

DP-0351-11A Datasheet



1 Introduction

The DP-0351-11A is a 3.5-inch TFT-LCD module featuring a resolution of 320 × 240 pixels. It incorporates a TFT-LCD panel, driver IC (NV3035), flexible printed circuit (FPC), backlight unit, and resistive touch panel (RTP).

Engineered to display 16.7 million colors via an RGB interface, the DP-0351-11A delivers excellent image quality, stable performance, and reliable operation for various embedded display applications.

1.1 Features

- 3.5" TFT-LCD with 320 × 240 resolution and resistive touch panel (RTP)
- Supports 16.7M colors for vivid and accurate display output
- RGB interface for reliable signal transmission
- Compliant with RoHS environmental requirements

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2 Part Numbers/Ordering Information

Part No.	Description
DP-0351-11A	TFT Display 3.5 inch (320* 240 resolution) with Resistive Touch Panel

Table 1 - Part Number/Ordering Information

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3 General Specifications

Item	Specification	Unit	Note
LCD Type	TFT	-	
LCD Size	3.5	inch	
Number of Pixels	320(H) x 240(V)	pixels	
Viewing Direction	12	o'clock	
Gray Scale Inversion Direction	6	o'clock	
Interface	24-bit RGB		
Display Colors	16.7M Colors (RGB 8 bit)	colors	
Module Size	76.90(H) x 64.00(V) x 4.25(D)	mm	Note 2
Active Area	70.08(H) x 52.56(V)	mm	
Display Driver IC	NV3035	-	
Touch Panel	Resistive Touch Panel	-	
Operation Temperature	-20~+70°C	°C	
Storage Temperature	-30~+80°C	°C	

Table 2 - General Specifications

Note:

1. Complies with environmental protection requirements and is RoHS compliant.
2. Module size excludes FPC and solder; with RTP.

4 Hardware Description

The DP-0351-11A features a 3.5-inch TFT-LCD with a 320 × 240 resolution, integrated with a resistive touch panel.

4.1 TFT-LCD Interface Pin Assignment

The interface connector pin configuration is described below.

Pin no	Symbol	Type	Description
1	VLED-	P	LED backlight (Cathode)
2	VLED-	P	LED backlight (Cathode)
3	VLED+	P	LED backlight (Anode)
4	VLED+	P	LED backlight (Anode)
5	NC	-	No Connection
6	NC	-	No Connection
7	NC	-	No Connection
8	RESET	I	Reset the display
9	SPENA	I	Chip select
10	SPCK	I	SPI clock
11	SPDA	I	Serial Data Pin
12	R0	I	Red Data Input
13	R1	I	Red Data Input
14	R2	I	Red Data Input
15	R3	I	Red Data Input
16	R4	I	Red Data Input
17	R5	I	Red Data Input
18	R6	I	Red Data Input
19	R7	I	Red Data Input
20	G0	I	Green Data Input
21	G1	I	Green Data Input
22	G2	I	Green Data Input
23	G3	I	Green Data Input
24	G4	I	Green Data Input
25	G5	I	Green Data Input
26	G6	I	Green Data Input
27	G7	I	Green Data Input
28	B0	I	Blue Data Input
29	B1	I	Blue Data Input
30	B2	I	Blue Data Input
31	B3	I	Blue Data Input
32	B4	I	Blue Data Input
33	B5	I	Blue Data Input
34	B6	I	Blue Data Input
35	B7	I	Blue Data Input
36	HSYNC	I	Line Sync Signal

37	VSYNC	I	Frame Sync Signal
38	PCLK	I	Data Clock
39	NC	-	No Connection
40	NC	-	No Connection
41	VCC	P	Power Supply
42	VCC	P	Power Supply
43	NC	-	No Connection
44	NC	-	No Connection
45	NC	-	No Connection
46	NC	-	No Connection
47	NC	-	No Connection
48	XR	O	Touch Panel Control Pin
49	YD	O	Touch Panel Control Pin
50	XL	O	Touch Panel Control Pin
51	YU	O	Touch Panel Control Pin
52	DE	I	Data Enable Pin
53	GND	P	Ground
54	GND	P	Ground

Table 3 - TFT-LCD Interface Pin Definition

5 Specifications

5.1 Absolute Maximum Ratings

5.1.1 Electrical Absolute Maximum Ratings

 Condition: $V_{SS}=0V$, $T_a=25^{\circ}C$

Item	Symbol	MIN.	MAX.	Unit	Note
Power Supply Voltage	VCC	-0.3	3.6	V	Note 1, 2

Table 4 - Electrical Absolute Maximum Ratings

Note:

1. Permanent damage to the LCD module may occur if operated beyond the specified limits. Operation beyond the specified electrical characteristics may lead to malfunction or reduced reliability.
2. VCC must always be greater than Vss.

5.1.2 Environmental Absolute Maximum Ratings

Item	Storage		Operating		Note
	MIN.	MAX.	MIN.	MAX.	
Ambient Temperature	-30°C	80°C	-20°C	70°C	Note 1, 2
Humidity	-	-	-	-	Note 3

Table 5 - Environmental Absolute Maximum Ratings

Note:

1. Response time decreases at low operating temperatures.
2. Background color may vary slightly with ambient temperature; this phenomenon is reversible.
3. $T_a \leq 40^{\circ}C$: 85%RH MAX
 $T_a > 40^{\circ}C$: Absolute humidity must not exceed the equivalent of 85% RH at 40°C.

5.2 Electrical Specifications

5.2.1 Electrical Characteristics

 Condition: $V_{SS}=0V$, $T_a=25^{\circ}C$

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Power Supply	VCC	3.0	3.3	3.6	V	
Input Voltage	'H'	V_{IH}	$0.8 \cdot V_{CC}$	-	V	$V_{CC}=3.3V$
	'L'	V_{IL}	0	-	V	$V_{CC}=3.3V$
Current Consumption	I_{CC1}	-	20	30	mA	Normal mode, Note 2
	I_{CC2}	-	0.05	0.1	mA	Sleep mode, Note 2
Clock Frequency	f_{clk}	-	6	12	MHz	

Table 6 - Electrical Characteristics

Note:

1. Measured at optimum contrast in transmissive mode.
2. Tested in 1x1 chessboard pattern.

5.2.2 LED Backlight Specification

The backlight consists of 6 white LEDs, providing uniform illumination across the display.

Condition: $V_{SS}=0V$, $T_a=25^{\circ}C$

Item	Symbol	Min.	Typ.	Max.	Unit	Condition
Supply Voltage	V_f	-	18	-	V	$I_f=20mA$

Table 7 - LED Backlight Specification

Note:

The forward current versus ambient temperature characteristics shown in Figure 1 are specified per LED string.

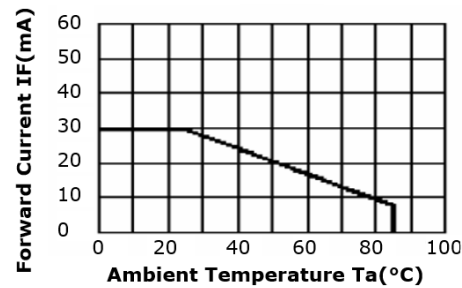


Figure 1 - Forward Current vs Ambient Temperature

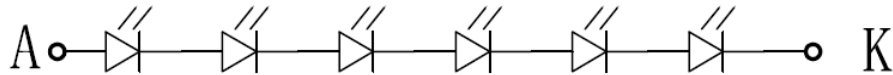


Figure 2 - Backlight LED Circuit

5.3 Input Data Timing

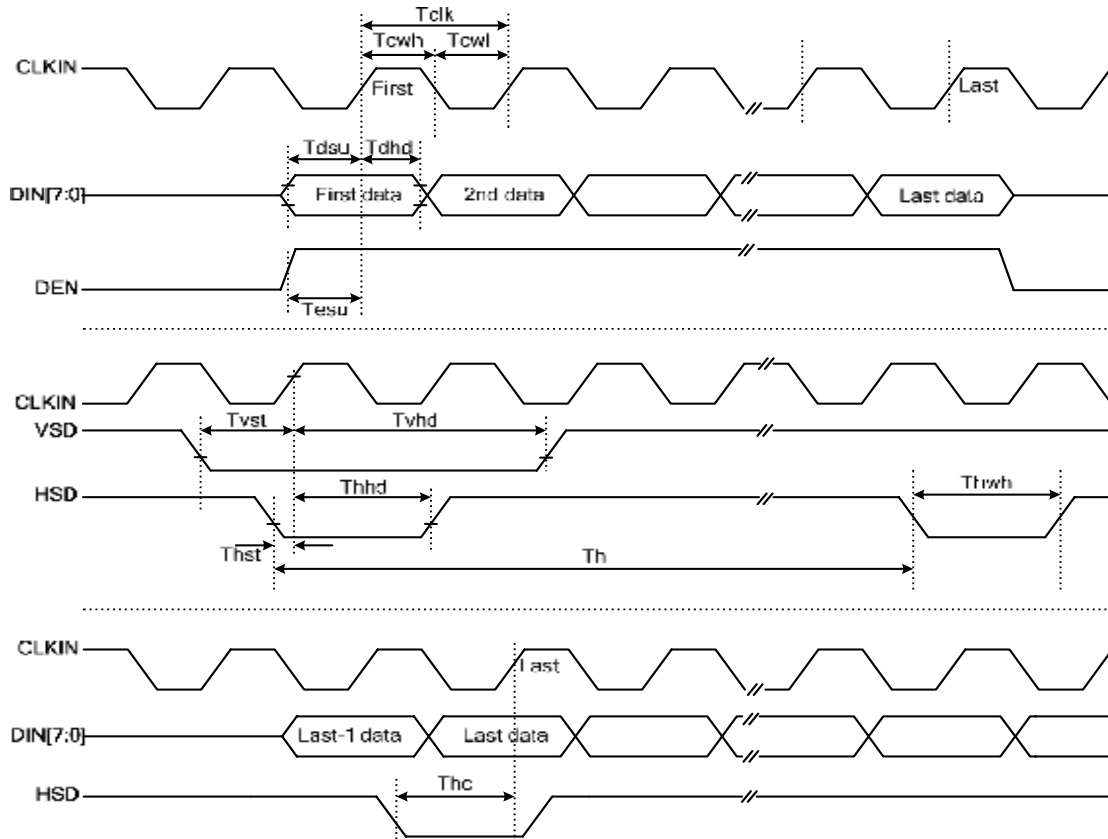


Figure 3 - Clock and Data Input Timing Diagram

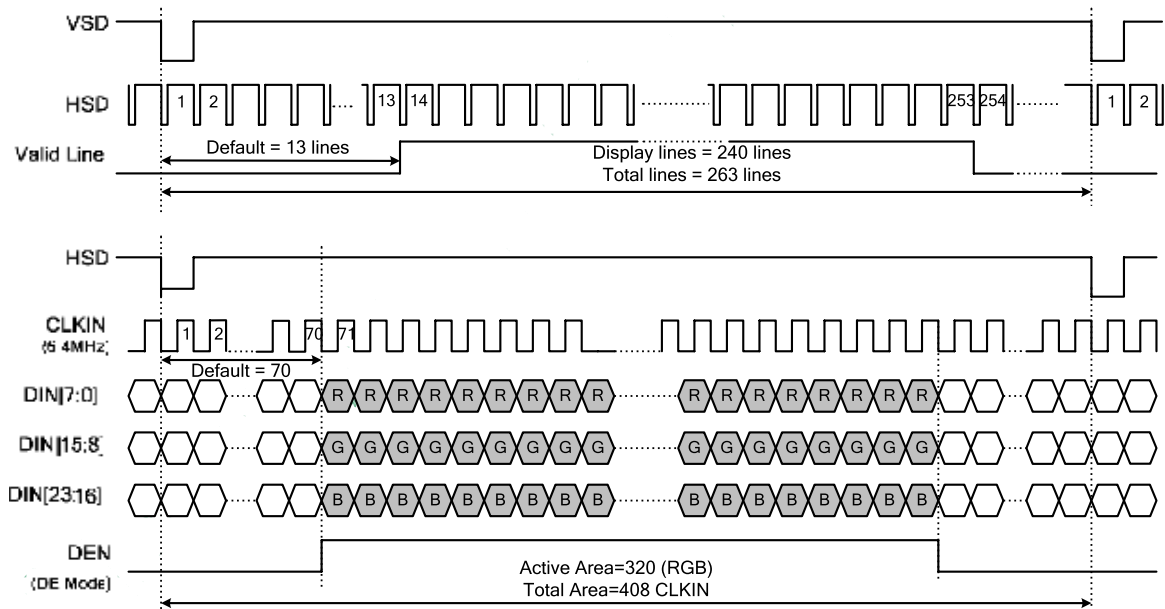


Figure 4 - RGB Input Data Timing

Parameter	Symbol	Value			Unit	Condition
		Min.	Typ.	Max.		
CLKIN	F _{CLK}	6.1	6.4	8.0	MHz	VDD=3.0~3.6V
CLKIN cycle time	T _{clk}	125	156	164	ns	
CLKIN pulse duty	T _{cwh}	40	50	60	%	T _{clk}
Time that HSD to 1st data input(NTSC)	T _{hs}	40	70	255	CLKIN	DDLY=70,Offset=0 (fixed)
HSD to CLKIN	T _{hc}	-	-	1	CLKIN	
HSD width	T _{hwh}	1	-	-	CLKIN	
VSD width	T _{vwh}	1	-	-	Th	
HSD period time	T _h	60	63.56	67	us	
VSD setup time	T _{vst}	8	-	-	ns	
VSD hold time	T _{vhd}	10	-	-	ns	
HSD setup time	T _{hst}	8	-	-	ns	
HSD hold time	T _{hhd}	10	-	-	ns	
Data setup time	T _{dsu}	8	-	-	ns	DIN[23:0] to CLKIN
Data hold time	T _{dhd}	10	-	-	ns	DIN[23:0] to CLKIN
Time that VSD to 1st line data input	T _{vs}	2	13	127	Th	

Table 8 - Data Input Timing

5.4 Optical Specifications

All optical specifications are measured under typical condition (Note 1, 2)

Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Brightness	Bp	$\theta=0^\circ$ $\Phi=0^\circ$	480	530	-	Cd/m ²	Note 1
Uniformity	ΔBp		80	-	-	%	Note 1 Note 2
Viewing Angle	3:00	Cr ≥ 10	-	60	-	Deg	Note 3
	6:00		-	45	-		
	9:00		-	60	-		
	12:00		-	60	-		
Contrast Ratio	Cr	$\theta=0^\circ$ $\Phi=0^\circ$	300	500	-	-	Note 4
Response Time	T _r		-	10	-	ms	Note 5
	T _f		-	10	-	ms	
Color of CIE Coordinate	W	x	$\theta=0^\circ$ $\Phi=0^\circ$	0.28		-	Note 1 Note 6
		y		0.33		-	
	R	X		0.51		-	
		y		0.34		-	
	G	x		0.31		-	
		y		0.56		-	
	B	x		0.15		-	
		y		0.14		-	
NTSC Ratio	S		50	60	-	%	

Table 9 - Optical Specifications

Remark: *Parameters may vary slightly depending on temperature, driving voltage, and material.*

Note:

1. Data are measured after the LEDs are turned on for 5 minutes with the LCM displaying full white. Brightness is the average value of 9 measured points. Measurement equipment: PR-705 (Φ8mm)

Measuring Conditions:

- Environment: Dark room
- Temperature: $T_a = 25^\circ\text{C}$
- Operating voltage adjusted for optimum contrast at the center of the display
- Values measured at the center point of the LCD panel after more than 5 minutes of backlight operation

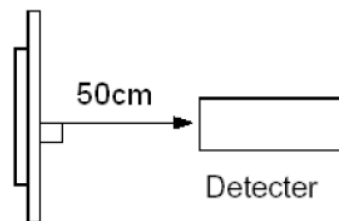


Figure 5 - Measurement Setup

2. The luminance uniformity is calculated using the following formula:

$$\Delta Bp = \frac{Bp(\text{Min.})}{Bp(\text{Max.})} \times 100\%$$

$Bp(\text{Max.})$ = Maximum brightness in 9 measured spots

$Bp(\text{Min.})$ = Minimum brightness in 9 measured spots

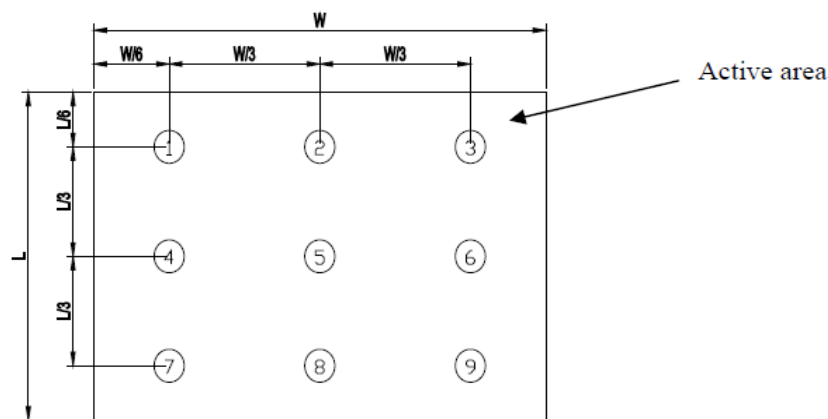
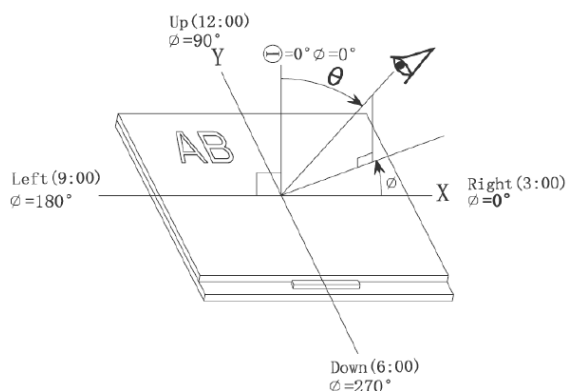
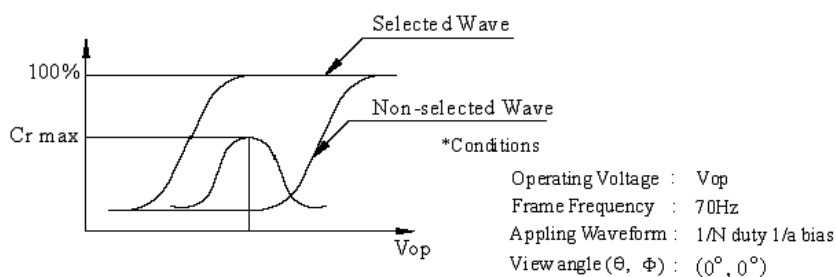


Figure 6 - Measurement Point

3. Definition of viewing angle: Refer to the figure below, indicated by θ and Φ .


Figure 7 - Viewing Angle

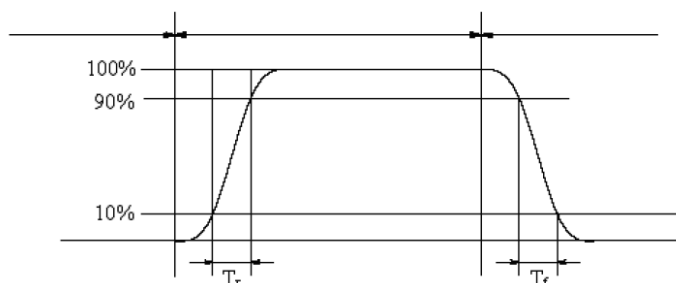
4. Definition of Contrast ratio. (Test equipment: DMS501)


Figure 8 - Contrast Ratio

$$\text{Contrast ratio, Cr} = \frac{\text{Brightness of selected dots}}{\text{Brightness of non-selected dots}}$$

5. Definition of response time. (Test equipment: DMS501)

The output signals of the photo detector are measured when the input signal changes from "black" to "white" (falling time) and from "white" to "black" (rising time). Response time is defined as the time interval between 10% and 90% of the signal amplitude. Refer to the figure below for illustration.


Figure 9 - Definition of Response Time

6. Definition of color in terms of CIE coordinates and NTSC ratio.

Color gamut:
$$S = \frac{\text{Area of RGB triangle}}{\text{Area of NTSC triangle}} \times 100\%$$

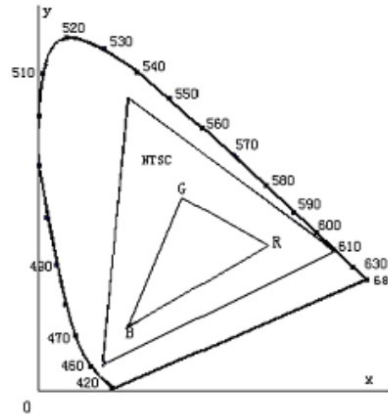


Figure 10 - 1931 CIE Chromaticity Diagram

7. Definition of cross talk.

Cross talk ratio(%) =
$$\frac{|\text{Pattern A Brightness} - \text{Pattern B Brightness}|}{\text{Pattern A Brightness}} \times 100\%$$

Electric volume value=3F+/-3Hex

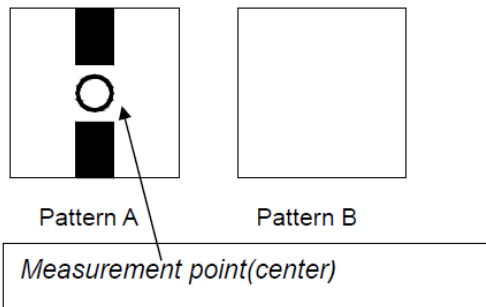


Figure 11 - Definition of Cross Talk

6 Reliability Test Items

Test Item	Test Conditions	Criterion
High Temperature Storage	Temperature: +80°C±2°C Duration: 96hrs Restoration: 2hrs at 25°C Power Status: OFF	1.No cosmetic or electrical defects shall be observed after testing. 2.Total current consumption shall not exceed twice the initial value.
Low Temperature Storage	Temperature: -30°C±2°C Duration: 96hrs Restoration: 2hrs at 25°C Power Status: OFF	
High Temperature Operation	Temperature: +70°C±2°C Duration: 96hrs Restoration: 2H at 25°C Power Status: ON	
Low Temperature Operation	Temperature: -20°C±2°C Duration: 96hrs Restoration: 4H at 25°C Power Status: ON	
High Temperature and Humidity Operation	Temperature: +60°C±2°C Humidity: 90% RH Duration: 96hrs Power Status: ON	
Temperature Cycle	Range: -30°C ~ +80°C Cycle: 5 cycles Dwell: 30 min at each extreme Transfer Time: 5 min Restoration: 2H at 25°C Power Status: OFF	Cosmetic and electrical defects are not permitted.
Vibration Test	Frequency: 10Hz ~ 150Hz Acceleration: 100m/s ² Duration: 120min	
Shock Test	Waveform: Half-sine wave Acceleration: 300m/s ² Duration: 11ms	

Table 10 - Reliability Test Items

Note: Operation : Supply 3.3 V to the logic system.

The inspection criteria after reliability testing are as follows:

Item	Inspection
Contrast	CR > 50%
I _{DD}	I _{DD} < 200%
Brightness	Brightness > 60%
Color Tone	Color Tone ±0.05

7 Dimension

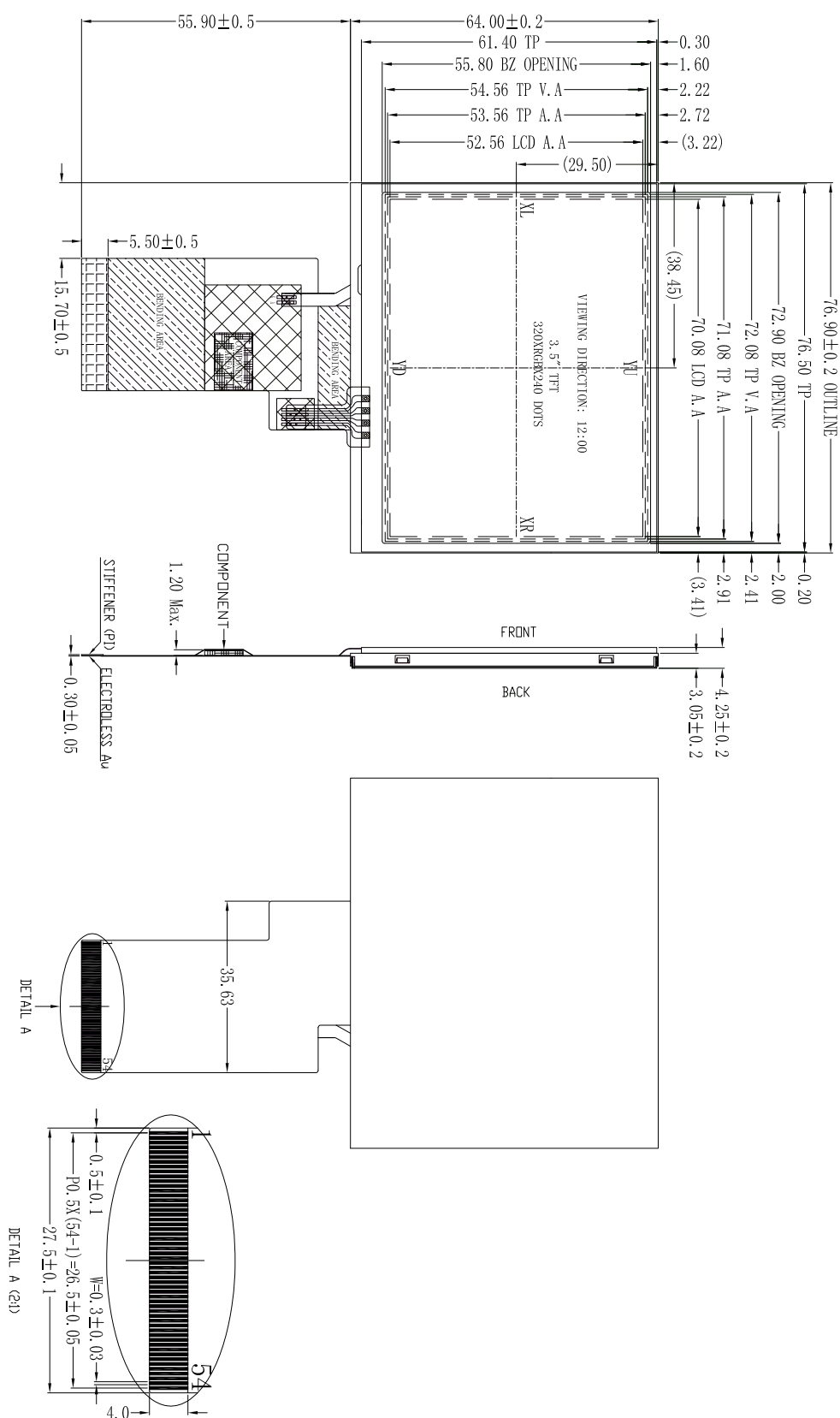


Figure 12 - LCM Dimension

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- The device has malfunctioned due to improper use, mishandling, or usage beyond its intended design.
- The device has been disassembled, repaired, or modified by unauthorized personnel.
- Any other conditions that do not comply with our warranty policy. For details, please [contact our sales team](#).

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Appendix A – References

Document References

NA

Acronyms and Abbreviations

Terms	Description
FPC	Flexible Printed Circuit
IC	Integrated Circuit
I2C	Inter-Integrated Circuit
LCD	Liquid Crystal Display
LCM	Liquid Crystal Module
LED	Light Emitting Diode
LED A	Light Emitting Diode Anode
LED K	Light Emitting Diode Cathode
RTP	Resistive Touch Panel
TFT	Thin Film Transistor

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Appendix C – Revision History

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Revision	Changes	Date
Version 1.0	Initial Release	10-11-2025