



# SPECIFICATION

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*easy* **TOUCH  
DISPLAY**

**easyTOUCH DISPLAY Advanced (12015572)**

10.1" - WXGA – eTD101W3201-INA-A

Version: 1.0  
Date: 08.06.2020

Note: This specification is subject to change without prior notice

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## ADVANCED LEVEL

**10.1 inch (25.7cm)**

**Part-No. 12015572**

**G101ICE-L01 incl.easyTOUCH eTD101W3201-INA-A**

### Display

Panel Type	InnoluxG101ICE-L01
Resolution (pixel) / format	1280 x 800/ wide
Brightness (typical)	500 cd/m <sup>2</sup>
Display Mode	AAS, 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, light-tight Dimensions according to outline drawing
Touch sensor type	10.1" easyTOUCH 12014890
Active area touch sensor (W x H)	226.0 (H) x 139.0 (V)
Optical Specification	according to DATA MODUL Outgoing Specification 12005965
Touch Interface	USB mXT640T

### 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

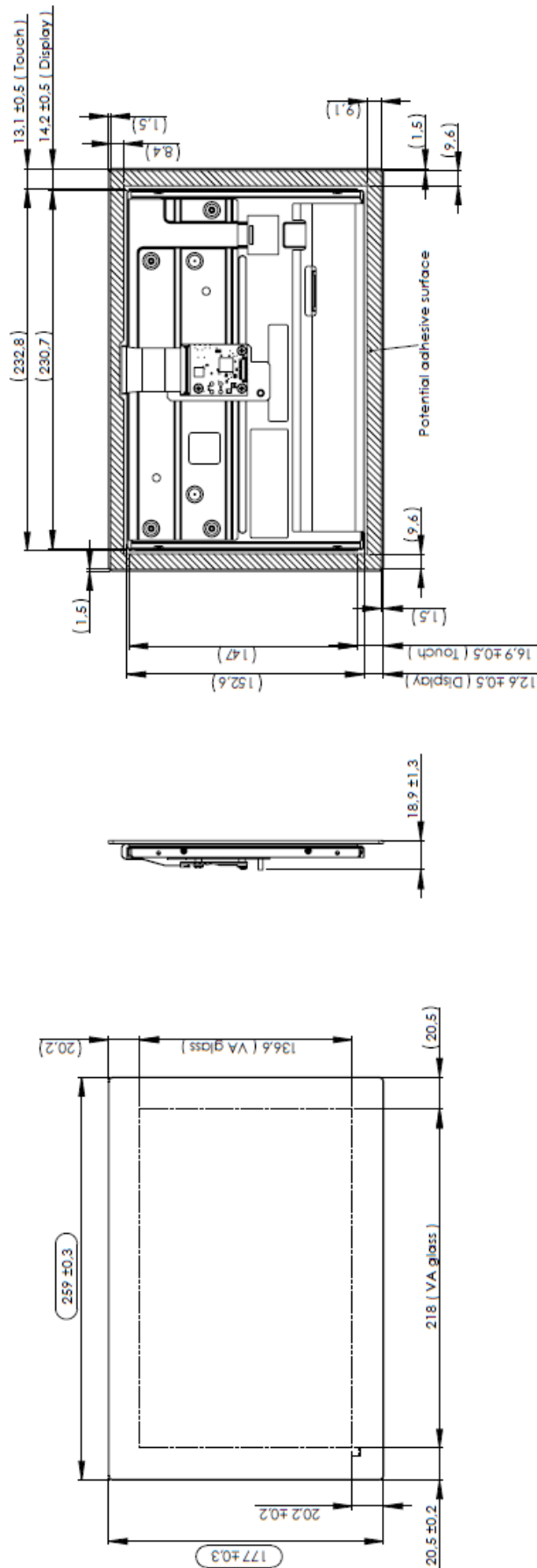
Touch Controller	easyTOUCH mXT640T Driverless USB
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### Environmental conditions

Temperature (operating)	-20 - 65 °C
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### Mechanical dimensions

Outline dimensions (W x H x T)	259.0 (H) x 177.0 (V) x 18.9 (T) Detailed dimensions according to outline drawing
Weight	approx. 0.780 kg







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**REVISION HISTORY**

Version	Date	Page	Description
Ver. 1.0	18 Jun., 2015	All	Approval Specification was first issued.
Ver. 1.1	16 Sep., 2015	1.5	Bezel area dimension modified
Ver. 3.0	16 Jun., 2019	All	Change Revision from C1 to C2



## 1. GENERAL DESCRIPTION

### 1.1 OVERVIEW

G101ICE-L01 is a 10.1" TFT Liquid Crystal Display module with LED Backlight units and 40 pins LVDS interface. This module supports 1280 x 800 WXGA mode and can display 16.2M/ 262k colors. The LED driving device for Backlight is built in PCBA.

### 1.2 FEATURES

- WXGA (1280 x 800 pixels) resolution
- DE (Data Enable) only mode
- LVDS Interface with 1pixel/clock
- Wide operating temperature.
- RoHS compliance

### 1.3 APPLICATION

- TFT LCD Monitor
- Factory Application
- Amusement

### 1.4 GENERAL SPECIFICATIONS

Item	Specification	Unit	Note
Active Area	216.96 (H) x 135.60 (V) (10.1" diagonal)	mm	(1)
Bezel Opening Area	218.96 (H) x 137.6 (V)	mm	
Driver Element	a-Si TFT active matrix	-	-
Pixel Number	1280 x R.G.B x 800	pixel	-
Pixel Pitch	0.1695 (H) x 0.1695 (V)	mm	-
Pixel Arrangement	RGB vertical Stripe	-	-
Display Colors	16,194,277 / 262,144	color	-
Display Mode	Normally Black	-	-
Surface Treatment	Hard Coating (3H), Anti-Glare	-	-
Module Power Consumption	6.18	W	Typical

**1.5 MECHANICAL SPECIFICATIONS**

Item		Min.	Typ.	Max.	Unit	Note
Module Size	Horizontal(H)	230.2	230.7	231.2	mm	(1)
	Vertical(V)	152.05	152.55	153.05	mm	
	Depth(D)	6.0	6.5	7.0	mm	(1)(2)
Bezel Area	Horizontal	217.66	218.96	218.26	mm	
	Vertical	137.3	137.6	137.9	mm	
Active Area	Horizontal	-	216.96	-	mm	
	Vertical	-	135.6	-	mm	
Weight		-	360	375	g	

Note (1) Please refer to the attached drawings for more information of front and back outline dimensions.

Note (2) The depth is without connector.



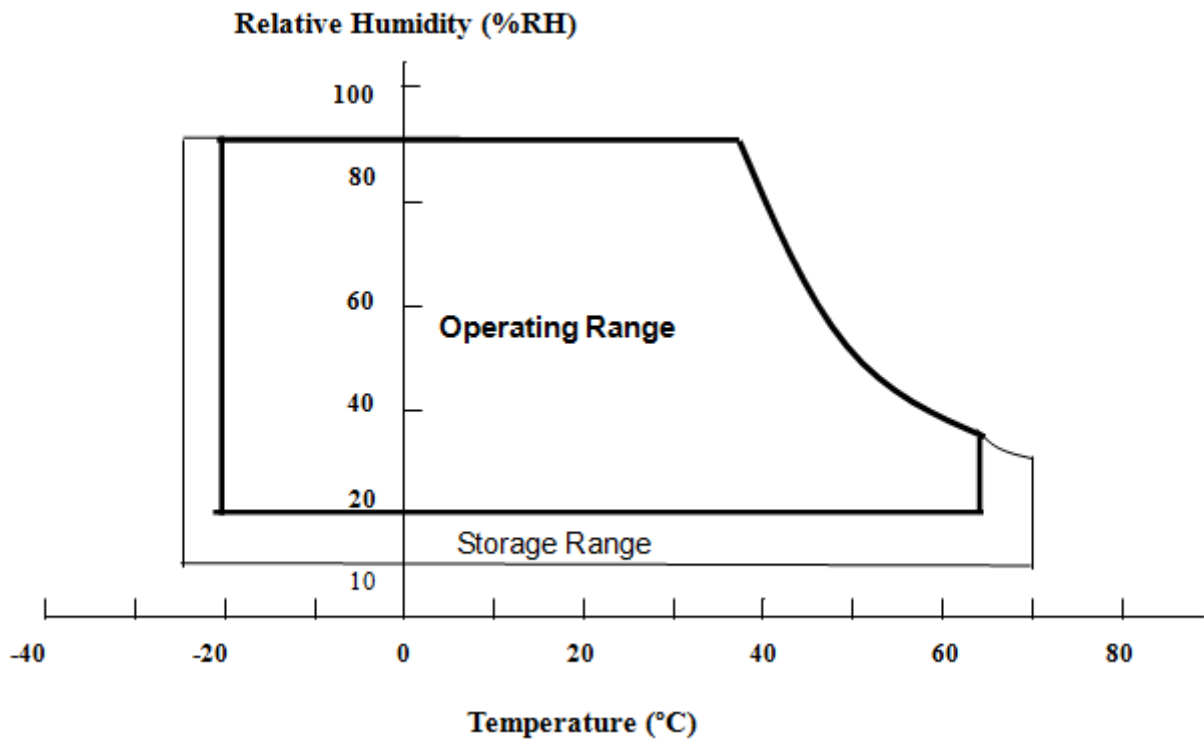
**2. ABSOLUTE MAXIMUM RATINGS**

**2.1 ABSOLUTE RATINGS OF ENVIRONMENT**

Item	Symbol	Value		Unit	Note
		Min.	Max.		
Operating Ambient Temperature	T <sub>OP</sub>	-20	+65	°C	
Storage Temperature	T <sub>ST</sub>	-25	+70	°C	

Note (1) Temperature and relative humidity range is shown in the figure below.

- (2) 90 %RH Max. (Ta < 40°C).
- (3) Wet-bulb temperature should be 39°C Max.
- (4) No condensation.



## 2.2 ELECTRICAL ABSOLUTE RATINGS

### 2.2.1 TFT LCD MODULE

Item	Symbol	Value		Unit	Note
		Min.	Max.		
Power Supply Voltage	VCC	-0.3	4	V	(1)

### 2.2.2 BACKLIGHT UNIT

Item	Symbol	Value		Unit	Note
		Min.	Max.		
Converter Voltage	$V_i$	-0.3	18	V	(1), (2)
Enable Voltage	EN	---	5.5	V	
Backlight Adjust	ADJ	---	5.5	V	

Note (1) Permanent damage to the device may occur if maximum values are exceeded. Function operation should be restricted to the conditions described under Normal Operating Conditions.

Note (2) Specified values are for lamp (Refer to 3.2 for further information).

3. ELECTRICAL SPECIFICATIONS

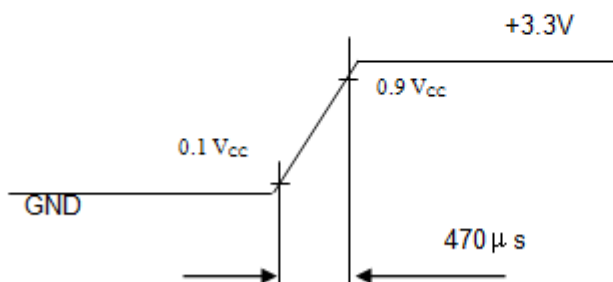
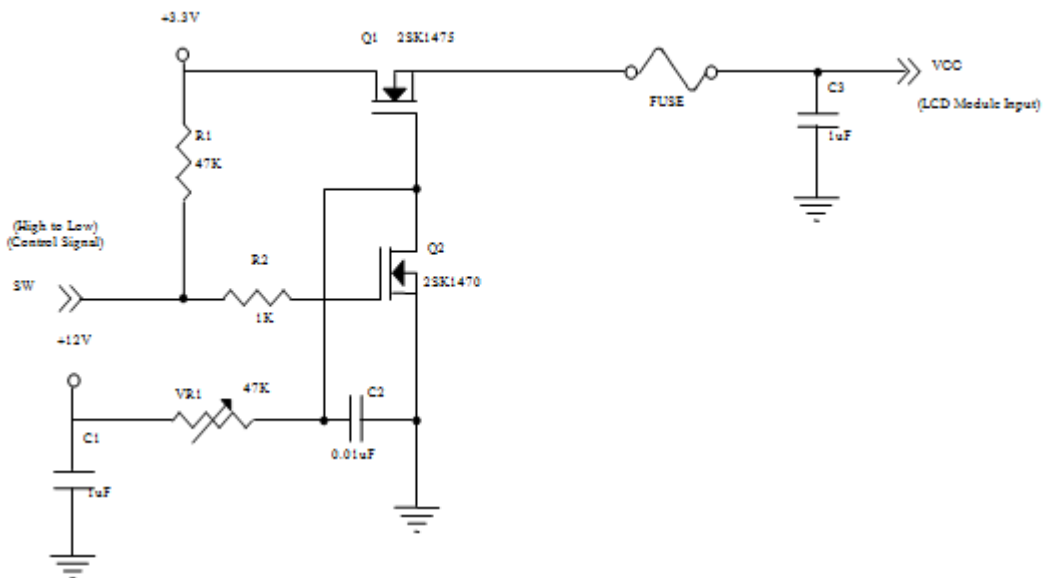
3.1 TFT LCD MODULE

Ta = 25 ± 2 °C

Parameter	Symbol	Value			Unit	Note
		Min.	Typ.	Max.		
Power Supply Voltage	V <sub>CC</sub>	3.0	3.3	3.6	V	-
Ripple Voltage	V <sub>RP</sub>	-	-	100	mVp-p	
Rush Current	I <sub>RUSH</sub>	-	-	1.5	A	(2)
Power Supply Current	White	-	265	320	mA	(3)a
	Black	-	210	260	mA	(3)b
LVDS differential input voltage	V <sub>id</sub>	200	-	600	mV	
LVDS common input voltage	V <sub>ic</sub>	1.0	1.2	1.4	V	
Differential Input Voltage for LVDS Receiver Threshold	"H" Level			100	mV	-
	"L" Level	-100			mV	-
Terminating Resistor	R <sub>T</sub>	-	100		Ohm	-

Note (1) The module should be always operated within above ranges.

Note (2) Measurement Conditions:



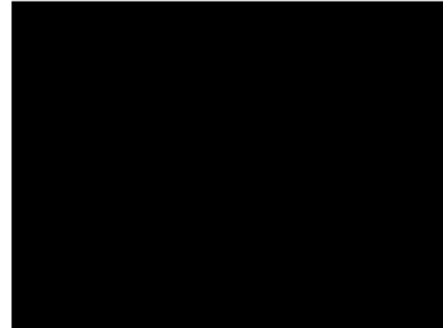
Note (3) The specified power supply current is under the conditions at  $V_{DD} = 3.3V$ ,  $T_a = 25 \pm 2 \text{ }^\circ\text{C}$ , DC Current and  $f_v = 60 \text{ Hz}$ , whereas a power dissipation check pattern below is displayed.

a. White Pattern



Active Area

b. Black Pattern



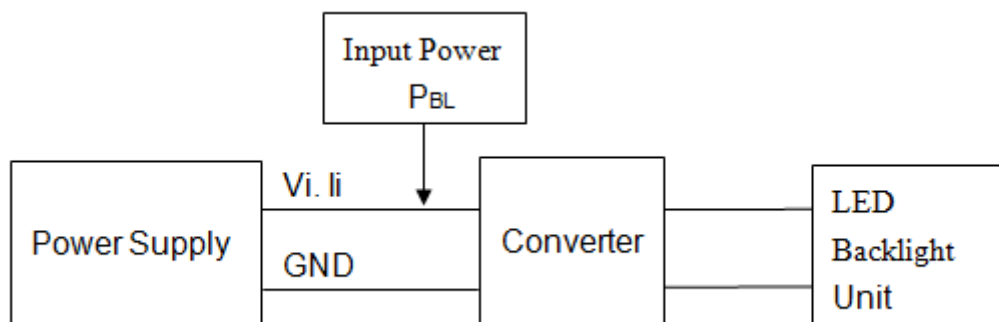
Active Area

### 3.2 BACKLIGHT UNIT

$T_a = 25 \pm 2 \text{ }^\circ\text{C}$

Parameter	Symbol	Value			Unit	Note
		Min.	Typ.	Max.		
Converter Power Supply Voltage	$V_i$	10.8	12.0	13.2	V	
Converter Power Supply Current	$I_i$	-	0.45	0.50	A	@ $V_i = 12V$ (Duty 100%)
Backlight Power Consumption	$P_{BL}$	-	5.3	5.8	W	@ $V_i = 12V$ (Duty 100%)
EN Control Level	Backlight on	2.5	3.3	5.0	V	
	Backlight off	0	---	0.8	V	
PWM Control Level	PWM High Level	2.5	3.3	5.0	V	
	PWM Low Level	0	-	0.15	V	
PWM Control Duty Ratio	-	1	-	100	%	@200Hz
PWM Control Frequency	$f_{PWM}$	190	200	20k	Hz	(2)
LED Life Time	$L_L$	50,000	-	-	Hrs	(3)

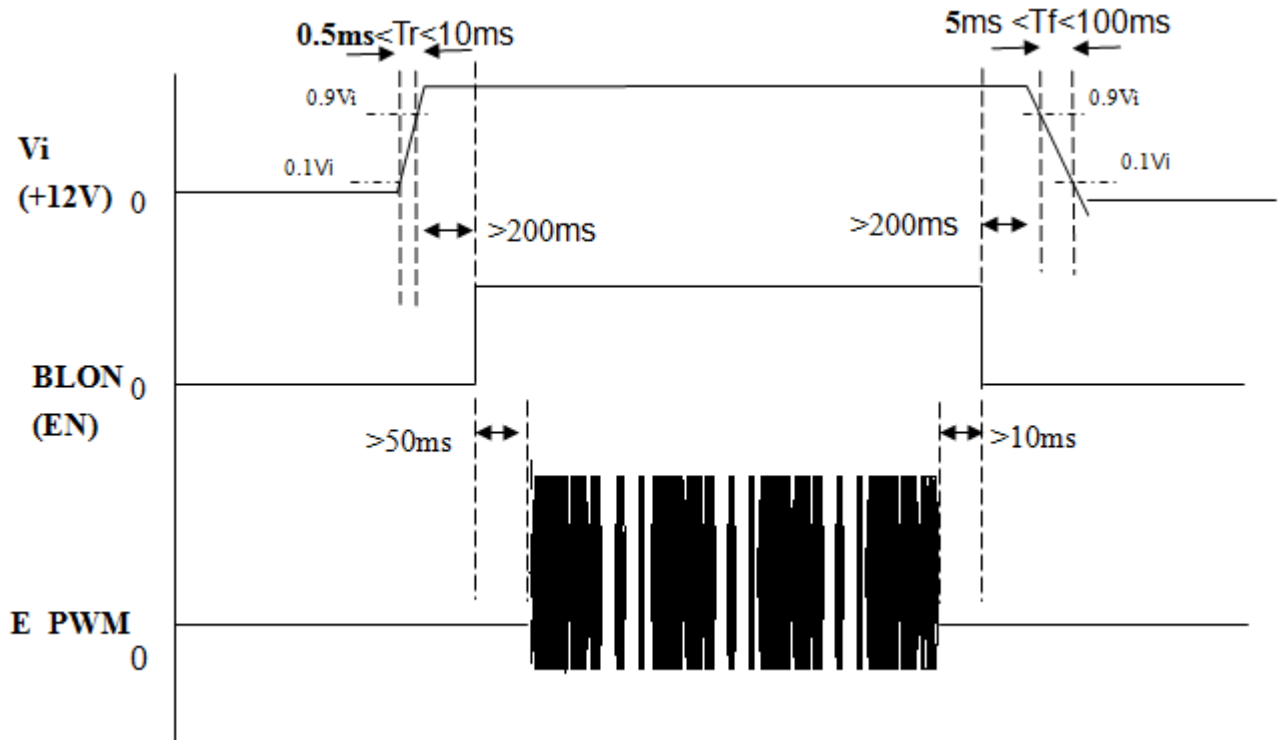
Note (1) LED current is measured by utilizing a high frequency current meter as shown below:



Note (2) At 200 Hz PWM control frequency · duty ratio range is restricted from 1% to 100%

Note (3) The lifetime of LED is defined as the time when it continues to operate under the conditions at  $T_a = 25 \pm 2 \text{ }^\circ\text{C}$  and Duty 100% until the brightness becomes  $\leq 50\%$  of its original value. Operating LED under high temperature environment will reduce life time and lead to color shift.

Power sequence and control signal timing are shown in the following figure



Note : While system is turned ON or OFF, the power sequences must follow as below descriptions

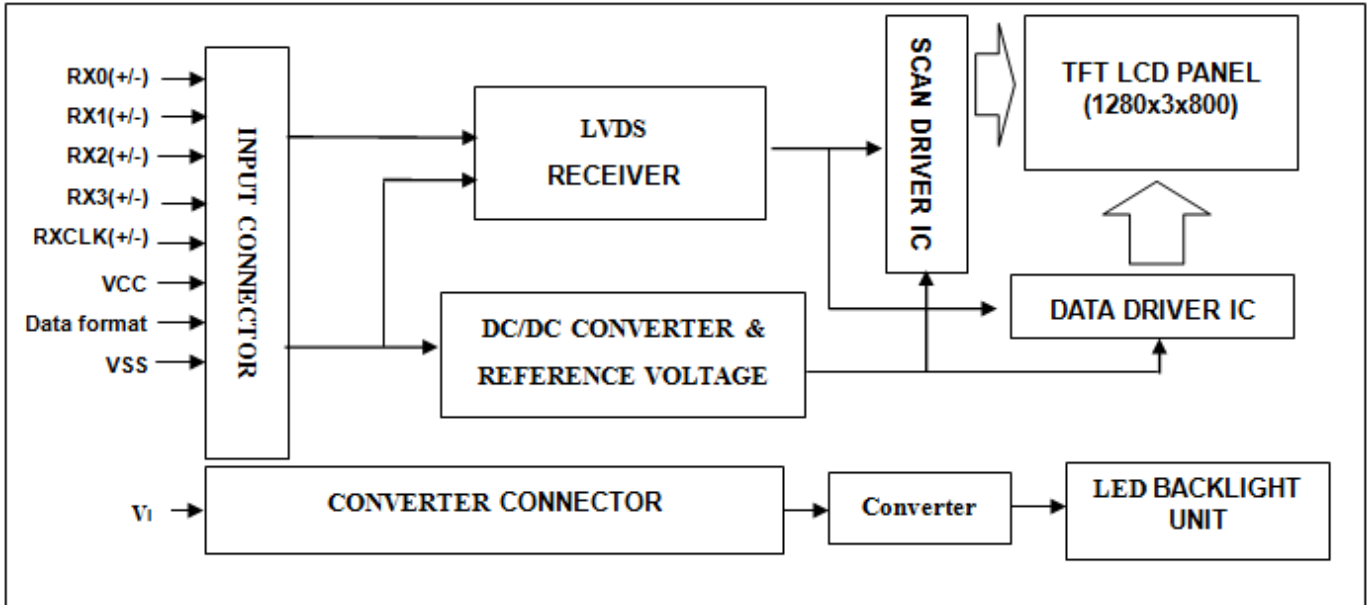
Turn ON sequence:  $V_i(+12V) \rightarrow \text{BLON} \rightarrow \text{E\_PWM}$  signal

Turn OFF sequence:  $\text{E\_PWM}$  signal  $\rightarrow \text{BLON} \rightarrow V_i(+12V)$



4. BLOCK DIAGRAM

4.1 TFT LCD MODULE



## 5. INPUT TERMINAL PIN ASSIGNMENT

### 5.1 TFT LCD MODULE

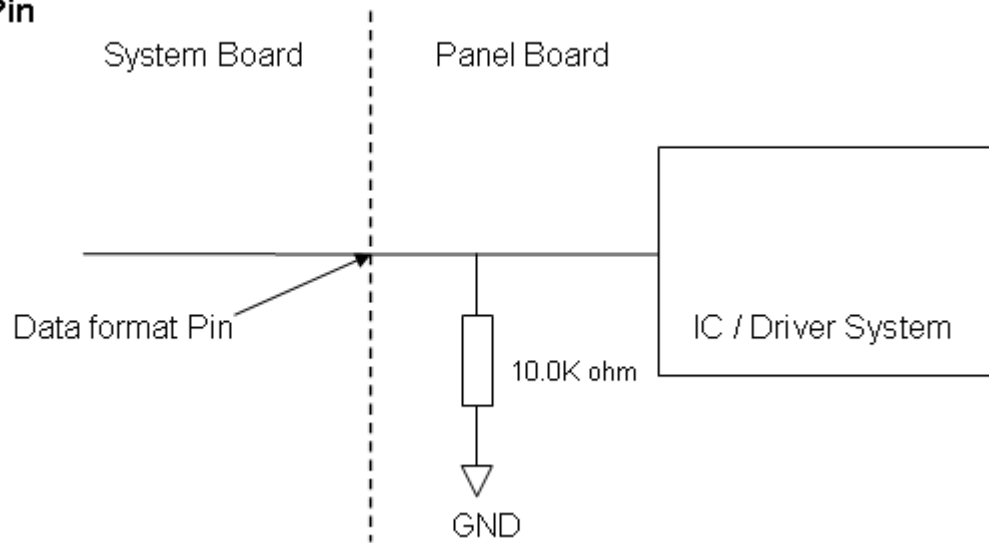
Pin No.	Symbol	Function	Polarity	Note
1	VCCS	Power Supply +3.3V(typical)		
2	VCCS	Power Supply +3.3V(typical)		
3	VCCS	Power Supply +3.3V(typical)		
4	Data format	L or NC : 8bit Input Mode H : 6bit Input Mode		Note (2),Note(3)
5	NC	No Connction (Reserve for INX test)		
6	NC	No Connction (Reserve for INX test)		
7	NC	No Connction (Reserve for INX test)		
8	Rxin0-	LVDS Differential Data Input	Negative	
9	Rxin0+	LVDS Differential Data Input	Positive	
10	VSS	Ground		
11	Rxin1-	LVDS Differential Data Input	Negative	
12	Rxin1+	LVDS Differential Data Input	Positive	
13	VSS	Ground		
14	Rxin2-	LVDS Differential Data Input	Negative	
15	Rxin2+	LVDS Differential Data Input	Positive	
16	VSS	Ground		
17	RxCLK-	LVDS Differential Clock Input	Negative	
18	RxCLK+	LVDS Differential Clock Input	Positive	
19	VSS	Ground		
20	Rxin3-	LVDS Differential Data Input	Negative	
21	Rxin3+	LVDS Differential Data Input	Positive	
22	VSS	Ground		
23	NC	No Connction (Reserve)		
24	NC	No Connction (Reserve)		
25	VSS	Ground		
26	VSS	Ground		
27	LED_PWM	PWM Control Signal od LED Converter		
28	LED_EN	Enable Control Signal od LED Converter		
29	LED_GND	LED Ground		
30	LED_GND	LED Ground		
31	LED_GND	LED Ground		
32	LED_GND	LED Ground		
33	LED_GND	LED Ground		
34	NC	No Connction (Reserve)		
35	NC	No Connction (Reserve)		
36	LED_VCCS	LED Power Supply		
37	LED_VCCS	LED Power Supply		
38	LED_VCCS	LED Power Supply		
39	LED_VCCS	LED Power Supply		
40	LED_VCCS	LED Power Supply		

Note (1) Connector Part No.: I-PEX 20455-040E-12 or Tyco\_5-2069716-3.

Note (2) "Low" stands for 0V. "High" stands for 3.3V. "NC" stands for "No Connection".

Note (3) Interface optional pin has internal scheme as following diagram, Customer should keep the interface voltage level requirement which including panel board loading as below.

Data format Pin



## 5.2 COLOR DATA INPUT ASSIGNMENT

The brightness of each primary color (red, green and blue) is based on the 8-bit gray scale data input for the color. The higher the binary input the brighter the color. The table below provides the assignment of color versus data input.

Color		Data Signal																							
		Red								Green								Blue							
		R7	R6	R5	R4	R3	R2	R1	R0	R7	R6	G5	G4	G3	G2	G1	G0	R7	R6	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	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	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	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
Gray Scale Of 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	
	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	
	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	
	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮		
	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮		
	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮		
	Red(252)	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Red(252)	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Red(252)	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Gray Scale Of 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	
	Green(1)	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	1	0	0	0	0	0	0	0	0	0	
	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮		
	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮		
	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮		
	Green(252)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	
	Green(252)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	
Green(252)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0		
Gray Scale Of 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	
	Blue(1)	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	
	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮		
	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮		
	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮		
	Blue(252)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	
	Blue(252)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	
Blue(252)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1		

Note (1)0: Low Level Voltage, 1: High Level Voltage

**6. INTERFACE TIMING**

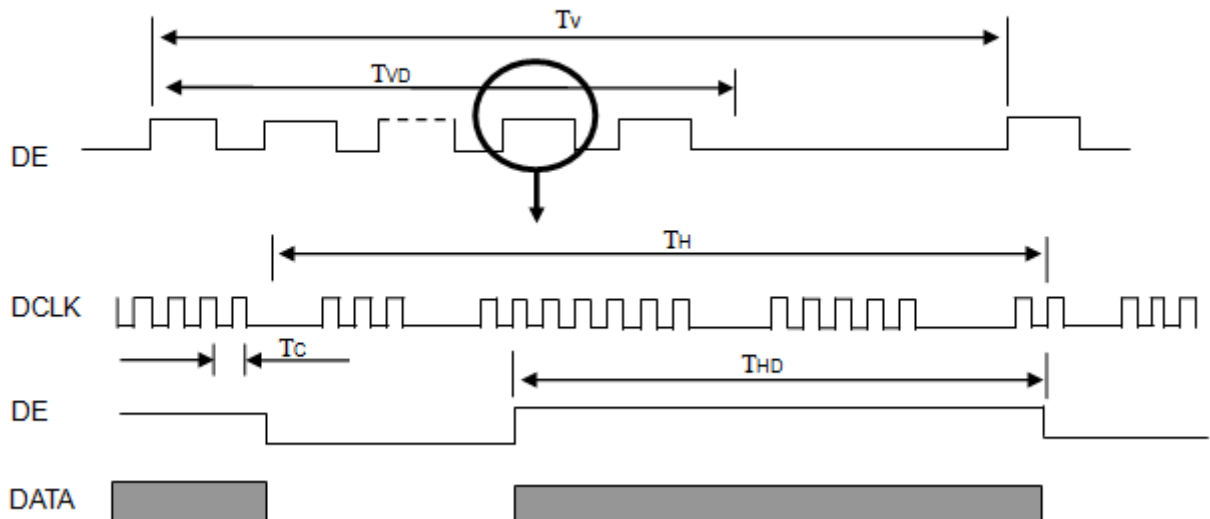
**6.1 INPUT SIGNAL TIMING SPECIFICATIONS**

The input signal timing specifications are shown as the following table and timing diagram.

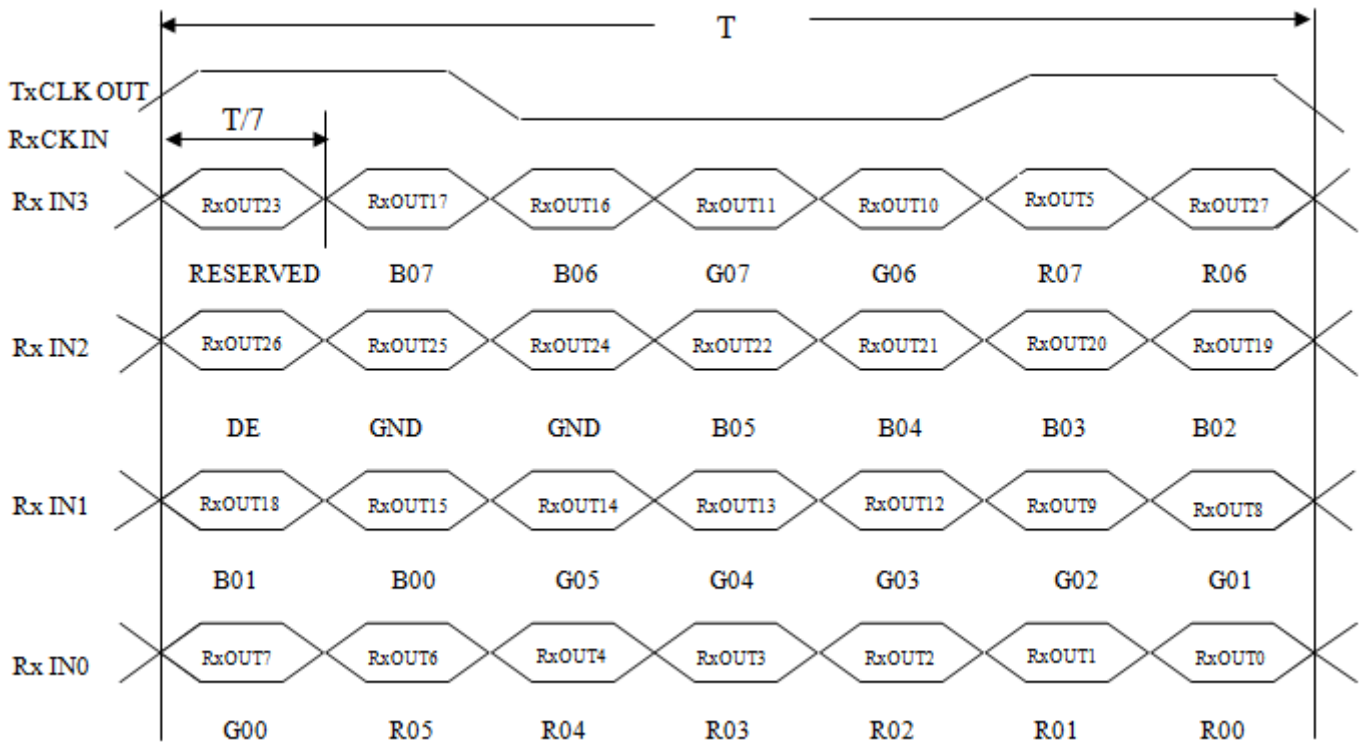
Signal	Item	Symbol	Min.	Typ.	Max.	Unit	Note
DCLK	Pixel Clock	$1/T_C$	60.40	71.1	74.7	MHz	-
DE	Vertical Total Time	$T_V$	810	823	829	$T_H$	-
	Vertical Address Time	$T_{VD}$	800	800	800	$T_H$	-
	Horizontal Total Time	$T_H$	1362	1440	1480	$T_C$	-
	Horizontal Address Time	$T_{HD}$	1280	1280	1280	$T_C$	-

Note (1) Because this module is operated by DE only mode, Hsync and Vsync input signals should be set to low logic level or ground. Otherwise, this module would operate abnormally.

**INPUT SIGNAL TIMING DIAGRAM**

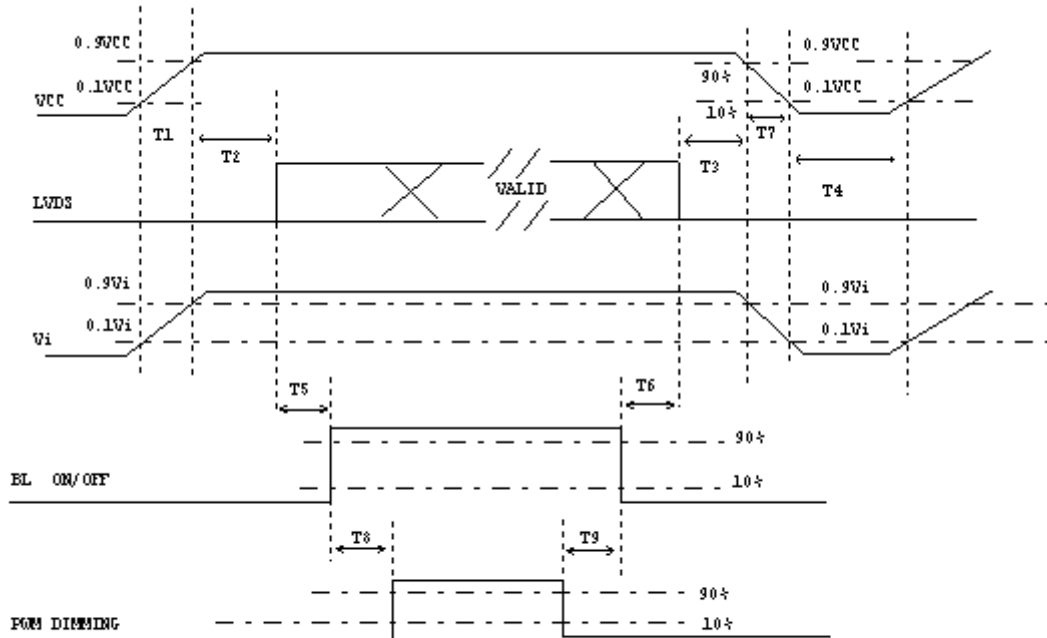


TIMING DIAGRAM of LVDS



**6.2 POWER ON/OFF SEQUENCE**

To prevent a latch-up or DC operation of LCD assembly, the power on/off sequence should be as the diagram below.



**Power ON/OFF sequence**

Note (1) Please avoid floating state of interface signal at invalid period.

Note (2) When the interface signal is invalid, be sure to pull down the power supply of LCD VCC to 0 V.

Note (3) The Backlight converter power must be turned on after the power supply for the logic and the interface signal is valid. The Backlight converter power must be turned off before the power supply for the logic and the interface signal is invalid.

Parameter	Value			Units
	Min	Typ	Max	
T1	0.5	-	10	ms
T2	0	-	50	ms
T3	0	-	50	ms
T4	500	-	-	ms
T5	200	-	-	ms
T6	200	-	-	ms
T7	5	-	300	ms
T8	10	-	-	ms
T9	10	-	-	ms



## 7. OPTICAL CHARACTERISTICS

### 7.1 TEST CONDITION

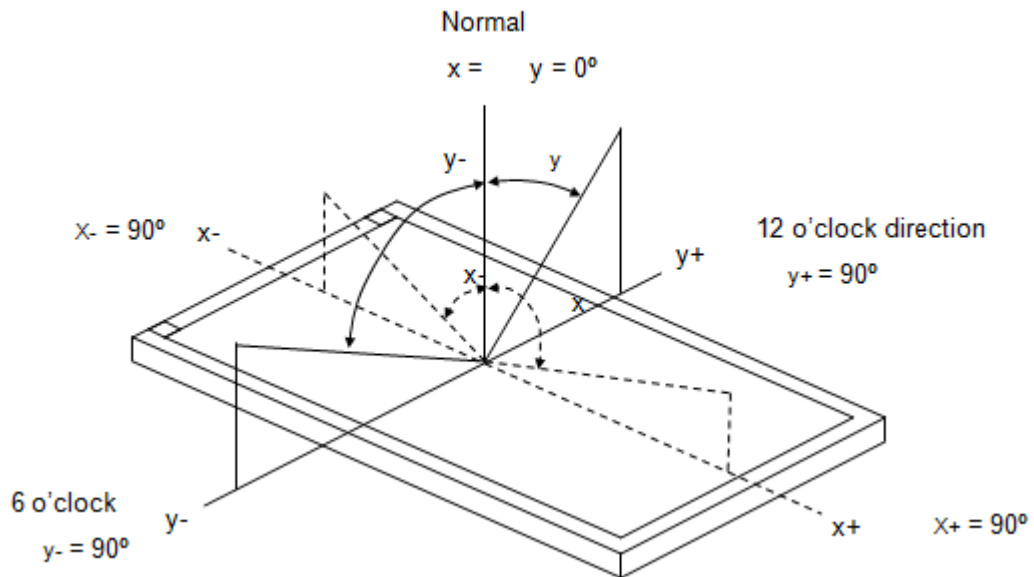
Item	Symbol	Value	Unit
Ambient Temperature	Ta	25±2	°C
Ambient Humidity	Ha	50±10	%RH
Supply Voltage	V <sub>CC</sub>	3.3	V
Input Signal	According to typical value in "3. ELECTRICAL CHARACTERISTICS"		
Converter Voltage	V <sub>i</sub>	12	V
Converter Duty		100%	

### 7.2 OPTICAL SPECIFICATION

The relative measurement methods of optical characteristics are shown in 7.2 and all items are measured at the center point of screen except white variation. The following items should be measured under the test conditions described in 7.1 and stable environment shown in Note (5).

Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Note	
Color Chromaticity	Red	$\theta_x=0^\circ, \theta_y=0^\circ$ CS-1000T	Typ - 0.05	0.592	Typ+ 0.05	-	(1), (5)	
				0.340				
	Green			0.316				
				0.591				
	Blue			0.154				
				0.123				
	White			0.313				
				0.329				
Center Luminance of White	L <sub>C</sub>		400	500		cd/m <sup>2</sup>	(4), (5)	
Contrast Ratio	CR		600	800		-	(2), (5)	
Response Time	T <sub>R</sub>	$\theta_x=0^\circ, \theta_y=0^\circ$	-	14	17	ms	(3)	
	T <sub>F</sub>			11	14			
White Variation	δW	$\theta_x=0^\circ, \theta_y=0^\circ$ USB2000	70	-	-	%	(5), (6)	
Viewing Angle	Horizontal	CR ≥ 10 USB2000	80	85	-	Deg.	(1), (5)	
				80	85			-
	Vertical			80	85			-
				80	85			-

Note (1) Definition of Viewing Angle ( $\theta_x, \theta_y$ ):



Note (2) Definition of Contrast Ratio (CR):

The contrast ratio can be calculated by the following expression.

$$\text{Contrast Ratio (CR)} = L_{252} / L_0$$

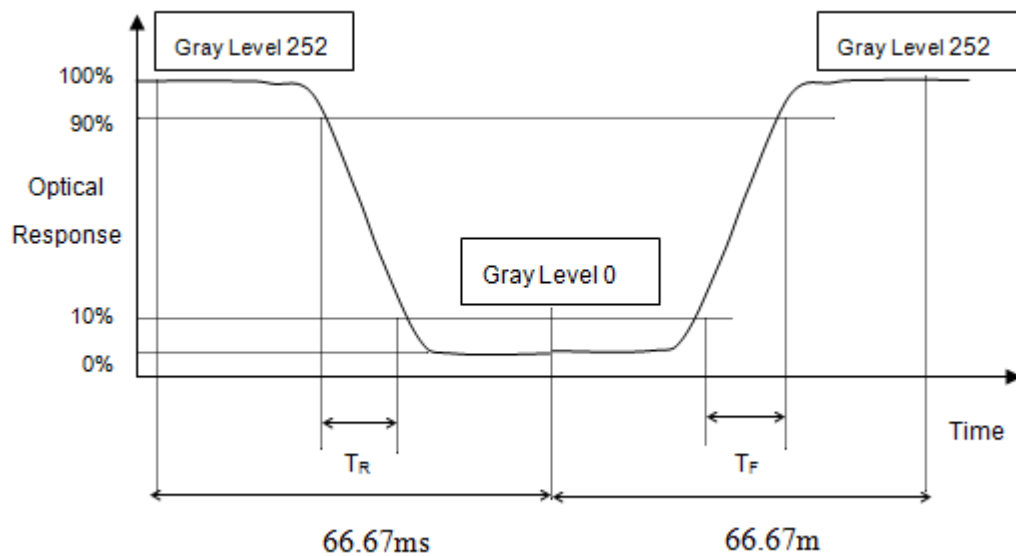
L<sub>252</sub>: Luminance of gray level 252

L<sub>0</sub>: Luminance of gray level 0

$$\text{CR} = \text{CR} (5)$$

CR (X) is corresponding to the Contrast Ratio of the point X at Figure in Note (6).

Note (3) Definition of Response Time ( $T_R, T_F$ ):



Note (4) Definition of Luminance of White ( $L_c$ ):

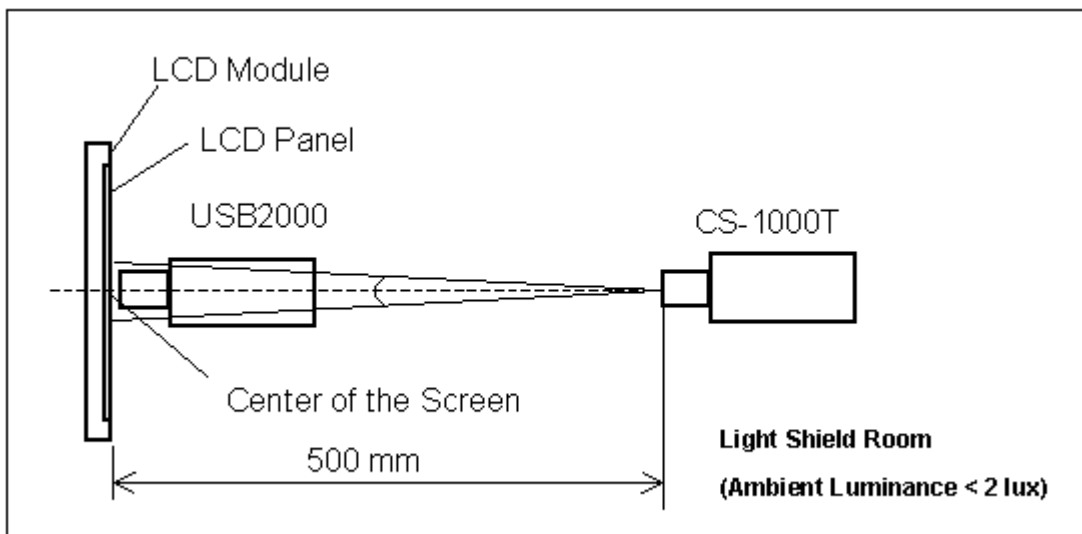
Measure the luminance of gray level 252 at center point

$$L_c = L(5)$$

$L(x)$  is corresponding to the luminance of the point X at Figure in Note (6).

Note (5) Measurement Setup:

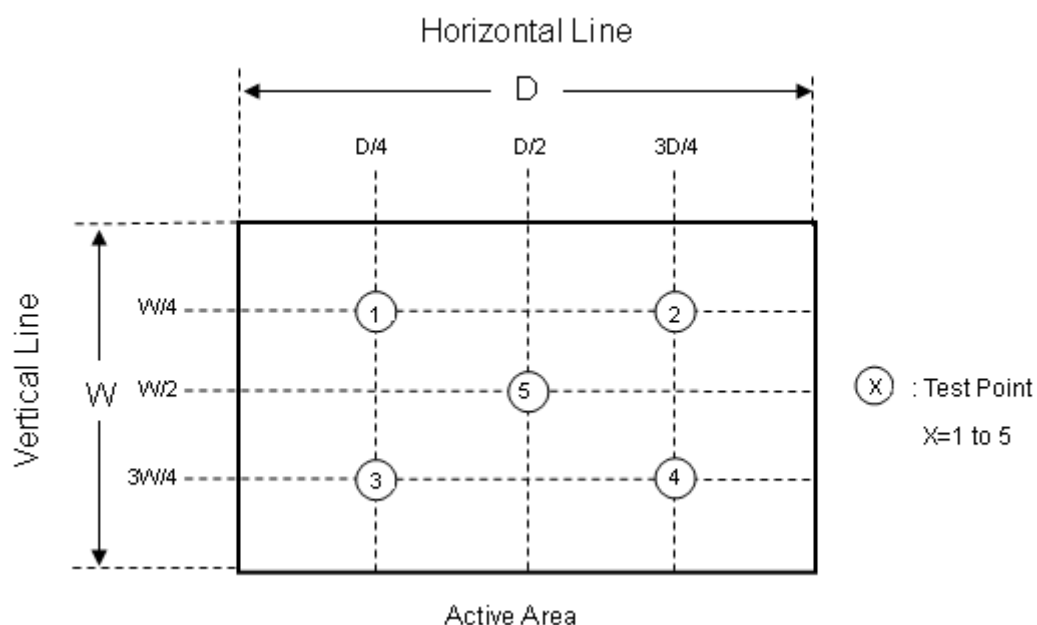
The LCD module should be stabilized at given temperature for 20 minutes to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting Backlight for 20 minutes in a windless room.



Note (6) Definition of White Variation ( $\delta W$ ):

Measure the luminance of gray level 252 at 5 points

$$W_{5p} = \{ \text{Minimum} [L(1) \sim L(5)] / \text{Maximum} [L(1) \sim L(5)] \} * 100\%$$



**8. RELIABILITY TEST CRITERIA**

Test Item	Test Condition	Note
High Temperature Storage Test	70°C, 240 hours	(1), (2) (4)
Low Temperature Storage Test	-25°C, 240 hours	
Thermal Shock Storage Test	-25°C, 0.5 hour ↔ 70°C, 0.5 hour; 100cycles, 1 hour/cycle)	
High Temperature Operation Test	65°C, 240 hours	
Low Temperature Operation Test	-20°C, 240 hours	
High Temperature & High Humidity Operation Test	60°C, RH 90%, 240 hours	
ESD Test (Operation)	150pF, 330Ω, 1 sec/cycle Condition 1 : panel contact, ±8 KV Condition 2 : panel non-contact ±15 KV	(1)
Shock (Non-Operating)	50G, 11ms, half sine wave, 1 time for ± X, ± Y, ± Z direction	(1), (3)
Vibration (Non-Operating)	1.5G, 10 ~ 300 Hz sine wave, 10 min/cycle, 3 cycles each X, Y, Z direction	(1), (3)

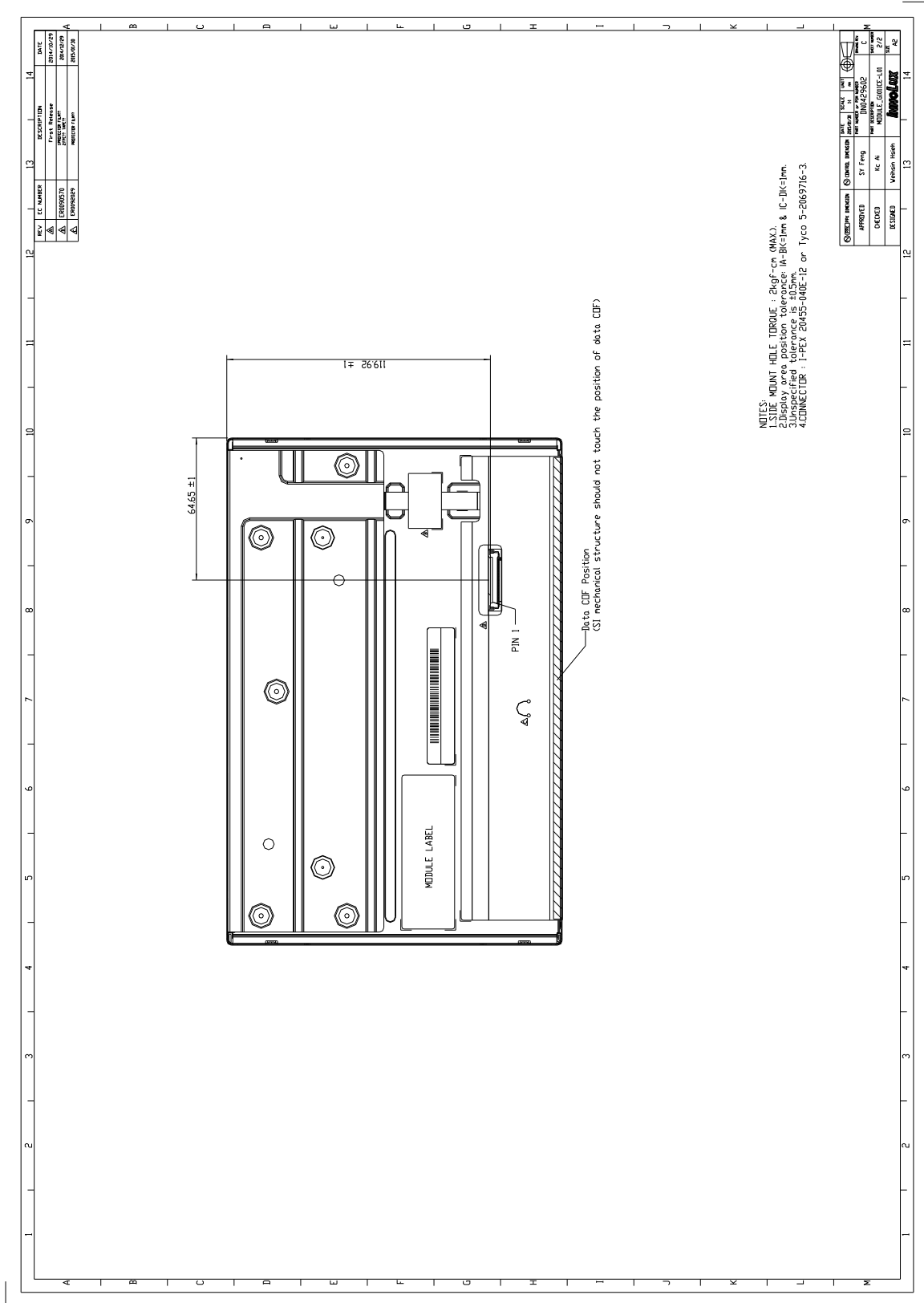
Note (1) No display malfunction.

Note (2) Judgment should be tested after storage at room temperature for more than two hour. All the cosmetic specification is judged before reliability test.

Note (3) At testing Vibration and Shock, the fixture in holding the module has to be hard and rigid enough so that the module would not be twisted or bent by the fixture.

Note (4) Temperature of panel display surface area should be 75°C Max.





NOTES:  
 1. SIDE MOUNT HOLE TORQUE : 2kgf-cm (MAX).  
 2. Display area position tolerance: A-B<=1mm & I-C<=1mm.  
 3. Unspecified tolerance is 0.10mm.  
 4. CONNECTOR : I-PEX ED45-040E-1E or Tyco 5-2069716-3.



**10.1" PCAP Solution  
12014890**

Date: 2/11/2019



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## 1 Scope

DATA MODUL's PCAP solution 12014890 consists of a 10.1" 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	10.1 inch /25.7 cm
Format	Wide
Composite	SITO with Tail
Outline dimensions	232.84 x 147.0 x 1.1 mm (WxHxT)
Active area	226 x 139 mm (WxH)
Bending radius of tail	R = 2 mm recommended
Transmissivity	90% (min.)
Haze	% (max.)
Operating temperature and humidity	-30 to +85°C, < 90% RH
Storage temperature and humidity	-40 to +95°C, < 80 % RH
Tail connector	OMRON XF2M-5515-1A

## 2.2 Reliability Tests

Low Temperature Storage Test	-40°C for 480h
High Temperature Storage Test	95°C for 480h
High Temperature / High Humidity Test	85°C, 85% RH for 480h
Cycle test	-40°C(30min), 85°C(30min), 500cycles

## 3 Recommended Touch Controller

The recommendation for this PCAP solution is a controller based on mXT640T. 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.

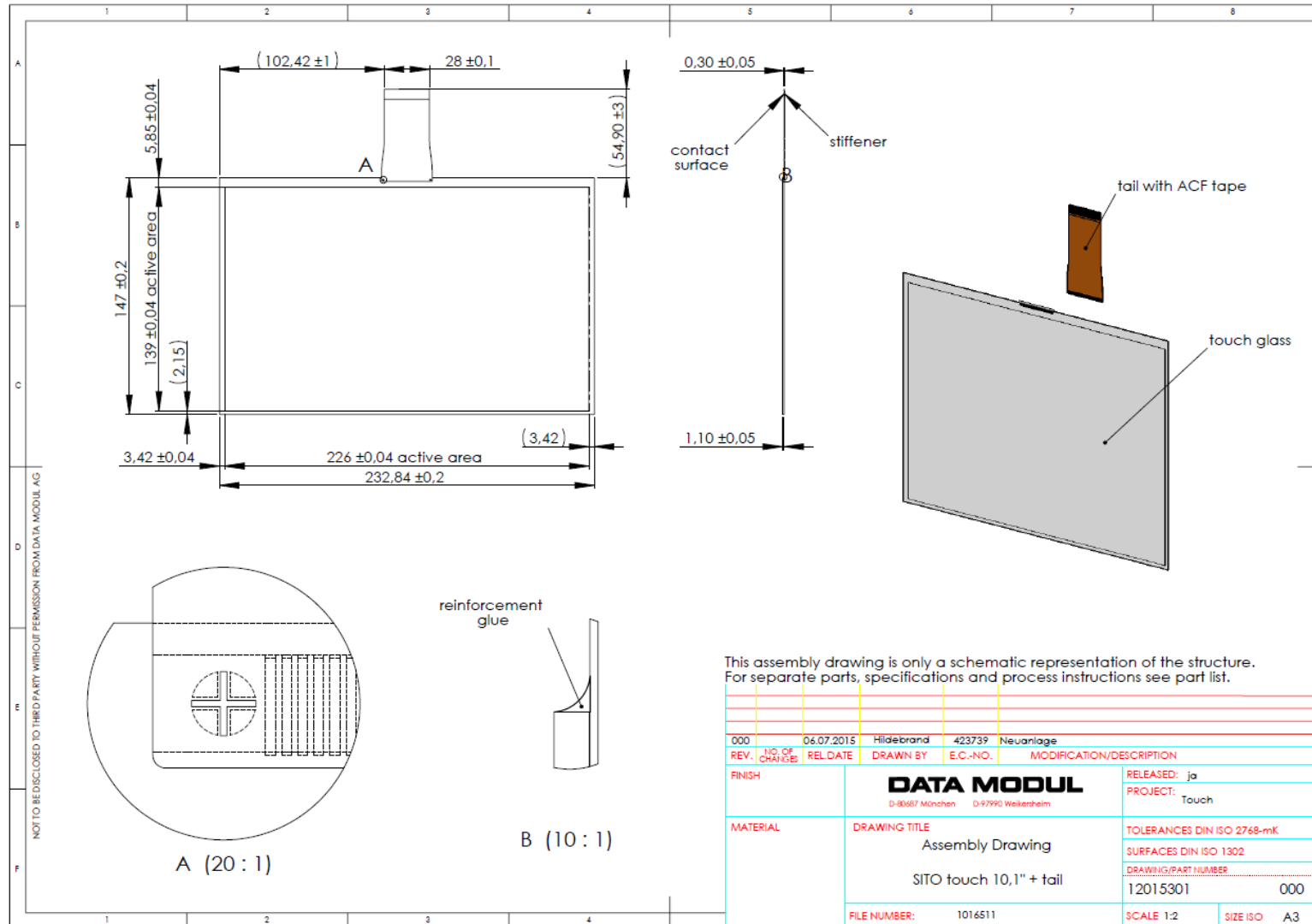
Precautions for mounting

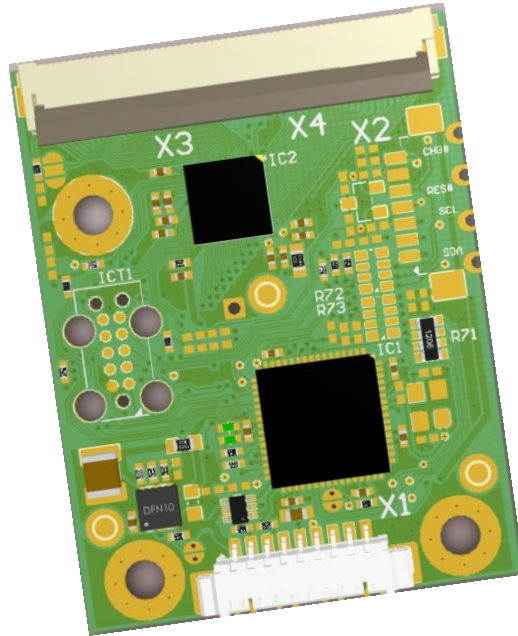
- The panel should be mounted using a configuration that either holds the panel by all four corners or by all four sides
- The bezel edge must be positioned outside the active area. The bezel may cause false activation if the edge overlaps the active area
- Any mounting configuration should ensure that 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 mXT640T PCAP USB controller

Revision: 002

Date: 2016-03-04

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# 1 Introduction

The easyTouch mXT640T 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. For the connection the customer can use the cable or connect the controller board via soldering pads on top of another PCB.

The controller is based on the Atmel maXTouch 640T which offers a very good touch performance and high noise resistance. To get the best touch performance with water and glove usage the mXT640T 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	33x43x4.5 mm
Operating temperature	-30 to +85 °C
Storage temperature	-30 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	10 fingers (max.)
Single touch	HID mouse with right mouse button emulation
Resolution	4096 x 4096 (x/y)
Report rate	350 Hz (max. subject to configuration)
USB connector	MOLEX 53261-0971 or equivalent

---

### 2.3 Electrical features

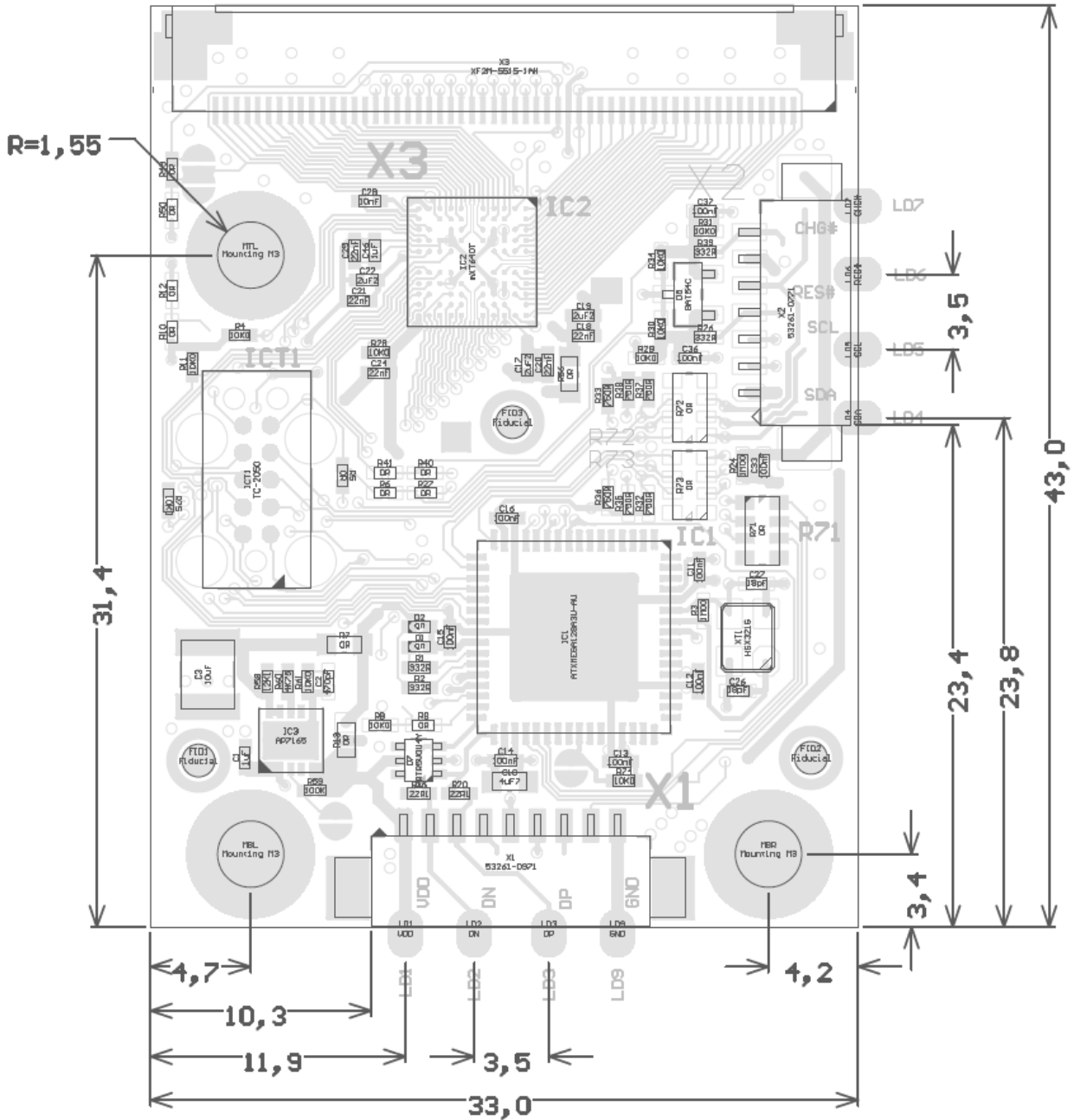
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Power supply	5 V± 5%
Vin ripple	±50 mV peak-peak (max.)
On board voltage	3.3 V and 6.6 V
Power consumption	200 mW (max. subject to configuration)

---



### 3 Mechanical drawing



Height: 4.5 mm (including components)

## 4 Connectors and signals

### 4.1 Connectors

Connector	Type	Connection
X1	1.25 mm pitch 9 pin header MOLEX 53261-0971	USB
X3	0.5 mm pitch 55 pin header	Flextail to touch sensor
Soldering pads LD1-9		Alternative connector of X1

### 4.2 X1 and soldering pads pin assignment

X1	Pad	Signal	Description
1	1	VDD_5V	USB power supply
2	2	USB DM	USB signal -
3	3	USB DP	USB signal +
4	4		Do not use
5	5		Do not use
6	6		Do not use
7	7		Do not use
8	-		Do not use
9	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	Molex 53261-xx71: E29179 or YeonHo 12505WR- xx: E108706
X3	0.5 mm pitch 55 pin header	Omron XF2M-xx15-1AH: LCP resin (UL94V-0)/natural LCP resin (UL94V-0)/black
PCB		Fuying: E315019

## 7 Appendix: Frequently asked questions

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

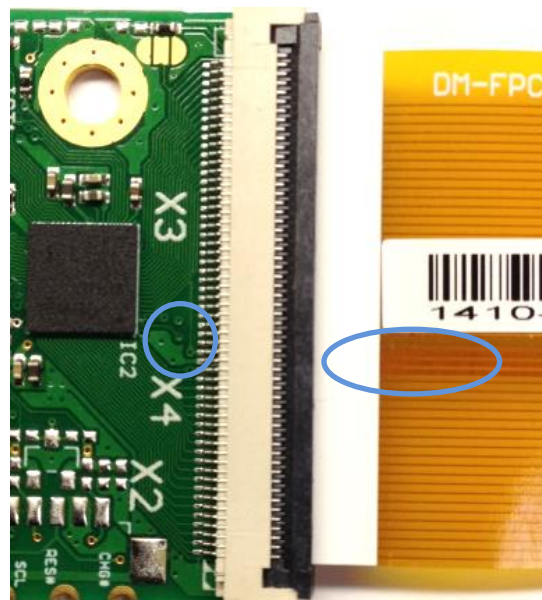
In mains-operated systems this can happen if the touch controller is missing the systems ground reference. Another reason can be an extreme amount of noise present that exceeds the touch threshold set in the controller.

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.

### Connecting is done, but no touch function at all?

If the tail is inserted “upside-down” you will not get any touch event. Please check if the tail is connected correctly. When connecting the touch panel to the controller, do not let the golden finger side misleading you. Always check the alignment of the three ground connections on the tail (marked blue in the following picture) to make sure the connection is correct. Please always connect the tail first before you connect to USB. You also should check if you touch the correct side of the panel.





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DATA MODUL AG  
Landsberger Straße 322 DE-  
80687 Munich  
Phone: +49-89-56017-0

DATA MODUL WEIKERSHEIM GMBH  
Lindenstraße 8  
DE-97990 Weikersheim Phone:  
+49-7934-101-0



More information and worldwide locations can be found at

[www.data-modul.com](http://www.data-modul.com)