HY-LINE®
COMPUTER COMPONENTS

VGA-TFT-PCAP-Modul Datenblatt

Modell SCF0507827GGU01

Kurzdaten

Hersteller	Data Image
Diagonale	5,7“ / 14,5 cm
Format	4:3
Auflösung	640 x 480
Backlight	LED / 340 cd/m²
Interface	RGB
Touchscreen	ja
Temperatur	-10… +60°C (Betrieb)

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DATA IMAGE

Confidential Document

DATA IMAGE CORPORATION

CTP Module Specification

Preliminary

ITEM NO.: SCF0507827GGU01

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Customer Companies	R&D Dept.	Q.C. Dept.	Eng. Dept.	Prod. Dept.
	JACK	JOE	GARY	KEN
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	4	7/AUG/12’		30

2. RECORD OF REVISION

Rev	Date	Item	Page	Comment
1	9/MAR/12’			Initial preliminary
2	2/JUN/12’	16	31	Modify OUTLINE DRAWING from Rev:1 to 2
3	15/JUL/12’	4 11.3 11.5 17	3 14 15 29	1.Add weight 2.Modify VIH 3.Modify CTP Interface and Data Format 4.Add PACKAGE INFORMATION
4	7/AUG/12’	12 16 17	21 29 30	1.Modify APPEARANCE SPECIFICATION 2.Modify OUTLINE DRAWING from Rev:2 to 3 3.Modify PACKAGE INFORMATION

3. APPLICATION

DVD player, Car TV, UMPC, POS

4. GENERAL SPECIFICATIONS

Parameter	Specifications	Unit
Screen Size	5.7 (diagonal)	inch
Display Format	640(H) x (R,G,B) x 480(V)	dot
LCD Active Area	115.2(W) × 86.4(H) mm	mm
Dot Pitch	0.06(W) × 0.18(H) mm	mm
Pixel Configuration	R.G.B. Stripe	
Outline Dimension	142.75(W) x 113.95(H) x 8.6 (D)	mm
Surface treatment	Clear	
Back-light	LED	
Weight	147(typ)	g
View Angle direction	12 o'clock	

5. ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	MIN.	MAX.	Unit	Remark
Power supply voltage	Vcc	-0.3	5.0	V	
Logic input voltage	VI	-0.3	V_{CC}+0.3	V	
Operating temperature	Top	-10	+60	℃	Ambient temperature
Storage temperature	Tst	-20	+70	℃	Ambient temperature

6. ELECTRICAL CHARACTERISTICS

VSS=0V,DCLK=25MHz,Ta=25℃

Parameter	Symbol	MIN.	Typ.	MAX.	Unit	Remark
Power Supply voltage for LCD	V_{CC}	+3.0	+3.3	+3.6	V	
Power Supply Current for LCD	I_{CC}		111	140	mA	V_{CC} =3.3V
Power Supply voltage for LED	V_{LED}	4.5	5	5.5	V	
Power Supply Current for LED	I_{LED}		333	400	mA	V_{LED} =5.0V
Ripple voltage	V_{RF}	-	-	100	mV_{P-P}	
"H" level logical input voltage	V_{IH}	0.7Vcc	--	Vcc	V	
"L" level logical input voltage	V_{IL}	0	--	0.3Vcc	V	
ADJ frequency		19K	20K	21K	Hz	
ADJ input voltage	VIH	3.0	-	3.3	V	
	VIL	0	-	0.3	V	
LED Dice life time		--	50000	--	Hr	Note 1

Note 1: The "LED dice life time" is defined as the brightness decrease to 50% original brightness that the ambient temperature is 22℃ and LED dice current=20mA.

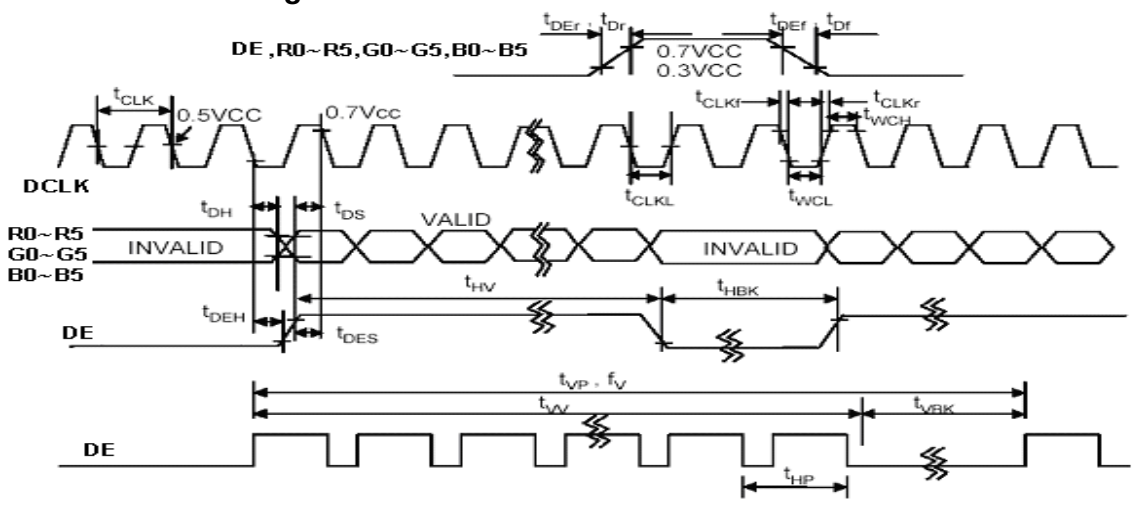
7. INPUT SIGNAL CHARACTERISTICS

7.1 DE mode Input signal characteristics

Signal	Parameter	Symbol	MIN.	TYP.	MAX.	Unit	Remarks
DCLK	Period	t_{CLK}	33	40	43	ns	
	Frequency	f_{CLK}	23	25	30	MHz	
	Low Level Width	t_{WCL}	6	-	-	ns	
	High Level Width	t_{WCH}	6	-	-	ns	
	Rise, Fall Time	t_{CLKr}, t_{CLKf}	-	-	3	ns	
	Duty (1)	-	0.45	0.50	0.55	-	
DE (Data Enable)	Setup Time	t_{DES}	5	-	-	ns	
	Hold Time	t_{DEH}	10	-	-	ns	
	Rise, Fall Time	t_{DEr}, t_{DEf}	-	-	16	ns	
	Horizontal Period	t_{HP}	750	800	900	t_{CLK}	
	Horizontal Valid	t_{HV}	640	640	640	t_{CLK}	
	Horizontal Blank	t_{HBK}	110	160	260	t_{CLK}	
	Vertical Period	t_{VP}	515	525	560	t_{HP}	
	Vertical Valid	t_{W}	480	480	480	t_{HP}	
	Vertical Blank	t_{VBK}	35	45	80	t_{HP}	
	Vertical Frequency	f_{v}	55	60	65	Hz	
Data R,G,B	Setup Time	t_{DS}	5	-	-	ns	
	Hold Time	t_{DH}	10	-	-	ns	
	Rise, Fall Time	t_{Dr}, t_{Df}	-	-	3	ns	

Note: (1) tCLKL / tCLK.

7.1.1 DE mode timing waveform



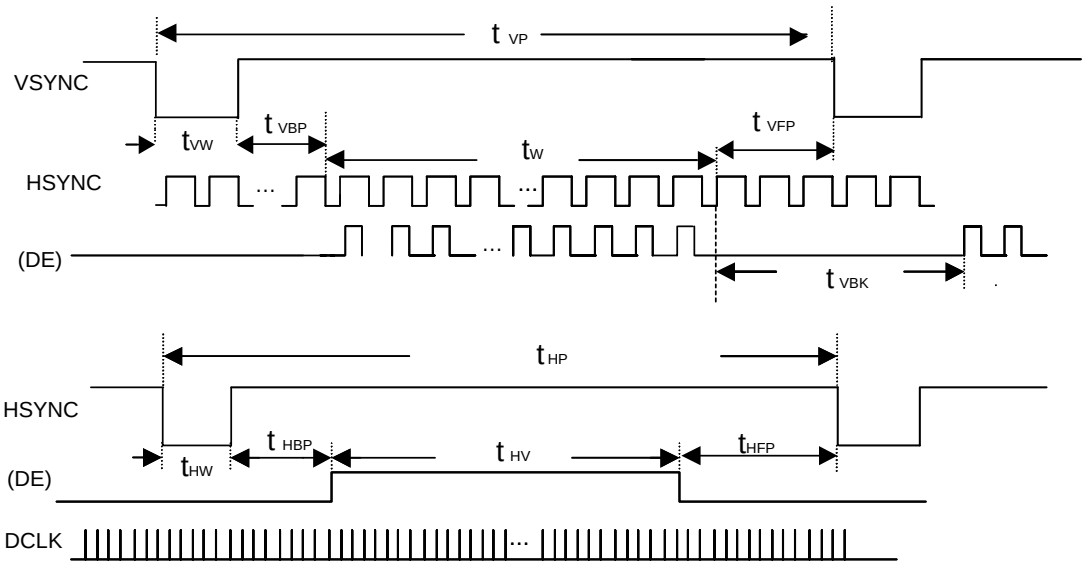
7.2 SYNC mode Input signal characteristics

Parameter	Symbol	MIN.	TYP.	MAX.	Unit	Remarks
Clock Period	t_{CLK}	33	40	43	ns	
Clock Frequency	f_{CLK}	23	25	30	MHz	
Clock Low Level Width	t_{WCL}	6	-	-	ns	
Clock High Level Width	t_{WCH}	6	-	-	ns	
Clock Rise, Fall Time	$t_{CLKr,}t_{CLKf}$	-	-	3	ns	
HSYNC Period	t_{HP}	750	800	900	t_{CLK}	
HSYNC Pulse Width	t_{HW}	5	30	-	t_{CLK}	
HSYNC Front Porch	t_{HFP}	1	16	116	t_{CLK}	
HSYNC Back Porch	t_{HBP}	1	114	139	t_{CLK}	
HSYNC Width + Back Porch	$t_{HW}+t_{HBP}$	144	144	144	t_{CLK}	
Horizontal Blank	t_{HBK}	1	160	260	t_{CLK}	
Horizontal Valid	t_{HV}	640	640	640	t_{CLK}	
VSYNC Period	t_{VP}	515	525	560	t_{HP}	
VSYNC Pulse Width	t_{VW}	1	3	5	t_{HP}	
VSYNC Front Porch	t_{VFP}	1	10	45	t_{HP}	
VSYNC Back Porch	t_{VBP}	30	32	34	t_{HP}	
VSYNC Width + Back Porch	$t_{VW}+t_{VBP}$	35	35	35	t_{CLK}	
Vertical Blank	t_{VBK}	35	45	80	t_{HP}	
Vaild data Width	t_{W}	480	480	480	t_{HP}	
Data Setup Time	t_{DS}	5	-	-	ns	
Data Hold Time	t_{DH}	10	-	-	ns	

Note: (1) tHBK = tHFP + tHW + tHBP

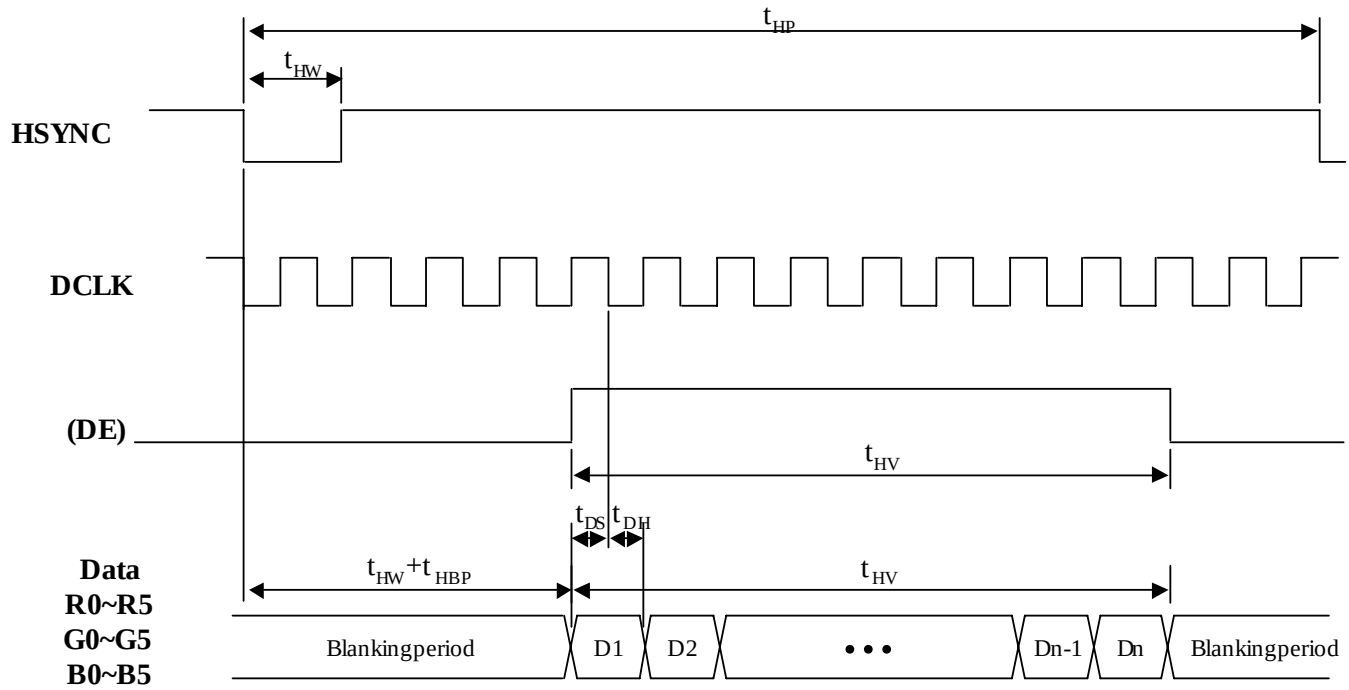
7.2.1 SYNC mode timing waveform

7.2.1.1 Input vertical timing



Remark : If SYNC mode is used, please fix DE signal to low, DE timing waveform is for reference only.

7.2.1.2 Input horizontal timing



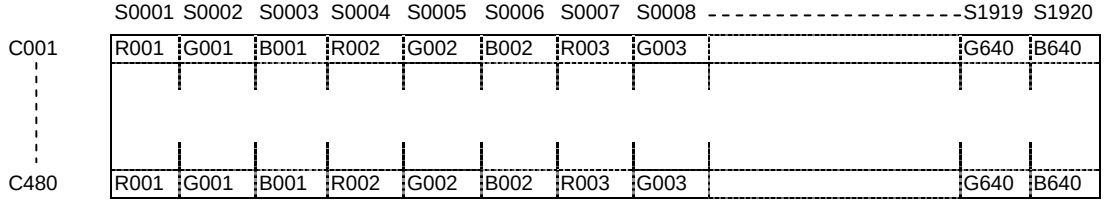
Remark : If SYNC mode is used, please fix DE signal to low, DE timing waveform is for reference only.

7.3 Color Data Assignment

COLOR	INPUT	R DATA						G DATA						B DATA					
	DATA	R5	R4	R3	R2	R1	R0	G5	G4	G3	G2	G1	G0	B5	B4	B3	B2	B1	B0
		MSB					LSB	MSB					LSB	MSB					LSB
BASIC COLOR	BLACK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(63)	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	GREEN(63)	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
	BLUE(63)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1
	CYAN	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1
	MAGENTA	1	1	1	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1
	YELLOW	1	1	1	1	1	1	1	1	1	1	1	1	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
RED	RED(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	1	0	0	0	0	0	0	0	0	0	0	0	0
	RED(2)	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	RED(62)	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(63)	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
GREEN	GREEN(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	1	0	0	0	0	0	0
	GREEN(2)	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	GREEN(62)	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0
	GREEN(63)	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
BLUE	BLUE(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	1
	BLUE(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	BLUE(62)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0
	BLUE(63)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1

Remarks:(1) Definition of Gray Scale
color(n):n is series of Gray Scale
The more n value is, the bright Gray Scale.
(2)Data:1-High,0-Low

Correspondence between Data and Display Position

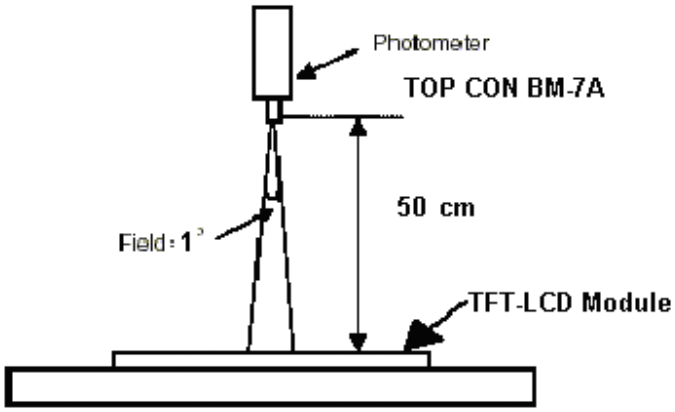


8. OPTICAL CHARACTERISTIC

Parameter		Symbol	Condition	MIN.	TYP.	MAX.	Unit	Remarks
Viewing Angle	Horizontal	θ_x+	Center CR≥10	60	70	--	deg	Note 1,4
		θ_x-		60	70	--		
	Vertical	θ_Y+		50	60	--		
		θ_Y-		30	40	--		
Contrast Ratio		CR	at optimized viewing angle	200	300			Note 1,3
Response time	Rise	Tr	Center θx=θy =0°	-	15		ms	Note 1,6
	Fall	Tf		-	35		ms	
Uniformity		B-uni	θx=θy =0°	70	80	--	%	Note1,5
Brightness		L	θx=θy =0° ADJ=3.3V	---	340	--	cd/m²	Note 1,2
Chromaticity		x_W	Center θx=θy =0°	0.259	0.309	0.359		Note 1,7
		y_W		0.270	0.320	0.370		
		x_R		0.565	0.615	0.665		
		y_R		0.310	0.360	0.410		
		x_G		0.295	0.345	0.395		
		y_G		0.490	0.540	0.590		
		x_B		0.098	0.148	0.198		
		y_B		0.056	0.106	0.156		
Image sticking		tis	2 hours			2	Sec	Note 8

The following optical specifications shall be measured in a darkroom or equivalent state(ambient luminance ≤1 lux, and at room temperature). The operation temperature is 25°C±2°C. The measurement method is shown in Note1.

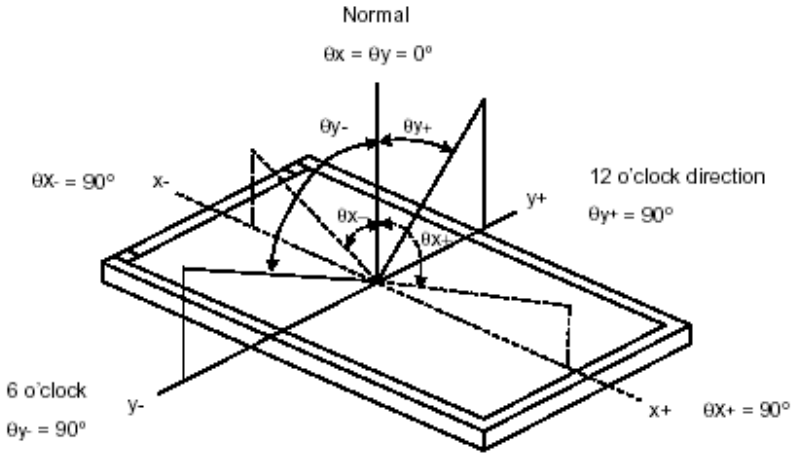
Note1: The method of optical measurement:



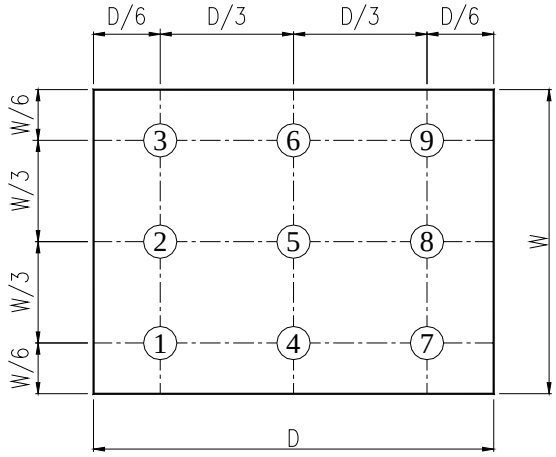
Note2: Measured at the center area of the panel and at the viewing angle of the θx=θy =0°
Note3: Definition of Contrast Ratio (CR):

$$CR = \frac{\text{Luminance with all pixels in white state}}{\text{Luminance with all pixels in Black state}}$$

Note4: Definition of Viewing Angle



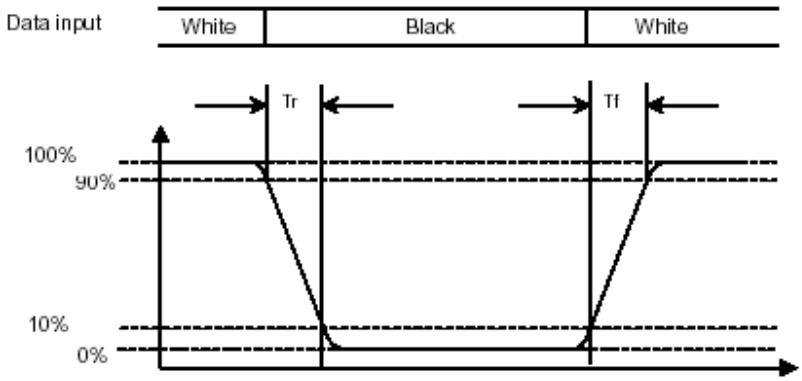
Note 5: Definition of Brightness Uniformity (B-uni):



$$\text{B-uni} = \frac{\text{Minimum luminance of 9 points}}{\text{Maximum luminance of 9points}} \quad \text{(Note 5).}$$

Note6: Definition of Response Time:

The Response Time is set initially by defining the “Rising Time (Tr)” and the “Falling Time (Tf)” respectively. Tr and Tf are defined as following figure.



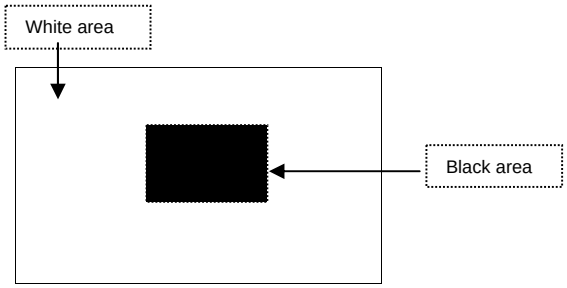
Note 7: Definition of Chromaticity:

The color coordinates (x_W,y_W),(x_R,y_R),(x_G,y_G),and (x_B,y_B) are obtained with all pixels in the viewing field at white, red, green, and blue states, respectively.

Note 8: Definition of Image sticking (tis):

Continuously display the test pattern shown in the figure below for 2 hours. Then display a completely white screen. The previous image shall not persist more than 2 sec at 25 °C

Image sticking pattern



9. PIN CONNECTIONS

Pin NO.	SYMBOL	DESCRIPTION
1	U/D	Up or Down Display Control
2	NC	No Connection
3	HSYNC	Horizontal SYNC.
4	VLED	Power Supply for LED Driver circuit
5	VLED	Power Supply for LED Driver circuit
6	VLED	Power Supply for LED Driver circuit
7	Vcc	Power Supply for LCD
8	VSYNC	Vertical SYNC.
9	DE	Data Enable
10	VSS	Power Ground
11	VSS	Power Ground
12	ADJ	Brightness control for LED B/L
13	B5	Blue Data 5 (MSB)
14	B4	Blue Data 4
15	B3	Blue Data 3
16	Vss	Power Ground
17	B2	Blue Data 2
18	B1	Blue Data 1
19	B0	Blue Data 0 (LSB)
20	Vss	Power Ground
21	G5	Green Data 5 (MSB)
22	G4	Green Data 4
23	G3	Green Data 3
24	Vss	Power Ground
25	G2	Green Data 2
26	G1	Green Data 1
27	G0	Green Data 0 (LSB)
28	Vss	Power Ground
29	R5	Red Data 5 (MSB)
30	R4	Red Data 4
31	R3	Red Data 3
32	Vss	Power Ground
33	R2	Red Data 2
34	R1	Red Data 1
35	R0	Red Data 0
36	VSS	Power Ground
37	VSS	Power Ground
38	DCLK	Clock Signals ; Latch Data at the Falling Edge
39	Vss	Power Ground
40	L/R	Left or Right Display Control

Remarks：
1) ADJ is brightness control Pin. The larger of the pulse duty is, the higher of the brightness.
2) ADJ signal is 0~3.3V.Operation frequency is 20KHz
3) VSS PIN must be grounding, can not be floating.

4) U/D and L/R control Function

L/R	U/D	Function
1	0	Normally display
0	0	Left and Right opposite
1	1	Up and Down opposite
0	1	Left and Right opposite, Up and Down opposite

5)If DE signal is fixed low, SYNC mode is used. Otherwise, DE mode is used.

9.1 Power Signal Sequence

Remarks:

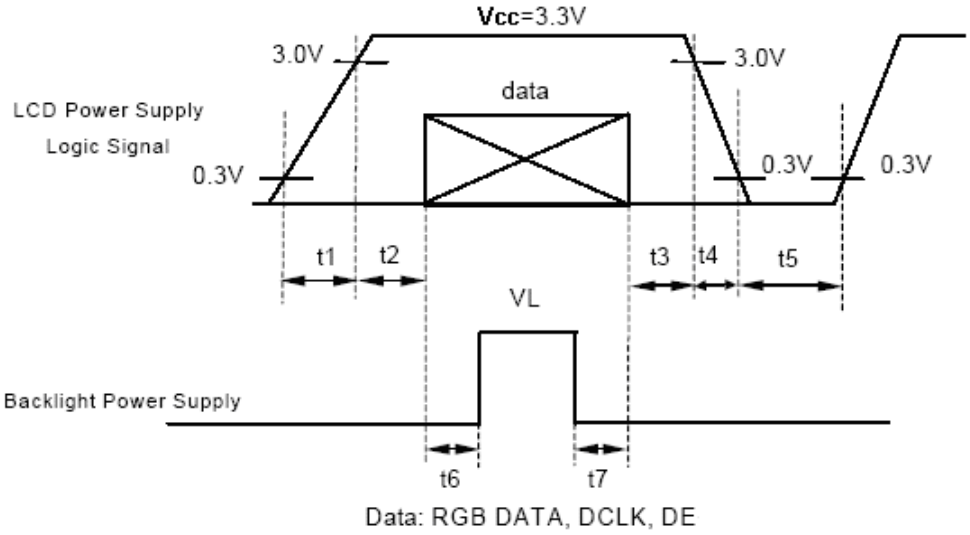
*1) Power Signal sequence:

t1 ≤10ms : 1 sec≤ t5

50ms≤ t2 : 200ms ≤t6

0<t3 ≤50ms: 200ms≤ t7

0<t4 ≤10ms

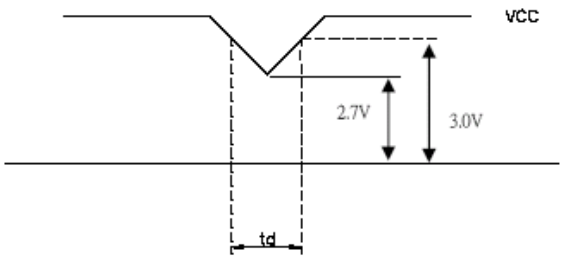


Data: RGB DATA, DCLK, DE

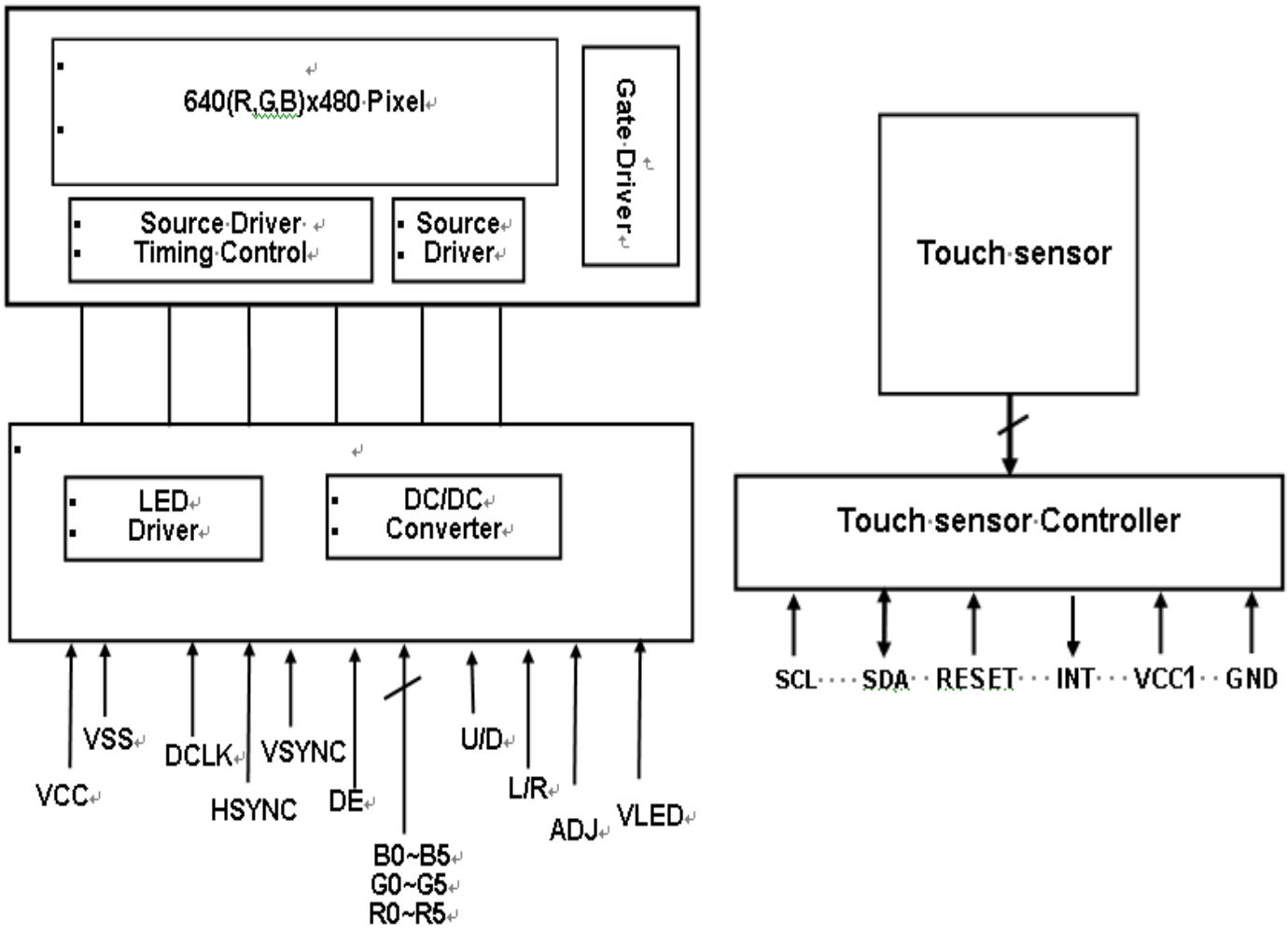
*2) VCC-dip condition:

(1) 2.7 V ≤VCC <3.0V,td ≤ 10 ms

(2) VCC＞3.0V,VCC-dip condition should be the same with VCC-turn-on condition。



10. BLOCK DIAGRAM

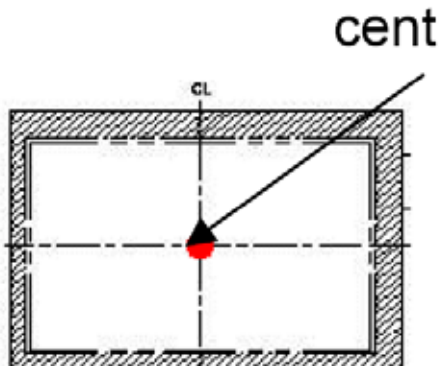


11. CTP General specifications

11.1 CTP main feature

Item	Specification	Unit
Type	Transparent type projected capacitive touch panel	
Input mode	Human's finger	
Finger	5	
Sensor Active Area	118.76(W)(typ.) x89.95(H)(typ.)	mm
Transparency	≧85%	%
Haze	≦2.0%	%
Hardness	7H (typ.) [by JIS K5400]	Pencil hardness
Report rate	Max：122	Points/sec
Response time	15	ms
Point hitting life time	1,000,000 times min.	Note 1

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



11.2 CTP Absolute Maximum Rating

Symbol	Description	Min	Typ.	Max	Unit	Notes
VCC1	Supply voltage	0.3	-	4	V	
VIO	DC input voltage	-0.3	-	VCC1+0.3	V	

11.3 CTP Electrical Characteristic

Symbol	Description	Min	Typ	Max	Unit	Notes
VCC1	Supply voltage	2.6	2.8	3.6	V	
GND	Supply voltage	-	0	-	V	
I	Active mode	-	10		mA	VCC1 = 2.8V
V_{IH}	Input H voltage	1.6	-	-	V	
V_{IL}	Input L voltage	-	-	0.7	V	
	System clock frequency	-	30	-	MHz	

11.4 CTP Pin Connections

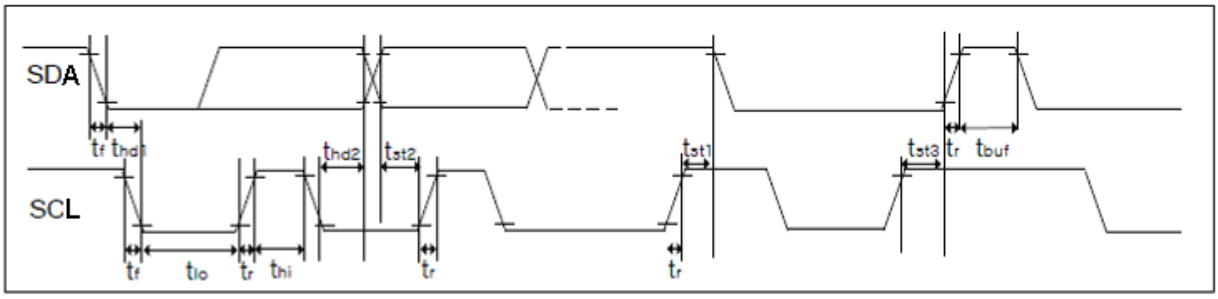
No.	Name	I/O	Description
1	NC	-	No connection
2	SCL	I	I^2C Clock
3	SDA	I/O	I^2C Data
4	NC	-	No connection
5	INT	O	Interrupt output
6	GND	P	Ground
7	VCC1	P	Power supply Voltage
8	/RESET	I	Reset active low
9	NC	-	No connection

11.5 CTP Interface and Data Format [Slave address is 0x5D（7 bit addressing）]

Communication protocol: I^2C

Clock frequency : 100Khz （400Khz Fast mode）

Below is timing of I2C hardware circuit:



Parameter	Symbol	Min	Max	Unit
SCL frequency	f_{sck}	-	600	KHZ
SCL low period	t_{lo}	0.8	-	us
SCL high period	t_{hi}	0.5	-	us
SCL setup time for START condition	t_{st1}	0.4	-	us
SCL setup time for STOP condition	t_{st3}	0.4	-	us
SCL hold time for START condition	t_{st1}	0.4	-	us
SDA setup time	t_{st2}	0.5	-	us
SDA hold time	t_{st2}	0.2	-	us

11.6 Timing Characteristic

The address of GT827's slave device is 0xBA/0xBB. When master CPU addressing GT827, it will send read and write control bits simultaneously where are appended to slave device ("0"- write; "1"- read) for composing a byte with device address. i.e.: 0xBA – conduct write operation to GT827; 0xBB – conduct read operation to GT827.

11.6.1 Postfix Communication:

Only after receiving postfix signal (under the condition of no external signal), can GT827 update coordinate in buffer in real time. After completing communication, I2C needs to send extra postfix signal. But if a series of communication appear, the postfix signal should be sent after the last one finished (except the coordinate reading process, the postfix signal could be sent after finishing reading a frame, so as to prevent output buffer to be changed by GT827 during the read process of master device). Below is the communication format of postfix: Use write process to search register addressing (0x8000), and send stop signal.

11.6.2 Data Transmission:

The communication usually is launched by master CPU. When SCL keeps "1" SDA manages the change from "1" to "0". Then the address information or data stream begins to transmit after start signal.
Any slave device connected with I2C circuit needs to check 8 bits address information after circuit launches start signal and respond correctly. After receiving the matching address information, GT827 will update SDA as an output and set the value as "0" for answering signal in the ninth clock cycle. The GT827 will lay idle if matching address information is unavailable (neither 0XBA nor 0XBB).
The SDA port sends the data with 9 bits serial data according to nine clock cycles. The 8 valid data + 1 receiver send ACK (acknowledgement signal) or NACK (negative acknowledgement signal). It is valid when SCL is "1" during the data transmission.
The main CPU sends stop signal after transmission where SDA manages the change from "0" to "1" when SCL stays "1".

11.6.3 Write operations to I²C slave

Write operations

Above is the flow chart of master CPU conducting write process for GT827. Master CPU launches a start signal and sends address, write and read information ("0" means write process -- 0XBA).

After receiving response，master CPU sends 16 bits address of register and writes 8 bits into register

The address pointer of GT827's register will automatically increase 1 in write process. So it can continuously write continuation register address at a time. If write process is done, master CPU sends stop signal.

11.6.4 Read operations to I²C slave

Read operation

Above is the flow chart of master CPU conducting read process for GT827. Master CPU launches a start signal and sends address, write and read information ("0" means read process -- 0XAA).

Once receives acknowledgement signal, master CPU sends 16 bits register address information and sets the read-demanding register address. Then master CPU resends a start signal for read process (0XAB). It begins to read data until receiving acknowledge.

Likewise, GT827 can conduct continuation read process. Master CPU will correspondingly send an acknowledgement signal to indicate successful byte reception. And CPU will send "NACK" once receiving the last byte to stop transmission.

11.7 Register information

Addr	R/W	Name	bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0
0XF40	R	Touch Flags	Buffer Status		L_touch	P4	P3	P2	P1	P0
0XF41	R	Touch key	Reserved				Key4	Key3	Key2	Key1
0XF42	R	Point0	Point0 X H							
0XF43	R		Point0 X L							
0XF44	R		Point0 Y H							
0XF45	R		Point0 Y L							
0XF46	R	Point1	Point0 Size							
0XF47	R		Point1 X H							
0XF48	R		Point1 X L							
0XF49	R		Point1 Y H							
0XF4A	R		Point1 Y L							
0XF4B	R		Point1 Size							
0XF4C	R	Point2	Point2 X H							
0XF4D	R		Point2 X L							
0XF4E	R		Point2 Y H							
0XF4F	R		Point2 Y L							
0XF50	R		Point2 Size							
0XF51	R	Point3	Point3 X H							
0XF52	R		Point3 X L							
0XF53	R		Point3 Y H							
0XF54	R		Point3 Y L							
0XF55	R		Point3 Size							
0XF56	R	Point4	Point4 X H							
0XF57	R		Point4 X L							
0XF58	R		Point4 Y H							
0XF59	R		Point4 Y L							
0XF5A	R		Point4 Size							
0XF5B	R	Coor checksum	Coordinate checksum							
0XF5C~ 0XF7C	-	NC	Reserved							
0xF7D	R	PID	Product ID(hex)							
0xF7E	R	VID_H	Product version High byte(hex)							

0xF7F	R	VID_L	Product version low byte(hex)
0xF80	R/W	DriverCH0	Screen 1 drives corresponding IC drive line
0xF81	R/W	DriverCH1	Screen 2 drives corresponding IC drive line
0xF82	R/W	DriverCH2	Screen 3 drives corresponding IC drive line
0xF83	R/W	DriverCH3	Screen 4 drives corresponding IC drive line
0xF84	R/W	DriverCH4	Screen 5 drives corresponding IC drive line
0xF85	R/W	DriverCH5	Screen 6 drives corresponding IC drive line
0xF86	R/W	DriverCH6	Screen 7 drives corresponding IC drive line
0xF87	R/W	DriverCH7	Screen 8 drives corresponding IC drive line
0xF88	R/W	DriverCH8	Screen 9 drives corresponding IC drive line
0xF89	R/W	DriverCH9	Screen 10 drives corresponding IC drive line
0xF8A	R/W	DriverCH10	Screen 11 drives corresponding IC drive line
0xF8B	R/W	DriverCH11	Screen 12 drives corresponding IC drive line
0xF8C	R/W	DriverCH12	Screen 13 drives corresponding IC drive line
0xF8D	R/W	DriverCH13	Screen 14 drives corresponding IC drive line
0xF8E	R/W	DriverCH14	Screen 15 drives corresponding IC drive line
0xF8F	R/W	DriverCH15	Screen 16 drives corresponding IC drive line
0xF90	R/W	DriverCH16	Screen 17 drives corresponding IC drive line
0xF91	R/W	DriverCH17	Screen 18 drives corresponding IC drive line
0xF92	R/W	DriverCH18	Screen 19 drives corresponding IC drive line
0xF93	R/W	DriverCH19	Screen 20 drives corresponding IC drive line
0xF94	R/W	DriverCH20	Screen 21 drives corresponding IC drive line
0xF95	R/W	DriverCH21	Screen 22 drives corresponding IC drive line
0xF96	R/W	DriverCH22	Screen 23 drives corresponding IC drive line
0xF97	R/W	DriverCH23	Screen 24 drives corresponding IC drive line
0xF98	R/W	DriverCH24	Screen 25 drives corresponding IC drive line
0xF99	R/W	DriverCH25	Screen 26 drives corresponding IC drive line
0xF9A	R/W	DriverCH26	Screen 27 drives corresponding IC drive line
0xF9B	R/W	DriverCH27	Screen 28 drives corresponding IC drive line
0xF9C	R/W	DriverCH28	Screen 29 drives corresponding IC drive line
0xF9D	R/W	NC	Reserved
0xF9E	R/W	SensorCH0	Screen 1 induction wire corresponds to IC drive line
0xF9F	R/W	SensorCH1	Screen 2 induction wire corresponds to IC drive line
0xFA0	R/W	SensorCH2	Screen 3 induction wire corresponds to IC drive line
0xFA1	R/W	SensorCH3	Screen 4 induction wire corresponds to IC drive line
0xFA2	R/W	SensorCH4	Screen 5 induction wire corresponds to IC drive line
0xFA3	R/W	SensorCH5	Screen 6 induction wire corresponds to IC drive line
0xFA4	R/W	SensorCH6	Screen 7 induction wire corresponds to IC drive line
0xFA5	R/W	SensorCH7	Screen 8 induction wire corresponds to IC drive line
0xFA6	R/W	SensorCH8	Screen 9 induction wire corresponds to IC drive line
0xFA7	R/W	SensorCH9	Screen 10 induction wire corresponds to IC drive line
0xFA8	R/W	SensorCH10	Screen 11 induction wire corresponds to IC drive line
0xFA9	R/W	SensorCH11	Screen 12 induction wire corresponds to IC drive line
0xFAA	R/W	SensorCH12	Screen 13 induction wire corresponds to IC drive line
0xFAB	R/W	SensorCH13	Screen 14 induction wire corresponds to IC drive line
0XFAC	R/W	SensorCH13	Screen 15 induction wire corresponds to IC drive line
0XFAD	R/W	SensorCH14	Screen 16 induction wire corresponds to IC drive line
0XFAE~ 0XFB1	-	NC	Reserved
0xFB2	R/W	ADCCFG	chip scanning control parameter
0xFB3	R/W	SCAN	chip scanning control parameter
0xFB4	R/W	F1SET	drive pulse 1 frequency
0xFB5	R/W	F2SET	drive pulse 2 frequency

0xFB6	R/W	F3SET	drive pulse 3 frequency								
0xFB7	R/W	F1PNUM	1 drive pulse								
0xFB8	R/W	F2PNUM	2 drive pulse								
0xFB9	R/W	F3PNUM	3 drive puilse								
0xFBA	R/W	F1DELAY	drive pulse 1 phase delay								
0xFBB	R/W	F2DELAY	drive pulse 2 phase delay								
0xFBC	R/W	F3DELAY	drive pulse 3 phase delay								
0xFBD	R/W	DC-DC	high pressure setting								
0xFBE	R/W	Sc_Touch	TP key threshold								
0xFBF	R/W	Sc_Leave	TP key up threshold								
0xFC0	R/W	Md_switch	Reserved	DD2: difference And half	Reserved	Shape_EN defamation denoise	INT pulse mode	SITO denoise switch	Reserved	Reserved	
0xFC1	R/W	LPower_C	Reserved	time to low power consumption without pressing: 0-63s valid, unit: S							
0xFC2	R/W	Refresh	0-100 valid; 0: period 10ms, 100: period 20ms								
0xFC3	R/W	Touch_N	Reserved	Reserved	Output touch point, 1-5 valid						
0xFC4	R/W	Output_Th	output limit: output until coordinate transformation value is higher than this, 0-254 configurable (unit:4 coordinate),255 means first pressing coordinate and keying up								
0xFC5	R/W	X_Ou_Max_H	X direction output maximum coordinate, the higher byte placed first								
0xFC6	R/W	X_Ou_Max_L									
0xFC7	R/W	Y_Ou_Max_H	Y direction output maximum coordinate, the higher byte placed first								
0xFC8	R/W	Y_Ou_Max_L									
0xFC9	R/W	X_Co_Sm	X direction slide control parameter, 0-255 configurable, 0 means closure								
0xFCA	R/W	Y_Co_Sm	Y direction slide control parameter, 0-255 configurable, 0 means closure								
0xFCB	R/W	X_Sp_Lim	X direction maximum speed limit of slide: 0-255 configurable, 0 means closure(unit:16 coordinate)								
0xFCC	R/W	Y_Sp_Lim	Y direction maximum speed limit of slide: 0-255 configurable, 0 means closure(unit:16 coordinate)								
0xFCD	R/W	Noise_R	sampling drop-driven							while noise elimination: 0-15 valid	
0xFCE	R/W	NC	Reserved								
0xFCF	R/W	Filter	Reserved						coordinate window filtering value (in base 4)		
0xFD0	R/W	Large_Tc	representative touch points for large area: 0-255 valid								
0xFD1	R/W	Shake_Cu	Touch Shake Count							Finger Number Shake Count	
0xFD2	R/W	Pos_Ref_T	benchmark update configuration in normal condition, 0-255 valid, 0 means close benchmark update								
0xFD3	R/W	NC	benchmark update configuration in sudden change condition,0-255 valid, 0 means close benchmark update								
0xFD4	R/W	NC	Reserved								
0xFD5	R/W	NC									
0xFD6	R/W	Edge_exp	Reserved						0: weak tensile 1: strong		
0xFD7	R/W	Tc_K_F	Key_com	Key_con	Reserved	valid interval in regional keys (unilateral): 0-15 valid					
0xFD8	R/W	Key 1	Key 1 position: 0-255 valid, 0 means unavailable								
0xFD9	R/W	Key 2	Key 2 position: 0-255 valid, 0 means unavailable								
0xFDA	R/W	Key 3	Key 3 position: 0-255 valid, 0 means unavailable								
0xFDB	R/W	Key 4	Key 4 position: 0-255 valid, 0 means unavailable								
0xFDC	R/W	K_Touch	key threshold								
0xFDD	R/W	K_Leave	key up threshold								
0xFDE	R/W	K_SEC_max	upper limit of sub-maximum difference in independent key judgment								
0xFEF	R/W	K_DIS_min	lower limit of difference between maximum and sub-maximum in independent key judgment								
0xFE0	R/W	X_border_Lim_Near	discarded coordinate numbers on X proximal border								

0xFE1	R/W	X_border_Lim_Far	discarded coordinate numbers on X far end			
0xFE2	R/W	Y_border_Lim_Near	discarded coordinate numbers on Y proximal border			
0xFE3	R/W	Y_border_Lim_Far	discarded coordinate numbers on Y far end			
0xFE4	R/W	KEY_ADCCFG	FPC ADCCFG parameter (applicable to drive key common port)			
0xFE5	R/W	KEY_F1SET	FPC drive frequency setting (applicable to drive key common port)			
0xFE6	R/W	KEY_F1NUM	FPC drive pulse number setting (applicable to drive key common port)			
0xFE7	R/W	Key_Shake_Cu	touch key Shake counter (0-255)			
0xFE8	R/W	Key2_Touch	touch Level of FPC touch key2			
0xFE9	R/W	Key3_Touch	touch Level of FPC touch key3			
0xFEA	R/W	Key4_Touch	touch Level of FPC touch key4			
0xFEB~0xFEE	-	NC	Reserved			
0xFEF	R/W	Con_Frs	mark for configuration update, write 1 when master completing configuration information			
0xFF0	R/W	Cfg_Chk_H	configuration information checksum, the higher byte placed first			
0xFF1	R/W	Cfg_Chk_L				
0xFF2	R/W	System_Sta	Power_sta		Reserved	
0xFF3	R/W	LED_Con	LED_EN	LED_CM	LED_SW	time of light-on after key up (unit: S)
0xFF4	R/W	Command	Reserved			
0xFF5	R/W	Module_Type	Reserved		module supplier' ID: 0-2 valid	

12. Appearance Specification

12.1 Process/Content:

12.1.1 Inspection equipment: lamp, functional test jigs, microscope, vernier caliper, ESD ring.

12.1.2 Environment requirement:

1.2.1 Temperature: 25±5℃

1.2.2 Humidity: 30-75%RH

1.2.3 Luminance: fluorescent lamp (600-800LUX)

12.1.3 Inspection Flow:

1.3.1：Inspection allocation

1.3.2：When work order flows into final inspection station, the foreman is responsible for allocation.

1.3.3：For urgent issue or special requirement from customer, it should be handled in priority.

1.3.4：In final inspection bench, all items should be checked by 100%.

1.3.5：Inspection standard should firstly comply with customer requirement. If customer has no requirement, then apply this standard.

12.1.4 Sampling Plan

1.4.1 Conduct sampling according to MIL-STD-105E standard, level II.

1.4.2 Definition of defect:

1.4.2.1 Check main defect according to AQL 0.65%

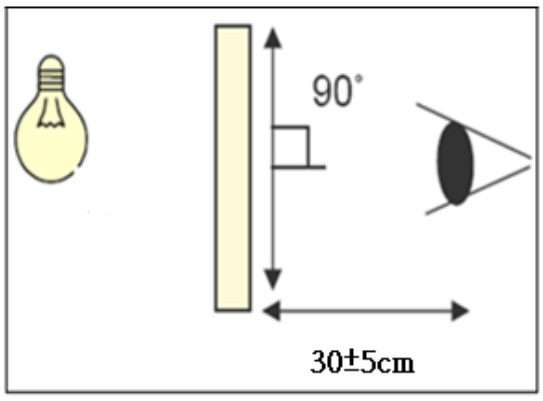
1.4.2.2 Check secondary defect according to AQL 1.0%

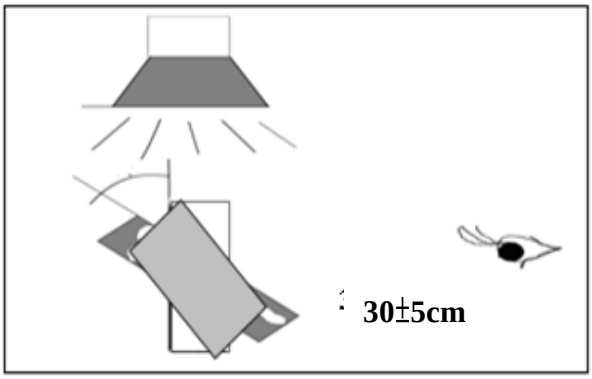
12.1.5 Appearance inspection

1.5.1：Appearance inspection method:

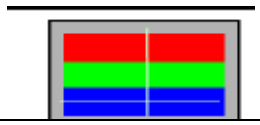
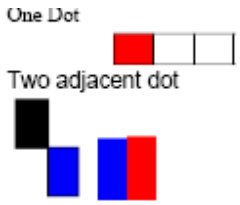
① Inspect the product through the light; angle: 90±15 degrees; visual distance: 30±5cm.

②. Inspect from the reflection of the light; angle: 90±15 degrees; visual distance: 30±5cm.





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

<table>
<tr><td>Inspection item</td><td>Inspection standard</td><td>Description</td></tr>
<tr><td>No image</td><td>Prohibited</td><td></td></tr>
<tr><td>Image abnormal</td><td>Prohibited</td><td></td></tr>
<tr><td>Bright line</td><td>Prohibited</td><td>  </td></tr>
<tr><td>Thin line</td><td>It is acceptable that the defect can not be seen with 10% ND filter.</td><td></td></tr>
<tr><td>Mura</td><td>It is acceptable that the defect can not be seen with 5% ND filter.</td><td></td></tr>
<tr><td>Dot</td><td>
<table>
<tr><td rowspan="2">Item</td><td>Acceptable</td><td rowspan="2">Total</td></tr>
<tr><td>Visible area</td></tr>
<tr><td>Bright dot</td><td>2</td><td rowspan="2">5</td></tr>
<tr><td>Dark dot</td><td>4</td></tr>
<tr><td>Bright adjacent dots</td><td>1</td><td>1</td></tr>
<tr><td>Dark adjacent dots</td><td>2</td><td>2</td></tr>
<tr><td>Adjacent dots with a bright dot and a dark dot</td><td>1</td><td>1</td></tr>
</table>
</td><td> 
</td></tr>
<tr><td>Foreign material in dot shape</td><td>
<table>
<tr><td>SPEC (unit: mm)</td><td>Acceptable</td></tr>
<tr><td>D≦0.2</td><td>Ignored</td></tr>
<tr><td>0.2<D≦0.5, distance>5</td><td>n≦4</td></tr>
<tr><td>D＞0.5</td><td>0</td></tr>
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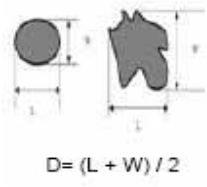
</td><td> 
</td></tr>
<tr><td>Inspection item</td><td>Inspection standard</td><td>Description</td></tr>
<tr><td>Foreign material in line shape</td><td>
<table>
<tr><td>SPEC</td><td>Acceptable</td></tr>
<tr><td>W≦0.05 and L≦5</td><td>Ignored</td></tr>
<tr><td>0.05<W≦0.1, L≦5, distance >5</td><td>n≦5</td></tr>
<tr><td>W>0.1 or L>5</td><td>0</td></tr>
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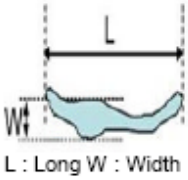
</td><td> 
</td></tr>
<tr><td>Contamination</td><td>It is acceptable if the dirt can be wiped.</td><td></td></tr>
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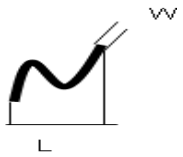
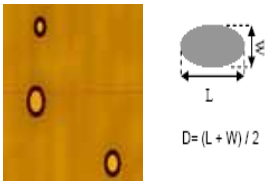
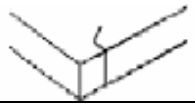
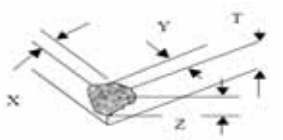
<table>
<tr><td>Scratch</td><td>
<table>
<tr><td>SPEC</td><td>Acceptable</td></tr>
<tr><td>W≦0.05 and L≦5</td><td>Ignored</td></tr>
<tr><td>0.05<W≦0.08, L≦5, distance >5</td><td>n≦5</td></tr>
<tr><td>0.08<W≦0.1, L≦5, distance >5</td><td>n≦3</td></tr>
<tr><td>W>0.1 or L>5</td><td>0</td></tr>
</table>
</td><td>  </td></tr>
<tr><td>Inspection item</td><td>SPEC</td><td>Description</td></tr>
<tr><td>Bubble</td><td>
<table>
<tr><td>SPEC (unit: mm)</td><td>Acceptable</td></tr>
<tr><td>D≦0.1</td><td>Ignored</td></tr>
<tr><td>Non visible area</td><td>Ignored</td></tr>
<tr><td>0.1<D≦0.3, distance >5</td><td>n≦3</td></tr>
<tr><td>D＞0.3</td><td>0</td></tr>
</table>
</td><td> 
</td></tr>
<tr><td>Cover & Sensor Crack</td><td>Prohibited</td><td>  </td></tr>
<tr><td>Cover angle missing</td><td>
<table>
<tr><td>SPEC (unit: mm)</td><td>Acceptable</td></tr>
<tr><td>Side/Bottom: X≦1.0, Y≦1.0, Z≦1/2T</td><td>Ignored</td></tr>
<tr><td>It is prohibited if the defect appears on the front.</td><td>0</td></tr>
</table>
</td><td>  </td></tr>
<tr><td>Cover edge break</td><td>
<table>
<tr><td>SPEC (unit: mm)</td><td>Acceptable</td></tr>
<tr><td>X≦ 1.0, Y≦ 1.0, Z≦1/2T</td><td>Ignored</td></tr>
<tr><td>X>1.0, Y>1.0, Z＞1/2T</td><td>0</td></tr>
</table>
</td><td>  </td></tr>
<tr><td>Inspection item</td><td>SPEC</td><td>Description</td></tr>
<tr><td>Ink</td><td>
<table>
<tr><td>SPEC (unit: mm)</td><td>Acceptable</td></tr>
<tr><td>word unclear, inverted, mistake, break line</td><td>0</td></tr>
</table>
</td><td></td></tr>
<tr><td>Bubble under protection film</td><td>
<table>
<tr><td>SPEC (unit: mm)</td><td>Acceptable</td></tr>
<tr><td>NA</td><td></td></tr>
</table>
</td><td></td></tr>
</table>

12.2. Defect Handling:

12.2.1 If reject found in sampling, inspectors should inform OQC engineer or foreman immediately to confirm the condition prior to the following operation.

5.1.2 Mark and isolate the defective product once defect found.

5.1.3 Inspectors should hold, mark and isolate the suspected product, and inform OQC engineers to confirm.

12.3. Note:

12.3.1 It should be operated in class 100 clean room.

12.3.2 Clean the product inside-out with class 100 clean cloth that soaked with little alcohol. Meanwhile, it is prohibited to clean ITO circuit with corrosive solvent.

12.3.3 Wear rubber gloves and finger cots to fetch the product. Fetch the product with the side rather than the surface. Moreover, replace the finger cots at every two hours.

12.3.4 Do not contact with higher hardness material during operation (it should place a cushion on working bench).

12.3.5 Keep ESD protection valid in the whole process.

13. QUALITY ASSURANCE

13.1 Test Condition

13.1.1 Temperature and Humidity(Ambient Temperature)

Temperature : 25 ± 5°C

Humidity : 65 ± 5%

13.1.2 Operation

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

13.1.3 Container

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

13.1.4 Test Frequency

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

13.1.5 Test Method

Reliability Test Item & Level		Test Level
No.	Test Item	
1.	Low Temperature Storage Test	T= -20℃,120hrs after 24 hrs at room temperature and test.
2.	High Temperature Storage Test	T= 70℃,120hrs after 24 hrs at room temperature and test.
3.	Low Temperature Operation Test	T= -10℃,120hrs after 24 hrs at room temperature and test.
4.	High Temperature Operation Test	T= 60℃,120hrs after 24 hrs at room temperature and test.
5.	High Temperature and High Humidity Operation Test	T= 40℃, 90%RH,120hrs after 24 hrs at room temperature and test.
6.	Thermal Cycling Test (No operation)	-20 ℃ 30min ~ 70 ℃ 30 min , 100 Cycles after 24 hrs at room temperature and test.
7.	Vibration Test (No operation)	Frequency :10 ~ 55 HZ Amplitude :1.5 mm Sweep time : 11 mins Test Period: 6 Cycles for each direction of X, Y, Z
8.	ESD TEST	Air Discharge : ±15KV Indirect Contact Discharge : ±8KV

13.2 Judgment standard

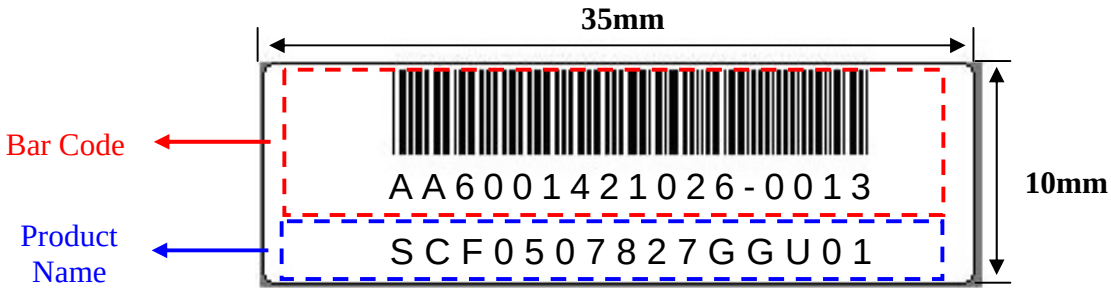
The Judgment of the above test should be made after exposure in room temperature for two hours as follow:

Pass: Normal display image with no obvious non-uniformity and no line defect. Partial transformation of the module parts should be ignored.

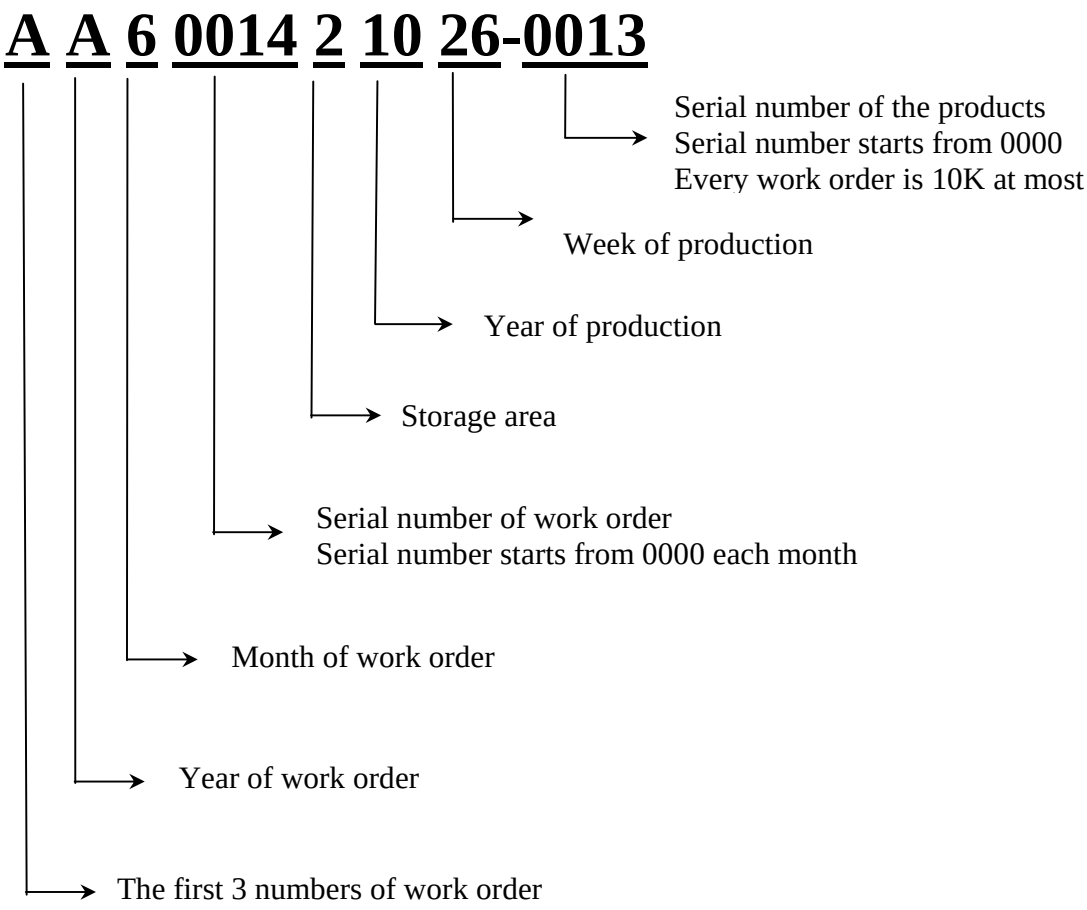
Fail: No display image, obvious non-uniformity, or line defect.

14. LCM PRODUCT LABEL DEFINE

Product Label style:



BarCode Define:



Product Name Define:

SC F 0507 827 G G U 01

Serial Number

Material of Glue

N : None

R : Other

C : OCA

U : UV

Material of Cover Lens

N : None

G : Glass

P : PMMA

C : PC

F : Film

R : Other

Material of Sensor

G : Glass

F : Film

R : Other

IC Number

827 : GT827

Size

0507 : 5.7inch

Module Type

N : None LCM

F : Standard CTP Module

X : Custom CTP Module

Capacitive Touch Panel

15. PRECAUTIONS IN USE LCM

1. LIQUID CRYSTAL DISPLAY (LCD)

LCD is made up of glass, organic sealant, organic fluid, and polymer based polarizers. The following precautions should be taken when handing,

(1). Keep the temperature within range of use and storage. Excessive temperature and humidity could cause polarization degradation, polarizer peel off or bubble.

(2). Do not contact the exposed polarizers with anything harder than an HB pencil lead. To clean dust off the display surface, wipe gently with cotton, chamois or other soft material soaked in petroleum benzin.

(3). Wipe off saliva or water drops immediately. Contact with water over a long period of time may cause polarizer deformation or color fading, while an active LCD with water condensation on its surface will cause corrosion of ITO electrodes.

(4). Glass can be easily chipped or cracked from rough handling, especially at corners and edges.

(5). Do not drive LCD with DC voltage.

2. Liquid Crystal Display Modules

2.1 Mechanical Considerations

LCM are assembled and adjusted with a high degree of precision. Avoid excessive shocks and do not make any alterations or modifications. The following should be noted.

(1). Do not tamper in any way with the tabs on the metal frame.

(2). Do not modify the PCB by drilling extra holes, changing its outline, moving its components or modifying its pattern.

(3). Do not touch the elastomer connector, especially insert an backlight panel (for example, EL).

(4). When mounting a LCM make sure that the PCB is not under any stress such as bending or twisting . Elastomer contacts are very delicate and missing pixels could result from slight dislocation of any of the elements.

(5). Avoid pressing on the metal bezel, otherwise the elastomer connector could be deformed and lose contact, resulting in missing pixels.

2.2. Static Electricity

LCM contains CMOS LSI's and the same precaution for such devices should apply, namely

(1). The operator should be grounded whenever he/she comes into contact with the module. Never touch any of the conductive parts such as the LSI pads, 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.

2.3 Soldering

(1). Solder only to the I/O terminals.

(2). Use only soldering irons with proper grounding and no leakage.

(3). Soldering temperature : 280°C ± 10°C

(4). Soldering time: 3 to 4 sec.

(5). Use eutectic solder with resin flux fill.

(6). If flux is used, the LCD surface should be covered to avoid flux spatters. Flux residue should be removed after wards.

2.4 Operation

(1). The viewing angle can be adjusted by varying the LCD driving voltage V0.

(2). Driving voltage should be kept within specified range; excess voltage shortens display life.

(3). Response time increases with decrease in temperature.

(4). Display may turn black or dark blue at temperatures above its operational range; this is (however not pressing on the viewing area) may cause the segments to appear "fractured".

(5). Mechanical disturbance during operation (such as pressing on the viewing area) may cause the segments to appear "fractured".

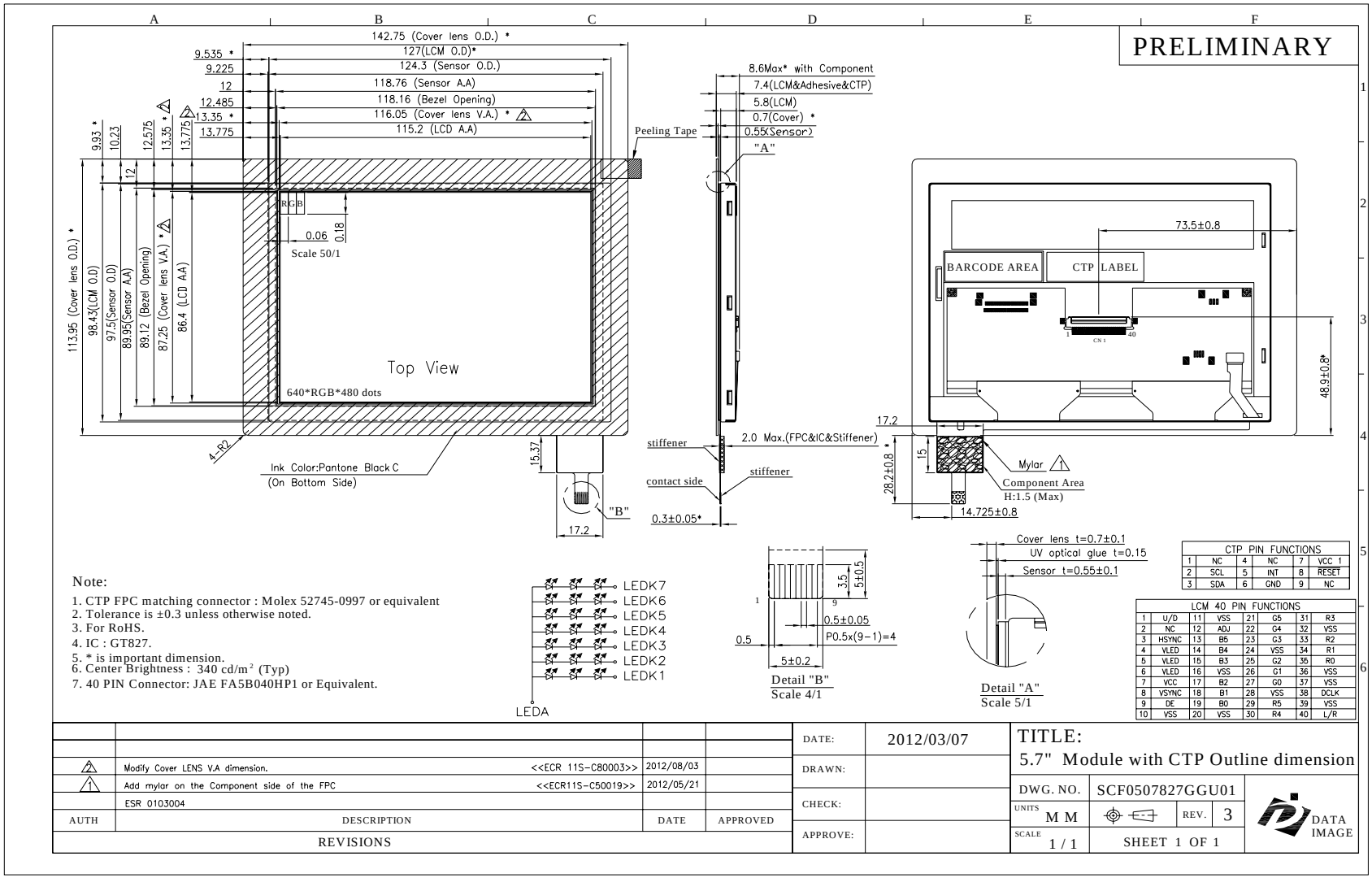
2.5 Storage

If any fluid leaks out of a damaged glass cell, wash off any human part that comes into contact with soap and water. Never swallow the fluid. The toxicity is extremely low but caution should be exercised at all the time.

2.6 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.

16. OUTLINE DRAWING



Note:

1. CTP FPC matching connector : Molex 52745-0997 or equivalent
2. Tolerance is ±0.3 unless otherwise noted.
3. For RoHS.
4. IC : GT827.
5. * is important dimension.
6. Center Brightness : 340 cd/m² (Typ)
7. 40 PIN Connector: JAE FA5B040HP1 or Equivalent.

CTP PIN FUNCTIONS

1	NC	4	NC	7	VCC 1
2	SCL	5	INT	8	RESET
3	SDA	6	GND	9	NC

LCM 40 PIN FUNCTIONS

1	U/D	11	VSS	21	G5	31	R3
2	NC	12	ADJ	22	G4	32	VSS
3	HSYNC	13	B5	23	G3	33	R2
4	VLED	14	B4	24	VSS	34	R1
5	VLED	15	B3	25	G2	35	R0
6	VLED	16	VSS	26	G1	36	VSS
7	VCC	17	B2	27	G0	37	VSS
8	VSYNC	18	B1	28	VSS	38	DCLK
9	DE	19	B0	29	R5	39	VSS
10	VSS	20	VSS	30	R4	40	L/R

2	Modify Cover LENS V.A dimension. <<ECR 11S-C80003>>	2012/08/03	
1	Add mylar on the Component side of the FPC <<ECR11S-C50019>>	2012/05/21	
	ESR 0103004		
AUTH	DESCRIPTION	DATE	APPROVED

REVISIONS

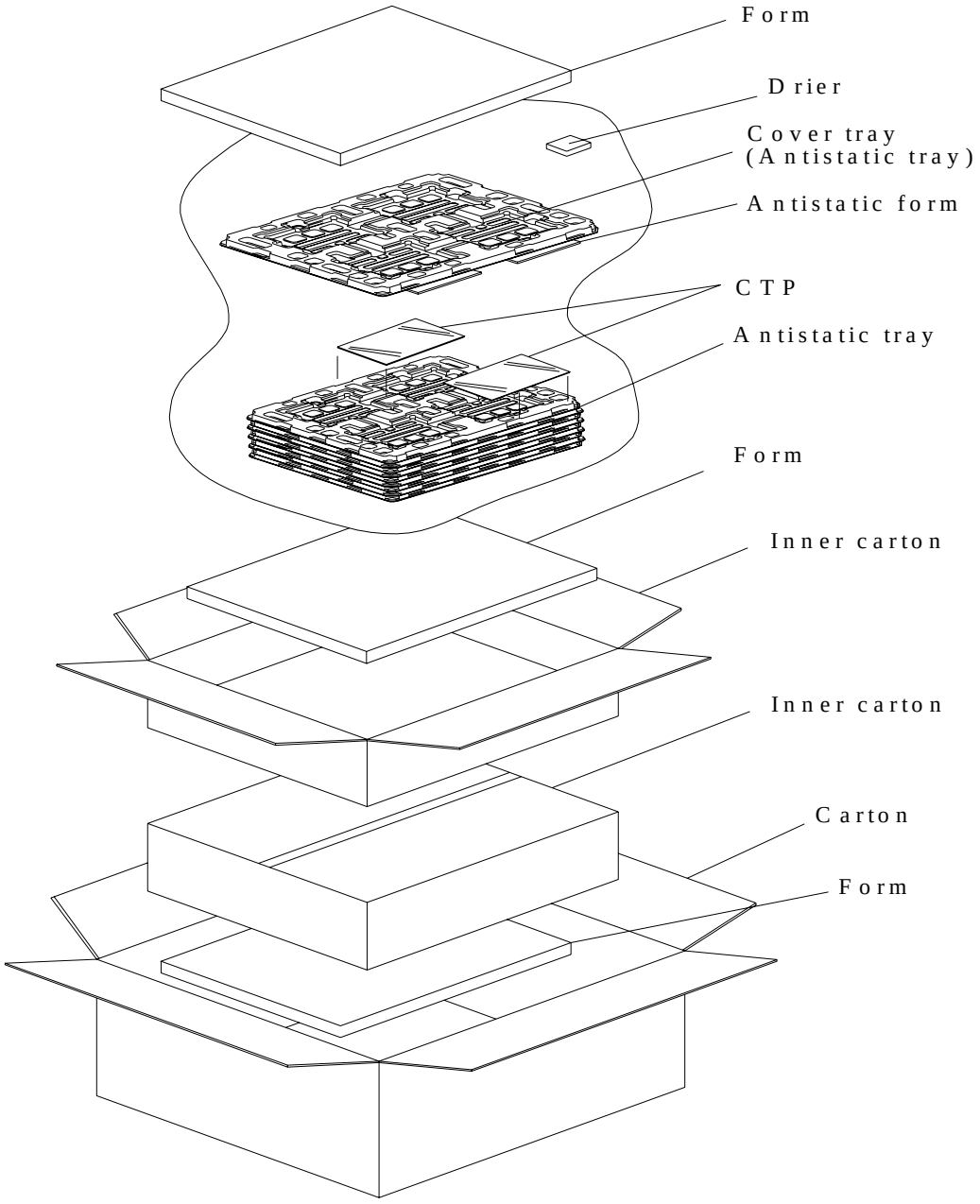
DATE:	2012/03/07
DRAWN:	
CHECK:	
APPROVE:	

TITLE: 5.7" Module with CTP Outline dimension

DWG. NO.	SCF0507827GGU01		
UNITS M M		REV.	3
SCALE 1 / 1	SHEET 1 OF 1		

DATA IMAGE

17. PACKAGE INFORMATION



1 Inner carton= 32 pcs

1 Carton= 2 Inner carton= 32 pcs*2=64pcs

Carton size : 465L x 380W x 395H (mm)

Total Weight =: 13 kgw

SCF0507827GGU01 PACKING