



Display Future Ltd

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LCD MODULE SPECIFICATION

Model: DF-SSC1052---M1

This module uses ROHS materials

For customer acceptance

Customer		date
Approved		
Comments		

The standard product specification may change without prior notice in order to improve performance or quality. Please contact Display Future Ltd for updated specification and product status before design for the standard product or release of the order.

Revision	1.0
Engineering	
Date	2018/01/4
Our Reference	

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1. GENERAL SPECIFICATIONS

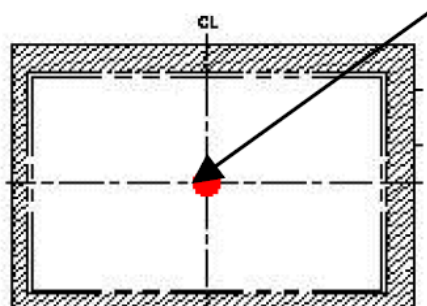
Composition: 10.4inch Capacitive Touch Panel (CTP).

Interface: I²C for the CTP.

Item	Specification	Unit
Type	Transparent type projected capacitive touch panel	
Input mode	Human's finger	
Finger	10	
Outline Dimension	228.4(W) x 175.4(H) x 1.775 (D)	mm
Sensor Active area	213.2(W) x 160.95(H)	mm
Transparency	≥ 85%	%
Haze	≤ 5.0%	%
Hardness	7H (typ.) [by JIS K5400]	Pencil hardness
Weight	T.B.D	g
Report rate	200(Max)	Points/sec
Response time	11(Max)	ms
Origin Point	The upper left corner	
Point hitting life time	1,000,000 times min.	Note 1

Note 1: Use 8 mm diameter silicon rubber/force 3N to knock on central point twice per second (no-operating), function pass after test.

central point



2. ABSOLUTE MAXIMUM RATINGS

Symbol	Description	Min	Typ.	Max	Unit	Notes
VCC	Power Supply voltage	-0.3	-	+5.5	V	
Vio	I/O input voltage	-0.3	-	VCC+0.3	V	

3. ELECTRICAL CHARACTERISTICS

Symbol	Description	Min	Typ.	Max	Unit	Notes
VCC	Power Supply voltage	2.7	-	5.5	V	
GND	Power Ground	-0.3	-	-	V	
I _{normal}	Normal operation mode	-	30	-	mA	At VCC=3.3V
I _{sleep}	Sleep Mode	-	15	-	uA	
V _{IH}	Input H voltage	0.4VCC	-	VCC+0.5	V	
V _{IL}	Input L voltage	-0.3	-	0.2VCC	V	

4. TIMING SPECIFICATIONS

4.1 Figure4-1 is the waveform of I2C fast mode timing

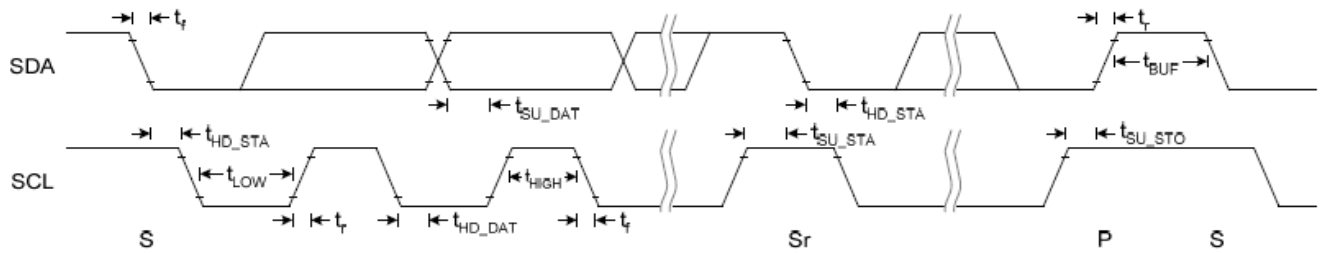


Figure4-1 I2C Waveform

Table is the timing characteristic of I2C fast mode plus

Conditions: VCC=3.3V, GND=0V, T_{OP}=25

Parameter	Symbol	Specification			
		MIN.	TYP.	MAX.	UNIT
SCL clock frequency	fSCL	0	-	1000	kHz
Low period of the SCL clock	tLOW	0.5	-	-	us
High period of the SCL clock	tHIGH	0.26	-	-	us
Set up time for a repeated START condition	tSU_STA	0.26	-	-	us
Hold time for a repeated START condition. After this period, the first clock pulse is generated	tHD_STA	0.26	-	-	us
Data set up time	tSU DAT	50	-	-	ns
Data hold time	tHD DAT	0	-	-	us
Signal falling time of SDA and SCL	t _f	-	-	120	ns
Signal rising time of SDA and SCL	t _r	-	-	120	ns
Data set up time	tSU DAT	100	-	-	ns
Data hold time	tHD DAT	0	-	0.9	us
Set up time for STOP condition	tSU_STO	0.26	-	-	us
Bus free time between a STOP and START condition	tBUF	0.5	-	-	us
Capacitive load for each bus line	C _b	-	-	550	pF

4.2 I2C Interface Protocol

4.2.1 Default I2C Address

The default I2C Address of NCB30x1 is 0x55 (7-bit address)

4.2.2 Register Read

For reading the registers value from NCB30x1, the I2C host has to tell the NCB30x1 the “start register address” before reading the corresponding register value.

I2C	I2C	Start Reg.	Start Reg.	I2C	I2C	I2C	Value of	Value of	...	Value of	I2C
Start	Addr(W)	Addr.LB(a)	Addr.HB(a)	Stop	Start	Addr(R)	Reg(a)	Reg(a+1)	...	Reg(a+n)	Stop

4.2.3 Register Write

For writing the registers of NCB30x1, the host has to tell the NCB30x1 the “start register address”. Register value would be written to the register with address starting from the “start register address”

I2C	I2C	Start Reg.	Start Reg.	Value of	Value of	...	Value of	I2C
Start	Addr(W)	Addr.LB(a)	Addr.HB(a)	Reg(a)	Reg(a+1)	...	Reg(a+n)	Stop

4.3 Register Definitions

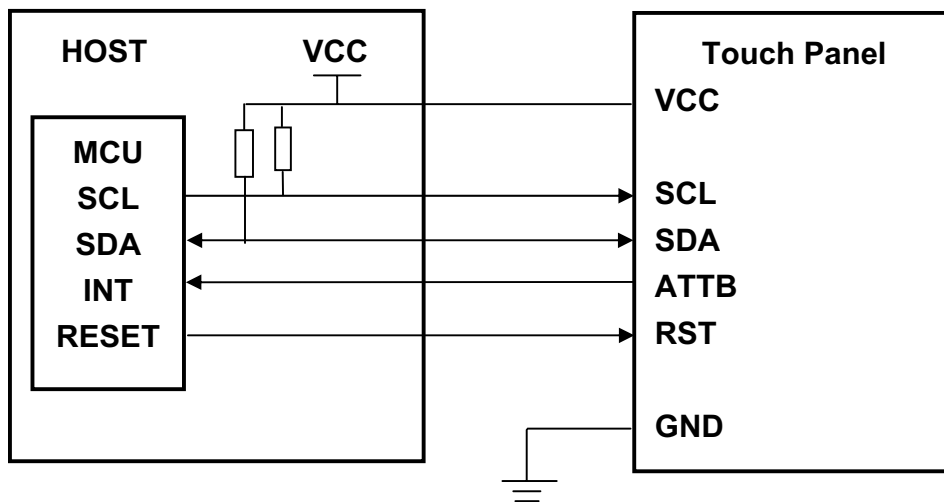
NCB30x1 provides an register interface for host to configure device attributes and retrieve information. The registers are listed bellow.

Register Addr	Name	Attribute	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0	
0x00F9	ReportID	R	ReportID for								
0x00FA	Message1	R	Message								
0x00FB	Message2	R	Message								
0x00FC	Message3	R	Message								
0x00FD	Message4	R	Message								
0x00FE	Message5	R	Message								
0x00FF	Message6	R	Message								
0x0100	Message7	R	Message								
0x0101	Reserved	Reserved	Reser								
0x0102	Reset	R/W	Re								
0x0103	BackUpNV	R/W	Backup								
0x0104	Calibrate	R/W	Calibr								
0x0105	ReportAll	R/W	Report Current								
0x0106	Reserved	Reserved	Reser								
0x0107	Diagnostic	R/W	Diagnostic Debug Command								
0x0108	IdleAcqInt	R/W	Idle Acquisition								
0x0109	ActAcqInt	R/W	Active Acquisition								
0x010A	Reserved	Reserved	Reser								
0x010B	Orient	R/W	Reserved				InvertY	InvertX	Switch		
0x010C	XRangeLsB	R/W	X Resolution Low								
0x010D	XRangeMsB	R/W	X Resolution High								
0x010E	YRangeLsB	R/W	Y Resolution Low								
0x010F	YRangeMsB	R/W	Y Resolution High								

5. PIN CONNECTIONS

No.	Name	I/O	Description
1	VCC	P	Power; VCC=3.3V(typ.)
2	GND	P	Power ground
3	RST	I	Active Low global reset signal input. Normally pull high.
4	SCL	I	Clock; 100KHz
5	SDA	I/O	Serial data access
6	ATTB	O	Active low when data output from touch panel
7	NC	-	No connect
8	NC	-	No connect

6. BLOCK DIAGRA



Note : 1. USE APPROPRIATE RESISTOR VALUE DURING HIGH SPEED SCL CLOCK.
 SUGGESTION : RESISTOR RECOMMENDATION : 2.2K ohm.

7. Appearance Specification

7.1 Inspection condition

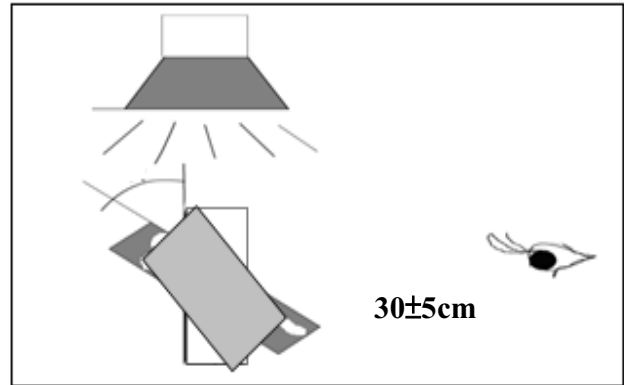
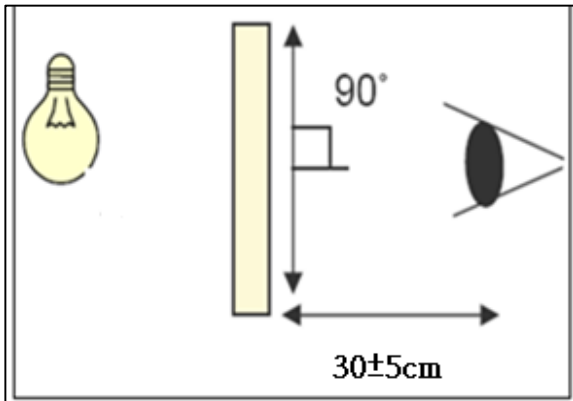
7.1.1 Inspection conditions

7.1.1.1 Inspection Distance : 30 ± 5 cm

7.1.1.2 View Angle :

(1) Inspection that light pervious to the product: $90 \pm 15^\circ$

(2) Inspection that light reflects on the product: $90 \pm 15^\circ$



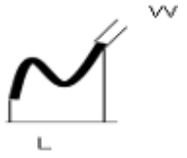
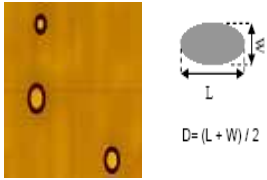
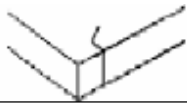
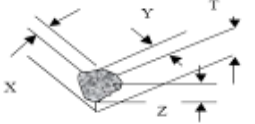
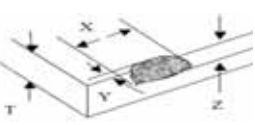
7.1.2 Environment conditions :

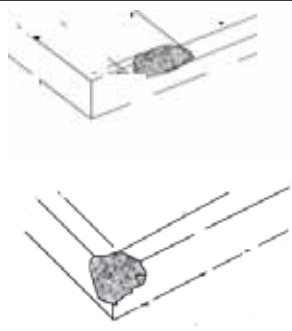

Ambient Temperature :	$25 \pm 5^\circ\text{C}$
Ambient Humidity :	30~75%RH
Ambient Illumination	600~800 lux

7.2 Inspection Parameters

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

Inspection item	Inspection standard		Description
Foreign material in dot shape	SPEC (unit: mm)	Acceptable	<p>$D = (L + W) / 2$</p>
	$D \leq 0.5$	Ignored	
	$0.5 < D \leq 0.8, \text{ distance} > 5$	$n \leq 3$	
	$D > 0.8$	0	
Foreign material in line shape	SPEC	Acceptable	<p>L : Long W : Width</p>
	$W \leq 0.05$ and $L \leq 7$	Ignored	
	$0.05 < W \leq 0.08, L \leq 7, \text{ distance} > 5$	$n \leq 3$	
	$W > 0.08$ or $L > 7$	0	
Contamination	It is acceptable if the dirt can be wiped.		

Scratch	SPEC	Acceptable	
	$W \leq 0.05$ and $L \leq 7$	Ignored	
	$0.05 < W \leq 0.08$, $L \leq 7$, distance > 5	$n \leq 3$	
	$0.08 < W \leq 0.1$, $L \leq 7$, distance > 5	$n \leq 2$	
	$W > 0.1$ or $L > 7$	0	
Inspection item	SPEC		Description
Bubble	SPEC (unit: mm)	Acceptable	
	$D \leq 0.2$	Ignored	
	Non visible area	Ignored	
	$0.2 < D \leq 0.3$, distance > 5	$n \leq 3$	
	$D > 0.3$	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	
Inspection item	SPEC		Description
Cover edge break	SPEC (unit: mm)	Acceptable	
	$X \leq 2.0$, $Y \leq 2.0$, $Z \leq T$	Ignored	
	$X > 2.0$, $Y > 2.0$, $Z > T$	0	

Sensor angle missing/edge break	SPEC (unit: mm)	Acceptable	
	Damage circuit or function.	0	
	It can be seen from the front of cover visible area.	0	
Sensor flange	SPEC (unit: mm)	Acceptable	
	Do not affect assembly.	Ignored	
Ink	SPEC (unit: mm)	Acceptable	
	word unclear, inverted, mistake, break line	0	
Bubble under protection film	SPEC (unit: mm)	Acceptable	
	NA		
Function	Prohibited		

7.3 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.

8. QUALITY ASSURANCE

8.1 Test Condition

8.1.1 Temperature and Humidity(Ambient Temperature)

Temperature : $25 \pm 5^{\circ}\text{C}$

Humidity : $65 \pm 5\%$

8.1.2 Operation

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

8.1.3 Container

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

8.1.4 Test Frequency

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

8.1.5 Test Method

Reliability Test Item & Level		Test Level	Remark
No.	Test Item		
1	High Temperature Storage Test	Ta=80°C,240hrs	IEC68-2-2
2	Low Temperature Storage Test	Ta=-30°C,240hrs	IEC68-2-1
3	High Temperature Operation Test	Ta=70°C,240hrs	IEC68-2-2
4	Low Temperature Operation Test	Ta=-20°C,240hrs	IEC68-2-1
5	High Temperature and High Humidity Operation Test	Ta=70°C,80%RH,240hrs	IEC68-2-3
6	ESD TEST	150pF, 330Ω, ±6KV(Contact)/±8KV(Air),	IEC-61000-4-2
7	Thermal Cycling Test (No operation)	-20°C → +25°C → 70°C, 100 Cycles (Dry) 30 min 5 min 30 min	IEC68-2-14
8	Vibration Test (No operation)	Sine wave, 10~500Hz, 1.5G, 0.37oct/min 3axis, 1 hour/axis	IEC68-2-6

9. PRECAUTIONS IN USE CTP

1. ASSEMBLY PRECAUTIONS

- (1) Since Touch Panel is consist of glass, please be careful your hands to be injured during handing. You must wear gloves during handing.
- (2) Do not touch, push or rub the exposed touch panel, tweezers or anything harder than HB pencil lead. And please do not rub with dust clothes with chemical treatment.
- (3) Do not stack the touch panels together. Do not put heavy objects on touch panel.
- (4) Please do not take a CTP to pieces and reconstruct it. Resolving and reconstructing modules may cause them not to work well.
- (5) Please excessive force or strain to the panel or tail is prohibited, Do not lift touch panel by cable(FPC).
- (6) Use clean sacks or glove to prevent fingerprints and/or stains left on the panel. Extra attention and carefulness should be taken while handling the glass edge.
- (7) Please pay attention for the matters stated below at mounting design of touch panel enclosure.
Enclosure support to fix touch panel must be out of active area.(do not design enclosure presses the active area to protect from miss put)

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 CTP. They are adjusted to the most suitable value. If they are changed, it might happen CTP does not satisfy the characteristics specification
- (3) Be careful for condensation at sudden temperature change. Condensation makes damage to sensor or electrical contacted parts.
- (4) CTP 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.
- (5) Touch the panel with your finger or stylus only to assure normal operation. Any sharp edged or hard objects are prohibited.
- (6) Operate the panel in a steady environment. Abrupt variation on temperature and humidity may cause malfunction of the panel.

3. ELECTROSTATIC DISCHARGE CONTROL

- (1) The operator should be grounded whenever he/she comes into contact with the CTP. Never touch any of the conductive parts such the copper leads on the FPC and the interface terminals with any parts of the human body.

- (2) The CTP 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 commentator 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.

5. STORAGE PRECAUTIONS

- (1) When you store touch panel 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 touch panel in the environment of high humidity and high temperature such as 60°C 90%RH
- (3) Please do not leave touch panel in the environment of low temperature; below -20°C.

6. OTHERS

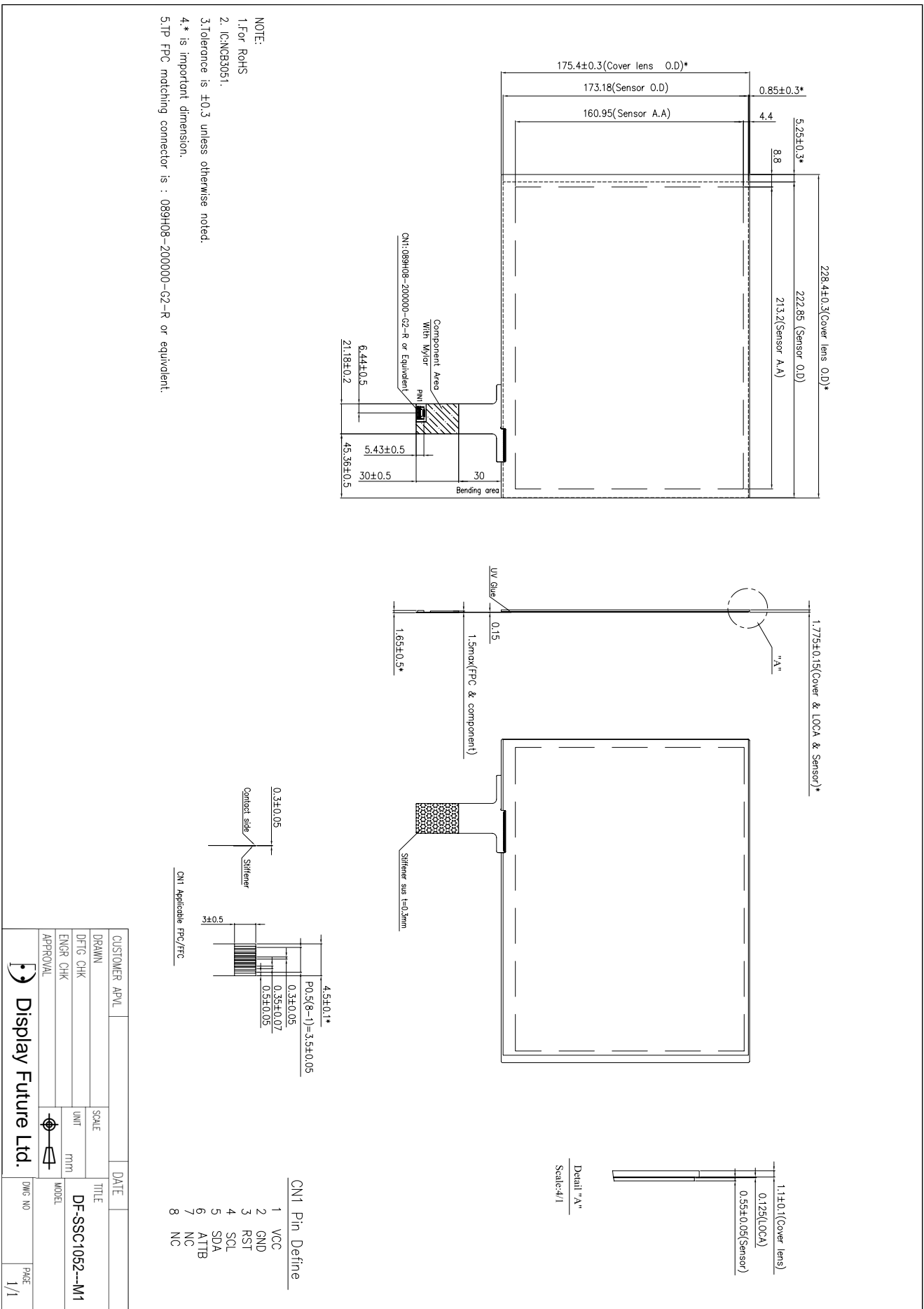
For the packaging box, please pay attention to the followings:

- a. Please do not pile them up more than 5 boxes. (They are not designed so.) And please do not turn over.
- b. Please handle packaging box with care not to give them sudden shock and vibrations. And also please do not throw them up.
- c. Packing box and inner case for CTP 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.)

7. LIMITED WARRANTY

Unless otherwise agreed between Display Future and customer, Display Future will replace or repair any of its CTP which is found to be defective electrically and visually when inspected in accordance with Display Future 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 Display Future is limited to repair and/or replacement on the terms set forth above. Display Future will not responsible for any subsequent or consequential events.

13. OUTLINE DRAWING



CUSTOMER APPL	DATE
DRAWN	SCALE
DFTG CHK	UNIT
ENGR CHK	mm
APPROVAL	MODEL
DWG NO	PAGE
	1/1