SPEC

Spec No.	TQ3C-8EAF0-E1YAA16-00
Date	April 5, 2011

TYPE : TCG070WVLPAANN-AN00

< 7.0 inch WVGA transmissive color TFT
with LED backlight>

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Issued
Date: Apr 21, 2011
KYOCERA
Hayato LCD Division

KYOCERA CORPORATION
SHIGA YASU PLANT
LCD DIVISION

This specification is subject to change without notice.
Consult Kyocera before ordering.

Original Issue Date	Designed by: Engineering dept.			Confirmed by: QA dept.	
	Prepared	Checked	Approved	Checked	Approved
April 5, 2011	S.Hatanaka	Y.Ikeda	M.Fujitani	I.Hama	

Warning

1. This Kyocera LCD module has been specifically designed for use only in electronic devices and industrial machines in the area of audio control, office automation, industrial control, home appliances, etc. The module should not be used in applications where the highest level of safety and reliability are required and module failure or malfunction of such module results in physical harm or loss of life, as well as enormous damage or loss. Such fields of applications include, without limitation, medical, aerospace, communications infrastructure, atomic energy control. Kyocera expressly disclaims any and all liability resulting in any way to the use of the module in such applications.

2. Customer agrees to indemnify, defend and hold Kyocera harmless from and against any and all actions, claims, damages, liabilities, awards, costs, and expenses, including legal expenses, resulting from or arising out of Customer's use, or sale for use, or Kyocera modules in applications.

Caution

1. Kyocera shall have the right, which Customer hereby acknowledges, to immediately scrap or destroy tooling for Kyocera modules for which no Purchase Orders have been received from the Customer in a two-year period.

Revision record

Date	Designed by : Engineering dept.			Confirmed by : QA dept.	
	Prepared	Checked	Approved	Checked	Approved

Rev.No.	Date	Page	Descriptions

1. Application

This document defines the specification of TCG070WVLPAANN-AN00. (RoHS Compliant)

2. Construction and outline

LCD	: Transmissive color dot matrix type TFT
Backlight system	: LED
Polarizer	: Anti-Glare treatment
Additional circuit	: Timing controller, Power supply (3.3V input) (without constant current circuit for LED Backlight)

3. Mechanical specifications

Item	Specification	Unit
Outline dimensions 1)	165(W)×(104.4)(H)×8.2(D)	mm
Active area	152.4(W)×91.44(H) (17.8cm/7.0 inch(Diagonal))	mm
Dot format	800×(R,G,B)(W)×480(H)	dot
Dot pitch	0.0635(W)×0.1905(H)	mm
Base color 2)	Normally White	-
Mass	195	g

1) Projection not included. Please refer to outline for details.
2) Due to the characteristics of the LCD material, the color varies with environmental temperature.

4. Absolute maximum ratings

4-1. Electrical absolute maximum ratings

Item		Symbol	Min.	Max.	Unit
Supply voltage		V_{DD}	-0.3	4.5	V
Input signal voltage	1)	V_{IN}	-0.3	4.5	V
LED forward current	2) 3)	IF	-	100	mA

1) Input signal : CK, R0～R5, G0～G5, B0～B5, H_{SYNC}, V_{SYNC}, ENAB, CM, SC
2) For each "AN-CA"
3) Do not apply reversed voltage.

4-2. Environmental absolute maximum ratings

Item		Symbol	Min.	Max.	Unit
Operating temperature	1)	T_{OP}	-20	70	°C
Storage temperature	2)	T_{STO}	-30	80	°C
Operating humidity	3)	H_{OP}	10	4)	%RH
Storage humidity	3)	H_{STO}	10	4)	%RH
Vibration		-	5)	5)	-
Shock		-	6)	6)	-

1) Operating temperature means a temperature which operation shall be guaranteed. Since display performance is evaluated at 25°C, another temperature range should be confirmed.
2) Temp. = -30°C＜48h , Temp. = 80°C＜168h
Store LCD at normal temperature/humidity. Keep them free from vibration and shock.
An LCD that is kept at a low or a high temperature for a long time can be defective due to other conditions, even if the low or high temperature satisfies the standard.
(Please refer to "Precautions for Use" for details.)

3) Non-condensing
4) Temp.≦40°C, 85%RH Max.
Temp.＞40°C, Absolute humidity shall be less than 85%RH at 40°C.
5)

Frequency	10～55 Hz	Acceleration value (0.3～9 m/s^2)
Vibration width	0.15mm	
Interval	10-55-10 Hz 1 minutes	

2 hours in each direction X, Y, Z (6 hours total)
EIAJ ED-2531

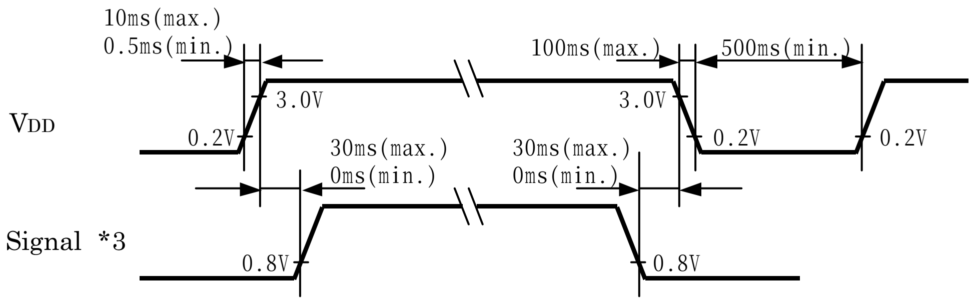
6) Acceleration: 490 m/s^2, Pulse width: 11 ms
3 times in each direction: ±X, ±Y, ±Z
EIAJ ED-2531

5. Electrical characteristics

Temp. = -20～70°C

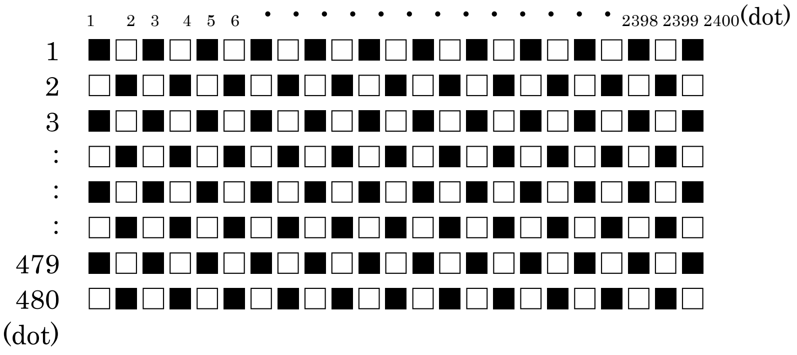
Item		Symbol	Condition	Min.	Typ.	Max.	Unit
Supply voltage	1)	V_{DD}	-	3.0	3.3	3.6	V
Current consumption		I_{DD}	2)	-	180	235	mA
Permissive input ripple voltage		V_{RP}	-	-	-	100	mVp-p
Input signal voltage	3)	V_{IL}	"Low" level	0	-	0.8	V
		V_{IH}	"High" level	2.0	-	V_{DD}	V
	4)	V_{IL}	"Low" level	0	-	0.3 V_{DD}	V
		V_{IH}	"High" level	0.7 V_{DD}	-	V_{DD}	V

1) V_{DD}-turn-on conditions


10ms(max.)
0.5ms(min.)
100ms(max.)
500ms(min.)
VDD
3.0V
3.0V
0.2V
0.2V
0.2V
30ms(max.)
0ms(min.)
30ms(max.)
0ms(min.)
Signal *3
0.8V
0.8V

2) Display pattern:

V_{DD} = 3.3V, Temp. = 25°C


1 2 3 4 5 6 · · · · · · · · · · · · · 2398 2399 2400(dot)
1
2
3
:
:
:
479
480
(dot)

3) Input signal : CK, R0～R5, G0～G5, B0～B5, H_{SYNC}, V_{SYNC}, ENAB, CM

4) Input signal : SC

6. Optical characteristics

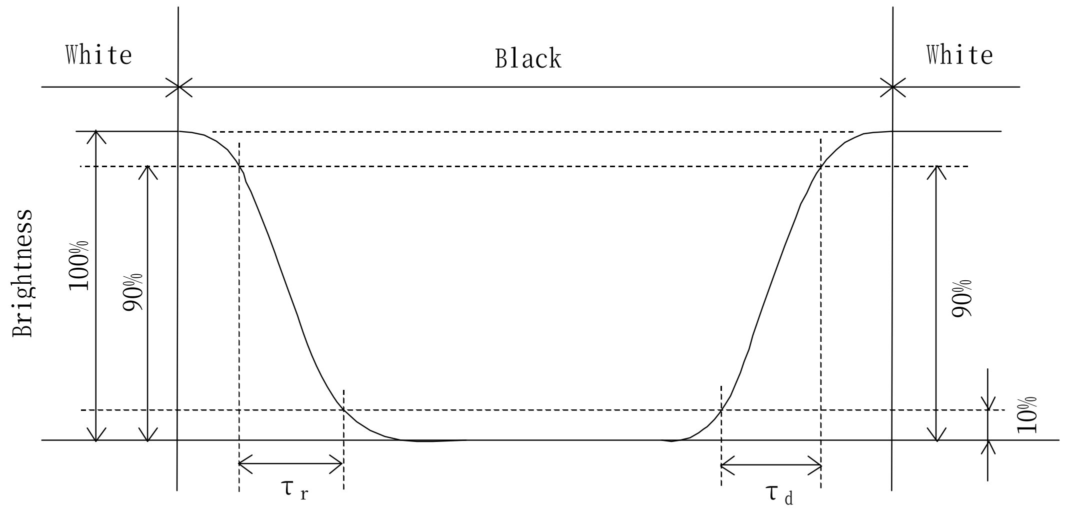
Measuring spot =φ6.0mm, Temp. = 25°C

Item		Symbol	Condition	Min.	Typ.	Max.	Unit
Response time	Rise	τ_r	θ=φ=0°	-	5	-	ms
	Down	τ_d	θ=φ=0°	-	25	-	ms
Viewing angle range View direction : 12 o'clock (Gray inversion)		θ UPPER	CR≧10	-	60	-	deg.
		θ LOWER		-	80	-	
		φ LEFT		-	80	-	deg.
		φ RIGHT		-	80	-	
Contrast ratio		CR	θ=φ=0°	700	1000	-	-
Brightness		L	IF=60mA/Line	250	350	-	cd/m²
Luminance(Brightness)		LU	-	70	-	-	%
Chromaticity coordinates	Red	x	θ=φ=0°	0.240	0.290	0.340	-
		y		0.255	0.305	0.355	
	Green	x	θ=φ=0°	0.550	0.600	0.650	
		y		0.300	0.350	0.400	
	Blue	x	θ=φ=0°	0.270	0.320	0.370	
		y		0.500	0.550	0.600	
	White	x	θ=φ=0°	0.100	0.150	0.200	
		y		0.070	0.120	0.170	

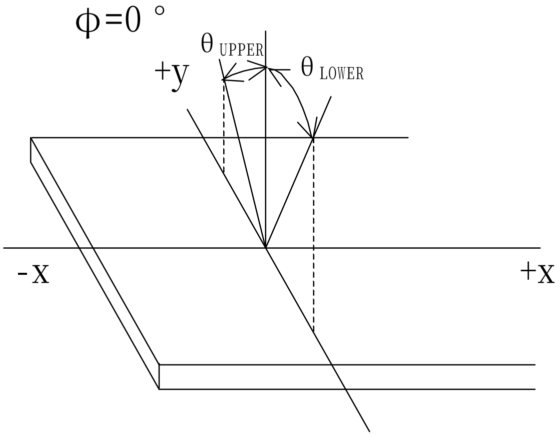
6-1. Definition of contrast ratio

$$\text{CR(Contrast ratio)} = \frac{\text{Brightness with all pixels "White"}}{\text{Brightness with all pixels "Black"}}$$

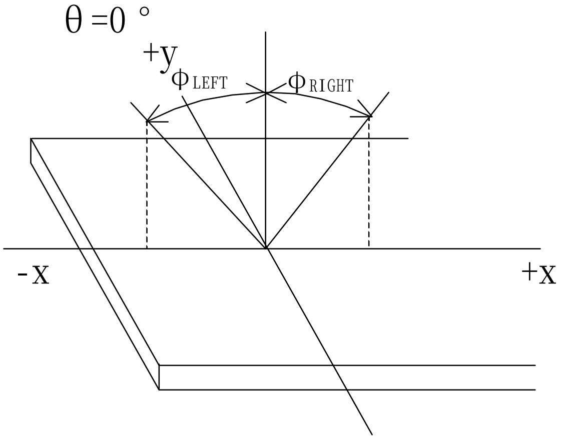
6-2. Definition of response time



6-3. Definition of viewing angle

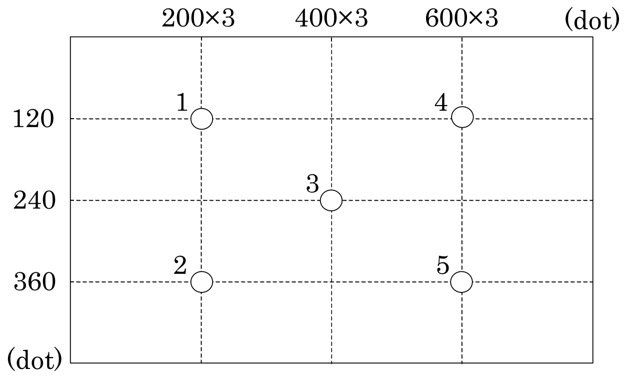

φ=0 °
θ UPPER
θ LOWER
+y
-x
+x
-y

θ direction


θ=0 °
+y
φ LEFT
φ RIGHT
-x
+x
-y

φ direction

6-4. Brightness measuring points


200×3
400×3
600×3
(dot)
120
240
360
(dot)
1
2
3
4
5

1) Rating is defined as the white brightness at center of display screen(3).
2) The brightness uniformity is calculated by using following formula.

$$\text{Brightness uniformity} = \frac{\text{Minimum brightness from 1 to 5}}{\text{Maximum brightness from 1 to 5}} \times 100\ [\%]$$

3) 30 minutes after CFL is turned on. (Ambient Temp.=25℃)

7. Interface signals

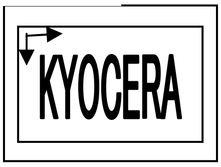
7-1. LCD

No.	Symbol	Description	Level
1	AN1	Anode1	
2	AN2	Anode2	
3	CA1	Cathode1	
4	CA2	Cathode2	
5	V_{DD}	3.3V power supply	
6	V_{DD}	3.3V power supply	
7	CM	Mode select signal(High or Open: Necessity of V･H_{SYNC}、GND: Uunecessity of V･H_{SYNC})	
8	ENAB	Data Enable (positive)	
9	V_{SYNC}	Vertical synchronous signal (negative)(fix low or high: when CM fixed to GND)	
10	H_{SYNC}	Horizontal synchronous signal (negative) (fix low or high: when CM fixed to GND)	
11	GND	GND	
12	B5	BLUE data signal (MSB)	
13	B4	BLUE data signal	
14	B3	BLUE data signal	
15	GND	GND	
16	B2	BLUE data signal	
17	B1	BLUE data signal	
18	B0	BLUE data signal (LSB)	
19	GND	GND	
20	G5	GREEN data signal (MSB)	
21	G4	GREEN data signal	
22	G3	GREEN data signal	
23	GND	GND	
24	G2	GREEN data signal	
25	G1	GREEN data signal	
26	G0	GREEN data signal (LSB)	
27	GND	GND	
28	R5	RED data signal (MSB)	
29	R4	RED data signal	
30	R3	RED data signal	
31	GND	GND	
32	R2	RED data signal	
33	R1	RED data signal	
34	R0	RED data signal (LSB)	
35	SC	Scan direction control(GND or Open: Normal、High: Reverse)	
36	GND	GND	
37	GND	GND	
38	CK	Sampling clock	
39	GND	GND	
40	GND	GND	

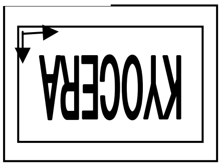
LCD connector	:	IMSA-9681S-40A-GF (IRISO)
Recommended matching FFC or FPC	:	0.5mm pitch

1) Scanning

SC : GND or Open



SC : High



8. Input timing characteristics

8-1. CM : High or Open（Necessity of V・H$_{\mathrm{SYNC}}$）

8-1-1. Timing characteristics

Item		Symbol	Min.	Typ.	Max.	Unit	Note
Clock	Frequency	Fck	29.88	33.2	36.52	MHz	
	Period	Tc	27.4	30.1	33.5	ns	
	High time	Tch	12	-	-	ns	
	Low time	Tcl	12	-	-	ns	
Data	Set up time	Tds	5	-	-	ns	
	Hold time	Tdh	10	-	-	ns	
Data Enable	Set up time	Tes	5	-	-	ns	
	Hold time	Teh	10	-	-	ns	
Horizontal sync. signal	Set up time	Ths	5	-	-	ns	
	Hold time	Thh	10	-	-	ns	
	Period	Th	944	1056	1088	Tc	
			-	31.8	-	μs	
	Pulse width	Thp	4	128	-	Tc	
	Front porch	Thf	-	40	-	Tc	
	Back porch	Thb	7	88	-	Tc	
Horizontal display period		Thd	800			Tc	
Vertical sync. signal	Period	Tv	516	525	534	Th	
			14.7	16.6	17.4	ms	
	Pulse width	Tvp	1	2	-	Th	
	Front porch	Tvf	-	11	-	Th	
	Back porch	Tvb	4	32	-	Th	
Vertical display period		Tvd	480			Th	

1) In case of lower frequency, the deterioration of the display quality, flicker etc., may occur.

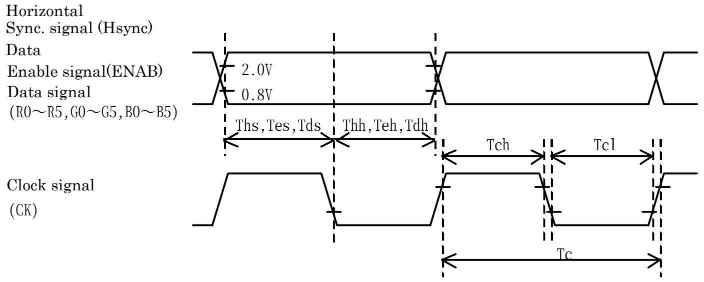
2) If CK is fixed to "H" or "L" level for certain period while ENAB is supplied, the panel may be damaged.

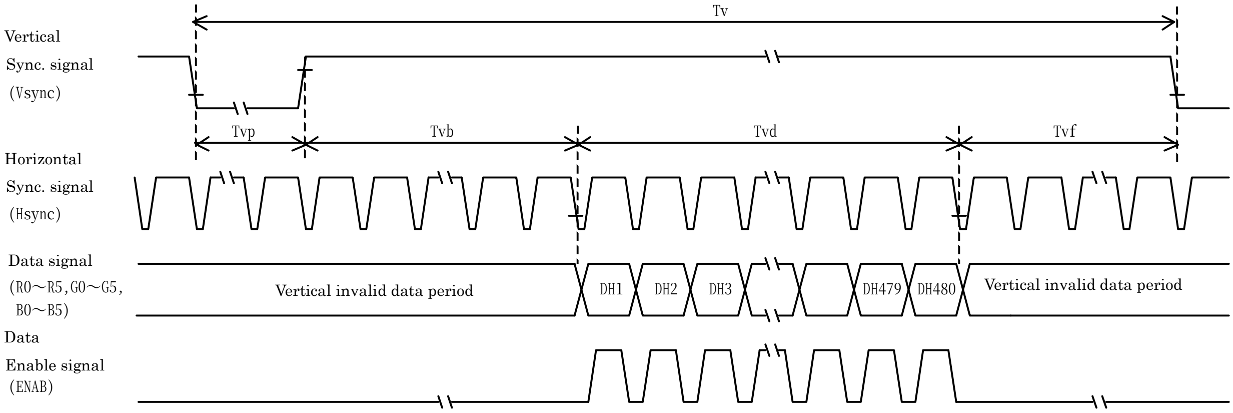
3) When dimming LED by PWM, please adjust LCD operating signal timing and LED driving frequency, to optimize the display quality. There is a possibility that flicker is observed by the interference of LCD operating signal timing and LED driving condition (especially driving frequency), even if the condition satisfies above timing specification.

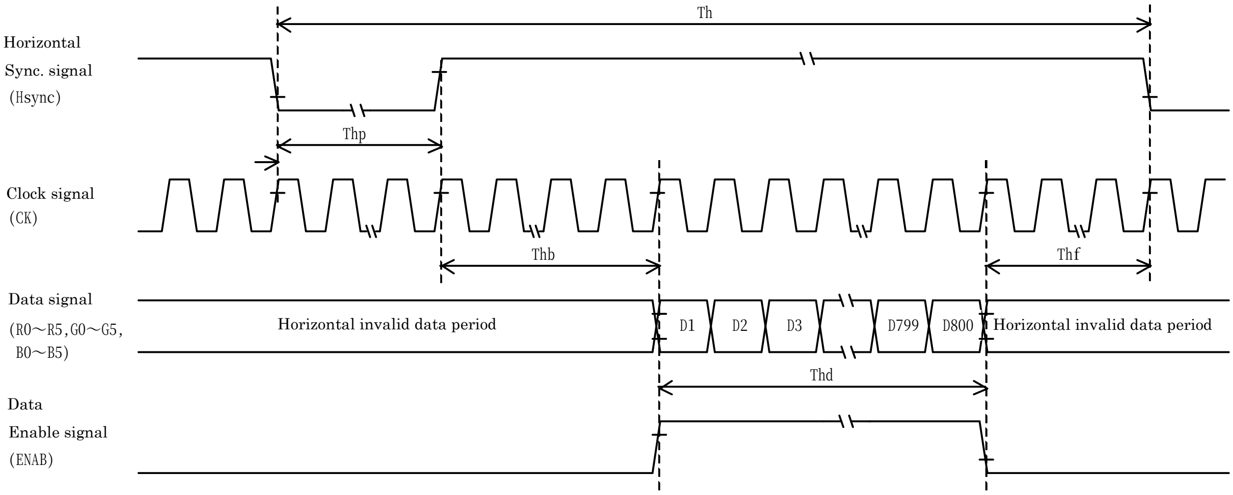
4) Do not make Tv, Th, and Thp fluctuate.

5) CK count of each Horizontal Scanning Time should be always the same.
Vertical invalid data period should be "n" X "Horizontal Scanning Time" . (n: integer)
Frame period should be always the same.

8-1-2. Input timing characteristics


Horizontal
Sync. signal (Hsync)
Data
Enable signal(ENAB)
Data signal
(R0～R5,G0～G5,B0～B5)
2.0V
0.8V
Ths,Tes,Tds
Thh,Teh,Tdh
Tch
Tcl
Clock signal
(CK)
Tc


Tv
Vertical
Sync. signal
(Vsync)
Tvp
Tvb
Tvd
Tvf
Horizontal
Sync. signal
(Hsync)
Data signal
(R0～R5,G0～G5,
B0～B5)
Vertical invalid data period
DH1
DH2
DH3
DH479
DH480
Vertical invalid data period
Data
Enable signal
(ENAB)


Th
Horizontal
Sync. signal
(Hsync)
Thp
Clock signal
(CK)
Thb
Thf
Data signal
(R0～R5,G0～G5,
B0～B5)
Horizontal invalid data period
D1
D2
D3
D799
D800
Horizontal invalid data period
Thd
Data
Enable signal
(ENAB)

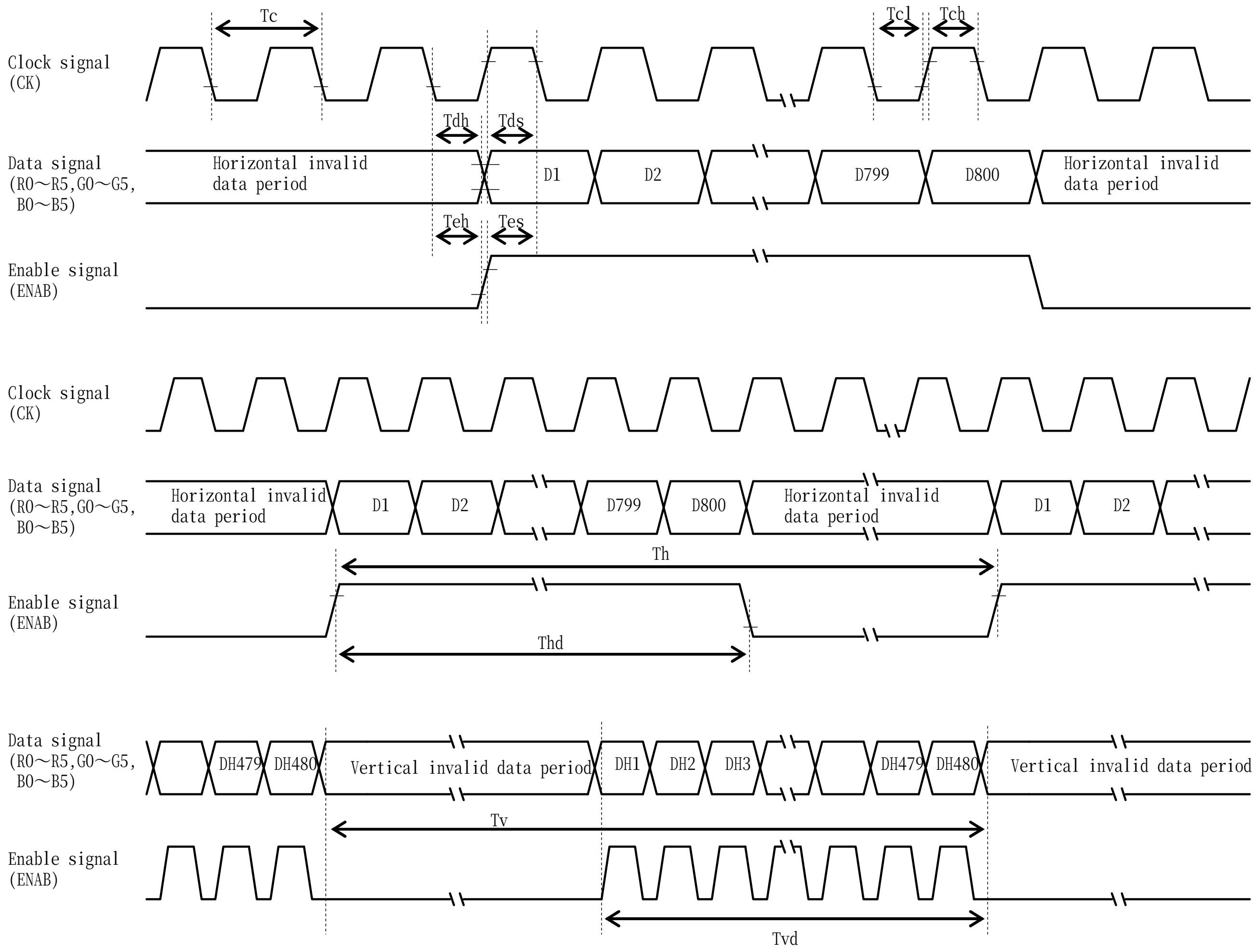
8-2. CM：GND（Uunecessity of V･H$_{SYNC}$）

8-2-1. Timing characteristics

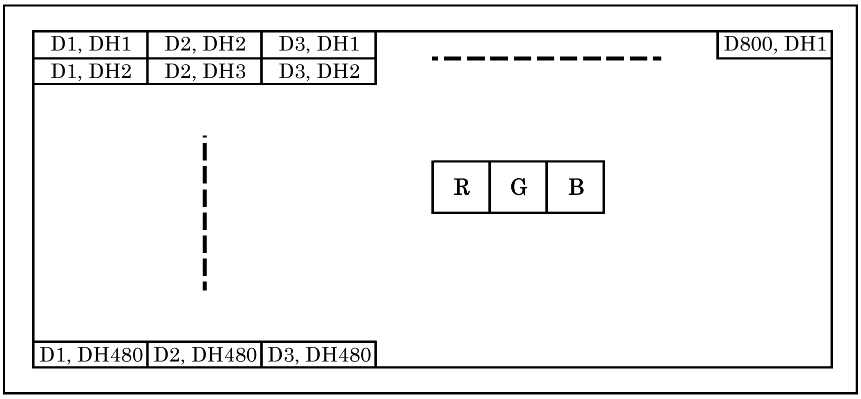
Item		Symbol	Min.	Typ.	Max.	Unit	Note
Clock	Frequency	Fck	29.88	33.2	36.52	MHz	
	Period	Tc	27.4	30.1	33.5	ns	
	High time	Tch	12	-	-	ns	
	Low time	Tcl	12	-	-	ns	
Data	Set up time	Tds	5	-	-	ns	
	Hold time	Tdh	10	-	-	ns	
Enable	Set up time	Tes	5	-	-	ns	
	Hold time	Teh	10	-	-	ns	
	Period	Th	1024	1056	1088	Tc	
			-	31.8	-	μs	
	Horizontal display period	Thd		800		Tc	
	Period	Tv	487	525	550	Th	
			14.7	16.6	17.4	ms	
	Vertical display period	Tvd		480		Th	

1) In case of lower frequency, the deterioration of the display quality, flicker etc., may occur.
2) If CK is fixed to "H" or "L" level for certain period while ENAB is supplied, the panel may be damaged.
3) When dimming LED by PWM, please adjust LCD operating signal timing and LED driving frequency, to optimize the display quality. There is a possibility that flicker is observed by the interference of LCD operating signal timing and LED driving condition (especially driving frequency), even if the condition satisfies above timing specification.
4) Do not make Tv, Th, and Thp fluctuate.
5) CK count of each Horizontal Scanning Time should be always the same.
Vertical invalid data period should be "n" X "Horizontal Scanning Time" . (n: integer)
Frame period should be always the same.

8-2-2. Input timing characteristics


Clock signal
(CK)
Tc
Tcl
Tch
Tdh
Tds
Data signal
(R0～R5,G0～G5,
B0～B5)
Horizontal invalid
data period
D1
D2
D799
D800
Horizontal invalid
data period
Teh
Tes
Enable signal
(ENAB)
Clock signal
(CK)
Data signal
(R0～R5,G0～G5,
B0～B5)
Horizontal invalid
data period
D1
D2
D799
D800
Horizontal invalid
data period
D1
D2
Th
Enable signal
(ENAB)
Thd
Data signal
(R0～R5,G0～G5,
B0～B5)
DH479
DH480
Vertical invalid data period
DH1
DH2
DH3
DH479
DH480
Vertical invalid data period
Tv
Enable signal
(ENAB)
Tvd

8-3. Input Data Signals and Display position on the screen


D1, DH1
D2, DH2
D3, DH1
D800, DH1
D1, DH2
D2, DH3
D3, DH2
R
G
B
D1, DH480
D2, DH480
D3, DH480

9. Backlight characteristics

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Forward current 1)	IF	-	60	-	mA	Ta=-20～70°C
Forward voltage 1)	VF	-	12.6	14.7	V	IF=60mA, Ta=-20℃
		-	12.0	14.1	V	IF=60mA, Ta=25℃
		-	11.6	13.8	V	IF=60mA, Ta=70℃
Operating life time 2), 3)	T	-	70,000	-	h	IF=60mA, Ta=25℃

1) For each “AN-CA”
2) When brightness decrease 50% of minimum brightness.
The average life of a LED will decrease when the LCD is operating at higher temperatures.
3) Life time is estimated data.(Condition : IF=60mA, Ta=25℃ in chamber).
4) An input current below 15mA may reduce the brightness uniformity of the LED backlight.
This is because the amount of light from each LED chip is different. Therefore, please evaluate carefully before finalizing the input current.

10. Lot number identification

The lot number shall be indicated on the back of the backlight case of each LCD.

```
TCG070WVLPAANN-AN00   - □□ - □□ - □   MADE IN  □□□□□
                        ↓↓    ↓    ↓               ↓
                        1 2   3    4               5
```

No1. - No5. above indicate
1. Year code
2. Month code
3. Date
4. Version Number
5. Country of origin (Japan or China)

Year	2011	2012	2013	2014	2015	2016
Code	1	2	3	4	5	6

Month	Jan.	Feb.	Mar.	Apr.	May	Jun.
Code	1	2	3	4	5	6

Month	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Code	7	8	9	X	Y	Z

11. Warranty

11-1. Incoming inspection

Please inspect the LCD within one month after your receipt.

11-2. Production warranty

Kyocera warrants its LCD's for a period of 12 months from the ship date. Kyocera shall, by mutual agreement, replace or re-work defective LCD's that are shown to be Kyocera's responsibility.

12. Precautions for use

12-1. Installation of the LCD

1) A transparent protection plate shall be added to protect the LCD and its polarizer.
2) The LCD shall be installed so that there is no pressure on the LSI chips.
3) The LCD shall be installed flat, without twisting or bending.
4) A transparent protection sheet is attached to the polarizer. Please remove the protection film slowly before use, paying attention to static electricity.

12-2. Static electricity

1) Since CMOS ICs are mounted directly onto the LCD glass, protection from static electricity is required.
2) Workers should use body grounding. Operator should wear ground straps.

12-3. LCD operation

1) The LCD shall be operated within the limits specified. Operation at values outside of these limits may shorten life, and/or harm display images.

12-4. Storage

1) The LCD shall be stored within the temperature and humidity limits specified. Store in a dark area, and protect the LCD from direct sunlight or fluorescent light.
2) Always store the LCD so that it is free from external pressure onto it.

12-5. Usage

1) DO NOT store in a high humidity environment for extended periods. Polarizer degradation bubbles, and/or peeling off of the polarizer may result.
2) The front polarizer is easily scratched or damaged. Prevent touching it with any hard material, and from being pushed or rubbed.
3) The LCD screen may be cleaned by wiping the screen surface with a soft cloth or cotton pad using a little Ethanol.
4) Water may cause damage or discoloration of the polarizer. Clean condensation or moisture from any source immediately.
5) Always keep the LCD free from condensation during testing. Condensation may permanently spot or stain the polarizer.
6) Do not disassemble LCD because it will result in damage.
7) This Kyocera LCD has been specifically designed for use in general electronic devices, but not for use in a special environment such as usage in an active gas. Hence, when the LCD is supposed to be used in a special environment, evaluate the LCD thoroughly beforehand and do not expose the LCD to chemicals such as an active gas.
8) Please do not use solid-base image pattern for long hours because a temporary afterimage may appear. We recommend using screen saver etc. in cases where a solid-base image pattern must be used.
9) Liquid crystal may leak when the LCD is broken. Be careful not to let the fluid go into your eyes and mouth. In the case the fluid touches your body; rinse it off right away with water and soap.

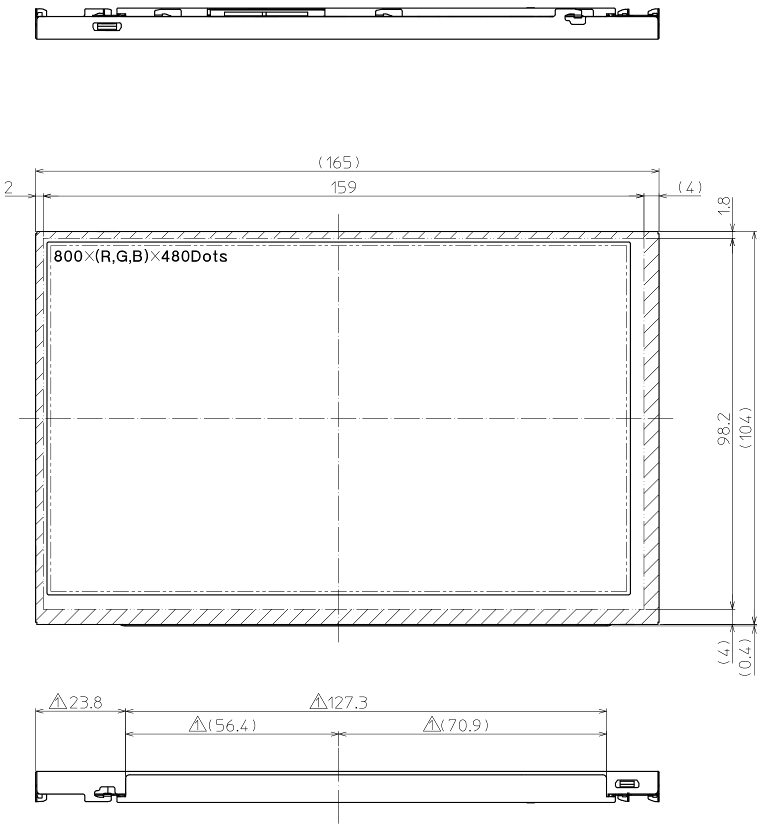
13. Reliability test data

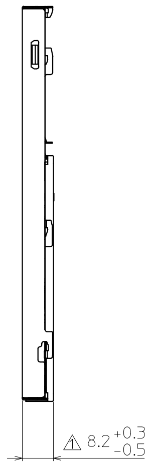
Test item	Test condition	Test time	Judgement
High temp. atmosphere	80°C	240h	Display function : No defect Display quality : No defect Current consumption : No defect
Low temp. atmosphere	-30°C	240h	Display function : No defect Display quality : No defect Current consumption : No defect
High temp. humidity atmosphere	40°C 90% RH	240h	Display function : No defect Display quality : No defect Current consumption : No defect
Temp. cycle	-30°C 0.5h R.T. 0.5h 80°C 0.5h	10cycles	Display function : No defect Display quality : No defect Current consumption : No defect
High temp. operation	70°C	500h	Display function : No defect Display quality : No defect Current consumption : No defect

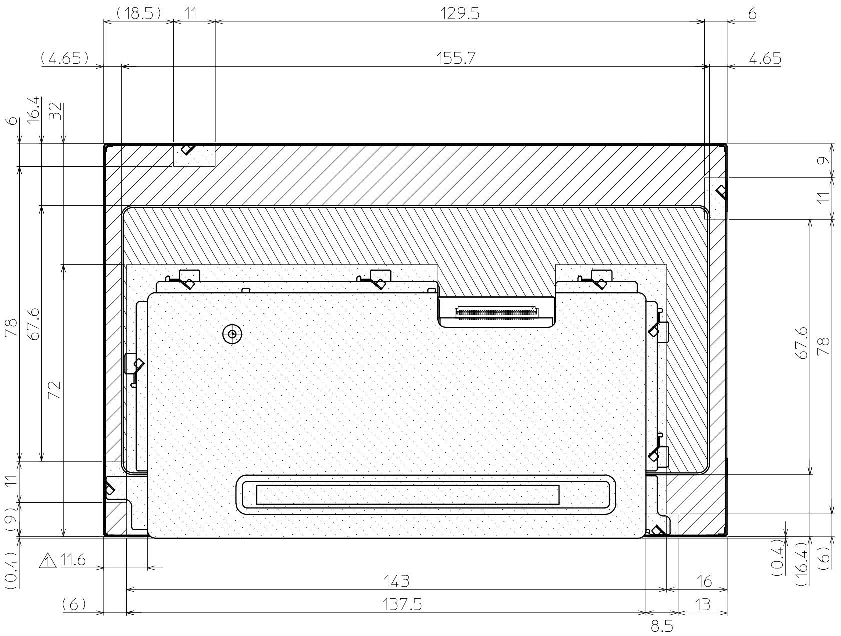
1) Each test item uses a test LCD only once. The tested LCD is not used in any other tests.
2) The LCD is tested in circumstances in which there is no condensation.
3) The reliability test is not an out-going inspection.
4) The result of the reliability test is for your reference purpose only.
   The reliability test is conducted only to examine the LCD's capability.

No	Description	Drawn	Checked	Checked	Approved
⚠1	·Added Dimensions(7point) （寸法追加(7箇所)）	10.11.05 蔭山	10.11.05 朝倉		10.11.05 朝倉

参考 (for Reference)

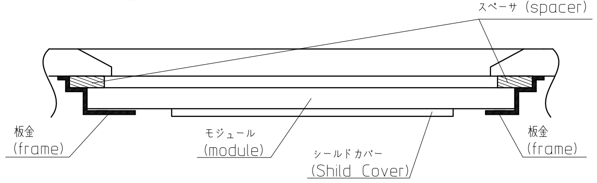






⚠ ▧ : Projection part is 5.5mm thickness.
: (厚み5.5mm)

※取り付け例 (Installation guidance)



(NTS)

※裏面の押さえつけ可能領域以外（押さえつけ禁止エリアを除く） を押さえると、取付構造によっては、
表示ムラが発生する場合が有ります。
しかしながら、GND接続等で押さえる必要が有る場合は、25mm2 (5mmX5mm)に対して、
0.65kgf (6.4N)を目安として下さい。
なお、上記値は、参考数値であり、実際の取付構造により十分評価頂きますようお願いします。

(※ If area other than pressure available area on the rear side is pressured,
there is a case that display variation is caused.
However, when pressure is needed for GND connection or so,
0.65kgf (6.4N) per 25mm2 (5mmX5mm) will be a referential figure.
Above figure is reference only. Therefore, please evaluate well under
the actual installation structure.)

取り付け方法
(Installation of the LCD)

ケースにモジュールをはめ込み(x,y固定)、裏面からZ方向を固定する事が可能。
(The LCD module shall be held in the X/Y direction by the housing, and in the Z direction using a backboard.)

斜線部の領域にて、下記の条件を満たし押さえることが望ましい。
(To hold the LCD module in place, it shall be supported with pressure applied to the hatched areas indicated by the descriptions below.)

▨ 押さえつけ可能領域
(Pressure may be applied in this area.)

押さえつけ可能領域面積（裏面）: 3544.9mm2
(Pressure may be applied in this area (Back side) : 3544.9mm2)
参考全体荷重 : 12kgf (117.6N)
(Referential total load : 12kgf (117.6N))
参考平均圧力 : 3.4gf/mm2 (33.7kPa)
(Referential average pressure : 3.4gf/mm2 (33.7kPa))
※上記値は参考数値であり、実際の取付構造により十分評価頂きますようお願いします。
(Above figure is reference only. Therefore, please evaluate well by the actual installation structure.)

░ 押さえつけ不可領域
(Pressure fuilure area.)

表面取り付け条件
(Installation conditions (Front side))

1.広い範囲で均一に押さえることが望ましい
(1. The LCD shall be uniformly supported over as wide an area as possible.)

裏面取り付け条件
(Installation conditions (Back side))

1.PCBへの接触無きこと
(1. Do not allow any foreign material to contact the PCB.)

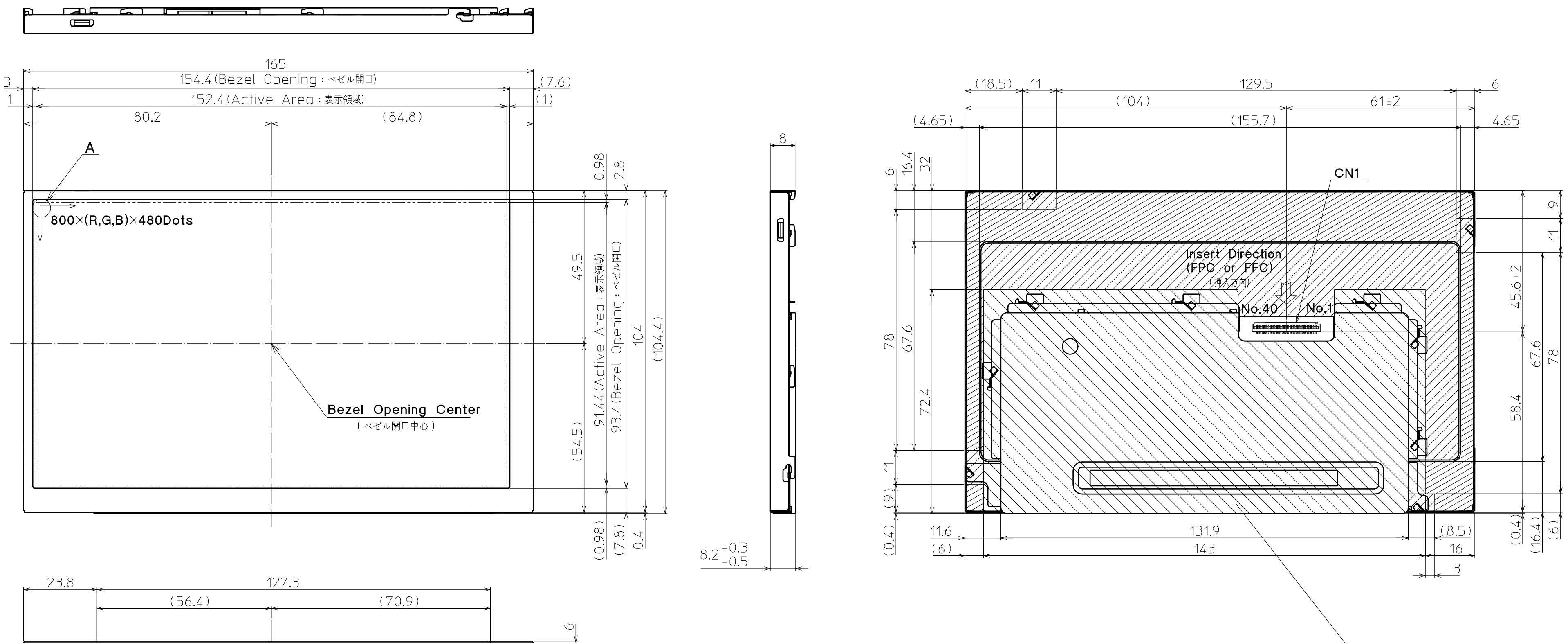
2.モジュールがたわむこと無きよう押さえつけのこと
(2. Do not allow the LCD module to bend or twist.)

3.広い範囲で均一に押さえることが望ましい
(3. Support the LCD with uniform pressure over as wide an area as possible.)

注記 (Note)
指定外公差 (Torelance without indication) : ±0.5

Material 材質	Treatment 処理	Approved '10.10.29	Checked	Checked '10.10.29	Drawn	Scale 1:1 (NTS)	Title TCG070WVLPAANN	KYOCERA	Year-Month-Day '10.10.22	Size 2
Quantity 製作数	Description; 備考 RoHS	朝倉		朝倉	蔭山		Module Installation	Drawing No. 121A8037200-1		

No	Description	Drawn	Checked	Checked	Approved

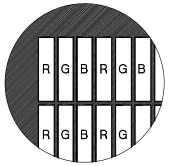

165
3
1
154.4 (Bezel Opening：ベゼル開口)
152.4 (Active Area：表示領域)
(7.6)
(1)
80.2
(84.8)
A
800×(R,G,B)×480Dots
Bezel Opening Center
(ベゼル開口中心)
0.98
2.8
49.5
(54.5)
91.44 (Active Area：表示領域)
93.4 (Bezel Opening：ベゼル開口)
104
(104.4)
(0.98)
(7.8)
0.4
8
8.2 +0.3 -0.5
23.8
127.3
(56.4)
(70.9)
6
(2.2)
(18.5)
11
129.5
6
(104)
61±2
(4.65)
(155.7)
4.65
CN1
Insert Direction
(FPC or FFC)
(挿入方向)
No.40
No.1
6
16.4
32
78
67.6
72.4
11
(9)
(0.4)
9
11
45.6±2
67.6
78
58.4
(0.4)
(16.4)
(6)
11.6
(6)
131.9
143
(8.5)
16
3

▧ : Projected part is 8.2mm thickness.
(厚み8.2mm)

▨ : Projected part is 6mm thickness.
(厚み6mm)

▨ : Projected part is 5.5mm thickness.
(厚み5.5mm)

shield cover area ▧
(シールドカバー領域)
8.2mm thickness.
(厚み8.2mm)


R
G
B
R
G
B
R
G
B
R
G

DETAIL A (Dot Size)
(NTS)

Note.(注記)
1. Connector CN1: IMSA-9681S-40A-GF (IRISO)
(コネクター)
2. The Information of LCD is displayed starting at the upper left hand corner, moving right then down to the lower right hand corner.
(LCDにおいて、画像データの表示は左上コーナーから始まり、右へ進み下へ送られ右下コーナーへ向かう.)
3. Tolerance without indication: ±0.5
(指示無き公差)

Material 材質	Treatment 処理	Approved '10.11.08 朝倉	Checked	Checked '10.11.08 朝倉	Drawn 蔭山	Scale 1:1 (NTS)	Title TCG070WVLPAANN	KYOCERA	Year-Month-Day '10.10.21	Size 2
Quantity 製作数	Description; 備考 RoHS						Outline Dimensions	Drawing No. 121A8036600		

Spec No.	TQ3C-8EAF0-E2YAA16-00
Date	April 5, 2011

KYOCERA INSPECTION STANDARD

TYPE : TCG070WVLPAANN-AN00

KYOCERA CORPORATION
SHIGA YASU PLANT
LCD DIVISION

Original Issue Date	Designed by : Engineering dept.			Confirmed by : QA dept.	
	Prepared	Checked	Approved	Checked	Approved
April 5, 2011	S.Hatanaka	Y.Ikeda	M.FujiTani	I.Hamao	

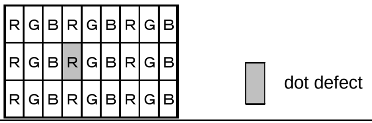
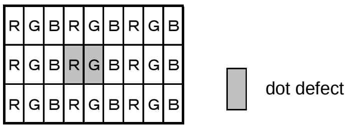
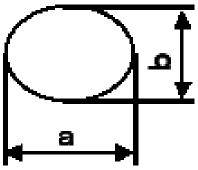
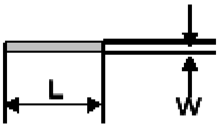
Revision record

Date	Designed by : Engineering dept.			Confirmed by : QA dept.	
	Prepared	Checked	Approved	Checked	Approved

Rev.No.	Date	Page	Descriptions

Visuals specification

1) Note

	Note		
General	1. Customer identified anomalies not defined within this inspection standard shall be reviewed by Kyocera, and an additional standard shall be determined by mutual consent. 2. This inspection standard about the image quality shall be applied to any defect within the effective viewing area and shall not be applicable to outside of the area. 3. Inspection conditions Luminance : 500 Lux min. Inspection distance : 300 mm. Temperature : 25 ± 5℃ Direction : Directly above		
Definition of inspection item	Dot defect	Bright dot defect	The dot is constantly “on” when power applied to the LCD, even when all “Black” data sent to the screen. Inspection tool: 5% Transparency neutral density filter. Count dot: If the dot is visible through the filter. Don’t count dot: If the dot is not visible through the filter.  R G B R G B R G B R G B R G B R G B R G B R G B R G B dot defect
		Black dot defect	The dot is constantly “off” when power applied to the LCD, even when all “White” data sent to the screen.
		Adjacent dot	Adjacent dot defect is defined as two or more bright dot defects or black dot defects.  R G B R G B R G B R G B R G B R G B R G B R G B R G B dot defect
	External inspection	Bubble, Scratch, Foreign particle (Polarizer, Cell, Backlight)	Visible operating (all pixels “Black” or “White”) and non operating.
		Appearance inspection	Does not satisfy the value at the spec.
	Others	LED wires	Damaged to the LED wires, connector, pin, functional failure or appearance failure.
	Definition of size	Definition of circle size  d = (a + b)/2	Definition of linear size 

2) Standard

<table>
<tr><th colspan="2">Classification</th><th colspan="2">Inspection item</th><th>Judgement standard</th></tr>
<tr><td rowspan="8">Defect
(in LCD glass)</td><td rowspan="7">Dot defect</td><td colspan="2">Bright dot defect</td><td>Acceptable number : 4
Bright dot spacing : 5 mm or more</td></tr>
<tr><td colspan="2">Black dot defect</td><td>Acceptable number : 5
Black dot spacing : 5 mm or more</td></tr>
<tr><td rowspan="2">2 dot join</td><td>Bright dot defect</td><td>Acceptable number : 2</td></tr>
<tr><td>Black dot defect</td><td>Acceptable number : 3</td></tr>
<tr><td colspan="2">3 or more dots join</td><td>Acceptable number : 0</td></tr>
<tr><td colspan="2">Total dot defects</td><td>Acceptable number : 5 Max</td></tr>
<tr><td colspan="2"></td><td></td></tr>
<tr><td>Others</td><td colspan="2">White dot, Dark dot
(Circle)</td><td><table>
<tr><th>Size (mm)</th><th>Acceptable number</th></tr>
<tr><td>d ≦ 0.2</td><td>(Neglected)</td></tr>
<tr><td>0.2 < d ≦ 0.4</td><td>5</td></tr>
<tr><td>0.4 < d ≦ 0.5</td><td>3</td></tr>
<tr><td>0.5 < d</td><td>0</td></tr>
</table></td></tr>
<tr><td colspan="2" rowspan="4">External inspection
(Defect on Polarizer or between Polarizer and LCD glass)</td><td colspan="2">Polarizer (Scratch)</td><td><table>
<tr><th>Width (mm)</th><th>Length (mm)</th><th>Acceptable number</th></tr>
<tr><td>W ≦ 0.1</td><td>—</td><td>(Neglected)</td></tr>
<tr><td rowspan="2">0.1 < W ≦ 0.3</td><td>L ≦ 5.0</td><td>(Neglected)</td></tr>
<tr><td>5.0 < L</td><td>0</td></tr>
<tr><td>0.3 < W</td><td>—</td><td>0</td></tr>
</table></td></tr>
<tr><td colspan="2">Polarizer (Bubble)</td><td><table>
<tr><th>Size (mm)</th><th>Acceptable number</th></tr>
<tr><td>d ≦ 0.2</td><td>(Neglected)</td></tr>
<tr><td>0.2 < d ≦ 0.3</td><td>5</td></tr>
<tr><td>0.3 < d ≦ 0.5</td><td>3</td></tr>
<tr><td>0.5 < d</td><td>0</td></tr>
</table></td></tr>
<tr><td colspan="2">Foreign particle
(Circular shape)</td><td><table>
<tr><th>Size (mm)</th><th>Acceptable number</th></tr>
<tr><td>d ≦ 0.2</td><td>(Neglected)</td></tr>
<tr><td>0.2 < d ≦ 0.4</td><td>5</td></tr>
<tr><td>0.4 < d ≦ 0.5</td><td>3</td></tr>
<tr><td>0.5 < d</td><td>0</td></tr>
</table></td></tr>
<tr><td colspan="2">Foreign particle
(Linear shape)
Scratch</td><td><table>
<tr><th>Width (mm)</th><th>Length (mm)</th><th>Acceptable number</th></tr>
<tr><td>W ≦ 0.03</td><td>—</td><td>(Neglected)</td></tr>
<tr><td rowspan="3">0.03 < W ≦ 0.1</td><td>L ≦ 2.0</td><td>(Neglected)</td></tr>
<tr><td>2.0 < L ≦ 4.0</td><td>3</td></tr>
<tr><td>4.0 < L</td><td>0</td></tr>
<tr><td>0.1 < W</td><td>—</td><td>(According to circular shape)</td></tr>
</table></td></tr>
</table>