SPEC

Spec No.	TQ3C-8EAF0-E1DEU85-00
Date	October 06, 2010

TYPE : TCG057VGLCZ-H50

< 5.7 inch VGA transmissive color TFT
with LED backlight and touch panel>

CONTENTS

1. Application
2. Construction and outline
3. Mechanical specifications
4. Absolute maximum ratings
5. Electrical characteristics
6. Optical characteristics
7. Interface signals
8. Input timing characteristics
9. Backlight characteristics
10. Design guidance for analog touch panel
11. Lot number identification
12. Warranty
13. Precautions for use
14. Reliability test data
15. Outline drawing

Issued
Date: Oct 12, 2010
KYOCERA
Hayato LCD Division

KYOCERA CORPORATION
KAGOSHIMA HAYATO 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
October 06, 2010	S.Hatanaka	Y.Ikeda	M.FujiTani		

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 TCG057VGLCZ-H50. (RoHS Compliant)

2. Construction and outline

LCD : Transmissive color dot matrix type TFT
Backlight system : LED
Additional circuit : Timing controller, Power supply (3.3V input)
(without constant current circuit for LED Backlight)
Touch panel : Analog type(Glass/Glass)
Surface film : Glare low-reflection treatment

3. Mechanical specifications

3-1. LCD

Item	Specification	Unit
Outline dimensions 1)	144(W)×(104.8)(H)×14.93(D)	mm
Active area	115.2(W)×86.4(H) (14.4cm/5.7 inch(Diagonal))	mm
Dot format	640×(B,G,R)(W)×480(H)	dot
Dot pitch	0.06(W)×0.18(H)	mm
Base color 2)	Normally White	-
Mass	255	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.

3-2. Touch panel

Item		Specification	Unit
Input		Radius-0.8 stylus or Finger	-
Actuation Force	Before reliability test	0.1～2.0	N
	After reliability test 1)	0.1～3.0	N
Operating life	Striking(Finger-input) 2)	1 million	hits
	Sliding(Stylus–input) 3)	100 thousand	characters
Surface hardness		2H or more(Pencil hardness)	-
Static load 4)		Min.5	kgf

1) Pls refer to “11.reliability test data” for details
(The tested panel is not used in any other tests)

2) Striking test condition
Testing rod : Silicon rubber (Hardness:60°),Tip : R = 6.0,
Testing location : Center of active area
Load : 2.45N
Cycle : 2hits/sec
Judgment : No defect in function
: No appearance defect which causes trouble to use.
*Dents, blurs and marks on surface film : neglected

3) Sliding test condition
Testing rod : Polyacetal resin, Tip : R = 0.8
Testing location : Center of active area
Load : 2.45N
Input length : 10mm
Input speed : 50mm/sec
Sliding times : 10mm sliding (back and forth) counts as 2 times.
Judgment : No defect in function
: No appearance defect which causes trouble to use.
*Dents, blurs and marks on surface film : neglected

4) Static load test condition
Testing rod : Silicon rubber, Tip : ϕ 10 , Hardness:50°
Applied period : Center of active area
Setting method : 2.45N
Judgement : 10mm

4. Absolute maximum ratings

4-1. Electrical absolute maximum ratings

Item		Symbol	Min.	Max.	Unit
Supply voltage		V_{DD}	0	4.0	V
Input signal voltage	1)	V_{IN}	-0.3	6.0	V
LED forward current	2) 3)	IF	-	(100)	mA
Supply voltage for touch panel		V_{TP}	0	6.0	V
Input current of touch panel		I_{TP}	0	0.5	mA

1) Input signal : CK, R0～R5, G0～G5, B0～B5, H_{SYNC}, V_{SYNC}, ENAB, R/L, U/D
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

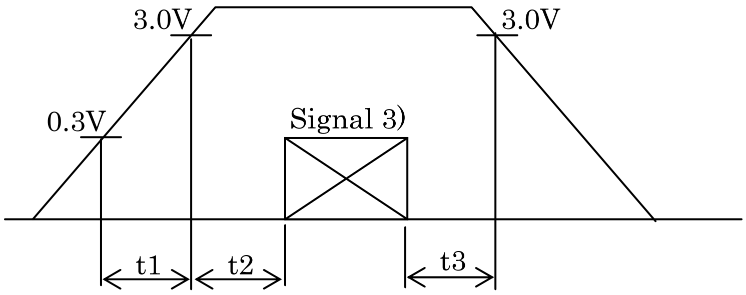
5. Electrical characteristics

5-1. LCD

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)	-	150	195	mA
Permissive input ripple voltage		V_{RP}	-	-	-	100	mVp-p
Input signal voltage	3)	V_{IL}	"Low" level	0	-	$0.3V_{DD}$	V
		V_{IH}	"High" level	$0.7V_{DD}$	-	V_{DD}	V

1) V_{DD}-turn-on conditions



$0 < t1 \leqq 20ms$

$0 < t2 \leqq 50ms$

$0 < t3 \leqq 1s$

2) Display pattern:

V_{DD} = 3.3V, Temp. = 25°C

	1 2 3 · · · · · · · · · · · · · · · 1920(dot)
1	■□■□■□■□■□■□■□■□■□■
2	□■□■□■□■□■□■□■□■□■□
3	■□■□■□■□■□■□■□■□■□■
:	□■□■□■□■□■□■□■□■□■□
:	■□■□■□■□■□■□■□■□■□■
:	□■□■□■□■□■□■□■□■□■□
479	■□■□■□■□■□■□■□■□■□■
480	□■□■□■□■□■□■□■□■□■□
(dot)	

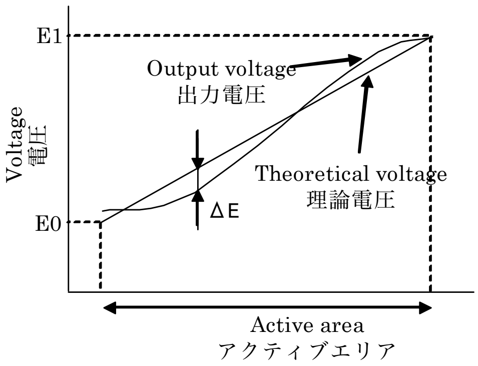
3) Input signal : CK, R0～R5, G0～G5, B0～B5, H_{SYNC}, V_{SYNC}, ENAB, R/L, U/D

5-2. Touch panel

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Supply voltage for touch panel	V_{TP}	-	-	5.0	-	V
Terminal resistance 1)	xL-xR	-	200	-	1200	Ω
	yU-yL	-	200	-	1000	Ω
Linearity 2)	-	-	less than ±2.5			%
Insulation resistance 3)	-	DC25V	50	-	-	MΩ
Chattering 4)	-	at ON/OFF	less than 10			ms

1) Resistance between terminal xL and xR, or between yU and yL

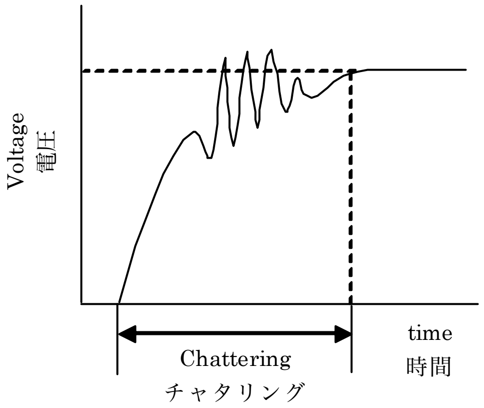
2) Apply 5VDC to the terminal xL-xR, and measure the output voltage at terminal y when a random input is applied in the active area. Measure the difference between the output and theoretical voltages. (Measure the actual voltage at the terminal using the same method.)


E1
E0
Voltage
電圧
Output voltage
出力電圧
Theoretical voltage
理論電圧
ΔE
Active area
アクティブエリア

Linearity リニアリティ $(\%) = \dfrac{\Delta E_{max}}{E1-E0}$

3) Resistance between the upper and lower terminals.

4) Apply 5VDC to the terminal xL-xR, and measure the oscillation at terminal y when applying a random input in the active area. (Measure the oscillation at terminal x using the same method.)


Voltage
電圧
Chattering
チャタリング
time
時間

6. Optical characteristics

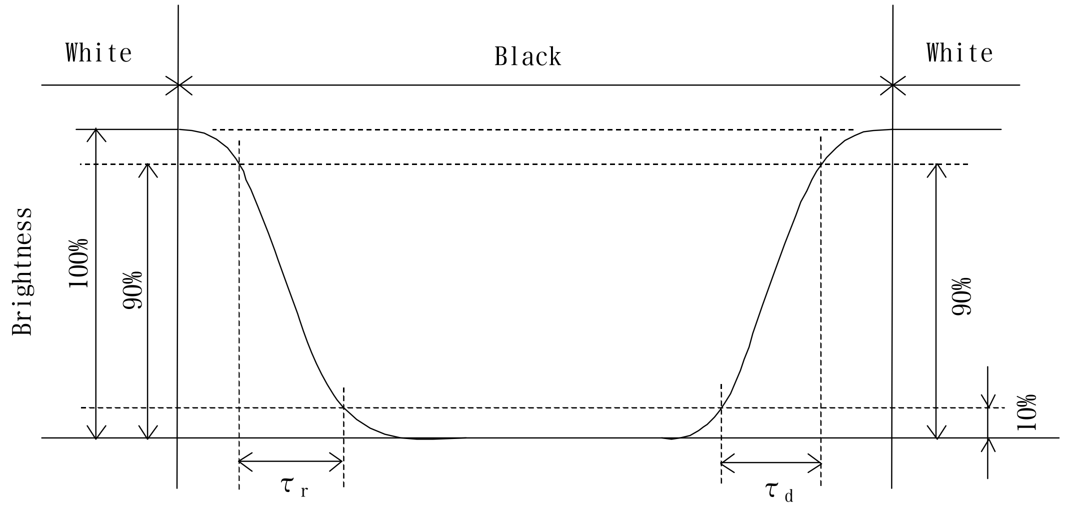
Measuring spot = ϕ 6.0mm, Temp. = 25°C

Item		Symbol	Condition	Min.	Typ.	Max.	Unit
Response time	Rise	τ_r	$\theta=\phi=0°$	-	10	-	ms
	Down	τ_d	$\theta=\phi=0°$	-	25	-	ms
Viewing angle range View direction : 12 o'clock (Gray inversion)		θ_{UPPER}	CR≧5	-	80	-	deg.
		θ_{LOWER}		-	80	-	
		ϕ_{LEFT}		-	80	-	deg.
		ϕ_{RIGHT}		-	80	-	
Contrast ratio		CR	$\theta=\phi=0°$	300	500	-	-
Brightness		L	IF=60 mA/Line	450	640	-	cd/m^2
Chromaticity coordinates	Red	x	$\theta=\phi=0°$	0.56	0.61	0.66	-
		y		0.31	0.36	0.41	
	Green	x	$\theta=\phi=0°$	0.29	0.34	0.39	
		y		0.51	0.56	0.61	
	Blue	x	$\theta=\phi=0°$	0.09	0.14	0.19	
		y		0.05	0.10	0.15	
	White	x	$\theta=\phi=0°$	0.27	0.32	0.37	
		y		0.29	0.34	0.39	

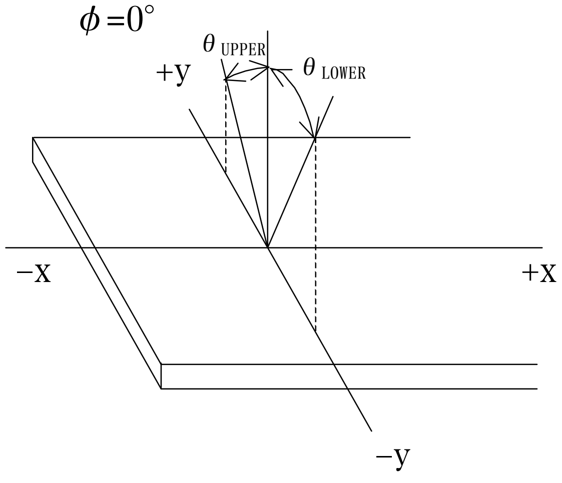
6-1. Definition of contrast ratio

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

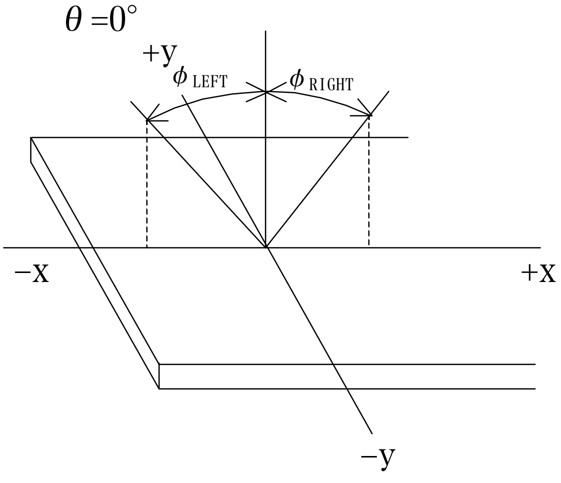
6-2. Definition of response time



6-3. Definition of viewing angle

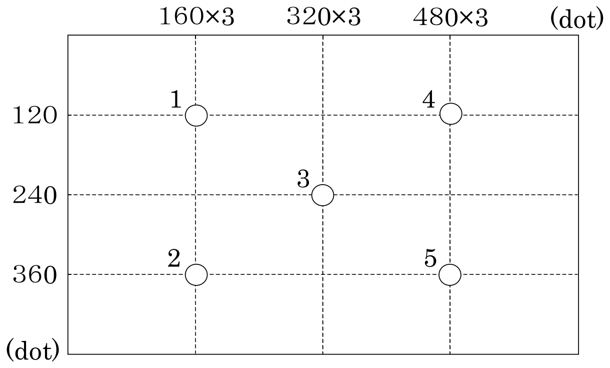

ϕ=0°
θ UPPER
θ LOWER
+y
−x
+x
−y

θ direction


θ=0°
+y
ϕ LEFT
ϕ RIGHT
−x
+x
−y

ϕ direction

6-4. Brightness measuring points


160×3
320×3
480×3
(dot)
120
240
360
(dot)
1
2
3
4
5

1) Rating is defined on the average in the viewing area. (measured point 1～5)
2) Measured 30 minutes after the LED is powered on. (Ambient temp. = 25°C)

7. Interface signals

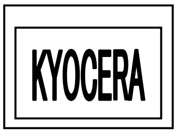
7-1. LCD

No.	Symbol	Description	I/O	Note
1	GND	GND	-	
2	CK	Clock signal for sampling each data signal	I	
3	H_{SYNC}	Horizontal synchronous signal (negative)	I	
4	V_{SYNC}	Vertical synchronous signal (negative)	I	
5	GND	GND	-	
6	R0	RED data signal (LSB)	I	
7	R1	RED data signal	I	
8	R2	RED data signal	I	
9	R3	RED data signal	I	
10	R4	RED data signal	I	
11	R5	RED data signal (MSB)	I	
12	GND	GND	-	
13	G0	GREEN data signal (LSB)	I	
14	G1	GREEN data signal	I	
15	G2	GREEN data signal	I	
16	G3	GREEN data signal	I	
17	G4	GREEN data signal	I	
18	G5	GREEN data signal (MSB)	I	
19	GND	GND	-	
20	B0	BLUE data signal (LSB)	I	
21	B1	BLUE data signal	I	
22	B2	BLUE data signal	I	
23	B3	BLUE data signal	I	
24	B4	BLUE data signal	I	
25	B5	BLUE data signal (MSB)	I	
26	GND	GND	-	
27	ENAB	Signal to settle the horizontal display position (positive)	I	1)
28	V_{DD}	3.3V power supply	-	
29	V_{DD}	3.3V power supply	-	
30	R/L	Horizontal display mode select signal L : Normal , H : Left / Right reverse mode	I	2)
31	U/D	Vertical display mode select signal H : Normal , L : Up / Down reverse mode	I	2)
32	NC	No connect	I	
33	GND	GND	-	

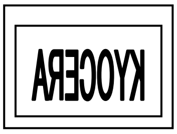
LCD connector	:	IMSA-9632S-33Z02-GF1 (IRISO)
Recommended matching FFC or FPC	:	0.5mm pitch

1) The horizontal display start timing is settled in accordance with a rising timing of ENAB signal.
In case ENAB is fixed "Low", the horizontal start timing is determined.
Don't keep ENAB "High" during operation.

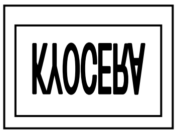
2)



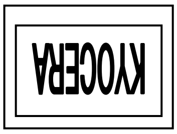
R/L = L
U/D = H



R/L = H
U/D = H



R/L = L
U/D = L



R/L = H
U/D = L

7-2. LED

No.	Symbol	Description
1	AN1	Anode 1
2	AN2	Anode 2
3	CA1	Cathode 1
4	CA2	Cathode 2

LCD side connector : PHR-4 (JST)
Recommended matching connector
: B4B-PH-SM4-TB (JST)
: B4B-PH-SM4-TB(LF)(SN) (JST)･･･(RoHS Compliant)
: S4B-PH-SM4-TB (JST)
: S4B-PH-SM4-TB (LF)(SN) (JST)･･･(RoHS Compliant)

7-3. Touch panel

No.	Symbol	Description
1	yU	y-Upper terminal
2	xL	x-Left terminal
3	yL	y-Lower terminal
4	xR	x-Right terminal

Touch panel side connector : 1.25mm pitch
Recommended matching connector : 04FFS-SP-GB-TF(LF)(SN) (JST)
: 00-8370-049-000-888+ (ELCO)

8. Input timing characteristics

8-1. Timing characteristics

Item		Symbol	Min	Typ	Max	Unit	Note
Clock	Frequency	1/Tc	22.66	25.18	27.69	MHz	
	Duty ratio	Tch/Tc	40	50	60	%	
Data	Set up time	Tds	5	–	–	ns	
	Hold time	Tdh	10	–	–	ns	
Horizontal sync. signal	Cycle	TH	30.0	31.8	–	μs	
			770	800	850	clock	
	Pulse width	THp	2	96	200	clock	
Vertical sync. signal	Cycle	TV	515	525	560	line	
	Pulse width	TVp	2	–	34	line	
Horizontal display period		THd	640			clock	
Hsync,-Clock phase difference		THc	10	–	Tc-10	ns	
Hsync-Vsync. phase difference		TVh	2Tc	–	TH-THp	ns	
Vertical sync. signal start position		TVs	34			line	
Vertical display period		TVd	480			line	

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

8-2. Horizontal display position

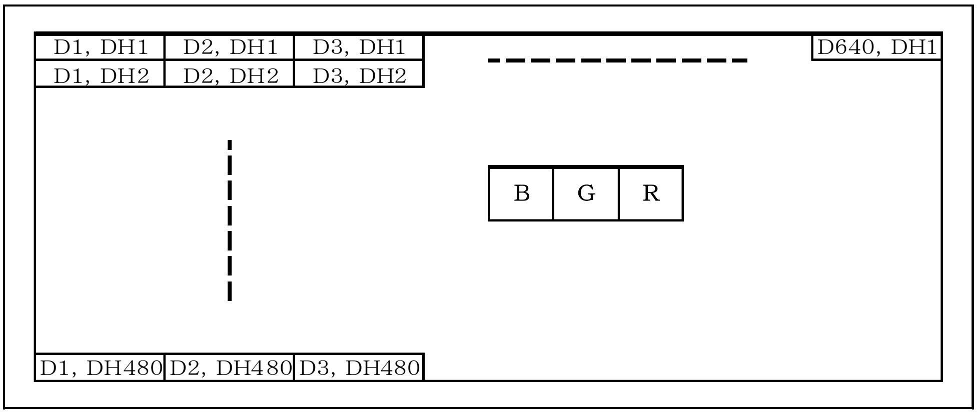
Item		Symbol	Min	Typ	Max	Unit	Note
Enable signal	Set up time	Tes	5	–	Tc-10	ns	
	Pulse width	Tep	2	640	TH-10	clock	
HSYNC – Enable signal phase difference		The	44	–	104	clock	

1) When ENAB is fixed at "Low", the display starts from the data of C104(clock) as shown in 8-5.
2) The horizontal display position is determined by ENAB signal.

8-3. Vertical display position

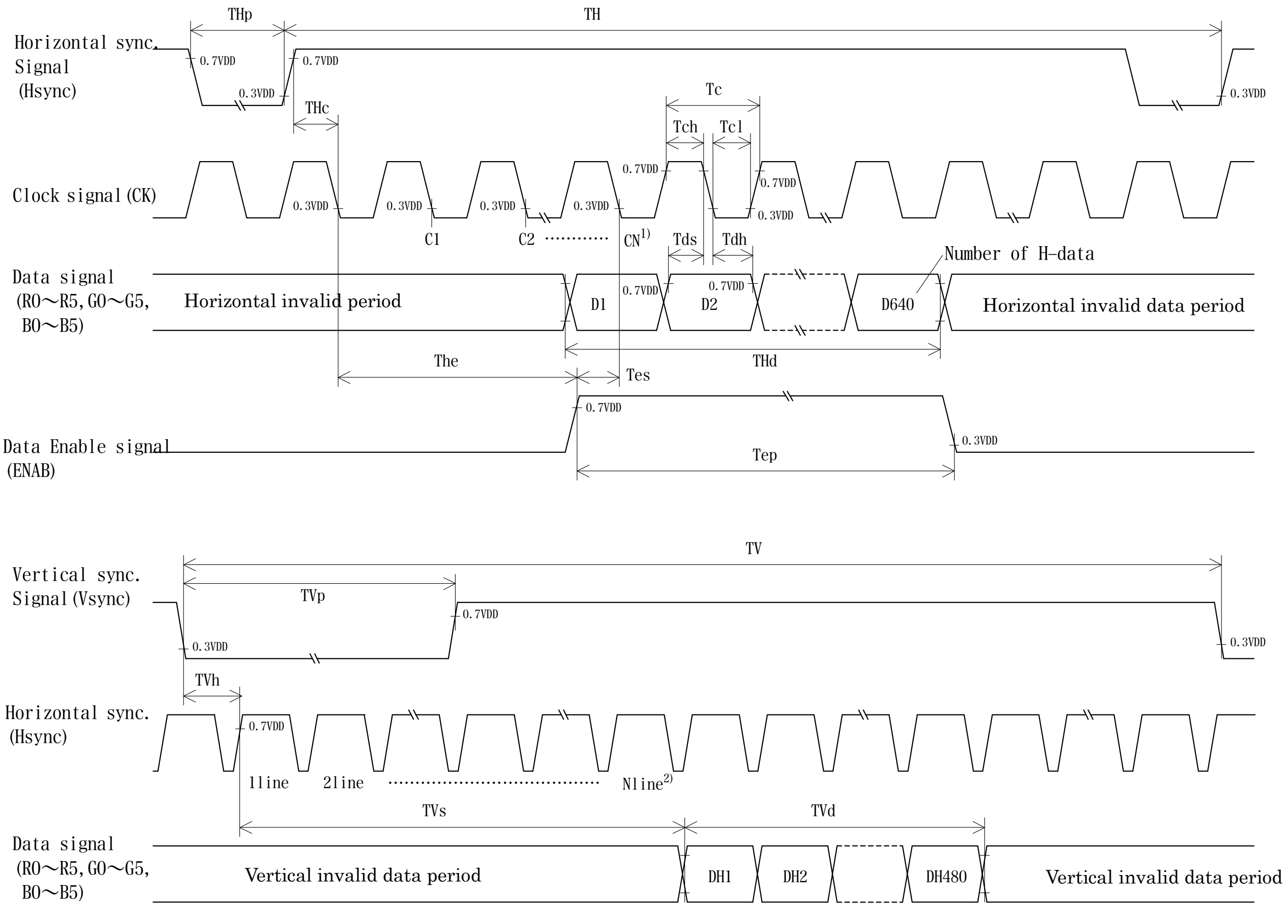
1) The vertical display position (TVs) is 34th line.
2) ENAB signal is independent of vertical display position.

8-4. Input Data Signals and Display position on the screen



D1, DH1
D2, DH1
D3, DH1
D640, DH1
D1, DH2
D2, DH2
D3, DH2
B
G
R
D1, DH480
D2, DH480
D3, DH480

8-5. Input timing characteristics



THp
TH
Horizontal sync. Signal (Hsync)
0.7VDD
0.3VDD
THc
Tc
Tch
Tcl
Clock signal (CK)
0.7VDD
0.3VDD
C1
C2
CN1)
Tds
Tdh
Number of H-data
Data signal (R0～R5, G0～G5, B0～B5)
Horizontal invalid period
D1
D2
D640
Horizontal invalid data period
The
Tes
THd
Data Enable signal (ENAB)
Tep
TV
Vertical sync. Signal (Vsync)
TVp
TVh
Horizontal sync. (Hsync)
1line
2line
Nline2)
TVs
TVd
Vertical invalid data period
DH1
DH2
DH480
Vertical invalid data period

1) When ENAB is fixed at "Low", the display starts from the data of C104(Clock).

2) The vertical display position(TVs) is fixed at 34th line.

9. Backlight characteristics

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Forward current 1)	IF	-	60	-	mA	Ta=-20～70°C
Forward voltage 1)	VF	-	18.9	22.1	V	IF=60mA, Ta=-20℃
		-	18.0	21.2	V	IF=60mA, Ta=25℃
		-	17.5	20.6	V	IF=60mA, Ta=70℃
Operating life time 2), 3)	T	-	50,000	-	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=(60)mA, Ta=25℃ in chamber).
4) An input current below (TBD)mA 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. Design guidance for analog touch panel

10-1. Electrical (In customer's design, please remember the following considerations.)

1) Do not use the current regulated circuit.
2) Keep the current limit with top and bottom layer.
(Please refer to “Electrical absolute maximum ratings” for details.)
3) Analog touch panel can not sense two points touching separately.
4) A contact resistance is appeared at the touch point between top and bottom layer.
After this resistance has stable read of the touch panel position data.
5) Because noise of inverter or peripheral circuits may interfere signal of touch panel itself it is necessary to design carefully in advance to avoid these noise problem.

10-2. Software

1) Do the "User Calibration".
2) "User Calibration" may be needed with long term using.
Include "User Calibration" menu in your software.
3) When drawing a line with a stylus, there may be a slight discontinuity when the stylus passes over a spacer-dot. If necessary, please provide a compensation feature within your software.

10-3. Mounting on display and housing bezel

1) Do not use an adhesive tape to bond it on the front of touch panel and hang it to the housing bezel.
2) This touch panel has an airtight but not watertight structure. Please not to use it for the applications requiring watertight or under the environments occurred condensation. If it is expected to be exposed to the environments that vapor, moisture or other liquids may seep inside a bezel, please be sure to take some measurements for drip-proof or waterproof by using sealing materials on the bezel.
3) Please mount the touch panel so that it does not move or slide relative to the LCD, even when vibration or shock is applied and even when high humidity or high temperature may weaken the mounting adhesive.

11. Lot number identification

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

TCG057VGLCZ-H50 - □□ - □□ - □ 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	2010	2011	2012	2013	2014	2015
Code	0	1	2	3	4	5

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

12. Warranty

12-1. Incoming inspection

Please inspect the LCD within one month after your receipt.

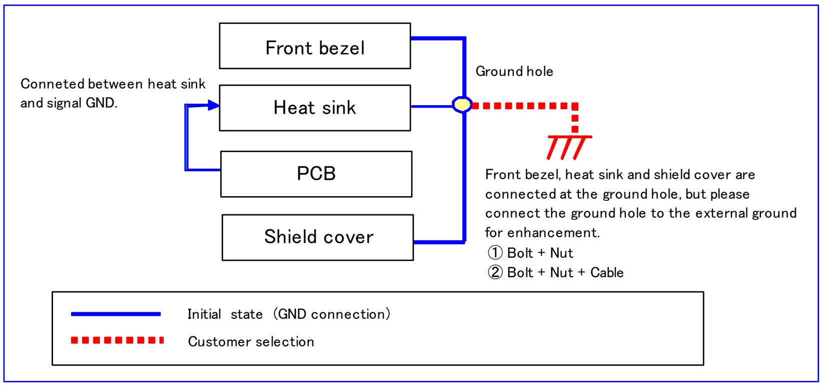
12-2. Production warranty

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.

13. Precautions for use

13-1. Installation of the LCD

1) The LCD has a grounding hole. Please ground the LCD to prevent noise and to stabilize its performance as circumstances demand.


Front bezel
Conneted between heat sink and signal GND.
Heat sink
PCB
Shield cover
Ground hole
Front bezel, heat sink and shield cover are connected at the ground hole, but please connect the ground hole to the external ground for enhancement.
① Bolt + Nut
② Bolt + Nut + Cable
Initial state (GND connection)
Customer selection

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) Please refer to the following our recommendable value of Clamp-down torque when installing.
   Clamp-down torque : 0.32±0.03N・m
   Please set up 'SPEED-LOW', 'SOFT START-SLOW' when using electric driver.
   Recommendable screw JIS tapping screw two types nominal dia.3.0mm installing boss hole depth 3.5±0.5mm
   Washer/mounting hole (Hole diameter) : ϕ3.0～ϕ3.4
   Please be careful not to use high torque which may damage LCD in installation.
5) A transparent protection sheet is attached to the touch panel. Please remove the protection film slowly before use, paying attention to static electricity.

13-2. 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.

13-3. 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.

13-4. 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.

13-5. Usage

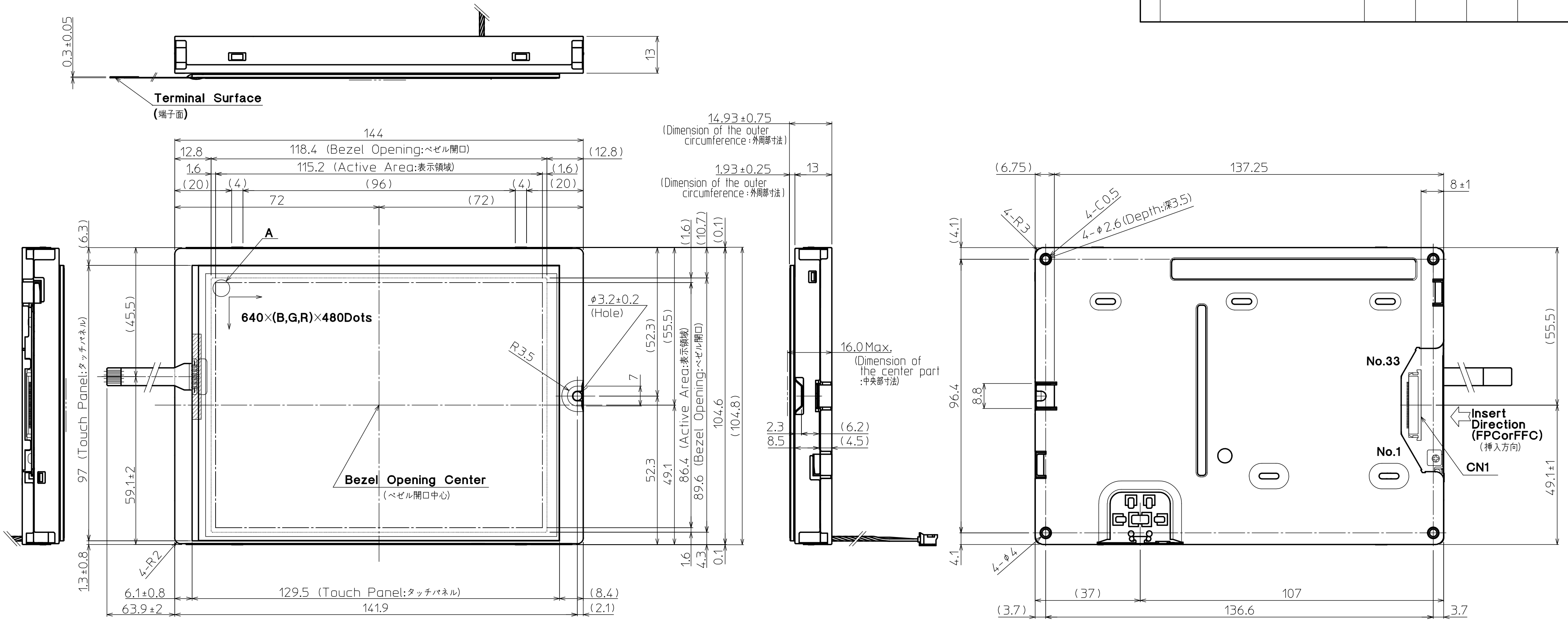
1) DO NOT store in a high humidity environment for extended periods. Polarizer degradation bubbles, and/or peeling off of the polarizer may result.
2) Do not push or rub the touch panel's surface with hard to sharp objects such as knives, or the touch panel may be scratched.
3) When the touch panel is dirty, gently wipe the surface with a soft cloth, sometimes moistened by mild detergent or alcohol. If a hazardous chemical is dropped on the touch panel by mistake, wipe it off right away to prevent human contact.
4) The touch panel is made of glass. It may break when dropped, or vibrated excessively. Usually there is a film on the surface of the glass which would prevent broken glass from scattering, but nevertheless handle it carefully during assembly and treat it gently during use.
5) Touch panel edges are sharp, so they have a possibility of cutting your body, for example your finger. Handle the touch panel with enough care to prevent cuts. When you hold the touch panel, put on the protector, for example the gloves which have a strength enough to stand sharpness of touch panel edges.
6) Always keep the LCD free from condensation during testing. Condensation may permanently spot or stain the polarizer.
7) Do not disassemble LCD because it will result in damage.
8) 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.
9) 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.
10) 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.

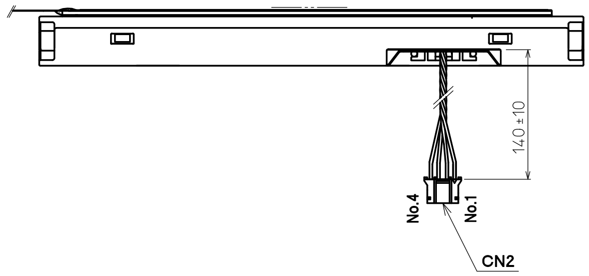
14. Reliability test data

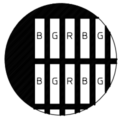
Test item	Test condition	Test time	Judgement
High temp. atmosphere	80°C	240h	Display function : No defect Display quality : No defect Current consumption : No defect
Low temp. atmosphere	-30°C	240h	Display function : No defect Display quality : No defect Current consumption : No defect
High temp. humidity 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
Point Activation 1)	Silicon rubber, Tip : R = 6.0 Hardness 60° Hitting force 2.45N Hitting speed 2 time/s	one million times	Terminal resistance : No defect Actuation Force : No defect No appearance defect which affects touch panel function. 2)
Sliding 1)	Polyacetal resin, Tip : R = 0.8 Load 2.45N Input length 10mm Input speed 50mm/s	100 thousand times 3)	Terminal resistance : No defect Actuation Force : No defect No appearance defect which affects touch panel function. 2)

1) Test in center of active area.
2) Dents, blurs and marks on surface film: neglected.
3) 10mm sliding (back and forth) counts as 2 times.
4) Temp. cycle test (Heat shock included): the LCD shall be tested after leaving it stabilize at room temperature for 2 hours after the last cycle.
5) An operational test was performed after the following conditions. First, the touch panel was left for a certain time under 5V voltages applied (without touch), Then it was left at room temperature (No VDC applied) for 2 hours.
6) Each test item uses a test LCD only once. The tested LCD is not used in any other tests.
7) The LCD is tested in circumstances in which there is no condensation.
8) The reliability test is not an out-going inspection.
9) 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


0.3±0.05
13
Terminal Surface
(端子面)
144
12.8
118.4 (Bezel Opening:ベゼル開口)
(12.8)
1.6
115.2 (Active Area:表示領域)
(1.6)
(20)
(4)
(96)
(4)
(20)
72
(72)
A
640×(B,G,R)×480Dots
φ3.2±0.2
(Hole)
R3.5
7
Bezel Opening Center
(ベゼル開口中心)
(6.3)
(45.5)
97 (Touch Panel:タッチパネル)
59.1±2
1.3±0.8
4-R2
(52.3)
52.3
(55.5)
49.1
(1.6)
(10.7)
(0.1)
86.4 (Active Area:表示領域)
89.6 (Bezel Opening:ベゼル開口)
104.6
(104.8)
1.6
4.3
0.1
6.1±0.8
129.5 (Touch Panel:タッチパネル)
(8.4)
63.9±2
141.9
(2.1)
14.93±0.75
(Dimension of the outer circumference:外周部寸法)
1.93±0.25
13
(Dimension of the outer circumference:外周部寸法)
16.0Max.
(Dimension of the center part:中央部寸法)
2.3
8.5
(6.2)
(4.5)
(6.75)
137.25
8±1
4-C0.5
4-R3
4-φ2.6(Depth:深3.5)
(4.1)
96.4
8.8
4.1
4-φ4
No.33
No.1
Insert Direction (FPCorFFC)
(挿入方向)
CN1
(55.5)
49.1±1
(37)
107
(3.7)
136.6
3.7


140±10
No.4
No.1
CN2


B G R B G
B G R B G

DETAIL A (Dot Size)
(NTS)

CN2 Pin Assign

	Cable Color
No.1	Black(黒)
No.2	Red(赤)
No.3	White(白)
No.4	Blue(青)

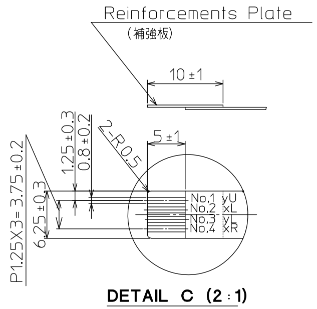
Note.(注記)
1. Connector CN1:IMSA-9632S-33Z02-GF1 (IRISO)
(コネクター) CN2:PHR-4 (JST)
2. Matching Connector CN2:B4B-PH-SM4-TB (JST)
(適合コネクター) B4B-PH-SM4-TB(LF)(SN) (JST)
S4B-PH-SM4-TB (JST)
S4B-PH-SM4-TB(LF)(SN) (JST) etc.
3. The Information of LCD is displayed starting at the upper left hand corner, moving 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。)
4. Tolerance without indication:±0.5
(指示無き公差)

Material 材質	Treatment 処理	Approved '10.09.21 鶴崎	Checked	Checked '10.09.21 今村	Drawn 木口	Scale 1:1(NTS)	Title TCG057VGLCZ-H50	KYOCERA	Year-Month-Day '10.09.17	Size 2
Quantity 製作数	Description; 備考 RoHS						Outline Dimensions	Drawing No.	121A8035500	1/2

No	Description	Drawn	Checked	Checked	Approved

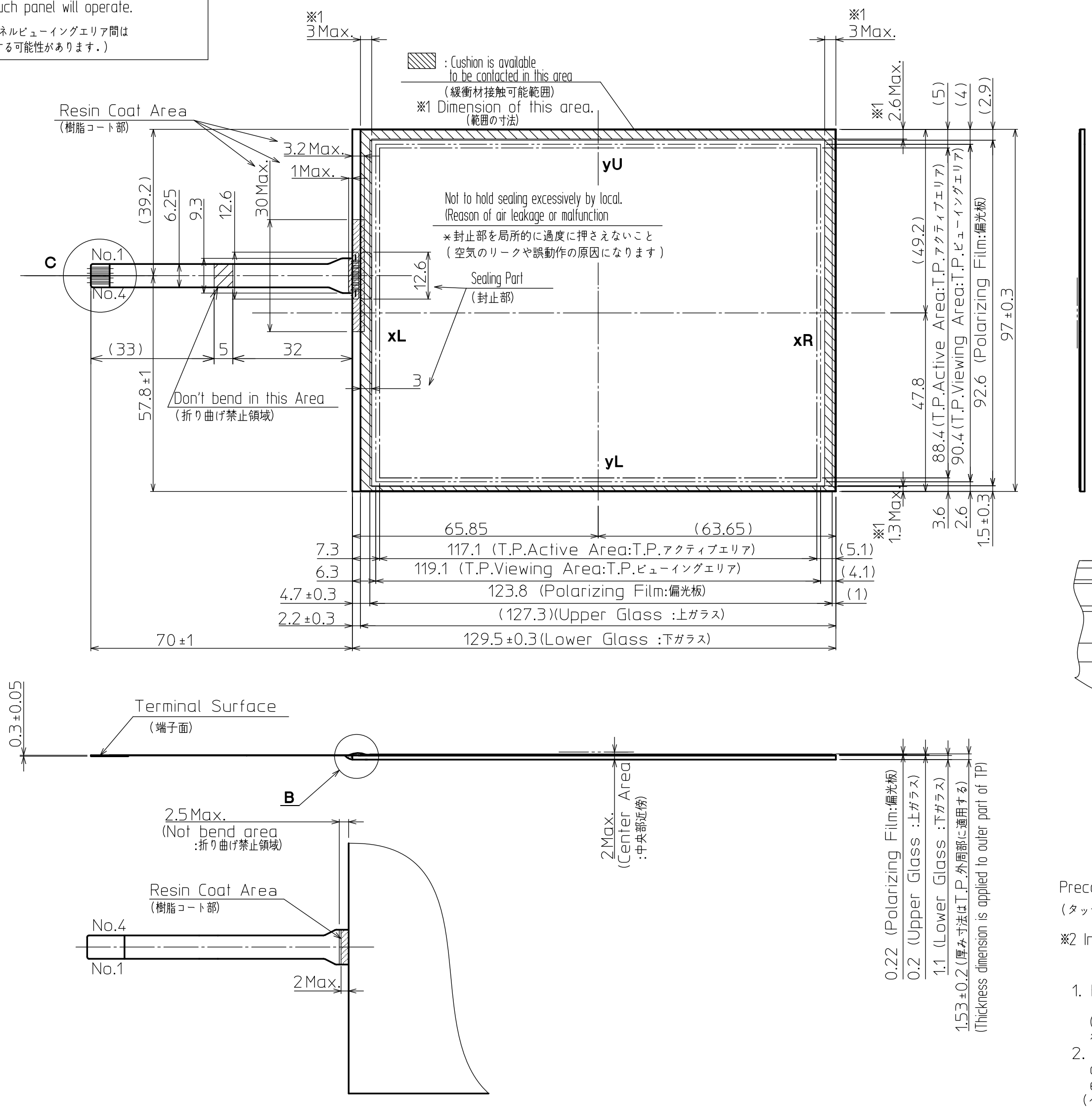
Note.(注記)

	Name(名称)	Explanation(説明)
1	T.P.	Touch panel (タッチパネル)
2	T.P. Active Area (T.P.アクティブエリア)	Operating area of touch panel (タッチパネルの動作範囲)
3	T.P. Viewing Area (T.P.ビューイングエリア)	Warranty area of touch panel's appearance (タッチパネルの外観(傷・異物等)保証範囲)
		By giving pressure between the active area and the viewing area of the touch panel, there is a possibility that the touch panel will operate. (タッチパネルアクティブエリアとタッチパネルビューイングエリア間は荷重をかけた場合は、タッチパネルが動作する可能性があります。)

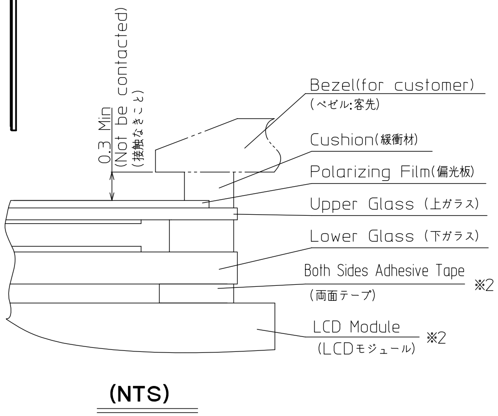


Reinforcements Plate
(補強板)
10 ±1
5 ±1
1.25 ±0.3
0.8 ±0.2
2-R0.5
P1.25X3=3.75 ±0.2
6.25 ±0.3
No.1 yU
No.2 xL
No.3 yL
No.4 xR

DETAIL C (2:1)

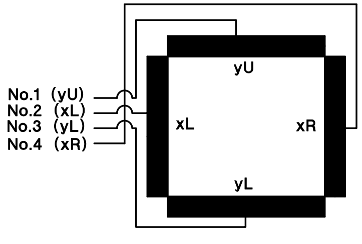


※1 3Max.
※1 3Max.
▨ : Cushion is available to be contacted in this area
(緩衝材接触可能範囲)
※1 Dimension of this area.
(範囲の寸法)
Resin Coat Area
(樹脂コート部)
3.2Max.
1Max.
30Max.
(39.2)
6.25
9.3
12.6
12.6
C
No.1
No.4
yU
yL
xL
xR
Not to hold sealing excessively by local.
(Reason of air leakage or malfunction
＊封止部を局所的に過度に押さえないこと
(空気のリークや誤動作の原因になります)
Sealing Part
(封止部)
3
(33)
5
32
57.8 ±1
Don't bend in this Area
(折り曲げ禁止領域)
※1 2.6Max.
(5)
(4)
(2.9)
(49.2)
47.8
88.4 (T.P.Active Area:T.P.アクティブエリア)
90.4 (T.P.Viewing Area:T.P.ビューイングエリア)
92.6 (Polarizing Film:偏光板)
97 ±0.3
※1 1.3Max.
3.6
2.6
1.5 ±0.3
65.85
(63.65)
7.3
117.1 (T.P.Active Area:T.P.アクティブエリア)
(5.1)
6.3
119.1 (T.P.Viewing Area:T.P.ビューイングエリア)
(4.1)
4.7 ±0.3
123.8 (Polarizing Film:偏光板)
(1)
2.2 ±0.3
(127.3)(Upper Glass :上ガラス)
70 ±1
129.5 ±0.3(Lower Glass :下ガラス)
0.3 ±0.05
Terminal Surface
(端子面)
B
2Max. (Center Area :中央部近傍)
0.22 (Polarizing Film:偏光板)
0.2 (Upper Glass :上ガラス)
1.1 (Lower Glass :下ガラス)
1.53 ±0.2 (厚み寸法はT.P.外周部に適用する)
(Thickness dimension is applied to outer part of TP)
2.5Max.
(Not bend area
:折り曲げ禁止領域)
Resin Coat Area
(樹脂コート部)
No.4
No.1
2Max.



0.3 Min
(Not be contacted)
(接触なきこと)
Bezel(for customer)
(ベゼル:客先)
Cushion(緩衝材)
Polarizing Film(偏光板)
Upper Glass (上ガラス)
Lower Glass (下ガラス)
Both Sides Adhesive Tape
(両面テープ)
※2
LCD Module
(LCDモジュール)
※2

(NTS)

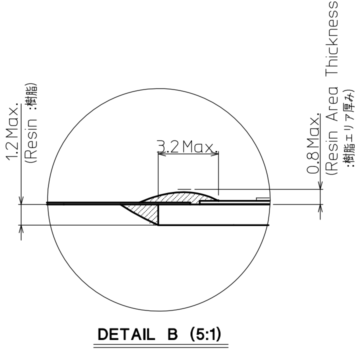


No.1 (yU)
No.2 (xL)
No.3 (yL)
No.4 (xR)
yU
xL
xR
yL

Touch Panel Pin-assign

(Pin-assign from Touch side)

(タッチパネル ピンアサイン、
タッチ面側からのピンアサイン)



1.2Max.
(Resin :樹脂)
3.2Max.
0.8Max.
(Resin Area Thickness
:樹脂エリア厚み)

DETAIL B (5:1)

Precaution in use of touch panel.
(タッチパネル使用上の注意事項)

※2 In case of assemble to the LCD.
(LCDに取りつける場合)

1. Fix touch panel at LCD module and the rear side of touch panel.
(タッチパネルの固定はLCDモジュール側とタッチパネル裏面とで行なうこと。)
2. Must maintain a gap between inside of bezel and touch panel to avoid malfunction or electrode damage of touch panel.
(ベゼル内側とタッチパネルの接触厳禁。誤動作や電極破損の原因となります。)
3. Tolerance without indication : ±0.5
(指示無き公差)

Material 材 質	Treatment 処 理	Approved '10.09.21	Checked	Checked '10.09.21	Drawn	Scale 1:1(2:1, 5:1,NTS)	Title TCG057VGLCZ-H50		KYOCERA	Year-Month-Day '10.09.17	Size 2
Quantity 製作数	Description; 備 考 RoHS	鶴崎		今村	木口		T.P. Outline Dimensions		Drawing No. 121A8035500		2/2

Spec No.	TQ3C-8EAF0-E2DEU85-00
Date	October 6, 2010

KYOCERA INSPECTION STANDARD

TYPE : TCG057VGLCZ-H50

KYOCERA CORPORATION
KAGOSHIMA HAYATO PLANT
LCD DIVISION

Original Issue Date	Designed by：Engineering dept.			Confirmed by：QA dept.	
	Prepared	Checked	Approved	Checked	Approved
October 6, 2010	S.Hatanaka	Y.Ikeda	M.FujiTani	I.Hama	

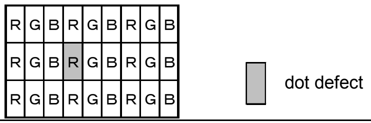
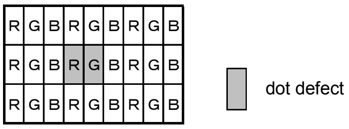
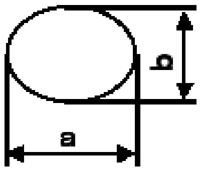
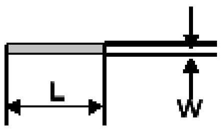
Revision record

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 active 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 wire	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 colspan="2">Judgement standard</th></tr>
<tr><td rowspan="7">Defect
(in LCD glass)</td><td rowspan="6">Dot defect</td><td colspan="2">Bright dot defect</td><td>Acceptable number
Bright dot spacing</td><td>: 4
: 5 mm or more</td></tr>
<tr><td colspan="2">Black dot defect</td><td>Acceptable number
Black dot spacing</td><td>: 5
: 5 mm or more</td></tr>
<tr><td rowspan="2">2 dot join</td><td>Bright dot defect</td><td>Acceptable number</td><td>: 2</td></tr>
<tr><td>Black dot defect</td><td>Acceptable number</td><td>: 3</td></tr>
<tr><td colspan="2">3 or more dots join</td><td>Acceptable number</td><td>: 0</td></tr>
<tr><td colspan="2">Total dot defects</td><td>Acceptable number</td><td>: 5 Max</td></tr>
<tr><td>Others</td><td colspan="2">White dot, Dark dot
(Circle)</td><td colspan="2">
<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 colspan="2">
<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 colspan="2">
<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 colspan="2">
<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 colspan="2">
<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>

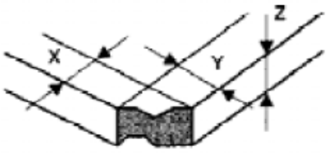
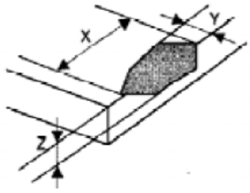
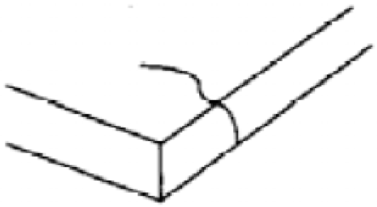
Inspection item	Judgement standard
Scratch, Foreign particle (Touch screen portion)	(W = Width, L = Length, D = Diameter = (major axis + minor axis)/ 2)

Item	Width(mm)	Length(mm)	Acceptable number
Scratch	d ≦ 0.03	L ≦ 20	Neglected
	0.03 ＜ d ≦ 0.05	L ≦ 10	2pcs within φ20mm
	0.05 ＜ d ≦ 0.08	L ≦ 6	2pcs within φ20mm
	0.08 ＜ d ≦ 0.1	L ≦ 4	1pcs within φ30mm
Foreign (line like)	W ≦ 0.05	Neglected	Neglected
	0.05 ＜ W ≦ 0.1	L ≦ 5	2pcs within φ30mm
Foreign (circle like)	D ≦ 0.2		Neglected
	0.2 ＜ D ≦ 0.3		2pcs within φ30mm

Above are applied to the visible area.

Unless there are foreign particle and damage affected seriously to the electrical performance out of the active area, we approve of this product.

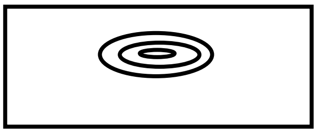
Inspection item	Judgement standard
Glass crack (Touch screen portion)	

Item	Size (mm)			Acceptable number
Corner crack		X	≦3	2 pcs /panel
		Y	≦3	
		Z	＜t	
Crack in other area than in corner		X	≦5	2 pcs /side
		Y	≦1.5	
		Z	＜t	
Progressive crack				0 pcs (NG even 1pcs)

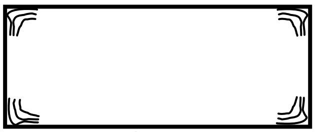
Above are applied to the visible area.

Unless there are foreign particle and damage affected seriously to the electrical performance out of the active area, we approve of this product.

Inspection item	Judgement standard
Newton's ring	All Newton Rings in the center of the screen must be rejected. Border around the screen are permitted.



N G



O K