



# SPECIFICATION

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*easy* **TOUCH  
DISPLAY**

**easyTOUCH DISPLAY Advanced (12035525)**

13,3" - FHD – eTD133W3202-AUA-A

Version: 1.0  
Date: 08.06.2020

Note: This specification is subject to change without prior notice

## **Table of Contents**

<b>1. easyTOUCH Display</b>	<b>P. 03</b>
<b>2. TFT AUO G133HAN01.0</b>	<b>P. 05</b>
<b>3. Touch Sensor</b>	<b>P. 31</b>
<b>4. Touch Controller</b>	<b>P. 36</b>



## ADVANCED LEVEL

**13.3 inch (33.8cm)**

**Part-No. 12035525**

**G133HAN01.0 incl. easyTOUCH eTD133W3202-AUA-A**

### Display

Panel Type	AUO G133HAN01.0
Resolution (pixel) / format	1920 x 1080/ wide
Brightness (typical)	400 cd/m <sup>2</sup>
Display Mode	VA, Normally black
Customer Interface Display	LVDS
Contrast ratio (typical)	800:1
Backlight	LED

### Glass and Touch

Cover glass	2mm Glare Glass, chemically strengthened, no treatment Printing RAL9005 organic Dimensions according to outline drawing
Touch sensor type	13.3" easyTOUCH
Active area touch sensor (W x H)	295.1 (H) x 166.7 (V)
Optical Specification	according to DATA MODUL Outgoing Specification 12005965
Touch Interface	USB mXT2952T2

### Assembling

Glass to touch	Optically bonded
Glass/Touch assembly to display	AirGap-Bonding with 4 stripes industrial double-sided adhesive tape
Touch Controllerboard	mounted on rear side of TFT with metal bracket

### Accessories

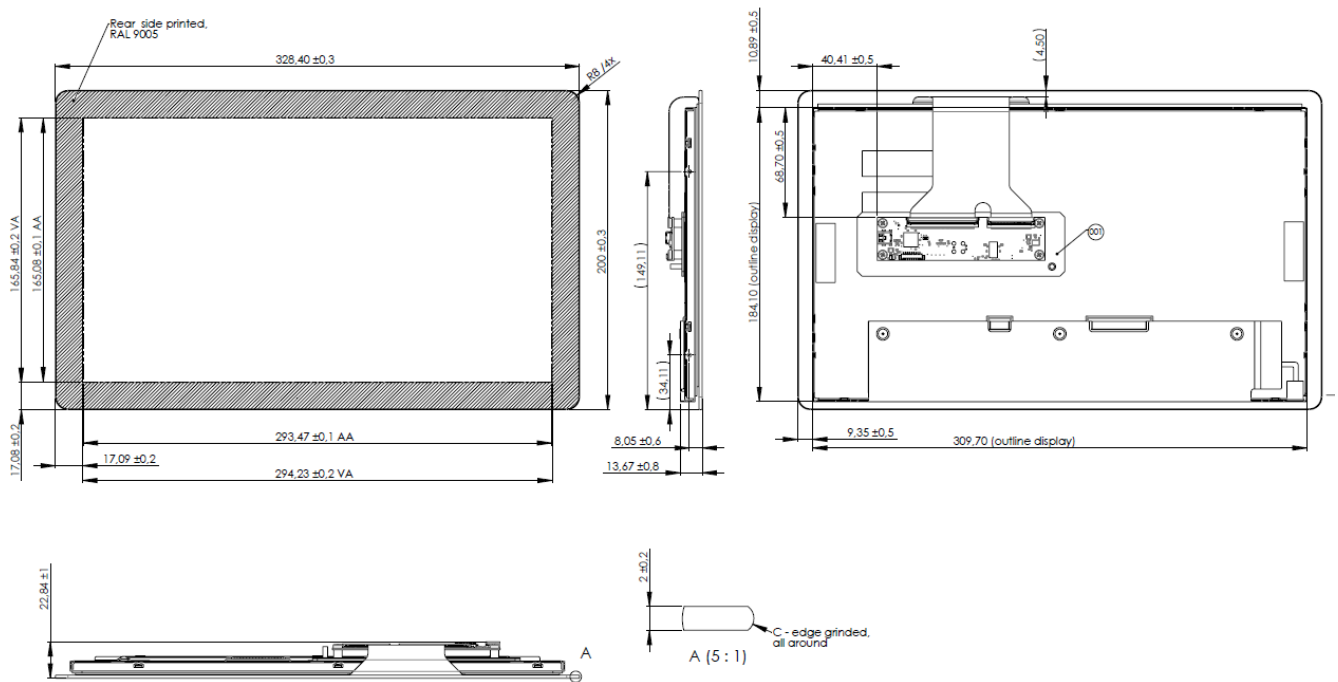
Touch Controller	easyTOUCH mXT2952T2 Driverless USB
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### Environmental conditions

Temperature (operating)	0 - 70 °C
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### Mechanical dimensions

Outline dimensions (W x H x T)	328.4 (H) x 200.0 (V) x 13.7 (T) Detailed dimensions according to outline drawing
Weight	approx. 1.1 kg









# Product Specification

AU OPTRONICS CORPORATION

## Contents

<b>1. Handling Precautions</b> .....	<b>5</b>
<b>2. General Description</b> .....	<b>6</b>
2.1 General Specification .....	6
2.2 Optical Characteristics .....	7
<b>3. Functional Block Diagram</b> .....	<b>11</b>
<b>4. Absolute Maximum Ratings</b> .....	<b>12</b>
4.1 Absolute Ratings of TFT LCD Module.....	12
4.2 Absolute Ratings of Environment .....	12
<b>5. Electrical Characteristics</b> .....	<b>13</b>
5.1 TFT LCD Module.....	13
5.2 Backlight Unit .....	15
<b>6. Signal Interface Characteristic</b> .....	<b>16</b>
6.1 Pixel Format Image .....	16
6.2 The Input Data Format .....	17
6.3 Signal Description (CN1).....	18
6.4 Interface Timing (LVDS).....	19
6.5 Power ON/OFF Sequence .....	20
<b>7. Connector &amp; Pin Assignment</b> .....	<b>21</b>
7.1 TFT LCD Module.....	21
7.2 Backlight Unit .....	22
<b>8. Panel Reliability Test</b> .....	<b>24</b>
<b>9. Label and Package</b> .....	<b>25</b>
9.1 Shipping Label Format .....	25
9.2 Carton Package .....	25
<b>10. Mechanical Characteristics</b> .....	<b>26</b>
10.1 LCM Outline Dimension (Front View) .....	26
10.2 LCM Outline Dimension (Rear View).....	27



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AU OPTRONICS CORPORATION

## Record of Revision

Version and Date	Page	Old Description	New Description	Remark																																																																																																																																			
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# Product Specification

AU OPTRONICS CORPORATION






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## 1. Handling Precautions

- 1) Since front polarizer is easily damaged, please be cautious and not to scratch it.
- 2) Be sure to turn off power supply when inserting or disconnecting from input connector.
- 3) Wipe off water drop immediately. Long contact with water may cause discoloration or spots.
- 4) When the panel surface is soiled, wipe it with absorbent cotton or soft cloth.
- 5) Since the panel is made of glass, it may be broken or cracked if dropped or bumped on hard surface.
- 6) To avoid ESD (Electro Static Discharge) damage, be sure to ground yourself before handling TFT-LCD Module.
- 7) Do not open nor modify the module assembly.
- 8) Do not press the reflector sheet at the back of the module to any direction.
- 9) In case if a module has to be put back into the packing container slot after it was taken out from the container, do not press the center of the LED light bar edge. Instead, press at the far ends of the LED light bar edge softly. Otherwise the TFT Module may be damaged.
- 10) At the insertion or removal of the Signal Interface Connector, be sure not to rotate nor tilt the Interface Connector of the TFT Module.
- 11) TFT-LCD Module is not allowed to be twisted & bent even force is added on module in a very short time. Please design your display product well to avoid external force applying to module by end-user directly.
- 12) Small amount of materials without flammability grade are used in the TFT-LCD module. The TFT-LCD module should be supplied by power complied with requirements of Limited Power Source (IEC60950-1 or UL60950-1), or be applied exemption.
- 13) Severe temperature condition may result in different luminance, response time and lamp ignition voltage.
- 14) Continuous operating TFT-LCD display under low temperature environment may accelerate lamp exhaustion and reduce luminance dramatically.
- 15) The data on this specification sheet is applicable when LCD module is placed in landscape position.
- 16) Continuous displaying fixed pattern may induce image sticking. It's recommended to use screen saver or shuffle content periodically if fixed pattern is displayed on the screen.



# Product Specification

AU OPTRONICS CORPORATION

## 2. General Description

G133HAN01.0 is a Color Active Matrix Liquid Crystal Display composed of a TFT LCD panel, a driver circuit, and LED backlight system. The screen format is intended to support the 16:9 FHD, 1920(H) x1080(V) screen and 16.7M colors (RGB 8-bits data driver) with LED backlight driving circuit.

G133HAN01.0 is designed for a display unit of industrial machine.

### 2.1 General Specification

The following items are characteristics summary on the table at 25 °C condition:

Items	Unit	Specifications
Screen Diagonal	[inch]	13.3"
Active Area	[mm]	293.472 (H) x 165.078 (V)
Pixels H x V		1920 x 3(RGB) x 1080
Pixel Pitch	[mm]	0.15285x 0.15285
Pixel Format		R.G.B. Vertical Stripe
Display Mode		AHVA
White Luminance ( Center )	[cd/m <sup>2</sup> ]	400 Typ.
Luminance Uniformity		80% (5 points, Typ.)
Contrast Ratio		800:1 (Typ.)
Response Time	[ms]	25 (Typ.)/ 35 (Max.)
Nominal Input Voltage VDD	[Volt]	+3.3 (Typ.)
LCD Power Consumption	[Watt]	1.8 W (Max. White Pattern)
LED Power Consumption	[Watt]	15W (Max.)
Weight	[Grams]	500 (Max.)
Physical Size	[mm]	309.7 x 184.1 x 9.6 (Typ.)
Electrical Interface		LVDS
Surface Treatment		Anti-glare
Support Color		16.7M Colors ( RGB 8-bits )
Temperature Range		
Operating	[°C]	-20 to +70
Storage (Non-Operating)	[°C]	-20 to +70



# Product Specification

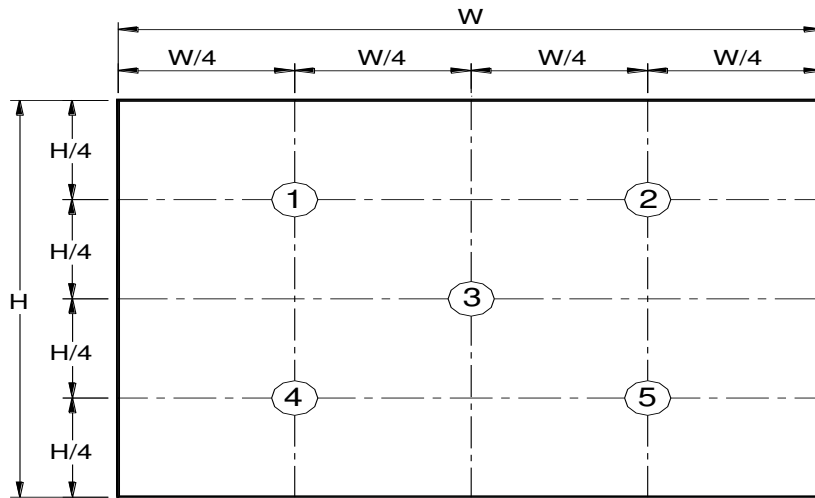
AU OPTRONICS CORPORATION

## 2.2 Optical Characteristics

The optical characteristics are measured under stable conditions at 25°C (Room Temperature) :

Item	Unit	Conditions	Min.	Typ.	Max.	Note			
Central Luminance	cd/m2		320	400	---	1, 3, 4			
Viewing Angle	degree	Horizontal (Right)	75	89	---	3, 7			
		CR = 10 (Left)	75	89	---				
		Vertical (Upper)	75	89	---				
		CR = 10 (Lower)	75	89	---				
Luminance Uniformity		5 Points	75	80	---	1, 2, 3			
Contrast Ratio			600	800	-	3, 5			
Response Time	msec	Rising + Falling	---	25	35	3, 6			
Color / Chromaticity Coodinates	Red	Rx	CIE 1931	0.625	0.675	0.725	3		
		Ry		0.266	0.316	0.366			
	Green	Gx		0.235	0.285	0.335			
		Gy		0.605	0.655	0.705			
	Blue	Bx		0.103	0.153	0.203			
		By		0.000	0.036	0.086			
	White	Wx		0.263	0.313	0.363			
		Wy		0.279	0.329	0.379			
	NTSC	%			-	90		-	

**Note 1:** 5 points position (Ref: Active area)

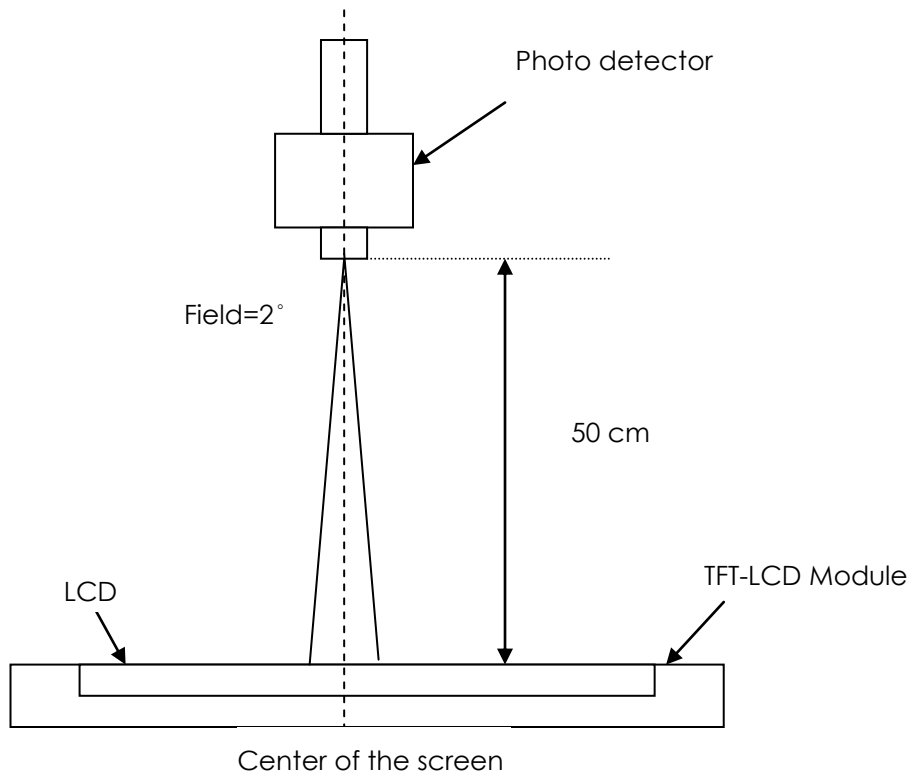


**Note 2:** The luminance uniformity of 5 points is defined by dividing the maximum luminance values by the minimum test point luminance

$$\delta_{w5} = \frac{\text{Maximum Brightness of five points}}{\text{Minimum Brightness of five points}}$$

**Note 3:** Measurement method

The LCD module should be stabilized at given temperature for 30 minutes to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting Backlight for 30 minutes in a stable, windless and dark room, and it should be measured in the center of screen.



**Note 4:** Definition of Average Luminance of White (Y<sub>L</sub>):

Measure the luminance of gray level 63 at 5 points ,  $Y_L = [L(1) + L(2) + L(3) + L(4) + L(5)] / 5$   
 L (x) is corresponding to the luminance of the point X at Figure in Note (1).

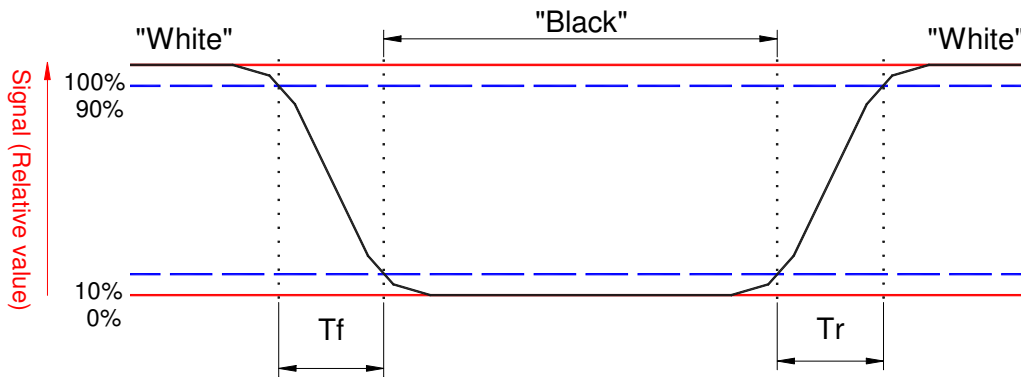
**Note 5:** Definition of contrast ratio:

Contrast ratio is calculated with the following formula.

$$\text{Contrast ratio (CR)} = \frac{\text{Brightness on the "White" state}}{\text{Brightness on the "Black" state}}$$

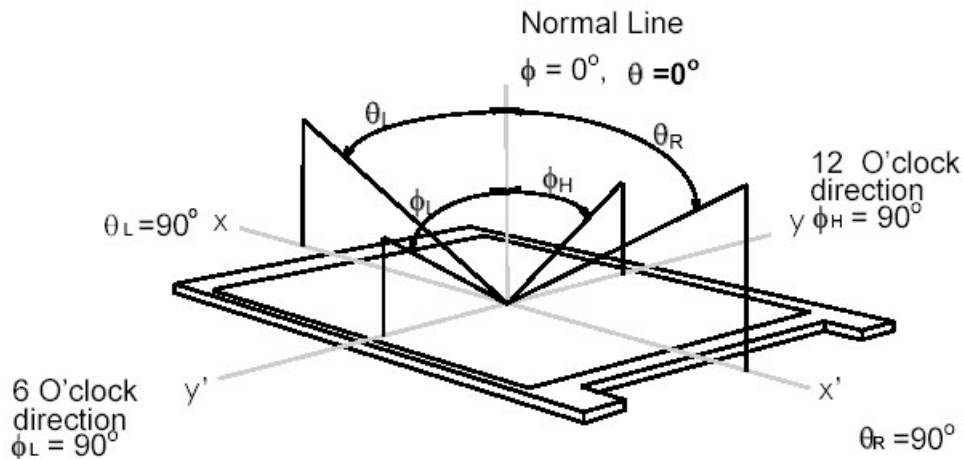
**Note 6:** Definition of response time:

The output signals of BM-7 or equivalent are measured when the input signals are changed from "Black" to "White" (falling time) and from "White" to "Black" (rising time), respectively. The response time interval is between the 10% and 90% of amplitudes. Refer to figure as below.



**Note 7:** Definition of viewing angle

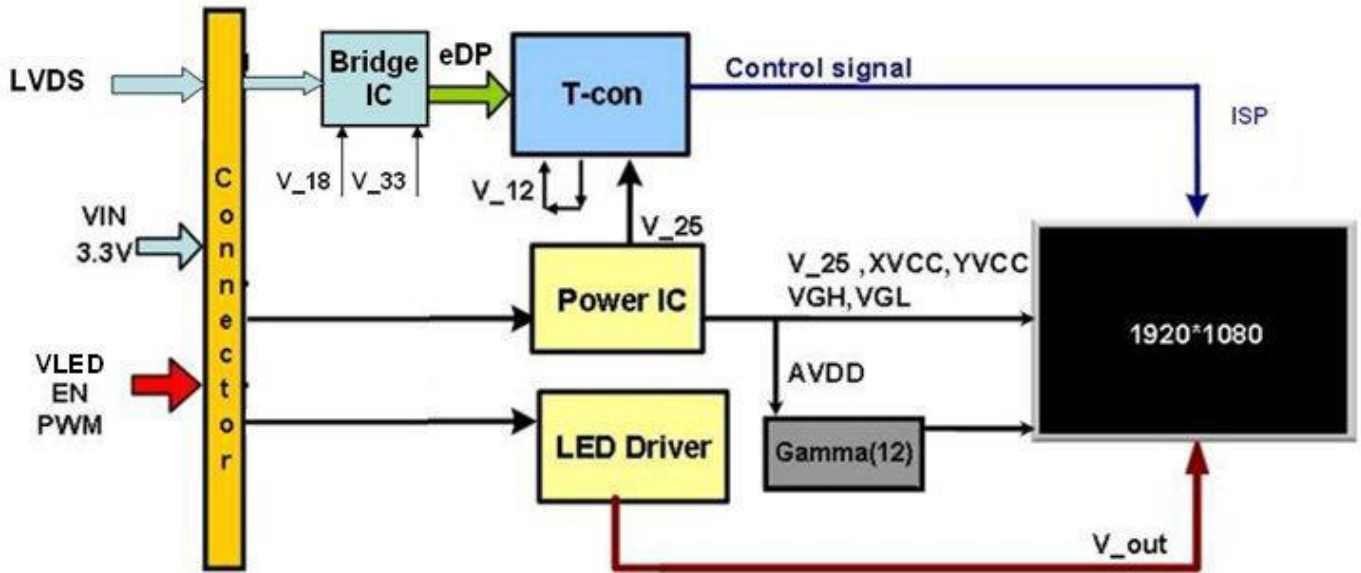
Viewing angle is the measurement of contrast ratio >10, at the screen center, over a 180° horizontal and 180° vertical range (off-normal viewing angles). The 180° viewing angle range is broken down as follows; 90° ( $\theta$ ) horizontal left and right and 90° ( $\Phi$ ) vertical, high (up) and low (down). The measurement direction is typically perpendicular to the display surface with the screen rotated about its center to develop the desired measurement viewing angle.





### 3. Functional Block Diagram

The following diagram shows the functional block of the 13.3 inch Color TFT-LCD Module:





## 4. Absolute Maximum Ratings

An absolute maximum rating of the module is as following:

### 4.1 Absolute Ratings of TFT LCD Module

Item	Symbol	Min	Max	Unit	Conditions
Logic/LCD Drive Voltage	VDD	-0.3	+4.0	[Volt]	Note 1,2
BL Input Voltage	VLED	-0.3	+34.0	[Volt]	Note 1,2
Signal Voltage	RinI-/+, ClkIN-/+	-0.3	VDD+0.3	[Volt]	Note 1, I=0,1,2,3
Signal Voltage	LED_EN , LED_PWM	-0.3	+5.5	[Volt]	Note 1,2

### 4.2 Absolute Ratings of Environment

Item	Symbol	Min	Max	Unit	Conditions
Operating Temp.	TOP	-20	+70	[°C]	Note 4
Operation Humidity	HOP	8	90	[%RH]	Note 4
Storage Temperature	TST	-20	+70	[°C]	Note 4
Storage Humidity	HST	5	90	[%RH]	Note 4

**Note 1:** At Ta (25°C)

**Note 2:** Permanent damage to the device may occur if exceed maximum values

**Note 3:** LED specification refer to section 5.2

**Note 4:** For quality performance, please refer to AUO IIS (Incoming Inspection Standard)

## 5. Electrical Characteristics

### 5.1 TFT LCD Module

#### 5.1.1 Power Specification

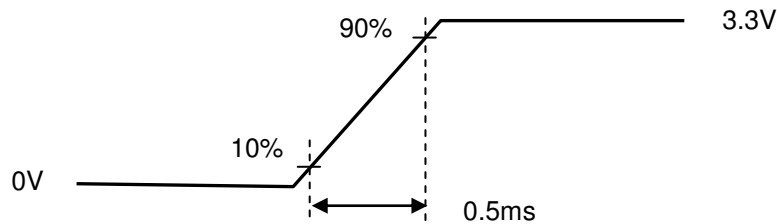
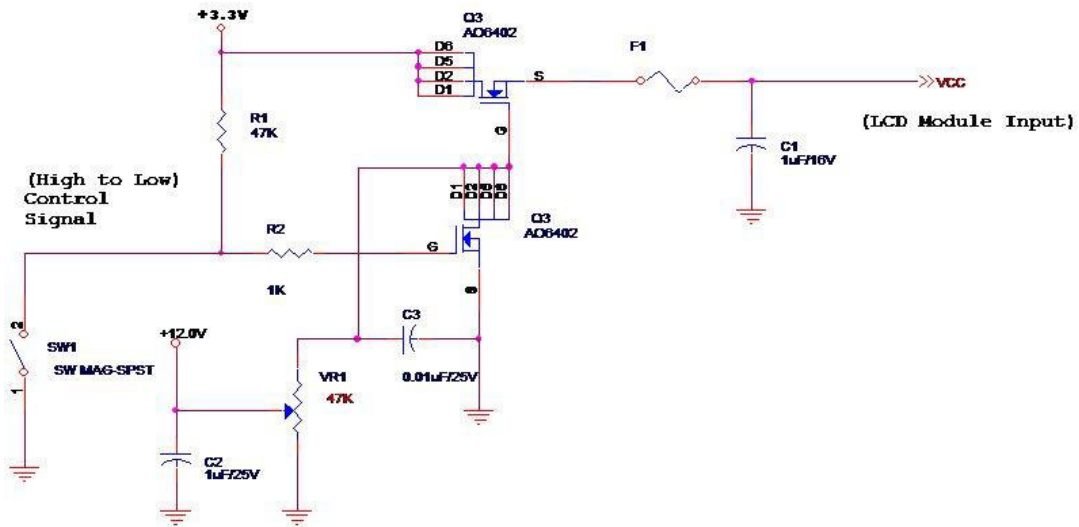
Input power specifications are as follows;

The power specification are measured under 25°C and frame frequency under 60Hz

Symble	Parameter	Min	Typ	Max	Units	Note
VDD	Logic/LCD Drive Voltage	3.0	3.3	3.6	[Volt]	
PDD	VDD Power	-	-	1.8	[Watt]	Note 1
IDD	IDD Current	-	-	500	[mA]	Note 1
IRush	Inrush Current	-	-	2	[A]	Note 2
VDDrp	Allowable Logic/LCD Drive Ripple Voltage	-	-	200	[mV] p-p	

**Note 1:** Maximum Measurement Condition : White Pattern at 3.6V driving voltage ( $P_{max}=V_{3.6} \times I_{white}$ )

**Note 2:** Measure Condition



Vin rising time

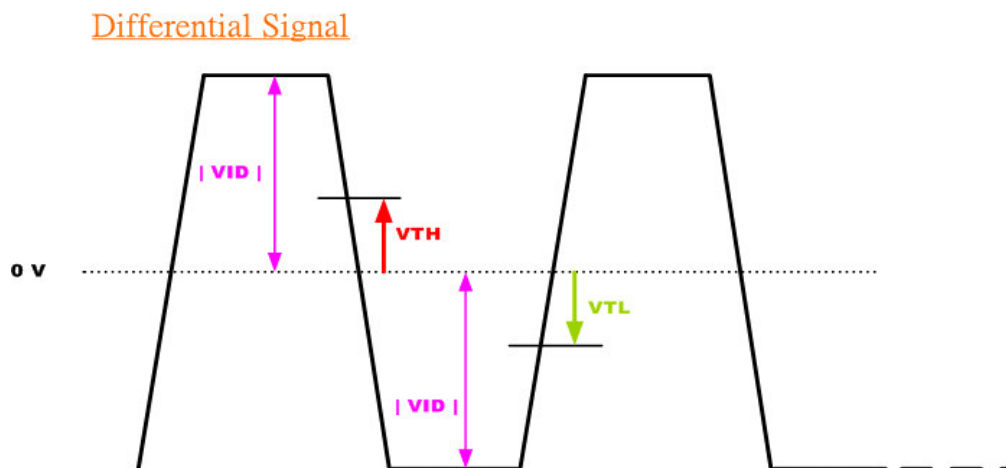
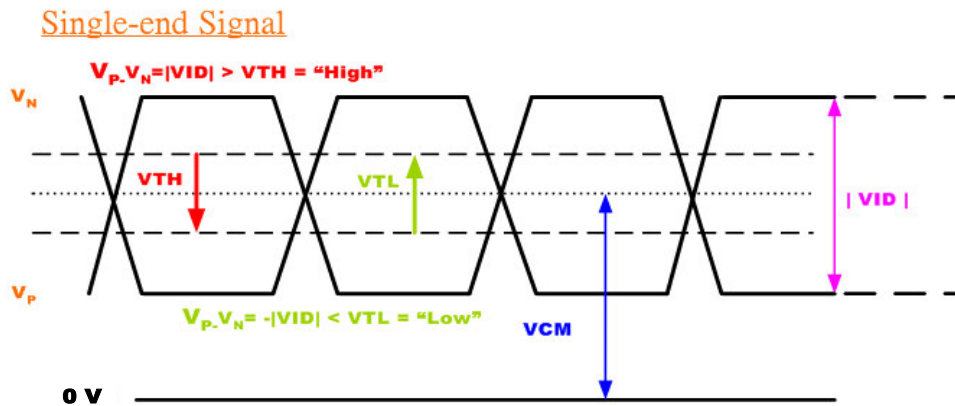
## 5.1.2 Signal Electrical Characteristics

Input signals shall be low or High-impedance state when VDD is off.

Signal electrical characteristics are as follows;

Symbol	Parameter	Min	Typ	Max	Units	Condition
$V_{TH}$	Differential Input High Threshold	-	-	+100	[mV]	$V_{CM} = 1.2V$ Note 1
$V_{TL}$	Differential Input Low Threshold	-100	-	-	[mV]	$V_{CM} = 1.2V$ Note 1
$ V_{ID} $	Input Differential Voltage	100	400	600	[mV]	Note 1
$V_{CM}$	Differential Input Common Mode Voltage	+1.125	-	+1.375	[Volt]	$V_{TH} - V_{TL} = 200mV$ (max) Note 1

**Note 1:** LVDS Signal Waveform





## 5.2 Backlight Unit

### 5.2.1 LED characteristics

Parameter	Symbol	Min	Typ	Max	Units	Condition
Backlight Power Consumption	PLED	-	-	15W	[Watt]	(Ta=25°C), Note 1
LED Life-Time	N/A	-	50,000	-	Hour	(Ta=25°C), Note 2

**Note 1:** Calculator value for reference  $P_{LED} = V_F$  (Normal Distribution) \*  $I_F$  (Normal Distribution) / Efficiency

**Note 2:** The LED life-time define as the estimated time to 50% degradation of initial luminous.

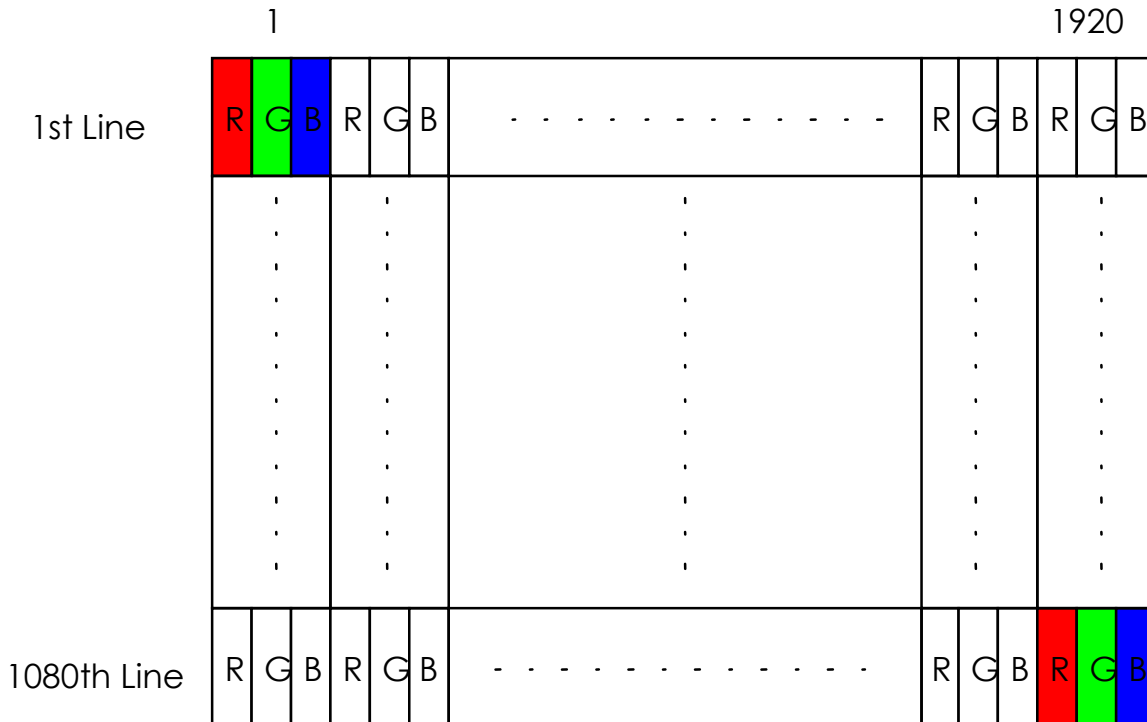
### 5.2.2 Backlight input signal characteristics

Parameter	Symbol	Min	Typ	Max	Units	Remark
LED Power Supply	VLED	10.8	12.0	13.2	[Volt]	Define as Connector Interface (Ta=25°C)
LED Input current	ILED	-	1.25	-	[A]	
LED Enable Input High Level	LED_EN	2	-	5	[Volt]	
LED Enable Input Low Level		-	-	0.8	[Volt]	
PWM Logic Input High Level	LED_PWM	2	-	5	[Volt]	
PWM Logic Input Low Level		-	-	0.52	[Volt]	
PWM Input Frequency	FPWM	500	-	10K	Hz	
PWM Duty Ratio	Duty	5	-	100	%	
LED Inrush Current	ILED <sub>Rush</sub>	-	-	3	[A]	

## 6. Signal Interface Characteristic

### 6.1 Pixel Format Image

Following figure shows the relationship of the input signals and LCD pixel format.





## 6.2 The Input Data Format

Interface	Type	Data
LVDS	JEIDA	8 bit

### JEIDA / NS Mapping Format (Using JEIDA)

RXIN1D0 N/P	J:RA6=G2	J:RA5=R7	J:RA4=R6	J:RA3=R5	J:RA2=R4	J:RA1=R3	J:RA0=R2
RXIN2D0 N/P	N:RA6=G0	N:RA5=R5	N:RA4=R4	N:RA3=R3	N:RA2=R2	N:RA1=R1	N:RA0=R0
RXIN1D1 N/P	J:RB6=B3	J:RB5=B2	J:RB4=G7	J:RB3=G6	J:RB2=G5	J:RB1=G4	J:RB0=G3
RXIN2D1 N/P	N:RB6=B1	N:RB5=B0	N:RB4=G5	N:RB3=G4	N:RB2=G3	N:RB1=G2	N:RB0=G1
RXIN1D2 N/P	J:RC6=DE	J:RC5=VS	J:RC4=HS	J:RC3=B7	J:RC2=B6	J:RC1=B5	J:RC0=B4
RXIN2D2 N/P	N:RC6=DE	N:RC5=VS	N:RC4=HS	N:RC3=B5	N:RC2=B4	N:RC1=B3	N:RC0=B2
RXIN1D3 N/P	J:RD6=X	J:RD5=B1	J:RD4=B0	J:RD3=G1	J:RD2=G0	J:RD1=R1	J:RD0=R0
RXIN2D3 N/P	N:RD6=X	N:RD5=B7	N:RD4=B6	N:RD3=G7	N:RD2=G6	N:RD1=R7	N:RD0=R6



### 6.3 Signal Description (CN1)

The module uses one LVDS receiver. LVDS is a differential signal technology for LCD interface and high speed data transfer device. The first LVDS port(RxOxxx) transmits odd pixels while the second LVDS port(RxExxx) transmits even pixels.

Pin	Signal	Description
1	RxOIN0-	Negative LVDS differential data input (Odd data)
2	RxOIN0+	Positive LVDS differential data input (Odd data)
3	RxOIN1-	Negative LVDS differential data input (Odd data)
4	RxOIN1+	Positive LVDS differential data input (Odd data)
5	RxOIN2-	Negative LVDS differential data input (Odd data, DSPTMG)
6	RxOIN2+	Positive LVDS differential data input (Odd data, DSPTMG)
7	GND	Power Ground
8	RxOCLKIN-	Negative LVDS differential clock input (Odd clock)
9	RxOCLKIN+	Positive LVDS differential clock input (Odd clock)
10	RxOIN3-	Negative LVDS differential data input (Odd data)
11	RxOIN3+	Positive LVDS differential data input (Odd data)
12	RxEIN0-	Negative LVDS differential data input (Even data)
13	RxEIN0+	Positive LVDS differential data input (Even data)
14	GND	Power Ground
15	RxEIN1-	Negative LVDS differential data input (Even data)
16	RxEIN1+	Positive LVDS differential data input (Even data)
17	GND	Power Ground
18	RxEIN2-	Negative LVDS differential data input (Even data)
19	RxEIN2+	Positive LVDS differential data input (Even data)
20	RxECLKIN-	Negative LVDS differential clock input (Even clock)
21	RxECLKIN+	Positive LVDS differential clock input (Even clock)
22	RxEIN3-	Negative LVDS differential data input (Even data)
23	RxEIN3+	Positive LVDS differential data input (Even data)
24	GND	Power Ground
25	AGBSEN	For AUO internal use
26	VDD	Power +3.3V
27	VDD	Power +3.3V
28	SCL	For AUO internal use
29	SDA	For AUO internal use
30	GND	Power Ground

## 6.4 Interface Timing (LVDS)

### 6.4.1 Timing Characteristics

Basically, interface timings should match the 1920x1080/ 60Hz manufacturing guide line timing.

Parameter	Symbol	Min.	Typ.	Max.	Unit	
Frame Rate	-	60	60	60	Hz	
Clock frequency	$1/T_{Clock}$	67	70.6	74.5	MHz	
Horizontal Section	Period	$T_H$	1023	1054	960+B	$T_{clock}$
	Active	$T_{HD}$	960			
	Blanking	$T_{HB}$	63	94	B	
Vertical Section	Period	$T_V$	1092	1116	1080+A	$T_{line}$
	Active	$T_{VD}$	1080			
	Blanking	$T_{VB}$	12	36	A	

**Note1 :** The above is as optimized setting

**Note2 :** The maximum clock frequency =  $[(960 + B) * (1080 + A) * 60] < 74.5\text{MHz}$

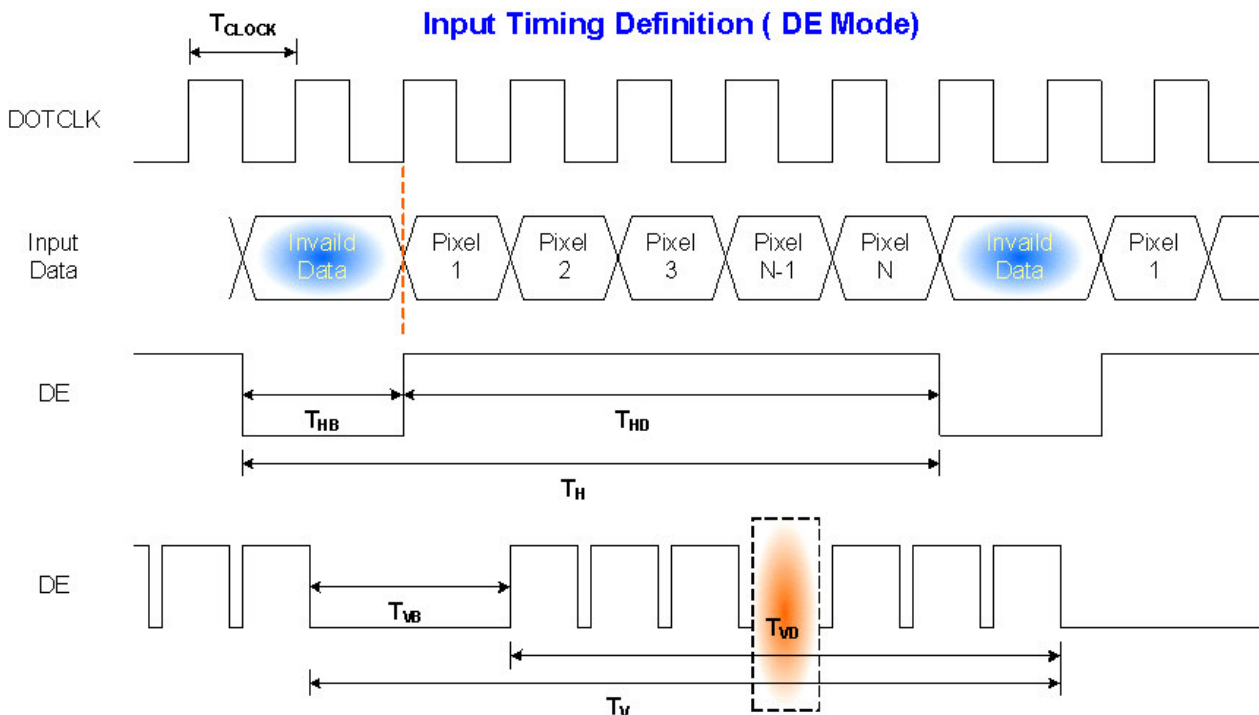
**Note3 :** Horizontal related parameters must be constant without variation( H\_Sync\_Width, H\_Front\_Porch and H\_Back\_Porch must be constant on each scanline).

**Note4 :** On vertical blank area, H\_Sync\_Width and H\_Total must be same as on the V\_Active area.

**Note5 :** Vertical related parameters must be constant without variation.( V\_Sync\_Width, V\_Front\_Porch and V\_Back\_Porch must be constant on each video field ).

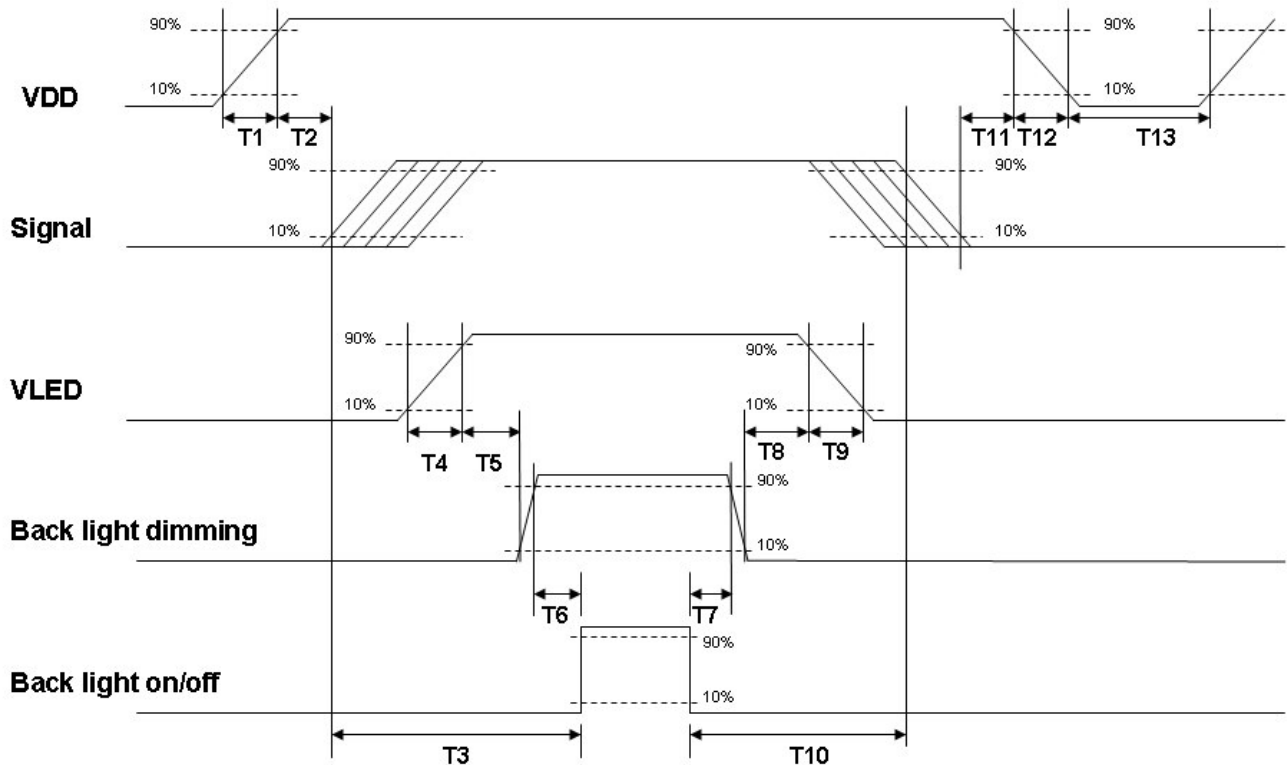
**Note6 :** The DE timings also must be constant without variation( H/V timing requirements are as same as previous. Blank timing must also be constant ).

### 6.4.2 Timing Diagram



## 6.5 Power ON/OFF Sequence

VDD power and LED on/off sequence is as below. Interface signals are also shown in the chart. Signals from any system shall be Hi-Z state or low level when VDD is off.



**Power ON/OFF sequence timing**

Parameter	Value			Units
	Min.	Typ.	Max.	
T1	0.1	-	10	[ms]
T2	200	-	-	[ms]
T3	50	-	-	[ms]
T4	0.5	-	10	[ms]
T5	10	-	-	[ms]
T6	10	-	-	[ms]
T7	10	-	-	[ms]
T8	10	-	-	[ms]
T9	0.5	-	10	[ms]
T10	50	-	-	[ms]
T11	10	-	-	[ms]
T12	-	-	10	[ms]
T13	1000	-	-	[ms]

The above on/off sequence should be applied to avoid abnormal function in the display. Please make sure to turn off the power when you plug the cable into the input connector or pull the cable out of the connector.



# Product Specification

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## 7. Connector & Pin Assignment

Physical interface is described as for the connector on module. These connectors are capable of accommodating the following signals and will be following components.

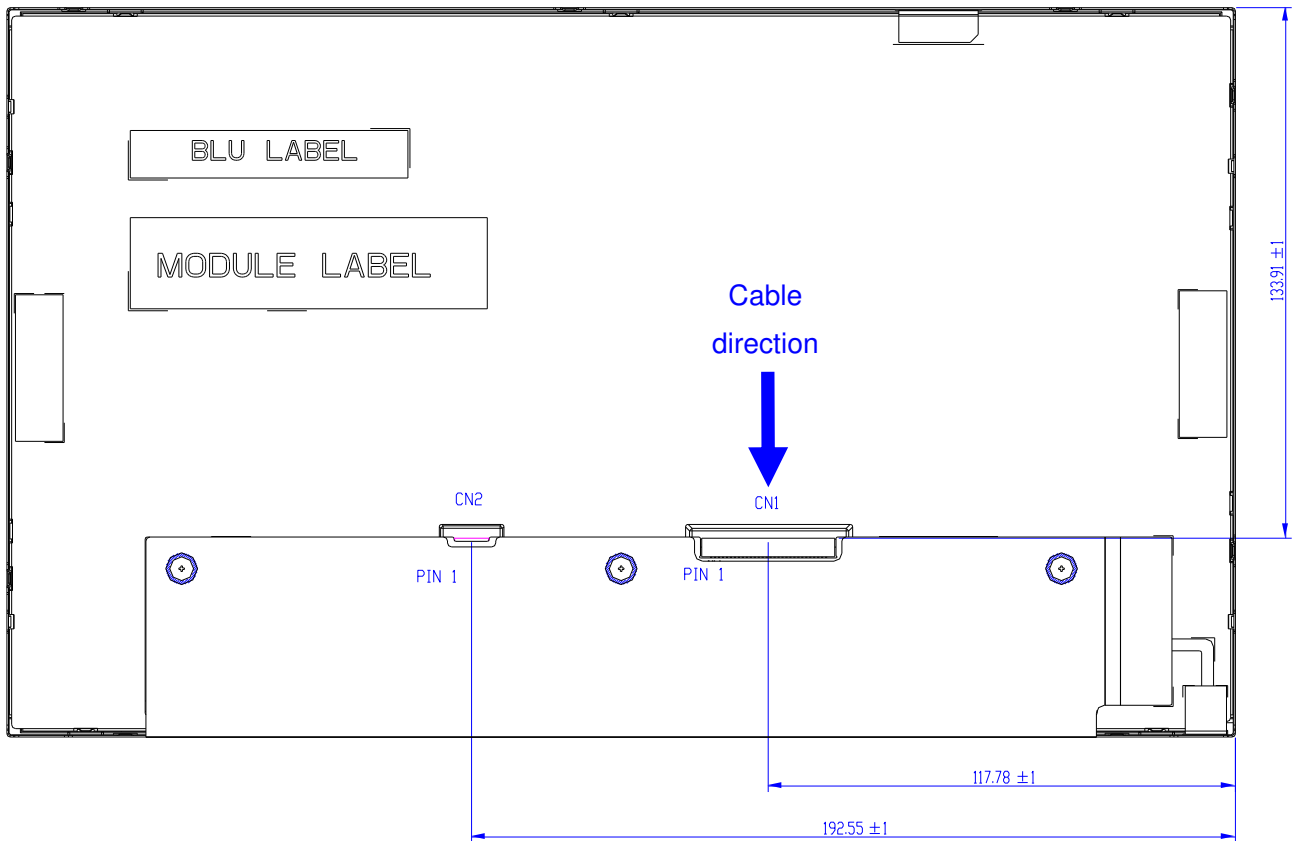
### 7.1 TFT LCD Module

#### 7.1.1 Connector(CN1)

Connector Name / Designation	Interface Connector / Interface card
Manufacturer	Hirose
Type Part Number	DF19K-30P-1H (54)
Mating Housing Part Number	DF19G-30S-1C(05) DF19A-2830SCFA(41)

#### 7.1.2 Pin Assignment(CN1)

Pin#	Signal Name	Pin#	Signal Name
1	RxOIN0-	2	RxOIN0+
3	RxOIN1-	4	RxOIN1+
5	RxOIN2-	6	RxOIN2+
7	GND	8	RxOCLKIN-
9	RxOCLKN+	10	RxOIN3-
11	RxOIN3+	12	RxEIN0-
13	RxEIN0+	14	GND
15	RxEIN1-	16	RxEIN1+
17	GND	18	RxEIN2-
19	RxEIN2+	20	RxECLKIN-
21	RxECLKIN+	22	RxEIN3-
23	RxEIN3+	24	GND
25	AGBSEN	26	VDD
27	VDD	28	SCL
29	SDA	30	GND



## 7.2 Backlight Unit

Physical interface is described as for the connector on module. These connectors are capable of accommodating the following signals and will be following components.

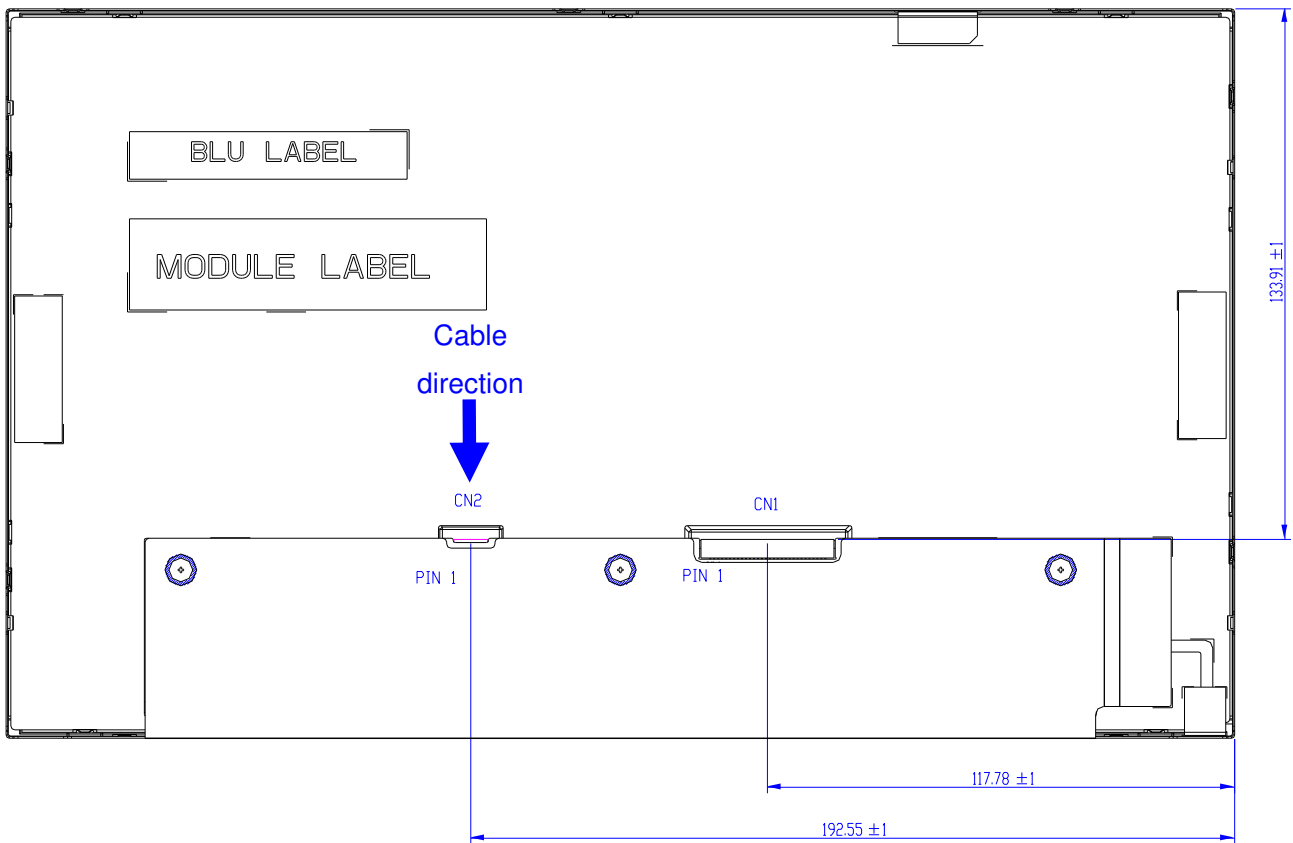
### 7.2.1 Connector (CN2)

Connector Name / Designation	LED Connector
Manufacturer	Hirose
Type Part Number	DF19G-8P-1H(54)
Mating Housing Part Number	DF19G-8S-1C(05) DF19A-2830SCFA(41)



**7.2.2 LED Driver Connector Pin Assignment (CN2)**

Pin#	Symbol	Signal Name
1	LED_EN	LED enable pin
2	LED_PWM	System PWM Single Input
3	NC	No connect
4	VLED	+12V
5	VLED	+12V
6	NC	No connect
7	GND	Ground
8	GND	Ground



## 8. Panel Reliability Test

Items	Required Condition	Note
Temperature Humidity Bias	Ta= 40°C, 90%RH, 300h	Note 1,2
High Temperature Operation	Ta= 70°C , Dry, 300h	
Low Temperature Operation	Ta=-20°C, 300h	
High Temperature Storage	Ta= 70°C, Dry, 300h	
Low Temperature Storage	Ta= -20°C, 300h	
Thermal Shock Test	Ta=-20°C to 60°C, Duration at 30 min, 50 cycles	
Vibration test(non-operation)	1.5G, (10~200Hz~10, random), 30 mins/axis (X, Y, Z)	Note 1,2
Shock Test(non-operation)	50G,20ms,Half-sine wave,( ±X, ±Y, ±Z)	
ESD	Contact Discharge: ±8 KV, 150pF(330Ω) 1sec, 8Points, 25times/point Air Discharge: ±15 KV, 150pF(330Ω) 1sec, 8Points, 25times/point	Note 1

**Note 1:** According to EN 61000-4-2 , ESD class B: Some performance degradation allowed.  
Self-recoverable. No data lost, No hardware failures.

**Note 2:**

- Water condensation is not allowed for each test items.
- Each test is done by new TFT-LCD module. Don't use the same TFT-LCD module repeatedly for reliability test.
- The reliability test is performed only to examine the TFT-LCD module capability.
- To inspect TFT-LCD module after reliability test, please store it at room temperature and room humidity for 24 hours at least in advance.
- No function failure occurs. Mura shall be ignored after high temperature reliability test



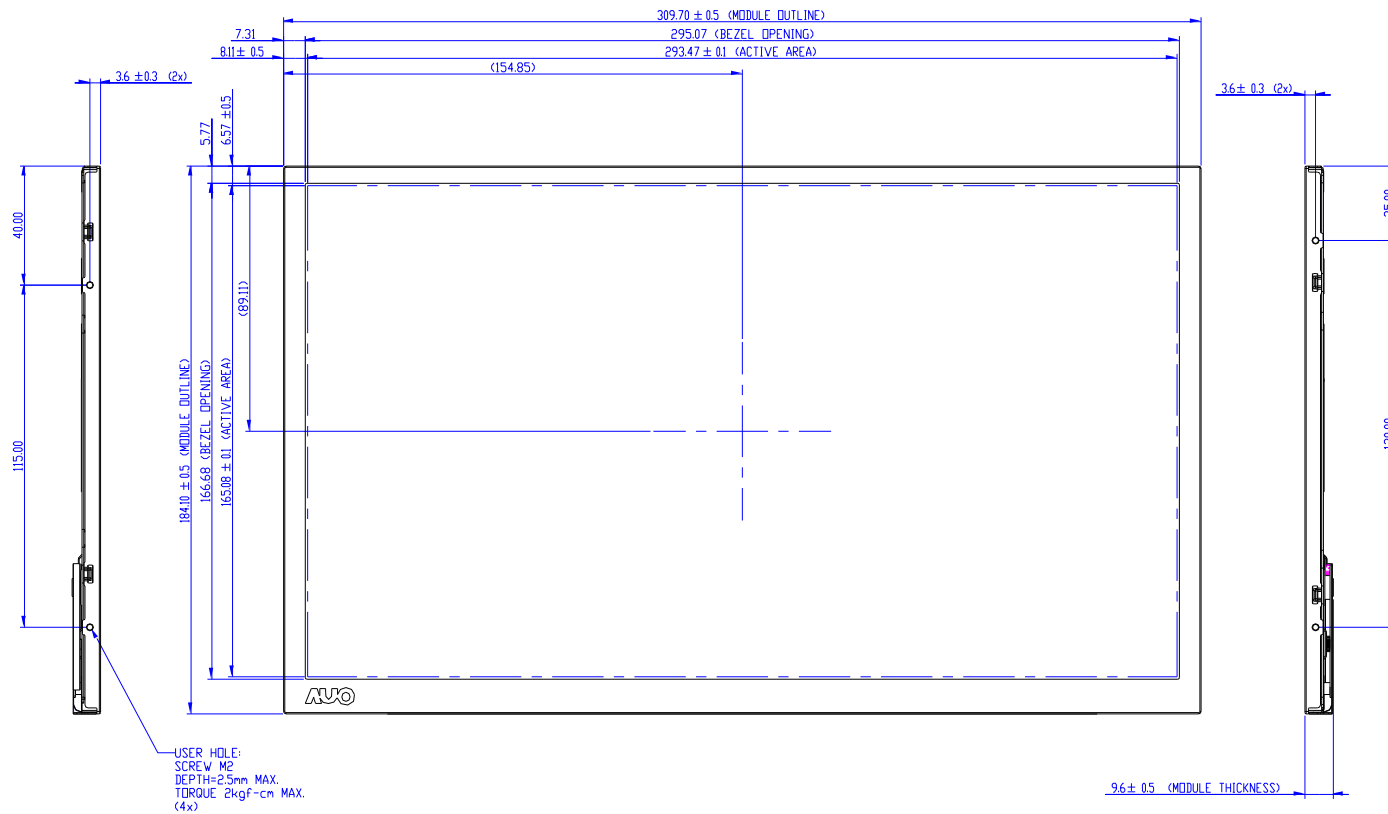
# Product Specification

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## 10 .Mechanical Characteristics

### 10.1 LCM Outline Dimension (Front View)

- NOTES:  
1. CN1: LVDS INTERFACE CONNECTOR TO BE HRS DF19K-30P-1H(54)  
2. CN2: LED DRIVER CONNECTOR TO BE HRS DF19G-8P-1H(54)  
3. USER HOLE MAXIMUM INSERTION DEPTH IS 2.5mm.  
4. UNSPECIFIED TOLERANCE TO BE  $\pm 0.5\text{mm}$ .

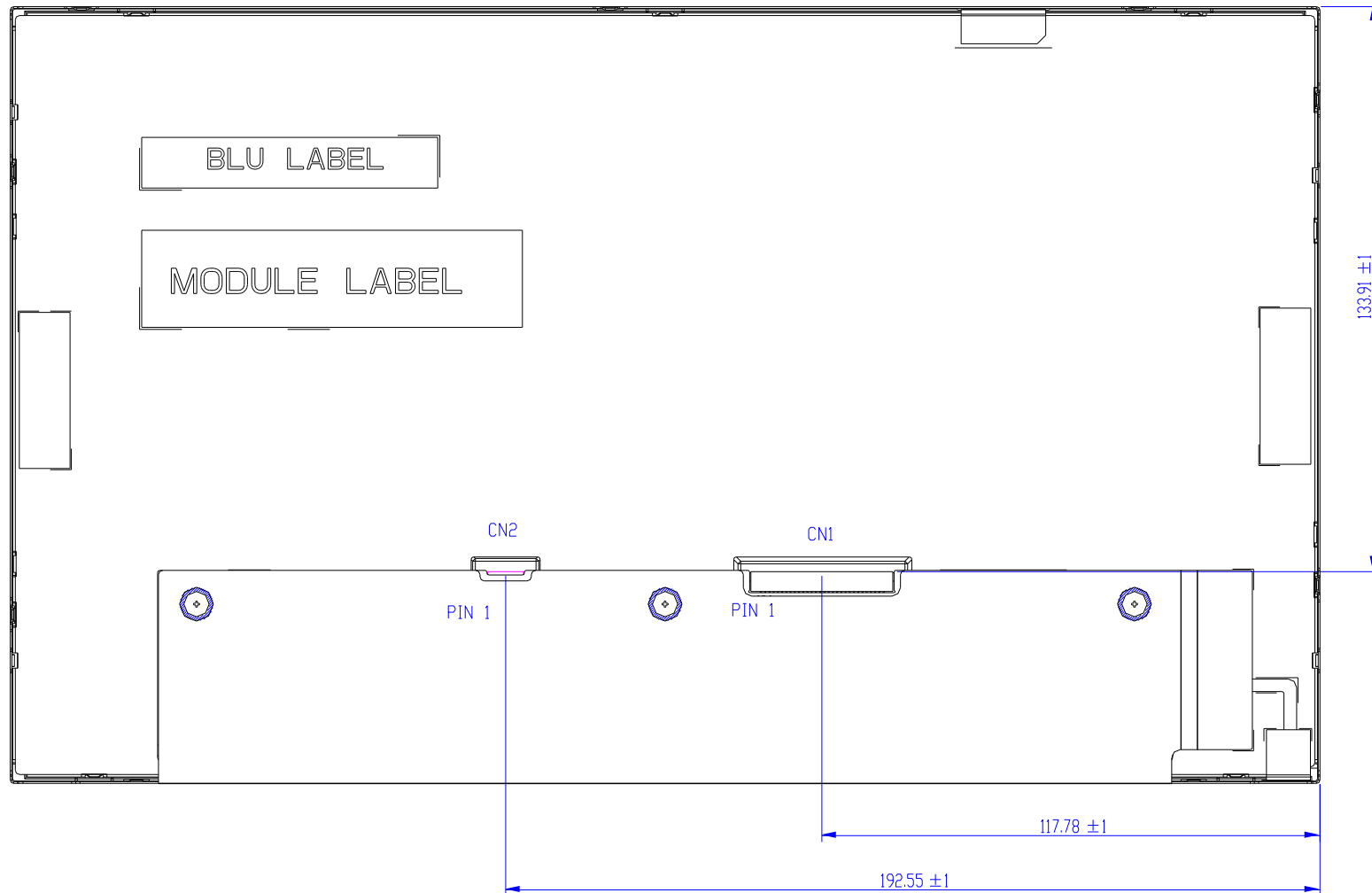




# Product Specification

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## 10.2 LCM Outline Dimension (Rear View)





**13.3" PCAP Solution  
12029459**

Date: 2/11/2019

## Table of contents

<b>1</b>	<b>Scope .....</b>	<b>3</b>
<b>2</b>	<b>Touch Sensor and Cover Glass .....</b>	<b>3</b>
2.1	Technical Parameters.....	3
2.2	Reliability Tests.....	4
<b>3</b>	<b>Recommended Touch Controller.....</b>	<b>4</b>
<b>4</b>	<b>Optical Inspection Criteria and Handling Recommendations .....</b>	<b>4</b>
4.1	Optical Inspection Criteria.....	4
4.2	Handling Recommendations .....	4
<b>5</b>	<b>Appendix A: Technical Drawing .....</b>	<b>5</b>
<b>6</b>	<b>Revision History .....</b>	<b>6</b>

## 1 Scope

DATA MODUL's PCAP solution 12029459 consists of a 13.3" capacitive touch screen. Please note that this is only a sub-assembly of the final product. The specification of the final end product might differ from this specification.

## 2 Touch Sensor and Cover Glass

### 2.1 Technical Parameters

Screen size	13.3 inch /33 cm
Format	Wide
Composite	SITO with Tail
Outline dimensions	303.3 x 177.0 x 1.1 mm (WxHxT)
Active area	295.07 x 166.68 mm (WxH)
Bending radius of tail	R = 2 mm recommended
Transmissivity	86% (min.)
Operating temperature and humidity	-30 to +85
Storage temperature and humidity	-40 to +85
Tail connector	Hirose FH28H-80S-0.5SH, Hirose FH28H-50S-0.5SH



## 2.2 Reliability Tests

Low Temperature Storage Test	-30 °C for 120 h, 1h recovery at room temperature
High Temperature Storage Test	70 °C for 120 h, 1h recovery at room temperature
High Temperature / High Humidity Test	60°C, 90% RH for 120h, 1h recovery at room temperature
Cycle test	-30°C / 80°C, 30 min / cycle, 100 cycles, 1 h recovery at room temperature

## 3 Recommended Touch Controller

The recommendation for this PCAP solution is a controller based on mXT2952T2. Please ask your local DATA MODUL sales representative for further details.

## 4 Optical Inspection Criteria and Handling Recommendations

### 4.1 Optical Inspection Criteria

For details on the optical inspection criteria, please refer to DATA MODULs Outgoing Spec or ask your local DATA MODUL sales representative.

### 4.2 Handling Recommendations

Precautions for operation

- Do not put a heavy, hard or sharp object on the product
- Do not bend the product in order to assure the reliability
- Do not put one product on the other. Otherwise, it may cause the product to be scratched
- Don't use any organic solvent acid or alkali solution.

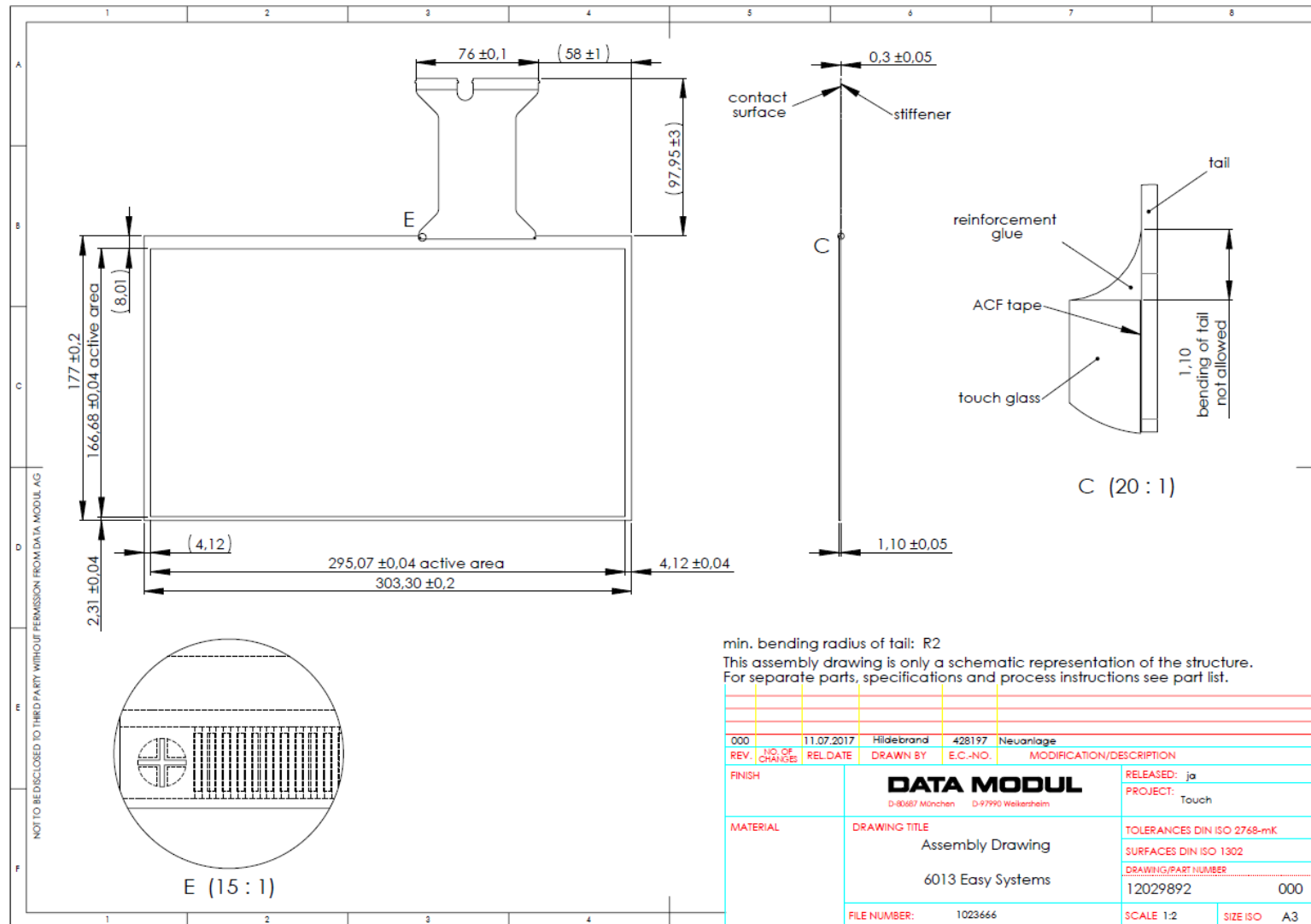
Precautions for mounting

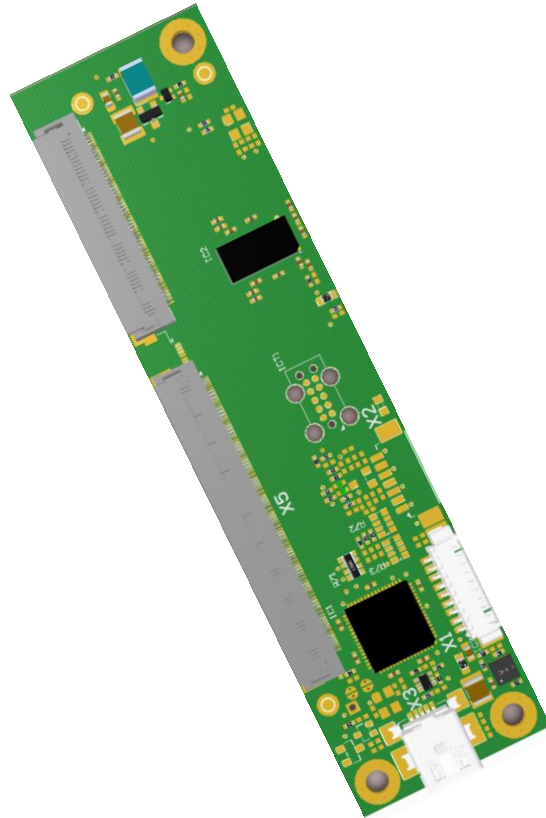
- The panel should be mounted using a configuration that either holds the panel by all four corners or by all four sides
- The bezel edge must be positioned outside the active area. The bezel may cause false activation if the edge overlaps the active area
- Any mounting configuration should ensure that there is no twisting force applied to the panel
- 1mm distance between TFT screen and touch panel is recommended

Precautions for tail

- The flex tail in general can be bent with a min. radius of about 1mm
- In order to avoid damaging and malfunction of the sensor, please don't bend the FPC area next to the panel
- Excess or repeated bending of the FPC connector should also be avoided

## 5 Appendix A: Technical Drawing





## **easyTOUCH mXT2952T2 2-tail PCAP USB controller**

Revision: 003

Date: 2016-03-29

## Table of contents

<b>1</b>	<b>Introduction.....</b>	<b>3</b>
<b>2</b>	<b>Controller specification .....</b>	<b>4</b>
2.1	Mechanical features .....	4
2.2	Connection features.....	4
2.3	Electrical features .....	4
<b>3</b>	<b>Mechanical drawing .....</b>	<b>5</b>
<b>4</b>	<b>Connectors and signals .....</b>	<b>6</b>
4.1	Connectors .....	6
4.2	X1 pin assignment .....	6
<b>5</b>	<b>UL information .....</b>	<b>7</b>
<b>7</b>	<b>Appendix: Frequently asked questions.....</b>	<b>8</b>

# 1 Introduction

The easyTouch mXT2952T2 Controller is designed as a part of the capacitive touch systems developed by Data Modul. It offers the possibility to connect a projective capacitive touch sensor to standard computers or embedded systems using USB.

The controller is based on the Atmel maXTouch 2952T2 which offers a very good touch performance and high noise resistance. To get the best touch performance with water and glove usage the mXT2952T2 has integrated self-capacitance technology. In combination with the mutual-capacitance entity the controller is applicable for single- and multi-touch. Together with outstanding filter technology the maXTouch ICs are suitable for industrial, medical and other applications.

For the communication with the OS the controller uses Data Modul's Driverless firmware. The firmware connects as a Human Interface Device (HID) without an additional driver to the most popular operating systems like Windows XP, Windows 7 / 8, Windows CE5/6/7, OSX and Linux. For more information about the Data Modul Driverless firmware please refer to the *Driverless Controller User Guide*.

## 2 Controller specification

### 2.1 Mechanical features

Size	105x27x6 mm
Operating temperature	-40 to +85 °C
Storage temperature	-40 to +85 °C
Temperature slew rate	10 °C /minute (max.)
Relative humidity	95 % at 60 °C no condensation
RoHS compliant	Yes

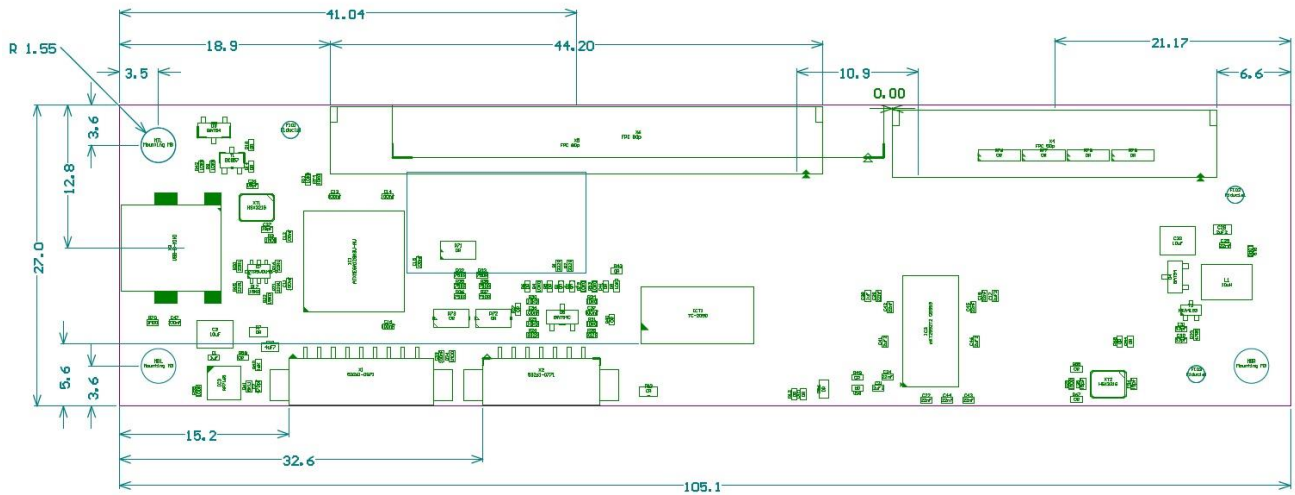
### 2.2 Connection features

Protocol	HID mouse, HID digitizer
Multi touch	16 fingers (max.)
Single touch	HID mouse with right mouse button emulation
Resolution	4096 x 4096 (x/y)
Report rate	>100 Hz for 15 touches, subject to configuration
USB connector	Mini USB or Molex 53261-0971

### 2.3 Electrical features

Power supply	5 V± 5%
Vin ripple	±50 mV peak-peak (max.)
On board voltage	3.3 V and 8.5 V
Power consumption	500 mW (max. subject to configuration)

### 3 Mechanical drawing



Height: 6 mm (including components)



## 4 Connectors and signals

### 4.1 Connectors

Connector	Type	Connection
X1	1.25 mm Pitch 9 pin header Molex 53261-0971 compatible	USB
X3	Mini USB connector	USB
X4	0.5 mm pitch 50 pin header	Flextail to touch sensor
X5	0.5 mm pitch 80 pin header	Flextail to touch sensor

### 4.2 X1 pin assignment

X1	Signal	Description
1	VDD_5V	USB power supply
2	USB DM	USB signal -
3	USB DP	USB signal +
4		Do not use
5		Do not use
6		Do not use
7		Do not use
8		Do not use
9	GND	Ground

Matching USB cable (length 2m): Article number **TP72241**

## 5 UL information

Part	Type	UL number
X1	1.25 mm pitch 9 pin header MOLEX 53261-0971 compatible	Molex 53261-xx71: E29179 or YeonHo 12505WR-xx: E108706
X3	Mini USB connector	FCI 10033526-N3212LF or W+P 8233-2-05-60-FTR/SW: Thermoplastic UL94V-0
X4	0.5 mm pitch 50 pin header	Hirose FH28D-xxS-0.5SH(05): LCP resin (UL94V-0)/gray LCP resin (UL94V-0)/black
X5	0.5 mm pitch 80 pin header	Hirose FH28H-xxS-0.5SH(05): LCP resin (UL94V-0)/gray LCP resin (UL94V-0)/black
PCB		Fastprint: E204460

## 7 Appendix: Frequently asked questions

### Touch coordinates are not stable and the cursor is “jumping around”?

In mains-operated systems this can happen if the touch controller is missing the systems ground reference. Another reason can be an extreme amount of noise present that exceeds the touch threshold set in the controller.

Please connect the system ground reference to one of the mounting holes. For best touch performance the touch controller needs a low impedance AC connection to the person that operates the system to achieve a good current loop back to the controller.

If the instability is caused by a noise source like a display, a switching regulator or a RF antenna your system may have an integration issue. With proper settings the controller can most likely suppress the noise. However, eliminating the noise source should be the first thing to check. If you have any difficulties to find the correct settings, please contact Data Modul.



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