



RVT4.3A480272CFWR36

LCD TFT Datasheet

Rev.1.5

2015-08-27

ITEM	CONTENTS	UNIT
LCD Type	TFT/Transmissive/Normally white	/
Size	4.3	Inch
Viewing Direction	12:00 (without image inversion)	O' Clock
Gray Scale Inversion Direction	6:00	O' Clock
LCM (W × H × D)	106.30 × 68.00 × 8.10	mm ³
Active Area (W × H)	95.04 × 53.86	mm ²
Dot Pitch (W × H)	0.066×0.198	mm ²
Number Of Dots	480 x (RGB) × 272	/
Driver IC	SSD1963	/
Backlight Type	10 LEDs	/
Surface Luminance	440	cd/m ²
Interface Type	Parallel 8/16b (i80 by default)	/
Color Depth	262k	/
Pixel Arrangement	RGB Vertical Stripe	/
Surface Treatment	Anti-glare	
Input Voltage	3.3	V
With/Without TSP	Resistive Touch Panel	/
Weight	91	g

Note 1: RoHS compliant

Note 2: LCM weight tolerance: ± 5%.

REVISION RECORD

REVNO.	REVDATE	CONTENTS	REMARKS
1.0	2014-11-12	Initial Release	
1.1	2014-11-26	Update mechanical drawing	
1.2	2014-12-19	Update interface description table	
1.3	2015-01-19	Update LED lifetime	
1.4	2015-02-24	Update thickness information	
1.5	2015-08-27	Adding PIN numbering in the mechanical drawing	

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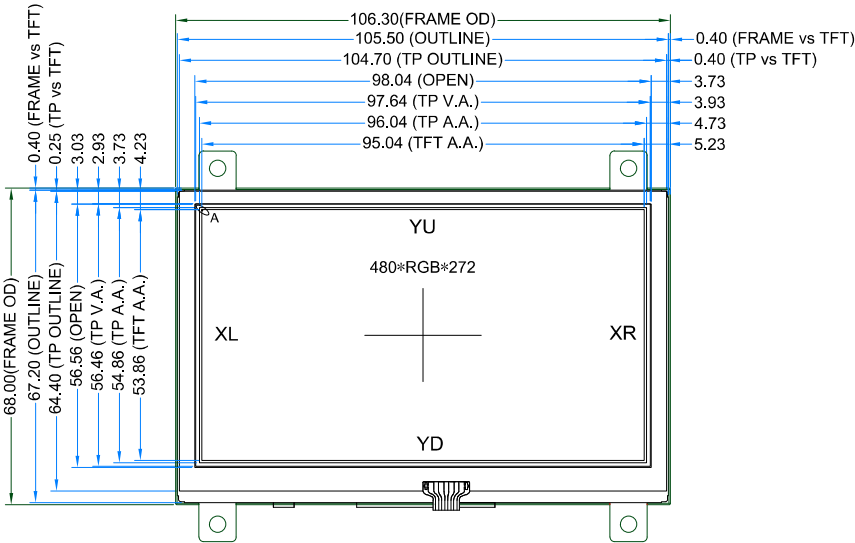
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1 MODULE CLASSIFICATION INFORMATION

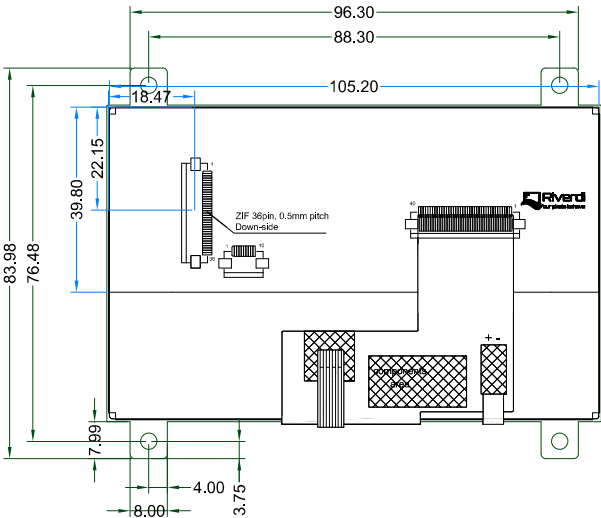
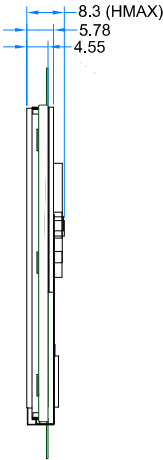
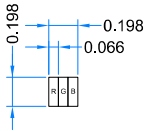
RV	T	4.3	A	480272	C	F	W	R	36
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.

1.	BRAND	RV – Riverdi
2.	PRODUCT TYPE	T – TFT Standard F – TFT Custom
3.	DISPLAY SIZE	3.5 – 3.5" 4.3 – 4.3" 5.7 – 5.7" 7.0 – 7.0"
4.	MODEL SERIAL NO.	A (A-Z)
5.	RESOLUTION	320240 – 320x240 px 480272 – 480x272 px 800480 – 800x480 px
6.	INTERFACE	T – TFT LCD, RGB L – TFT LCD, LVDS C – TFT + Controller
7.	FRAME	N – No Frame F – Mounting Frame
8.	BACKLIGHT TYPE	W – LED White
9.	TOUCH PANEL	N – No Touch Panel R – Resistive Touch Panel C – Capacitive Touch Panel
10.	VERSION	36 (00-99)

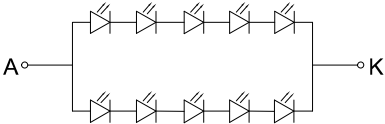
PIN	DESC
1	GND
2	VDD
3	BL_E
4	D/C
5	WR
6	RD
7	D0
8	D1
9	D2
10	D3
11	D4
12	D5
13	D6
14	D7
15	D8
16	D9
17	D10
18	D11
19	D12
20	D13
21	D14
22	D15
23	NC
24	NC
25	CS
26	RESET
27	DISP ON
28	NC
29	XL
30	YU
31	XR
32	YD
33	VLED-
34	VLED-
35	VLED+
36	VLED+



DETAIL A 60:1

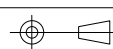


BACKLIGHT LED CIRCUIT DIAGRAM



- NOTES:
1. DISPLAY TYPE: TFT, TRANSMISSIVE, NORMALLY WHITE
 2. OPERATION VOLTAGE: VDD=3.3V
 3. VIEWING DIRECTION: 12 O'CLOCK
 4. IC CONTROLLER: SSD1963QL9
 5. OPERATING TEMP.: -20°C ~ 70°C
 6. STORAGE TEMP.: -30°C ~ 80°C
 7. LED BACKLIGHT: 10-LED WHITE, BUILT-IN INVERTER
 8. SURFACE LUMINANCE: 440 cd/m²
 9. GENERAL TOLERANCE: ±0.2
 10. RoHS COMPLIANT

1.1	Update PIN information	2015.08.26
1.0	Initial case	2014.12.19
Ver.	DESCRIPTION	DATE

CUSTOMER APVL		DATE	2015/08/26
DRAWN	SCALE	TITLE	
DFTG CHK	UNIT	RVT4.3A480272CFWR36	
ENGR CHK	mm	MODEL	
APPROVAL		DWG NO	PAGE
		Rev.1.1	1/1

3 ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	MIN	MAX	UNIT
Supply Voltage For Logic	VDD	-0.3	4.6	V
Input Voltage For Logic	VIN	-0.3	VDD	V
Input Voltage For LED Inverter	BLVDD	-0.3	7.0	V
Operating Temperature	T _{OP}	-20	70	°C
Storage Temperature	T _{ST}	-30	80	°C
Humidity	RH	-	90% (Max 60°C)	RH

4 ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT	NOTES
Supply Voltage For Module	VDD	3.0	3.3	3.6	V	
Input Voltage for LED Inverter	BLVDD	2.8	3.3	5.5	V	
Input Voltage 'H' level for BL_E pin	BL_EH	1.5	-	5.5	V	
Input Voltage 'L' level for BL_E pin	BL_EL	0	-	0.7	V	
Input Current (Exclude LED Backlight)	IDD	-	25	32	mA	VDD = 3.3V
LED Backlight Current	IDD _{backlight}		265	332	mA	BLVDD=3.3V
LED Backlight Current	IDD _{backlight}		156	195	mA	BLVDD=5V
Total Input Current (Include LED Backlight 100%)	IDD _{total}	-	290	363	mA	BLVDD=3.3V
Input Voltage 'H' level	V _{IH}	0.7VDD	-	VDD	V	
Input Voltage 'L' level	V _{IL}	0	-	0.2VDD	V	
LED Life Time	-	30000	50000	-	Hrs	Note 1

Note 1: The LED life time is defined as the module brightness decrease to 50% original brightness at Ta=25°C.

5 ELECTRO-OPTICAL CHARACTERISTICS

ITEM	SYMBOL	CONDITION	MIN	TYP	MAX	UNIT	REMARK	NOTE
Response Time	Tr+Tf	$\theta=0^\circ$ $\phi=0^\circ$ Ta=25	-	25	30	ms	Figure 1	4
Contrast Ratio	Cr		400	500	-	---	Figure 2	1
Luminance Uniformity	δ WHITE		80	-	-	%	Figure 2	3
Surface Luminance	Lv		-	440	-	cd/m ²	Figure 2	2
Viewing Angle Range	θ	$\phi = 90^\circ$	40	50	-	deg	Figure 3	6
		$\phi = 270^\circ$	60	70	-	deg	Figure 3	
		$\phi = 0^\circ$	60	70	-	deg	Figure 3	
		$\phi = 180^\circ$	60	70	-	deg	Figure 3	
CIE (x, y) Chromaticity	Red	x	0.551	0.591	0.631	Figure 2		5
		y	0.270	0.310	0.350			
	Green	x	0.302	0.342	0.382			
		y	0.516	0.561	0.601			
	Blue	x	0.105	0.145	0.185			
		y	0.047	0.087	0.127			
	White	x	0.250	0.290	0.330			
		y	0.300	0.340	0.380			

Note 1. Contrast Ratio(CR) is defined mathematically as below, for more information see Figure 1.

$$\text{Contrast Ratio} = \frac{\text{Average Surface Luminance with all white pixels (P1, P2, P3, P4, P5)}}{\text{Average Surface Luminance with all black pixels (P1, P2, P3, P4, P5)}}$$

Note 2. Surface luminance is the LCD surface from the surface with all pixels displaying white. For more information see Figure 2.

L_v = Average Surface Luminance with all white pixels (P1, P2, P3, P4, P5)

Note 3. The uniformity in surface luminance δ WHITE is determined by measuring luminance at each test position 1 through 5, and then dividing the maximum luminance of 5 points luminance by minimum luminance of 5 points luminance. For more information see Figure 2.

$$\delta \text{ WHITE} = \frac{\text{Minimum Surface Luminance with all white pixels (P1, P2, P3, P4, P5)}}{\text{Maximum Surface Luminance with all white pixels (P1, P2, P3, P4, P5)}}$$

Note 4. Response time is the time required for the display to transition from white to black (Rise Time, T_r) and from black to white (Decay Time, T_f). For additional information see FIG 1. The test equipment is Autronic-Melchers's ConoScope series.

Note 5. CIE (x, y) chromaticity, the x, y value is determined by measuring luminance at each test position 1 through 5, and then make average value.

Note 6. Viewing angle is the angle at which the contrast ratio is greater than 2. For TFT module 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 surface. For more information see Figure 3.

Note 7. For viewing angle and response time testing, the testing data is based on Autronic-Melchers's ConoScope series. Instruments for Contrast Ratio, Surface Luminance, Luminance Uniformity, CIE the test data is based on TOPCON's BM-5 photo detector.

Figure 1. The definition of response time

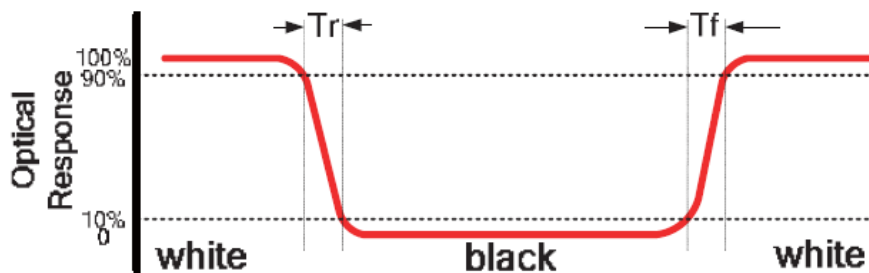


Figure 2. Measuring method for Contrast ratio, surface luminance, Luminance uniformity, CIE (x,y) chromaticity

A : 5 mm
B : 5 mm
H,V : Active Area

Light spot size $\varnothing=5\text{mm}$, 500mm distance from the LCD surface to detector lens
measurement instrument is TOPCON's luminance meter BM-5

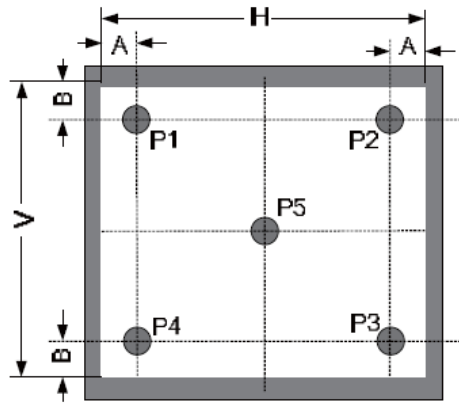
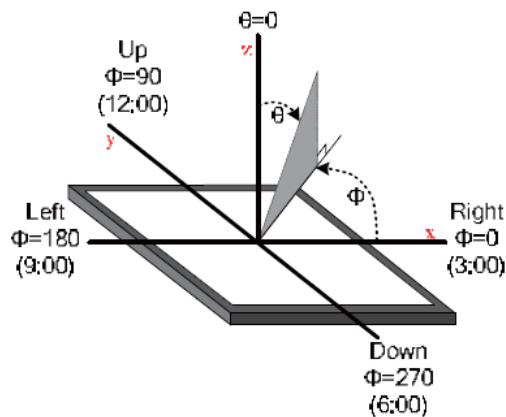


Figure 3. The definition of viewing angle



6 INTERFACE DESCRIPTION

PIN NO.	SYMBOL	I/O	DESCRIPTION
1	GND	P	Power Ground
2	VDD	P	Power Supply: +3.3V
3	BL_E	I	Backlight Control Signal, H: On/L: Off (internally pulled-up to BLVDD)
4	D/C	I	Data/Command Select
5	WR	I	Write Strobe Signal
6	RD	I	Read Strobe Signal
7-22	D0-D15	I	Data Bus. Pins not used should be floating.
23	NC	-	No Connection
24	NC	-	No Connection
25	CS	I	Chip Select
26	RESET	I	Hardware reset
27	DISP ON	I	Display Control H: On/L: Off (internally pulled-up)
28	NC	-	No Connection
29	XL	-	Touch left electrode
30	YU	-	Touch up electrode
31	XR	-	Touch right electrode
32	YD	-	Touch down electrode
33	BLGND	-	Backlight ground, can be connected to GND
34	BLGND	-	Backlight ground, can be connected to GND
35	BLVDD	-	Backlight power supply, can be connected to VDD
36	BLVDD	-	Backlight power supply, can be connected to VDD

7 INTERFACE TIMING CHARACTERISTICS

7.1 8080 Mode

The 8080 mode MCU interface consist of CS#, D/C#, RD#, WR#, D[15:0]. This interface use WR# to define a write cycle and RD# for read cycle. If the WR# goes low when the CS# signal is low, the data or command will be latched into the system at the rising edge of WR#. Similarly, the read cycle will start when RD# goes low and end at the rising edge of RD#.

7.2 Pixel Data Format

Interface	Cycle	D[17]	D[16]	D[15]	D[14]	D[13]	D[12]	D[11]	D[10]	D[9]	D[8]	D[7]	D[6]	D[5]	D[4]	D[3]	D[2]	D[1]	D[0]
16 bits (565 format)	1 st			R5	R4	R3	R2	R1	G5	G4	G3	G2	G1	G0	B5	B4	B3	B2	B1
16 bits	1 st			R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	G0
	2 nd			B7	B6	B5	B4	B3	B2	B1	B0	R7	R6	R5	R4	R3	R2	R1	R0
	3 rd			G7	G6	G5	G4	G3	G2	G1	G0	B7	B6	B5	B4	B3	B2	B1	B0
12 bits	1 st							R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4
	2 nd							G3	G2	G1	G0	B7	B6	B5	B4	B3	B2	B1	B0
9 bits	1 st										R5	R4	R3	R2	R1	R0	G5	G4	G3
	2 nd										G2	G1	G0	B5	B4	B3	B2	B1	B0
8 bits	1 st											R7	R6	R5	R4	R3	R2	R1	R0
	2 nd											G7	G6	G5	G4	G3	G2	G1	G0
	3 rd											B7	B6	B5	B4	B3	B2	B1	B0

7.3 Parallel 8080-series Interface Timing

Figure 4. Parallel 8080-series Interface Timing Diagram (Write Cycle)

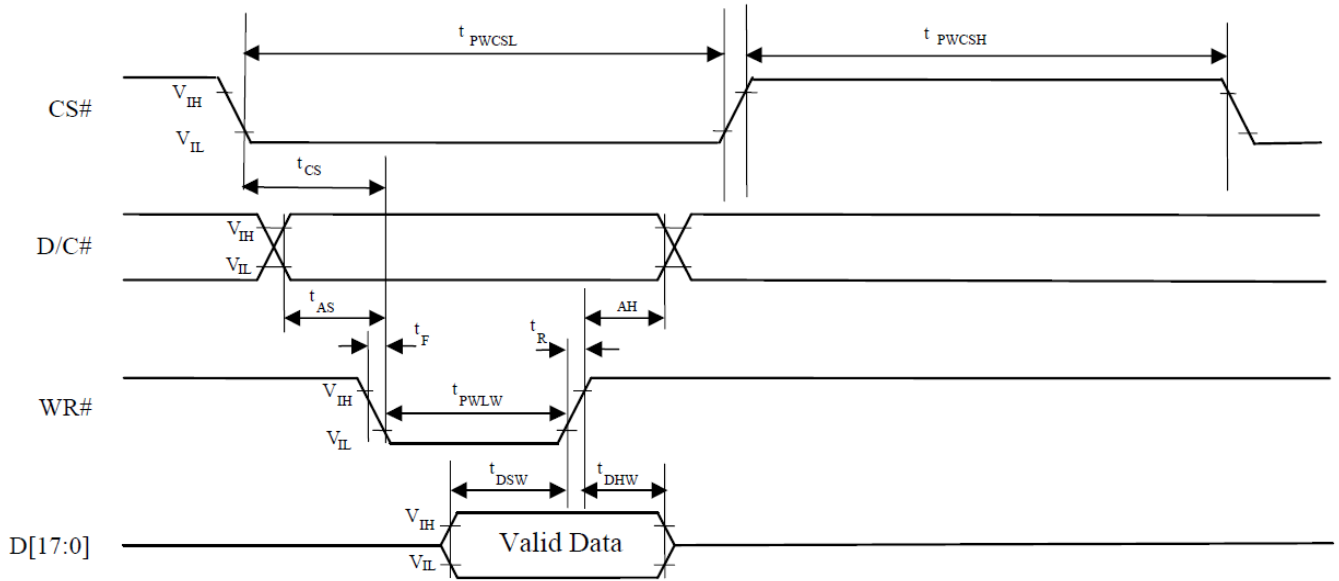
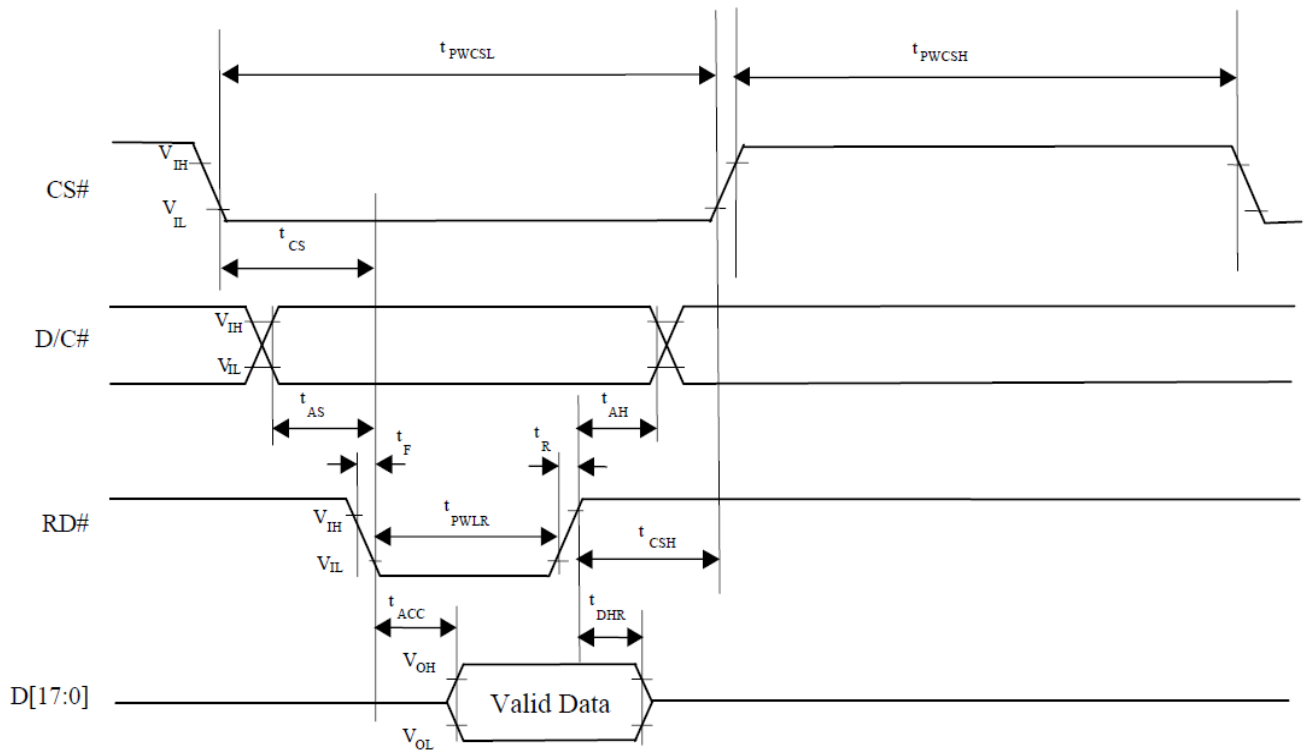


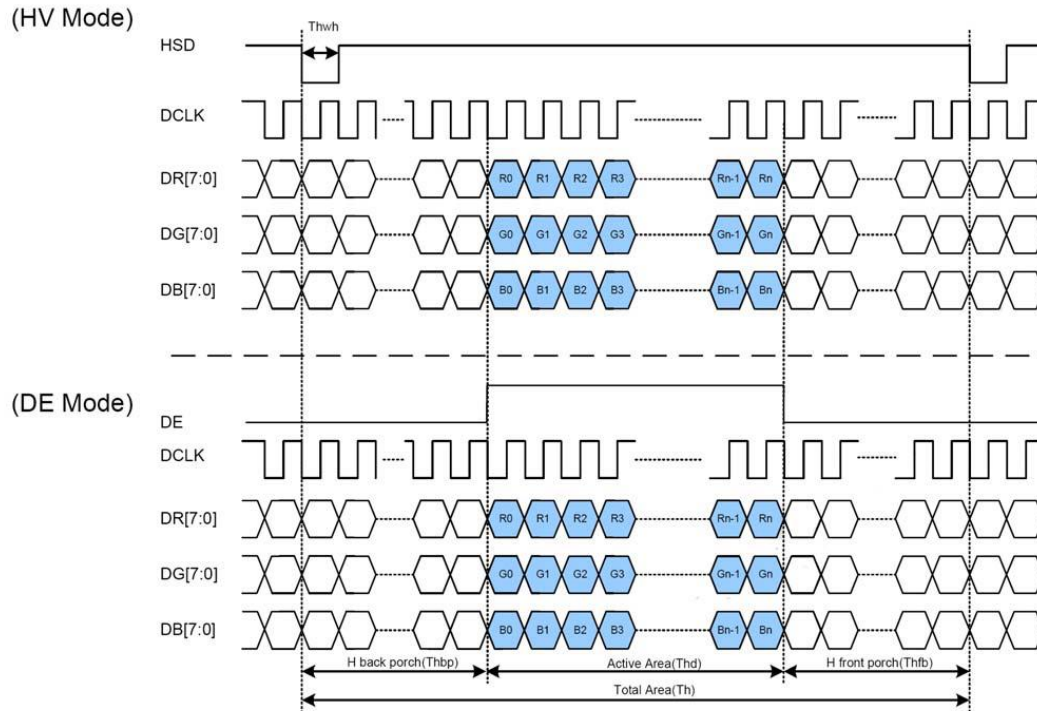
Figure 5. Parallel 8080-series Interface Timing Diagram (Read Cycle)



8 LCD TIMING CHARACTERISTICS

8.1 Clock and data input time diagram

Figure 6. Clock and data input time diagram



8.2 Parallel RGB input timing table

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT
DCLK Frequency	Fclk	5	9	12	MHz
VSD Period Time	Tv	277	288	400	H
VSD Display Area	Tvd	272			H
VSD Back Porch	Tvb	3	8	31	H
VSD Front Porch	Tvfp	2	8	97	H
HSD Period Time	Th	520	525	800	DCLK
HSD Display Area	Thd	480			DCLK
HSD Back Porch	Thbp	36	40	255	DCLK
HSD Front Porch	Thfp	4	5	65	DCLK

9 TOUCH SCREEN PANEL SPECIFICATIONS

9.1 Electrical characteristics

ITEM	VALUE			UNIT	REMARK
	Min.	Typ.	Max.		
Linearity	-3.0	-	3.0	%	Analog X and Y directions
Terminal Resistance	400	-	1050	Ω	X
	100	-	450	Ω	Y
Insulation Resistance	-	-	-	M Ω	DC 25V
Voltage	-	-	10	V	DC
Chattering	-	-	10	ms	100k Ω pull-up
Transparency	80	-	-	%	JIS K7105

Note: Avoid operating with hard or sharp material such as a ball point pen or a mechanical pencil except a polyacetal pen (tip R0.8mm or less) or a finger.

9.2 Mechanical & Reliability characteristics

ITEM	VALUE			UNIT	REMARK
	Min.	Typ.	Max.		
Activation Force	80	-	-	gf	Note 1
Durability - Surface Scratching	Write 100,000	-	-	characters	Note 2
Durability-Surface Pitting	1,000,000	-	-	touches	Note 3
Surface Hardness	3	-	-	H	JIS K5400

10 RELIABILITY TEST

NO.	TEST ITEM	TEST CONDITION
1	High Temperature Storage	80 $\pm$ 2 $^{\circ}$ C/240hours
2	Low Temperature Storage	-30 $\pm$ 2 $^{\circ}$ C/240hours
3	High Temperature Operating	70 $\pm$ 2 $^{\circ}$ C/240hours
4	Low Temperature Operating	-20 $\pm$ 2 $^{\circ}$ C/240hours
5	Temperature Cycle	-30 $\pm$ 2 $^{\circ}$ C $\sim$ 25 $\sim$ 80 $\pm$ 2 $^{\circ}$ C $\times$ 20 cycles (30min.) (5min.) (30min.)
6	Damp Proof Test	60 $^{\circ}$ C $\pm$ 5 $^{\circ}$ C $\times$ 90%RH/240hours
7	Vibration Test	Frequency 10Hz $\sim$ 55Hz Amplitude of vibration : 1.5mm Sweep: 10Hz $\sim$ 55Hz $\sim$ 10Hz X, Y, Z 2 hours for each direction.
8	Package Drop Test	Height:60 cm 1 corner,3 edges,6 surfaces
9	ESD Test	Air: $\pm$ 4KV 150pF/330 Ω 5 times Contact: $\pm$ 2KV 150pF/330 Ω 5 time

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