



晶采光電科技股份有限公司
AMPIRE CO., LTD.

SPECIFICATIONS FOR LCD MODULE

CUSTOMER	
CUSTOMER PART NO.	
AMPIRE PART NO.	AM-320240LKTMQW-51H
APPROVED BY	
DATE	

☐ Approved For Specifications

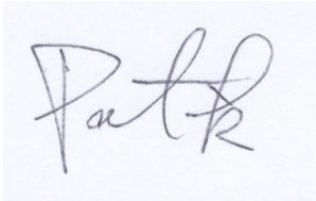
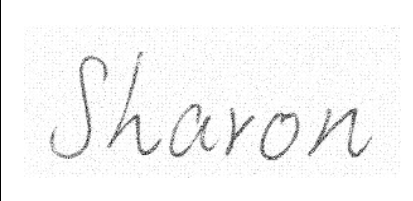

☐ Approved For Specifications & Sample

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RECORD OF REVISION

Revision Date	Page	Contents	Editor
2015/02/10	--	New Release.	Emil
2015/03/06	23.24	Revise Mechanical Drawing	Sharon

1 General Description and Features

3.5 inch Amorphous-TFT-LCD (Thin Film Transistor Liquid Crystal Display) module. This module is composed of a 3.5" TFT-LCD panel, a driver circuit and backlight unit.

- 1.1 Construction: 3.5" a-Si color TFT-LCD, White LED Backlight.
- 1.2 Resolution (pixel): 320(R.G.B) X240.
- 1.3 Number of the Colors: 16.7M Dithering (R, G, B 8 bit digital each).
- 1.4 LCD type: Transmissive Color TFT LCD (normally White).
- 1.5 View Angle: 6 o'clock.
- 1.6 24Bit RGB Interface.
- 1.7 Interface: 50 pin.
- 1.8 Power Supply Voltage: 3.3V single power input. Built-in power supply circuit.

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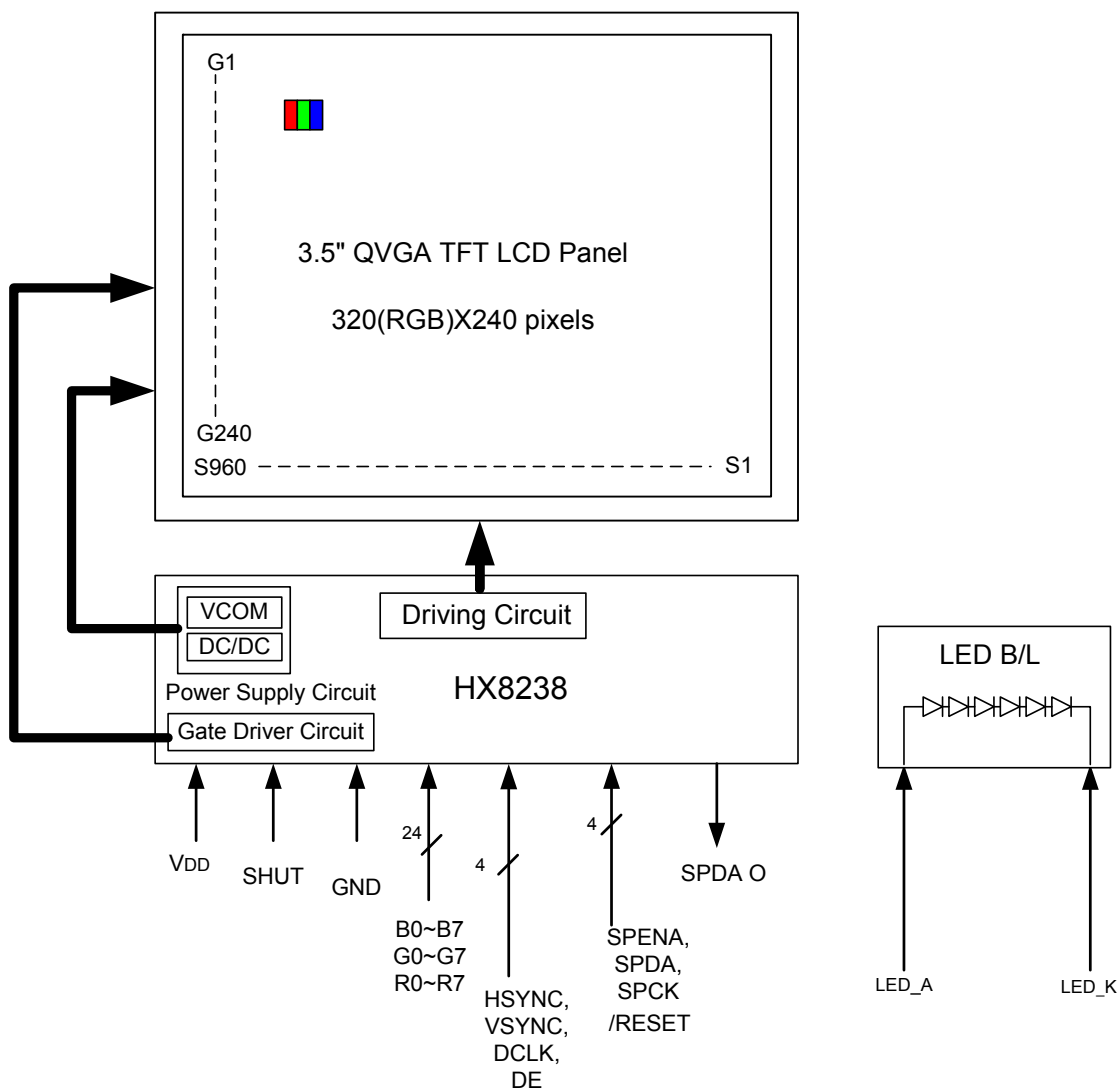
2 Physical specifications

Item	Specifications	unit
Display Resolution	320(RGB)(W) x 240(H)	dot
Active area	70.08 x 52.56	mm
Screen size	3.5(Diagonal)	inch
Pixel pitch	0.073 (W) x 0.219 (H)	mm
Color configuration	R.G.B – Vertical stripe	
Overall Dimension	76.9(W) x 63.9(H) x 3.15(T)	mm
Input interface	digital 24-bits RGB	
Surface Treatment	Anti - glare(AG)	
Backlight unit	White LED	
Display Mode	Normally White/Transmissive	

Note 1: Requirements on Environmental Protection: RoHS

Note 2: LCM weight tolerance: +/- 5%

3 Functional Block Diagram



4 Electrical Specifications

TFT LCD Panel FPC Descriptions

Pin no	Symbol	I/O	Description	Remark
1	LED_K	P	LED backlight Cathode	
2	LED_K	P	LED backlight Cathode	
3	LED_A	P	LED backlight Anode	
4	LED_A	P	LED backlight Anode	
5	NC	--	No Connect	
6	RESET	I	Reset; low active	
7	SPENA	I	Serial port data enable signal	
8	SPCK	I	SPI Serial Clock	
9	SPDA	I	SPI Serial Data input	
10	SPDA O	O	SPI Serial Data output	
11	B7	I	Blue Data Bit 7	
12.	B6	I	Blue Data Bit 6	
13.	B5	I	Blue Data Bit 5	
14.	B4	I	Blue Data Bit 4	
15.	B3	I	Blue Data Bit 3	
16.	B2	I	Blue Data Bit 2	
17.	B1	I	Blue Data Bit 1	
18.	B0	I	Blue Data Bit 0	
19.	G7	I	Green Data Bit 7	
20.	G6	I	Green Data Bit 6	
21.	G5	I	Green Data Bit 5	
22.	G4	I	Green Data Bit 4	
23.	G3	I	Green Data Bit 3	
24.	G2	I	Green Data Bit 2	
25.	G1	I	Green Data Bit 1	
26.	G0	I	Green Data Bit 0	
27.	R7	I	Red Data Bit 7	
28.	R6	I	Red Data Bit 6	
29.	R5	I	Red Data Bit 5	
30.	R4	I	Red Data Bit 4	
31.	R3	I	Red Data Bit 3	
32.	R2	I	Red Data Bit 2	

33.	R1	I	Red Data Bit 1	
34.	R0	I	Red Data Bit 0	
35.	CLK	I	Data Clock	
36.	HSYNC	I	Horizontal Synchronous Signal	
37.	VSYNC	I	Vertical Synchronous Signal	
38.	DEN	I	Data enabling signal	
39.	VDD	P	Power supply (3.3V)	
40.	VDD	P	Power supply (3.3V)	
41.	VDD	P	Power supply (3.3V)	
42.	VDD	P	Power supply (3.3V)	
43.	NC	--	Must keep floating.	
44.	NC	--		
45.	NC	--		
46.	NC	--		
47.	Shutdown	I	High level: sleep mode for the driver Low level: normal operating mode	
48.	NC	--	No Connect	
49.	GND	P	Ground	
50.	GND	P	Ground	

Note 2-1:

I/O definition: I – Input O – Output P – Power/Ground

5 Basic Display Color and Gray Scale

Color		Input Color Data																							
		Red								Green								Blue							
		MSB				LSB				MSB				LSB				MSB				LSB			
		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
	Red(255)	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Green(255)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	Blue(255)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	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
	Magenta	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	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	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
Red	Red(0) Dark	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(1)	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(2)	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	Red(253)	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(254)	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(255) Bright	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Green	Green(0) Dark	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(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
	Green(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	Green(253)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0
	Green(254)	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(255) Bright	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
Blue	Blue(0) Dark	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(1)	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(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	Blue(253)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1
	Blue(254)	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(255) Bright	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1

6 Absolute Maximum Ratings

Item	Symbol	Min	Max	Unit	Remark
Power Supply Voltage	VDD	-0.3	5.0	V	
Logic Input Signal Voltage	R7~R2,G7~G2,B7~B2,RESET SPENA,SPCK SPDA,HSYNC VSYNC,CLK,DEN	-0.3	VDD+0.3	V	
Back Light Forward Current	I _{LED}	--	25	mA	For each LED
Operating Temperature	T _{OPR}	-20	70	°C	
Storage Temperature	T _{STG}	-30	80	°C	

7 Electrical Characteristics

7.1 DC Electrical characteristic of the LCD

Typical operating conditions (GND=0V, Ta=25°C)

Item		Symbol	Min.	Typ.	Max.	Unit	Remark
Power supply		VDD	3.0	3.3	3.6	V	
Input Voltage for logic	H Level	V _{IH}	0.8VDD	-	VDD	V	Note1
	L Level	V _{IL}	0	-	0.2VDD	V	
(Panel + LSI)		Black Mode (60Hz)	--	35	50	mW	
Power Consumption		Standby mode	--	0.12	0.17	mW	

Note1: Hsync, Vsync, DEN, DCLK, R0~R5, G0~G5, B0~B5

7.2 Electrical characteristic of LED Back-light

Item	Symbol	Min.	Typ.	Max.	Unit	Remark
Forward current	I _F	-	15	20	mA	
Forward voltage	V _F	-	18.5		V	
Power consumption	W _{BL}	-	288	-	mW	
Operating life time	-	-	50000	-	Hours	

Note1: The figure below shows the connection of backlight LED.

Note2: IF is defined for one channel LED.

Optical performance should be evaluated at Ta=25°C only.

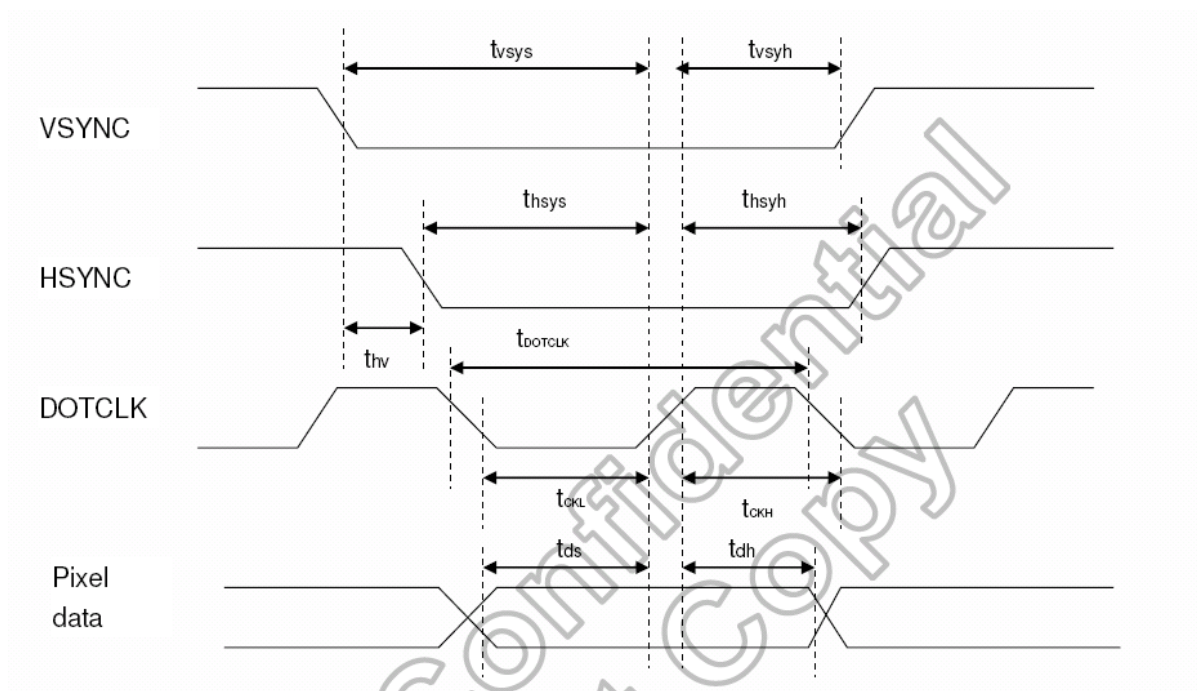
IF LED is driven by high current, high ambient temperature & humidity condition, the life time of LED will be reduced.

Operating life means brightness goes down to 50% initial brightness. Typical operating life time is estimated data.

8 AC Timing characteristic of the LCD

8.1 Timing Parameter

AC Electrical Characteristics

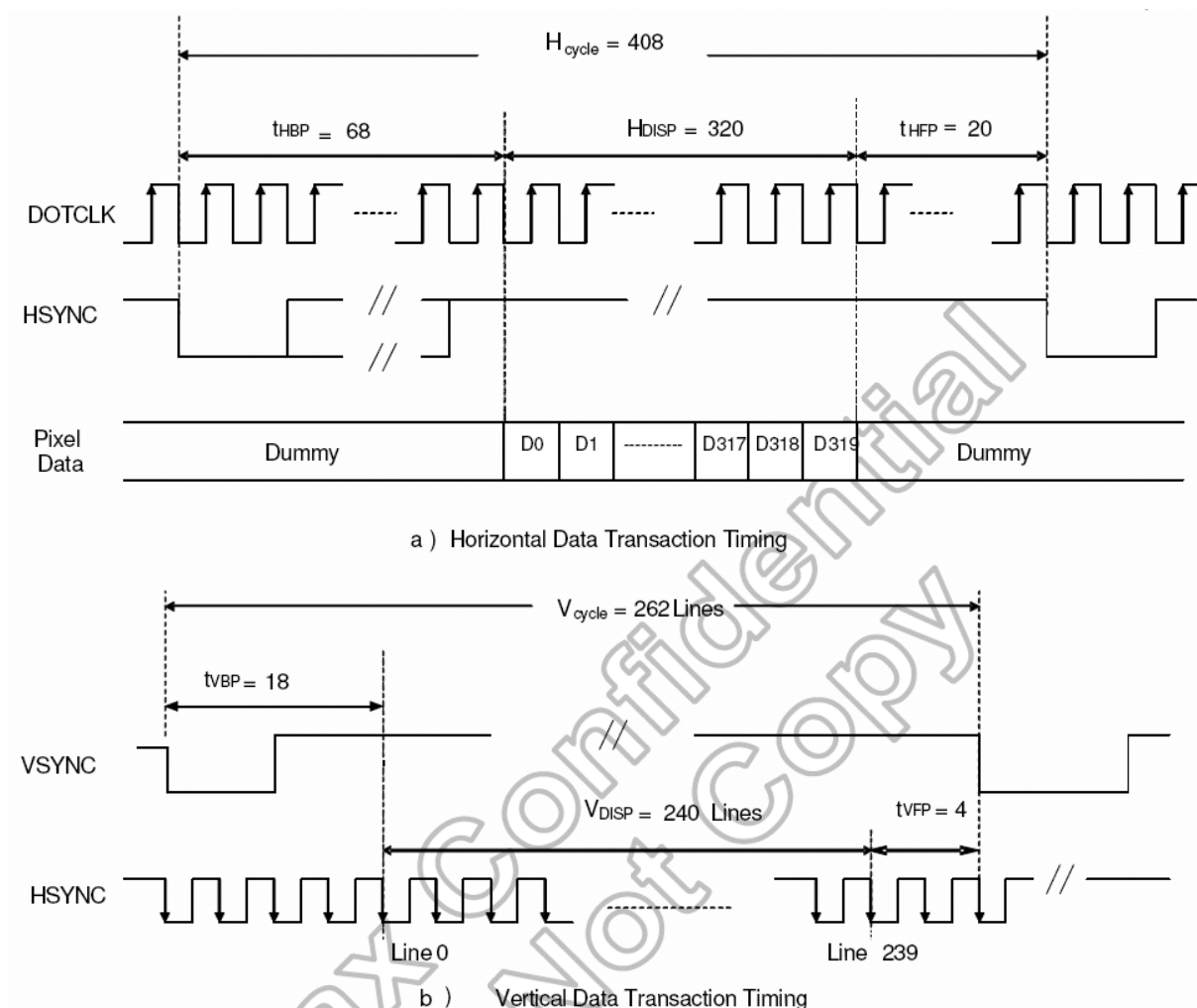


Pixel Timing

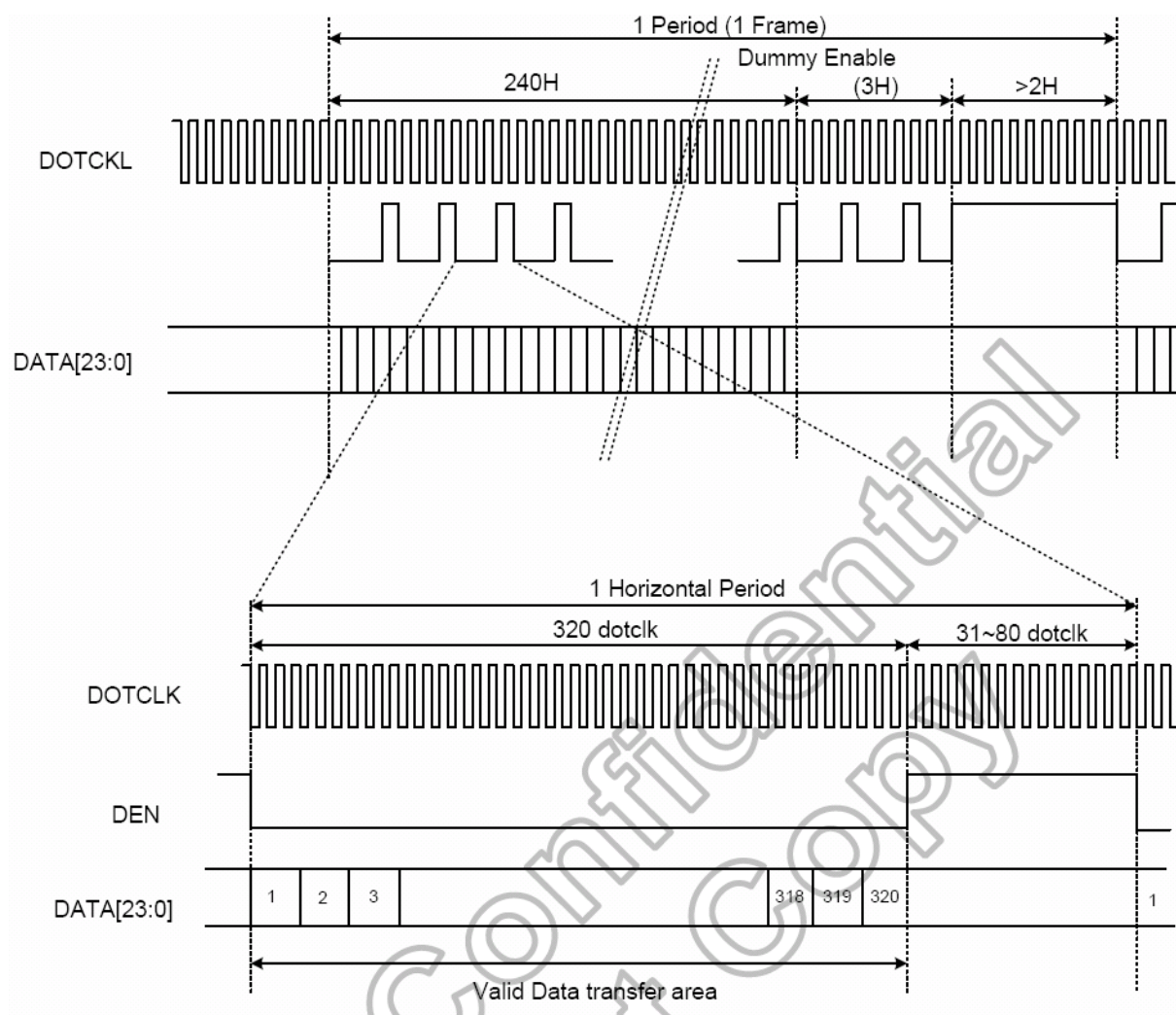
Characteristics	Symbol	Min		Typ		Max		Unit
		24 bit	8 bit	24 bit	8 bit	24 bit	8 bit	
DOTCLK Frequency	fDOTCLK	-	-	6.5	19.5	10	30	MHz
DOTCLK Period	tDOTCLK	100	33.3	154	51.3	-	-	ns
Vertical Sync Setup Time	tvsys	20	10	-	-	-	-	ns
Vertical Sync Hold Time	tvsyh	20	10	-	-	-	-	ns
Horizontal Sync Setup Time	thsys	20	10	-	-	-	-	ns
Horizontal Sync Hold Time	thsyh	20	10	-	-	-	-	ns
Phase difference of Sync Signal Falling Edge	thv	1		-		240		tDOTCLK
DOTCLK Low Period	tCKL	50	15	-	-	-	-	ns
DOTCLK High Period	tCKH	50	15	-	-	-	-	ns
Data Setup Time	tds	12	10	-	-	-	-	ns
Data hold Time	tdh	12	10	-	-	-	-	ns
Reset pulse width	tRES	10		-		-		us

Note: External clock source must be provided to DOTCLK pin of HX8238-A. The driver will not operate if absent of the clocking signal.

Pixel Timing Table



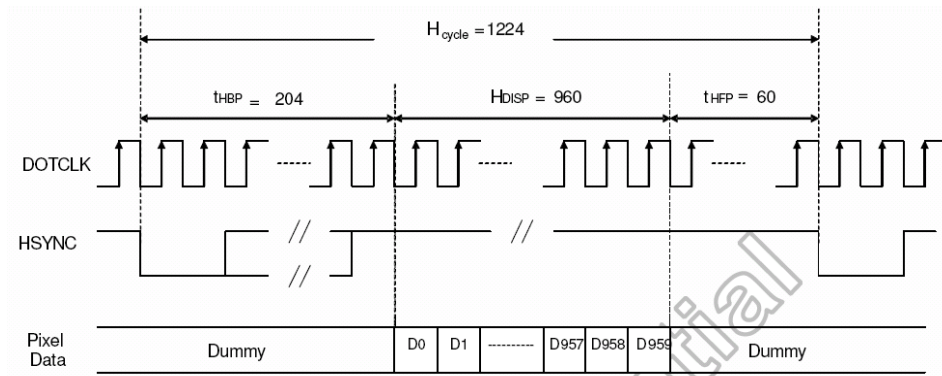
(a) Data Transaction Timing in Parallel RGB (24 bit) Interface (SYNC Mode)



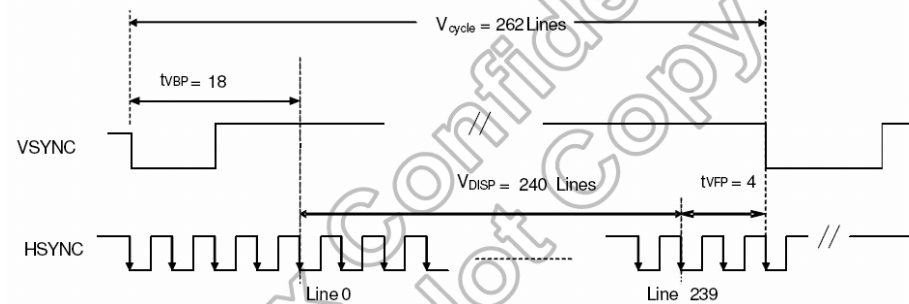
b) Data Transaction Timing in Parallel RGB (24 bit) Interface (DE Mode)

Characteristics	Symbol	Min		Typ		Max		Unit
		24 bit	8 bit	24 bit	8 bit	24 bit	8 bit	
DOTCLK Frequency	fDOTCLK	-	-	6.5	19.5	10	30	MHz
DOTCLK Period	tDOTCLK	100	33.3	154	51.3	-	-	ns
Horizontal Frequency (Line)	fH	-	-	14.9	-	22.35	-	KHz
Vertical Frequency (Refresh)	fV	-	-	60	-	90	-	Hz
Horizontal Back Porch	tHBP	-	-	68	204	-	-	tDOTCLK
Horizontal Front Porch	tHFP	-	-	20	60	-	-	tDOTCLK
Horizontal Data Start Point	tHBP	-	-	68	204	-	-	tDOTCLK
Horizontal Blanking Period	tHBP + tHFP	-	-	88	264	-	-	tDOTCLK
Horizontal Display Area	HDISP	-	-	320	960	-	-	tDOTCLK
Horizontal Cycle	Hcycle	-	-	408	1224	450	1350	tDOTCLK
Vertical Back Porch	tVBP	-	-	18	-	-	-	Lines
Vertical Front Porch	tVFP	-	-	4	-	-	-	Lines
Vertical Data Start Point	tVBP	-	-	18	-	-	-	Lines
Vertical Blanking Period	tVBP + tVFP	-	-	22	-	-	-	Lines
Vertical Display Area	NTSC	VDISP	-	240	-	-	-	Lines
	PAL			280(PALM=0)				
				288(PALM=1)				
Vertical Cycle	NTSC	Vcycle	-	262	350	-	-	Lines
	PAL			313				

Data Transaction Timing in Normal Operating Mode

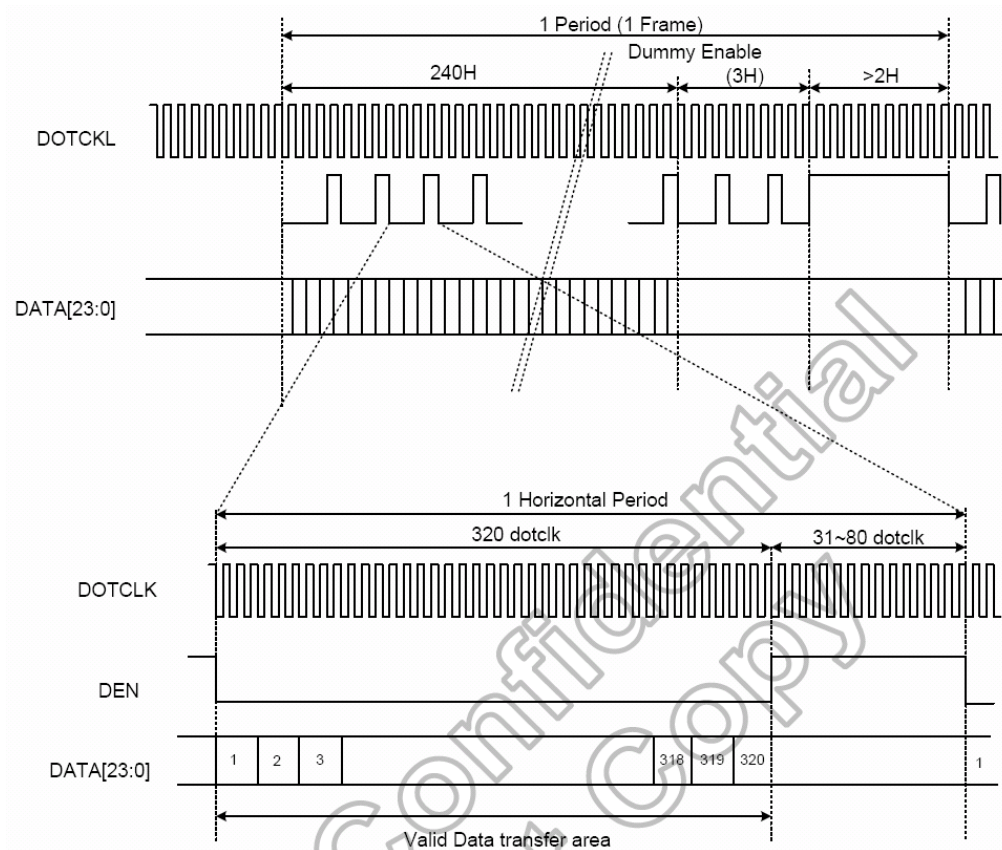


a) Horizontal Data Transaction Timing



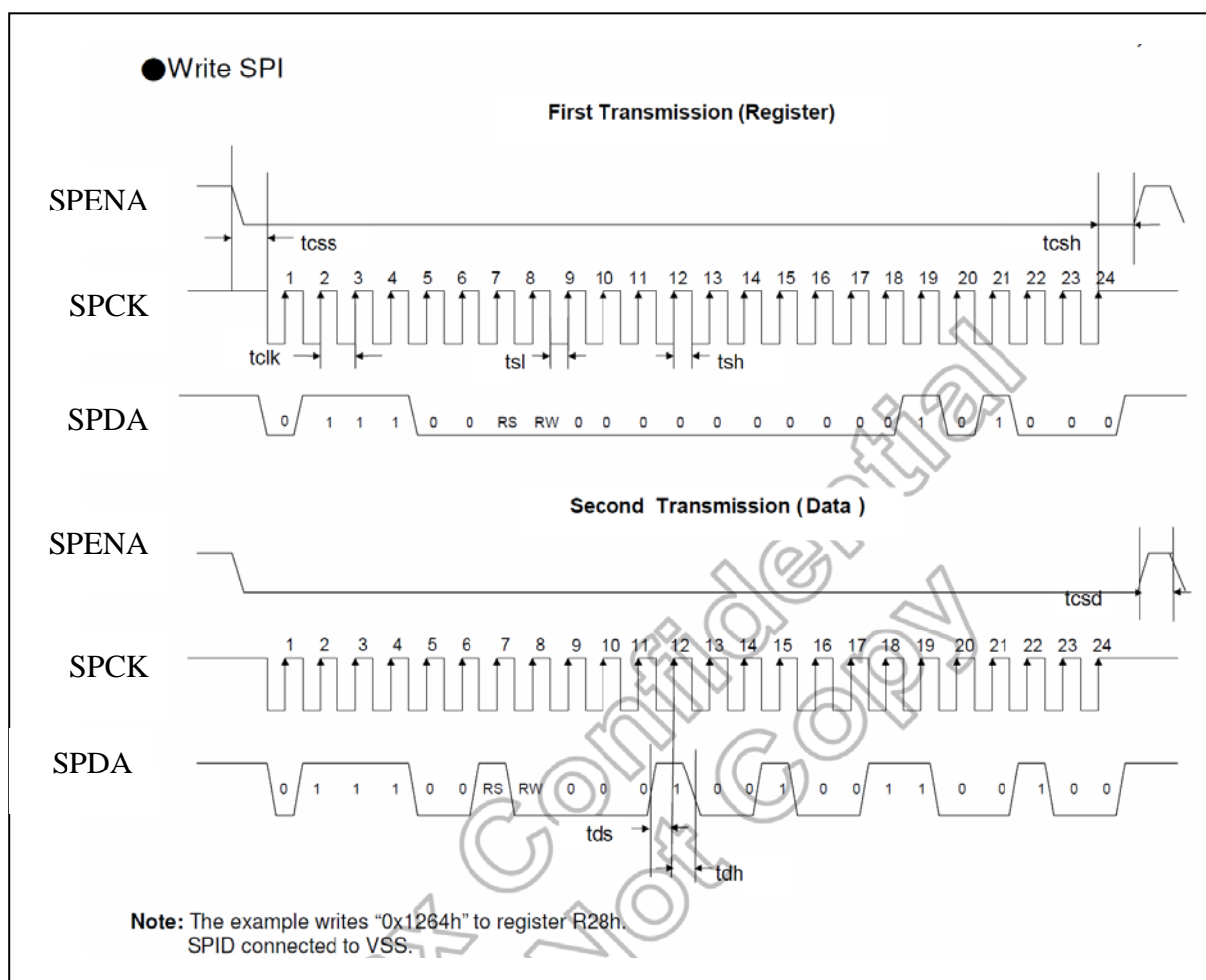
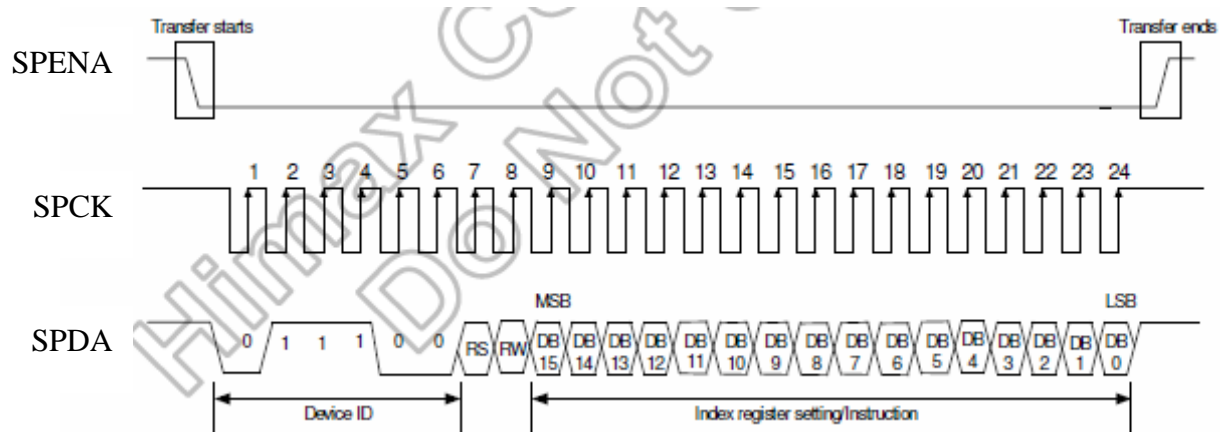
b) Vertical Data Transaction Timing

Data Transaction Timing in Serial RGB (8 bit) Interface (SYNC Mode)



Data Transaction Timing in Serial RGB (8 bit) Interface (DE Mode)

8.2 AC Timing of SPI interface

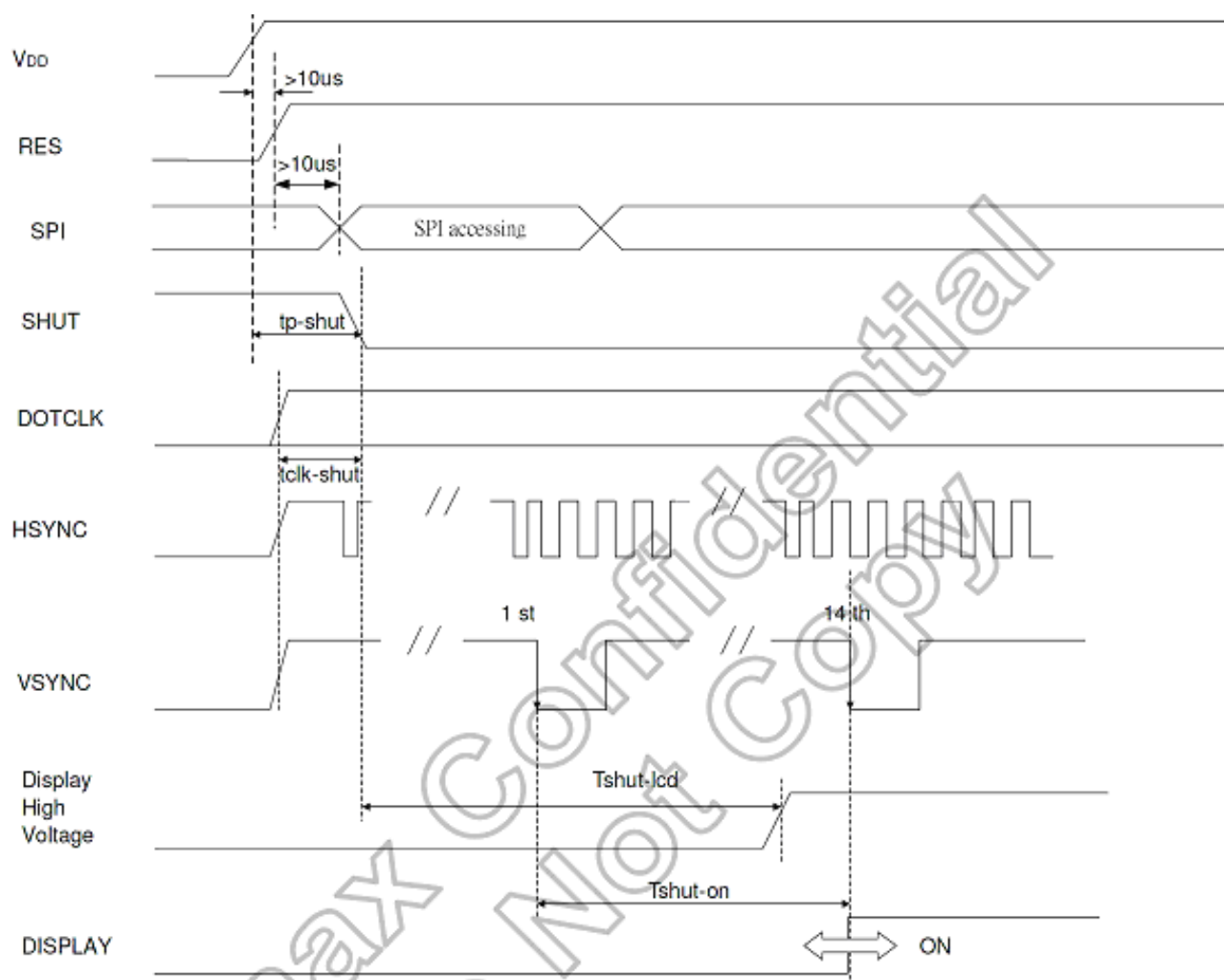


Characteristics	Symbol	Min	Typ	Max	Unit
Serial Clock Frequency	fclk	-	-	20	MHz
Serial Clock Cycle Time	tclk	50	-	-	ns
Clock Low Width	tsl	25	-	-	ns
Clock High Width	tsh	25	-	-	ns
Chip Select Setup Time	tcss	0	-	-	ns
Chip Select Hold Time	tcsh	10	-	-	ns
Chip Select High Delay Time	tcsd	20	-	-	ns
Data Setup Time	tds	5	-	-	ns
Data Hold Time	tdh	10	-	-	ns

8.3 Command table

Reg#	Register	R/W	R/S	IB15	IB14	IB13	IB12	IB11	IB10	IB9	IB8	IB7	IB6	IB5	IB4	IB3	IB2	IB1	IB0
SR	Status Read	1	0	L7	L6	L5	L4	L3	L2	L1	L0	0	0	0	0	0	0	0	0
R01h	Driver output control	0	1	0	RL	REV	PINV	BGR	SM	TB	CPE	0	0	0	0	0	0	0	0
R02h	LCD driver AC control	0	1	0	0	0	0	0	0	B/C	0	0	0	0	0	0	0	0	0
R03h	Power control (1)	0	1	DCT3	DCT2	DCT1	DCT0	BTf	BT2	BT1	BT0	DC3	DC2	DC1	DC0	AP2	AP1	AP0	0
R04h	Data and color filter control	0	1	0	0	0	0	0	PALM	BLT1	BLT0	OEA1	OEA0	SEL2	SEL1	SEL0	SWD2	SWD1	SWD0
R05h	Function control	0	1	GHN	XDK	GDIS	LPF	DEP	CKP	VSP	HSP	DEO	DIT	0	PWM	0	FB2	FB1	FB0
R06h	Reserved	Reserved																	
R07h	Reserved	Reserved																	
R0Ah	Contrast/Brightness control	0	1	0	BR6	BR5	BR4	BR3	BR2	BR1	BR0	0	0	0	CON4	CON3	CON2	CON1	CON0
R0Bh	Frame cycle control	0	1	NO1	NO0	SDT1	SDT0	0	EQ2	EQ1	EQ0	0	0	0	0	0	0	0	0
R0Dh	Power control (2)	0	1	0	VRC2	VRC1	VRC0	0	0	VDS1	VDS0	0	0	VRH5	VRH4	VRH3	VRH2	VRH1	VRH0
R0Eh	Power control (3)	0	1	0	0	1	VDV6	VDV5	VDV4	VDV3	VDV2	VDV1	VDV0	0	0	0	0	0	0
R0Fh	Gate scan starting Position	0	1	0	0	0	0	0	0	0	0	SCN7	SCN6	SCN5	SCN4	SCN3	SCN2	SCN1	SCN0
R16h	Horizontal Porch	0	1	XLIM8	XLIM7	XLIM6	XLIM5	XLIM4	XLIM3	XLIM2	XLIM1	XLIM0	0	0	0	0	0	0	0
R17h	Vertical Porch	0	1	STH1	STH0	HBP6	HBP5	HBP4	HBP3	HBP2	HBP1	HBP0	VBP6	VBP5	VBP4	VBP3	VBP2	VBP1	VBP0
R1Eh	Power control (4)	0	1	0	0	0	0	0	0	0	0	nQTP	VCM6	VCM5	VCM4	VCM3	VCM2	VCM1	VCM0
R27h	Reserved	Reserved																	
R28h	Reserved	Reserved																	
R29h	Reserved	Reserved																	
R2Bh	Reserved	Reserved																	
R30h	γ control (1)	0	1	0	0	0	0	0	PKP 12	PKP 11	PKP 10	0	0	0	0	0	PKP 02	PKP 01	PKP 00
R31h	γ control (2)	0	1	0	0	0	0	0	PKP 32	PKP 31	PKP 30	0	0	0	0	0	PKP 22	PKP 21	PKP 20
R32h	γ control (3)	0	1	0	0	0	0	0	PKP 52	PKP 51	PKP 50	0	0	0	0	0	PKP 42	PKP 41	PKP 40
R33h	γ control (4)	0	1	0	0	0	0	0	PRP 12	PRP 11	PRP 10	0	0	0	0	0	PRP 02	PRP 01	PRP 00
R34h	γ control (5)	0	1	0	0	0	0	0	PKN 12	PKN 11	PKN 10	0	0	0	0	0	PKN 02	PKN 01	PKN 00
R35h	γ control (6)	0	1	0	0	0	0	0	PKN 32	PKN 31	PKN 30	0	0	0	0	0	PKN 22	PKN 21	PKN 20
R36h	γ control (7)	0	1	0	0	0	0	0	PKN 52	PKN 51	PKN 50	0	0	0	0	0	PKN 42	PKN 41	PKN 40
R37h	γ control (8)	0	1	0	0	0	0	0	PRN 12	PRN 11	PRN 10	0	0	0	0	0	PRN 02	PRN 01	PRN 00
R3Ah	γ control (9)	0	1	0	0	0	VRP 14	VRP 13	VRP 12	VRP 11	VRP 10	0	0	0	0	VRP 03	VRP 02	VRP 01	VRP 00
R3Bh	γ control (10)	0	1	0	0	0	VRN 14	VRN 13	VRN 12	VRN 11	VRN 10	0	0	0	0	VRN 03	VRN 02	VRN 01	VRN 00

8.4 Power on sequence

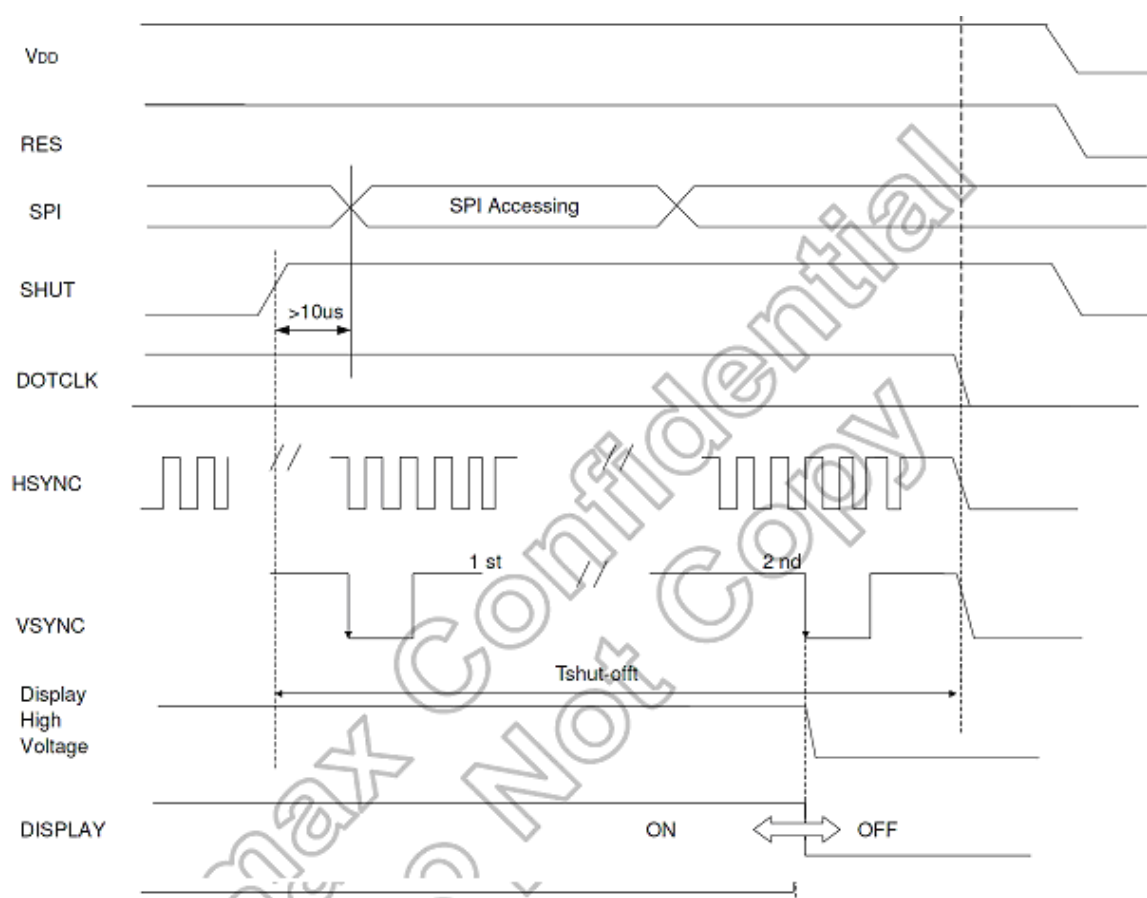


Characteristics	Symbol	Min	Typ	Max	Units
VDDD / VDDIO on to falling edge of SHUT	t_{p-shut}	1	-	-	us
DOTCLK	$t_{clk-shut}$	1	-	-	clk
Falling edge of SHUT to LCD power on	$t_{shut-lcd}$	-	-	128	ms
Falling edge of SHUT to display start	$t_{shut-on}$	-	-	14	frame
- 1 line: 408 clk - 1 frame: 262 line - DOTCLK = 6.5MHz		-	166	232.4	ms

Note: It is necessary to input DOTCLK before the falling edge of SHUT.

Display starts at 10th falling edge of VSTNC after the falling edge of SHUT.

8.5 Power off sequence



Characteristics	Symbol	Min	Typ	Max	Unit
Rising edge of SHUT to display off	tshut-off	2	-	-	frame
- 1 line: 408 clk - 1 frame: 262 line - DOTCLK = 6.5MHz		33.4	-	-	ms
Input-signal-off to VDDD / VDDIO off	toff-vdd	1	-	-	us

Note: DOTCLK must be maintained at least 2 frames after the rising edge of SHUT.

Display become off at the 2nd falling edge of VSTNC after the falling edge of SHUT.

If RESET signal is necessary for power down, provide it after the 2-frames-cycle of the SHUT period.

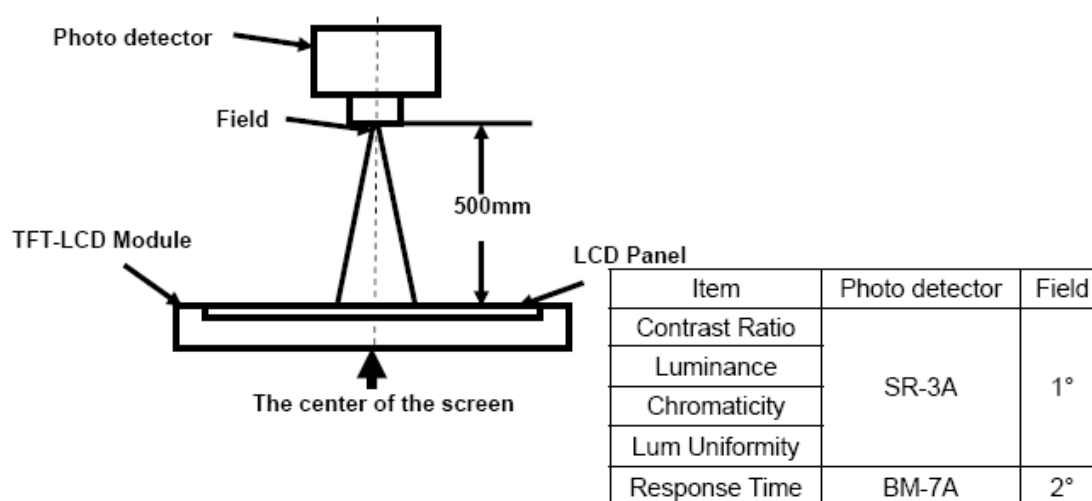
9 Optical specification

9.1 Optical characteristic of the LCD

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
View Angles		θ T	$CR \geq 10$	-	60	-	Degree	Note 2
		θ B		-	80	-		
		θ L		-	80	-		
		θ R		-	80	-		
Contrast Ratio		CR	$\theta = 0^\circ$	400	500	-		Note 1 Note 3
Response Time		T _{ON}	25℃	-	15	30		Note 1 Note 4
		T _{OFF}		-	35	50		
Chromaticity	White	x	Backlight is on	0.26	0.31	0.36		Note 5 Note 1
		y		0.27	0.32	0.37		
	Red	x		0.56	0.61	0.66		
		y		0.31	0.36	0.41		
	Green	x		0.30	0.35	0.40		
		y		0.53	0.58	0.63		
	Blue	x		0.10	0.15	0.20		
		y		0.02	0.07	0.12		
Uniformity		U		70	80	-	%	Note 1 Note 6
NTSC				-	50	-	%	Note 5
Luminance		L		320	400	-	cd/m ²	Note 1 Note 7

Note 1: Definition of optical measurement system.

The optical characteristics should be measured in dark room. After 5 minutes operation, the optical properties are measured at the center point of the LCD screen. All input terminals LCD panel must be ground when measuring the center area of the panel.



Note 2: Definition of viewing angle range and measurement system.

viewing angle is measured at the center point of the LCD by CONOSCOPE (ergo-80).

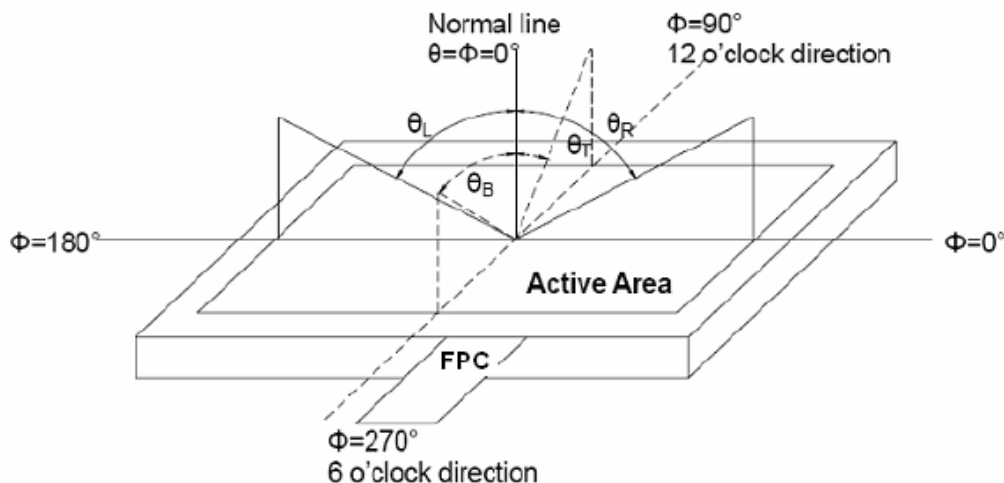


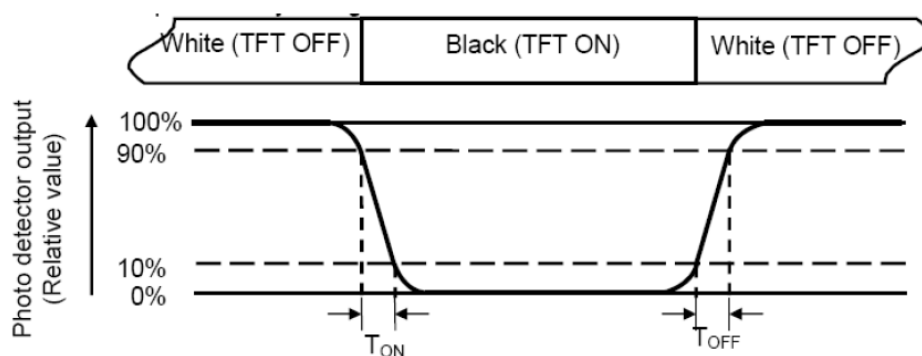
Fig. 1 Definition of viewing angle

Note 3: Definition of contrast ratio

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

Note 4: Definition of Response time

The response time is defined as the LCD optical switching time interval between "White" state and "Black" state. Rise time (T_{ON}) is the time between photo detector output intensity changed from 90% to 10%. And fall time (T_{OFF}) is the time between photo detector output intensity changed from 10% to 90%.



Note 5: Definition of color chromaticity (CIE1931)

Color coordinates measured at center point of LCD.

Note 6: Definition of Luminance Uniformity

Active area is divided into 9 measuring areas (Refer Fig. 2). Every measuring point is placed at the center of each measuring area.

Luminance Uniformity(U) = L_{min} / L_{max}

L -----Active area length W ----- Active area width

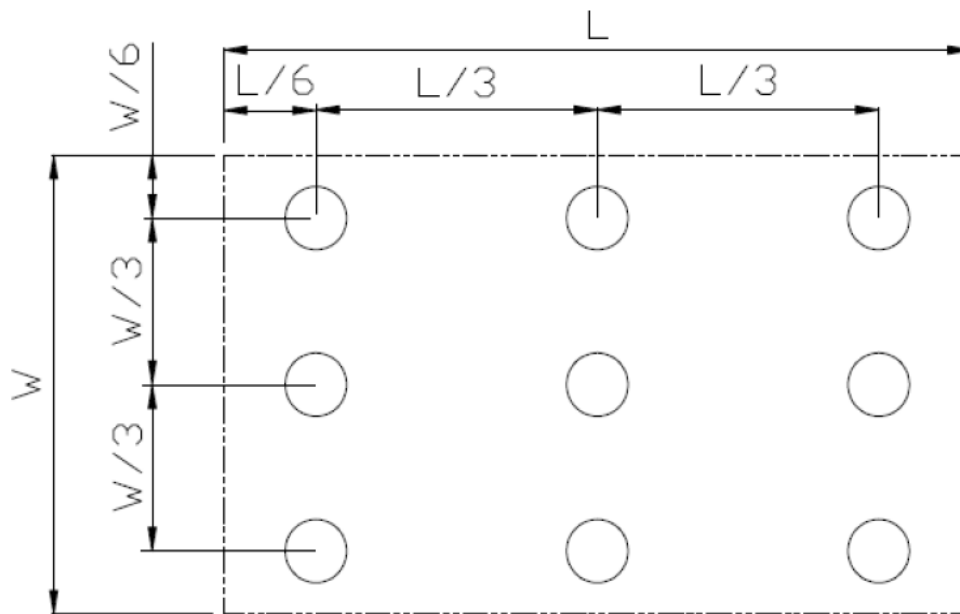


Fig. 2 Definition of uniformity

L_{max} : The measured maximum luminance of all measurement position.

L_{min} : The measured minimum luminance of all measurement position.

Note 7: Definition of Luminance:

Measure the luminance of white state at center point.

10 QUALITY AND RELIABILITY

No	Test Item	Condition	Remarks
1	High Temperature Operation	Ts=+60℃,240hrs	Note1 IEC60068-2-2,GB2423.2—89
2	Low Temperature Operation	Ta=-20℃,240hrs	Note 2, IEC60068-2-1 GB2423.1—89
3	High Temperature Storage	Ta=+70℃,240hrs	IEC60068-2-2, GB2423.2—89
4	Low Temperature Storage	Ta=-30℃,240hrs	IEC60068-2-1 GB2423.1—89
5	High Temperature & High Humidity Storage	+60℃,90% RH max,160 hours	IEC60068-2-3, GB/T2423.3—2006
6	Thermal Shock (Non-operation)	-30℃ 30 min~+70℃ 30 min, Change time:5min,30 Cycle.	Start with cold temperature, end with high temperature IEC60068-2-14,GB2423.22—87
7	Electro Static Discharge (Operation)	C=150pF, R=330Ω, 5points/panel Air:±8KV,5times;Contact:±4KV,5times; (Environment:15℃ ~ 35℃,30% ~ 60%,86Kpa~106Kpa)	IEC61000-4-2 GB/T17626.2—1998
8	Vibration (Non-operation)	Frequency range:10~55Hz,Stroke:1.5mm Sweep:10Hz~55Hz~10Hz 2 hours for each direction of X.Y.Z.(package condition)	IEC60068-2-6 GB/T2423.10—1995
9	Shock (Non-operation)	60G 6ms, ± X,± Y,± Z 3times for each direction	IEC60068-2-27 GB/T2423.5—1995
10	Package Drop Test	Height:80 cm,1 corner, 3 edges, 6 surfaces	IEC60068-2-32 GB/T2423.8—1995

Note 1: Ts is the temperature of panel's surface.

Note2: Ta is the ambient temperature of sample.

11 USE PRECAUTIONS

11.1 Handling Precautions

- 11.1.1. The display panel is made of glass. Do not subject it to a mechanical shock by dropping it from a high place, etc.
- 11.1.2. If the display panel is damaged and the liquid crystal substance inside it leaks out, be sure not to get any in your mouth, if the substance comes into contact with your skin or clothes, promptly wash it off using soap and water.
- 11.1.3. Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary.
- 11.1.4. The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarizer carefully.
- 11.1.5. If the display surface is contaminated, breathe on the surface and gently wipe it with a soft dry cloth. If still not completely clear, moisten cloth with one of the following solvents:
 - Isopropyl alcohol
 - Ethyl alcoholSolvents other than those mentioned above may damage the polarizer. Especially, do not use the following:
 - Water
 - Ketone
 - Aromatic solvents
- 11.1.6. Do not attempt to disassemble the LCD Module.
- 11.1.7. If the logic circuit power is off, do not apply the input signals.
- 11.1.8. To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.
 - 11.1.8.1. Be sure to ground the body when handling the LCD Modules.
 - 11.1.8.2. Tools required for assembly, such as soldering irons, must be properly ground.
 - 11.1.8.3. To reduce the amount of static electricity generated, do not conduct assembly and other work under dry conditions.
 - 11.1.8.4. The LCD Module is coated with a film to protect the display surface. Be care when peeling off this protective film since static electricity may be generated.

11.2 Storage Precautions

- 11.2.1. When storing the LCD modules, avoid exposure to direct sunlight or to the light of fluorescent lamps.
- 12.2.2. The LCD modules should be stored under the storage temperature range. If the LCD modules will be stored for a long time, the recommend condition is:
Temperature : 0℃ ~ 40℃ Relatively humidity: ≤80%

11.2.3. The LCD modules should be stored in the room without acid, alkali and harmful gas.

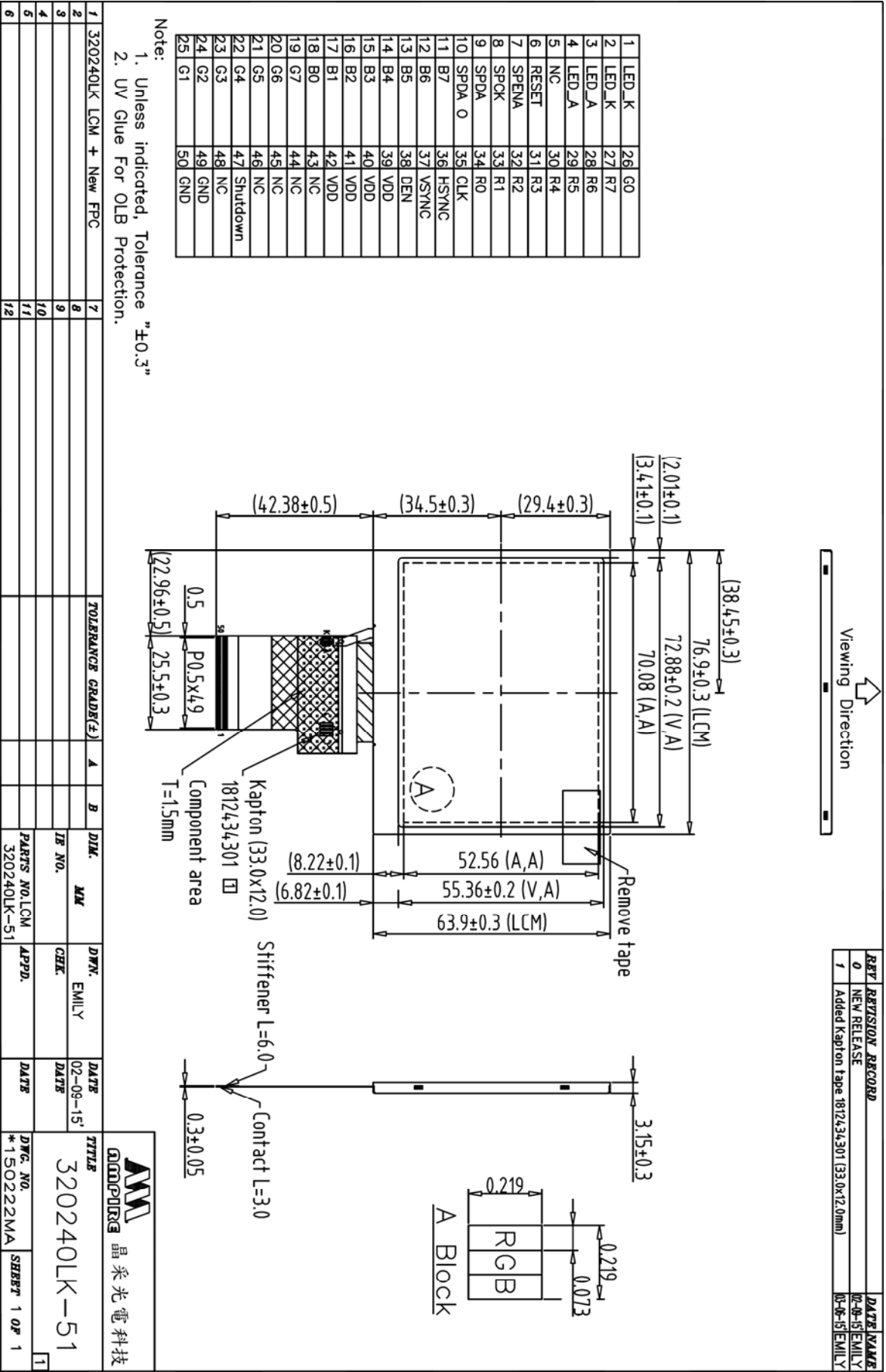
11.3 Transportation Precautions

The LCD modules should be no falling and violent shocking during transportation, and also should avoid excessive press, water, damp and sunshine.

11.4 Other

AMIPRE will provide one year warrantee for all products and three months warrantee for all repairing products.

12 Mechanical Dimensions

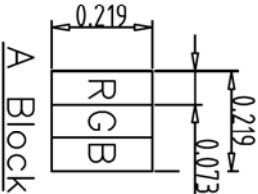
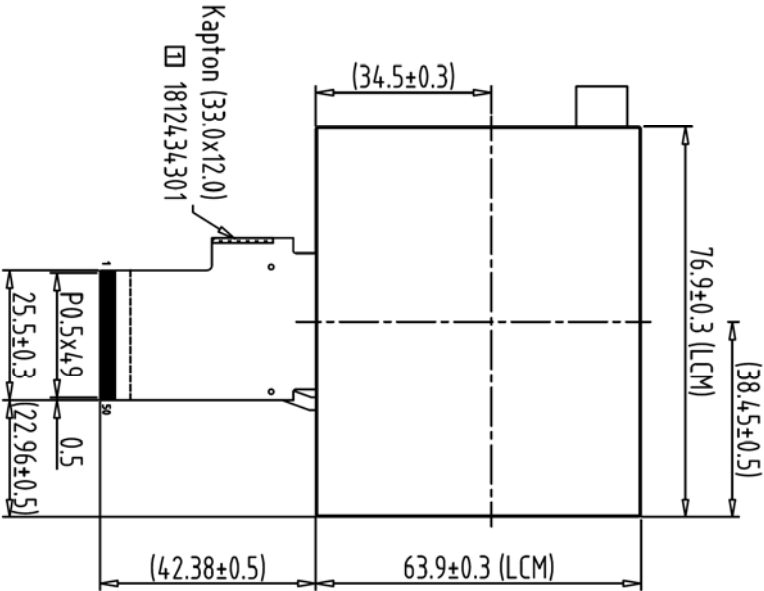


REV	REVISION RECORD	DATE NAME
0	NEW RELEASE	02-09-15 EMILY
1	Added Kapton tape 1812434301 (33.0x12.0mm)	02-09-15 EMILY

1	LED_K	26	G0
2	LED_K	27	R7
3	LED_A	28	R6
4	LED_A	29	R5
5	NC	30	R4
6	RESET	31	R3
7	SPENA	32	R2
8	SPCK	33	R1
9	SPDA	34	R0
10	SPDA_0	35	CLK
11	B7	36	HSYNC
12	B6	37	VSYNC
13	B5	38	DEN
14	B4	39	VDD
15	B3	40	VDD
16	B2	41	VDD
17	B1	42	VDD
18	B0	43	NC
19	G7	44	NC
20	G6	45	NC
21	G5	46	NC
22	G4	47	Shutdown
23	G3	48	NC
24	G2	49	GND
25	G1	50	GND

Note:

1. Unless indicated, Tolerance "±0.3"
2. UV Glue For OLB Protection.



1	320240LK LCM + New FPC	7		TOLERANCE GRADE(F)	A	B	Dim.	MM	DW'N.	EMILY	DATE	TITLE
2		8					IE NO.		CHEK.		DATE	320240LK-51
3		9										
4		10										
5		11					PARTS NO.	LCM-1	APPD.		DATE	DWG. NO.
6		12					320240LK-51					*150223MA SHEET 1 OF 1

AMPIRE 晶采光電科技

13. PACKING DRAWING

REV. REVISION RECORD
0 NEW RELEASE

REV.	REVISION	RECORD	DATE	NAME
0	NEW RELEASE		10-14-11	Henry

Small Box Size: LxWxH
(267.0x224.0x124.0mm)
Tolerance ±10.0

Empty Tray
(205.0x255.0x16.0mm)
Tolerance±1.0

There is 1 pcs end product
in each lattice,
and 4 pcs end products
in each cover.
*真空盒交錯堆疊

Big Box
(No.2)
Size: LxWxH
(491.0x300.0x295.0mm)
Tolerance ±10.0

4 320240LC
3 320240LB
2 320240L6
1 320240L4
No. 適用品號

TITLE				DATE			
320240L				10-14-11			
(3.5")				DATE			
DWG. NO.				DATE			
*111041SA				DATE			
SHEET 1 OF 1							