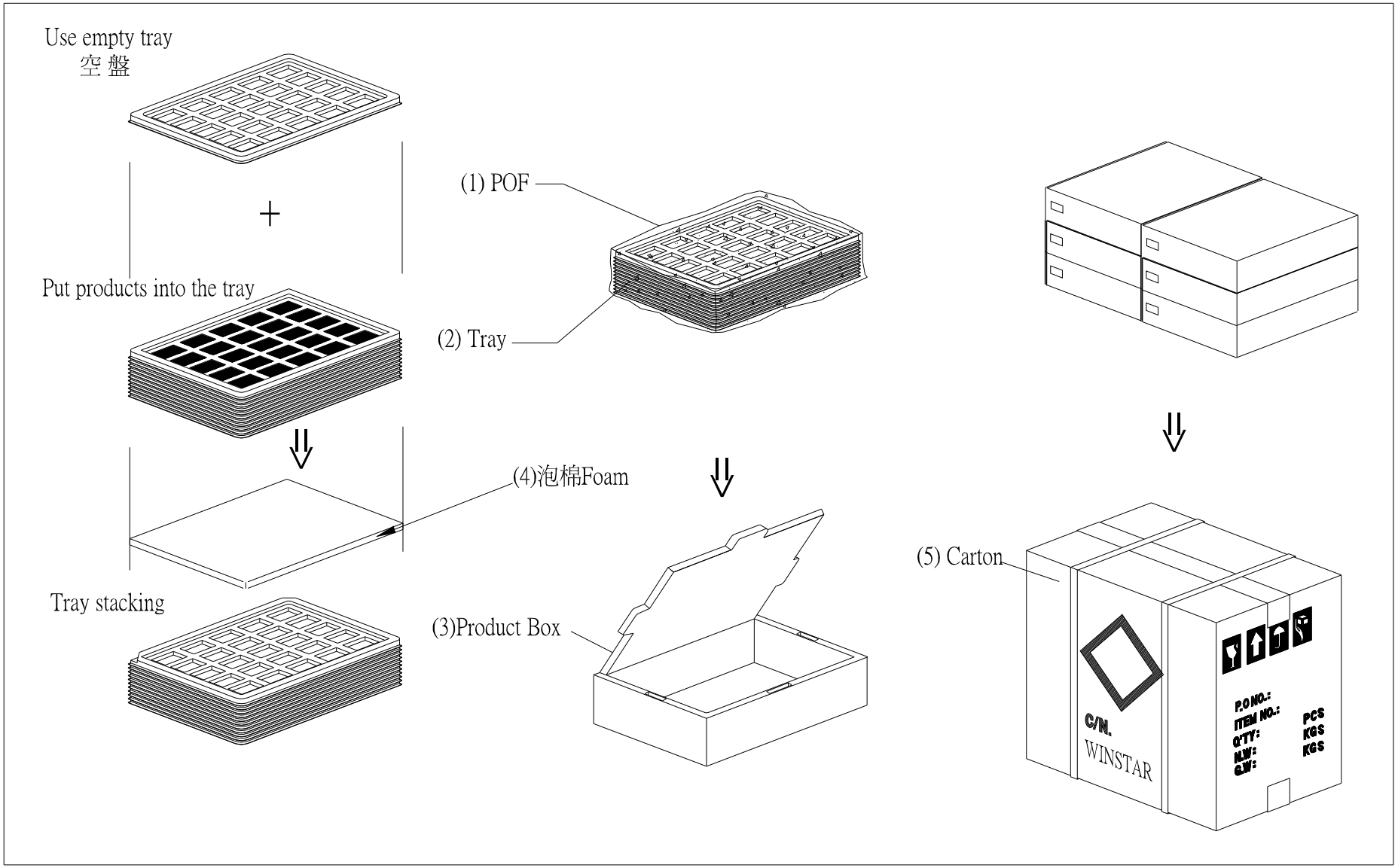
1. Label Specifications :

MOOEL:

LOT NO :

QUANTITY:

CHECK:


Use empty tray
空盤
Put products into the tray
Tray stacking
(1) POF
(2) Tray
(4)泡棉Foam
(3)Product Box
(5) Carton
C/N.
WINSTAR
P.O NO.:
ITEM NO.:
Q'TY:
N.W:
G.W:
PCS
KGS
KGS

winstar **LCM Sample Estimate Feedback Sheet**

Module Number： _____

1、Panel Specification：

1. Panel Type： □ Pass □ NG ,_____
2. View Direction： □ Pass □ NG ,_____
3. Numbers of Dots： □ Pass □ NG ,_____
4. View Area： □ Pass □ NG ,_____
5. Active Area： □ Pass □ NG ,_____
6. Operating Temperature： □ Pass □ NG ,_____
7. Storage Temperature： □ Pass □ NG ,_____
8. Others：_____

2、Mechanical Specification：

1. PCB Size： □ Pass □ NG ,_____
2. Frame Size： □ Pass □ NG ,_____
3. Material of Frame： □ Pass □ NG ,_____
4. Connector Position： □ Pass □ NG ,_____
5. Fix Hole Position： □ Pass □ NG ,_____
6. Backlight Position： □ Pass □ NG ,_____
7. Thickness of PCB： □ Pass □ NG ,_____
8. Height of Frame to PCB： □ Pass □ NG ,_____
9. Height of Module： □ Pass □ NG ,_____
10. Others： □ Pass □ NG ,_____

3、Relative Hole Size：

1. Pitch of Connector： □ Pass □ NG ,_____
2. Hole size of Connector： □ Pass □ NG ,_____
3. Mounting Hole size： □ Pass □ NG ,_____
4. Mounting Hole Type： □ Pass □ NG ,_____
5. Others： □ Pass □ NG ,_____

4、Backlight Specification：

1. B/L Type： □ Pass □ NG ,_____
2. B/L Color： □ Pass □ NG ,_____
3. B/L Driving Voltage (Reference for LED Type)： □ Pass □ NG ,_____
4. B/L Driving Current： □ Pass □ NG ,_____
5. Brightness of B/L： □ Pass □ NG ,_____
6. B/L Solder Method： □ Pass □ NG ,_____
7. Others： □ Pass □ NG ,_____

>> **Go to page 2** <<

5、Electronic Characteristics of Module：

1. Input Voltage： □ Pass □ NG ,_____
2. Supply Current： □ Pass □ NG ,_____
3. Driving Voltage for LCD： □ Pass □ NG ,_____
4. Contrast for LCD： □ Pass □ NG ,_____
5. B/L Driving Method： □ Pass □ NG ,_____
6. Negative Voltage Output： □ Pass □ NG ,_____
7. Interface Function： □ Pass □ NG ,_____
8. LCD Uniformity： □ Pass □ NG ,_____
9. ESD test： □ Pass □ NG ,_____
10. Others： □ Pass □ NG ,_____

6、Summary：

Sales signature：_____

Customer Signature：_____ **Date**：____/____/____