DATA MODUL

SPECIFICATION

AUO

G084SN05 V9 with touch panel

8.4" TFT - SVGA – + resisitive TP

Version: 1.0
Date: 22.12.2017

Note: This specification is subject to change without prior notice

DATA MODUL

Display: AUO G084SN05 V9

Touch: DMC TP-3174S7F0
4-wire resistive Touch

Part-No: UP03100
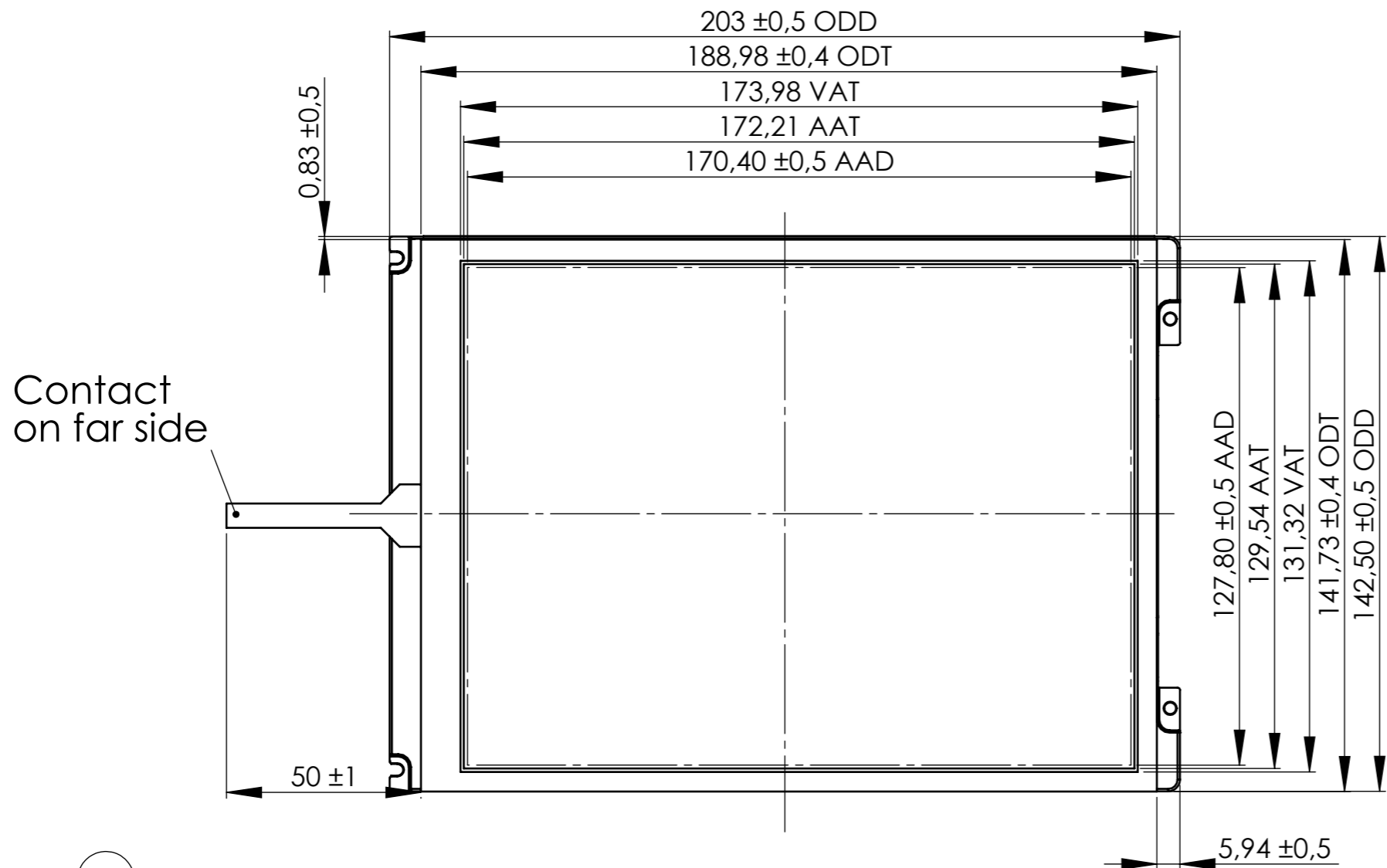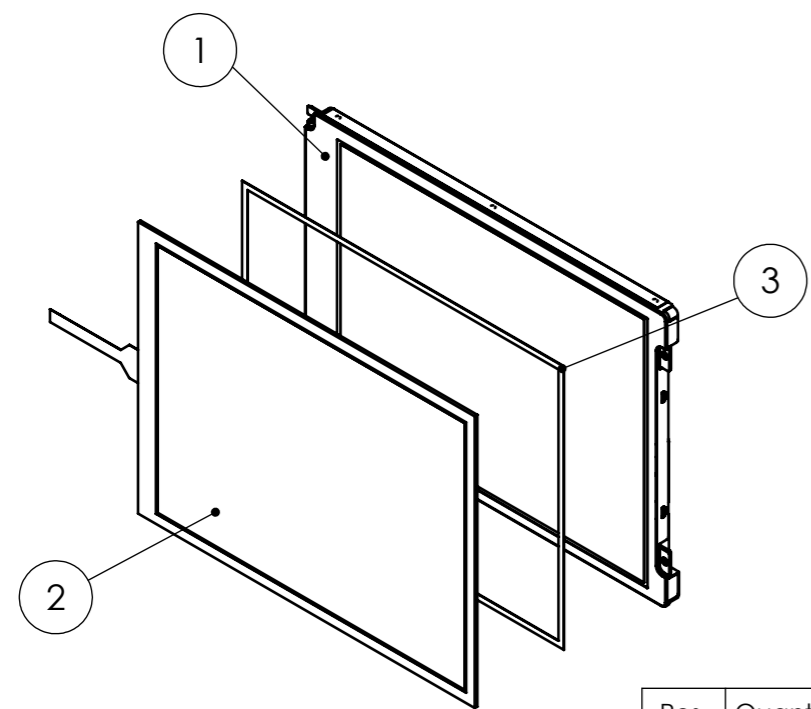
Content

- Mechanical Drawing
- Appendix A: Specification of TFT
- Appendix B: Specification of touch panel

Please be aware that some of the values e.g. optical, mechanical etc. of the complete unit might differ from the original values of the individual components

203 ±0,5 ODD
188,98 ±0,4 ODT
173,98 VAT
172,21 AAT
170,40 ±0,5 AAD

0,83 ±0,5

9,03 (max. 10,03)

Contact on far side

50 ±1

127,80 ±0,5 AAD
129,54 AAT
131,32 VAT
141,73 ±0,4 ODT
142,50 ±0,5 ODD

5,94 ±0,5

ODD	Outline Dimension Display
ODT	Outline Dimension Touch
VAT	Viewing Area Touch
AAT	Active Area Touch
AAD	Active Area Display

This drawing is only schematic representation of the structure.
The parts to be used are defined in the ProAlpha parts list.

M 1:3

Pos.	Quantity	File Number	Description
1	1	1009883-T	TFT-LCD MODULE 8,4"
2	1	1009865-T	Touch
3	1	1009953-T	Klebeband 3x0,13

REV.	NO. OF CHANGES	REL.DATE	DRAWN BY	E.C.-NO.	MODIFICATION/DESCRIPTION
000		26.02.2013	Aschenbrenner	10000	Neuanlage

FINISH

RELEASED: ja

CONRAC
D-97990 Weikersheim

DATA MODUL
D-80687 München

PROJECT: DMO_C_

MATERIAL

DRAWING TITLE

Assembly

TFT Display 8,4" + resistive Touch

TOLERANCES DIN ISO 2768-mK

SURFACES DIN ISO 1302

DRAWING/PART NUMBER

12002654   000

FILE NUMBER: 1009955

SCALE 1:1.5   SIZE ISO   A3

☐ **Preliminary Specifications**
■ **Final Specifications**

Module	8.4 Inch Color TFT-LCD
Model Name	G084SN05 V9

Customer	Date
Checked & Approved by	

Note: This Specification is subject to change without notice.

Approved by	Date
Leader Feng	2011/12/28
Prepared by	
Daniel PY Tsai	2011/12/28

General Display Business Division / AU Optronics corporation

G084SN05 V9 rev. 1.0

Contents

Record of Revision

Version and Date	Page	Old description	New Description
0.0 2011/04/07		First Edition	
0.1 2011.08/01	5		Update Input Voltage, Power Consumption, Weight
	6		Update Response Time
	11		Update Power Specification
	13		Update Parameter guideline for LED backlight
	20, 21		Update LED Connector, Cable Color
1.0 2011/12/28	6	White Luminance condition @ I_F= 80mA	White Luminance condition @ I_F= 50mA
	6	TBD	Update Optical Characteristics spec.
	13	TBD	Update Parameter guideline for LED backlight
	22, 23	LCM Front, Rear View	Update LCM Front, Rear View

G084SN05 V9 rev. 1.0

1. Operating Precautions

1) Since front polarizer is easily damaged, please be cautious 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 Discharde) 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 Reflector edge. Instead, press at the far ends of the LED Reflector 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) After installation of the TFT Module into an enclosure (Notebook PC Bezel, for example), do not twist nor bend the TFT Module even momentary. At designing the enclosure, it should be taken into consideration that no bending/twisting forces are applied to the TFT Module from outside.   Otherwise the TFT Module may be damaged.

12) Small amount of materials having no flammability grade is used in the LCD module. The LCD module should be supplied by power complied with requirements of Limited Power Source (IEC60950 or UL1950), or be applied exemption.

13) Severe temperature condition may result in different luminance, response time.

14) Continuous operating TFT-LCD Module under high temperature environment may accelerate LED light bar 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 is recommended to use screen saver or shuffle content periodically if fixed pattern is displayed on the screen.

2. General Description

This specification applies to the 8.4 inch color TFT LCD module G084SN05 V9.

G084SN05 V9 designed with wide viewing angle; wide operating temperature and long life LEDs backlight is well suited to be the display units for Industrial Applications.

LED driving board for backlight unit is included in this panel and the structure of the LED units is replaceable.

G084SN05 V9 is built in timing controller and LVDS interface.

The screen format is intended to support the SVGA (800(H) x 600(V)) screen and 16.2M (RGB 8-bits) or 262k colors (RGB 6-bits).

G084SN05 V9 is a RoHS product.

2.1 Display Characteristics

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

Items	Unit	Specifications
Screen Diagonal	[inch]	8.4 (213.4mm)
Active Area	[mm]	170.4(H) x 127.8(V)
Pixels H x V		800x3(RGB) x 600
Pixel Pitch	[mm]	0.213x 0.213
Pixel Arrangement		R.G.B. Vertical Stripe
Display Mode		TN, Normally White
Nominal Input Voltage VDD	[Volt]	3.3 (typ)
Typical Power Consumption	[Watt]	2.94 (typ)
Weight	[Grams]	250 (typ)
Physical Size	[mm]	203.0(W) x 142.5(H) x 8.0(D) (typ.)
Electrical Interface		1 channel LVDS
Surface Treatment		Anti-glare, Hardness 3H
Support Color		262K(6-bit) / 16.2M(8-bit)

Temperature Range
    Operating
    Storage (Non-Operating)
	[°C]
	[°C]
		-30 to +85 (panel surface temperature)
		-30 to +85

RoHS Compliance		RoHS Compliance

2.2 Optical Characteristics

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

| Item	Unit	Conditions	Min.	Typ.	Max.	Note
White Luminance	[cd/m2]	I_F= 50mA (center point)	350	450	-	1
Uniformity	%	9 Points	70	75	-	1, 2, 3
Contrast Ratio			400	600	-	4
Response Time	[msec]	Rising	-	20	30	5
	[msec]	Falling	-	10	20	
	[msec]	Raising + Falling	-	30	50	
Viewing Angle	[degree] [degree]	Horizontal (Right) CR $\geq$ 10 (Left)	70 70	80 80	- -	6
	[degree] [degree]	Vertical (Upper) CR $\geq$ 10 (Lower)	65 50	80 60	- -	
Color / Chromaticity Coordinates (CIE 1931)		Red x	0.559	0.609	0.659	1
		Red y	0.283	0.333	0.383	
		Green x	0.315	0.365	0.415	
		Green y	0.520	0.570	0.620	
		Blue x	0.101	0.151	0.201	
		Blue y	0.056	0.106	0.156	
		White x	0.26	0.31	0.36	
		White y	0.28	0.33	0.38	
Color Gamut	%			45	-	1

Note 1: Measurement method

Equipment : Pattern Generator, Power Supply, Digital Voltmeter, Luminance meter (SR_3 or equivalent)

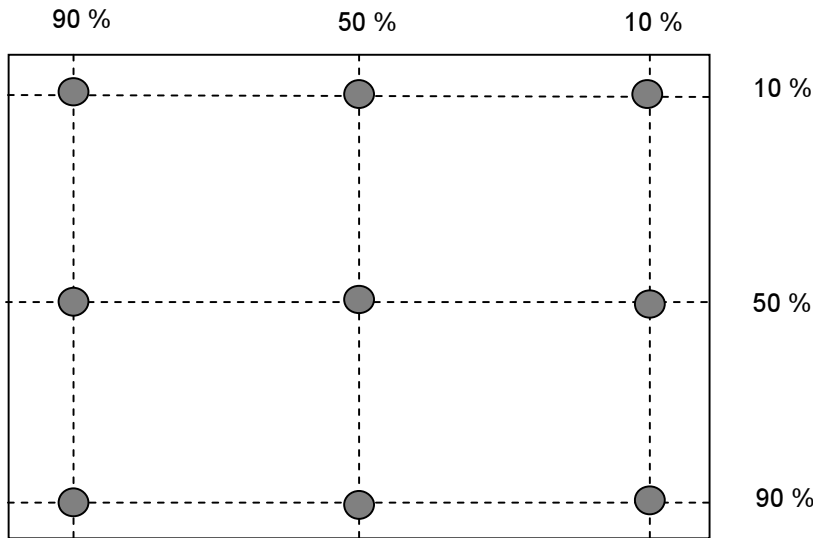Aperture   1° with 50cm viewing distance

Test Point   Center

Environment   < 1 lux

LCD Module

SR_3 or equivalent

Measuring distance

Module Driving Equipment
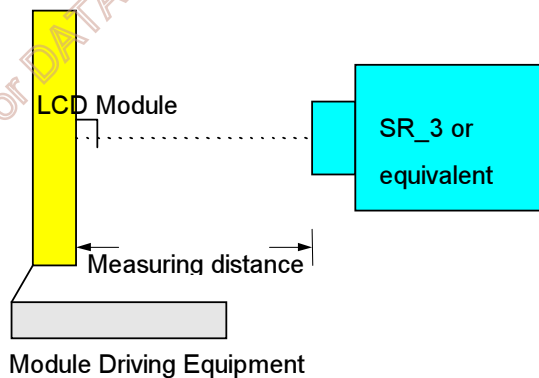
Note 2: Definition of 9 points position (Display active area : 170.4(H) x 127.8(V))

Note 3: The luminance uniformity of 9 points is defined by dividing the minimum luminance value by the maximum test point luminance

$$\delta_{W9} = \frac{\text{Minimum Brightness of nine points}}{\text{Maximum Brightness of nine points}}$$

Note 4： Definition of contrast ratio (CR):

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

Note 5: Definition of response time:

The output signals of photo detector are measured when the input signals are changed from "White" to "Black" (falling time) and from "Black" to "White" (rising time), respectively. The response time interval is between 10% and 90% of amplitudes. Please refer to the figure as below.

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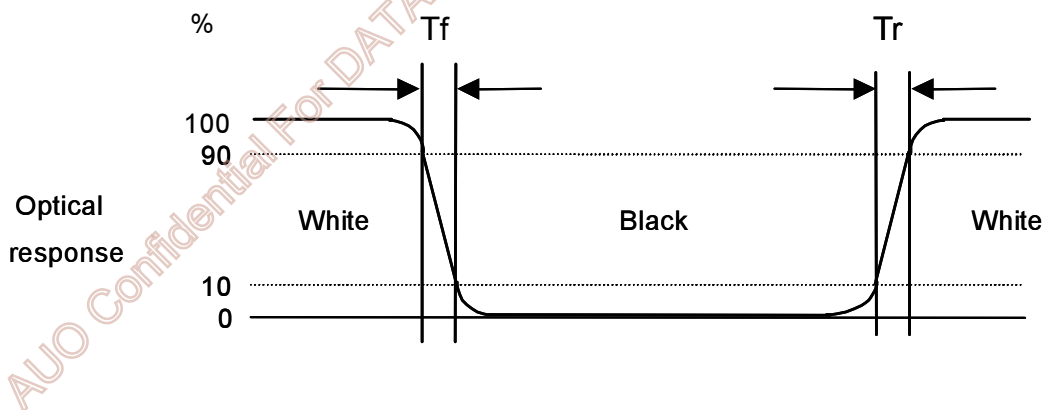
Note 6: Definition of viewing angle

Viewing angle is the measurement of contrast ratio $\geq$ 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 below: 90° (θ) horizontal left and right, and 90° (Φ) vertical high (up) and low (down). The measurement direction is typically perpendicular to the display surface with the screen rotated to its center to develop the desired measurement viewing angle.
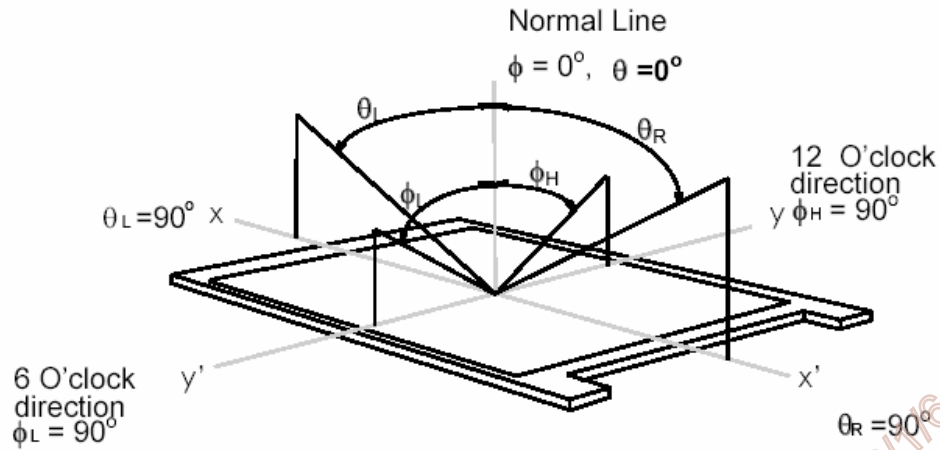
3. Functional Block Diagram

The following diagram shows the functional block of the 8.4 inch color TFT/LCD module:
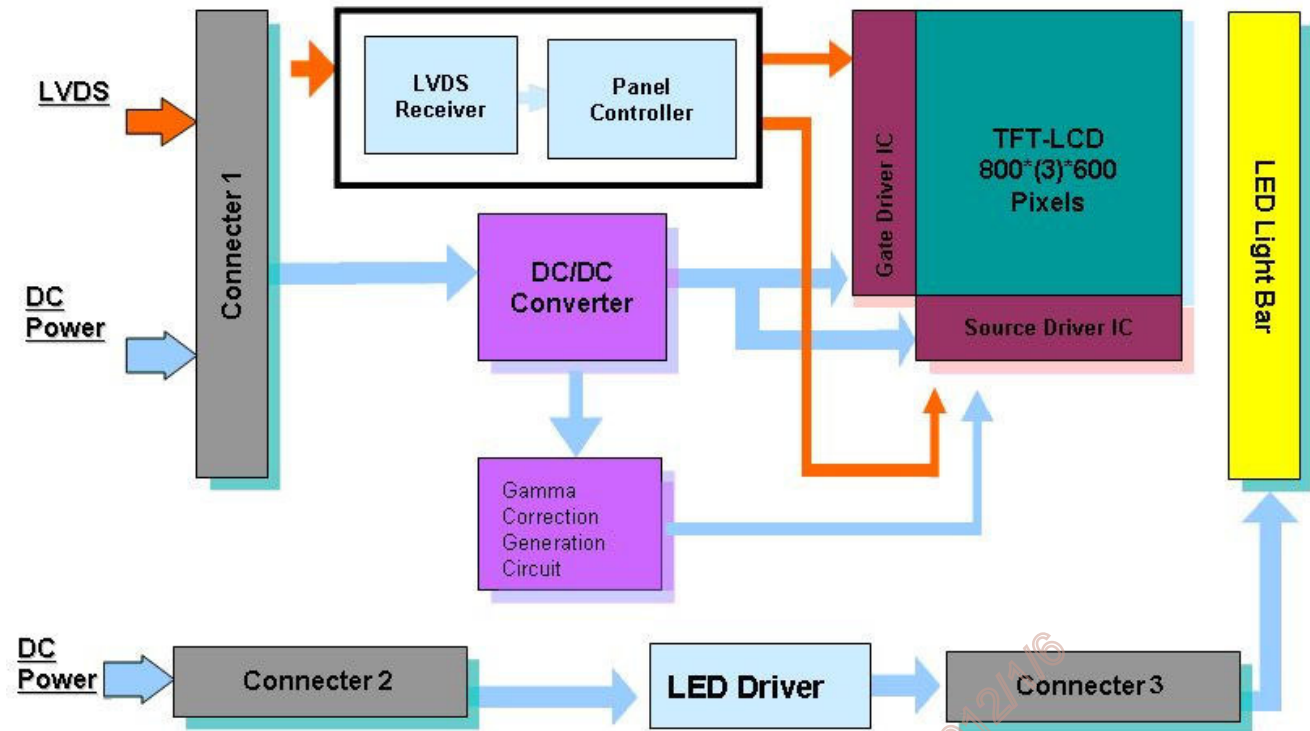
4. Absolute Maximum Ratings

4.1 Absolute Ratings of TFT LCD Module

Item	Symbol	Min	Max	Unit	Conditions
Logic/LCD Drive Voltage	VDD	-0.3	+3.6	[Volt]	

4.2 Absolute Ratings of Environment

Item	Symbol	Min	Max	Unit
Operating Temperature	TOP	-30	+85	[$^{\circ}$C]
Operation Humidity	HOP	5	90	[%RH]
Storage Temperature	TST	-30	+85	[$^{\circ}$C]
Storage Humidity	HST	5	90	[%RH]

Note: Maximum Wet-Bulb should be 390C and no condensation.
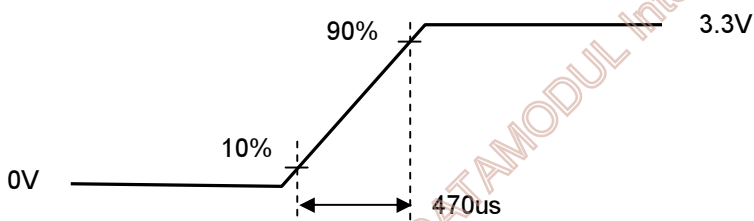
Data Modul AG   -   www.data-modul.com

5. Electrical Characteristics

5.1 TFT LCD Module

5.1.1 Power Specification

Symbol	Parameter	Min	Typ	Max	Units	Remark
VDD	Logic/LCD Drive Voltage	3.0	3.3	3.6	[Volt]	±10%
I$_{VDD}$	VDD Current	-	270	330	[mA]	64 Gray Bar Pattern (VDD=3.3V, at 60Hz)
P$_{VDD}$	VDD Power	-	0.9	1.2	[Watt]	64 Gray Bar Pattern (VDD=3.3V, at 60Hz)

Note 1: Measurement condition:
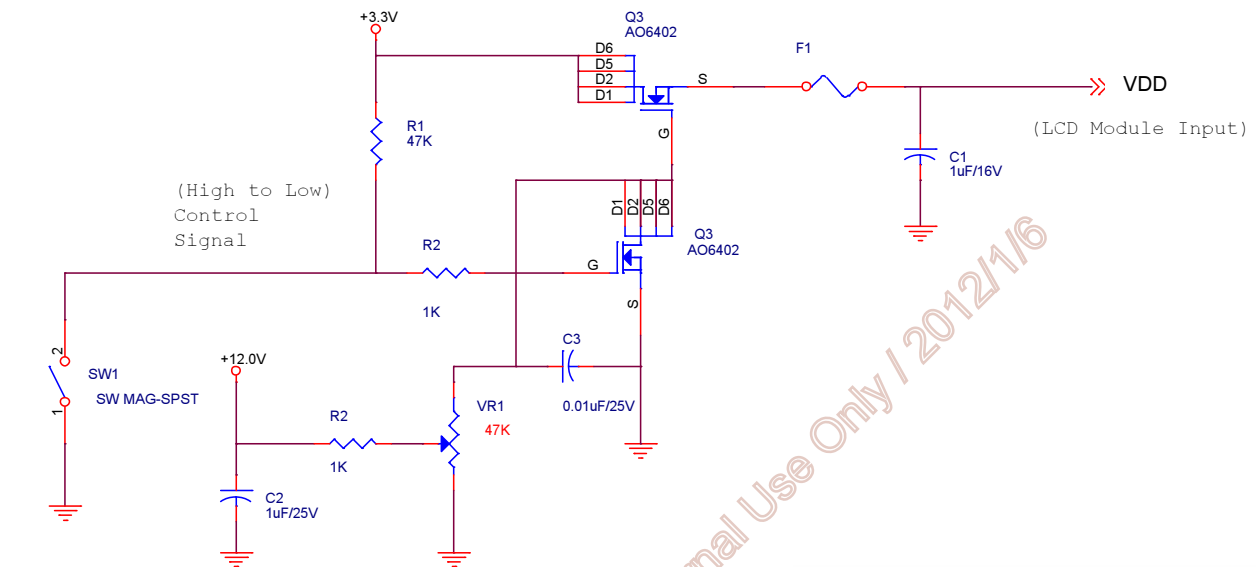
VDD rising time

64 Gray pattern

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5.1.2 Signal Electrical Characteristics

Input signals shall be low or Hi-Z state when VDD is off.

Symbol	Item	Min.	Typ.	Max.	Unit	Remark
VTH	Differential Input High Threshold	-	-	100	[mV]	VICM=1.2V
VTL	Differential Input Low Threshold	-100	-	-	[mV]	VICM=1.2V
│ VID │	Input Differential Voltage	100	400	600	[mV]	
VICM	Differential Input Common Mode Voltage	1.1		1.6	[V]	VTH/VTL=±100mV

Note: LVDS Signal Waveform.
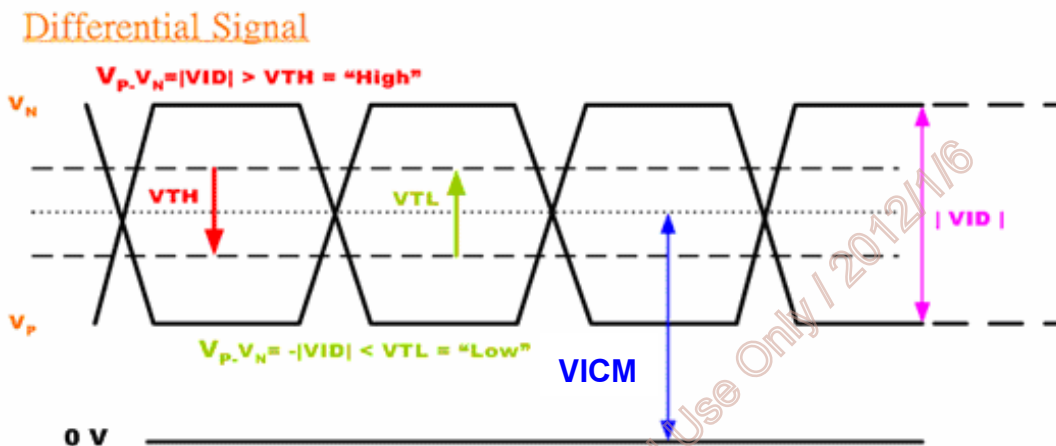
5.2 Backlight Unit

5.2.1 Parameter guideline for LED backlight

Following characteristics are measured under a stable condition using an inverter at 250C (Room Temperature):

Symbol	Parameter	Min.	Typ.	Max.	Unit	Remark
VCC	Input Voltage	10.8	12	12.6	[Volt]	
I$_{VCC}$	Input Current	-	0.17	-	[A]	100% PWM Duty
P$_{VCC}$	Power Consumption	-	2.04	2.14	[Watt]	100% PWM Duty
F$_{PWM}$	Dimming Frequency	200	-	20K	[Hz]	
	Swing Voltage	3	3.3	5.5	V	
	Dimming Duty Cycle	5	-	100	%	
I$_F$	LED Forward Current	-	50	52.5	mA	Ta = 25°C
V$_F$	LED Forward Voltage	-	21		Volt	I$_F$ = 50mA, Ta = -30°C
			19.2	21.9	Volt	I$_F$ = 50mA, Ta = 25°C
			18.3			I$_F$ = 50mA, Ta = 85°C
P$_{LED}$	LED Power Consumption	-	1.92	-	Watt	I$_F$ = 50mA, Ta = 25°C (total power)
Operation Lifetime		50,000			Hrs	I$_F$ = 50mA, Ta = 25°C

Note 1: Ta means ambient temperature of TFT-LCD module.

Note 2: VCC, Ivcc, P$_{VCC}$, are defined for LED B/L.(100% duty of PWM dimming)

Note 3: I$_F$, V$_F$ are defined for each channel of LED Light Bar. There are two LED channels (AN1-CA1-CA2) in back light unit.

Note 4: If G084SN05 V9 module is driven by high current or at high ambient temperature & humidity condition. The operating life will be reduced.

Note 5: Operating life means brightness goes down to 50% initial brightness. Minimum operating life time is estimated data.
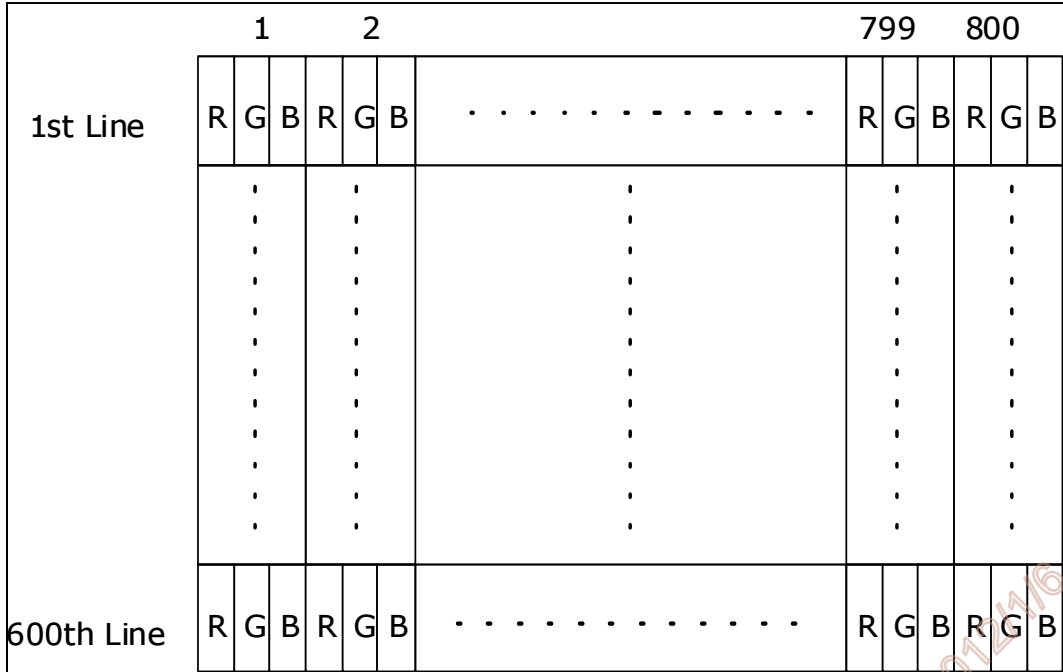
6. Signal Characteristic

6.1 Pixel Format Image

Following figure shows the relationship between input signal and LCD pixel format.

6.2 Signal Description

LVDS is a differential signal technology for LCD interface and high speed data transfer device. The connector pin definition is as below.

Pin No.	Symbol	Description
1	VDD	Power Supply, 3.3V (typical)
2	VDD	Power Supply, 3.3V (typical)
3	UD	Vertical Reverse Scan Control, When UD=Low or NC → Normal Mode. When UD=High → Vertical Reverse Scan. Note
4	LR	Horizontal Reverse Scan Control, When LR=Low or NC → Normal Mode. When LR=High → Horizontal Reverse Scan. Note
5	RxIN1-	LVDS differential data input Pair 0
6	RxIN1+	
7	GND	Ground
8	RxIN2-	LVDS differential data input Pair 1
9	RxIN2+	
10	GND	Ground
11	RxIN3-	LVDS differential data input Pair 2
12	RxIN3+	
13	GND	Ground
14	RxCLKIN-	LVDS differential Clock input Pair
15	RxCLKIN+	
16	GND	Ground
17	SEL 68	LVDS 6/8 bit select function control, Low or NC → 6 Bit Input Mode. High → 8 Bit Input Mode. Note
18	NC	NC
19	RxIN4-	LVDS differential data input Pair 3. Must be set to **NC** in 6 bit input mode.
20	RxIN4+	

Note : "Low" stands for 0V. "High" stands for 3.3V. "NC" stands for "No Connected."

6.3 Scanning Direction

The following figures show the image seen from the front view. The arrow indicates the direction of scan.
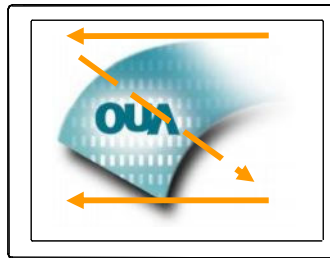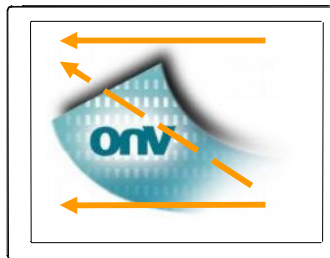

Fig. 1

Fig. 2

Fig. 3

Fig. 4

Fig. 1 Normal scan (Pin3, UD = Low or NC ; Pin4, RL = Low or NC)

Fig. 2 Reverse scan (Pin3, UD = Low or NC ; Pin4, RL = High)

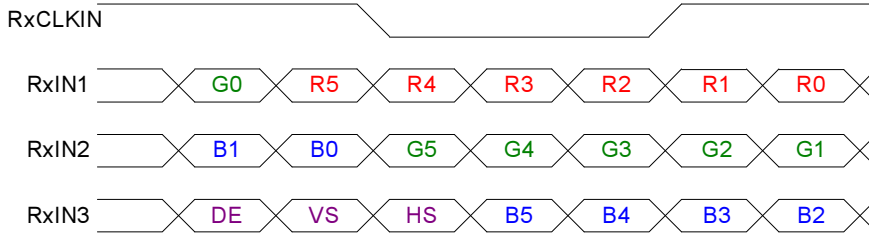Fig. 3 Reverse scan (Pin3, UD = High ; Pin4, RL = Low or NC)

Fig. 4 Reverse scan (Pin3, UD = High ; Pin4, RL = High)

6.4 The Input Data Format

6.4.1 SEL68

SEL68 = "Low" or "NC" for 6 bits LVDS Input

RxCLKIN								
RxIN1	G0	R5	R4	R3	R2	R1	R0	
RxIN2	B1	B0	G5	G4	G3	G2	G1	
RxIN3	DE	VS	HS	B5	B4	B3	B2	

SEL68 = "High" for 8 bits LVDS Input

RxCLKIN								
RxIN1	G0	R5	R4	R3	R2	R1	R0	
RxIN2	B1	B0	G5	G4	G3	G2	G1	
RxIN3	DE	VS	HS	B5	B4	B3	B2	
RxIN4	RSV	B7	B6	G7	G6	R7	R6	
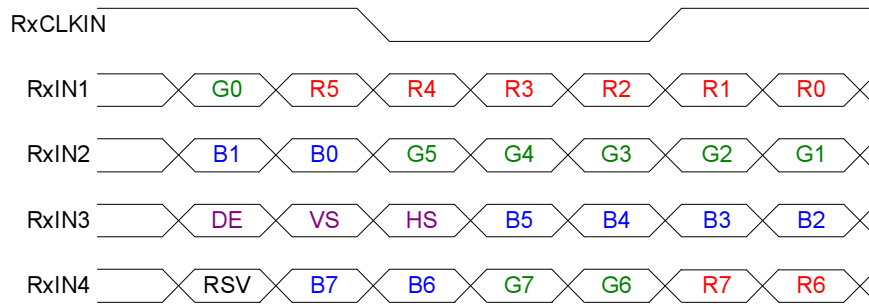
Note1: Please follow PSWG.

Note2: R/G/B data 7:MSB, R/G/B data 0:LSB

Signal Name	Description	Remark
R7	Red Data 7 (MSB)	Red-pixel Data
R6	Red Data 6	Each red pixel's brightness data consists of these
R5	Red Data 5	8 bits pixel data.
R4	Red Data 4	
R3	Red Data 3	
R2	Red Data 2	
R1	Red Data 1	
R0	Red Data 0 (LSB)	
G7	Green Data 7 (MSB)	Green-pixel Data
G6	GreenData 6	Each green pixel's brightness data consists of these
G5	GreenData 5	8 bits pixel data.
G4	GreenData 4	
G3	GreenData 3	
G2	GreenData 2	
G1	GreenData 1	
G0	GreenData 0 (LSB)	
B7	Blue Data 7 (MSB)	Blue-pixel Data
B6	Blue Data 6	Each blue pixel's brightness data consists of these
B5	Blue Data 5	8 bits pixel data.
B4	Blue Data 4	
B3	Blue Data 3	
B2	Blue Data 2	
B1	Blue Data 1	
B0	Blue Data 0 (LSB)	
RxCLKIN+ RxCLKIN-	LVDS Clock Input	
DE	Display Enable	
VS	Vertical Sync	
HS	Horizontal Sync	

Note: Output signals from any system shall be low or Hi-Z state when VDD is off.

6.5 Interface Timing

6.5.1 Timing Characteristics

DE mode only

| Parameter		Symbol	Min.	Typ.	Max.	Unit	Condition
Clock frequency		1/ T$_{Clock}$	33.6	39.8	48.3	MHz	
Vertical Section	Period	T$_V$	608	628	650	T$_H$	
	Active	T$_{VD}$	600	600	600		
	Blanking	T$_{VB}$	8	28	50		
Horizontal Section	Period	T$_H$	920	1056	1240	T$_{Clock}$	
	Active	T$_{HD}$	800	800	800		
	Blanking	T$_{HB}$	120	256	440		

Note: Frame rate is 60 Hz.
Note: DE mode.

6.5.2 Input Timing Diagram
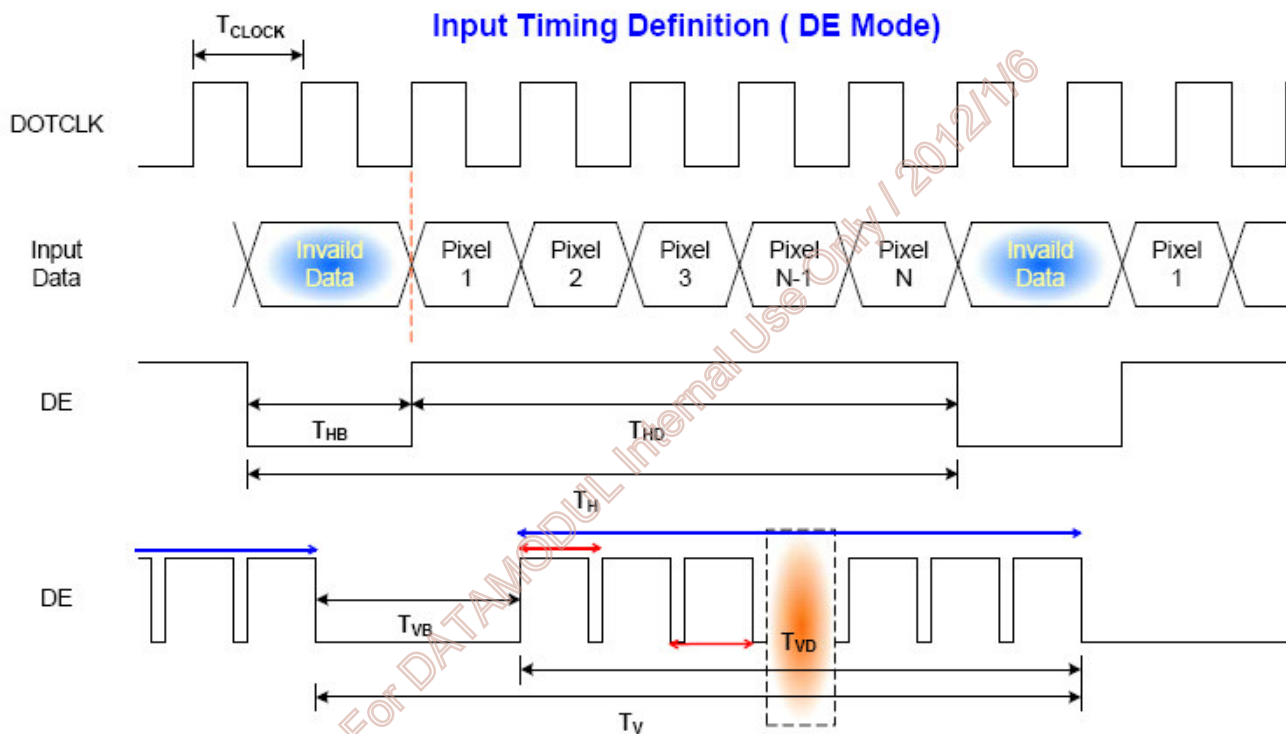
6.6 Power ON/OFF Sequence

VDD power and BackLight 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.
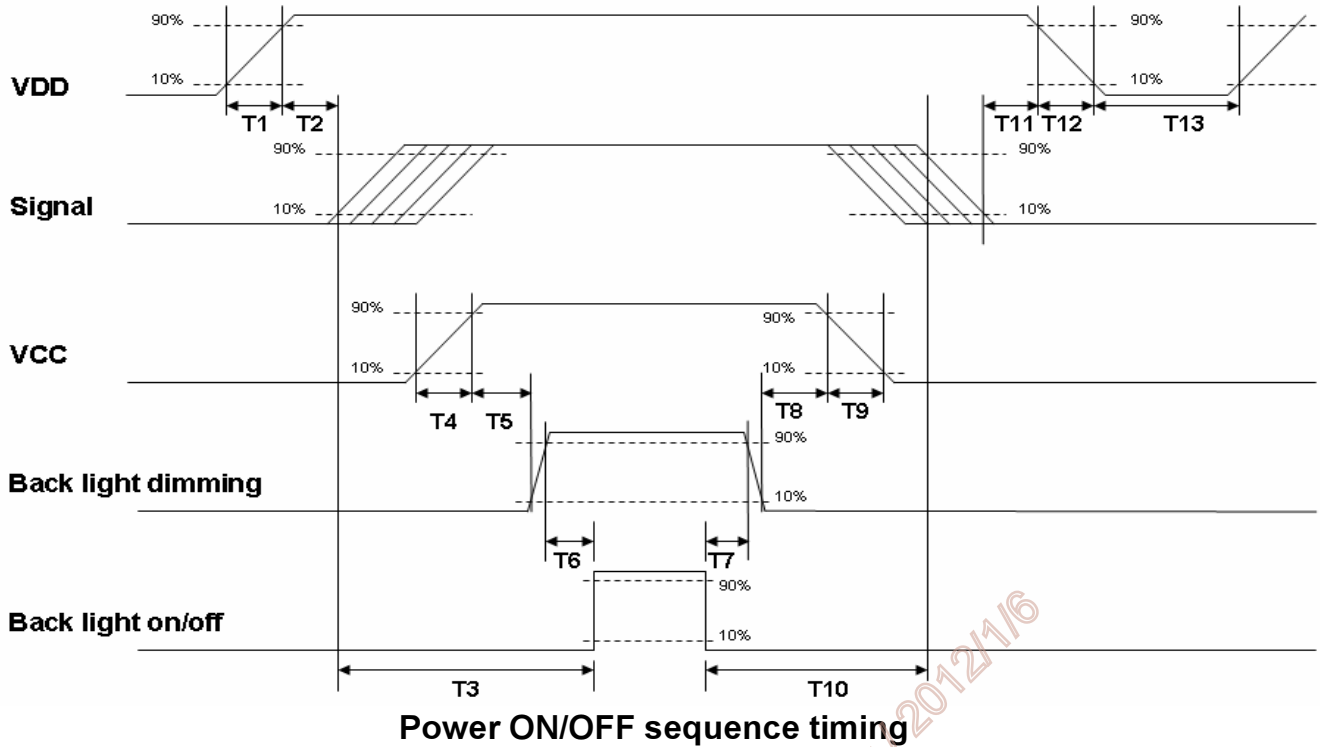
Power ON/OFF sequence timing

Parameter	Value			Units
	Min.	Typ.	Max.	
T1	0.5	--	10	[ms]
T2	30	40	50	[ms]
T3	200	--	--	[ms]
T4	0.5	--	10	[ms]
T5	10	--	--	[ms]
T6	10	--	--	[ms]
T7	0	--	--	[ms]
T8	10	--	--	[ms]
T9	--	--	10	[ms]
T10	110	--	--	[ms]
T11	0	16	50	[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.

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 Signal (CN1): LVDS Connector

Connector Name / Designation	Signal Connector
Manufacturer	STM, Hirose or compatible
Connector Model Number	STM -MSB24013P20HA, Hirose- DF19LA-20P-1H or compatible
Mating Model Number	STM-P24013P20, Hirose-DF19-20S-1C or compatible

Pin No.	Signal Name	Pin No.	Signal Name
1	VDD	2	VDD
3	UD	4	LR
5	RxIN1-	6	RxIN1+
7	GND	8	RxIN2-
9	RxIN2+	10	GND
11	RxIN3-	12	RxIN3+
13	GND	14	RxCKIN-
15	RxCKIN+	16	GND
17	SEL 68	18	NC
19	RxIN4-	20	RxIN4+

7.2 LED Backlight Unit (CN2): LED Driver Connector

Connector Name / Designation	LED Connector
Manufacturer	ENTERY
Connector Model Number	ENTERY 3808K-F04N-02R or compatible
Mating Model Number	ENTERY H208K-P04N-02B or compatible.

Pin #	Symbol	Pin Description
1	VCC	12V input
2	GND	GND
3	Display_ON/OFF	+5.0V or +3.3 V:ON, 0V:OFF
4	Dimming	PWM

7.3 LED Light Bar Input Connector (CN3):

Manufacturer	ENTERY
Connector Model Number	ENTERY 3800K-F03N-03 or compatible
Mating Connecter Model Number	ENTERY H203K-D03N-04B or compatible

Pin #	Symbol	Pin Description
1	AN1	LED anode
2	CA1	LED cathode
3	CA2	LED cathode

Pin #	Symbol	Cable color
1	AN1	Red
2	CA1	Black
3	CA2	Black

8. Reliability Test Criteria

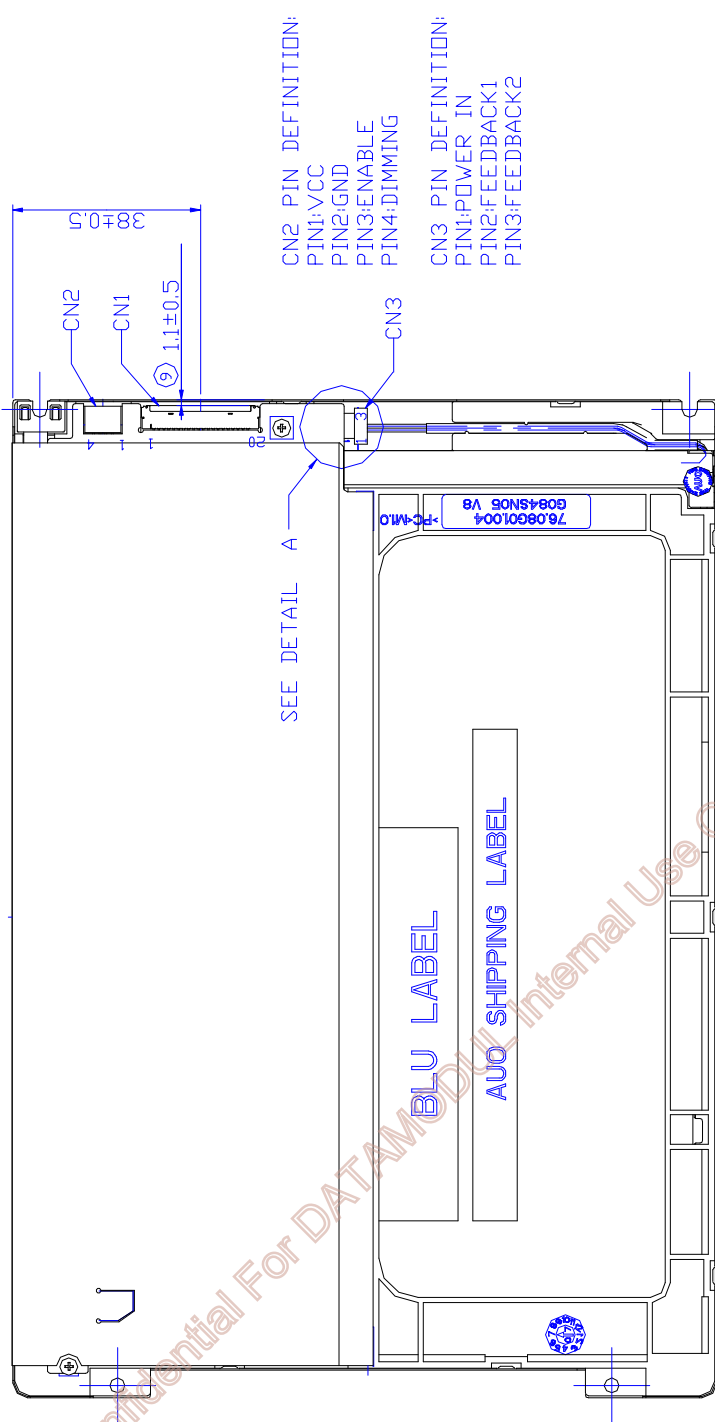| Items	Required Condition	Note
Temperature Humidity Bias	40^0C/90%,300 hours	
High Temperature Operation	85^0C,300 hours	
Low Temperature Operation	-30^0C,300 hours	
Hot Storage	85^0C,300 hours	
Cold Storage	-30^0C,300 hours	
Thermal Shock Test	-20^0C/30 min ,600C/30 min ,100cycles	
Shock Test (Non-Operating)	50G,20ms,Half-sine wave,(±X, ±Y, ±Z)	
Vibration Test (Non-Operating)	1.5G, (10~200Hz, P-P) 30 mins/axis (X, Y, Z)	
On/off test	On/10 sec, Off/10 sec, 30,000 cycles	
ESD	Contact Discharge: ± 8KV, 150pF(330Ω) 1sec, 8 points, 25 times/ point Air Discharge: ± 15KV, 150pF(330Ω) 1sec, 8 points, 25 times/ point	Note 1

Note1: According to EN61000-4-2, ESD class B: Some performance degradation allowed. No data lost

. Self-recoverable. No hardware failures.

G084SN05 V9

# 9. Mechanical Characteristics

9.1 LCM Front View

① 203±0.5(OUTLINE AREA)
② 198.5±0.5(USER HOLE)
③ 174.15±0.3(BEZEL OPENING)
④ 170.4±0.5(ACTIVE AREA)

⑤ 142.5±0.5(OUTLINE AREA)
⑥ 131.5±0.5(USER HOLE)
⑦ 131.2±0.3(BEZEL OPENING)
⑧ 127.8±0.5(ACTIVE AREA)

8.4" SVGA(800X600 Pixels)
ACTIVE AREA 170.4X127.8
PIXEL PITCH 0.071X3(RGB)X0.213

ACTIVE AREA CENTER

67.2
8.0±0.3
1.6
1.4

10.55±0.3
(2.5)
95.3±0.5
14.9±0.3

(21.2)
(2X) 11.25
50.7±0.5
88±0.5
100±0.5
2-Ø3 (2X)
5.6 (2X)

2-R1.5
6.3
9.23 (2X)
15.7±0.5
5.23 (2X)

AUO

G084SN05 V9

9.2 LCM Rear View
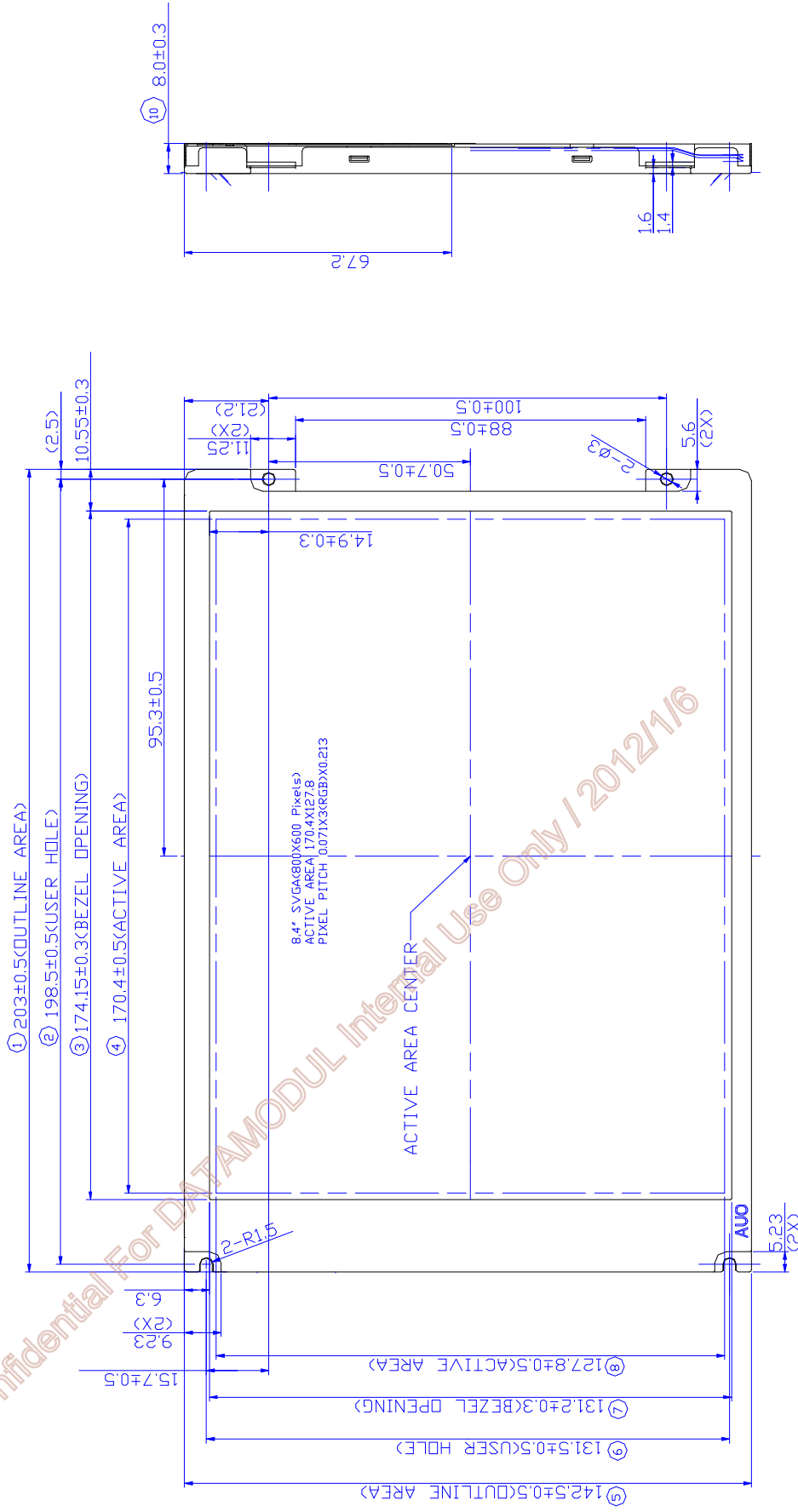
CN2 PIN DEFINITION:
PIN1:VCC
PIN2:GND
PIN3:ENABLE
PIN4:DIMMING

CN3 PIN DEFINITION:
PIN1:POWER IN
PIN2:FEEDBACK1
PIN3:FEEDBACK2

PCBA(CN4)

CN3

DETAIL A
SCALE 2.000

SEE DETAIL A

BLU LABEL

AUO SHIPPING LABEL

NOTE:
1.CONNECTOR:
CN1:STM MSB24013P20HA
MATING CONNECTOR:
STM P24013P20
CN2:ENTERY 3808K-F04N-02R
MATING CONNECTOR:
ENTERY H208K-P04N-02B
CN3:ENTERY H203K-D03N-04B
MATING CONNECTOR:
ENTERY 3800K-F03N-03R
2.GENERAL TOLERANCE:LEVEL 3
3.CHECK CODE FROM ① TO ⑩
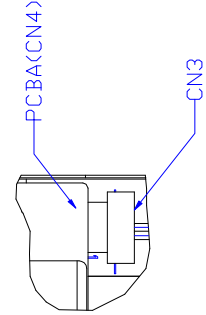
Reminding to check screw's torque value before fastening panel.

10. Label and Packaging

10.1 Shipping Label (on the rear side of TFT-LCD display)

Manufactured
XX/XX
Model No:
G084SN05 V.9
AU Optronics
MADE IN CHINA (Sxx)

10.2 Carton Package
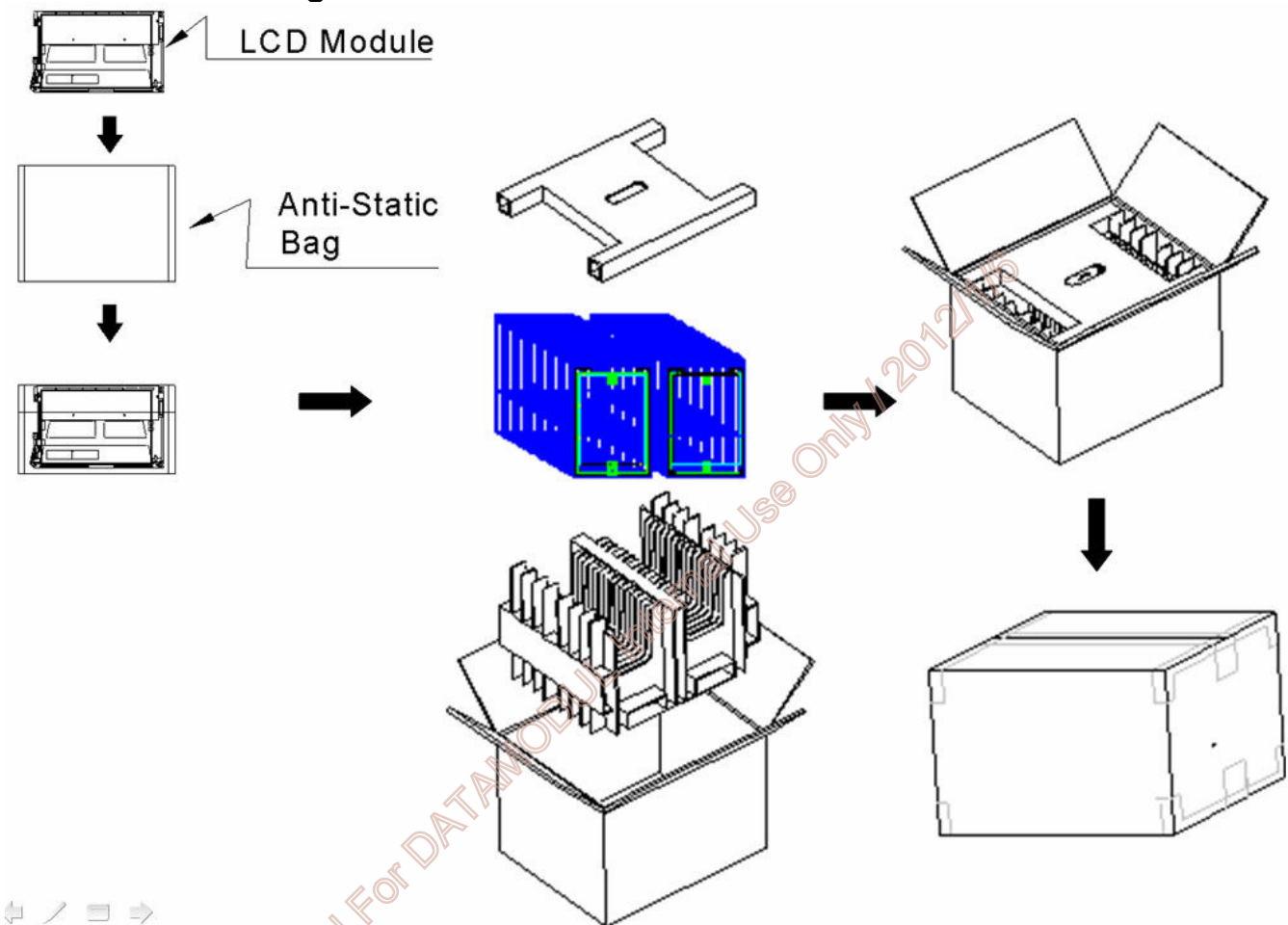
Note:
1. Max. Capacity: 30pcs LCD Modules / per carton
2. Max. Weight: 12 kg / per carton
3. The outside dimension of carton is 405(L) mm x 328(W) mm x 301(H) mm

11 Safety

11.1 Sharp Edge Requirements

There will be no sharp edges or corners on the display assembly that could cause injury.

11.2 Materials

11.2.1 Toxicity

There will be no carcinogenic materials used anywhere in the display module. If toxic materials are used, they will be reviewed and approved by the responsible AUO toxicologist.

11.2.2 Flammability

All components including electrical components that do not meet the flammability grade UL94-V1 in the module will complete the flammability rating exception approval process.

The pRxlNted circuit board will be made from material rated 94-V1 or better. The actual UL flammability rating will be pRxlNted on the pRxlNted circuit board.

11.3 Capacitors

If any polarized capacitors are used in the display assembly, provisions will be made to keep them from being inserted backwards.

11.4 National Test Lab Requirement

The display module will satisfy all requirements for compliance to:

UL 1950, First Edition   U.S.A. Information Technology Equipment

Specification

AST/ATP Series
Revision 11

Version March 23, 2010

Table of Contents

1. Product Specifications

1-1. Product Applicable

§ This specification is applied to the analog resistive touchscreen: ATP/AST Series.

1-2. Structure

§ Dimensions, structure, and shape are referred on the drawing attached.

1-3. Environmental Specifications

Specification	Value
Operating Temperature	-20°C to 70°C (no condensation)
Operating Humidity	-20°C to 60°C Less than 90%RH (no condensation) Exceeding 60°C 133.8g/m^3 (no condensation)
Storage Temperature	-40°C to 80°C (no condensation)
Storage Humidity	-40°C to 60°C Less than 95%RH (no condensation) Exceeding 60°C 142.9g/m^3 (no condensation)
Chemical Resistance (top surface)	Toluene, Tricholoroethylene, Athetone, Alcohol, Gasoline, Machine Oil, Ammonia, Glass Cleaner, Mayonnaise, Ketchup, Wine, Salad Oil, Vinegar, Lipstick, etc.

1-4. Mechanical Characteristics

Specification	Value	
Activation Force	0.05N to 0.8N	
Operating Life	Input (finger)	10,000,000 hits
	Character Input (pen)	100,000 characters
Light Transmittance	Over 80% (typical value at full wavelength)	
Surface Hardness	Over 2H (by JIS pencil hardness)	

1-5. Electrical Characteristics

Specification	Value	
Maximum Voltage	DC6V	
Maximum Current	Top Electrode	100mA
	Bottom Electrode	100mA
	Between the Top and Bottom	0.5mA
Linearity	Under ±2% (Under ±1% (typical value))	
Terminal Resistance	Top Electrode	Less than 1kΩ
	Bottom Electrode	Less than 1kΩ
Insulation Resistance	Neighboring Terminals	Over 20MΩ at 25V
	Active Area Electrodes	Over 20MΩ at 25V
Chattering	Less than 10msec at ON/OFF.	

1-6. Appearance

§ Scratch, dust (W = width, L = length, D = average diameter = (longest + shortest) /2)

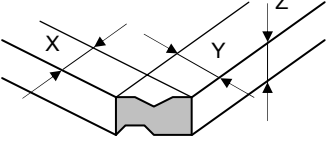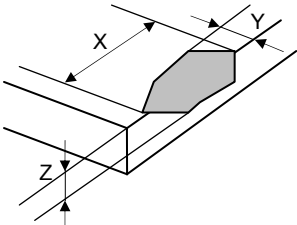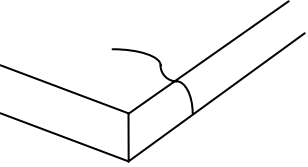| Item	Width (mm)	Length (mm)	Acceptable Numbers	Total
Linear(Scratch/Dust) Over 0.1mm in diameter refer to the Circular.	0.1≥W>0.05	4≥L	1pcs in φ30mm	Within 5pcs /panel
	0.05≥W>0.03	10≥L	2pcs in φ20mm	
	0.03≥W	20≥L	Acceptable	
Circular (Scratch/Dust)	0.4≥D>0.3 *1		1pcs in viewing area *1	
	0.3≥D>0.2		2pcs in φ30mm	
	0.2≥D		Acceptable	

Applied only in the Active Area. Scratches or dusts in the outside of the Active Area are acceptable unless the electrical characteristics are affected.

*1 Applied to the size of 14 inches or more.

§ Dirt

Acceptable if not noticeable on a black mat.

§ Tip, crack (t = glass thickness) (applicable only for the glass)

Item	Size (mm)			Acceptable Numbers
Corner		X	≤3	2pcs /panel
		Y	≤3	
		Z	≤t	
Side		X	≤5	2pcs /side
		Y	≤3	
		Z	≤t	
Crack				Not acceptable

2. Testing Regulation

2-1. Testing Regulation

§ If the regulation is not specified, the test is performed under the supplier's regulation.

§ Tests are performed under the room temperature unless specified. The room temperature is referred as follows:

Temperature: 20°C±5°C
Humidity: 65%±10%RH

2-2. Environmental Specifications

§ Chemical Resistance Test

Condition: Tested after leaving the chemical on the surface for 12 hours being wiped off by cloth.

Judgement: Must be no effect in appearance.

2-3. Mechanical Characteristics

§ Activation Force Test

Condition: Measured by depressing the point between the dots to the conduction by the testing rod (Figure 1).

Judgement: Must satisfy the specification.

Silicon Rubber
(Hardness: 60°)
Tip: R = 4.0

Figure 1. Testing rod 1

§ Operating Life Test (Finger)

Condition: Testing rod: Refer to Figure 1
Voltage: DC5V
Load: 3N
Cycle: 2 hits/sec

Judgement: Must satisfy the following:
Activation Force: Must satisfy the specification.
Linearity: Must satisfy the specification.
Terminal Resistance: Must satisfy the specification.
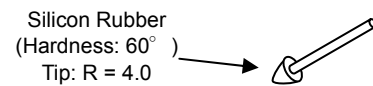Insulation Resistance: Must satisfy the specification.

§ Operating Life Test (Pen)

Condition: Testing rod: Refer to Figure 2
Voltage: DC5V
Load: 2.5N
Input size: 10 x 10 mm
Input character: A to Z/minute

Judgement: Must satisfy the following:
Activation Force: Must satisfy the specification.
Linearity: Must satisfy the specification.
Terminal Resistance: Must satisfy the specification.
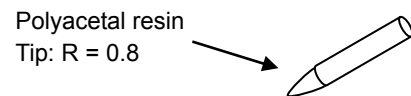Insulation Resistance: Must satisfy the specification.

Polyacetal resin
Tip: R = 0.8

Figure 2. Testing rod 2

2-4. Electrical Characteristics

§ Terminal Resistance Test

Condition: Top and bottom electrodes are measured at the terminal.

Judgement: Must satisfy the specification.

§ Insulation Resistance Test

Neighboring Terminals: Measured by applying the reference voltage to the terminals
Active Area Electrodes: Measured by applying the reference voltage to the top and bottom electrodes.

Judgement: Must satisfy the specification.

2-5. Appearance

§ Appearance Test

Condition: Tested by an examiner with over 1.0 eyesight at 30cm away from the product under the transmittable light at over 60° the surface of the product.

Judgement: Must satisfy the specification.

3. Reliability Condition

3-1. Temperature Condition

§ Temperature Condition Test

Following test are performed in the condition with no dew condensation:

Cold Test: Tested after leaving the parts in -40°C±3°C for 240 hours and in the room temperature for 2 hours.

Heat Test: Tested after leaving the parts in 80°C±3°C for 240 hours and in the room temperature for 2 hours.

Humidity Test: Tested after leaving the parts in the temperature 60°C±3°C, humidity 90 to 95% for 240 hours and in the room temperature for 2 hours.

Cycle Test: Tested after 5 cycles of leaving the parts in the temperature -30°C±3°C for 1 hour and in the room temperature for 0.5 hours, then leaving the parts in the temperature 70°C±3°C for 1 hour and in the room temperature for 0.5 hours.

Judgement: Must satisfy the following:

Activation Force:	Must satisfy the specification.
Linearity:	Must satisfy the specification.
Terminal Resistance:	Must satisfy the specification.
Insulation Resistance:	Must satisfy the specification.
Appearance:	Must satisfy the specification.

4. Recommended Connector

4-1. Recommended Connector

Part No.	Pins	Pitch
KCA-K4R	4 pin Double-sided	1.25mm

5. Handling Notes

5-1. Precautions

§ This product is intended for use in standard applications (computers, office automation, and other office equipment, industrial, communications, and measurement equipment, personal and household devices, etc.) Please avoid using this product for special applications where failure or abnormal operation may directly affect human lives, or cause physical injury or property damage, or where extremely high levels of reliability are required (such as aerospace systems, vehicle operating control, atomic energy controls, medical devices for life support, etc.).

5-2. Handling Notes

§ Do not depress or scratch the product with any object with a sharp edge or end.

§ Do not forcibly bend or fold the product.

§ When the product is stored, make sure it is packed in a packing box and stored in a storage temperature range, eliminating any outside load.

§ Do not use or store the product under a condition where the product will be exposed to water, organic solution or acid.

§ Do not use the product under the direct sunlight.

§ Do not disassemble the product.

§ When you handle the product, Hold the product by its body. Do not hold by the tail.

§ Clean the product with a soft cloth or a soft cloth with neutral detergent or alcohol. When contaminated by chemicals, wipe them off immediately with caution not to cause injury to human body.

§ The edge of the glass is not rounded and may cause injury.

5-3. Construction Notes

§ The environmental specifications, mechanical characteristics, and electrical characteristics are only applied to the Active Area.

§ Do not use the touchscreen when the condensation occurs. The condensation inside of the touchscreen is a natural phenomenon and should disappear after the touchscreen is warmed up.

5-4. Electrical & Software Notice

The best performance can be obtained when used with the original analog resistive touchscreen controller, "TSC-10" Series. If the touchscreen controller or controller software is to be developed by the customer, please note the following:

§ There is a contact resistance between the top and bottom electrodes and it changes by the pressure of a finger or a pen. The data must be read after the contact resistance becomes stabilized.

§ The terminal resistance of the analog resistive touchscreen varies by the individual, time, and environment. The controller software must have the calibration function to adjust the input position and the display position.

§ The analog resistive touchscreen outputs 2 point input as 1 point in between the 2 points. The controller software must not be designed to have the 2 point input function.

§ For drawing applications, the line may be intermittent when the pen comes on the dot spacers. A software compensation is needed.

5-5. Mounting Notes

§ Bezel Edge

Bezel edge must be positioned in the area between the Active Area and the Viewing Area. The bezel may press the touchscreen and cause input if the edge enters the Active Area.
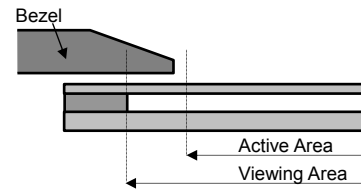
§ Gap between the Bezel and Touchscreen

A gap of approximately 0.5mm is needed between the bezel and the top electrode. It may cause unexpected input if the gap is too narrow.
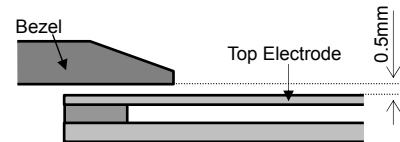
§ Cushion

If a cushion is used between the bezel and the top electrode, the cushion must be free enough to absorb the expansion and contraction difference between the bezel and the top electrode. If the cushion is squashed too hard, the expansion and the contraction difference may cause the distortion to the top electrode.

The cushion must be positioned more than 1mm outward from an inside of the insulation area. (Please refer to right figure)
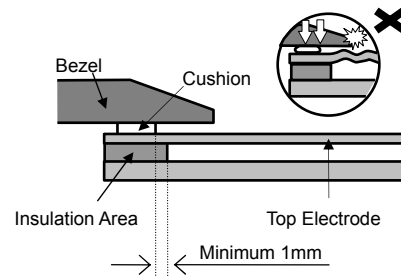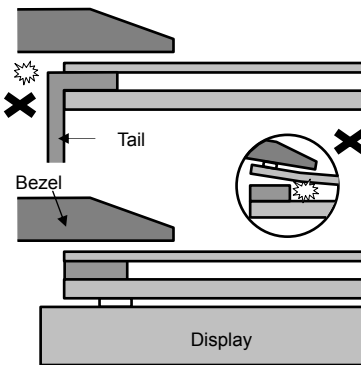
§ Tolerance

There is a tolerance of 0.2 to 0.3mm for the dimensions of the touchscreen and the tail. A gap must be made to absorb the tolerance in the case and the connector.
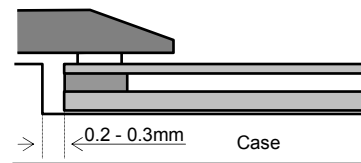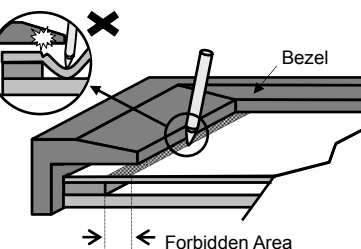
§ Tail

The tail must not be forcibly stressed or bent too hard to avoid the conduction in the insulated area and wire breaking.

§ Mounting

Touchscreen must be held from the bottom such as the structure gluing the touchscreen onto the display. If the touchscreen is glued to the bezel, the adhesion between the top and bottom electrode is stressed and may come off.

§ Forbidden Area

The area within 2mm from the insulation area is structurally week for the pressure, espcially for pen use. The film may be forcibly bent and may cause defection. This area must be protected by the bezel and input must be avoided.

§ Air Vent

Most of the touchscreens have the air vent to equalize the inside air pressure to the outside one. The air vent must be open and liquid contact must be avoided as the liquid may be absorbed if the lquid is accumilated near the air vent. The top electlode must not be swelled by the air pressure from inside of the case.
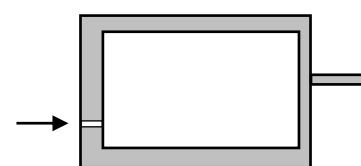
6. Warranty

6-1. Warranty Period

§ The warranty period is limited to 1 year from the date of shipping. The warranty for the initial defection such as appearance defection is limited to 1 month.

§ Any defected parts under proper use will be examined by the supplier and replaced by the new parts if the defection is considered to be caused by the supplier.

§ The replacement is subject to be included in the next lot.

6-2. Warranty Target

§ The warranty only covers the product itself and does not cover any damage to others caused by using this product. Onsite repair or replacement is not supported.

§ We will do our best for delivery problem and product defections, but the warranty for the production line is not covered.

§ Resistive touchscreens are structurally not repairable. All defections are subject to replacement.

6-3. Warranty Exceptions

Following conditions are not covered with the warranty and subject to charge.

§ Any malfunctions and damages during transportation and transfer by the user.

§ Any malfunctions and damages caused by a natural disaster or a fire.

§ Any malfunctions and damages caused by static electricity

§ Any malfunctions and damages caused by the failure of the associated equipment.

§ If the product is remodeled, disassembled or repaired by the user.

§ If the product is glued onto the equipment and uninstalled.

§ Any malfunctions and damages caused by an improper usage and handling against the specifications and notes.

6-4. Tools

§ To maintain the quality, the printing screens and the die-cut plates are generally limited to use up to 1 year. Reorders after 1 year from the initial order or from the last renewal are subject to the tooling charge for replacing the printing screens and the die-cut plates. Reorders for the discontinued standard parts are also subject to tooling charge.

§ All the tools, such as CAD data (except for the drawing for approval), block copies (films), printing screens, and die-cut plates are not to be provided for administrative purpose.

6-5. Changes

§ Because of the manufacturing process, changing the dimensions, circuit pattern, and the tail position requires replacing most of the tools and is subject to high tooling charge. Please be careful when ordering and approving the drawing.

§ Circuit pattern and the materials that does not affect the environmental, electrical, and mechanical characteristics such as film, glass, ink and glue are subject to change for the supplier's reason or for improvement within the specifications.

§ Standard products are subject to change for improvement without notice.

7. Revision history

Rev1 (April 15, 1998)
Initial release

Rev2 (June 1, 1999)
The overall revision by specification review.

Rev3 (April 1, 2002)
The address in the office was changed by the move.

Rev4 (August 16, 2002)
1-4.Activation Force is changed "50g± 30g" to "0.5N±0.3".
1-4.Light Transmission is changed 76% to 80%(TYP).

Rev5 (September 3, 2002)
1-3.Operating Temperature is changed "0°C to 60°C" to "-20°C to 70°C".
1-3.Storing Temperature is changed "-20°C to 70°C" to "-40°C to 80°C"
1-4.Operating Life is changed "1,000,000 hits" to "10,000,000 hits".
1-5.Linearity is changed "Under ±2%" to "Under ±1% (typical value)".

Rev6 (June 28, 2004)
1-3.Operating Humidity is changed "Less than 90%RH (no condensation)" to "-20°C to 60°C Less than 90%RH (no condensation) Exceeding 60°C 133.8g/m^3 (no condensation)".
1-3.Storing Humidity is changed "Less than 95%RH (no condensation)" to "-40°C to 60°C Less than 95%RH (no condensation), Exceeding 60°C 142.9g/m^3 (no condensation)".
1-5.Maximum Voltage is changed "DC5V" to "DC6V".
1-5.Linearity is changed "Under ±1% (typical value)" to "Under ±2% (Under ±1% (typical value))".

Rev7 (October 15, 2004)
4-4.Electrical & Software Notice: Changed "FIT-10 series" to "TSC-10 series".

Rev8 (April 7, 2005)
Added Item4 Recommended Connector.

Rev9 (September 6, 2005)
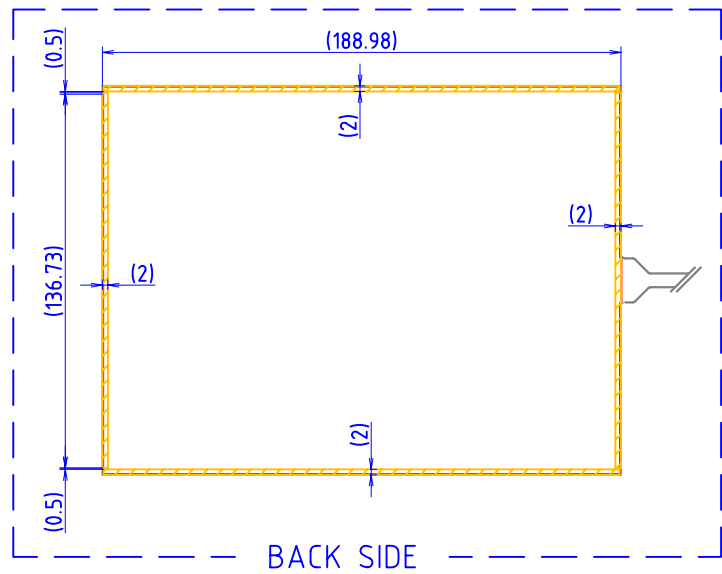2-3.Mechanical Characteristics: Added Operating Life Test (Pen).

Rev10 (November 10, 2006)
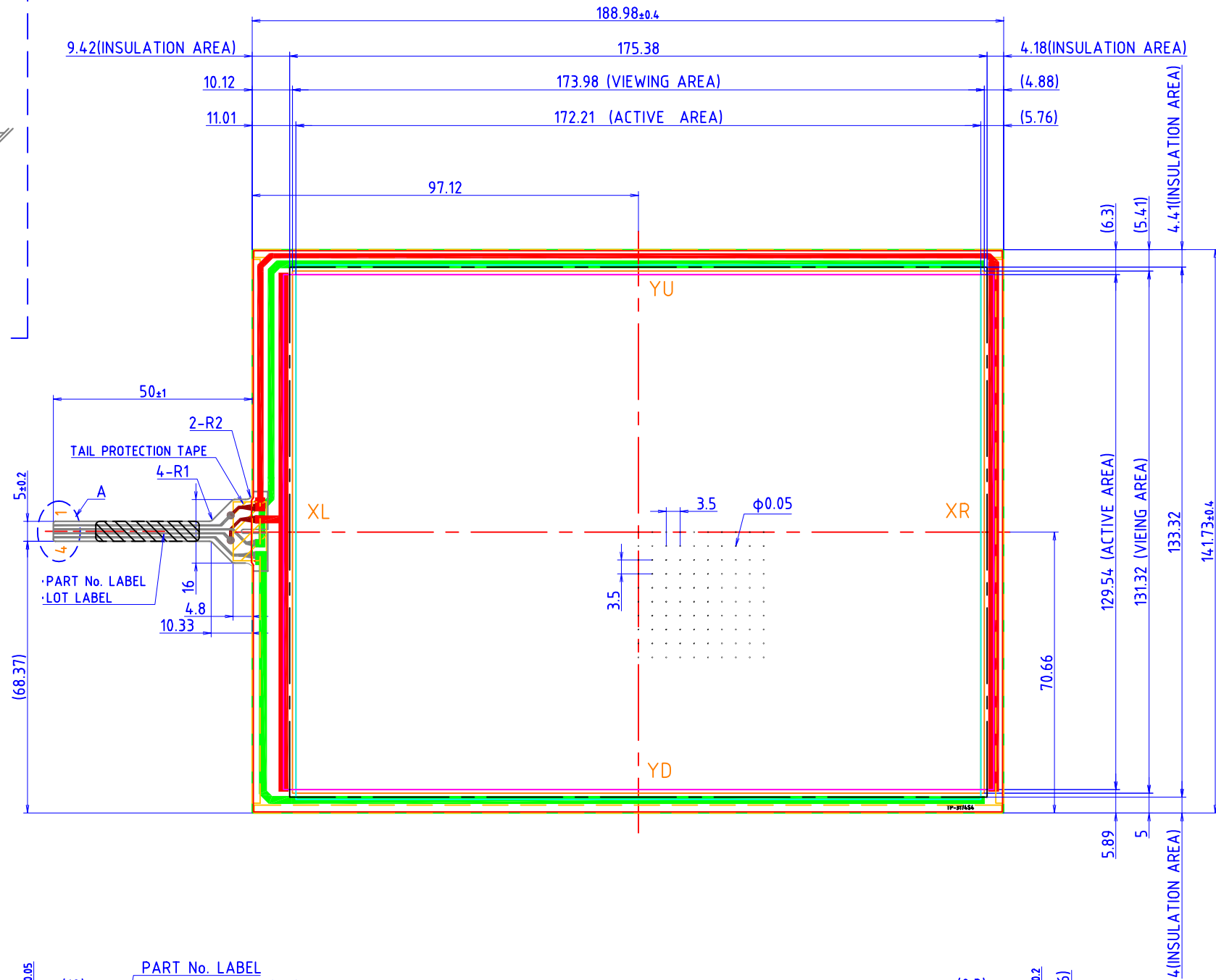
The specification item name was changed.

　　　　1-3."Storing Temperature" to "Storage Temperature"

　　　　1-3."Storing Humidity" to "Storage Humidity"

　　　　1-4."Operating Load" to "Activation Force"

　　　　1-4."Light Transmissivity" to "Light Transmittance"

　　　　1-4."Top Surface Hardness" to "Surface Hardness"

　　　　2-3."Operating Load Test" to "Activation Force Test"

　　　　2-3."Operating Load" to "Activation Force"

　　　　3-1."Operationg Load" to "Activation Force"

1-4.Operating Force is changed "0.5N±0.3N" to "0.05N to 0.8N".

1-5.Insulation Resistance is changed "Over 100MΩ at 25V" to "Over 20MΩ at 25V".

1-6.Tip, crack: Deleted "Applied only in the Active Area. Scratches or dusts in the outside of the Active Area are acceptable unless the electrical characteristics are affected.".

2-3. § Operating Life Test (Pen) Load: 300g to 250g

5-5. § Cushion: Added an installation position of a cushion.
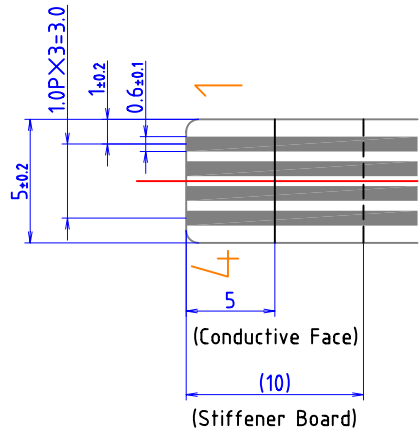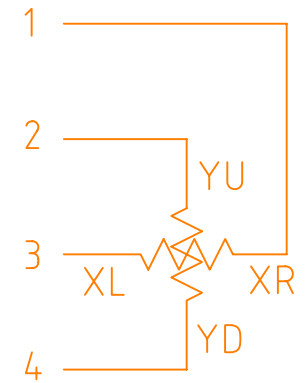
7.Added Revision History.

Rev11 (March 23, 2010)

1-6. Appearance specification was revised. Characters of scratch/dust were classified into Circular and Linear. The total acceptable number of scratch/dust was added.

2-3. Unit of Load (g) changed to (N) to unify the unit

2-3. Operating Life Test (Finger) Activation Force, Within ±50% of the specification → Must satisfy the specification. (Clerical error was corrected)

2-3. Operating Life Test (Pen) Activation Force, Within ±50% of the specification → Must satisfy the specification. (Clerical error was corrected)

3-1. Temperature Condition Cold Test -30℃→ -40℃ (Clerical error was corrected)

3-1. Activation Force, Within ±50% of the specification. → Must satisfy the specification (Clerical error was corrected)
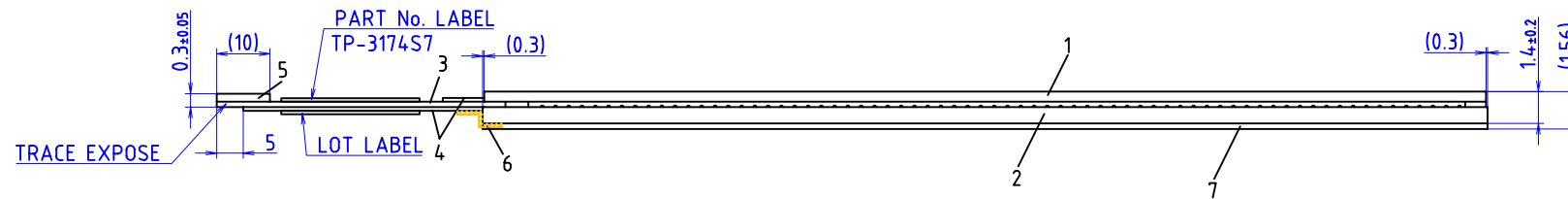
BACK SIDE

(188.98)
(2)
(0.5)
(136.73)
(2)
(2)
(2)
(0.5)

188.98±0.4
9.42(INSULATION AREA)
175.38
4.18(INSULATION AREA)
10.12
173.98 (VIEWING AREA)
(4.88)
11.01
172.21 (ACTIVE AREA)
(5.76)
97.12
4.41(INSULATION AREA)
(6.3)
(5.41)

YU
XL
XR
3.5 Φ0.05
3.5
YD

129.54 (ACTIVE AREA)
131.32 (VIEING AREA)
133.32
141.73±0.4
70.66

5.89
5
4(INSULATION AREA)

50±1
2-R2
TAIL PROTECTION TAPE
4-R1
5±0.2
A
·PART No. LABEL
·LOT LABEL
16
4.8
10.33
(68.37)

1.0PX3=3.0
1±0.2
0.6±0.1
5±0.2
5
(Conductive Face)
(10)
(Stiffener Board)

SECTION A

0.3±0.05
(10)
PART No. LABEL
TP-3174S7
5
3
1.4±0.2 (1.56)
(0.3)
(0.3)
1
TRACE EXPOSE
5
LOT LABEL
4
6
2
7

PIN ASSIGNMENT

1
2
YU
3
XL   XR
4
YD

REMARKS

TAIL PATTERN PITCH		1.00mm
TAIL PATTERN WIDTH	Ag	0.6mm
	−	− mm
CIRCUIT PATTERN WIDTH	Ag	1.2～2.0mm
	−	− mm

○TOP CIRCUIT IS RED,BOTTOM CIRCUIT IS GREEN
○LIGHT BLUE IS BOTTOM CIRCUIT
○0.05φ DOT SPACER PRINTED ON BOTTOM SHEET
○TOLERANCE=0.5mm EXCEPT WHERE INDICATED.

	ITEM	MATERIAL		REMARKS
1	ITO FILM	POLYESTER	188μm	ANTI-GLARE (ANR)
2	ITO GLASS	t=1.1mm		
3	TAIL	POLYESTER	38μm	
4	REINFORCEMENT FILM	POLYESTER	25μm	
5	STIFFENER	POLYESTER	250μm	
6	TAIL PROTECTION TAPE	POLYESTER	25μm	
7	ADHESIVE SHEET	ACRYLIC	160μm	

CUSTOMER APPROVAL
DATE: / /

PART No.	APPROVED	CHECKED	CHECKED	TRACED	DESIGNED
	Sep/08/09		Sep/08/09	Sep/08/09	
TP-3174S7F0	NEMOTO		MOUE	MOCHIZUKI	MOUE
TYPE					
Sep/08/09	FIRST EDITION	MOCHIZUKI	Data Modul AG		
DATE	REVISION	NAME	CIRCUIT DRAWING	DMC Co., Ltd.	

DATA MODUL

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DATA MODUL AG

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