



LC720DUQ

Product Specification

SPECIFICATION FOR APPROVAL

() Preliminary Specification

(●) Final Specification

Title	72.0" WUXGA TFT LCD
-------	---------------------

BUYER	General
MODEL	

SUPPLIER	LG.Display Co., Ltd.
*MODEL	LC720DUQ
SUFFIX	SCM2 (RoHS Verified)

*When you obtain standard approval,
please use the above model name without suffix

APPROVED BY	SIGNATURE	DATE
/		
/		
/		

Please return 1 copy for your confirmation with
your signature and comments.

APPROVED BY	SIGNATURE	DATE
P.Y. Kim / Team Leader		
REVIEWED BY		
S.J. Cho / Project Leader		
PREPARED BY		
S.W. Kwag / Engineer		

TV Products Development Dept.
LG. Display LCD Co., Ltd



LC720DUQ

Product Specification

CONTENTS

Number	ITEM	Page
	COVER	1
	CONTENTS	2
	RECORD OF REVISIONS	3
1	GENERAL DESCRIPTION	4
2	ABSOLUTE MAXIMUM RATINGS	5
3	ELECTRICAL SPECIFICATIONS	6
3-1	ELECTRICAL CHARACTERISTICS	6
3-2	INTERFACE CONNECTIONS	8
3-3	SIGNAL TIMING SPECIFICATIONS	13
3-4	LVDS SIGNAL SPECIFICATIONS	14
3-5	COLOR DATA REFERENCE	17
3-6	POWER SEQUENCE	18
4	OPTICAL SPECIFICATIONS	20
5	MECHANICAL CHARACTERISTICS	24
6	RELIABILITY	27
7	INTERNATIONAL STANDARDS	28
7-1	SAFETY	28
7-2	EMC	28
7-3	ENVIRONMENT	28
8	PACKING	29
8-1	INFORMATION OF LCM LABEL	29
8-2	PACKING FORM	29
9	PRECAUTIONS	30
9-1	MOUNTING PRECAUTIONS	30
9-2	OPERATING PRECAUTIONS	30
9-3	ELECTROSTATIC DISCHARGE CONTROL	31
9-4	PRECAUTIONS FOR STRONG LIGHT EXPOSURE	31
9-5	STORAGE	31
9-6	HANDLING PRECAUTIONS FOR PROTECTION FILM	31

RECORD OF REVISIONS

One step solution for LCD / PDP / OLED panel application: Datasheet, inventory and accessory! www.panelook.com

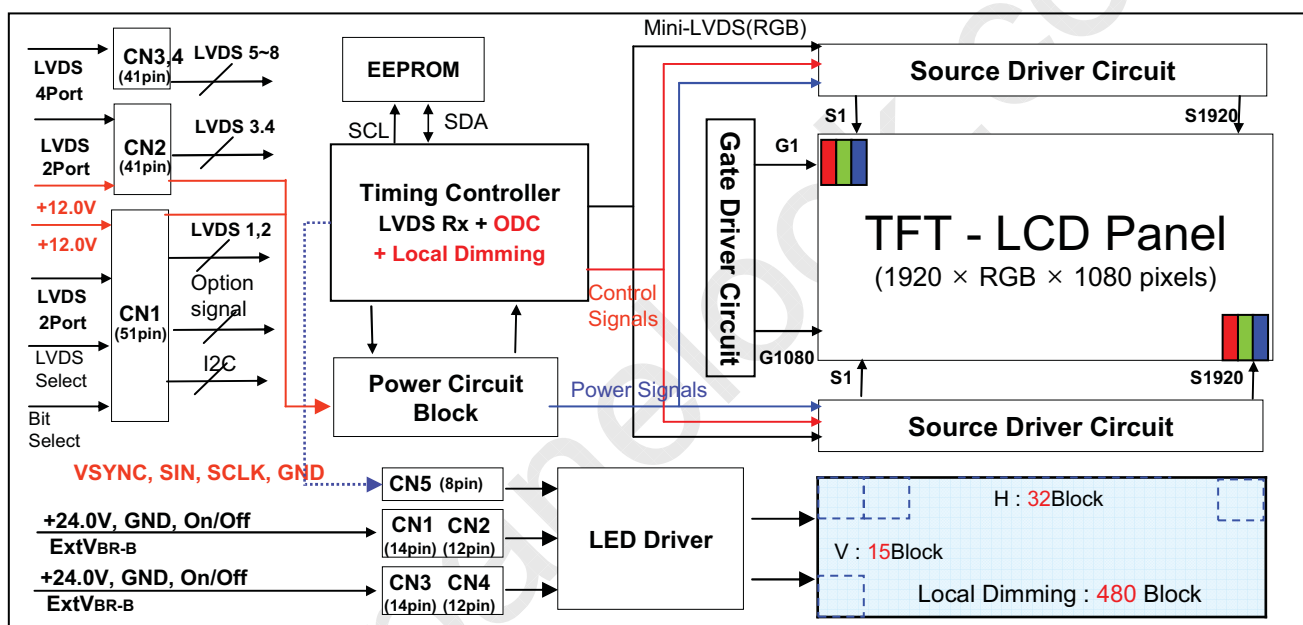
LC720DUQ

Product Specification

1. General Description

The LC720DUQ is a Color Active Matrix Liquid Crystal Display with an integral Light Emitting Diode (LED) backlight system. The matrix employs a-Si Thin Film Transistor as the active element. It is a transmissive type display operating in the normally black mode. It has a 72.07 inch diagonally measured active display area with WUXGA resolution (1080 vertical by 1920 horizontal pixel array). Each pixel is divided into Red, Green and Blue sub-pixels or dots which are arranged in vertical stripes. Gray scale or the luminance of the sub-pixel color is determined with a 10-bit gray scale signal for each dot. Therefore, it can present a palette of more than 1.06Billion colors.

It is intended to support LCD TV, PCTV where high brightness, super wide viewing angle, high color gamut, high color depth and fast response time are important.



General Features

Active Screen Size	72.07 inches(1830.616mm) diagonal
Outline Dimension	1666.0(H) x 968.0 (V) x 60.0 mm(D) (Typ.)
Pixel Pitch	0.831 mm x 0.831 mm
Pixel Format	1920 horiz. by 1080 vert. Pixels, RGB stripe arrangement
Color Depth	10bit(D) , 1.06Billion colors
Luminance, White	500 cd/m ² (Center 1point ,Typ.)
Viewing Angle (CR>10)	Viewing angle free (R/L 178 (Min.), U/D 178 (Min.))
Power Consumption	Total 374W (Typ.) (Logic=11W with T-CON , LED Driver =363W(Typ) @EXTVBR-B = 100%)
Weight	37Kg (Typ.)
Display Mode	Transmissive mode, Normally black
Surface Treatment	Hard coating(3H), Anti-glare treatment of the front polarizer (Haze 10%)

LC720DUQ

Product Specification

2. Absolute Maximum Ratings

The following items are maximum values which, if exceeded, may cause faulty operation or damage to the LCD module.

Table 1. ABSOLUTE MAXIMUM RATINGS

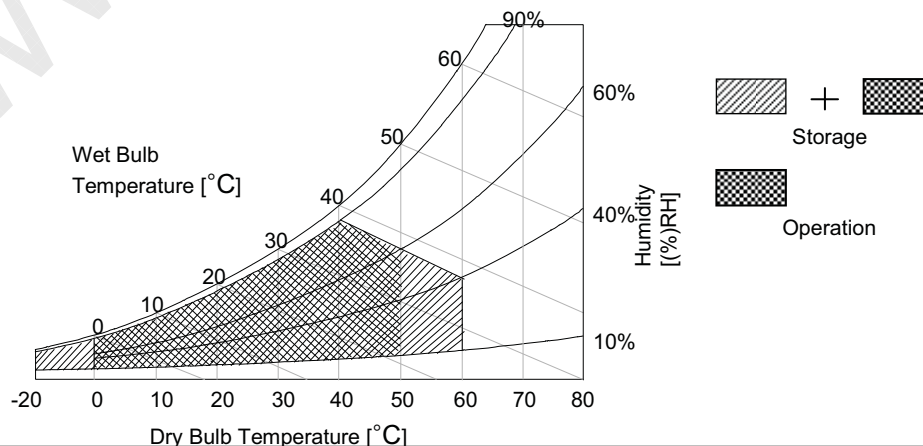
Parameter		Symbol	Value		Unit	Note
			Min	Max		
Power Input Voltage	LCD Circuit	VLCD	-0.3	+14.0	VDC	
	Driver	VBL	-0.3	+ 27.0	VDC	
Driver Control Voltage	ON/OFF	VOFF / VON	-0.3	+5.5	VDC	
	Brightness	EXTVBR-B	0.0	+5.5	VDC	
T-Con Option Selection Voltage		VLOGIC	-0.3	+4.0	VDC	1
Operating Temperature		TOP	0	+50	°C	2,3
Storage Temperature		TST	-20	+60	°C	
Panel Front Temperature		TSUR	-	+68	°C	4
Operating Ambient Humidity		HOP	10	90	%RH	2,3
Storage Humidity		HST	10	90	%RH	

Note: 1. Ambient temperature condition ($T_a = 25 \pm 2^\circ\text{C}$)

2. Temperature and relative humidity range are shown in the figure below. Wet bulb temperature should be Max 39°C and no condensation of water.

3. Gravity mura can be guaranteed below 40°C condition.

4. The maximum operating temperature is based on the test condition that the surface temperature of display area is less than or equal to 68°C with LCD module alone in a temperature controlled chamber. Thermal management should be considered in final product design to prevent the surface temperature of display area from being over 68°C . The range of operating temperature may degrade in case of improper thermal management in final product design.



LC720DUQ

Product Specification

3. Electrical Specifications

3-1. Electrical Characteristics

It requires two power inputs. One is employed to power for the LCD circuit. The other is used for the LED backlight and LED Driver circuit.

Table 2. ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Value			Unit	Note
		Min	Typ	Max		
Circuit :						
Power Input Voltage	VLCD	10.8	12.0	13.2	Vdc	
Power Input Current	ILCD	640	920	1200	mA	1
		1750	2500	3250	mA	2
Power Consumption	PLCD	7.7	11	14.3	Watt	1
		21	30	39	Watt	2
Rush current	IRUSH	–	–	10.0	A	3

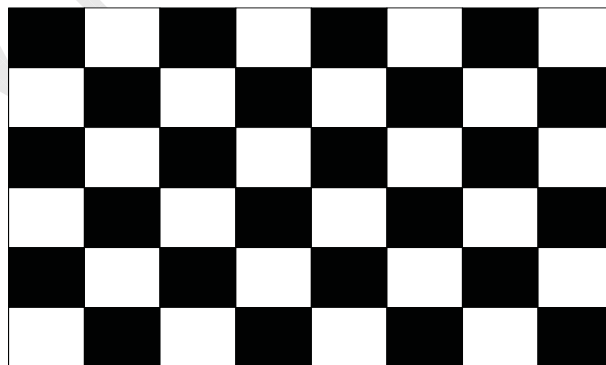
Note 1. The specified current and power consumption are under the V_{LCD}=12.0V, Ta=25 ± 2°C, f_V=240Hz condition whereas mosaic pattern(8 x 6) is displayed and f_V is the frame frequency.

2. The current is specified at the maximum current pattern.

3. The duration of rush current is about 2ms and rising time of power input is 0.5ms (min.).

White : 1023 Gray

Black : 0 Gray



Mosaic Pattern(8 x 6)



LC720DUQ

Product Specification

Table 3. ELECTRICAL CHARACTERISTICS (Continue)

Parameter		Symbol	Values			Unit	Notes
			Min	Typ	Max		
LED Driver :							
Power Supply Input Voltage		VBL	22.8	24.0	25.2	Vdc	1
Power Supply Input Current		IBL_A	–	15.1	16.8	A	Ext VBR-B = 100%
Power Supply Input Current (In-Rush)		Irush	–	–	17.6	A	VBL = 22.8V Ext VBR-B = 100% 4
Power Consumption		PBL	–	363	399	W	Ext VBR-B = 100%
Input Voltage for Control System Signals	On/Off	On	V on	2.5	–	5.0	Vdc
		Off	V off	–0.3	0.0	0.5	Vdc
	Brightness Adjust		ExtVBR-B	10	–	100	%
	PWM Frequency for NTSC & PAL		PAL		200	Hz	3
			NTSC		240	Hz	3
	Pulse Duty Level (PWM)		High Level	2.5	–	5.0	Vdc
			Low Level	0.0	–	0.5	Vdc
	VSYN, SIN, SCLK, Reverse (Local Dimming)		High Level	2.7	3.3	3.6	Vdc
LED :							
Life Time			30,000			Hrs	2

Notes :

- Electrical characteristics are determined after the unit has been 'ON' and stable for approximately 60 minutes at 25±2°C. The specified current and power consumption are under the typical supply Input voltage 24V and VBR (ExtVBR-B : 100%), it is total power consumption.
- The life time(MTTF) is determined as the time which luminance of the LED is 50% compared to that of initial value at the typical LED current (ExtVBR-B : 100%) on condition of continuous operating in LCM state at 25±2°C.
- LGD recommend that the PWM freq. is synchronized with One time harmonic of Vsync signal of system. Though PWM frequency is over 252Hz(Max), function of LED Driver is not affected.
- The duration of rush current is about 10ms.
- Even though inrush current is over the specified value, there is no problem if I²T spec of fuse is satisfied.



LC720DUQ

Product Specification

3-2. Interface Connections

This LCD module employs three kinds of interface connection, **51-pin**, **41-pin** and **4-pin** connector are used for the module electronics and **14-pin** connector is used for the integral backlight system.

3-2-1. LCD Module

- LCD Connector : **FI-R51S-HF**(manufactured by **JAE**) or compatible **(CN1)** Refer to below and next Page table
- Mating Connector : **FI-R51HL(JAE)** or compatible

Table 4-1. MODULE CONNECTOR(CN1) PIN CONFIGURATION

No	Symbol	Description	No	Symbol	Description
1	3D_EN	'H' = Enable , 'L' or NC = Disable	27	Bit Select	H or NC=10bit(D), "L" = 8bit
2	NC	No Connection (Reserved for LGD)	28	R2AN	SECOND LVDS Receiver Signal (A-)
3	NC	No Connection (Reserved for LGD)	29	R2AP	SECOND LVDS Receiver Signal (A+)
4	SDA	I2C data	30	R2BN	SECOND LVDS Receiver Signal (B-)
5	SCL	I2C clock	31	R2BP	SECOND LVDS Receiver Signal (B+)
6	NC	No Connection (Reserved for LGD)	32	R2CN	SECOND LVDS Receiver Signal (C-)
7	LVDS Select	'H' =JEIDA , Fix	33	R2CP	SECOND LVDS Receiver Signal (C+)
8	3D_Vsync	3D Vsync in	34	GND	Ground
9	NC	No Connection (Reserved for LGD)	35	R2CLKN	SECOND LVDS Receiver Clock Signal(-)
10	L-DIM Enable	'H' = Enable , 'L' or NC = Disable	36	R2CLKP	SECOND LVDS Receiver Clock Signal(+)
11	GND	Ground	37	GND	Ground
12	R1AN	FIRST LVDS Receiver Signal (A-)	38	R2DN	SECOND LVDS Receiver Signal (D-)
13	R1AP	FIRST LVDS Receiver Signal (A+)	39	R2DP	SECOND LVDS Receiver Signal (D+)
14	R1BN	FIRST LVDS Receiver Signal (B-)	40	R2EN	SECOND LVDS Receiver Signal (E-)
15	R1BP	FIRST LVDS Receiver Signal (B+)	41	R2EP	SECOND LVDS Receiver Signal (E+)
16	R1CN	FIRST LVDS Receiver Signal (C-)	42	NC	No Connection
17	R1CP	FIRST LVDS Receiver Signal (C+)	43	NC	No Connection
18	GND	Ground	44	GND	Ground
19	R1CLKN	FIRST LVDS Receiver Clock Signal(-)	45	GND	Ground
20	R1CLKP	FIRST LVDS Receiver Clock Signal(+)	46	GND	Ground
21	GND	Ground	47	NC	No connection
22	R1DN	FIRST LVDS Receiver Signal (D-)	48	VLCD	Power Supply +12.0V
23	R1DP	FIRST LVDS Receiver Signal (D+)	49	VLCD	Power Supply +12.0V
24	R1EN	FIRST LVDS Receiver Signal (E-)	50	VLCD	Power Supply +12.0V
25	R1EP	FIRST LVDS Receiver Signal (E+)	51	VLCD	Power Supply +12.0V
26	NC	No Connection	-	-	-

- Note
1. All GND(ground) pins should be connected together to the LCD module's metal frame.
 2. All VLCD (power input) pins should be connected together.
 3. All Input levels of LVDS signals are based on the EIA 644 Standard.
 4. Specific pins(pin No. **#2,#3,#6,#9**) are used for internal data process of the LCD module.
These pins should be no connection.
 5. Specific pins (pin No. **# 8,#10**) are used for **Local Dimming** and **3D function** of the LCD module.
If not used, these pins are no connection. **(Please see the Appendix III-4 for more information.)**
 6. LVDS pin (pin No. **#24,25,40,41**) are used for 10Bit(D) of the LCD module.
If used for 8Bit(R), these pins are no connection.
 7. Specific pin No. **#44** is used for "No signal detection" of system signal interface.
It should be GND for NSB(No Signal Black) during the system interface signal is not.
If this pin is "H", LCD Module displays AGP(Auto Generation Pattern).



LC720DUQ

Product Specification

- LCD Connector : FI-RE41S-HF (manufactured by JAE) or compatible (CN2, CN3, CN4)
- Mating Connector : FI-RE41HL or compatible

Table 4-2. MODULE CONNECTOR(CN2) PIN CONFIGURATION

No	Symbol	Description	No	Symbol	Description
1	GND	Ground	22	RE3N	THIRD LVDS Receiver Signal (E-)
2	VLCD	Power Supply +12.0V	23	RE3P	THIRD LVDS Receiver Signal (E+)
3	VLCD	Power Supply +12.0V	24	GND	Ground
4	VLCD	Power Supply +12.0V	25	GND	Ground
5	VLCD	Power Supply +12.0V	26	RA4N	FORTH LVDS Receiver Signal (A-)
6	NC	No connection	27	RA4P	FORTH LVDS Receiver Signal (A+)
7	NC	No connection	28	RB4N	FORTH LVDS Receiver Signal (B-)
8	NC	No connection	29	RB4P	FORTH LVDS Receiver Signal (B+)
9	GND	Ground	30	RC4N	FORTH LVDS Receiver Signal (C-)
10	RA3N	THIRD LVDS Receiver Signal (A-)	31	RC4P	FORTH LVDS Receiver Signal (C+)
11	RA3P	THIRD LVDS Receiver Signal (A+)	32	GND	Ground
12	RB3N	THIRD LVDS Receiver Signal (B-)	33	RCLK4N	FORTH LVDS Receiver Clock Signal(-)
13	RB3P	THIRD LVDS Receiver Signal (B+)	34	RCLK4P	FORTH LVDS Receiver Clock Signal(+)
14	RC3N	THIRD LVDS Receiver Signal (C-)	35	GND	Ground
15	RC3P	THIRD LVDS Receiver Signal (C+)	36	RD4N	FORTH LVDS Receiver Signal (D-)
16	GND	Ground	37	RD4P	FORTH LVDS Receiver Signal (D+)
17	RCLK3N	THIRD LVDS Receiver Clock Signal(-)	38	RE4N	FORTH LVDS Receiver Signal (E-)
18	RCLK3P	THIRD LVDS Receiver Clock Signal(+)	39	RE4P	FORTH LVDS Receiver Signal (E+)
19	GND	Ground	40	GND	Ground
20	RD3N	THIRD LVDS Receiver Signal (D-)	41	GND	Ground
21	RD3P	THIRD LVDS Receiver Signal (D+)	-		

- Note :
1. All GND(ground) pins should be connected together to the LCD module's metal frame.
 2. LVDS pin (**pin No. #22,23,38,39**) are used for 10Bit(D) of the LCD module.
If used for 8Bit(R), these pins are no connection.



LC720DUQ

Product Specification

Table 4-3. MODULE CONNECTOR(CN3) PIN CONFIGURATION

No	Symbol	Description	No	Symbol	Description
1	GND	Ground	22	RE5N	FIFTH LVDS Receiver Signal (E-)
2	NC	No connection	23	RE5P	FIFTH LVDS Receiver Signal (E+)
3	NC	No connection	24	GND	Ground
4	NC	No connection	25	GND	Ground
5	NC	No connection	26	RA6N	SIXTH LVDS Receiver Signal (A-)
6	NC	No connection	27	RA6P	SIXTH LVDS Receiver Signal (A+)
7	NC	No connection	28	RB6N	SIXTH LVDS Receiver Signal (B-)
8	NC	No connection	29	RB6P	SIXTH LVDS Receiver Signal (B+)
9	GND	Ground	30	RC6N	SIXTH LVDS Receiver Signal (C-)
10	RA5N	FIFTH LVDS Receiver Signal (A-)	31	RC6P	SIXTH LVDS Receiver Signal (C+)
11	RA5P	FIFTH LVDS Receiver Signal (A+)	32	GND	Ground
12	RB5N	FIFTH LVDS Receiver Signal (B-)	33	RCLK6N	SIXTH LVDS Receiver Clock Signal(-)
13	RB5P	FIFTH LVDS Receiver Signal (B+)	34	RCLK6P	SIXTH LVDS Receiver Clock Signal(+)
14	RC5N	FIFTH LVDS Receiver Signal (C-)	35	GND	Ground
15	RC5P	FIFTH LVDS Receiver Signal (C+)	36	RD6N	SIXTH LVDS Receiver Signal (D-)
16	GND	Ground	37	RD6P	SIXTH LVDS Receiver Signal (D+)
17	RCLK5N	FIFTH LVDS Receiver Clock Signal(-)	38	RE6N	SIXTH LVDS Receiver Signal (E-)
18	RCLK5P	FIFTH LVDS Receiver Clock Signal(+)	39	RE6P	SIXTH LVDS Receiver Signal (E+)
19	GND	Ground	40	GND	Ground
20	RD5N	FIFTH LVDS Receiver Signal (D-)	41	GND	Ground
21	RD5P	FIFTH LVDS Receiver Signal (D+)	-		

- Note :
1. All GND(ground) pins should be connected together to the LCD module's metal frame.
 2. LVDS pin (**pin No. #22,23,38,39**) are used for 10Bit(D) of the LCD module.
If used for 8Bit(R), these pins are no connection.



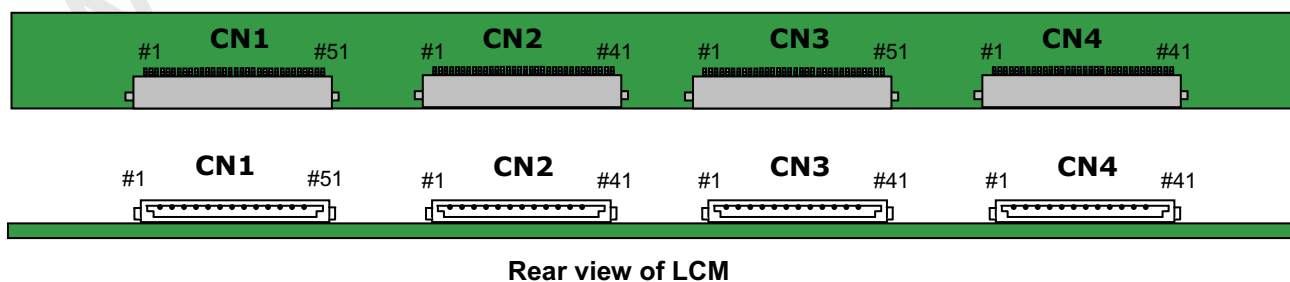
LC720DUQ

Product Specification

Table 4-4. MODULE CONNECTOR(CN4) PIN CONFIGURATION

No	Symbol	Description	No	Symbol	Description
1	GND	Ground	22	RC8N	EIGHTH LVDS Receiver Signal (C-)
2	RA7N	SEVENTH LVDS Receiver Signal (A-)	23	RC8P	EIGHTH LVDS Receiver Signal (C+)
3	RA7P	SEVENTH LVDS Receiver Signal (A+)	24	GND	Ground
4	RB7N	SEVENTH LVDS Receiver Signal (B-)	25	RCLK8N	EIGHTH LVDS Receiver Clock Signal(-)
5	RB7P	SEVENTH LVDS Receiver Signal (B+)	26	RCLK8P	EIGHTH LVDS Receiver Clock Signal(+)
6	RC7N	SEVENTH LVDS Receiver Signal (C-)	27	GND	Ground
7	RC7P	SEVENTH LVDS Receiver Signal (C+)	28	RD8N	EIGHTH LVDS Receiver Signal (D-)
8	GND	Ground	29	RD8P	EIGHTH LVDS Receiver Signal (D+)
9	RCLK7N	SEVENTH LVDS Receiver Clock Signal(-)	30	RE8N	EIGHTH LVDS Receiver Signal (E-)
10	RCLK7P	SEVENTH LVDS Receiver Clock Signal(+)	31	RE8P	EIGHTH LVDS Receiver Signal (E+)
11	GND	Ground	32	GND	Ground
12	RD7N	SEVENTH LVDS Receiver Signal (D-)	33	GND	Ground
13	RD7P	SEVENTH LVDS Receiver Signal (D+)	34	NC	No connection
14	RE7N	SEVENTH LVDS Receiver Signal (E-)	35	NC	No connection
15	RE7P	SEVENTH LVDS Receiver Signal (E+)	36	NC	No connection
16	GND	Ground	37	NC	No Connection (Reserved for LGD)
17	GND	Ground	38	NC	No Connection (Reserved for LGD)
18	RA8N	EIGHTH LVDS Receiver Signal (A-)	39	NC	No Connection (Reserved for LGD)
19	RA8P	EIGHTH LVDS Receiver Signal (A+)	40	NC	No Connection (Reserved for LGD)
20	RB8N	EIGHTH LVDS Receiver Signal (B-)	41	GND	Ground
21	RB8P	EIGHTH LVDS Receiver Signal (B+)	-		

Note : 1. All GND(ground) pins should be connected together to the LCD module's metal frame.
2. LVDS pin (**pin No. #14,15,30,31**) are used for 10Bit(D) of the LCD module.
If used for 8Bit(R), these pins are no connection.



Rear view of LCM

LC720DUQ

Product Specification

3-2-2. Backlight Module

Board A(CN1101), Board B(CN2101)

- LED Driver Connector : 20022WR-14B1(Yeonho)
or Equivalent

- Mating Connector : 20022HS-14 or Equivalent

Board A(CN1106), Board B(CN2106)

- LED Driver Connector : 20022WR-12B1(Yeonho)
or Equivalent

- Mating Connector : 20022HS-12 or Equivalent

Table 5. LED DRIVER CONNECTOR PIN CONFIGURATION

Pin No	Symbol	Description	Board A (CN1101) Board B (CN2101)	Board A (CN1106) Board B (CN2106)	Note
1	VBL	Power Supply +24.0V	VBL	VBL	
2	VBL	Power Supply +24.0V	VBL	VBL	
3	VBL	Power Supply +24.0V	VBL	VBL	
4	VBL	Power Supply +24.0V	VBL	VBL	
5	VBL	Power Supply +24.0V	VBL	VBL	
6	GND	Backlight Ground	GND	GND	1
7	GND	Backlight Ground	GND	GND	
8	GND	Backlight Ground	GND	GND	
9	GND	Backlight Ground	GND	GND	
10	GND	Backlight Ground	GND	GND	
11	NC	No connection	OPEN or GND	Don't Care	
12	VON/OFF	Backlight ON/OFF control	VON/OFF	Don't Care	
13	EXTVBR-B	External PWM	EXTVBR-B		2
14	GND	Backlight Ground	GND		3

Notes : 1. GND should be connected to the LCD module's metal frame.

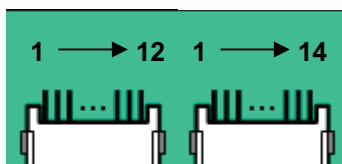
2. High : on duty / Low : off duty, Pin#13 can be opened. (if Pin #13 is open , EXTVBR-B is 100%)

3. #14 of Input CNT Must be Connected to **Backlight Ground**.

4. Each impedance of pin #12 and 13 is over 50 [KΩ] and over 50 [KΩ].

◆ Rear view of LCM

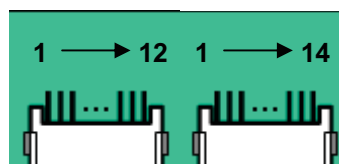
Board B



CN2106

CN2101

Board A



CN1106

CN1101



LC720DUQ

Product Specification

3-3. Signal Timing Specifications

Table 6 shows the signal timing required at the input of the LVDS transmitter. All of the interface signal timings should be satisfied with the following specification for normal operation.

Table 6-1. TIMING TABLE for NTSC (DE Only Mode)

ITEM		Symbol	NTSC/ATSC	DVB/PAL	Unit	Note
Horizontal	Display Period	tHV	240	240	tclk	
	Blank	tHB	35	35	tclk	
	Total	tHP	275	275	tclk	2200/8
Vertical	Display Period	tV	1080	1080	Lines	
	Blank	tVB	45	270	Lines	
	Total	tVP	1125	1350	Lines	

ITEM		Symbol	NTSC/ATSC	DVB/PAL	Unit	Note
Frequency	DCLK	fCLK	74.25	74.25	MHz	297/4
	Horizontal	fH	270	270	KHz	
	Vertical	fV	240	200	Hz	

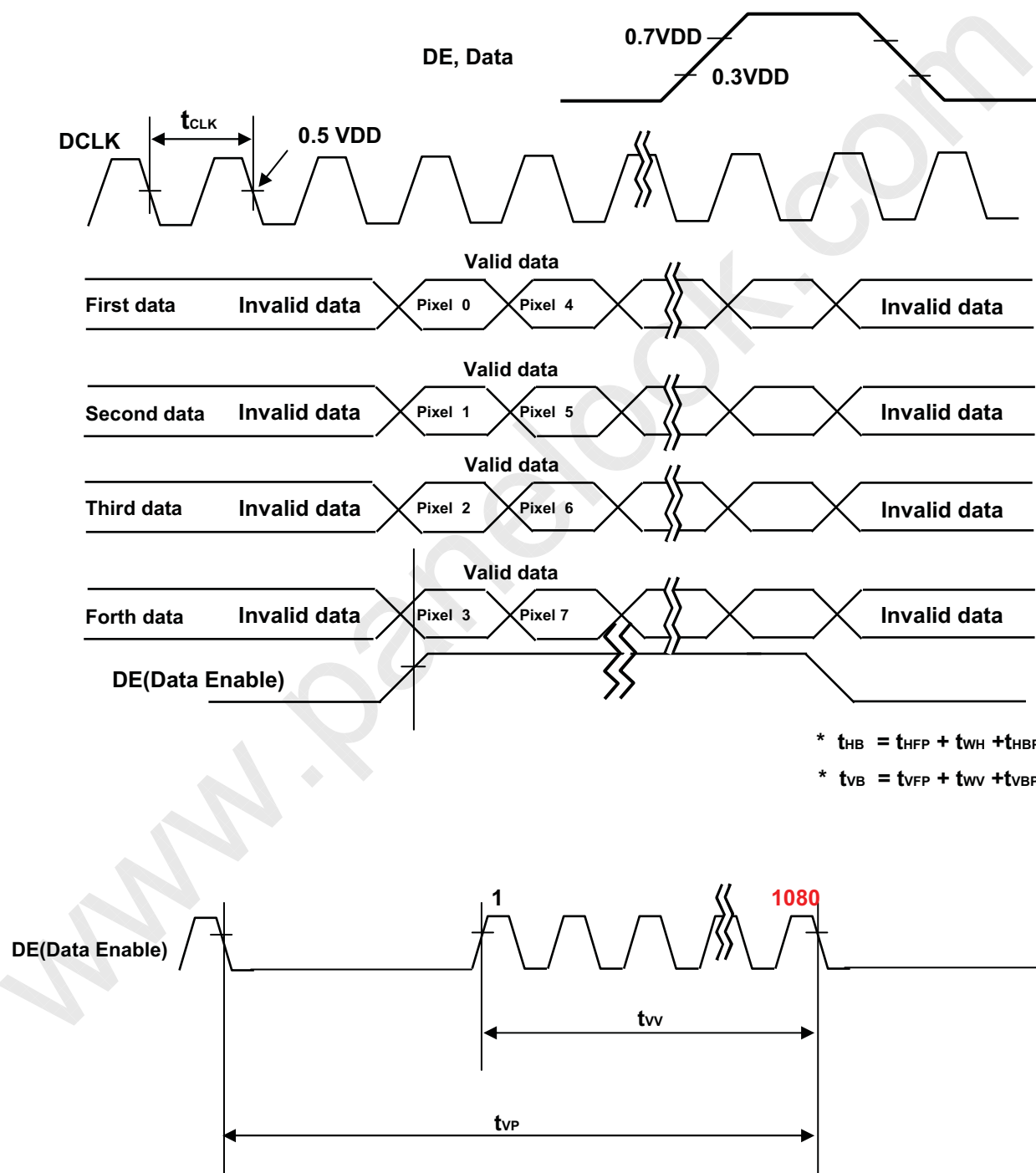
- Note
1. The Input of HSYNC & VSYNC signal does not have an effect on normal operation(DE Only Mode).
If you use spread spectrum for EMI, add some additional clock to minimum value for clock margin.
 2. The performance of the electro-optical characteristics may be influenced by variance of the vertical refresh rate and the horizontal frequency.

LC720DUQ

Product Specification

3-4. LVDS Signal Specification

3-4-1. LVDS Input Signal Timing Diagram

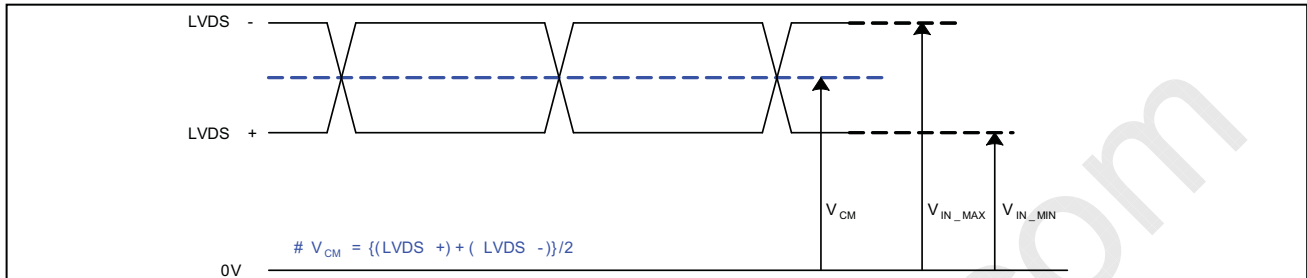


LC720DUQ

Product Specification

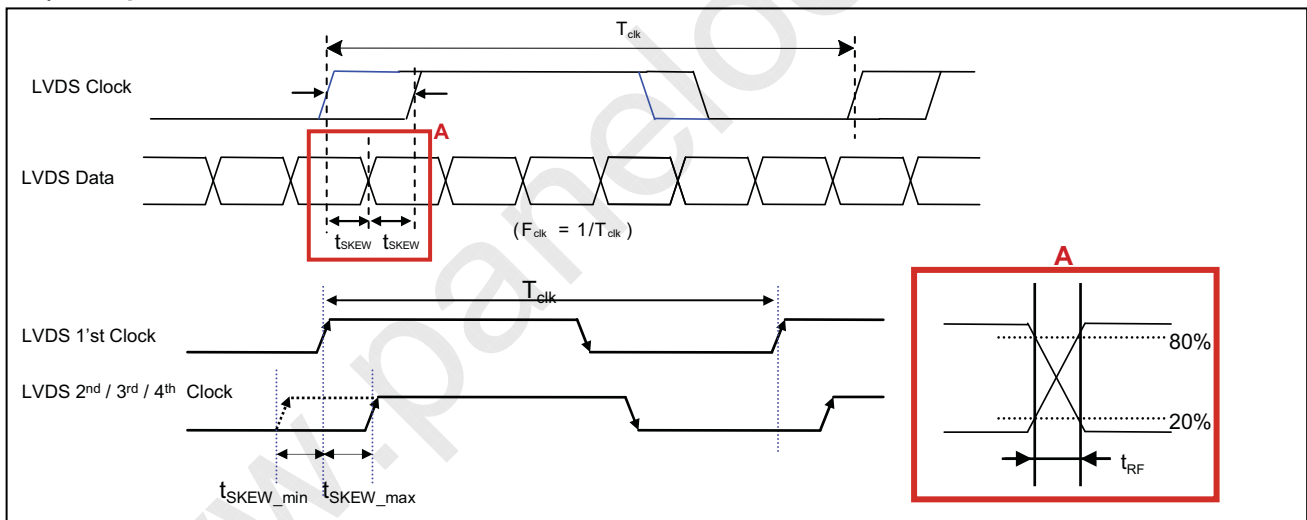
3-4-2. LVDS Input Signal Characteristics

1) DC Specification



Description	Symbol	Min	Max	Unit	Note
LVDS Common mode Voltage	V_{CM}	1.0	1.5	V	-
LVDS Input Voltage Range	V_{IN}	0.7	1.8	V	-
Change in common mode Voltage	ΔV_{CM}		250	mV	-

2) AC Specification

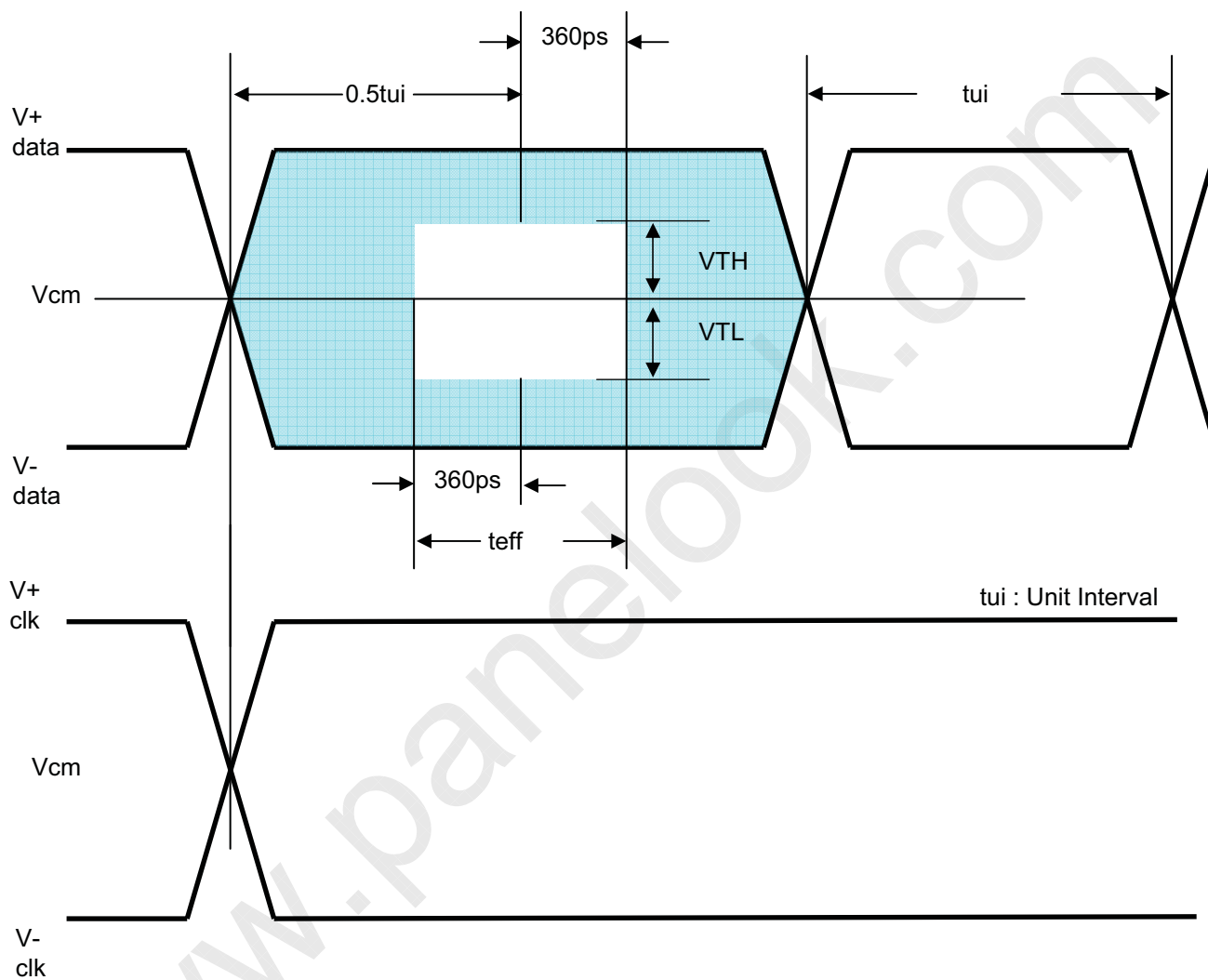


Description		Symbol	Min	Max	Unit	Note
LVDS Differential Voltage	High Threshold	V _{TH}	100	300	mV	3
	Low Threshold	V _{TL}	-300	-100	mV	
LVDS Clock to Data Skew Margin		t _{SKEW}		(0.25 *T _{clk})/7	ps	-
LVDS Clock/DATA Rising/Falling time		t _{RF}	260	(0.3*T _{clk})/7	ps	2
Effective time of LVDS		t _{eff}	±360		ps	-
LVDS Clock to Clock Skew Margin (Even to Odd)		t _{SKEW EO}		1/7* T _{clk}	T _{clk}	-

Note 1. All Input levels of LVDS signals are based on the EIA 644 Standard.
2. If t_{RF} isn't enough, t_{eff} should be meet the range.
3. LVDS Differential Voltage is defined within t_{eff}

LC720DUQ

Product Specification





LC720DUQ

Product Specification

3-5. Color Data Reference

The brightness of each primary color(red,green,blue) is based on the 10bit gray scale data input for the color. The higher binary input, the brighter the color. Table 7 provides a reference for color versus data input.

Table 7. COLOR DATA REFERENCE

Color		Input Color Data																															
		RED										GREEN										BLUE											
		MSB					LSB					MSB					LSB					MSB					LSB						
		R9	R8	R7	R6	R5	R4	R3	R2	R1	R0	G9	G8	G7	G6	G5	G4	G3	G2	G1	G0	B9	B8	B7	B6	B5	B4	B3	B2	B1	B0		
Basic Color	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		
	Red (1023)	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	Green (1023)	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0		
	Blue (1023)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1		
	Cyan	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
	Magenta	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1		
	Yellow	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	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	1	1	1	1	1	1		
RED	RED (0000)	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		
	RED (0001)	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		
	...																																
	RED (1022)	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	RED (1023)	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
GREEN	GREEN (0000)	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		
	GREEN (0001)	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		
	...																																
	GREEN (1022)	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0		
	GREEN (1023)	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0		
BLUE	BLUE (0000)	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		
	BLUE (0001)	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		
	...																																
	BLUE (1022)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0		
	BLUE (1023)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1		

LC720DUQ

Product Specification

3-6. Power Sequence

3-6-1. LCD Driving circuit

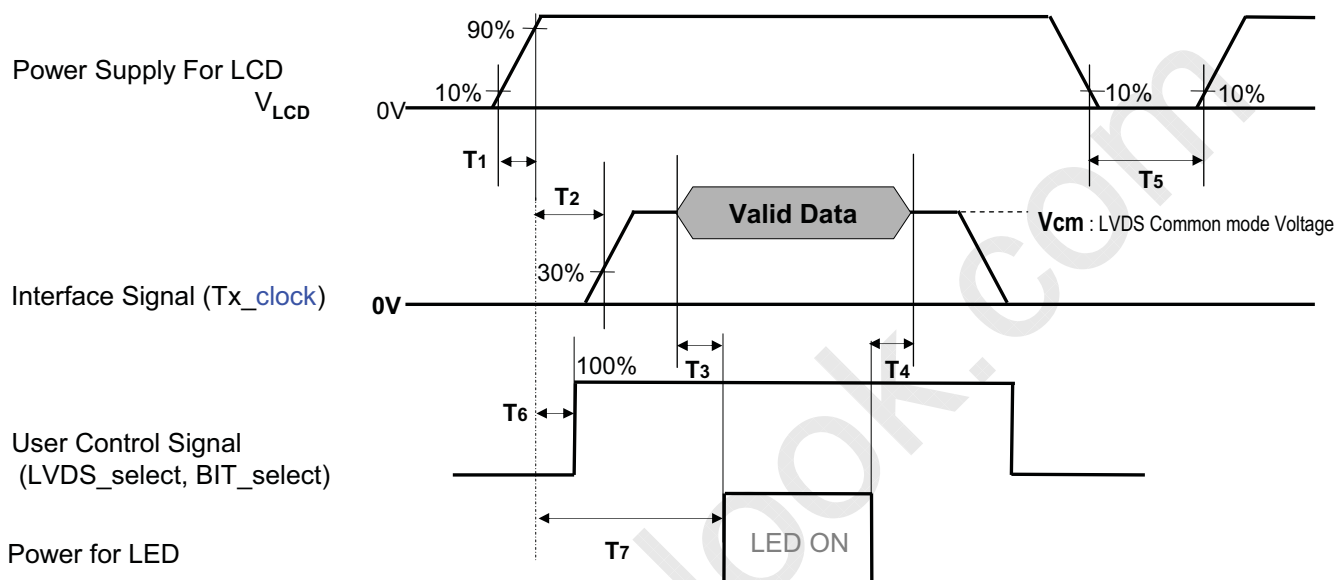


Table 8. POWER SEQUENCE

Parameter	Value			Unit	Notes
	Min	Typ	Max		
T1	0.5	—	20	ms	
T2	0	—	—	ms	4
T3	200	—	—	ms	3
T4	200	—	—	ms	3
T5	1.0	—	—	s	5
T6	—	—	T2	ms	4
T7	0.5	—	—	s	

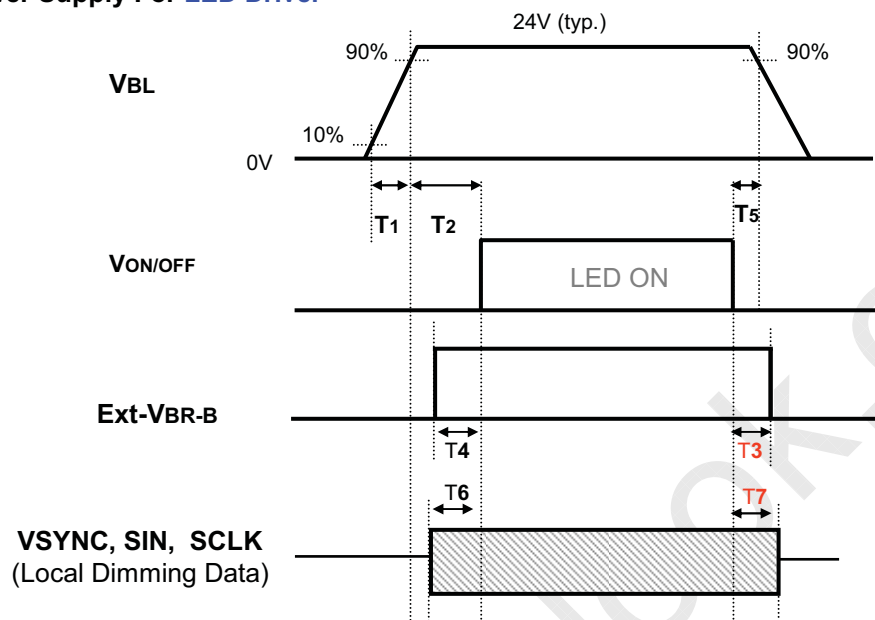
- Note :
1. Please avoid floating state of interface signal at invalid period.
 2. When the power supply for LCD (V_{LCD}) is off, be sure to pull down the valid and invalid data to 0V.
 3. The $T3$ / $T4$ is recommended value, the case when failed to meet a minimum specification, abnormal display would be shown. There is no reliability problem.
 4. If the on time of signals (Interface signal and user control signals) precedes the on time of Power (V_{LCD}), it will be happened abnormal display. When $T6$ is NC status, $T6$ doesn't need to be measured.
 5. $T5$ should be measured after the Module has been fully discharged between power off and on period.

LC720DUQ

Product Specification

3-6-2. Sequence for LED Driver

Power Supply For LED Driver



3-6-3. Dip condition for LED Driver

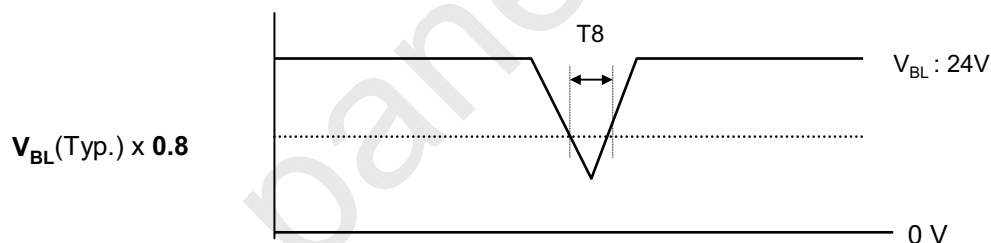


Table 9. Power Sequence for LED Driver

Parameter	Values			Units	Remarks
	Min	Typ	Max		
T1	20	—	—	ms	1
T2	500	—	—	ms	
T3	10	—	—	ms	
T4	0	—	—	ms	
T5	0	—	—	ms	
T6	0	—	—	ms	
T7	0	—	—	ms	
T8	—	—	10	ms	$V_{BL}(Typ.) \times 0.8$

Notes : 1. T1 describes rising time of 0V to 24V and this parameter does not applied at restarting time.

Even though T1 is over the specified value, there is no problem if I2T spec of fuse is satisfied.

LC720DUQ

Product Specification

4. Optical Specification

Optical characteristics are determined after the unit has been 'ON' and stable in a dark environment at $25\pm2^{\circ}\text{C}$. The values are specified at an approximate distance 50cm from the LCD surface at a viewing angle of Φ and θ equal to 0° .

It is presented additional information concerning the measurement equipment and method in FIG. 1.

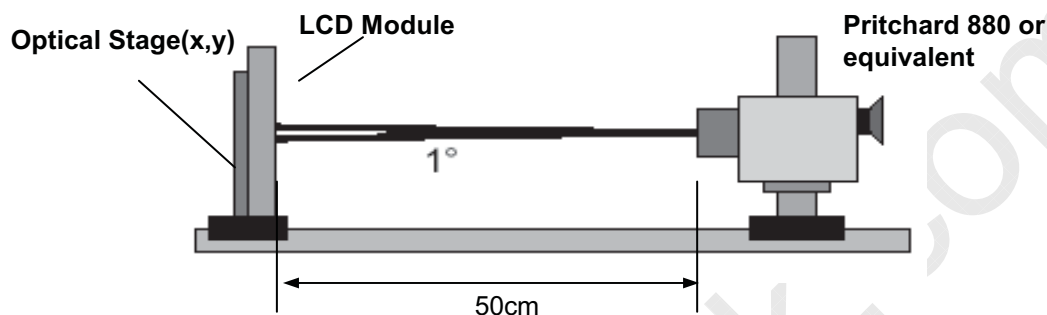


FIG. 1 Optical Characteristic Measurement Equipment and Method

$T_a = 25\pm2^{\circ}\text{C}$, $V_{\text{LCD}} = 12.0\text{V}$, $f_v = 240\text{Hz}$, $D_{\text{clk}} = 74.25\text{MHz}$,
 $\text{EXTV}_{\text{BR-B}} = 100\%$

Table 10. OPTICAL CHARACTERISTICS

Parameter		Symbol		Value			Unit	Note
				Min	Typ	Max		
Contrast Ratio		CR		1000	1200			1
Surface Luminance, white		L _{WH}		400	500	–	cd/m ²	2
Luminance Variation		δ _{WHITE}	5P	–	–	1.3		3
Response Time (G to G)	Rising	Tr		–	3	5	ms	4
	Falling	Tf		–	3	5		
Color Coordinates [CIE1931]	RED	Rx		Typ –0.03	0.646	Typ +0.03		
		Ry			0.330			
	GREEN	Gx			0.303			
		Gy			0.600			
	BLUE	Bx			0.152			
		By			0.059			
	WHITE	Wx			0.279			
		Wy			0.292			
Color Temperature					10,000		K	
Color Gamut					72		%	
Viewing Angle (CR>10)								
	x axis, right(φ=0°)	θr		89	–	–	degree	5
	x axis, left (φ=180°)	θl		89	–	–		
	y axis, up (φ=90°)	θu		89	–	–		
	y axis, down (φ=270°)	θd		89	–	–		
Gray Scale				–	–	–		6

Ver. 1.1

20 / 39



LC720DUQ

Product Specification

Note : 1. Contrast Ratio(CR) is defined mathematically as :

$$CR = \frac{\text{Surface Luminance at all white pixels}}{\text{Surface Luminance at all black pixels}}$$

It is measured at center 1-point.

2. Surface luminance is determined after the unit has been 'ON' and 1Hour after lighting the backlight in a dark environment at $25 \pm 2^\circ\text{C}$. Surface luminance is the luminance value at center 1-point across the LCD surface 50cm from the surface with all pixels displaying white. For more information see the FIG. 10.

3. The variation in surface luminance, δ WHITE is defined as :

$$\delta \text{ WHITE}(5P) = \text{Maximum}(L_{on1}, L_{on2}, L_{on3}, L_{on4}, L_{on5}) / \text{Minimum}(L_{on1}, L_{on2}, L_{on3}, L_{on4}, L_{on5})$$

Where L_{on1} to L_{on5} are the luminance with all pixels displaying white at 5 locations .

For more information, see the FIG. 10.

4. Response time is the time required for the display to transit from G(255) to G(0) (Rise Time, Tr_R) and from G(0) to G(255) (Decay Time, Tr_D).

5. Viewing angle is the angle at which the contrast ratio is greater than 10. The angles are determined for the horizontal or x axis and the vertical or y axis with respect to the z axis which is normal to the LCD module surface. For more information, see the FIG. 12.

6. Gray scale specification

Gamma Value is approximately 2.2. For more information, see the Table 10.

Table 10. GRAY SCALE SPECIFICATION

Gray Level	Luminance [%] (Typ)
L0	0.08
L15	0.28
L31	1.05
L47	2.50
L63	4.69
L79	7.67
L95	11.5
L111	16.1
L127	21.6
L143	28.1
L159	35.4
L175	43.7
L191	53.0
L207	63.2
L223	74.5
L239	86.7
L255	100

LC720DUQ

Product Specification

Measuring point for surface luminance & luminance variation

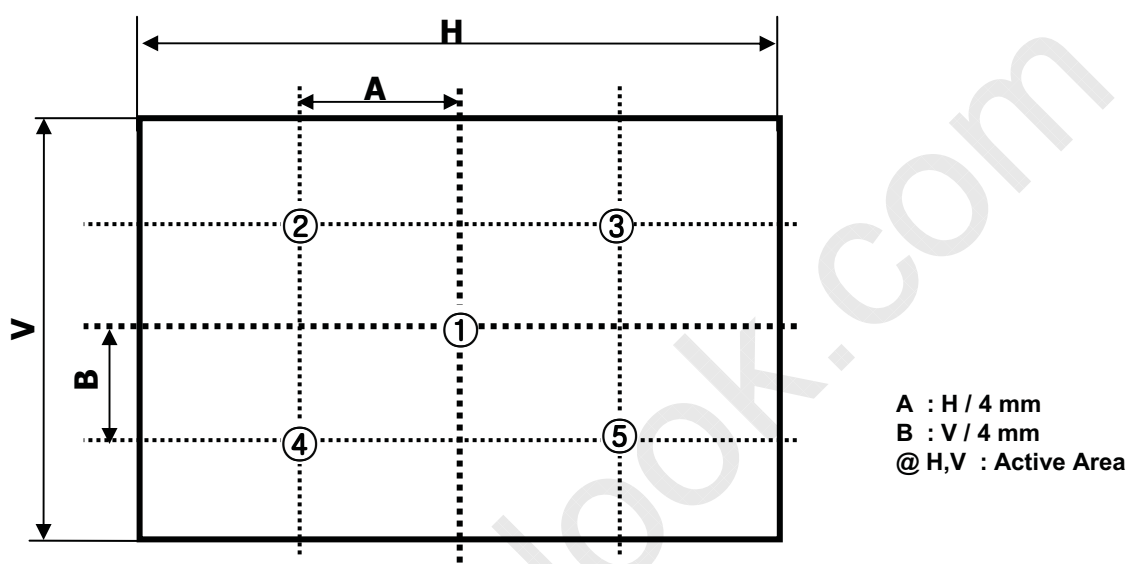


FIG. 10 5 Points for Luminance Measure

Response time is defined as the following figure and shall be measured by switching the input signal for Black and White

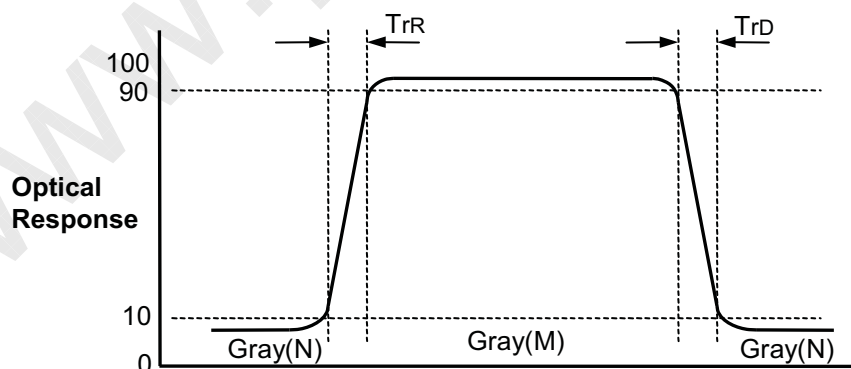
 $N, M = \text{Black} \sim \text{White}, N < M$

FIG. 11 Response Time

LC720DUQ

Product Specification

Dimension of viewing angle range

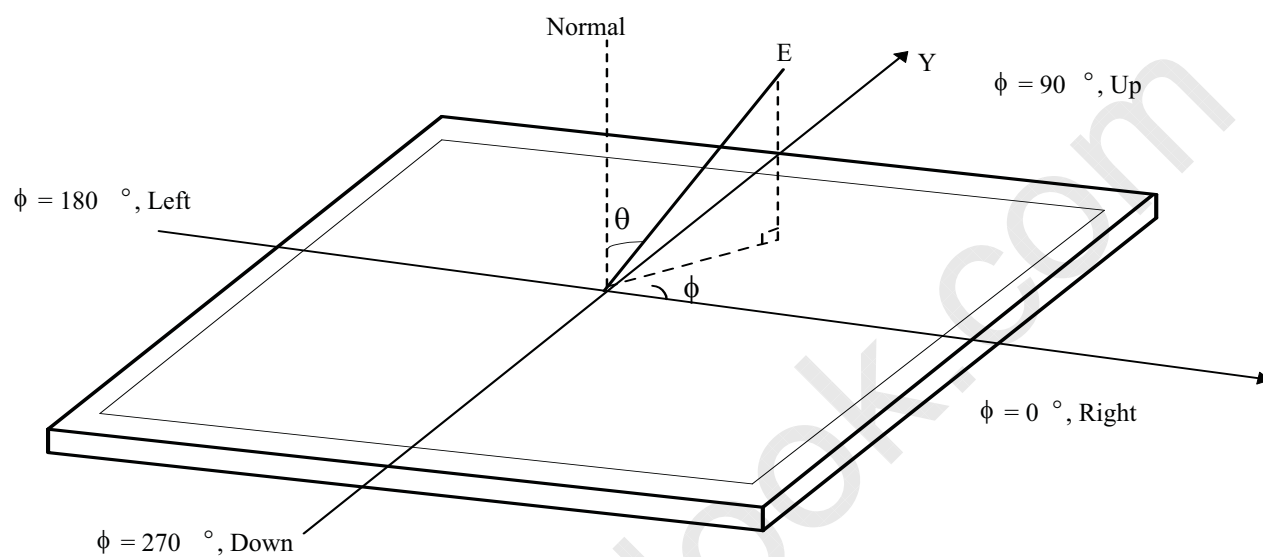


FIG.12 Viewing Angle

LC720DUQ

Product Specification

5. Mechanical Characteristics

Table 11 provides general mechanical characteristics.

Table 11. MECHANICAL CHARACTERISTICS

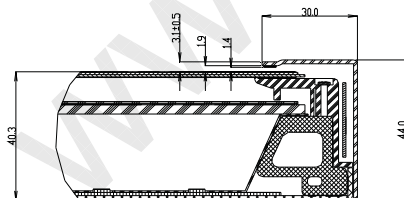
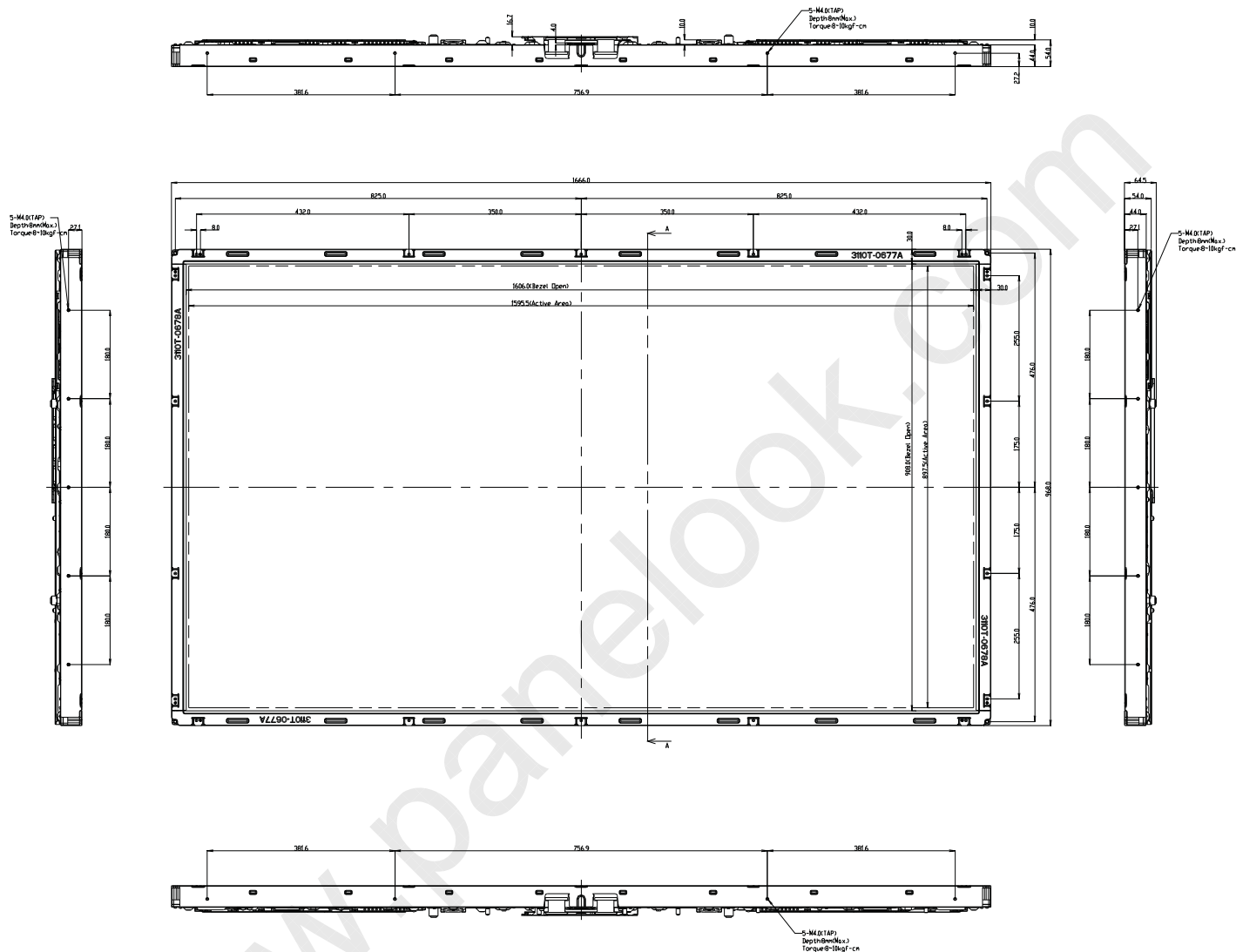
Item	Value	
Outline Dimension	Horizontal	1666.0 mm
	Vertical	968.0 mm
	Depth	60.0 mm
Bezel Area	Horizontal	1606.0mm
	Vertical	908.0mm
Active Display Area	Horizontal	1595.52 mm
	Vertical	897.48 mm
Weight	37.5kg(Typ), 39.5Kg(Max)	

Note : Please refer to a mechanical drawing in terms of tolerance at the next page.

LC720DUQ

Product Specification

[FRONT VIEW]

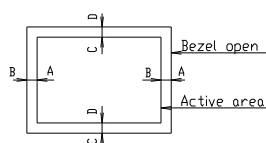


SECTION A-A

NOTES

1. Unspecified tolerances are to be $\pm 1.0\text{mm}$.
2. Tilt and partial disposition tolerance of display area are as following.

(1) X-Direction : A-B	1.5mm
(2) Y-Direction : C-D	1.5mm



3. Torque : 3.5 ~ 5.0Kgf·cm

4. This part should be contains Eco-hazardous substances (Pb, Cd, Hg, Cr6+, PBB, PBDE, etc.) within standard level of LG Display, Details should be followed Green Procurement standard(B-8022). Especially, Part should be followed and controlled the following specifications.

- (1) Eco-hazardous substances test report should be submitted when Part certification test and First Mass Production.
- (2) Don't flow Eco-hazardous substances into resin by using scrap.
- (3) Don't flow Eco-hazardous substances into metal by using impurities or improper stuff.

Product Specification

[illegible]



LC720DUQ

Product Specification

6. Reliability

Table 12. ENVIRONMENT TEST CONDITION

No.	Test Item	Condition
1	High temperature storage test	Ta= 60°C 240h
2	Low temperature storage test	Ta= -20°C 240h
3	High temperature operation test	Ta= 50°C 50%RH 240h
4	Low temperature operation test	Ta= 0°C 240h
5	Vibration test (non-operating)	Wave form : random Vibration level : 1.0Grms Bandwidth : 10-300Hz Duration : X,Y,Z, 30 min Each direction per 10 min
6	Humidity condition Operation	Ta= 40 °C ,90%RH
7	Altitude operating storage / shipment	0 - 15,000 ft 0 - 40,000 ft

Note : Before and after Reliability test, LCM should be operated with normal function.



LC720DUQ

Product Specification

7. International Standards

7-1. Safety

- a) UL 60065, Seventh Edition, Underwriters Laboratories Inc.
Audio, Video and Similar Electronic Apparatus - Safety Requirements.
- b) CAN/CSA C22.2 No.60065:03, Canadian Standards Association.
Audio, Video and Similar Electronic Apparatus - Safety Requirements.
- c) EN 60065:2002 + A11:2008, European Committee for Electrotechnical Standardization (CENELEC).
Audio, Video and Similar Electronic Apparatus - Safety Requirements.
- d) IEC 60065:2005 + A1:2005, The International Electrotechnical Commission (IEC).
Audio, Video and Similar Electronic Apparatus - Safety Requirements.
(Including report of IEC60825-1:2001 clause 8 and clause 9)

Notes

1. Laser (LED Backlight) Information

Class 1 LED Product IEC60825-1 : 2001 Embedded LED Power (Class 1)
--

2. Caution

: LED inside.

Class 1M laser (LEDs) radiation when open.

Do not open while operating.

7-2. EMC

- a) ANSI C63.4 "American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz." American National Standards Institute (ANSI), 2003.
- b) CISPR 22 "Information technology equipment – Radio disturbance characteristics – Limit and methods of measurement." International Special Committee on Radio Interference (CISPR), 2005.
- c) CISPR 13 "Sound and television broadcast receivers and associated equipment – Radio disturbance characteristics – Limits and method of measurement." International Special Committee on Radio Interference (CISPR), 2006.

7-2. Environment

- a) RoHS, Directive 2002/95/EC of the European Parliament and of the council of 27 January 2003

LC720DUQ

Product Specification

8. Packing

8-1. Information of LCM Label

a) Lot Mark

A	B	C	D	E	F	G	H	I	J	K	L	M
---	---	---	---	---	---	---	---	---	---	---	---	---

A,B,C : SIZE(INCH)
E : MONTH

D : YEAR
F ~ M : SERIAL NO.

Note

1. YEAR

Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Mark	A	B	C	D	E	F	G	H	J	K

2. MONTH

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mark	1	2	4	4	5	6	7	8	9	A	B	C

b) Location of Lot Mark

Serial NO. is printed on the label. The label is attached to the backside of the LCD module.
This is subject to change without prior notice.

8-2. Packing Form

a) Package quantity in one Pallet : 6ea

b) Pallet Size : 190mm0 X 1140mm X 1248mm



LC720DUQ

Product Specification

9. Precautions

Please pay attention to the followings when you use this TFT LCD module.

9-1. Mounting Precautions

- (1) You must mount a module using specified mounting holes (Details refer to the drawings).
- (2) You should consider the mounting structure so that uneven force (ex. Twisted stress) is not applied to the module. And the case on which a module is mounted should have sufficient strength so that external force is not transmitted directly to the module.
- (3) Please attach the surface transparent protective plate to the surface in order to protect the polarizer. Transparent protective plate should have sufficient strength in order to resist external force.
- (4) You should adopt radiation structure to satisfy the temperature specification.
- (5) Acetic acid type and chlorine type materials for the cover case are not desirable because the former generates corrosive gas of attacking the polarizer at high temperature and the latter causes circuit break by electro-chemical reaction.
- (6) Do not touch, push or rub the exposed polarizers with glass, tweezers or anything harder than HB pencil lead. And please do not rub with dust clothes with chemical treatment. Do not touch the surface of polarizer for bare hand or greasy cloth. (Some cosmetics are detrimental to the polarizer.)
- (7) When the surface becomes dusty, please wipe gently with absorbent cotton or other soft materials like chamois soaks with petroleum benzine. Normal-hexane is recommended for cleaning the adhesives used to attach front / rear polarizers. Do not use acetone, toluene and alcohol because they cause chemical damage to the polarizer.
- (8) Wipe off saliva or water drops as soon as possible. Their long time contact with polarizer causes deformations and color fading.
- (9) Do not open the case because inside circuits do not have sufficient strength.

9-2. Operating Precautions

- (1) The spike noise causes the mis-operation of circuits. It should be lower than following voltage :
 $V = \pm 200\text{mV}$ (Over and under shoot voltage)
- (2) Response time depends on the temperature. (In lower temperature, it becomes longer.)
- (3) Brightness depends on the temperature. (In lower temperature, it becomes lower.)
And in lower temperature, response time (required time that brightness is stable after turned on) becomes longer
- (4) Be careful for condensation at sudden temperature change. Condensation makes damage to polarizer or electrical contacted parts. And after fading condensation, smear or spot will occur.
- (5) When fixed patterns are displayed for a long time, remnant image is likely to occur.
- (6) Module has high frequency circuits. Sufficient suppression to the electromagnetic interference shall be done by system manufacturers. Grounding and shielding methods may be important to minimize the interference.
- (7) Please do not give any mechanical and/or acoustical impact to LCM. Otherwise, LCM can't be operated its full characteristics perfectly.
- (8) A screw which is fastened up the steels should be a machine screw.
(if not, it can cause conductive particles and deal LCM a fatal blow)
- (9) Please do not set LCD on its edge.
- (10) The conductive material and signal cables are kept away from LED driver inductor to prevent abnormal display, sound noise and temperature rising.



LC720DUQ

Product Specification

9-3. Electrostatic Discharge Control

Since a module is composed of electronic circuits, it is not strong to electrostatic discharge. Make certain that treatment persons are connected to ground through wrist band etc. And don't touch interface pin directly.

9-4. Precautions for Strong Light Exposure

Strong light exposure causes degradation of polarizer and color filter.

9-5. Storage

When storing modules as spares for a long time, the following precautions are necessary.

- (1) Store them in a dark place. Do not expose the module to sunlight or fluorescent light. Keep the temperature between 5°C and 35°C at normal humidity.
- (2) The polarizer surface should not come in contact with any other object.
It is recommended that they be stored in the container in which they were shipped.

9-6. Handling Precautions for Protection Film

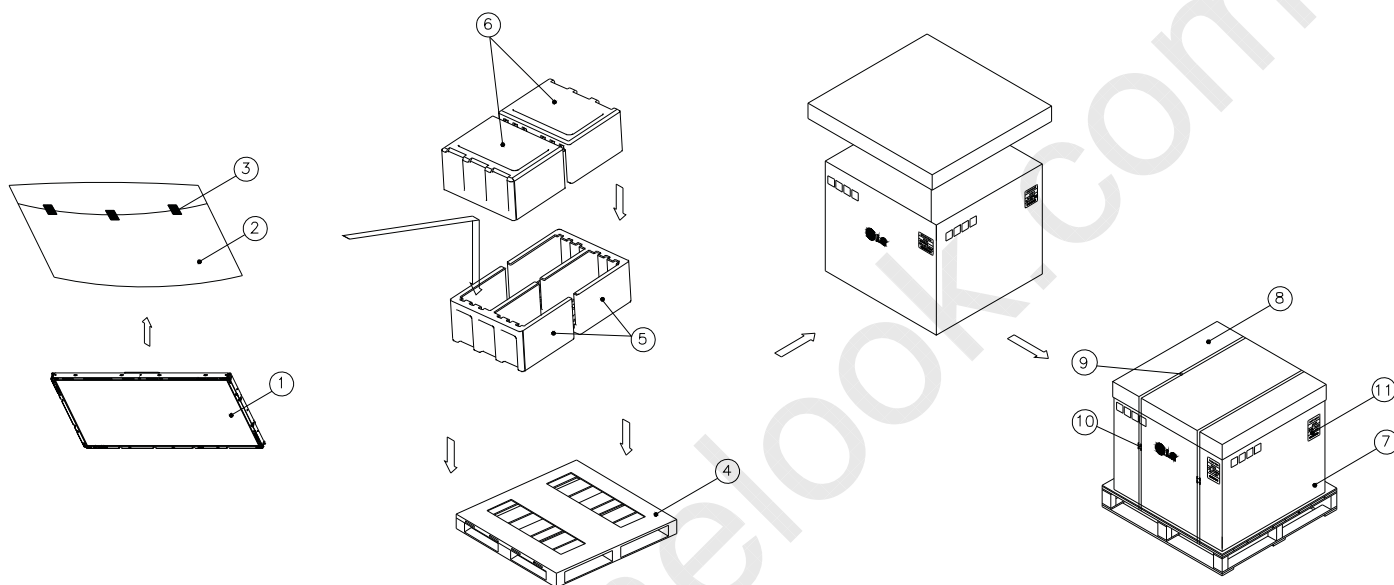
- (1) The protection film is attached to the bezel with a small masking tape.
When the protection film is peeled off, static electricity is generated between the film and polarizer.
This should be peeled off slowly and carefully by people who are electrically grounded and with well ion-blown equipment or in such a condition, etc.
- (2) When the module with protection film attached is stored for a long time, sometimes there remains a very small amount of glue still on the bezel after the protection film is peeled off.
- (3) You can remove the glue easily. When the glue remains on the bezel surface or its vestige is recognized, please wipe them off with absorbent cotton waste or other soft material like chamois soaked with normal-hexane.

LC720DUQ

Product Specification

APPENDIX-I

■ LC720DUQ-SCM2 – Pallet Ass'y

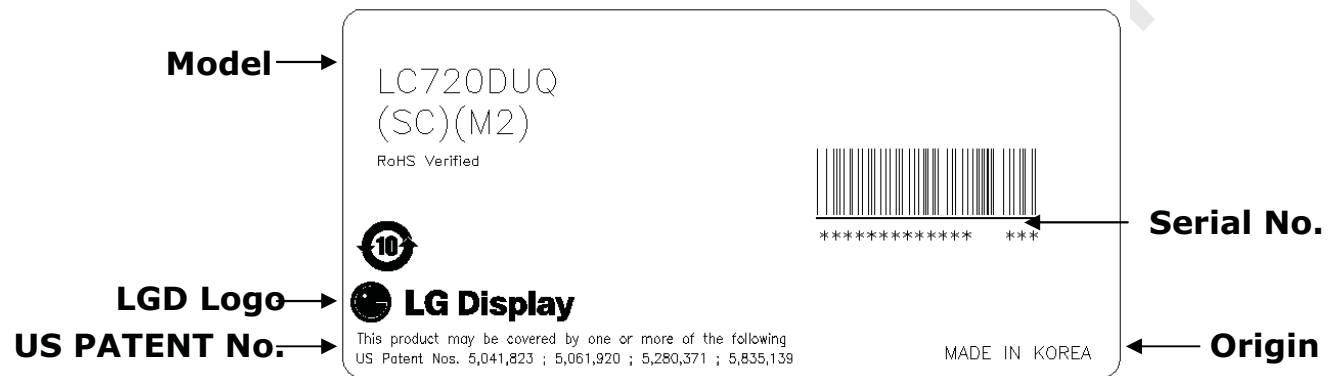


NO.	DESCRIPTION	MATERIAL
1	LCD Module	
2	BAG	72INCH
3	TAPE	MASKING 20MM X 50M
4	PALLET	Plywood (1900X1140X126.5)
5	PACKING	EPS
6	PACKING	EPS
7	ANGLE PACKING	PAPER
8	ANGLE COVER	PAPER
9	BAND,CLIP	STEEL
10	BAND	PP
11	LABEL	YUPO PAPER 80G 100X70

LC720DUQ

APPENDIX- II-1

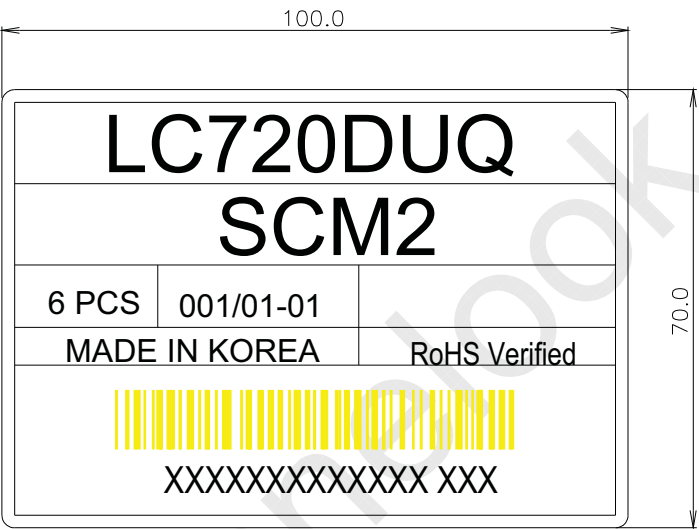
■ LC720DUQ-SCM2-LCM Label



LC720DUQ

APPENDIX- II-2

■ LC720DUQ-SCM2-Pallet Label

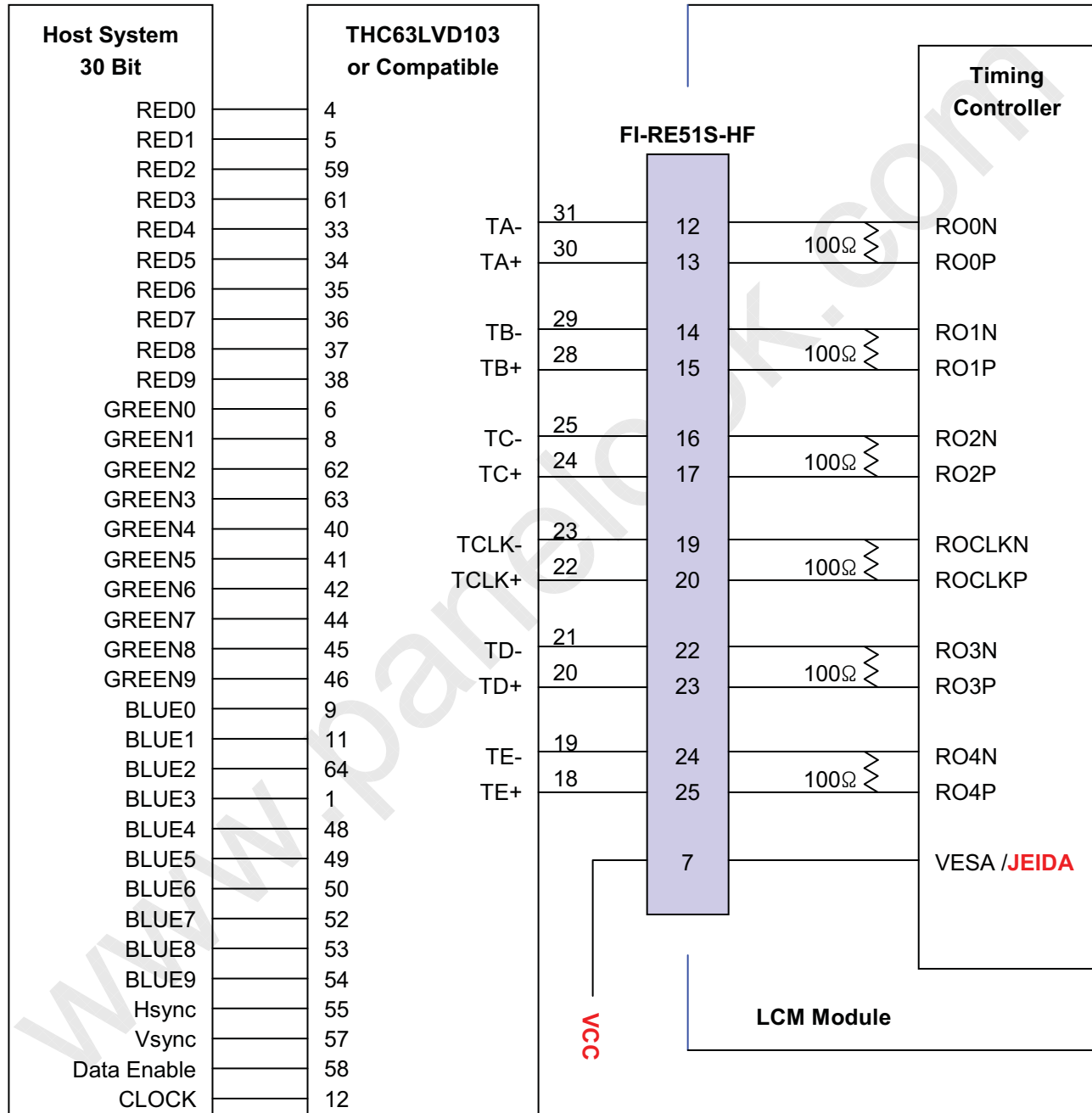


LC720DUQ

Product Specification

APPENDIX- III-1

■ Required signal assignment for Flat Link (Thine : THC63LVD103) Transmitter(Pin7="H")



Note :1. The LCD module uses a 100 Ohm[Ω] resistor between positive and negative lines of each receiver input.

2. Refer to LVDS Transmitter Data Sheet for detail descriptions. (THC63LVD103 or Compatible)

3. '9' means MSB and '0' means LSB at R,G,B pixel data.

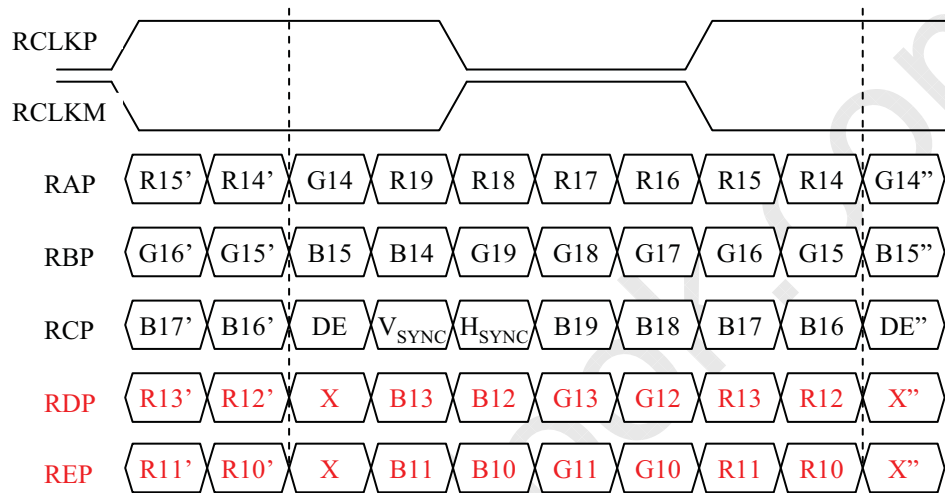
LC720DUQ

Product Specification

APPENDIX- III-2

■ LVDS Data-Mapping Information (10 Bit)

1) LVDS Select : "H" Data-Mapping (JEIDA format)



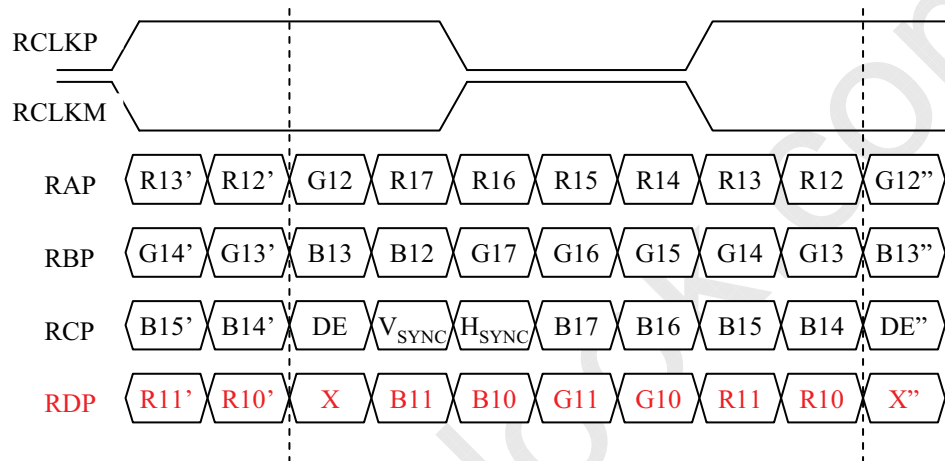
LC720DUQ

Product Specification

APPENDIX- III-2

■ LVDS Data-Mapping Information (8 Bit)

1) LVDS Select : "H" Data-Mapping (JEIDA format)

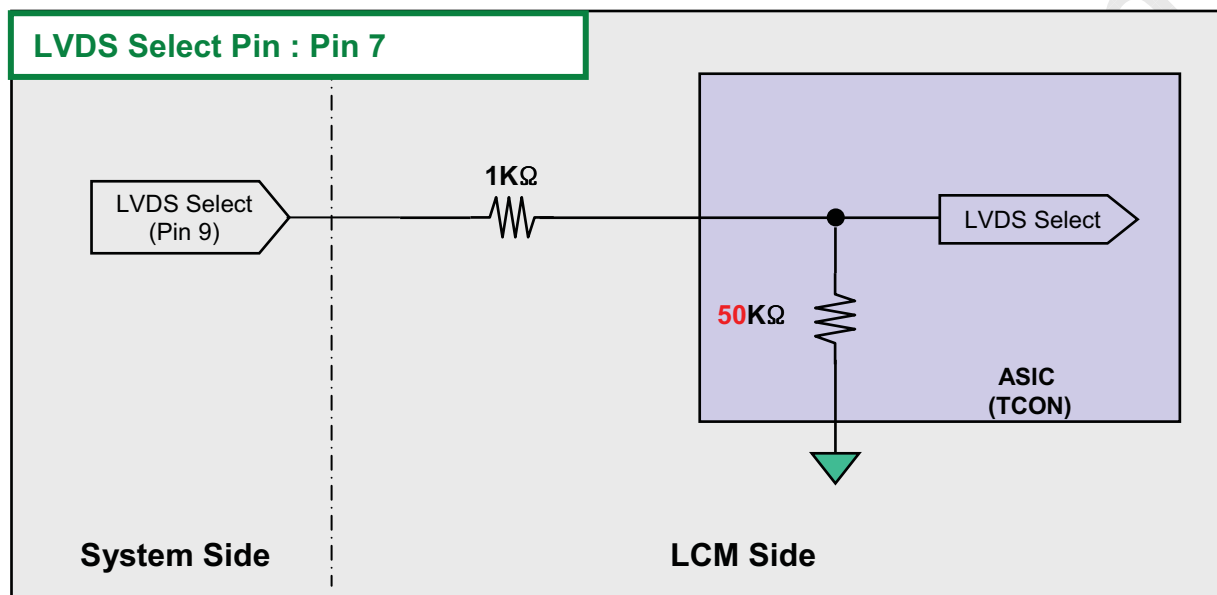
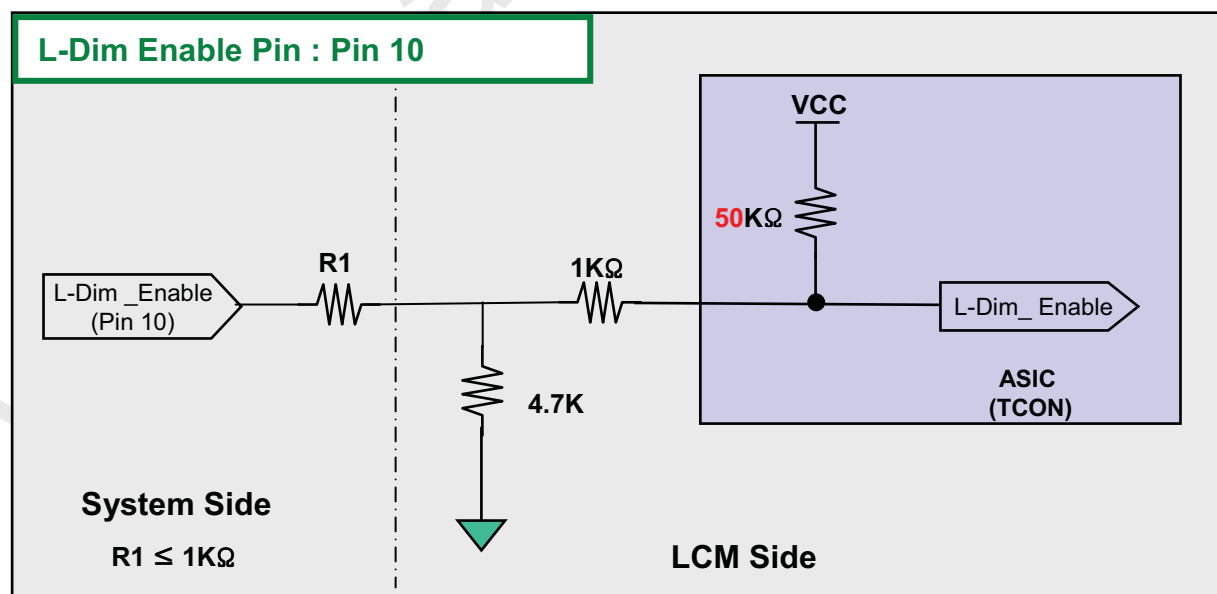


LC720DUQ

Product Specification

APPENDIX- III-3

■ Option Pin Circuit Block Diagram

1) Circuit Block Diagram of **LVDS Format** Selection pin2) Circuit Block Diagram of **L-Dim Enable** Selection pin

■ Local Dimming & 3D_Mode Design Guide

- | No | Symbol | | Option | T-con Register (I2C control) | 비고 |
|----|---------|---------------------------------------|--|--|---------------------------|
| 1 | 2D_Mode | Local Dimming on
Local Dimming off | 3D_EN="L", Local_EN= "H"
3D_EN="L", Local_EN= "L" | Tcon Register address 81C : "3 "
Tcon Register address 81C : "3 " | T-con Device Address "70" |
| 2 | 3D_Mode | Local Dimming off | 3D_EN="H", Local_EN= "L" | Tcon Register address 81C : "7 " | |

No	Symbol	Description
1	3D_EN	'H' = Enable , 'L' or NC = Disable
2	NC	No Connection (Reserved for LGD)
3	NC	No Connection (Reserved for LGD)
4	SDA	I2C data
5	SCL	I2C clock
6	NC	No Connection (Reserved for LGD)
7	LVDS Select	'H' = JEIDA , 'Fix'
8	3D_Vsync	3D Vsync in
9	NC	No Connection (Reserved for LGD)
10	L-DIM Enable	'H' = Enable , 'L' or NC = Disable

