TFT-Display Datasheet

SCF1500188GGU00 | DataImage

Features

Active Screen Area	304.1x228.1 [mm]
Size | Format	15“ | 4:3
Resolution	1024/768
Backlight	LED
Brightness	210 cd/m^2
LED Life Time	50K (h)
Interface	LVDS
Viewing Angle	L/R 80/80 - U/D 70/70
Touchscreen	PCAP
Power Supply	3.3V [Typ.]
Module Outline	354.1x238.75x15.378[mm]
Operation Temperature	-30… + 70°C
Storage Temperature	-40… + 70°C

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DATA IMAGE CORPORATION

CTP Module Specification

Preliminary

ITEM NO.: SCF1500188GGU00

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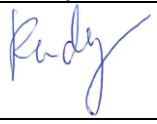
Customer Companies	QA Approved	DQA Check	R&D Approved	R&D Check
Customer Approved by	Version:	Issued Date:	Total Pages:	Prepared
	1	25/SEP/15’	23	

2. RECORD OF REVISION

Rev	Date	Item	Page	Comment	Source
1	25/SEP/15’			Initial Preliminary	ESR0405027

3. GENERAL SPECIFICATIONS

Composition: A TFT-LCD module with 15 inches Capacitive Touch Panel (CTP).

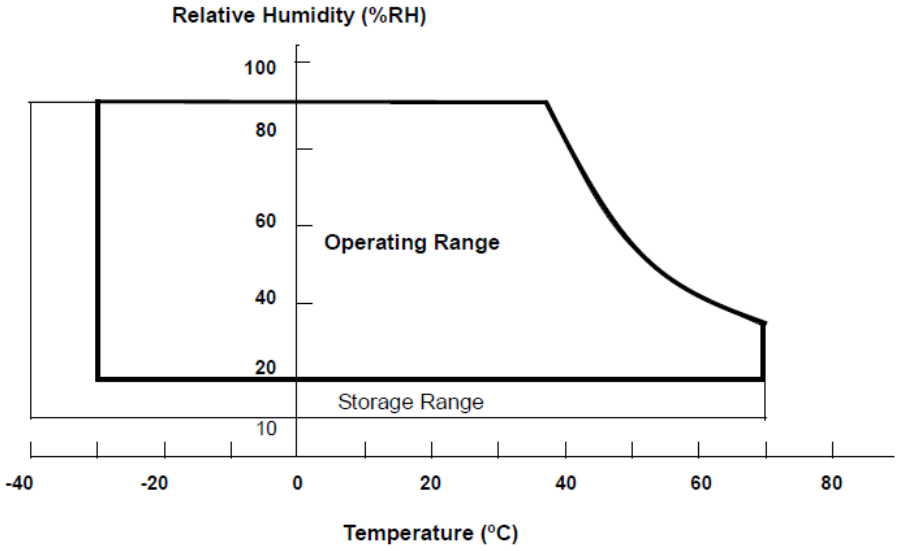
Parameter	Specifications	Unit
Display resolution	1024(W) x (R,G,B) x768(H)	dot
Screen size	15 (diagonal)	inch
Outline dimension	354.1(W) x 238.75(H) x15.378(D)	mm
Display active area	304.1 (W x 228.1(H)	mm
Sensor active area	308.99(W) x 232.99(H)	mm
Pixel pitch	0.297 (W) x 0.297 (H)	mm
Display mode	Normally White	
Surface treatment	Anti-Glare, 7H	
Weight	TBD	g
View angle direction(gray inversion)	6 o'clock	
LCM part number	FG150050DSSWBG01	
Our components and processes are compliant to RoHS. standard		

4. LCD ABSOLUTE MAXIMUM RATINGS

GND=0V

Parameter	Symbol	Min.	Max.	Unit	Remark
Power supply voltage	VCC	-0.3	4	V	
Converter voltage	Vi	-0.3	18	V	
Enable Voltage	EN	--	5.5	V	
Backlight Adjust	ADJ	--	5.5	V	
Operating temperature	Top	-30	70	°C	
Storage temperature	Tst	-40	70	°C	

Note 1: Temperature and relative humidity range is shown in the figure below.
Note 2: 90 %RH Max. (Ta ≦ 40 ºC).
Note 3: Wet-bulb temperature should be 39 ºC Max. (Ta > 40 ºC).
Note 4: No condensation.



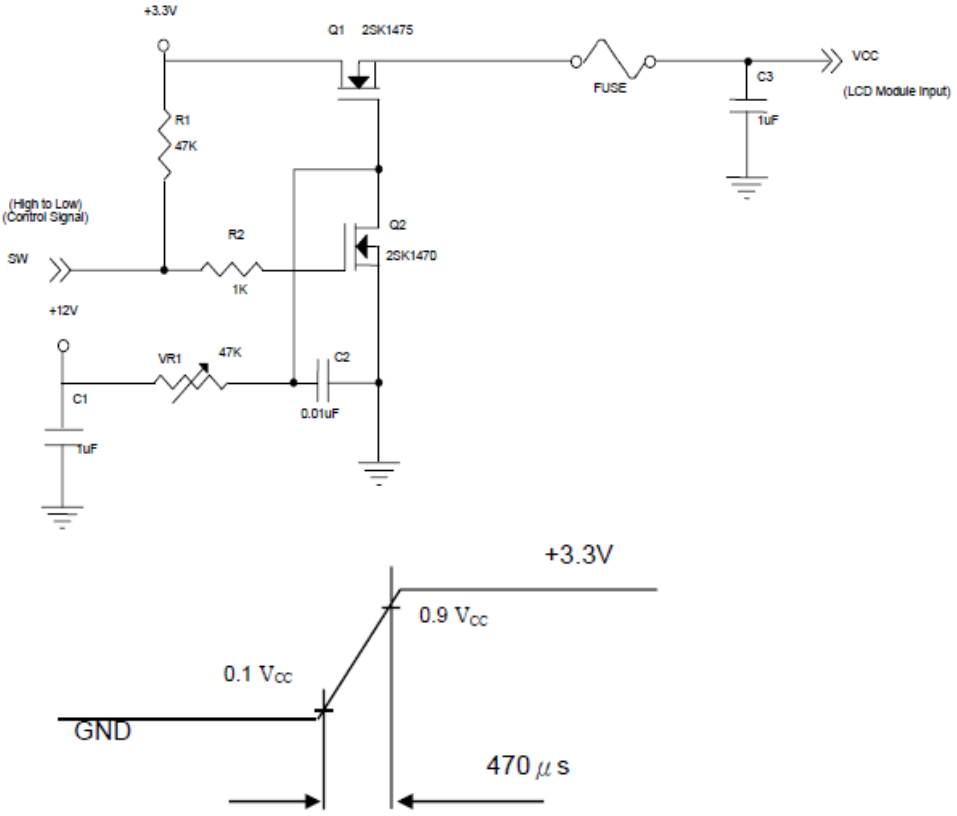
5. LCD ELECTRICAL CHARACTERISTICS

5.1 Typical Operation Conditions

Parameter		Symbol	Min.	Typ.	Max.	Unit	Remark
Power Supply voltage		V_{CC}	3.0	3.3	3.6	V	
Ripple voltage		V_{RP}	-	-	100	mV_{P-P}	
Rush Current		I_{RUSH}	-	-	2.0	A	Note2
Power Supply Current	White	I_{CC}	-	410	510	mA	Note3,a
	Black		-	590	690	mA	Note3,b
LVDS differential input voltage		Vid	200	-	600	Mv	
LVDS common input voltage		Vic	1.0	1.2	1.4	V	
"H" level logical input voltage		V_{IH}	-	-	100	mV	
"L" level logical input voltage		V_{IL}	-100	-	-	mV	
Terminating Resistor		R_T	-	100	-	Ohm	

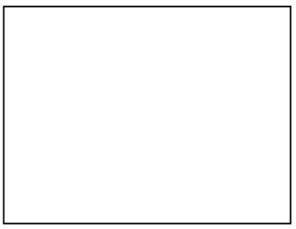
Note 1：The module should be always operated within above ranges.

Note 2：Measurement Conditions:



Note 3： The specified power supply current is under the conditions at V_{DD} =3.3V, Ta =25 ± 2°C, DC Current and f_v = 60 Hz, whereas a power dissipation check pattern below is displayed.

a. White Pattern



Active Area

b. Black Pattern

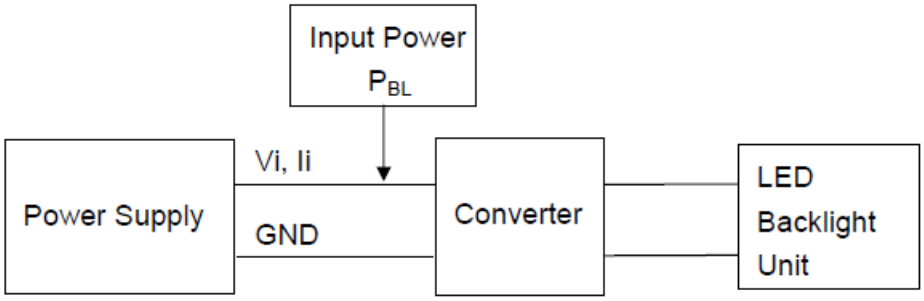
Active Area

5.2 Backlight Driving Conditions

Ta=25 ± 2°C

Item		Symbol	Values			Unit	Remark
			Min.	Typ.	Max.		
Power Supply Voltage		V_i	10.8	12.0	13.2	V	
Power Supply Current		I_i	0.45	0.4	0.37	A	@ Vi = 12V (Duty 100%)
Backlight Power Consumption		P_{BL}	-	-	4.9	W	@ Vi = 12V (Duty 100%)
EN Control Level	Backlight on	-	2.0	3.3	5.0	V	
	Backlight off		0	-	0.8	V	
PWM Control Level	PWM High Level	-	2.0	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	Note 3
LED Life Time		L_L	50000	-	-	Hrs	Note 4

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



Note 2：At 20k Hz PWM control frequency，duty ratio range is restricted from 20% to 100%.

Note 3：The lifetime of LED is defined as the time when it continues to operate under the conditions at Ta = 25 ±2 ℃ and Duty 100% until the brightness becomes ≦ 50% of its original value. Operating LED under high temperature environment will reduce life time and lead to color shift.

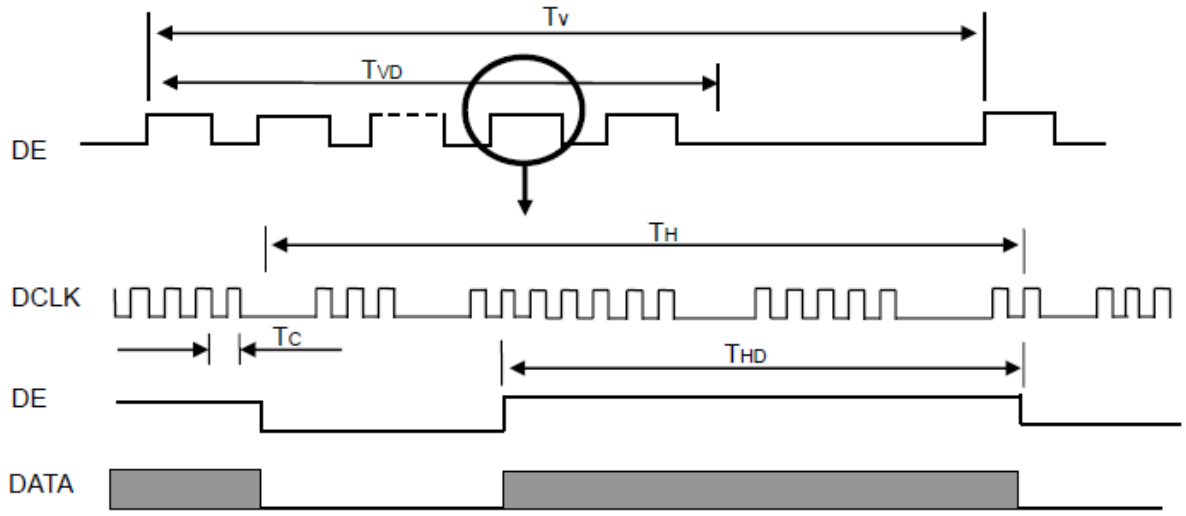
6. LCD INPUT SIGNAL CHARACTERISTICS

6.1 AC Characteristics

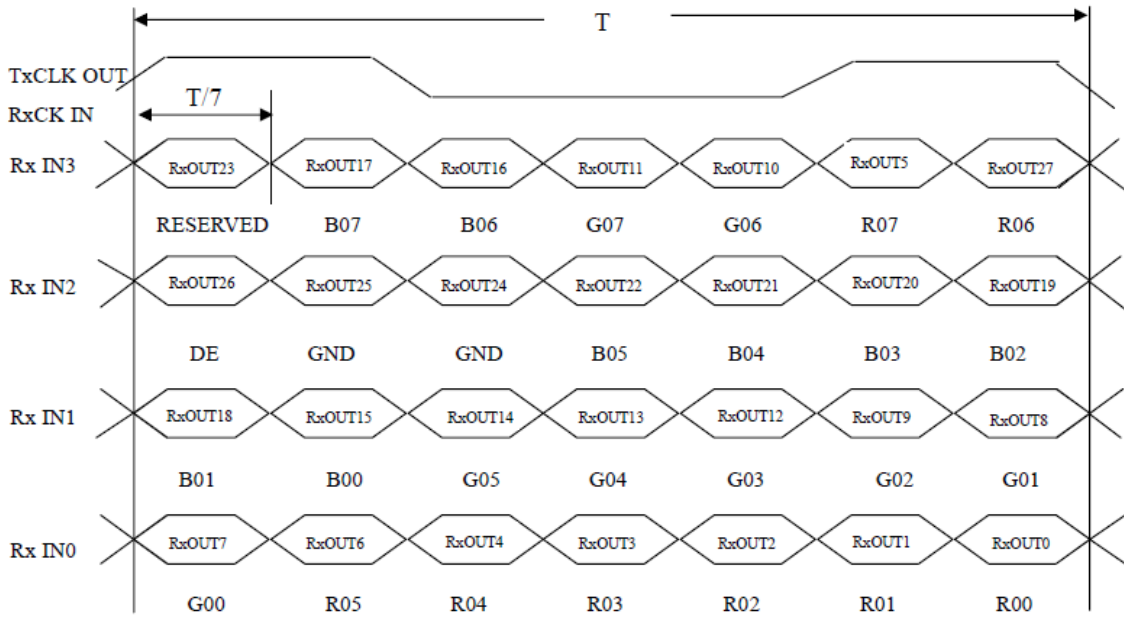
Signal	Parameter	Symbol	Min.	Typ.	Max.	Unit
DCLK	Pixel Clock	1/Tc	53.35	65	80	MHz
DE	Vertical Total Time	Tv	780	806	1200	TH
	Vertical Address Time	TVD	768	768	768	TH
	Horizontal Total Time	TH	1140	1344	1600	Tc
	Horizontal Address Time	THD	1024	1024	1024	Tc

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

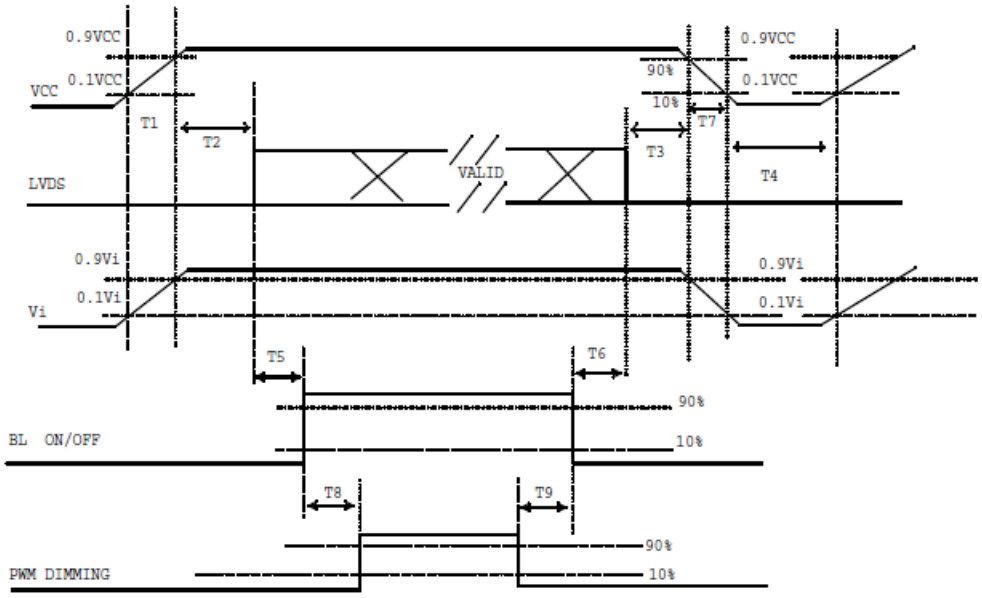


TIMING DIAGRAM of LVDS



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.



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

6.3 Scanning Direction

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

Fig.1 Normal Scan

Normal scan (pin 4, LR/UD = High or NC)

Fig.2 Reverse Scan

Reverse scan (pin 4, LR/UD = Low)

6.4 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	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	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	0
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	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	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	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	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	0
	Green(1)	0	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	0	1	0	0	0	0	0	0	0	0	0
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	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	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	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	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	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	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	0
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	Blue(252)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1
	Blue(252)	0	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	0	1	1	1	1	1	1	1	1

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

7. LCD PIN CONNECTIONS

7.1 LCM Pin Function

Pin NO.	Symbol	Description	Remark
1	VCC	Power Supply +3.3V(typical)	
2	VCC	Power Supply +3.3V(typical)	
3	GND	Ground	
4	LR/UD	Reverse Scan Control H or NC = Normal Mode. L = Horizontal / Vertical Reverse Scan.	
5	RX0-	LVDS Differential Negative Data Input	
6	RX0+	LVDS Differential Positive Data Input	
7	GND	Ground	
8	RX1-	LVDS Differential Negative Data Input	
9	RX1+	LVDS Differential Positive Data Input	
10	GND	Ground	
11	RX2-	LVDS Differential Negative Data Input	
12	RX2+	LVDS Differential Positive Data Input	
13	GND	Ground	
14	RXCLK-	LVDS Differential Negative Data Input	
15	RXCLK+	LVDS Differential Positive Data Input	
16	GND	Ground	
17	RX3-	LVDS Differential Negative Data Input	
18	RX3+	LVDS Differential Positive Data Input	
19	GND	Ground	
20	SEL68	LVDS 6/8 bit select function control, High → 6bit Input Mode Low or NC → 8bit Input Mode	Note3

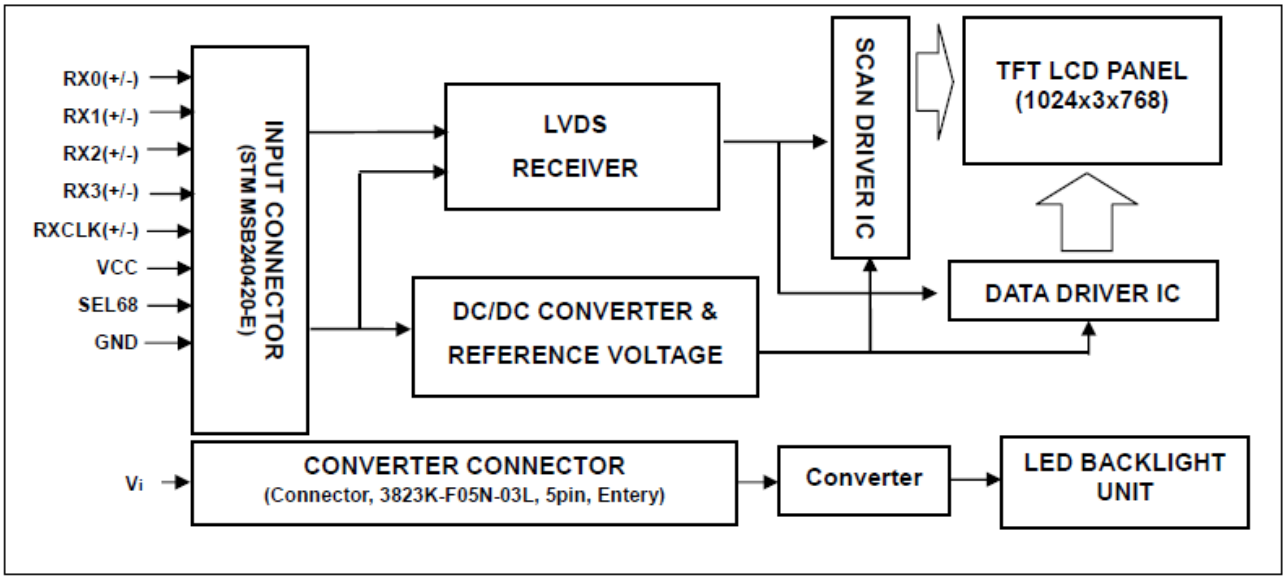
Note 1： Connector Part No.: STM MSB240420G, Entery 3804K-F20N-10L or equivalent.
Note 2： User's connector Part No.: STM P240420, Entery H204K-D20N-02B or equivalent.
Note 3： "Low" stands for 0V. "High" stands for 3.3V. "NC" stands for "No Connection".

7.2 Backlight Pin Function

Pin NO.	Symbol	Description	Remark
1	V_i	Converter input voltage	12V
2	V_{GND}	Converter ground	Ground
3	EN	Enable pin	3.3V
4	ADJ	Backlight Adjust	PWM Dimming (Hi: 3.3V_{DC}, Lo: 0V_{DC})
5	NC	Not Connect	

Note 1：Connector Part No.: 3808K-F05N-03L (Entery) or equivalent.
Note 2：User's connector Part No.: 3808K-F05N-03L (Entery) or equivalent.

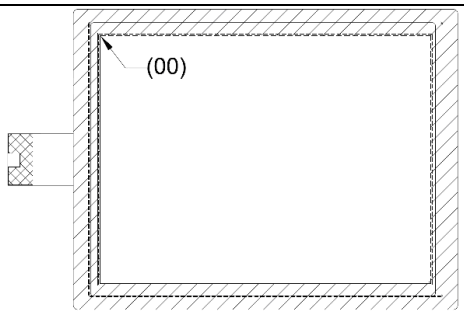
8. LCD BLOCK DIAGRAM



9. CTP SPECIFICATIONS

9.1 CTP General Specifications

Composition: It's 15 inch Capacitive Touch Panel (CTP).

Item	Specification	Unit
Type	Transparent type projected capacitive touch panel	
Input mode	Human's finger	
Multi touch	10	Point
Interface	USB	
(X,Y) Position		

9.2 Absolute Maximum Rating

Symbol	Description	Min	Typ.	Max	Unit	Notes
VDD	Supply voltage	-0.5	-	6	V	
VIO	Input I/O pin voltage	GND-0.3	-	VDD+0.3	V	

9.3 Electrical Characteristic

Symbol	Description	Min	Typ.	Max	Unit	Notes
VDD	Supply voltage	4.75	5	5.25	V	USB 5V

9.4 Pin Connections

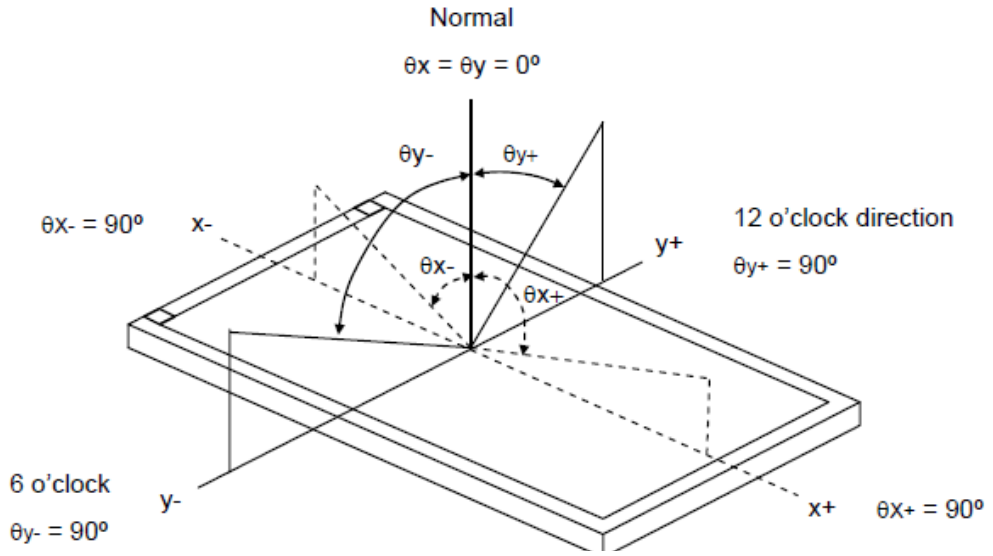
Pin Number	Pin Name	Description
1	VDD	Power Supply Voltage, USB 5V
2	D-	USB data -
3	D+	USB data+
4	GND_E	Ground
5	GND_E	Ground

10. OPTICAL CHARACTERISTIC

Item	Symbol	Value	Unit
Ambient Temperature	Ta	25±2	°C
Ambient Humidity	Ha	50±10	%RH
Supply Voltage	VCC	3.3	V
Input Signal	According to typical value in "5. ELECTRICAL CHARACTERISTICS"		
Converter Duty		100%	

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit	Remarks
Viewing Angle	Horizontal	θ_x+	Center CR≥10	70	80	--	deg	Note 1,5
		θ_x-		70	80	--		
	Vertical	θ_Y+		50	70	--		
		θ_Y-		50	70	--		
Contrast Ratio		CR	Center θx=θy =0°	450	700			Note 2,5
Response time	Rise	T_R		-	5	10	ms	Note 3
	Fall	T_F		-	11	16	ms	
White Variation		δW		-	1.25	1.33	-	Note5,6
Brightness		L_C		170	210	--	cd/㎡	Note 4,5
Chromaticity	Red	R_X		Typ. -0.05	0.604	Typ. +0.05	-	Note 1,5
		R_Y			0.356			
	Green	G_X			0.338			
		G_Y			0.590			
	Blue	B_X			0.148			
		B_Y			0.098			
	White	W_X			0.313			
		W_Y			0.329			

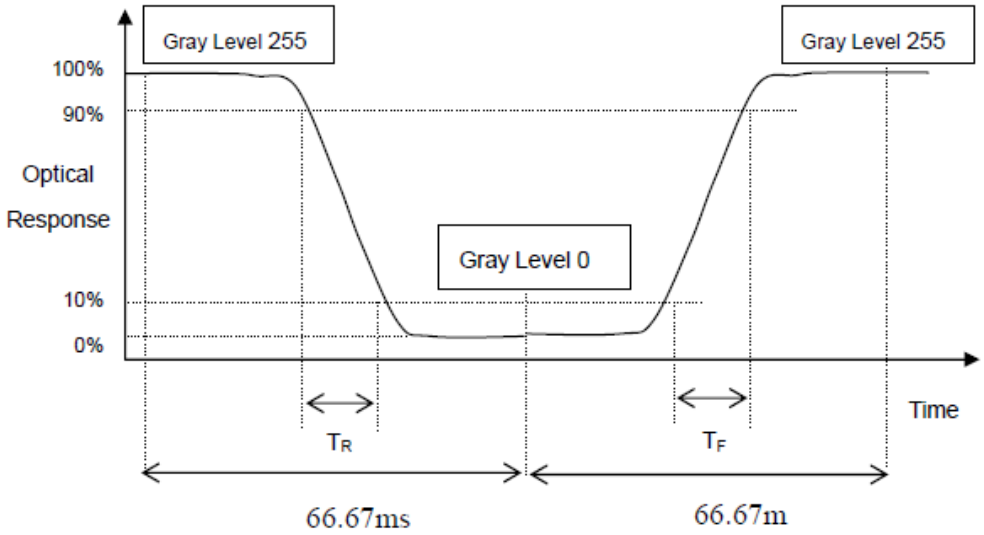
Note 1： Definition of Viewing Angle (θx, θy):



Note 2： Definition of Contrast Ratio (CR):

The contrast ratio can be calculated by the following expression.
Contrast Ratio (CR) = L255 / L0
L255: Luminance of gray level 255
L0: Luminance of gray level 0
CR = 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):

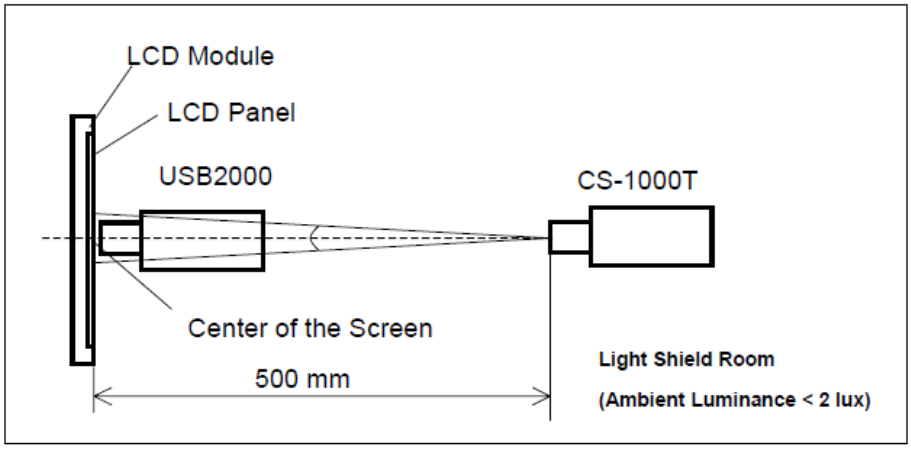


Note 4： Definition of Luminance of White (L_C):

Measure the luminance of gray level 255 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:

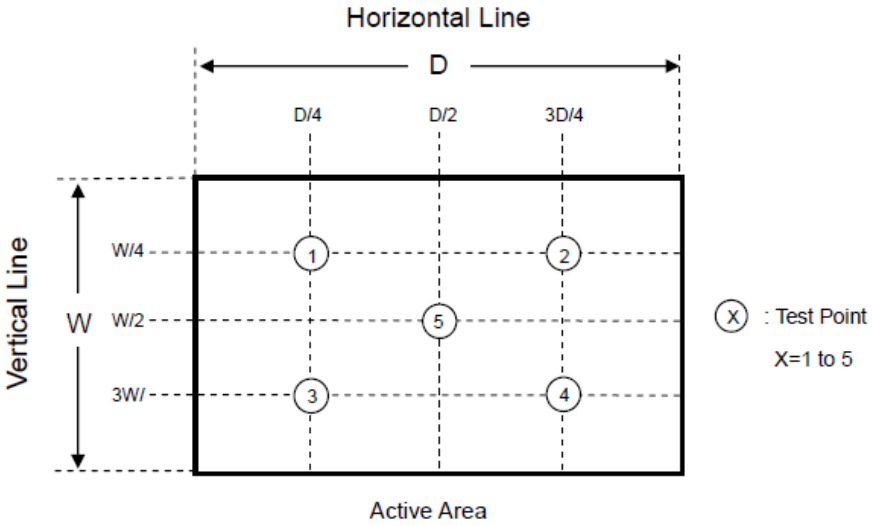
The LCD module should be stabilized at given temperature for 20 minutes to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting Backlight for 20 minutes in a windless room.



Note 6 ： Definition of White Variation (δW):

Measure the luminance of gray level 255 at 5 points

$$\delta W = \frac{\text{Maximum [L (1), L (2), L (3), L (4), L (5)]}}{\text{Minimum [L (1), L (2), L (3), L (4), L (5)]}}$$



11. QUALITY ASSURANCE

11.1 Test Condition

11.1.1 Temperature and Humidity (Ambient Temperature)

Temperature : 25 ± 5°C
Humidity : 65 ± 5%

11.1.2 Operation

Unless specified otherwise, test will be conducted under function state.

11.1.3 Container

Unless specified otherwise, vibration test will be conducted to the product itself without putting it in a container.

11.1.4 Test Frequency

In case of related to deterioration such as shock test. It will be conducted only once.

11.1.5 Test Method

Reliability Test Item & Level		Test Level	Remark
No.	Test Item		
1	High Temperature Storage Test	T=70°C,240hrs	Note1,2 (IEC68-2-2)
2	Low Temperature Storage Test	T=-40°C,240hrs	Note1,2 (IEC68-2-1)
3	Thermal Cycling Test (No operation)	-30°C/30min→25°C/5 min →70°C/30min; 100cycles, 1 hour/cycle	Note1,2 (IEC68-2-14)
4	High Temperature Operation Test	T=70°C,240hrs	Note1,2 (IEC68-2-2)
5	Low Temperature Operation Test	T=-30°C,240hrs	Note1,2 (IEC68-2-1)
6	High Temperature and High Humidity Operation Test	T=60°C,90%RH,240hrs	Note1,2 (IEC68-2-3)
7	ESD Test	State: operating Location: LCM/TP surface Condition:150pf 330Ω Contact +/- 4kV Air +/-8kV Criteria: Class C	Note2 (IEC61000-4-2)
8	Shock test (No operation)	50G, 11ms, half sine wave, 1 time for ± X, ± Y, ± Z direction	Note 2(IEC68-2-27)
9	Vibration Test (No operation)	1.5G, 10 ~ 300 Hz sine wave, 10 min/cycle, 3 cycles each X, Y, Z direction	Note2 (IEC68-2-6)

Note 1： No condensation of water.
Note 2： No display malfunction.
Note 3： Temperature of panel display surface area should be 90°C Max.

12. APPEARANCE SPECIFICATION

12.1 Inspection condition

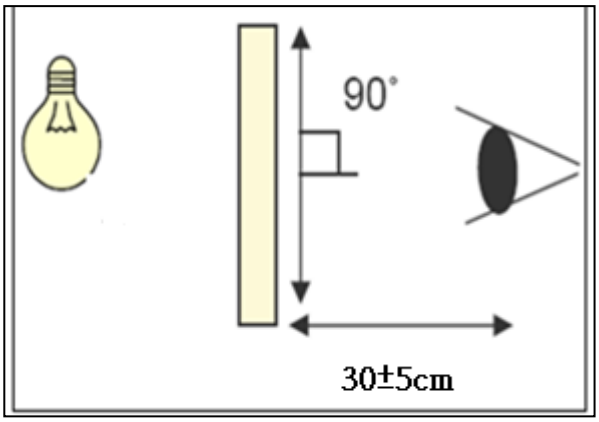
12.1.1 Inspection conditions

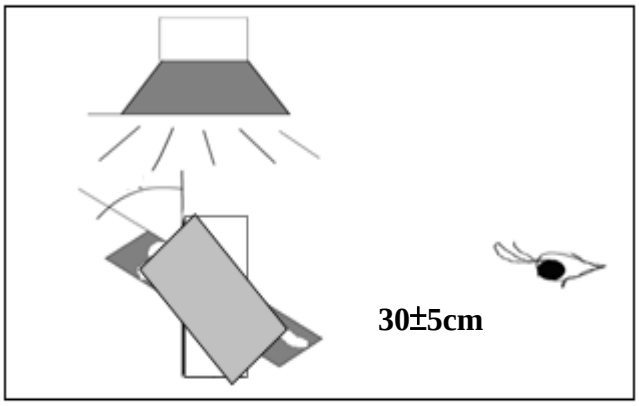
12.1.1.1 Inspection Distance : 30 ± 5 cm

12.1.1.2 View Angle :

(1) Inspection that light pervious to the product: 90±15°

(2) Inspection that light reflects on the product: 90±15°



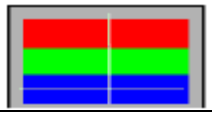


12.1.2 Environment conditions

Ambient Temperature :	25±5℃
Ambient Humidity :	30~75%RH
Ambient Illumination	600~800 lux

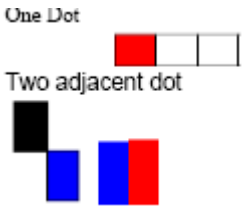
12.2 Inspection Parameters

Appearance inspection standard (D: diameter, L: length; W: width, Z: height, T: glass thickness)

Inspection item	Inspection standard	Description
No image	Prohibited	
Image abnormal	Prohibited	
Bright line	Prohibited	
Thin line	It is acceptable that the defect can not be seen with 10% ND filter.	
Mura	It is acceptable that the defect can not be seen with 5% ND filter.	

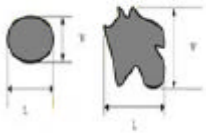
Dot

Item	Acceptable Visible area	Total
Bright dot	3	6
Dark dot	5	
Bright adjacent dots	1	1
Dark adjacent dots	2	2
Adjacent dots with a bright dot and a dark dot	2	2



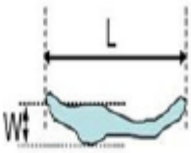
Foreign material in dot shape

SPEC (unit: mm)	Acceptable
D≦0.5	Ignored
0.5<D≦0.8, distance>5	n≦5
D＞0.8	0



Foreign material in line shape

SPEC	Acceptable
W≦0.05 and L≦10	Ignored
0.05<W≦0.1, L≦10, distance >5	n≦5
W>0.1 or L>10	0



Contamination

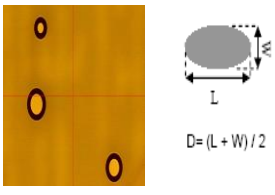
It is acceptable if the dirt can be wiped.

Scratch

SPEC	Acceptable
W≦0.05 and L≦10	Ignored
0.05<W≦0.08, L≦10, distance >5	n≦5
0.08<W≦0.1, L≦10, distance >5	n≦3
W>0.1 or L>10	0

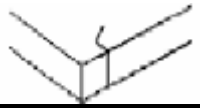
Bubble

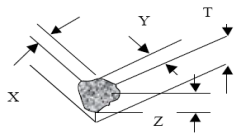
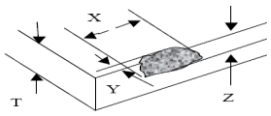
SPEC (unit: mm)	Acceptable
D≦0.3	Ignored
Non visible area	Ignored
0.3<D≦0.5, distance >5	n≦5
D＞0.5	0



Cover & Sensor Crack

Prohibited



Cover angle missing	SPEC (unit: mm) / Acceptable Side/Bottom / Ignored It is prohibited if the defect appears on the front. / 0	
Cover edge break	SPEC (unit: mm) / Acceptable X≦3.0, Y≦3.0, Z≦T / Ignored X>3.0, Y>3.0, Z＞T / 0	
Inspection item	SPEC	Description
Ink	SPEC (unit: mm) / Acceptable word unclear, inverted, mistake, break line / 0	
Bubble under protection film	SPEC (unit: mm) / Acceptable NA	
Function	Prohibited	

12.3 Sampling Condition

Unless otherwise agree in written, the sampling inspection shall be applied to the incoming inspection of customer.
Lot size: Quantity of shipment lot per model.
Sampling type: normal inspection, single sampling
Sampling table: MIL-STD-105E
Inspection level: Level II

Class of defects	**Definition**		
	Major	AQL 0.65	It is a defect that is likely to result in failure or to reduce materially the usability of the product for the intended function.
	Minor	AQL 1.5	It is a defect that will not result in functioning problem with deviation classified.

13. PRODUCT LABEL DEFINE

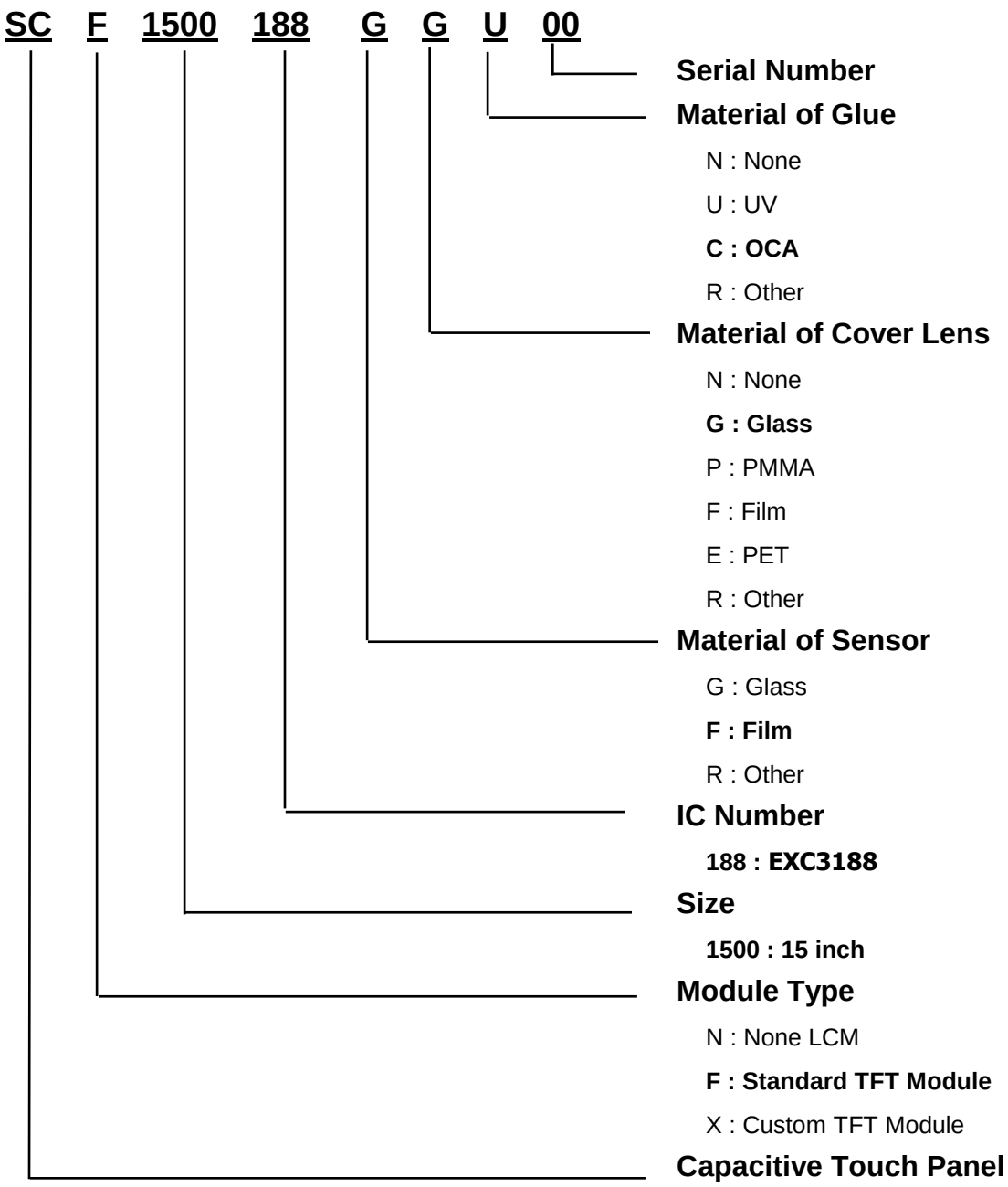
Product Label style:

Bar Code Define:

A A 6 0014 2 10 26-0013

- Serial number of the products
  Serial number starts from 0000
  Every work order is 10K at most
- Week of production
- Year of production
- Storage area
- Serial number of work order
  Serial number starts from 0000 each
- Month of work order
- Year of work order
- The first 3 numbers of work order

Product Name Define:



14. PRECAUTIONS IN USE LCM

1. ASSEMBLY PRECAUTIONS
   (1) You must mount a module using holes arranged in four corners or four sides.

   (2) You should consider the mounting structure so that uneven force (ex. Twisted stress) is not applied to the module. And the case on which a module is mounted should have sufficient strength so that external force is not transmitted directly to the module.
   (3) Do not touch, push or rub the exposed polarizers with glass, tweezers or anything harder than HB pencil lead. And please do not rub with dust clothes with chemical treatment.
   (4) Wipe off saliva or water drops as soon as possible. Their long time contact with polarizer causes deformations and color fading.
   (5) Do not open the case because inside circuits do not have sufficient strength.
   (6) Please do not take a LCD module to pieces and reconstruct it. Resolving and reconstructing modules may cause them not to work well.
   (7) Please do not touch metal frames with bare hands and soiled gloves. A color change of the metal frames can happen during a long preservation of soiled LCD modules.
   (8) Please pay attention to handling lead wire of backlight so that it is not tugged in connecting with inverter.

2. OPERATING PRECAUTIONS
   (1) Please be sure to turn off the power supply before connecting and disconnecting signal input cable.
   (2) Please do not change variable resistance settings in LCD module. They are adjusted to the most suitable value. If they are changed, it might happen LCD does not satisfy the characteristics specification
   (3) Be careful for condensation at sudden temperature change. Condensation makes damage to polarizer or electrical contacted parts. And after fading condensation, smear or spot will occur.
   (4) When fixed patterns are displayed for a long time, remnant image is likely to occur.
   (5) Module has high frequency circuits. Sufficient suppression to the electromagnetic interference shall be done by system manufacturers. Grounding and shielding methods may be important to minimize the interference.
   (6) Please consider that LCD backlight takes longer time to become stable of radiation characteristics in low temperature than in room temperature.

3. ELECTROSTATIC DISCHARGE CONTROL
   (1) The operator should be grounded whenever he/she comes into contact with the module. Never touch any of the conductive parts such the copper leads on the PCB and the interface terminals with any parts of the human body.
   (2) The modules should be kept in antistatic bags or other containers resistant to static for storage.
   (3) Only properly grounded soldering irons should be used.
   (4) If an electric screwdriver is used, it should be well grounded and shielded from commutator sparks.
   (5) The normal static prevention measures should be observed for work clothes and working benches; for the latter conductive (rubber) mat is recommended
   (6) Since dry air is inductive to statics, a relative humidity of 50-60% is recommended.

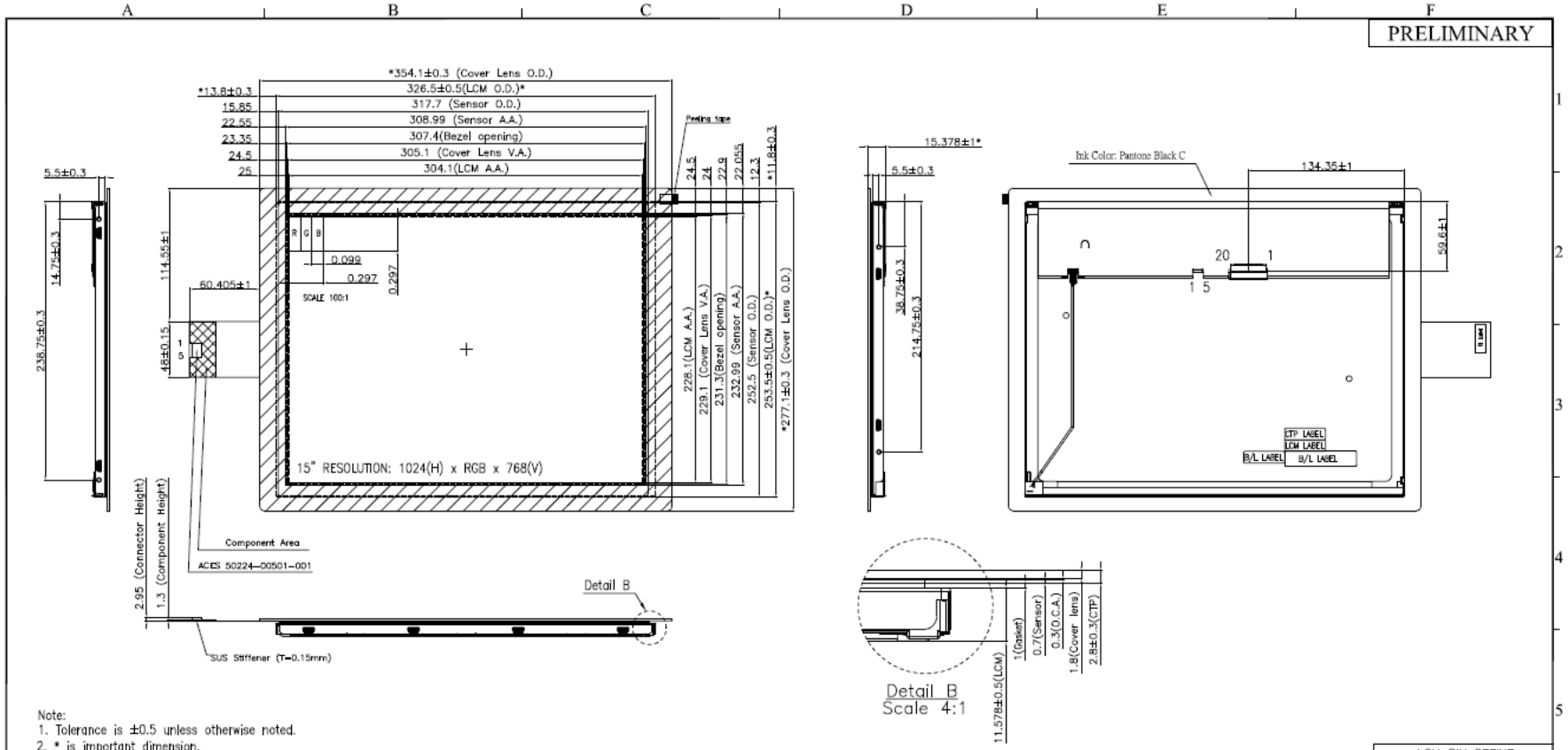
4. STORAGE PRECAUTIONS
   (1) When you store LCDs for a long time, it is recommended to keep the temperature between 0°C-40°C without the exposure of sunlight and to keep the humidity less than 90%RH.
   (2) Please do not leave the LCDs in the environment of high humidity and high temperature such as 60°C 90%RH
   (3) Please do not leave the LCDs in the environment of low temperature; below -20°C.

5. OTHERS
   (1) A strong incident light into LCD panel might cause display characteristics' changing inferior because of polarizer film, color filter, and other materials becoming inferior. Please do not expose LCD module direct sunlight Land strong UV rays
   (2) Please pay attention to a panel side of LCD module not to contact with other materials in preserving it alone.
   (3) For the packaging box, please pay attention to the followings:
   (4) Please do not pile them up more than 5 boxes. (They are not designed so.) And please do not turn over.
   (5) Please handle packaging box with care not to give them sudden shock and vibrations. And also please do not throw them up.
   (6) Packing box and inner case for LCDs are made of cardboard. So please pay attention not to get them wet. (Such like keeping them in high humidity or wet place can occur getting them wet.)

6. LIMITED WARRANTY

Unless otherwise agreed between DATA IMAGE and customer, DATA IMAGE will replace or repair any of its LCD and LCM which is found to be defective electrically and visually when inspected in accordance with DATA IMAGE acceptance standards, for a period on one year from date of shipment. Confirmation of such date shall be based on freight documents. The warranty liability of DATA IMAGE is limited to repair and/or replacement on the terms set forth above. DATA IMAGE will not responsible for any subsequent or consequential events.

15. OUTLINE DRAWING



Note:
1. Tolerance is ±0.5 unless otherwise noted.
2. * is important dimension.
3. Center brightness: 210 cd/m² (Typ.),170 cd/m² (Min.)
4. LCM connector: Entery 3804K-F20N-10L or equivalent.
   LCM matching connector: Entery H204K-D20N-02B or equivalent.
5. Backlight connector: Entery 3808K-F05N-03L or equivalent.
   Backlight matching connector: Entery H208K-P05N-02B or equivalent.
6. CTP matching connector: ACES 50233-005H0H0-001 or equivalent.
7. Torque of M3 user hole should be within 4 kgf-cm and re-screw 10 times.
8. M3 screw length is 3.0mm Max.
9. For RoHS.

CTP PIN FUNCTION	
1	VDD
2	D-
3	D+
4	GND_E
5	GND_E

B/L PIN FUNCTION	
1	Vi
2	V_GND
3	EN
4	ADJ
5	NC

LCM PIN DEFINE			
1	VCC	11	RX2-
2	VCC	12	RX2+
3	GND	13	GND
4	LR/UD	14	RXCLK-
5	RX0-	15	RXCLK+
6	RX0+	16	GND
7	GND	17	RX3-
8	RX1-	18	RX3+
9	RX1+	19	GND
10	GND	20	SEL68

AUTH	DESCRIPTION	DATE	APPROVED
	ESR0405027		

REVISIONS

DATE:	2015/06/09
DRAWN:	
CHECK:	
APPROVE:	

TITLE: CTP Module outline dimension

DWG. NO.	SCF1500188GGU00		
UNITS M M		REV.	1
SCALE 1 / 1	SHEET 1 OF 1		

DATA IMAGE

16. PACKAGE INFORMATION

TBD

DATA IMAGE CORPORATION

CTP Module Specification

Preliminary

ITEM NO.: SCF1500188GGU00

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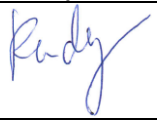
Customer Companies	QA Approved	DQA Check	R&D Approved	R&D Check
Customer Approved by	Version:	Issued Date:	Total Pages:	Prepared
	1	25/SEP/15’	23	

2. RECORD OF REVISION

Rev	Date	Item	Page	Comment	Source
1	25/SEP/15’			Initial Preliminary	ESR0405027

3. GENERAL SPECIFICATIONS

Composition: A TFT-LCD module with 15 inches Capacitive Touch Panel (CTP).

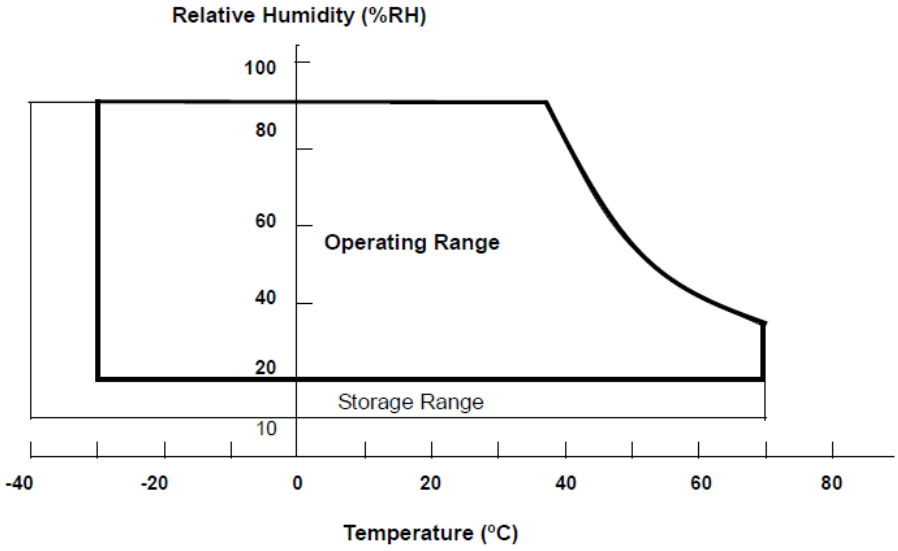
Parameter	Specifications	Unit
Display resolution	1024(W) x (R,G,B) x768(H)	dot
Screen size	15 (diagonal)	inch
Outline dimension	354.1(W) x 238.75(H) x15.378(D)	mm
Display active area	304.1 (W x 228.1(H)	mm
Sensor active area	308.99(W) x 232.99(H)	mm
Pixel pitch	0.297 (W) x 0.297 (H)	mm
Display mode	Normally White	
Surface treatment	Anti-Glare, 7H	
Weight	TBD	g
View angle direction(gray inversion)	6 o'clock	
LCM part number	FG150050DSSWBG01	
Our components and processes are compliant to RoHS. standard		

4. LCD ABSOLUTE MAXIMUM RATINGS

GND=0V

Parameter	Symbol	Min.	Max.	Unit	Remark
Power supply voltage	VCC	-0.3	4	V	
Converter voltage	Vi	-0.3	18	V	
Enable Voltage	EN	--	5.5	V	
Backlight Adjust	ADJ	--	5.5	V	
Operating temperature	Top	-30	70	°C	
Storage temperature	Tst	-40	70	°C	

Note 1: Temperature and relative humidity range is shown in the figure below.
Note 2: 90 %RH Max. (Ta ≦ 40 ºC).
Note 3: Wet-bulb temperature should be 39 ºC Max. (Ta > 40 ºC).
Note 4: No condensation.



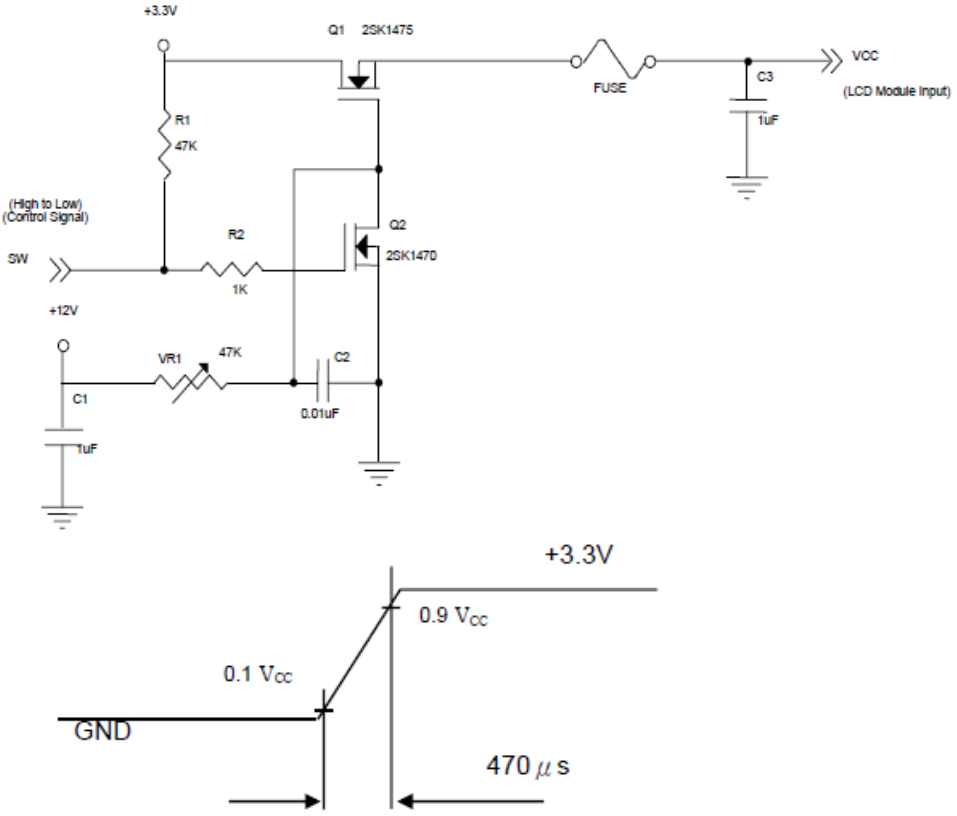
5. LCD ELECTRICAL CHARACTERISTICS

5.1 Typical Operation Conditions

Parameter		Symbol	Min.	Typ.	Max.	Unit	Remark
Power Supply voltage		V_{CC}	3.0	3.3	3.6	V	
Ripple voltage		V_{RP}	-	-	100	mV_{P-P}	
Rush Current		I_{RUSH}	-	-	2.0	A	Note2
Power Supply Current	White	I_{CC}	-	410	510	mA	Note3,a
	Black		-	590	690	mA	Note3,b
LVDS differential input voltage		Vid	200	-	600	Mv	
LVDS common input voltage		Vic	1.0	1.2	1.4	V	
"H" level logical input voltage		V_{IH}	-	-	100	mV	
"L" level logical input voltage		V_{IL}	-100	-	-	mV	
Terminating Resistor		R_T	-	100	-	Ohm	

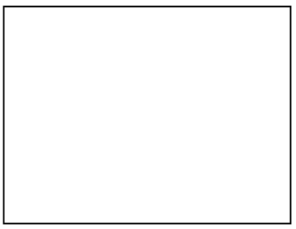
Note 1：The module should be always operated within above ranges.

Note 2：Measurement Conditions:



Note 3： The specified power supply current is under the conditions at V_{DD} =3.3V, Ta =25 ± 2°C, DC Current and f_v = 60 Hz, whereas a power dissipation check pattern below is displayed.

a. White Pattern



Active Area

b. Black Pattern

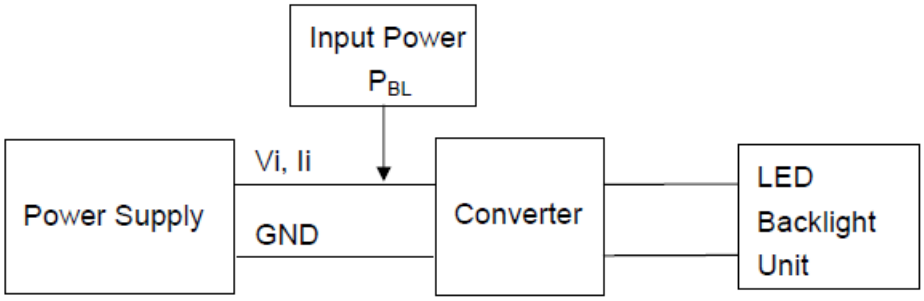
Active Area

5.2 Backlight Driving Conditions

Ta=25 ± 2°C

Item		Symbol	Values			Unit	Remark
			Min.	Typ.	Max.		
Power Supply Voltage		V_i	10.8	12.0	13.2	V	
Power Supply Current		I_i	0.45	0.4	0.37	A	@ Vi = 12V (Duty 100%)
Backlight Power Consumption		P_{BL}	-	-	4.9	W	@ Vi = 12V (Duty 100%)
EN Control Level	Backlight on	-	2.0	3.3	5.0	V	
	Backlight off		0	-	0.8	V	
PWM Control Level	PWM High Level	-	2.0	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	Note 3
LED Life Time		L_L	50000	-	-	Hrs	Note 4

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



Note 2：At 20k Hz PWM control frequency，duty ratio range is restricted from 20% to 100%.

Note 3：The lifetime of LED is defined as the time when it continues to operate under the conditions at Ta = 25 ±2 ℃ and Duty 100% until the brightness becomes ≦ 50% of its original value. Operating LED under high temperature environment will reduce life time and lead to color shift.

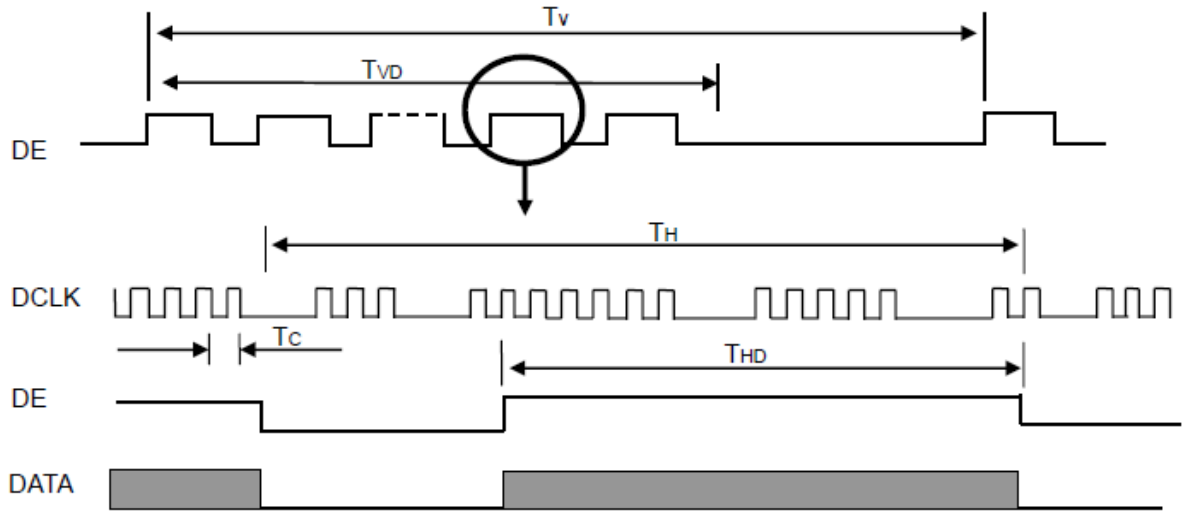
6. LCD INPUT SIGNAL CHARACTERISTICS

6.1 AC Characteristics

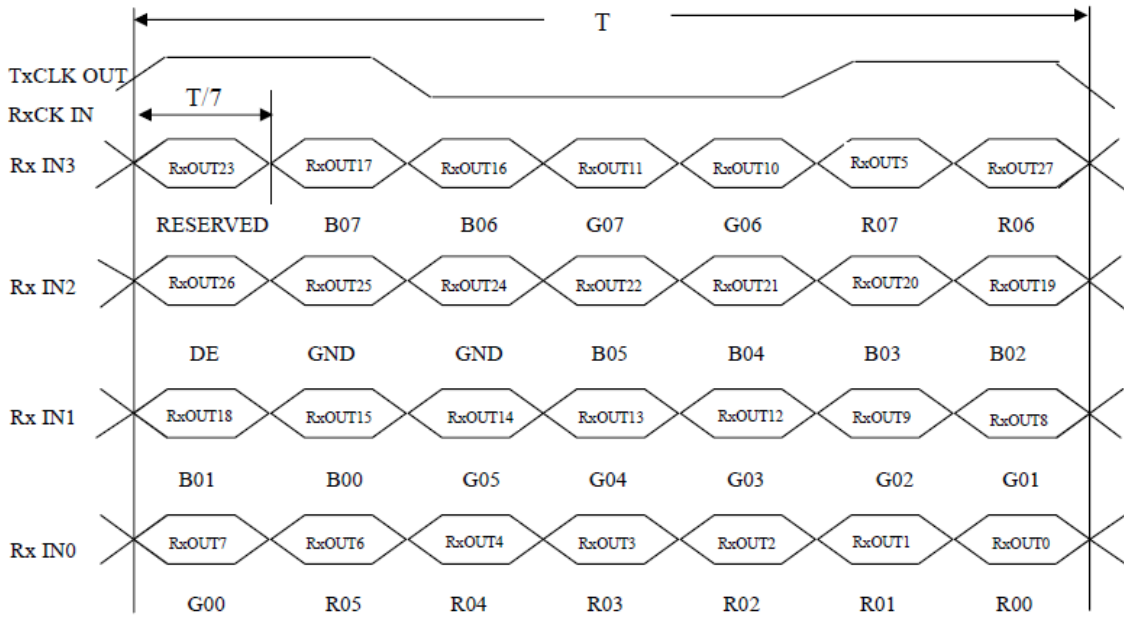
Signal	Parameter	Symbol	Min.	Typ.	Max.	Unit
DCLK	Pixel Clock	1/Tc	53.35	65	80	MHz
DE	Vertical Total Time	Tv	780	806	1200	TH
	Vertical Address Time	TVD	768	768	768	TH
	Horizontal Total Time	TH	1140	1344	1600	Tc
	Horizontal Address Time	THD	1024	1024	1024	Tc

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

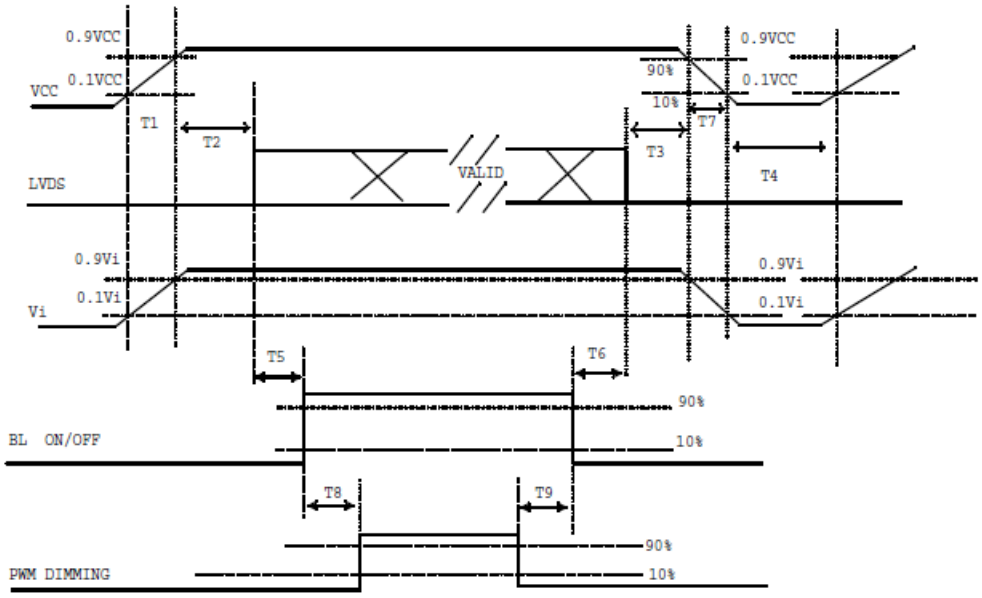


TIMING DIAGRAM of LVDS



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.



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

6.3 Scanning Direction

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

Fig.1 Normal Scan

Normal scan (pin 4, LR/UD = High or NC)

Fig.2 Reverse Scan

Reverse scan (pin 4, LR/UD = Low)

6.4 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	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	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	0
	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
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	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	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	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	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	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	0
	Green(1)	0	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	0	1	0	0	0	0	0	0	0	0	0
	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
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	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	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	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	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	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	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	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	0
	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	Blue(252)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1
	Blue(252)	0	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	0	1	1	1	1	1	1	1	1

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

7. LCD PIN CONNECTIONS

7.1 LCM Pin Function

Pin NO.	Symbol	Description	Remark
1	VCC	Power Supply +3.3V(typical)	
2	VCC	Power Supply +3.3V(typical)	
3	GND	Ground	
4	LR/UD	Reverse Scan Control H or NC = Normal Mode. L = Horizontal / Vertical Reverse Scan.	
5	RX0-	LVDS Differential Negative Data Input	
6	RX0+	LVDS Differential Positive Data Input	
7	GND	Ground	
8	RX1-	LVDS Differential Negative Data Input	
9	RX1+	LVDS Differential Positive Data Input	
10	GND	Ground	
11	RX2-	LVDS Differential Negative Data Input	
12	RX2+	LVDS Differential Positive Data Input	
13	GND	Ground	
14	RXCLK-	LVDS Differential Negative Data Input	
15	RXCLK+	LVDS Differential Positive Data Input	
16	GND	Ground	
17	RX3-	LVDS Differential Negative Data Input	
18	RX3+	LVDS Differential Positive Data Input	
19	GND	Ground	
20	SEL68	LVDS 6/8 bit select function control, High → 6bit Input Mode Low or NC → 8bit Input Mode	Note3

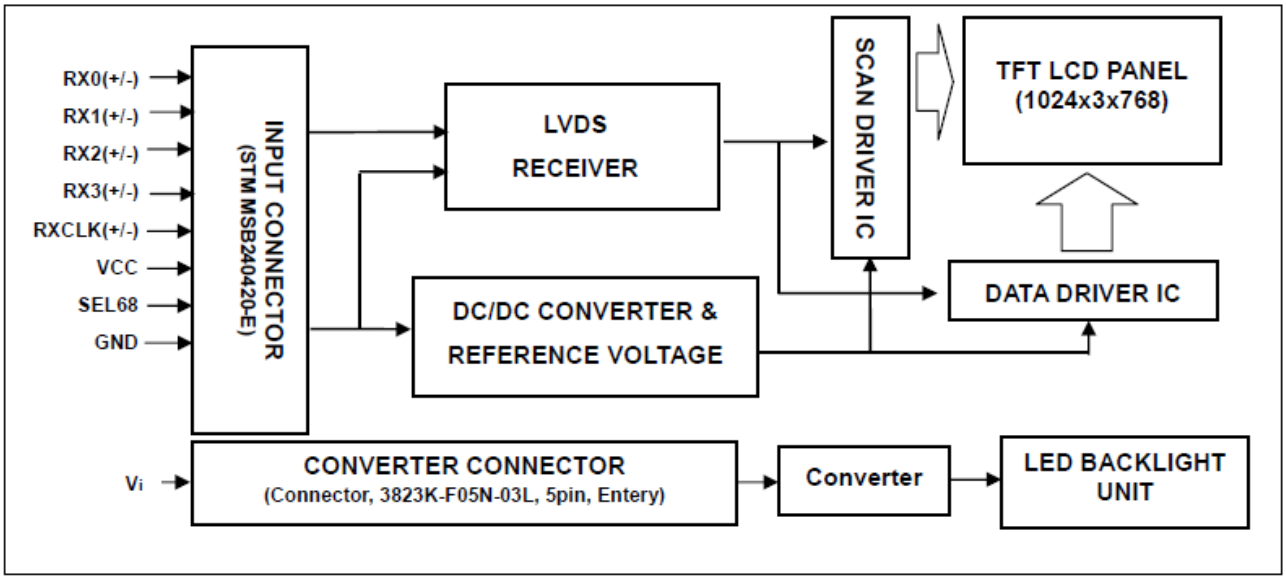
Note 1： Connector Part No.: STM MSB240420G, Entery 3804K-F20N-10L or equivalent.
Note 2： User's connector Part No.: STM P240420, Entery H204K-D20N-02B or equivalent.
Note 3： "Low" stands for 0V. "High" stands for 3.3V. "NC" stands for "No Connection".

7.2 Backlight Pin Function

Pin NO.	Symbol	Description	Remark
1	V_i	Converter input voltage	12V
2	V_{GND}	Converter ground	Ground
3	EN	Enable pin	3.3V
4	ADJ	Backlight Adjust	PWM Dimming (Hi: 3.3V_{DC}, Lo: 0V_{DC})
5	NC	Not Connect	

Note 1：Connector Part No.: 3808K-F05N-03L (Entery) or equivalent.
Note 2：User's connector Part No.: 3808K-F05N-03L (Entery) or equivalent.

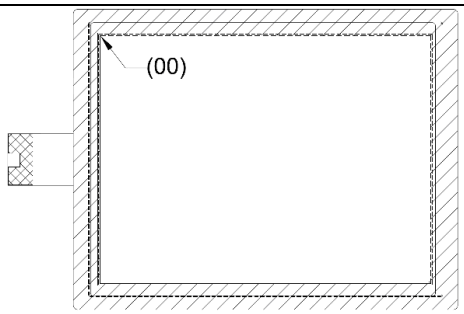
8. LCD BLOCK DIAGRAM



9. CTP SPECIFICATIONS

9.1 CTP General Specifications

Composition: It's 15 inch Capacitive Touch Panel (CTP).

Item	Specification	Unit
Type	Transparent type projected capacitive touch panel	
Input mode	Human's finger	
Multi touch	10	Point
Interface	USB	
(X,Y) Position		

9.2 Absolute Maximum Rating

Symbol	Description	Min	Typ.	Max	Unit	Notes
VDD	Supply voltage	-0.5	-	6	V	
VIO	Input I/O pin voltage	GND-0.3	-	VDD+0.3	V	

9.3 Electrical Characteristic

Symbol	Description	Min	Typ.	Max	Unit	Notes
VDD	Supply voltage	4.75	5	5.25	V	USB 5V

9.4 Pin Connections

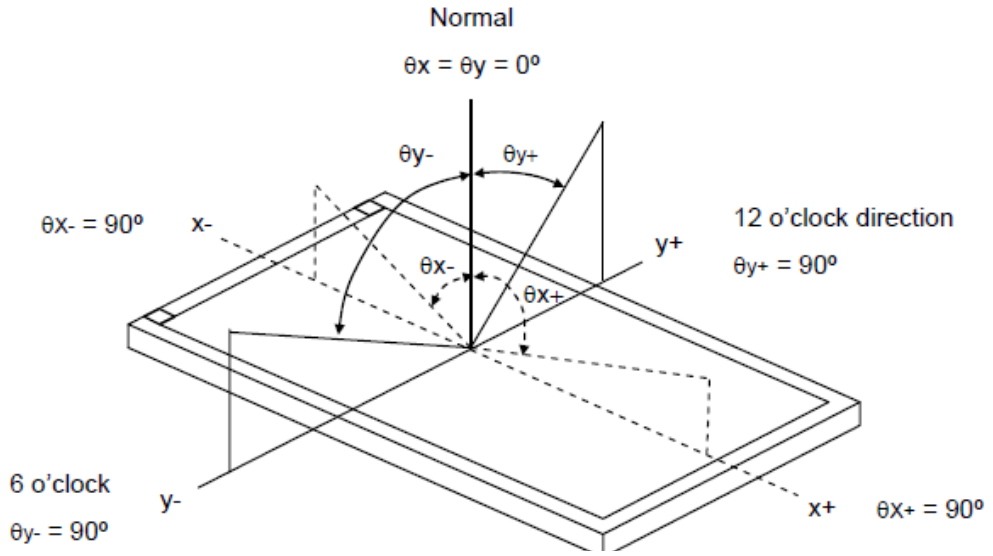
Pin Number	Pin Name	Description
1	VDD	Power Supply Voltage, USB 5V
2	D-	USB data -
3	D+	USB data+
4	GND_E	Ground
5	GND_E	Ground

10. OPTICAL CHARACTERISTIC

Item	Symbol	Value	Unit
Ambient Temperature	Ta	25±2	°C
Ambient Humidity	Ha	50±10	%RH
Supply Voltage	VCC	3.3	V
Input Signal	According to typical value in "5. ELECTRICAL CHARACTERISTICS"		
Converter Duty		100%	

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit	Remarks
Viewing Angle	Horizontal	θ_x+	Center CR≥10	70	80	--	deg	Note 1,5
		θ_x-		70	80	--		
	Vertical	θ_Y+		50	70	--		
		θ_Y-		50	70	--		
Contrast Ratio		CR	Center θx=θy =0°	450	700			Note 2,5
Response time	Rise	T_R		-	5	10	ms	Note 3
	Fall	T_F		-	11	16	ms	
White Variation		δW		-	1.25	1.33	-	Note5,6
Brightness		L_C		170	210	--	cd/㎡	Note 4,5
Chromaticity	Red	R_X		Typ. -0.05	0.604	Typ. +0.05	-	Note 1,5
		R_Y			0.356			
	Green	G_X			0.338			
		G_Y			0.590			
	Blue	B_X			0.148			
		B_Y			0.098			
	White	W_X			0.313			
		W_Y			0.329			

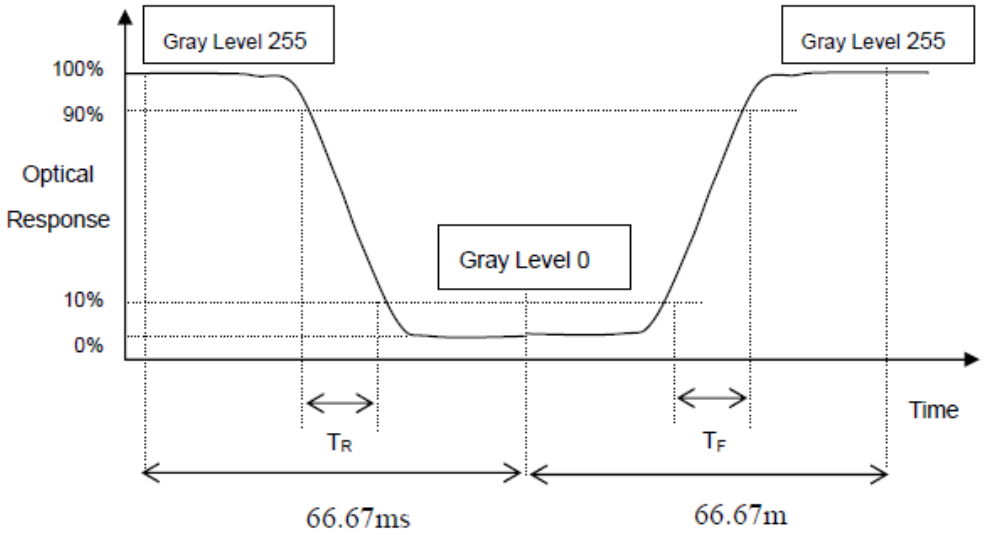
Note 1： Definition of Viewing Angle (θx, θy):



Note 2： Definition of Contrast Ratio (CR):

The contrast ratio can be calculated by the following expression.
Contrast Ratio (CR) = L255 / L0
L255: Luminance of gray level 255
L0: Luminance of gray level 0
CR = 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):

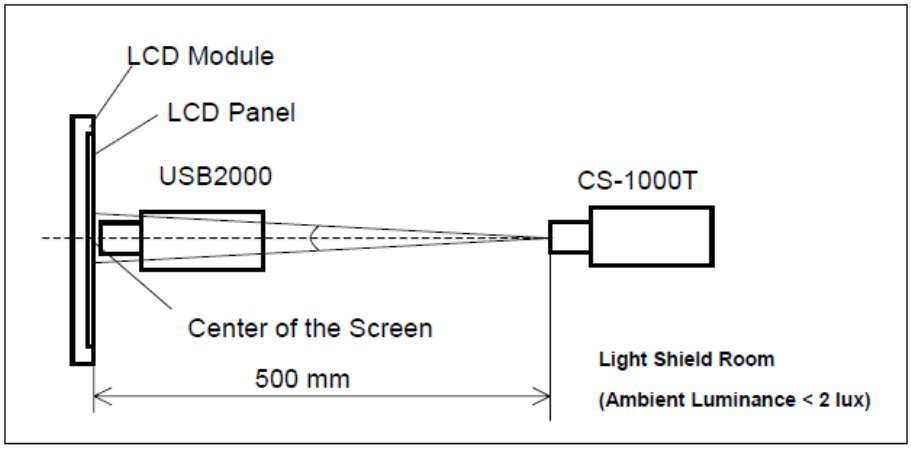


Note 4： Definition of Luminance of White (L_C):

Measure the luminance of gray level 255 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:

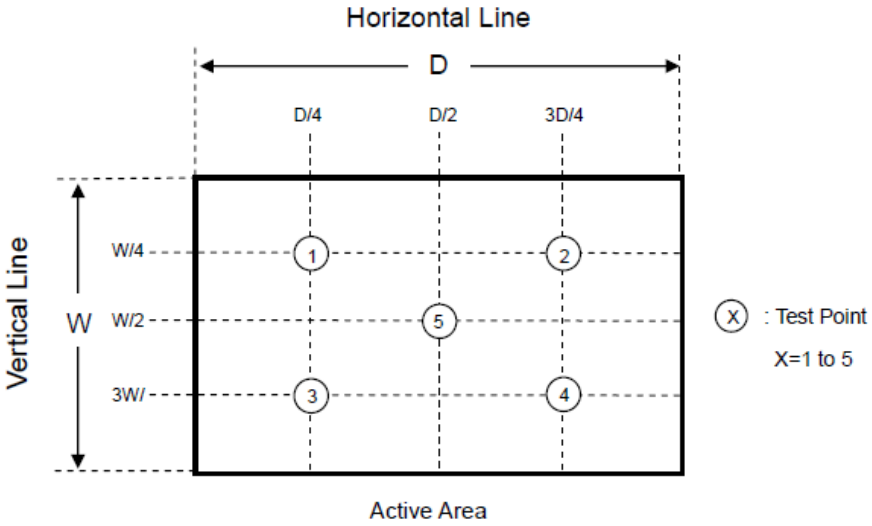
The LCD module should be stabilized at given temperature for 20 minutes to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting Backlight for 20 minutes in a windless room.



Note 6 ： Definition of White Variation (δW):

Measure the luminance of gray level 255 at 5 points

$$\delta W = \frac{\text{Maximum [L (1), L (2), L (3), L (4), L (5)]}}{\text{Minimum [L (1), L (2), L (3), L (4), L (5)]}}$$



11. QUALITY ASSURANCE

11.1 Test Condition

11.1.1 Temperature and Humidity (Ambient Temperature)

Temperature : 25 ± 5°C
Humidity : 65 ± 5%

11.1.2 Operation

Unless specified otherwise, test will be conducted under function state.

11.1.3 Container

Unless specified otherwise, vibration test will be conducted to the product itself without putting it in a container.

11.1.4 Test Frequency

In case of related to deterioration such as shock test. It will be conducted only once.

11.1.5 Test Method

Reliability Test Item & Level		Test Level	Remark
No.	Test Item		
1	High Temperature Storage Test	T=70°C,240hrs	Note1,2 (IEC68-2-2)
2	Low Temperature Storage Test	T=-40°C,240hrs	Note1,2 (IEC68-2-1)
3	Thermal Cycling Test (No operation)	-30°C/30min→25°C/5 min →70°C/30min; 100cycles, 1 hour/cycle	Note1,2 (IEC68-2-14)
4	High Temperature Operation Test	T=70°C,240hrs	Note1,2 (IEC68-2-2)
5	Low Temperature Operation Test	T=-30°C,240hrs	Note1,2 (IEC68-2-1)
6	High Temperature and High Humidity Operation Test	T=60°C,90%RH,240hrs	Note1,2 (IEC68-2-3)
7	ESD Test	State: operating Location: LCM/TP surface Condition:150pf 330Ω Contact +/- 4kV Air +/-8kV Criteria: Class C	Note2 (IEC61000-4-2)
8	Shock test (No operation)	50G, 11ms, half sine wave, 1 time for ± X, ± Y, ± Z direction	Note 2(IEC68-2-27)
9	Vibration Test (No operation)	1.5G, 10 ~ 300 Hz sine wave, 10 min/cycle, 3 cycles each X, Y, Z direction	Note2 (IEC68-2-6)

Note 1： No condensation of water.
Note 2： No display malfunction.
Note 3： Temperature of panel display surface area should be 90°C Max.

12. APPEARANCE SPECIFICATION

12.1 Inspection condition

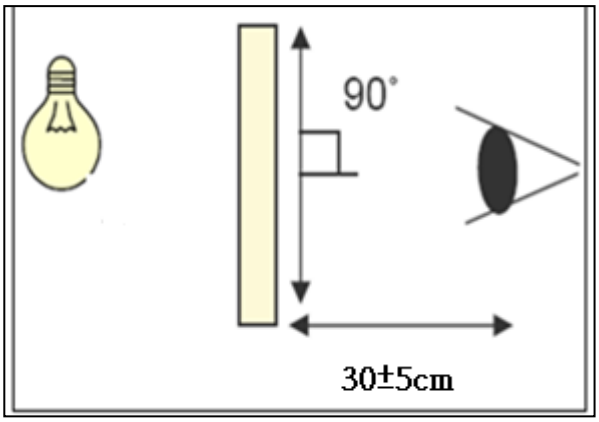
12.1.1 Inspection conditions

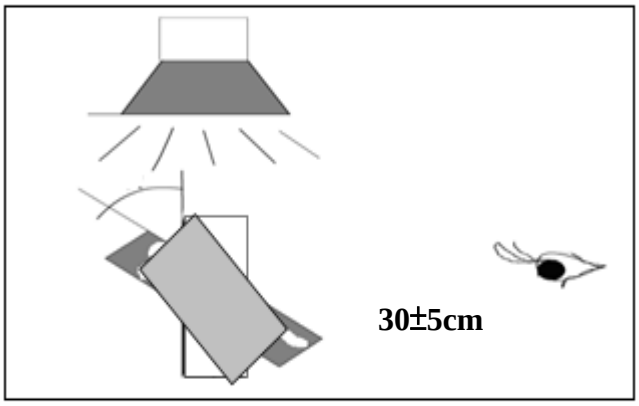
12.1.1.1 Inspection Distance : 30 ± 5 cm

12.1.1.2 View Angle :

(1) Inspection that light pervious to the product: 90±15°

(2) Inspection that light reflects on the product: 90±15°



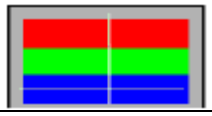


12.1.2 Environment conditions

Ambient Temperature :	25±5℃
Ambient Humidity :	30~75%RH
Ambient Illumination	600~800 lux

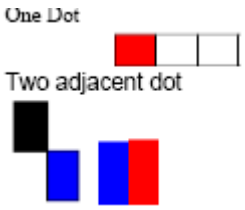
12.2 Inspection Parameters

Appearance inspection standard (D: diameter, L: length; W: width, Z: height, T: glass thickness)

Inspection item	Inspection standard	Description
No image	Prohibited	
Image abnormal	Prohibited	
Bright line	Prohibited	
Thin line	It is acceptable that the defect can not be seen with 10% ND filter.	
Mura	It is acceptable that the defect can not be seen with 5% ND filter.	

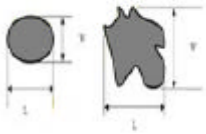
Dot

Item	Acceptable Visible area	Total
Bright dot	3	6
Dark dot	5	
Bright adjacent dots	1	1
Dark adjacent dots	2	2
Adjacent dots with a bright dot and a dark dot	2	2



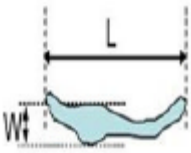
Foreign material in dot shape

SPEC (unit: mm)	Acceptable
D≦0.5	Ignored
0.5<D≦0.8, distance>5	n≦5
D＞0.8	0



Foreign material in line shape

SPEC	Acceptable
W≦0.05 and L≦10	Ignored
0.05<W≦0.1, L≦10, distance >5	n≦5
W>0.1 or L>10	0



Contamination

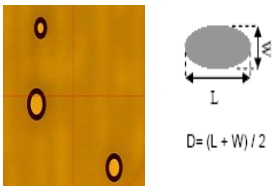
It is acceptable if the dirt can be wiped.

Scratch

SPEC	Acceptable
W≦0.05 and L≦10	Ignored
0.05<W≦0.08, L≦10, distance >5	n≦5
0.08<W≦0.1, L≦10, distance >5	n≦3
W>0.1 or L>10	0

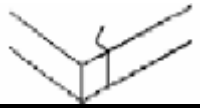
Bubble

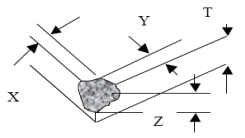
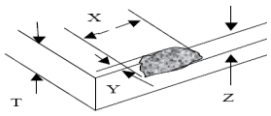
SPEC (unit: mm)	Acceptable
D≦0.3	Ignored
Non visible area	Ignored
0.3<D≦0.5, distance >5	n≦5
D＞0.5	0



Cover & Sensor Crack

Prohibited



Cover angle missing	SPEC (unit: mm) / Acceptable Side/Bottom / Ignored It is prohibited if the defect appears on the front. / 0	
Cover edge break	SPEC (unit: mm) / Acceptable X≦3.0, Y≦3.0, Z≦T / Ignored X>3.0, Y>3.0, Z＞T / 0	
Inspection item	SPEC	Description
Ink	SPEC (unit: mm) / Acceptable word unclear, inverted, mistake, break line / 0	
Bubble under protection film	SPEC (unit: mm) / Acceptable NA	
Function	Prohibited	

12.3 Sampling Condition

Unless otherwise agree in written, the sampling inspection shall be applied to the incoming inspection of customer.
Lot size: Quantity of shipment lot per model.
Sampling type: normal inspection, single sampling
Sampling table: MIL-STD-105E
Inspection level: Level II

Class of defects	**Definition**		
	Major	AQL 0.65	It is a defect that is likely to result in failure or to reduce materially the usability of the product for the intended function.
	Minor	AQL 1.5	It is a defect that will not result in functioning problem with deviation classified.

13. PRODUCT LABEL DEFINE

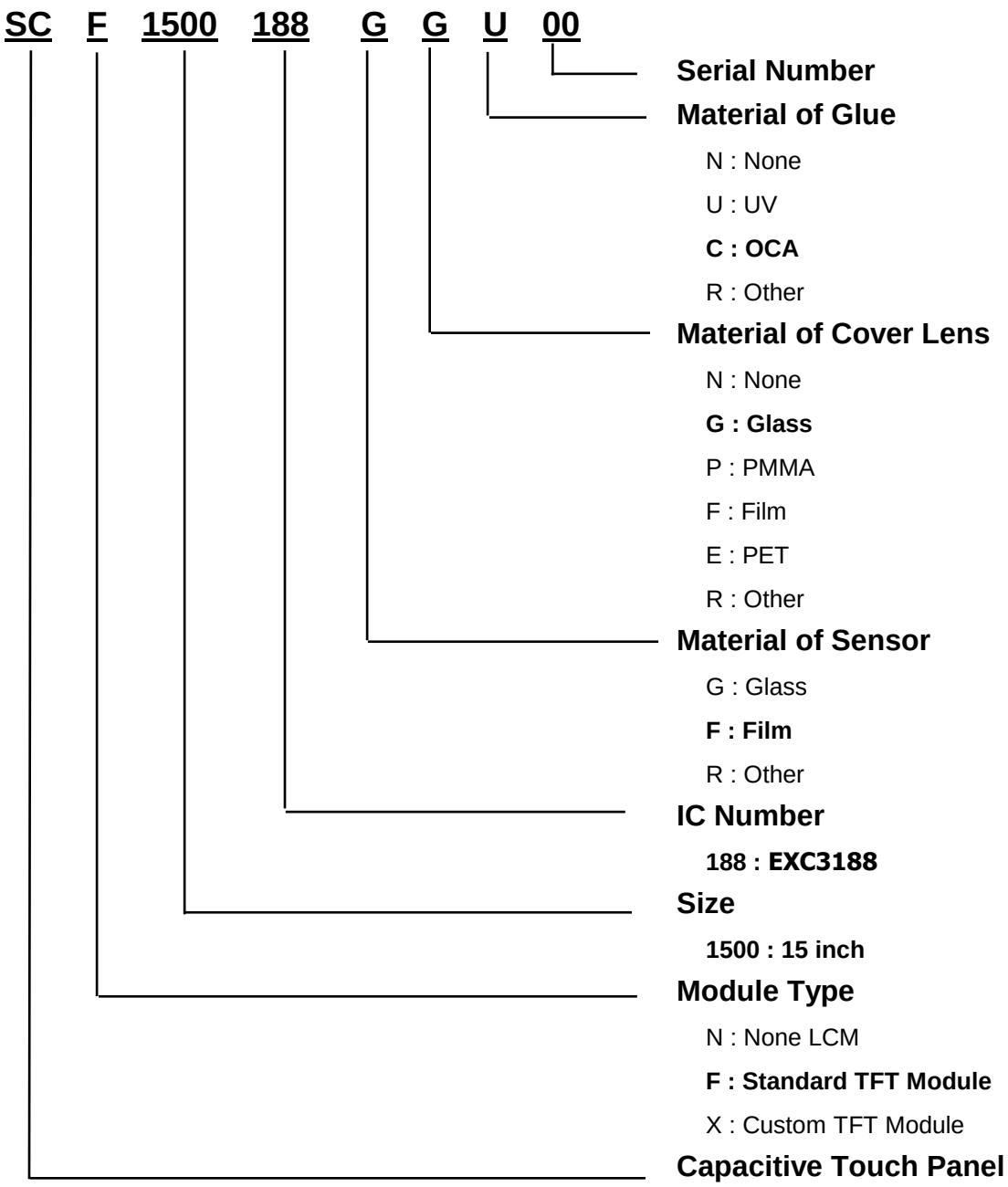
Product Label style:

Bar Code Define:

A A 6 0014 2 10 26-0013

- Serial number of the products
  Serial number starts from 0000
  Every work order is 10K at most
- Week of production
- Year of production
- Storage area
- Serial number of work order
  Serial number starts from 0000 each
- Month of work order
- Year of work order
- The first 3 numbers of work order

Product Name Define:



14. PRECAUTIONS IN USE LCM

1. ASSEMBLY PRECAUTIONS
   (1) You must mount a module using holes arranged in four corners or four sides.

   (2) You should consider the mounting structure so that uneven force (ex. Twisted stress) is not applied to the module. And the case on which a module is mounted should have sufficient strength so that external force is not transmitted directly to the module.
   (3) Do not touch, push or rub the exposed polarizers with glass, tweezers or anything harder than HB pencil lead. And please do not rub with dust clothes with chemical treatment.
   (4) Wipe off saliva or water drops as soon as possible. Their long time contact with polarizer causes deformations and color fading.
   (5) Do not open the case because inside circuits do not have sufficient strength.
   (6) Please do not take a LCD module to pieces and reconstruct it. Resolving and reconstructing modules may cause them not to work well.
   (7) Please do not touch metal frames with bare hands and soiled gloves. A color change of the metal frames can happen during a long preservation of soiled LCD modules.
   (8) Please pay attention to handling lead wire of backlight so that it is not tugged in connecting with inverter.

2. OPERATING PRECAUTIONS
   (1) Please be sure to turn off the power supply before connecting and disconnecting signal input cable.
   (2) Please do not change variable resistance settings in LCD module. They are adjusted to the most suitable value. If they are changed, it might happen LCD does not satisfy the characteristics specification
   (3) Be careful for condensation at sudden temperature change. Condensation makes damage to polarizer or electrical contacted parts. And after fading condensation, smear or spot will occur.
   (4) When fixed patterns are displayed for a long time, remnant image is likely to occur.
   (5) Module has high frequency circuits. Sufficient suppression to the electromagnetic interference shall be done by system manufacturers. Grounding and shielding methods may be important to minimize the interference.
   (6) Please consider that LCD backlight takes longer time to become stable of radiation characteristics in low temperature than in room temperature.

3. ELECTROSTATIC DISCHARGE CONTROL
   (1) The operator should be grounded whenever he/she comes into contact with the module. Never touch any of the conductive parts such the copper leads on the PCB and the interface terminals with any parts of the human body.
   (2) The modules should be kept in antistatic bags or other containers resistant to static for storage.
   (3) Only properly grounded soldering irons should be used.
   (4) If an electric screwdriver is used, it should be well grounded and shielded from commutator sparks.
   (5) The normal static prevention measures should be observed for work clothes and working benches; for the latter conductive (rubber) mat is recommended
   (6) Since dry air is inductive to statics, a relative humidity of 50-60% is recommended.

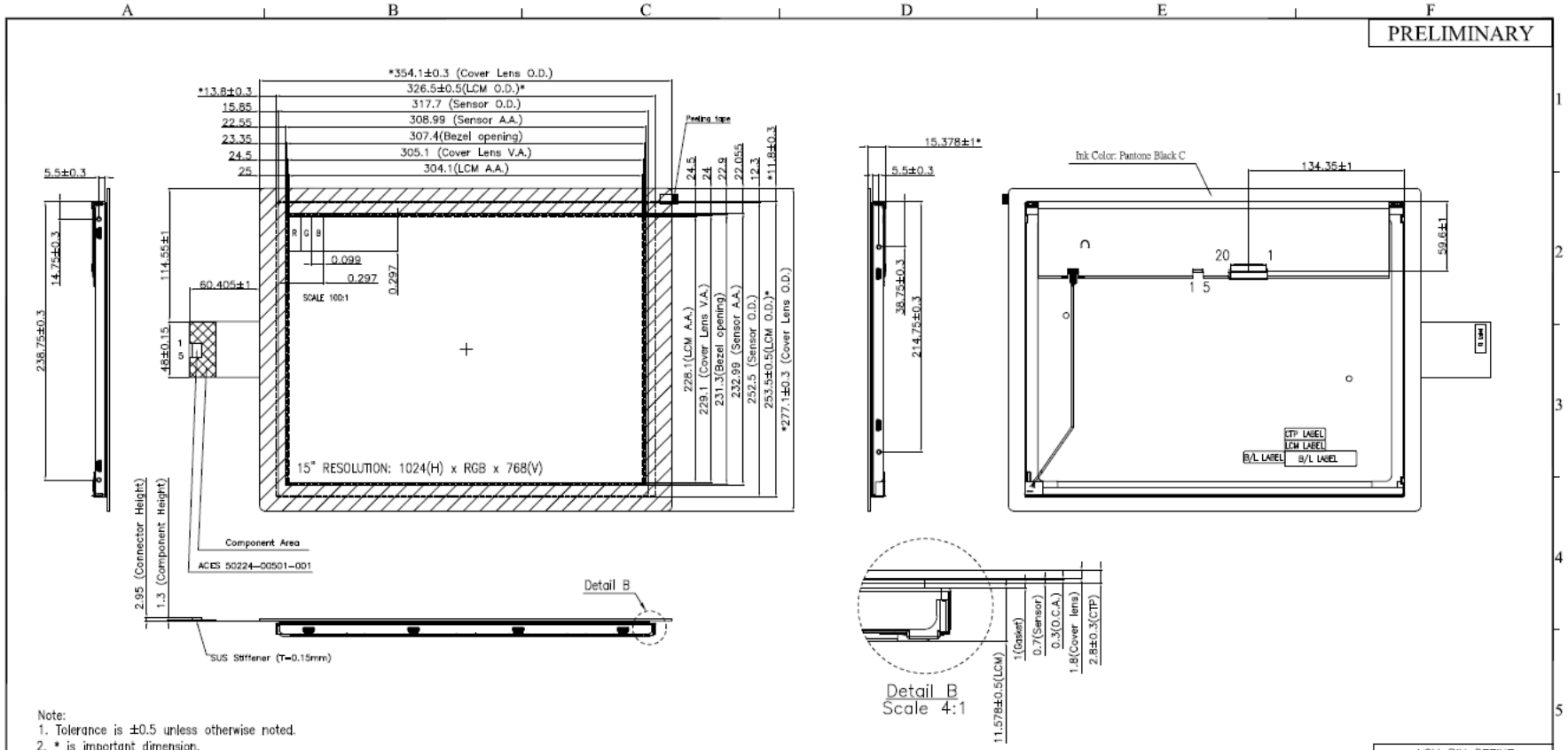
4. STORAGE PRECAUTIONS
   (1) When you store LCDs for a long time, it is recommended to keep the temperature between 0°C-40°C without the exposure of sunlight and to keep the humidity less than 90%RH.
   (2) Please do not leave the LCDs in the environment of high humidity and high temperature such as 60°C 90%RH
   (3) Please do not leave the LCDs in the environment of low temperature; below -20°C.

5. OTHERS
   (1) A strong incident light into LCD panel might cause display characteristics' changing inferior because of polarizer film, color filter, and other materials becoming inferior. Please do not expose LCD module direct sunlight Land strong UV rays
   (2) Please pay attention to a panel side of LCD module not to contact with other materials in preserving it alone.
   (3) For the packaging box, please pay attention to the followings:
   (4) Please do not pile them up more than 5 boxes. (They are not designed so.) And please do not turn over.
   (5) Please handle packaging box with care not to give them sudden shock and vibrations. And also please do not throw them up.
   (6) Packing box and inner case for LCDs are made of cardboard. So please pay attention not to get them wet. (Such like keeping them in high humidity or wet place can occur getting them wet.)

6. LIMITED WARRANTY

Unless otherwise agreed between DATA IMAGE and customer, DATA IMAGE will replace or repair any of its LCD and LCM which is found to be defective electrically and visually when inspected in accordance with DATA IMAGE acceptance standards, for a period on one year from date of shipment. Confirmation of such date shall be based on freight documents. The warranty liability of DATA IMAGE is limited to repair and/or replacement on the terms set forth above. DATA IMAGE will not responsible for any subsequent or consequential events.

15. OUTLINE DRAWING



Note:
1. Tolerance is ±0.5 unless otherwise noted.
2. * is important dimension.
3. Center brightness: 210 cd/m² (Typ.),170 cd/m² (Min.)
4. LCM connector: Entery 3804K-F20N-10L or equivalent.
   LCM matching connector: Entery H204K-D20N-02B or equivalent.
5. Backlight connector: Entery 3808K-F05N-03L or equivalent.
   Backlight matching connector: Entery H208K-P05N-02B or equivalent.
6. CTP matching connector: ACES 50233-005H0H0-001 or equivalent.
7. Torque of M3 user hole should be within 4 kgf-cm and re-screw 10 times.
8. M3 screw length is 3.0mm Max.
9. For RoHS.

CTP PIN FUNCTION	
1	VDD
2	D-
3	D+
4	GND_E
5	GND_E

B/L PIN FUNCTION	
1	Vi
2	V_GND
3	EN
4	ADJ
5	NC

LCM PIN DEFINE			
1	VCC	11	RX2-
2	VCC	12	RX2+
3	GND	13	GND
4	LR/UD	14	RXCLK-
5	RX0-	15	RXCLK+
6	RX0+	16	GND
7	GND	17	RX3-
8	RX1-	18	RX3+
9	RX1+	19	GND
10	GND	20	SEL68

AUTH	DESCRIPTION	DATE	APPROVED
	ESR0405027		

REVISIONS

DATE:	2015/06/09
DRAWN:	
CHECK:	
APPROVE:	

TITLE: CTP Module outline dimension

DWG. NO.	SCF1500188GGU00		
UNITS M M		REV.	1
SCALE 1 / 1	SHEET 1 OF 1		

DATA IMAGE

16. PACKAGE INFORMATION

TBD