

Tentative Specification
Preliminary Specification
Approval Specification

MODEL NO.: G154IJE SUFFIX: L02

Customer: SIEMENS	3
APPROVED BY	SIGNATURE
Name / Title Note	
Please return 1 copy for yo signature and comments.	ur confirmation with your

Approved By	Checked By	Prepared By
yuhsiang.chang	clark.kuo	thurston.lin
(張喻翔/514-1092	2) (郭鐘亮/514-10921)	(林群祥/514-10927)
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REVISION HISTORY

Version	Date	Section	Description
2.0	21 th Dec., 2011	All	G154IJE-L02 Approval Spec. was first issued.
2.1	20 th ,Jan.,2012		MECHANICAL SPECIFICATIONS, Weight Typ. 4200g → 920g Modified PWM Control Level : low level 0.15V→0.4V
2.2	11 th ,May, 2012		



1. GENERAL DESCRIPTION

1.1 OVERVIEW

The G154IJE-L02 model is a 15.4" MVA TFT-LCD module with a white LED Backlight Unit and a 30-pin 1ch-LVDS interface. This module supports 1280 x 800 WXGA mode and displays 262k/ 16.2M colors. The converter for the Backlight Unit is built in.

1.2 GENERAL SPECIFICATIONS

Item	Specification	Unit	Note
Diagonal Size	15.4	inch	
Active Area	331.2(H) x 207.0(V)	mm	(1)
Bezel Opening Area	334.5 x 210.3	mm	
Driver Element	a-si TFT active matrix	-	-
Pixel Number	1280 x R.G.B. x 800	pixel	-
Pixel Pitch	0.259(H) x 0.259(V)	mm	-
Pixel Arrangement	RGB vertical stripe	-	-
Display Colors	262k/ 16.2M	color	-
Transmissive Mode	Normally black	-	-
Surface Treatment	AG, 3H	-	-
Luminance, White	400	Cd/m2	
Power Consumption	Total 19W (Max.) @ cell 4W (Max.), BL 15W (Max.)		

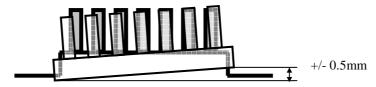


1.5 MECHANICAL SPECIFICATIONS

Item		Min.	Тур.	Max.	Unit	Note
	Horizontal (H)	351.5	352	352.5	mm	
Module Size	Vertical (V)	229.5	230	230.5	mm	(1)
	Thickness (T)	8.2	8.7	9.2		
Bezel Area	Horizontal	334.2	334.5	334.8	mm	
Dezei Alea	Vertical	210.0	210.3	210.6	mm	
Weight		-	920	-	g	
		The mounting in				
I/F connector n	nounting position	the screen		(2)		
			horizontal.			

Note (1) Please refer to the attached drawings for more information of front and back outline dimensions.

(2) Connector mounting position





2. ABSOLUTE MAXIMUM RATINGS

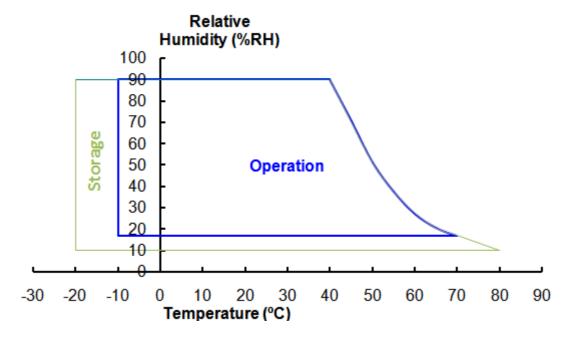
2.1 ABSOLUTE RATINGS OF ENVIRONMENT

Item	Symbol	Va	Unit	Note		
iteiii	Syllibol	Min.	Max.	Offic	Note	
Operating Ambient Temperature	T _{OP}	-10	+70	۰C	(1), (2)	
Storage Temperature	T _{ST}	-20	+80	°C	(1)	

Note (1): Temperature and relative humidity range is shown in the figure below.

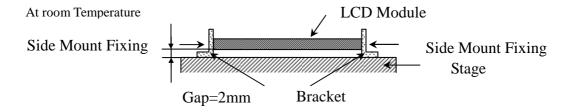
- (a) 90 %RH Max. (Ta \leq 40 °C).
- (b) Wet-bulb temperature should be 39 °C Max. (Ta > 40 °C).
- (c) No condensation.

Note (2) The temperature of panel surface should be -10 $^{\circ}$ C min. and 70 $^{\circ}$ C max.



- Note (3) 1 time for $\pm X$, $\pm Y$, $\pm Z$. for Condition (25G / 6ms) is half Sine Wave,.
- Note (4) 5- 9Hz: 3,5mm amplitude 9- 500Hz: 1g- each 10 cycles / axis (X,Y,Z); 1 octave / min.
- Note (5) At testing Vibration and Shock, the fixture in holding the module has to be hard and rigid enough so that the module would not be twisted or bent by the fixture.

The fixing condition is shown as below:





2.2 ELECTRICAL ABSOLUTE RATINGS

2.2.1 TFT LCD MODULE

Item	Cymbol	Value		Unit	Note	
item	Symbol	Min.	Max.	Offit	Note	
Power Supply Voltage	Vcc	-0.3	4.0	V	(1)	
Logic Input Voltage	V_{IN}	-0.3	Vcc+0.3	V	(1)	

2.2.2 BACKLIGHT UNIT

Item		Value	Unit	Note		
item	Min	Тур.	Max.	Offic	Note	
LED Light Bar Input voltage	-	31	-	V_{DC}	(4) (0)	
LED Light Bar Input Current	-	400	-	mA_{DC}	(1), (2)	

Note (1) Permanent damage to the device may occur if maximum values are exceeded. Function operation should be restricted to the conditions described under Normal Operating Conditions.

Note (2) Specified values are for LED (Refer to Section 3.2 for further information).



3. ELECTRICAL CHARACTERISTICS

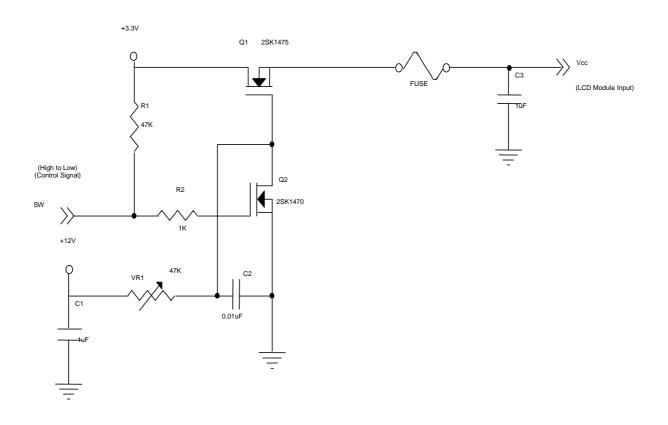
3.1 TFT LCD MODULE

Ta = 25 ± 2 °C

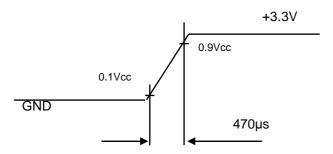
Paramete	Symbol		Value		Unit	Note	
Faiametei		Symbol	Min.	Тур.	Max.		
Power Supply Voltage		Vcc	3.0	3.3	3.6	V	at Vcc=3.3V
Ripple Voltage		V_{RP}	-	50		mV	-
Rush Current		I _{RUSH}	ı	1	1.5	Α	(2)
Initial Stage Current		I _{IS}	ı	ı	1.0	Α	(2)
Dowar Supply Current	White	lcc	ı	1.2	1.44	Α	(3)a, at Vcc=3.3V
Power Supply Current	Black	ICC	ı	750	900	mA	(3)b, at Vcc=3.3V
LVDS Differential Input F	ligh Threshold	VTH(LVDS)	ı	1	+100	mV	(5), VCM=1.2V
LVDS Differential Input L	ow Threshold	VTL(LVDS)	-100	-	-	mV	(5) VCM=1.2V
LVDS Common Mode Vo	ltage	VCM	1.125	•	1.375	V	(5)
LVDS Differential Input Voltage		VID	100	-	600	mV	(5)
Terminating Resistor		RT	-	100	-	Ohm	
Power per EBL WG		PEBL	-	3	-	W	(4)

Note (1) The assembly should be always operated within above ranges.

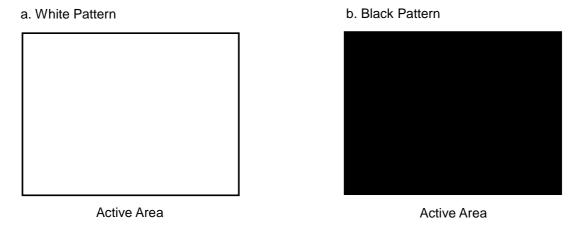
Note (2) Measurement Conditions:



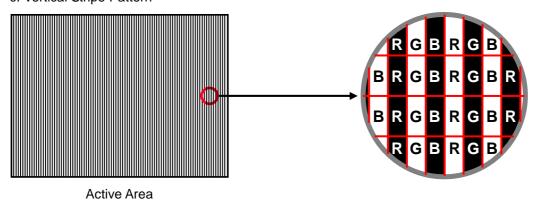
VCC rising time is 470us



Note (3) The specified power supply current is under the conditions at Vcc = 3.3 V, Ta = 25 ± 2 °C, $f_v = 60$ Hz, whereas a power dissipation check pattern below is displayed.



c. Vertical Stripe Pattern





3.2 BACKLIGHT UNIT

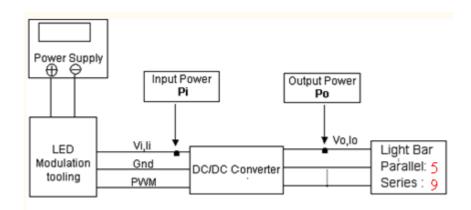
 $Ta = 25 \pm 2 \, {}^{\circ}C$

Parameter		Symbol		Value	Unit	Note		
raiametei		Symbol	Min.	Тур.	Max.	Offic	NOLE	
Converter Power Supply V	oltage	V_{i}	10.8	12.0	13.2	V	(Duty 100%)	
Converter Power Supply C	urrent	I.	1.1	1.2	1.3	Α	@ Vi = 12V	
Converter Fower Supply C	urrent	l _i	1.1	1.2	1.5	Υ .	(Duty 100%)	
							@ Vi = 12V	
LED Power Consumption		P _{LED}		14.4		W	(Duty	
							100%),(3)	
EN Control Level	Backlight on	BLU_EN	2		5	V		
E14 Control Ecver	Backlight off		0		0.8	V		
PWM Control Level	PWM High Level	BLU_ADJ	2.0		5	V		
1 VVIVI CONTION Level	PWM Low Level	DEO_AD3	0		0.4	V		
PWM Control Duty Ratio			1		100	%		
PWM Control Frequency		f _{PWM}	130	200	210	Hz		
LED Life Time		L _L	50,000			Hrs	(1), (2)	

Note (1) LED current is measured by utilizing a high frequency current meter as shown below:

Note (2) The lifetime of LED is defined as the time when it continues to operate under the conditions at $Ta = 50\pm2$ °C and $I_{LED} = 80\text{mA}_{DC}$ (LED forward current) until the brightness becomes $\leq 50\%$ of its original value.

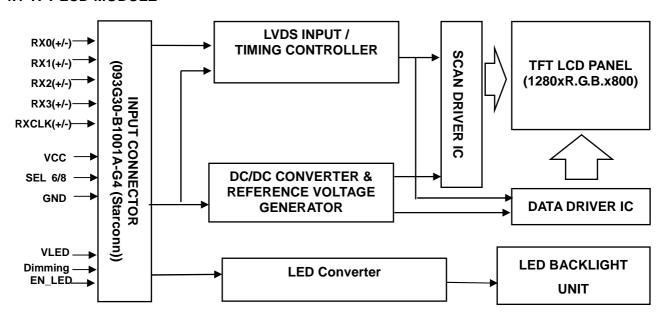
Note (3) $P_L = I_o \times V_o$





4. BLOCK DIAGRAM

4.1 TFT LCD MODULE





5. INPUT TERMINAL PIN ASSIGNMENT

5.1 TFT LCD MODULE

Pin	Name	Description	Remark
1	12V	LED Power supply	LED converter power
2	12V	LED Power supply	
3	12V	LED Power supply	
4	12V	LED Power supply	
5	ENLED	Enable Pin	
6	Dimming	Backlight Adjust	
7	GND	Ground	
8	GND	Ground	
9	VCC	Power supply +3.3V	System power
10	VCC	Power supply +3.3V	
11	GND	Ground	
12	GND	Ground	
13	RX0-	Differential Data Input, CH0 (Negative)	
14	RX0+	Differential Data Input, CH0 (Positive)	
15	GND	Ground	
16	RX1-	Differential Data Input, CH1 (Negative)	
17	RX1+	Differential Data Input , CH1 (Positive)	
18	GND	Ground	
19	RX2-	Differential Data Input , CH2 (Negative)	B2~B5, DE, Hsync, Vsync
20	RX2+	Differential Data Input , CH2 (Positive)	
21	GND	Ground	
22	RXCLK-	Differential Clock Input (Negative)	LVDS Level Clock
23	RXCLK+	Differential Clock Input (Positive)	
24	GND	Ground	
25	RX3-	Differential Data Input, CH3 (Negative)	
26	RX3+	Differential Data Input, CH3 (Positive)	
27	GND	Ground	
00	051.0/0	LVDS 6/8 bit select function control,	(0)
28	SEL6/8	Low or NC → 6 bit Input Mode	(2)
20	GND	High →8 bit Input Mode GND	
29 30		-	
30	GND	Ground	

Note (1) Connector Part No.: STARCONN 093G30-B1001A-G4 or equivalent.

Note (2) "Low" stands for 0V. "High" stands for 3.3V. "NC" stands for "No Connected".



5.3 COLOR DATA INPUT ASSIGNMENT

The brightness of each primary color (red, green and blue) is based on the 6-bit gray scale data input for the color. The higher the binary input, the brighter the color. The table below provides the assignment of color versus data input.

			Data Signal																
Color				Re	ed						en					Bl	ue		
		R5	R4	R3	R2	R1	R0	G5	G4	G3	G2	G1	G0	B5	B4	В3	B2	B1	B0
	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	Green	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
Basic	Blue	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1
Colors	Cyan	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1
	Magenta	1	1	1	1	1	1	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	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
	Red(0)/Dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(1)	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Gray	Red(2)	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Scale	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
Of	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
Red	Red(61)	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
	Red(62)	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(63)	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	Green(0)/Dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Green(1)	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Gray	Green(2)	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Scale	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
Of	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
Green	Green(61)	0	0	0	0	0	0	1	1	1	1	0	1	0	0	0	0	0	0
	Green(62)	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0
	Green(63)	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
	Blue(0)/Dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Blue(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Gray	Blue(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Scale	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
Of	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
Blue	Blue(61)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	1
	Blue(62)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0
	Blue(63)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1

Note (1) 0: Low Level Voltage, 1: High Level Voltage



6. INTERFACE TIMING

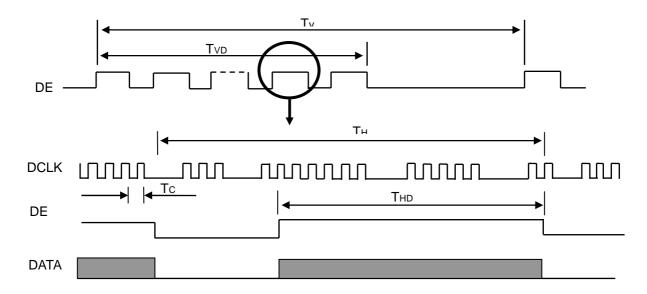
6.1 INPUT SIGNAL TIMING SPECIFICATIONS

The input signal timing specifications are shown as the following table and timing diagram.

Signal	Item	Symbol	Min.	Тур.	Max.	Unit	Note
DCLK	Frequency	1/Tc	67.45	71	74.55	MHz	-
	Vertical Total Time	TV	810	823	1000	TH	-
DE	Vertical Addressing Time	TVD	800	800	800	TH	-
DE	Horizontal Total Time	TH	1360	1440	1600	Tc	-
	Horizontal Addressing Time	THD	1280	1280	1280	Tc	-

Note: (1) Because this module is operated by DE only mode, Hsync and Vsync input signals should be set to low logic level or ground. Otherwise, this module would operate abnormally.

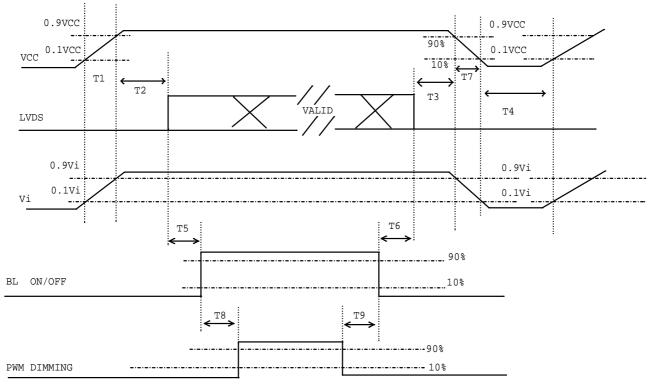
INPUT SIGNAL TIMING DIAGRAM





6.2 POWER ON/OFF SEQUENCE

To prevent a latch-up or DC operation of LCD assembly, the power on/off sequence should be as the diagram below.



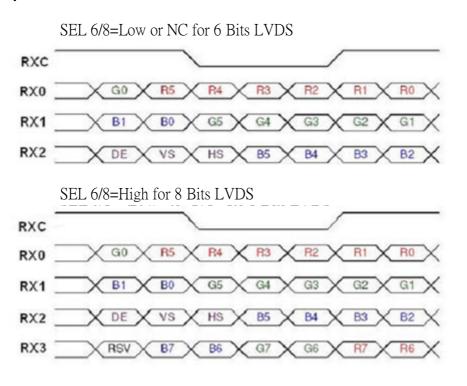
Power ON/OFF sequence

- Note (1) Please avoid floating state of interface signal at invalid period.
- Note (2) When the interface signal is invalid, be sure to pull down the power supply of LCD VCC to 0 V.
- Note (3) The Backlight converter power must be turned on after the power supply for the logic and the interface signal is valid. The Backlight converter power must be turned off before the power supply for the logic and the interface signal is invalid.

Parameter		Units			
Parameter	Min	Тур	Max	Office	
T1	0.5	ı	10	ms	
T2	0	-	50	ms	
Т3	0	-	50	ms	
T4	500	-	-	ms	
T5	200	ı	-	ms	
T6	20	-	-	ms	
T7	5	-	300	ms	
Т8	10	-	-	ms	
Т9	10	-	-	ms	



6.3 The Input Data Format



Note (1) R/G/B data 7: MSB, R/G/B data 0: LSB

Note (2) Please follow PSWG

Signal Name	Description	Remark
R7	Red Data 7 (MSB)	Red-pixel Data
R6	Red Data 6	Each red pixel's brightness data consists of these
R5	Red Data 5	8 bits pixel data.
R4	Red Data 4	
R3	Red Data 3	
R2	Red Data 2	
R1	Red Data 1	
R0	Red Data 0 (LSB)	
G7	Green Data 7 (MSB)	Green-pixel Data
G6	GreenData 6	Each green pixel's brightness data consists of these
G5	GreenData 5	8 bits pixel data.
G4	GreenData 4	
G3	GreenData 3	
G2	GreenData 2	
G1	GreenData 1	
G0	GreenData 0 (LSB)	
B7	Blue Data 7 (MSB)	Blue-pixel Data
B6	Blue Data 6	Each blue pixel's brightness data consists of these
B5	Blue Data 5	8 bits pixel data.
B4	Blue Data 4	
B3	Blue Data 3	
B2	Blue Data 2	
B1	Blue Data 1	
B0	Blue Data 0 (LSB)	
RXCLKIN+	LVDS Clock Input	
RXCLKIN-		
DE	Display Enable	
VS	Vertical Sync	
HS	Horizontal Sync	



7. OPTICAL CHARACTERISTICS

7.1 TEST CONDITIONS

Item	Symbol	Value	Unit
Ambient Temperature	Ta	25±2	°C
Ambient Humidity	На	50±10	%RH
Supply Voltage	V_{CC}	3.3	V
Input Signal	According to typical va	alue in "3. ELECTRICAL	CHARACTERISTICS"
Converter PWM duty		100%	

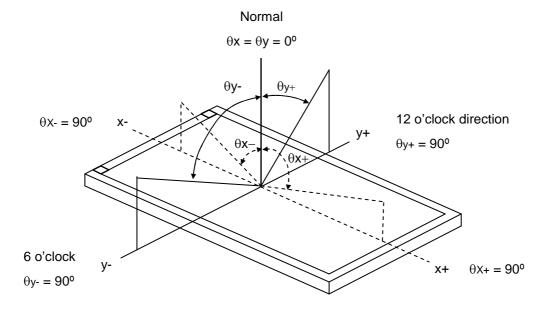
7.2 OPTICAL SPECIFICATIONS

The relative measurement methods of optical characteristics are shown in 7.2. The following items should be measured under the test conditions described in 7.1 and stable environment shown in Note (5).

Item		Symbol	Condition	Min.	Тур.	Max.	Unit	Note
Contrast Ratio		CR		800	1000	-	-	(2), (5)
Response Tin	00	T_R		-	15	20	ms	(3)
ixesponse iiii	iie	T _F		-	10	15	ms	(3)
Luminance of	White (5P)	L _{AVE}		300	400	-	cd/m ²	(4), (5)
White Variation	on	δW	θ_x =0°, θ_Y =0° Viewing	-	1.25	1.4	-	(5), (6)
	Red	Rx	Normal Angle		0.565	Тур. +0.05	-	(1), (5)
		Ry		Тур. +0.05	0.351		-	
	Green	Gx			0.357		-	
Color		Gy			0.590		-	
Chromaticity	Blue	Bx			0.155		-	
		Ву			0.131		-	
	White	Wx			0.313		-	
	vviile	Wy			0.329		-	
	Horizontal	θ_x +		80	88	-		
Viewing	Honzontal	θ_{x} -	OD>40	80	88	-	Dog	(1), (5)
Angle	Vertical	θ_{Y} +	CR≥10	80	88	-	Deg.	
	Vertical	$\theta_{ ext{Y}}$ -		80	88	-		



Note (1) Definition of Viewing Angle (θx , θy):



Note (2) Definition of Contrast Ratio (CR):

The contrast ratio can be calculated by the following expression.

Contrast Ratio (CR) = L63 / L0

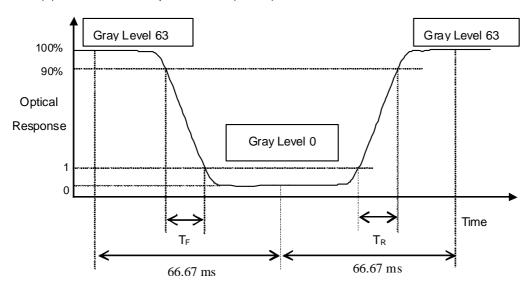
L63: Luminance of gray level 63

L 0: Luminance of gray level 0

CR = CR (5)

CR (X) is corresponding to the Contrast Ratio of the point X at Figure in Note (6).

Note (3) Definition of Response Time (T_R, T_F) and measurement method:





Note (4) Definition of Luminance of White (L_C):

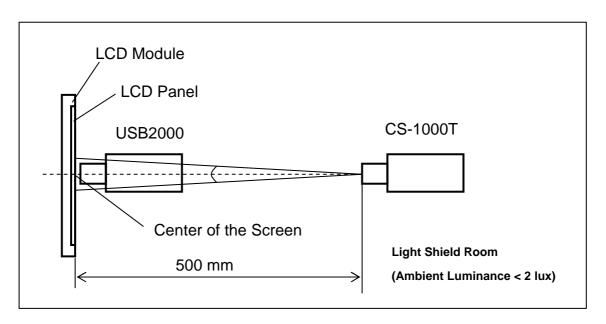
Measure the luminance of gray level 63 at center point

$$L_{\rm C} = L (5)$$

L (x) is corresponding to the luminance of the point X at Figure in Note (6).

Note (5) Measurement Setup:

The LCD module should be stabilized at given temperature for 20 minutes to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting Backlight for 20 minutes in a windless room.

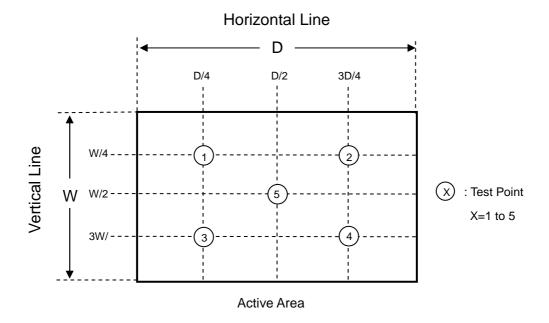




Note (6) Definition of White Variation (δW):

Measure the luminance of gray level 63 at 5 points

$$\delta W = \frac{\text{Maximum [L (1), L (2), L (3), L (4), L (5)]}}{\text{Minimum [L (1), L (2), L (3), L (4), L (5)]}}$$





8. Reliability Test Criteria

Test Item	Test Condition	Note
High Temperature Storage Test	80°C,504 hours	
Low Temperature Storage Test	-20°C, 504 hours	
Thermal Shock Storage Test	-20°C, 0.5hour←→80°C, 0.5hour; 1hour/cycle,100cycles	
High Temperature Operation Test	70°C, 504 hours	(1)(2)(4)
Low Temperature Operation Test	-10°C, 504 hours	
High Temperature & High Humidity Operation Test	60°C, 90%RH, 504hours	
Shock (Non-Operating)	25g, half sine, duration: 6ms	(3)(4)
Shock (Non-Operating)	- 1000 cycles / axis, neg. / pos. direction	(3)(4)
Shock (Operating)	15g, half sine, duration: 30ms	(3)(4)
Shock (Operating)	- 3 cycles / axis, neg. / pos. direction	(3)(4)
	5- 9Hz: 3,5mm amplitude	
Vibration (Non-Operating)	9- 500Hz: 1g	(3)(4)
	- each 10 cycles / axis (X,Y,Z); 1 octave / min.	
	10- 58Hz: 0,075mm amplitude	
Vibration (Operating)	58- 500Hz: 1g	(3)(4)
	- each 10 cycles / axis (X,Y,Z); 1 octave / min.	

- Note (1) There should be no condensation on the surface of panel during test.
- Note (2) Temperature of panel display surface area should be 80 °C Max.
- Note (3) At testing Vibration and Shock, the fixture in holding the module has to be hard and rigid enough so that the module would not be twisted or bent by the fixture.
- Note (4) In the standard conditions, there is no function failure issue occurred. All the cosmetic specification is judged before reliability test.



9. PACKAGING

9.1 PACKING SPECIFICATIONS

- (1) 13pcs LCD modules / 1 Box
- (2) Box dimensions: 465(L) X 362 (W) X 314 (H) mm
- (3) Weight: approximately 11 Kg (13 modules per box)

9.2 PACKING METHOD

(1) Carton Packing should have no failure in the following reliability test items.

Test Item	Test Conditions	Note
	ISTA STANDARD	
	Random, Frequency Range: 2 – 200 Hz	
Vibration	Top & Bottom: 30 minutes (+Z), 10 min (-Z),	Non Operation
	Right & Left: 10 minutes (X)	-
	Back & Forth 10 minutes (Y)	
Dropping Test	1 Angle, 3 Edge, 6 Face, 61 cm	Non Operation

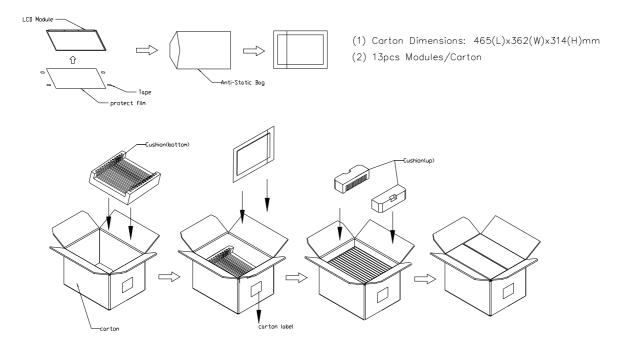


Figure. 9-1 Packing method



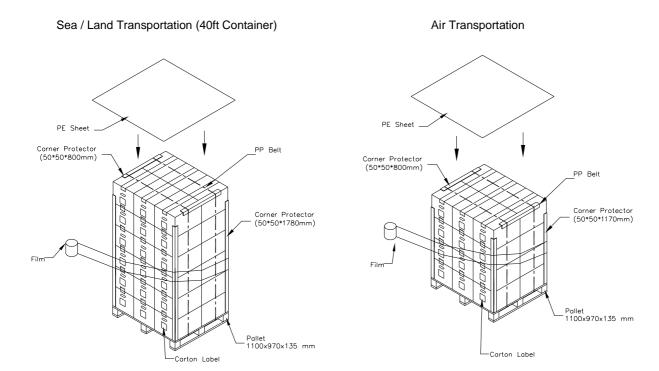


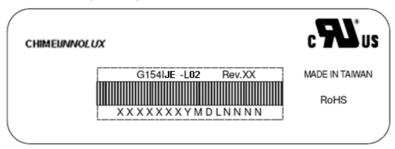
Figure. 9-2 Packing method



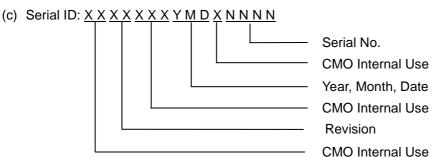
10. DEFINITION OF LABELS

10.1 CMI MODULE LABEL

The barcode nameplate is pasted on each module as illustration, and its definitions are as following explanation.



- (a) Model Name: G154IJE -L02
- (b) Revision: Rev. XX, for example: A1, ...C1, C2 ...etc.



Serial ID includes the information as below:

(a) Manufactured Date: Year: 0~9, for 2010~2019

Month: 1~9, A~C, for Jan. ~ Dec.

Day: 1~9, A~Y, for 1st to 31st, exclude I, O and U

- (b) Revision Code: cover all the change
- (c) Serial No.: Manufacturing sequence of product



10.2 CARTON LABEL

CHIMEI INNOLUX
PO.NC:
Caron ID

(a) P/N: Internal control

(b) Model Name: G154IJE-L02

(c) Production year and month: shown at left down corner

(d) Production location: Made In XXXX. XXXX stands for production location.



11. PRECAUTIONS

11.1 ASSEMBLY AND HANDLING PRECAUTIONS

- (1) Do not apply rough force such as bending or twisting to the module during assembly.
- (2) To assemble or install module into user's system can be only in clean working areas. The dust and oil may cause electrical short or worsen the polarizer.
- (3) It's not permitted to have pressure or impulse on the module because the LCD panel and Backlight will be damaged.
- (4) Always follow the correct power sequence when LCD module is connecting and operating. This can prevent damage to the CMOS LSI chips during latch-up.
- (5) Do not pull the I/F connector in or out while the module is operating.
- (6) Do not disassemble the module.
- (7) Use a soft dry cloth without chemicals for cleaning, because the surface of polarizer is very soft and easily scratched.
- (8) It is dangerous that moisture come into or contacted the LCD module, because moisture may damage LCD module when it is operating.
- (9) High temperature or humidity may reduce the performance of module. Please store LCD module within the specified storage conditions.
- (10) When ambient temperature is lower than 10°C may reduce the display quality. For example, the response time will become slowly, and the starting voltage of CCFL will be higher than room temperature.
- (11) Do not keep same pattern in a long period of time. It may cause image sticking on LCD.

11.2 SAFETY PRECAUTIONS

- (1) Do not disassemble the module or insert anything into the Backlight unit.
- (2) If the liquid crystal material leaks from the panel, it should be kept away from the eyes or mouth. In case of contact with hands, skin or clothes, it has to be washed away thoroughly with soap.
- (3) After the module's end of life, it is not harmful in case of normal operation and storage.

