TITLE : HV089WU1-1E0

Preliminary Product Specification

HYDIS Technologies

REVISION HISTORY

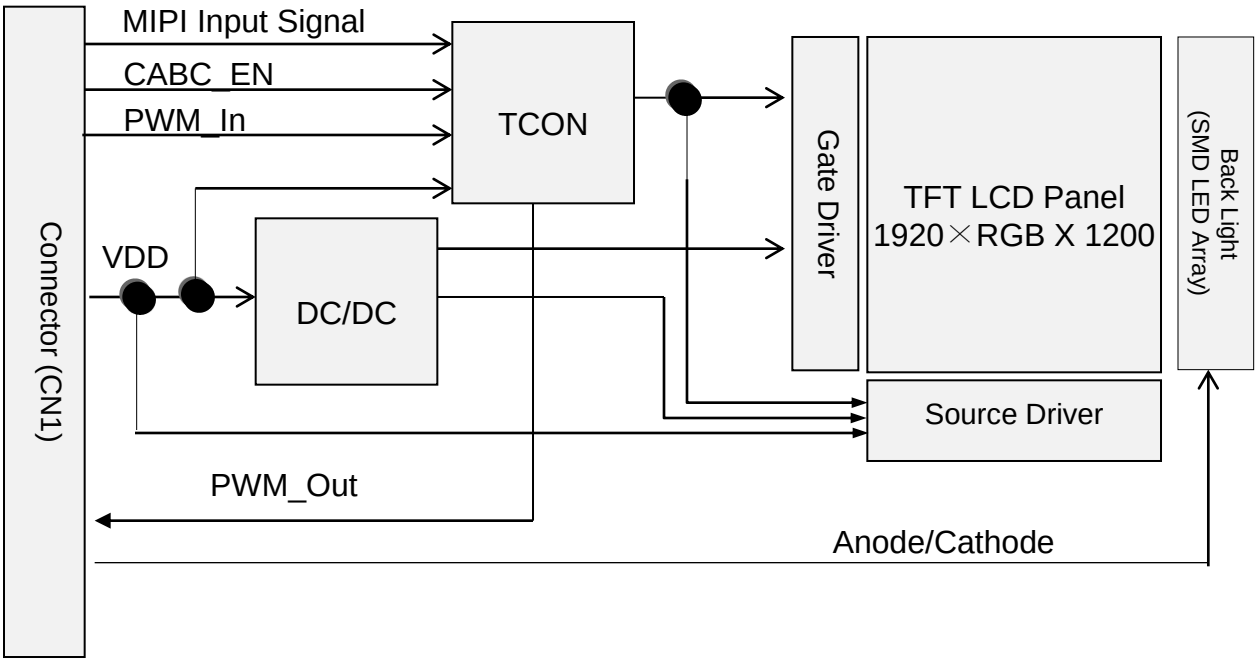
REV.	ECN NO.	DESCRIPTION OF CHANGES	DATE	PREPARED
P0		* Initial Release	2012.02.13	CY.KIM
P1		1. Module thickness : 2.7(Typ.) -> 2.85(Max.) 2. Weight : 150g(max) -> 120g (typ), 130g(max) 3. Surface treatment : AG -> HC Clear 4. Interface : LVDS -> MIPI 4lane 5. Color coordination Wx 0.310 , Wy 0.340 Rx 0.601 , Ry 0.631 Gx 0.345 , Gy 0.572 Bx 0.149 , By 0.110	2012.02.20	JT.LEE

Contents

1.0 GENERAL DESCRIPTION

1.1 Introduction

HV089WU1-1E0 is a color active matrix TFT LCD module using amorphous silicon TFT's (Thin Film Transistors) as an active switching devices. This module has a 8.9 inch diagonally measured active area with WUXGA resolutions (1920 horizontal by 1200 vertical pixel array). Each pixel is divided into RED, GREEN, BLUE dots which are arranged in vertical Stripe and this module can display 16.7M colors. The TFT-LCD panel used for this module is a low reflection and higher color type.



1.2 Features

- 3.3 V Logic Power
- MIPI 4Lane Interface (DSI 1.02, D-PHY 1.0. Video mode only)
- 16.7M Colors (6bit + HFRC)
- Data Enable Signal Mode
- SMD LED (35EA) Bottom alignment
- Green Product (RoHS) & Halogen free

1.3 Application

- Slate/Tablet

1.4 General Specifications

< Table 1. General Specifications >

Parameter	Specification	Unit	Remark
Active area	191.52(H) ×119.7(V)	mm	
Number of pixels	1920(H) ×1200(V)	pixels	
Pixel pitch	99.75(H) ×99.75(V)	um	
Pixel arrangement	RGB Vertical Stripe		
Display colors	16.7M	colors	
Display mode	Normally Black		
Outline dimension	203.5 (H) x 135.9 (V) x 2.85 (D, Max)	mm	
Weight	120 (Typ.), 130 (Max.)	g	
Back-light	Bottom edge side, 35-LEDs type		

2.0 ABSOLUTE MAXIMUM RATINGS

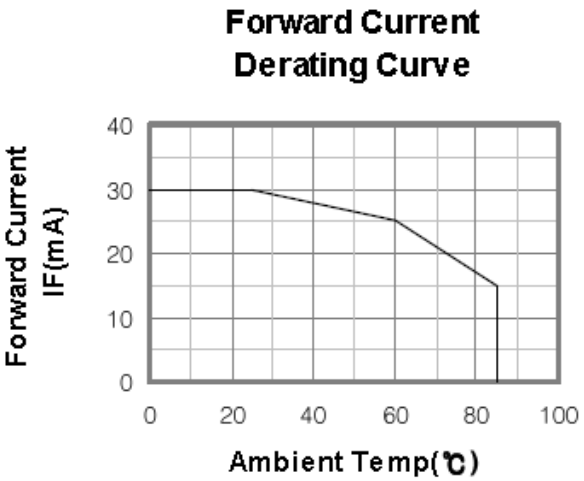
The followings are maximum values which, if exceed, may cause faulty operation or damage to the unit.

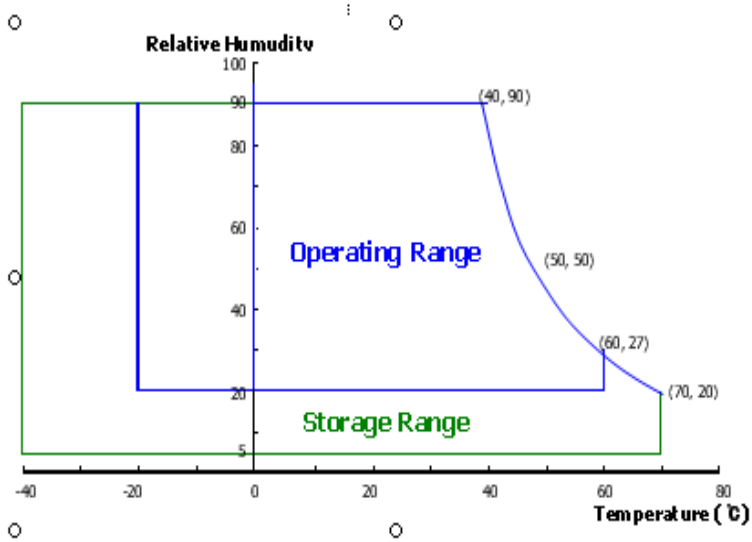
< Table 2. Absolute Maximum Ratings > Ta=25+/-2°C

Parameter	Symbol	Min.	Max.	Unit	Remarks
Logic Power Supply Voltage	V_{CC}	-0.3	V_{CC}+0.3	V	
Back-light Power Supply Voltage	V_L	-0.3	40	V	
Back-light LED Current	I_L	-	25	mA	Note 1
Back-light LED Reverse Voltage	V_R	-	5	V	
Operating Temperature	T_{OP}	-20	+60	℃	Note 1, Note 2
Storage Temperature	T_{SP}	-40	+70	℃	

Note 1. Ambient temperature vs allowable forward current are shown in the figure below.

Note 2. Temperature and relative humidity range are shown in the figure below.
90% RH Max. (40℃ ≥ Ta)
Maximum wet - bulb temperature at 39℃ or less. (> 40℃) No condensation.





3.0 ELECTRICAL SPECIFICATIONS

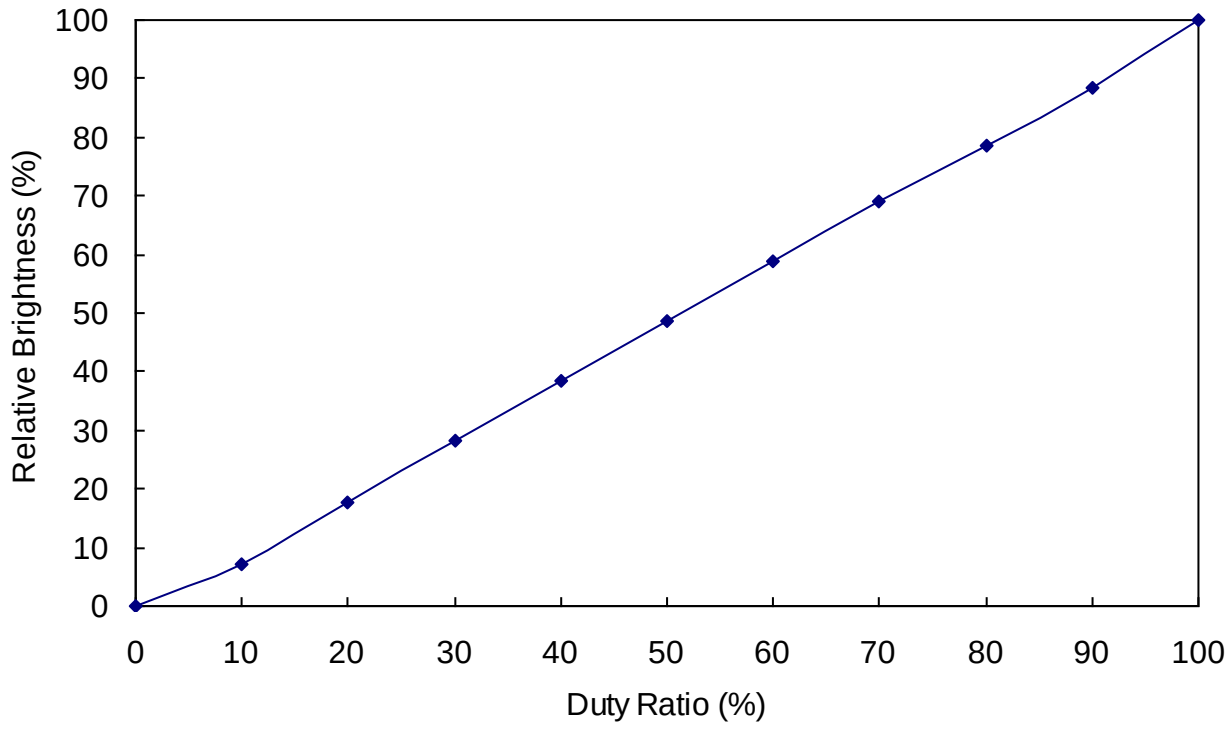
3.1 Electrical Specifications

< Table 3. Electrical Specifications >

Parameter		Min.	Typ.	Max.	Unit	Remarks
Logic Power Supply Voltage	V_{DD}	3.0	3.3	3.6	V	
Logic Power Supply Current	I_{DD}	-	227	-	mA	Vdd=3.3V, 25℃ Note 1
Back-light LED Voltage / Back-light LED Total Voltage	V_{LED} /V_{BL}	-	3.0/42	-	V	Note 2
Back-light LED Current / Back-light LED Total Current	I_{LED} /I_{BL}	-	20/240	-	mA	Note 2
Power Consumption	P_{DD}	-	0.75	-	W	Vdd=3.3V, 25℃ Note 1
	P_{BL}	-	2.1	-	W	
	Ptotal	-	2.85	-	W	

Notes : 1. The supply voltage is measured and specified at the interface connector of LCM.
(Max Pattern : White)
2. Calculated value for reference (VLED × ILED × # of LEDs (35EA)).

3.2 PWM Duty Ratio vs Brightness



Notes :

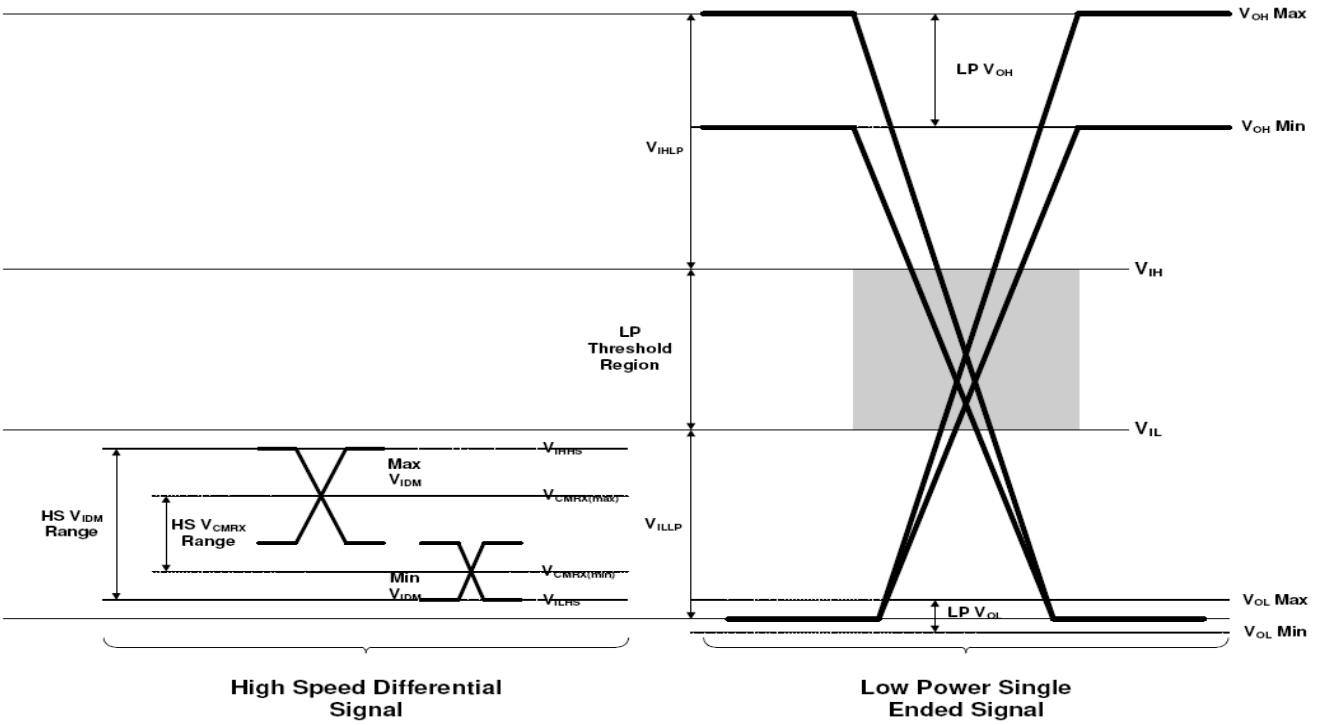
In case of duty ratio 0%, LED can't illuminate itself so this state is LED off.

In case of duty ratio 100%, the brightness of LED is maximum and the state is LED on.

3.2 MIPI Interface DC Characteristic

< Table 4. MIPI Interface DC Characteristic >

Parameter			Min.	Typ.	Max.	Unit	Remarks
Input data bit rate		BR_{MIPI}	200	-	1000	Mbps	
Differential Input impedance		Z_{ID}	80	100	125	Ω	
High speed Rx	Common-mode voltage	V_{CMRX}	70	-	330	mV	
	Differential input high threshold	V_{IDTH}	-	-	70	mV	
	Differential input low threshold	V_{IDTL}	-70	-	-	mV	
	Differential input voltage range	$\|V_{IDM}\|$	70	-	500	mV	
	Single-end input high voltage	V_{IHHS}	-	-	460	mV	
	Single-end input low voltage	V_{ILHS}	-40	-	-	mV	
Low Power Rx	Logic 1 input voltage	V_{IHLP}	880	-	-	mV	
	Logic 0 input voltage	V_{ILLP}	-	-	550	mV	
Low power Tx	Output high level	V_{OH}	1.08	1.2	1.32	V	
	Output low level	V_{OL}	-50	-	50	mV	

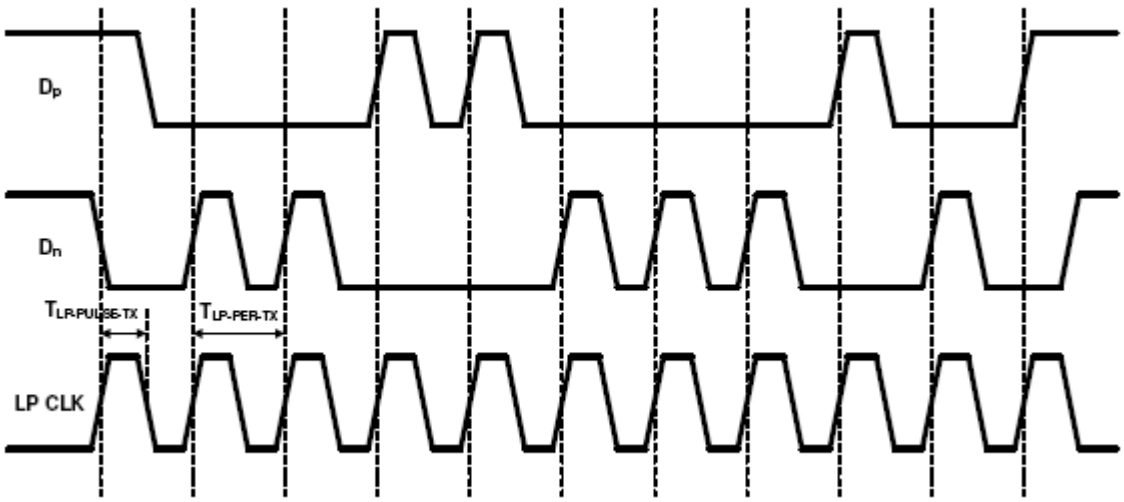


3.3 MIPI Interface AC Characteristic

< Table 5. LP Transmitter AC Specifications>

Parameter		Min.	Typ.	Max.	Unit	Remarks
Minimum pulse width response (LP Rx mode)	T_{MIN-RX}	50	-	-	ns	
Pulse width of the LP exclusive-OR clock	$T_{LP-PULSE-TX}$	50	55	58	ns	Note 1
15%~85% rise time and fall time (LP Tx mode)	T_{RLP} / T_{FLP}	-	-	25	ns	
30%~85% rise time and fall time of EOT (LP Tx mode)	T_{REOT}	-	-	35	ns	
Period of the LP exclusive-OR clock	$T_{LP-PER-TX}$	90	-	-	ns	
Data to clock setup time	T_{SETUP}	0.15	-	-	UI	
Data to clock setup time	T_{HOLD}	0.15	-	-	UI	

Note 1 : 1st clock pulse after STOP state or last clock pulse before STOP state/all other pulse



4.0 OPTICAL SPECIFICATIONS

4.1 Overview

The test of optical specifications shall be measured in a dark room (ambient luminance ≤ 1 lux and temperature = 25±2℃) with the equipment of Luminance meter system (Goniometer system and TOPCON BM-5A) and test unit shall be located at an approximate distance 50cm from the LCD surface at a viewing angle of θ and Φ equal to 0°. We refer to $\theta_{Ø=0}$ (=θ3) as the 3 o'clock direction (the "right"), $\theta_{Ø=90}$ (= θ12) as the 12 o'clock direction ("upward"), $\theta_{Ø=180}$ (= θ9) as the 9 o'clock direction ("left") and $\theta_{Ø=270}$(= θ6) as the 6 o'clock direction ("bottom"). While scanning θ and/or Ø, the center of the measuring spot on the Display surface shall stay fixed. The backlight should be operating for 30 minutes prior to measurement. V_{DD} shall be 3.3+/- 0.3V at 25°C.

4.2 Optical Specifications

<Table 6. Optical Specifications>

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit	Remarks
Viewing Angle range	Horizontal	Θ_3	CR > 10	80	89	-	Deg.	Note 1
		Θ_9		80	89	-	Deg.	
	Vertical	Θ_{12}		80	89	-	Deg.	
		Θ_6		80	89	-	Deg.	
Luminance Contrast ratio		CR	Θ = 0°	640	800	-		Note 2
Luminance of White	1 Points	Y_w	Θ = 0°	400	450	-	cd/m^2	Note 4 Note 5
White Luminance uniformity	9 Points	ΔY9		72	80	-	%	
White Chromaticity		W_x	Θ = 0°	0.280	0.310	0.340	-	Note 3
		W_y		0.310	0.340	0.370	-	
Reproduction of color	Red	R_x	Θ = 0°	0.567	0.597	0.627	-	
		R_y		0.318	0.348	0.378	-	
	Green	G_x		0.311	0.341	0.371	-	
		G_y		0.547	0.577	0.607	-	
	Blue	B_x		0.124	0.154	0.184	-	
		B_y		0.077	0.107	0.137	-	
Response Time		Total ($T_r + T_d$)	Ta= 25° C Θ = 0°	-	30	50	ms	Note 6
Cross Talk		CT	Θ = 0°	-	-	2.0	%	Note 7

Notes :

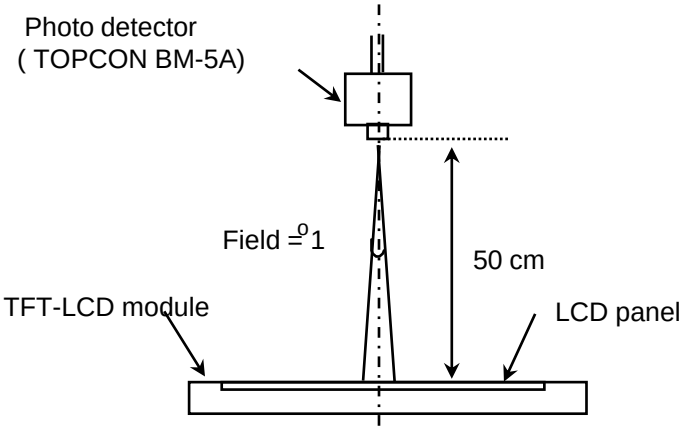
1. Viewing angle is the angle at which the contrast ratio is greater than 10. The viewing angles are determined for the horizontal or 3, 9 o'clock direction and the vertical or 6, 12 o'clock direction with respect to the optical axis which is normal to the LCD surface (see Figure1).

2. Contrast measurements shall be made at viewing angle of Θ= 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 (see Figure1). Luminance Contrast Ratio (CR) is defined mathematically as CR = Luminance when displaying a white raster / Luminance when displaying a black raster.

3. Reference only / Standard Front Surface Treatment Measured with green cover glass. The color chromaticity coordinates specified in Table 4 shall be calculated from the spectral data measured with all pixels first in red, green, blue and white. Measurements shall be made at the center of the panel.

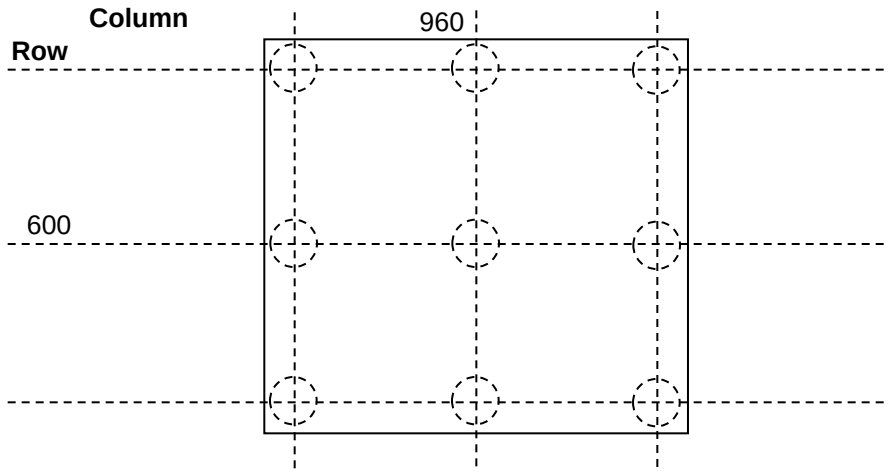
4.3 Optical Measurements

Figure 1. Measurement Set Up



Optical characteristics measurement setup

Figure 2. White Luminance and Uniformity Measurement Locations (9 points)



Note 4.

Luminance of white is defined as luminance values of 9 points across the LCD surface. Luminance shall be measured with all pixels in the view field set first to white. This measurement shall be taken at the locations shown in Figure 2 for a total of the measurements per display.

* Yw = (Sum of 9 Points Luminance / 9)
* LED Condition = (Duty Ratio 100%, LED current 20.0mA)

Figure 3. Response Time Testing

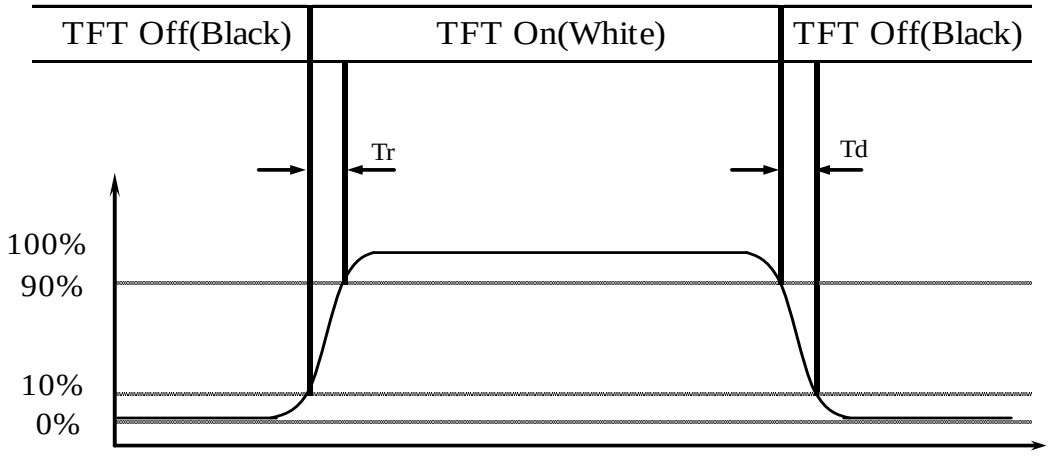
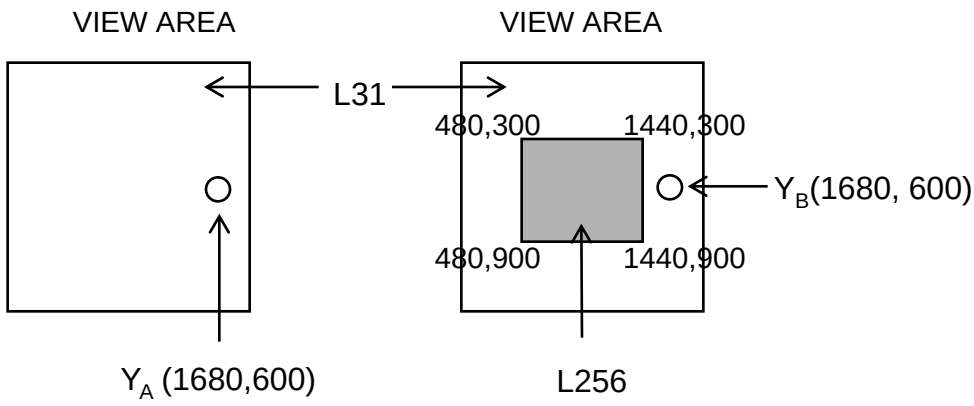


Figure 4. Cross Modulation Test Description



$$\text{Cross-Talk (\%)} = \left| \frac{Y_B - Y_A}{Y_B} \right| \times 100$$

Where:

Y_A = Initial luminance of measured area (cd/m^2)

Y_B = Subsequent luminance of measured area (cd/m^2)

The location measured will be exactly the same in both patterns

Note 6.

The electro-optical response time measurements shall be made as Figure 4 by switching the “data” input signal ON and OFF. The times needed for the luminance to change from 10% to 90% is Tr, and 90% to 10% is Td.

Note 7.

Cross-Talk of one area of the LCD surface by another shall be measured by comparing the luminance (YA) of a 25mm diameter area, with all display pixels set to a gray level, to the luminance (YB) of that same area when any adjacent area is driven dark (Refer to Figure 4).

5.0 INTERFACE CONNECTIONS

5.1 Electrical Interface Connection

CN1	HYDIS side connector	FF12-45A-R11B (DDK)

< Table 7, Electrical Interface Connection >

Pin No.	SYMBOL	FUNCTION
1	VDD	Power Supply, 3.3V(Typical)
2	VDD	Power Supply, 3.3V(Typical)
3	VDD	Power Supply, 3.3V(Typical)
4	V_EDID	EDID supply voltage
5	NC(BIST)	BIST testing (Only for Hydis)
6	SCL	EDID CLK
7	SDA	EDID DATA
8	NC	Non connection
9	NC	Non connection
10	GND	Ground
11	NC	Non connection
12	NC	Non connection
13	GND	Ground
14	NC	Non connection
15	NC	Non connection
16	GND	Ground
17	NC	Non connection
18	NC	Non connection
19	GND	Ground
20	MIPI_2N	MIPI_DATA
21	MIPI_2P	MIPI_DATA
22	GND	Ground
23	MIPI_1N	MIPI_DATA
24	MIPI_1P	MIPI_DATA

Pin No.	SYMBOL	FUNCTION
25	MIPI_CLKN	MIPI_CLK
26	MIPI_CLKP	MIPI_CLK
27	GND	Ground
28	MIPI_0N	MIPI_DATA
29	MIPI_0P	MIPI_DATA
30	GND	Ground
31	MIPI_3N	MIPI_DATA
32	MIPI3_P	MIPI_DATA
33	GND	Ground
34	FB1	LED string 1 cathode
35	FB2	LED string 2 cathode
36	FB3	LED string 3 cathode
37	FB4	LED string 4 cathode
38	FB5	LED string 5 cathode
39	LED_PWM_In	PWM supply form host
40	LED_PWM_Out	PWM return to BL driver
41	CABC_EN	Hi : CABC enable, low : disable
42	NC	Non connection
43	VLED	LED Power Supply (12V)
44	VLED	LED Power Supply (12V)
45	VLED	LED Power Supply (12V)

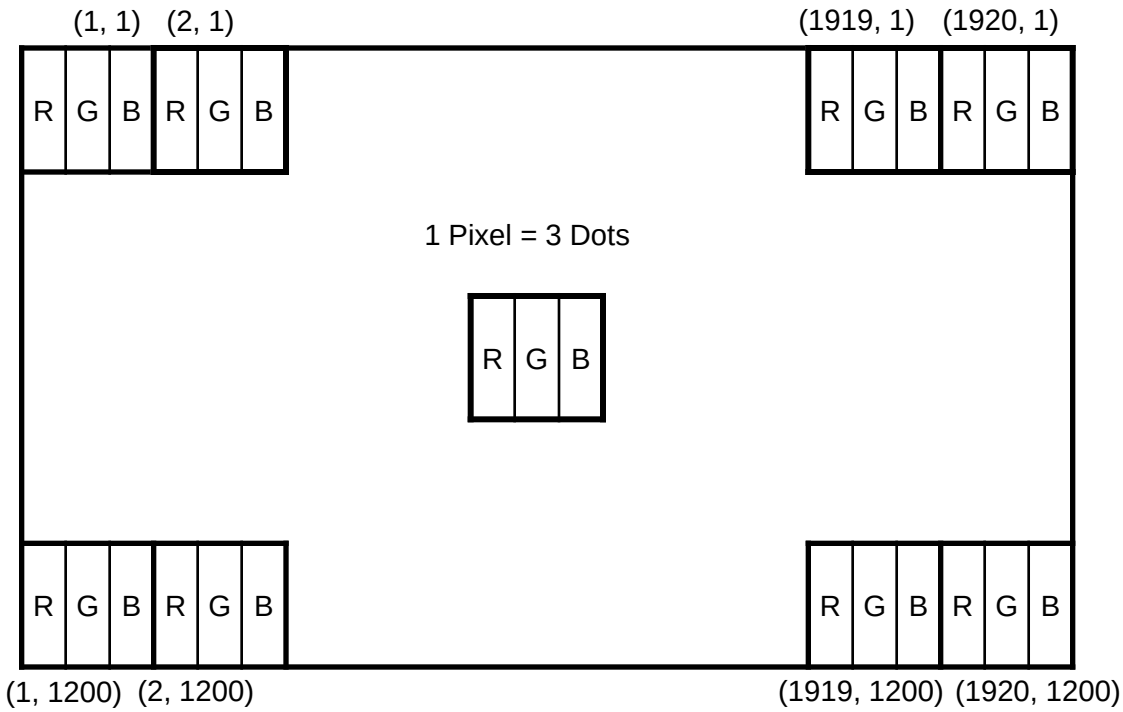
5.2 Back-light Interface

CN2 LED FPC Connector (20347-008E)

<Table 8, LED FPC connection >

Pin No.	Symbol	Function	Remark
1	Anode1	LED Anode	
2	Anode1		
3	NC	NC	
4	Cathode1	LED Cathode1	
5	Cathode2	LED Cathode2	
6	Cathode3	LED Cathode3	
7	Cathode4	LED Cathode4	
8	Cathode5	LED Cathode5	

5.3 Data Input Format



6.0. SIGNAL TIMING SPECIFICATIONS

6.1 The LCM is operated by the only DE (Data enable) mode

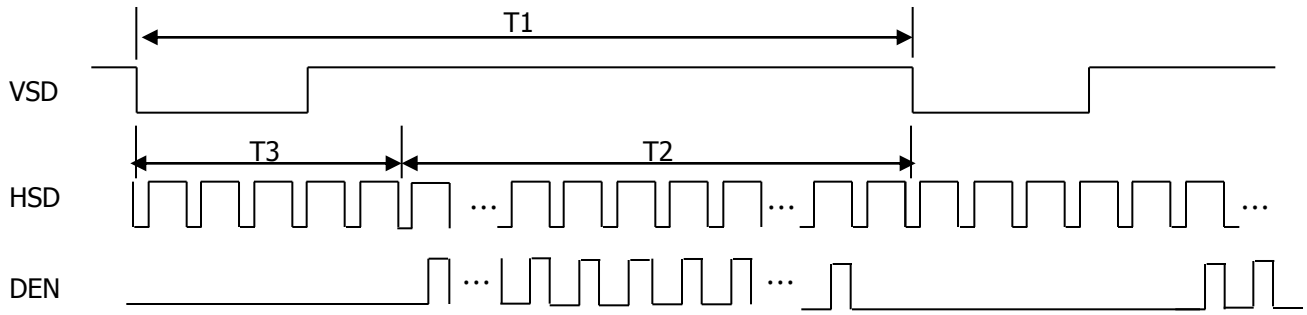
< Table 9, Signal Timing >

Item	Symbol	Min.	Typ.	Max.	Unit
Frame Rate	-		60		Hz
Frame Period	T1		1235		Lines
Vertical Display Time	T2		1200		Lines
Vertical Blanking Time	T3		35		Lines
1 Line Scanning Time	T4		2040		Clocks
Horizontal Display Time	T5		1920		Clocks
Horizontal Blanking Time	T6		120		Clocks
Clock Rate	1/T7		159.43		MHz

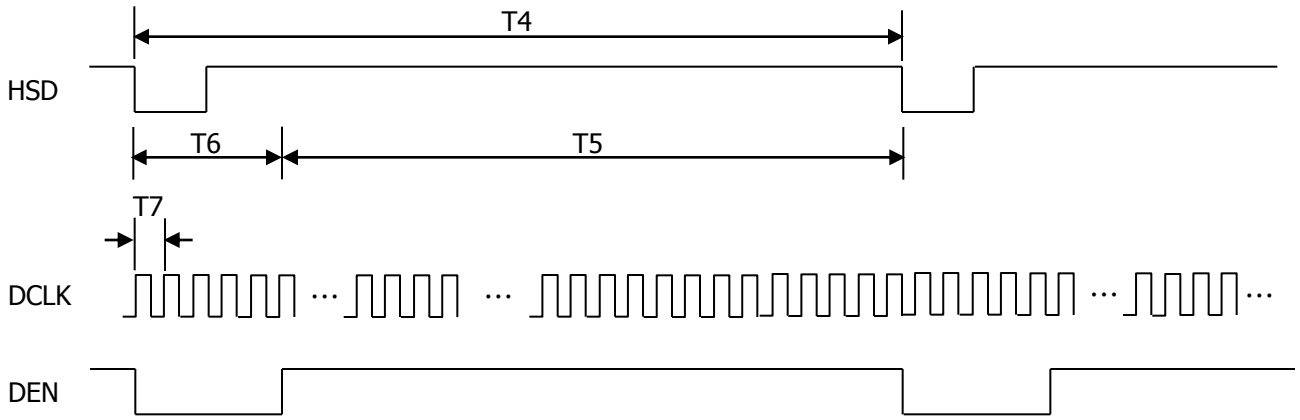
Note 1. This value only guarantee for the circuit-operation

7.0 SIGNAL TIMING WAVEFORMS

7.1 Vertical Input Timing Waveforms of Interface Signal



7.2 Horizontal Input Timing Waveforms of Interface Signal



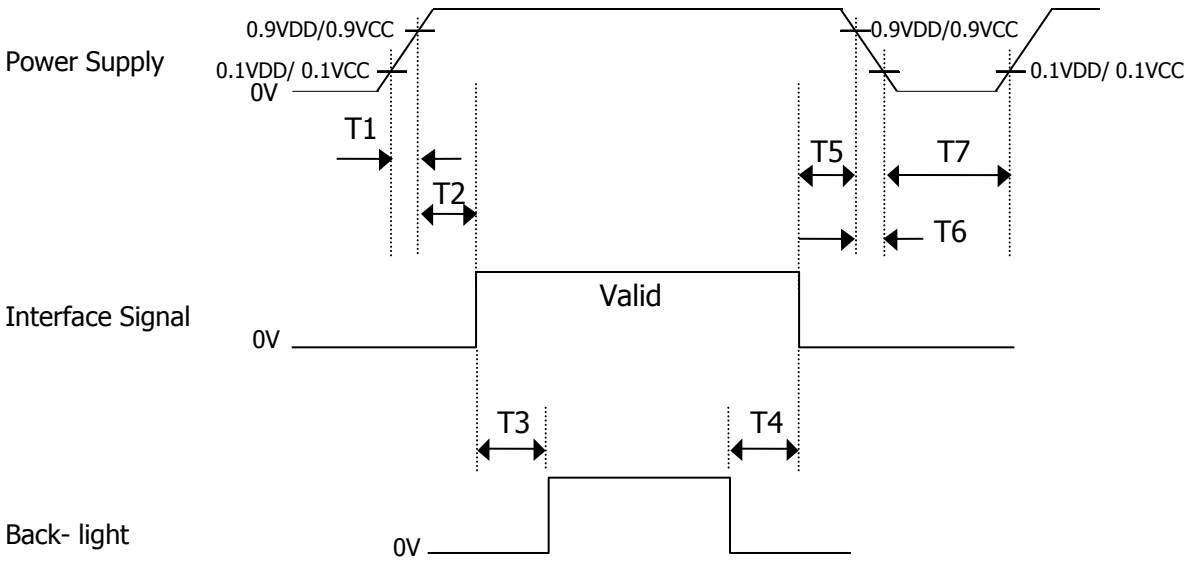
8.0 INPUT SIGNALS, BASIC DISPLAY COLORS & GRAY SCALE OF COLORS

A total of 16.7M colors are displayed with dither & HFRC using 64 gray from 8bit input.

Colors & Gray Scale		Red data								Green data								Blue data							
		R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	G0	B7	B6	B5	B4	B3	B2	B1	B0
Basic Colors	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Blue	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	Green	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	Cyan	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Red	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Magenta	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1
	Yellow	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	White	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Gray Scale Of Red	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	△	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Darker	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	△	↑								↑								↑							
	▽	↓								↓								↓							
	Brighter	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	▽	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gray Scale Of Green	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	△	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
	Darker	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	△	↑								↑								↑							
	▽	↓								↓								↓							
	Brighter	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0
	▽	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
	Green	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
Gray Scale Of Blue	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	△	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	Darker	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	△	↑								↑								↑							
	▽	↓								↓								↓							
	Brighter	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1
	▽	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0
	Blue	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
Gray Scale Of White & Black	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	△	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
	Darker	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0
	△	↑								↑								↑							
	▽	↓								↓								↓							
	Brighter	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1
	▽	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0
	White	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

9.0 POWER SEQUENCE

To prevent a latch-up or DC operation of the LCD module, the power on/off sequence shall be as shown in below



- T1 ≤ 50 ms
- 100 ≤ T2 ≤ 150 ms
- 200 ms ≤ T3
- 200 ms ≤ T4
- 0 ≤ T5 ≤ 50 ms
- 0 ≤ T6 ≤ 10ms
- 150ms ≤ T7

Notes : 1. When the power supply VDD/ VCC is 0V, Keep the level of input signals on the low or keep high impedance.
2. Do not keep the interface signal high impedance when power is on.
3. Back Light must be turn on after power for logic and interface signal are valid.

10.0 MECHANICAL CHARACTERISTICS

10.1 Dimensional Requirements

Figure 5 & 6 shows mechanical outlines for the model

< Table 10, Mechanical Characters >

Parameter	Specification	Unit
Active area	191.52(H) ×119.7(V)	mm
Number of pixels	1920(H) ×1200(V)	pixels
Pixel pitch	99.75(H) ×99.75(V)	um
Pixel arrangement	RGB Vertical Stripe	
Display colors	16.7M	colors
Display mode	Normally Black	
Outline dimension	203.5 (H) x 135.9 V) x 2.85 (D, Max.)	mm
Weight	120 (Typ.), 130 (Max.)	g
Back-light	Bottom edge side, 35-LEDs type	

10.2 LR and Polarizer Hardness.

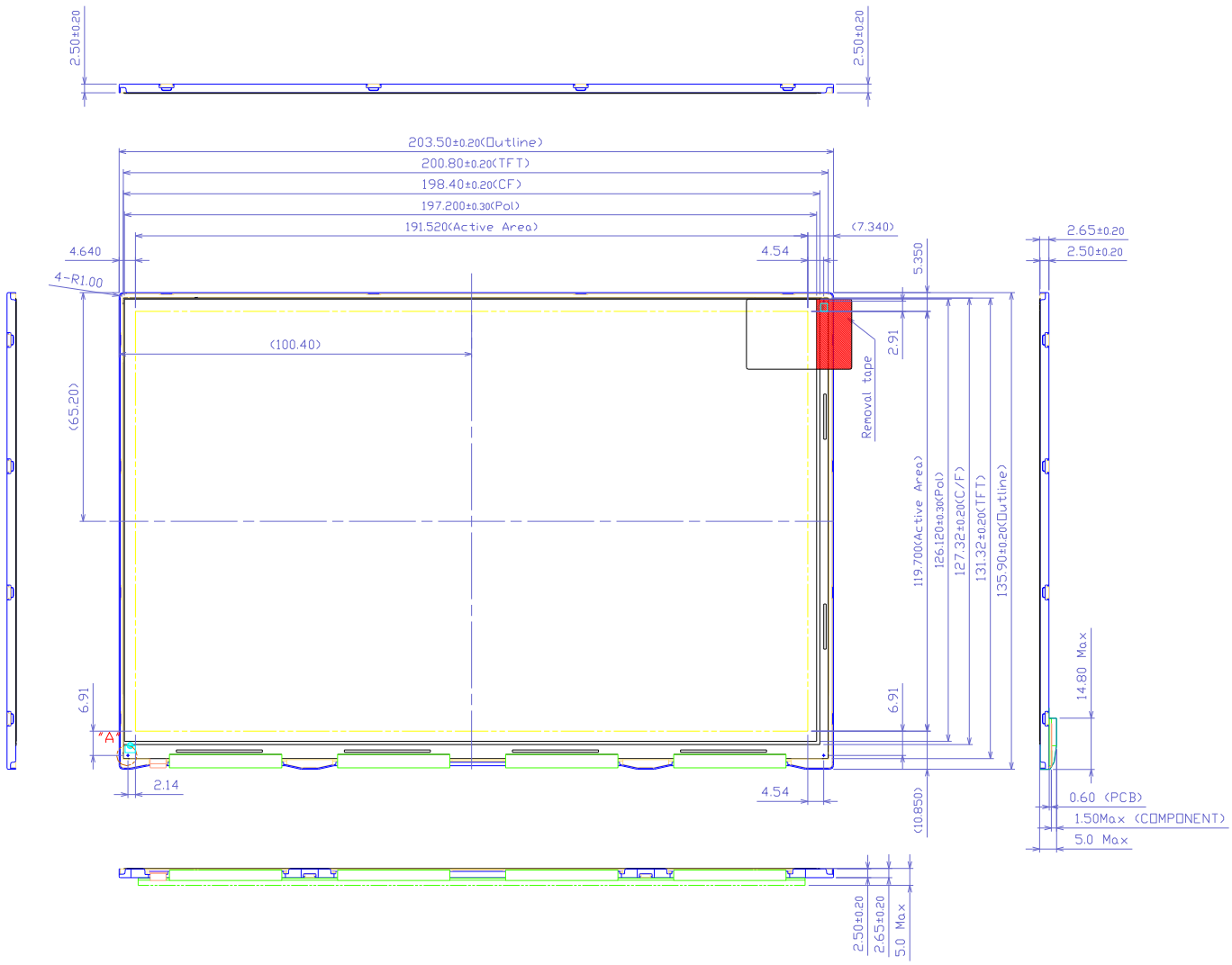
The surface of the LCD has an Low reflection coating and a coating to reduce scratching.

10.3 Light Leakage

There shall not be visible light from the back-lighting system around the edges of the screen as seen from a distance 50cm from the screen with an overhead light level of 150lux. The manufacture shall furnish limit samples of the panel showing the light leakage acceptable.

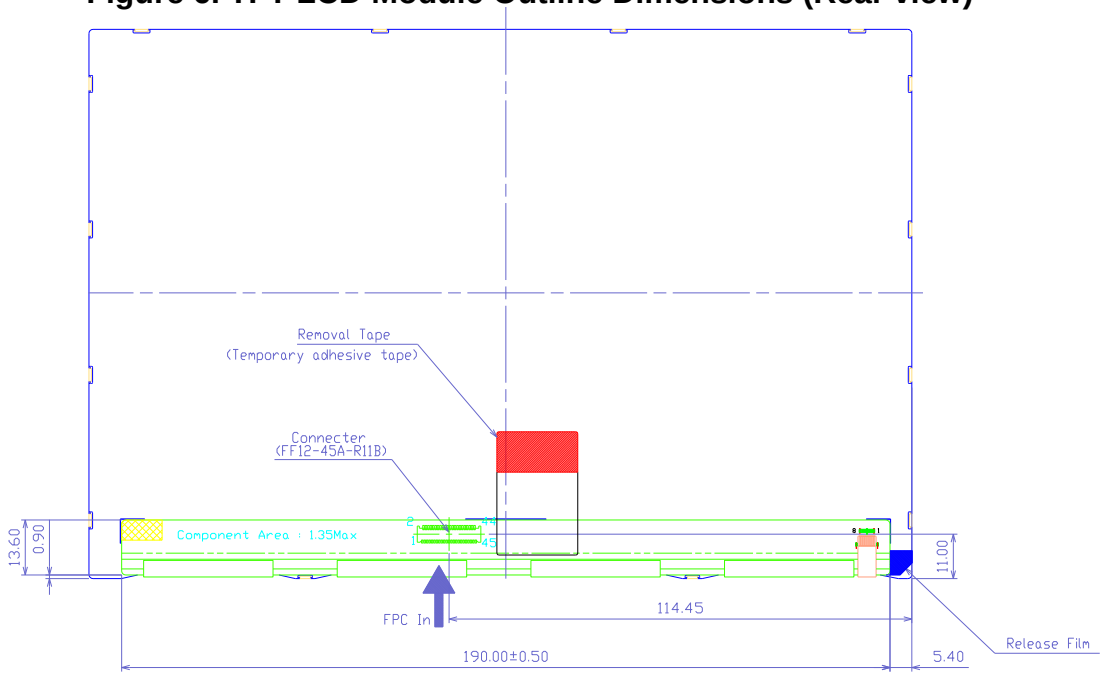
11.0 Mechanical Drawing

Figure 5. TFT-LCD Module Outline Dimension (Front View)

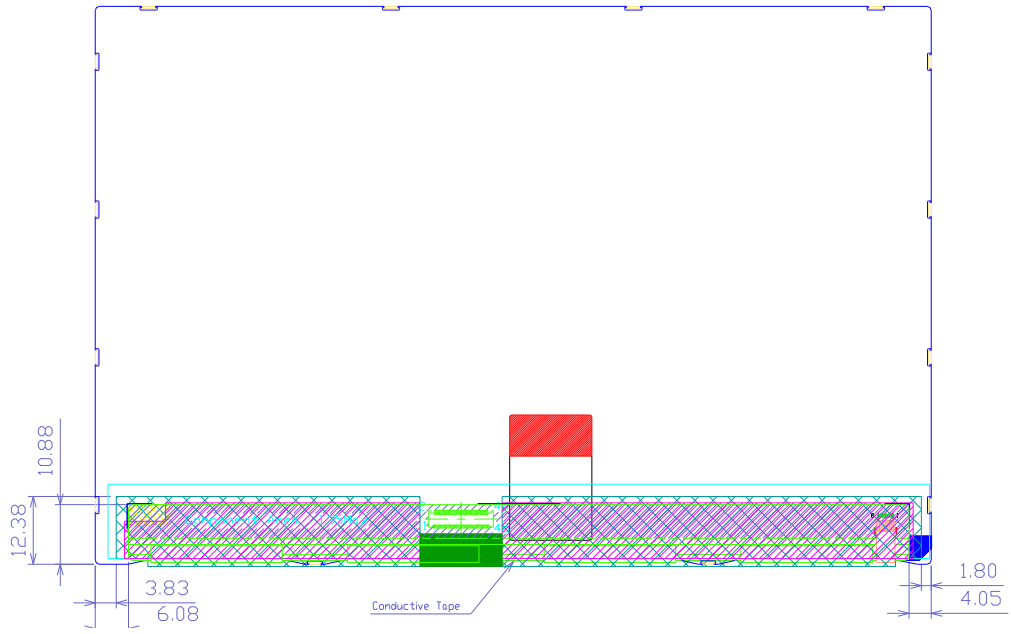


(w/o conductive tape)

Figure 6. TFT-LCD Module Outline Dimensions (Rear view)



(w/o conductive tape)



(w/ conductive tape)

12.0 RELIABLITY TEST

The Reliability test items and its conditions are shown in below.

< Table10, Reliability Test >

No	Test Item	Conditions
1	Temperature and Humidity test (Operation)	1. Ta = 40℃/90% 24hr 2. Ta = 40℃/30% 24hr 3. Ta = 0℃ 24hr
2	Temperature and Humidity Cycling (Storage)	Ta = 85℃/90%RH (2H) ,-20℃(2H),Waypoint(25℃25% RH turn off Humidity control) 12cycle. 144Hr
3	Thermal shock	Ta = -40 °C ↔ 85 °C (30min residence), 100 cycle
4	Low temperature storage test	Ta = -40 °C, 300 hrs
5	Low Temperature Test (Operation)	Ta = -20 °C, 300hrs
6	Biased Humidity/Heat Soak Test (Storage)	Ta = 85 °C /85%, 300hr
7	Altitude storage	20000 ft/-40 °C, 24hr
8	Hot Start Test	Ta = 85 °C 1hr, power on/off per 5m, 5 time
9	Cold Start Test	Ta = -40 °C 1hr, power on/off per 5m, 5 time
10	Mechanical shock	100 G, 6 ms, half sine wave(±X,±Y,±Z). Acceleration measured shock table.
11	Mechanical Random vibration	3.5 Grms, PSD =0.025g^2/Hz, 5-500 Hz 15 minutes in all axes (X, Y, Z)
12	4 Pt Bend Test	1. 7 kgf deflection. Scribed edge side up 2. 4 kgf deflection. Scribed edge side down
13	Ring on Ring Test	X kgf applied. Load rae:75mm/min
14	ESD	Screen: 150 pF, 330 Ohm, +/-15kV air, +/- 8 kV contact. FPC: 100 pFm100 Ohm, +/-200V 10 points, 20times/pt
15	Functional Test	Page flip script, 2 m flips

13.0 HANDLING & CAUTIONS

13.1 Cautions when taking out the module

• Pick the pouch only, when taking out module from a shipping package.

13.2 Cautions for handling the module

- As the electrostatic discharges may break the LCD module, handle the LCD module with care. Peel a protection sheet off from the LCD panel surface as slowly as possible.
- As the LCD panel and back - light element are made from fragile glass (epoxy) material, impulse and pressure to the LCD module should be avoided.
- As the surface of the polarizer is very soft and easily scratched, use a soft dry cloth without chemicals for cleaning.
- Do not pull the interface connector in or out while the LCD module is operating.
- Put the module display side down on a flat horizontal plane.
- Handle connectors and cables with care.

13.3 Cautions for the operation

- When the module is operating, do not lose MCLK, DE signals. If any one of these signals were lost, the LCD panel would be damaged.
- Obey the supply voltage sequence. If wrong sequence is applied, the module would be damaged.

13.4 Cautions for the atmosphere

- Dew drop atmosphere should be avoided.
- Do not store and/or operate the LCD module in a high temperature and/or humidity atmosphere. Storage in an electro-conductive polymer packing pouch and under relatively low temperature atmosphere is recommended.

13.5 Cautions for the module characteristics

- Do not apply fixed pattern data signal to the LCD module at product aging.
- Applying fixed pattern for a long time may cause image sticking.

13.6 Cautions for the digitizer assembly

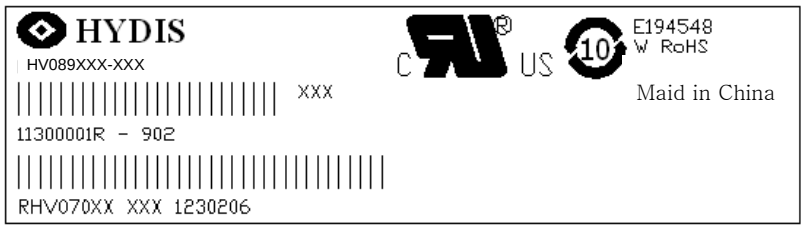
- When assembling FPC connector, do not flip connector past 90° due to possible damage to connector.
- When positioning digitizer underneath driver IC, do not lift driver IC past 90° due to possible damage to drive IC pattern.
- Please be warned that during assembly of digitizer, the opening or closing of FPC will result in possible electrostatic discharge damage to the LED

13.7 Other cautions

- Do not re-adjust variable resistor or switch etc.
- When returning the module for repair or etc., Please pack the module not to be broken. We recommend to use the original shipping packages.

14.0 LABELS

14.1 Product Label (Label Size: 66 x18mm)

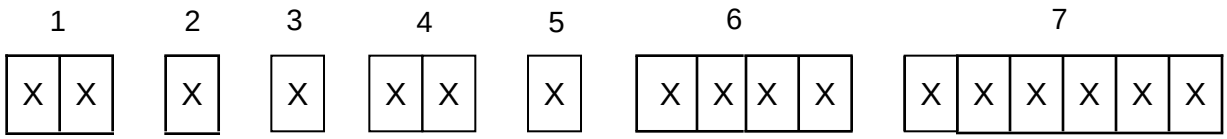


Item	Description	Item	Description
HYDIS	COMPANY NAME	E194548	UL CODE
HV089XXX-XXX	Model name	W、ROHS	UL CODE、EUROPE ROHS MARK
XXX 902	Material code, customer code	Made in Taiwan	Manufacturing location
11300001R	barcode Manufacturing serial no		UL Mark
	ROHS Mark	RHV070XX XXX 1230206	customer code Explanation is as below

barcode Manufacturing serial no

Example	1	1	3	0	0	0	0	1	R
code	1	2	3	4	5	6	7	8	9
definition	Year	Cycle		Water code					Manufacturer code

HYDIS Barcode



No 1. Control Number

No 2. Rank / Grade

No 3. Line Classification
(HYDIS : H)

No 4. Year (5 : 2005, 6 : 2006, …)

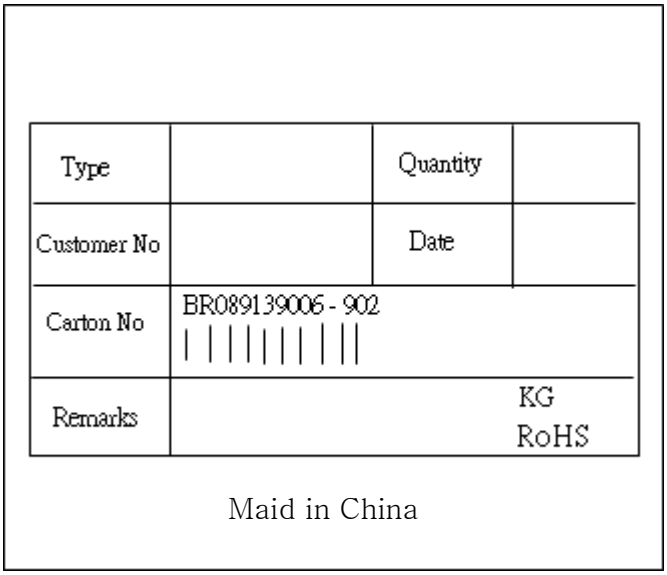
No 5. Month (1, 2, 3,…, 9, X, Y, Z)

No 6. FG Code

No 7. Serial Number

14.2 Box Packing Label

Box Label (size:80 x 70 mm)



Contents	DESCRIPTION
B	CELL Cost code
R	MDL Manufacturing code
089	MDL Size
1	Year
39	Cycle
006	Serial No
902	Customer code

Pallet label (size:80 x 70 mm)

Contents	DESCRIPTION
HYDIS	Company Name
HV089XXX-XXX	Type Name
XX CN，XXX PCS	Carton quantity，Number panel
XXXX/XX/XX	Year / Month / Day
BR089139006A - 902	BOX ID and Customer Code

Contents	DESCRIPTION
B	CELL Cost code
R	MDL Manufacturing code
089	MDL Size
1	Year
39	Cycle
006	Serial No
A	Special code
902	Customer code

BOX ID Description ：

BR089139006A - 902

15.0 PACKING INFORMATION

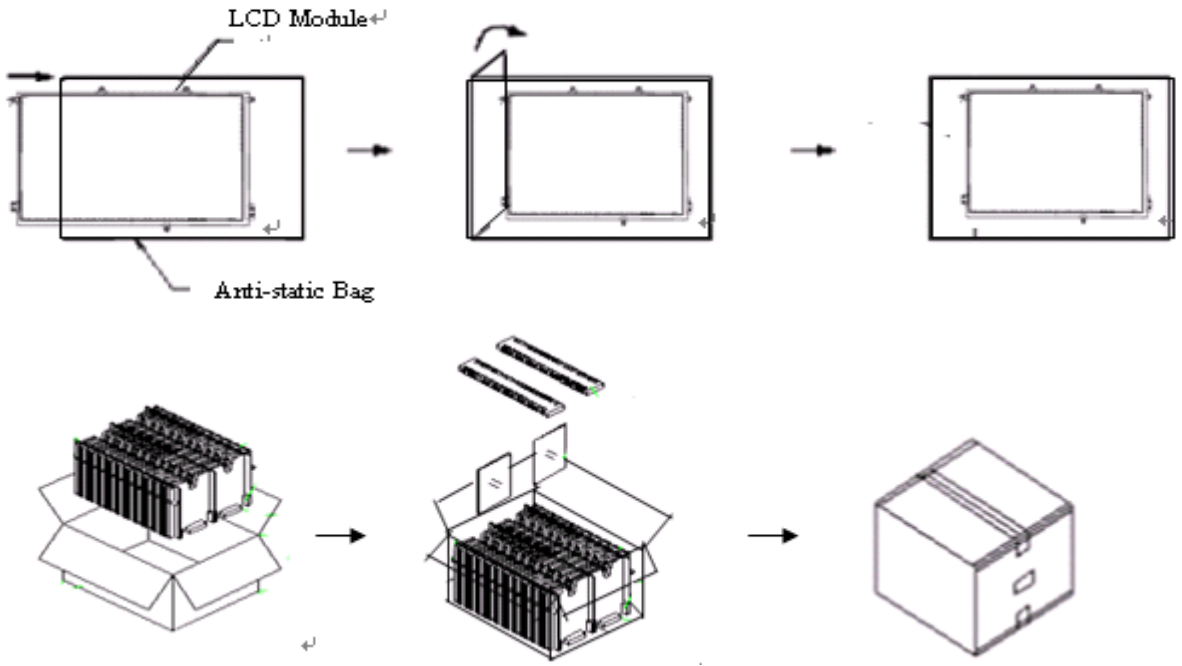
15.1 Box Packing

15.1.1 Packing specification

(1) 46 LCD modules (max.) / 1 Box
(2) Box dimensions: 375(L) X 441(w)X 302(H) mm
(3) Weight: approximately 9.36Kg (46modules per box)

15.1.2 PACKING Method

(1) Figures 2-1 and 2-2 are the packing method



15.2 **Pallet** Packing

15.2.1 PALLET specification

(1) 18 box (max.) / 1 pallet
(2) Pallet: 1150(L) X 900(W) X 130(H) mm
(3) Pallet stack: 1150(L) X 1000(W) X1036(H) mm
(4) Angle boards: L 906 X 50 X 50mm
(5) Gross Weight:178.5Kg