ＡＶシステム事業本部
液晶ＤＳ第四事業部　技術部殿

納入仕様書番号	LD-K23Z03

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納 入 仕 様 書

品名　ＴＦＴ－ＬＣＤモジュール

形名　ＬＫ３１５Ｔ３ＨＢ００Ｘ/Ｔ/Ａ

【受領印欄】

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当仕様書について異議があれば発注時点までにお申し出ください。

ＲｏＨＳ規制対応部品

シャープ株式会社

大型液晶事業本部

液晶事業部 第二開発部

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RECORDS OF REVISION

MODEL No. : LK315T3HB00X/T/A

SPEC No. : LD-K23Z03

DATE	NO.	REVISED No.	PAGE	SUMMARY	NOTE
2012.1.6	LD-K23Z03	-	-	-	1st Issue

1. Application

This specification applies to the color 31.5" Wide XGA TFT Open-Cell LK315T3HB00X/T/A.

* In case of using the device for applications such as control and safety equipment for transportation (aircraft, trains, automobiles, etc.), rescue and security equipment and various safety related equipment which require higher reliability and safety, take into consideration that appropriate measures such as fail-safe functions and redundant system design should be taken.

* Do not use the device for equipment that requires an extreme level of reliability, such as aerospace applications, telecommunication equipment (trunk lines), nuclear power control equipment and medical or other equipment for life support.

* SHARP assumes no responsibility for any damage resulting from the use of the device that does not comply with the instructions and the precautions specified in these specification sheets.

* Contact and consult with a SHARP sales representative for any questions about this device.

2. Overview

This Open-Cell is a color active matrix LCD module incorporating amorphous silicon TFT (Thin Film Transistor). It is composed of a color TFT-LCD panel, driver ICs, control circuit, power supply circuit, inverter circuit and back light system etc. Graphics and texts can be displayed on a 1366×RGB×768 dots panel with 16,777,216 colors by using LVDS (Low Voltage Differential Signaling) to interface, +12V of DC supply voltages.

This module also includes the LED-PWB module to drive the LED.

And in order to improve the response time of LCD, this module applies the Over Shoot driving (O/S driving) technology for the control circuit .In the O/S driving technology, signals are being applied to the Liquid Crystal according to a pre-fixed process as an image signal of the present frame when a difference is found between image signal of the previous frame and that of the current frame after comparing them.

By using the captioned process, the image signals of this Open-Cell are being set so that image response can be completed within one frame, as a result, image blur can be improved and clear image performance can be realized.

3. Mechanical Specifications

Parameter	Specifications	Unit
Display size	80.039 （Diagonal）	cm
	31.5 （Diagonal）	inch
Active area	697.69 (H) × 392.26 (V)	mm
Pixel Format	1366 (H) × 768 (V) （1pixel = R + G + B dot）	pixel
Pixel pitch	0.51075(H) × 0.51075 (V)	mm
Pixel configuration	R,G, B vertical stripe	
Display mode	Normally black	
Unit Outline Dimensions (*1)	709.3(W) × 451.2(H) ×4.8max(D)	mm
Mass	1.2	kg
Surface treatment	Low-Haze Anti Glare Hard coating: 2H	

(*1) Outline dimensions are shown in Fig.1

4. Input Terminals

4-1. TFT panel driving

CN1 (Interface signals and +12V DC power supply) (Shown in Fig.1)

Using connector : GT103-30S-H23-D-E2500 (LSMtron)

Matching connector : FI-X30H/FI-X30HL, FI-X30C/FI-X30C2L
or FI-X30M (Japan Aviation Electronics Ind. , Ltd.)

Matching LVDS transmitter : THC63LVDM83R (THine) or equivalent device

Pin No.	Symbol	Function	Remark
1	VCC	+12V Power Supply	
2	VCC	+12V Power Supply	
3	VCC	+12V Power Supply	
4	VCC	+12V Power Supply	
5	GND	Ground	
6	GND	Ground	
7	GND	Ground	
8	GND	Ground	
9	SELLVDS	Select LVDS data order [Note 1]	Default: Pull down (L:GND) [Note 2]
10	Reserved	Not Available	
11	GND	Ground	
12	RIN0-	Negative (-) LVDS differential data input	LVDS
13	RIN0+	Positive (+) LVDS differential data input	LVDS
14	GND	Ground	
15	RIN1-	Negative (-) LVDS differential data input	LVDS
16	RIN1+	Positive (+) LVDS differential data input	LVDS
17	GND	Ground	
18	RIN2-	Negative (-) LVDS differential data input	LVDS
19	RIN2+	Positive (+) LVDS differential data input	LVDS
20	GND	Ground	
21	CLKIN-	Clock Signal(-)	LVDS
22	CLKIN+	Clock Signal(+)	LVDS
23	GND	Ground	
24	RIN3-	Negative (-) LVDS differential data input	LVDS
25	RIN3+	Positive (+) LVDS differential data input	LVDS
26	GND	Ground	
27	Reserved	Not Available	
28	Reserved	Not Available	
29	GND	Ground	
30	Reserved	Write Protect	Default: Pull down (Protect enable)

[Note] GND of a liquid crystal panel drive part has connected with a module chassis.

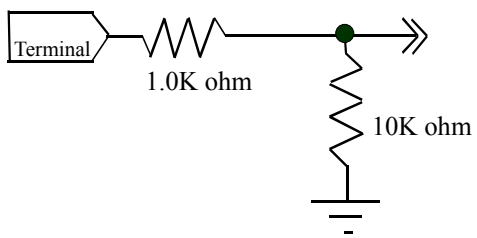
[Note1] SELLVDS

Transmitter		SELLVDS	
Pin No	Data	= L(GND) or Open	= H(3.3V)
51	TA0	R0(LSB)	R2
52	TA1	R1	R3
54	TA2	R2	R4
55	TA3	R3	R5
56	TA4	R4	R6
3	TA5	R5	R7(MSB)
4	TA6	G0(LSB)	G2
6	TB0	G1	G3
7	TB1	G2	G4
11	TB2	G3	G5
12	TB3	G4	G6
14	TB4	G5	G7(MSB)
15	TB5	B0(LSB)	B2
19	TB6	B1	B3
20	TC0	B2	B4
22	TC1	B3	B5
23	TC2	B4	B6
24	TC3	B5	B7(MSB)
27	TC4	NA	NA
28	TC5	NA	NA
30	TC6	DE(*)	DE(*)
50	TD0	R6	R0(LSB)
2	TD1	R7(MSB)	R1
8	TD2	G6	G0(LSB)
10	TD3	G7(MSB)	G1
16	TD4	B6	B0(LSB)
18	TD5	B7(MSB)	B1
25	TD6	NA	NA

NA: Not Available

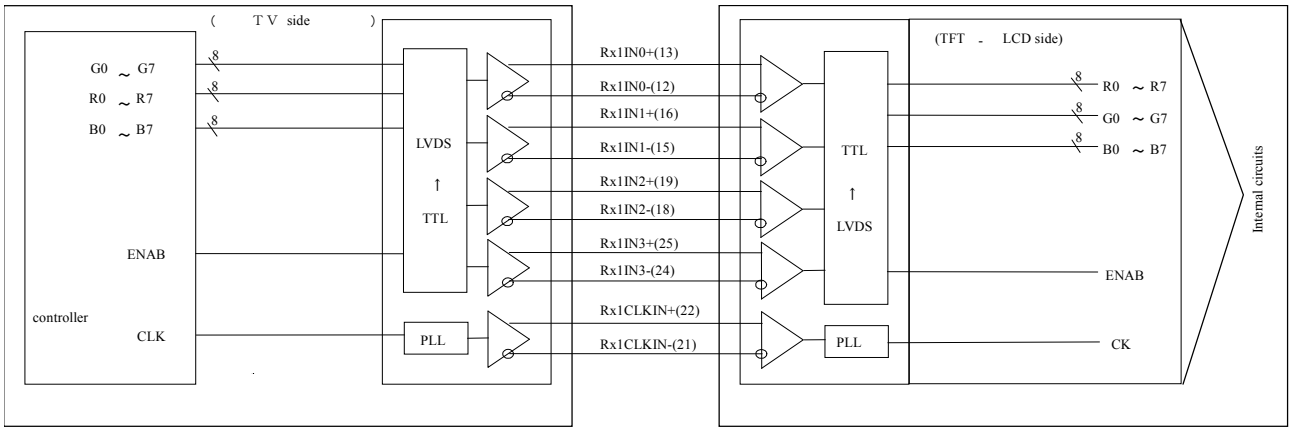
(*) Since the display position is prescribed by the rise of DE (Display Enable) signal, please do not fix DE signal during operation at "High."

[Note 2] The equivalent circuit figure of the terminal

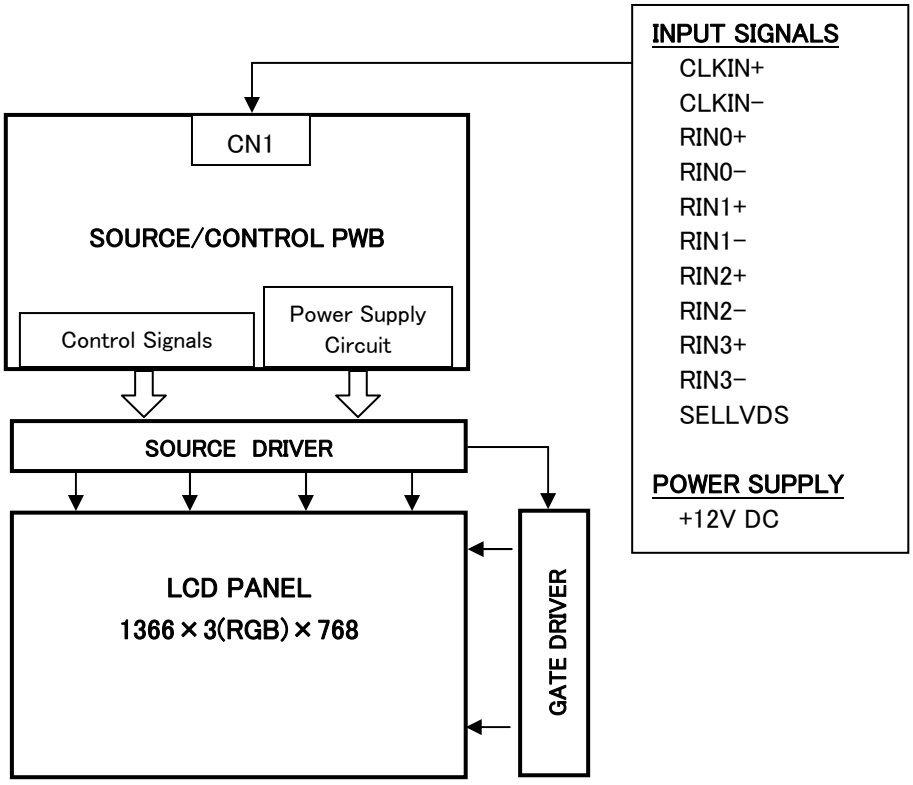


・Interface block diagram

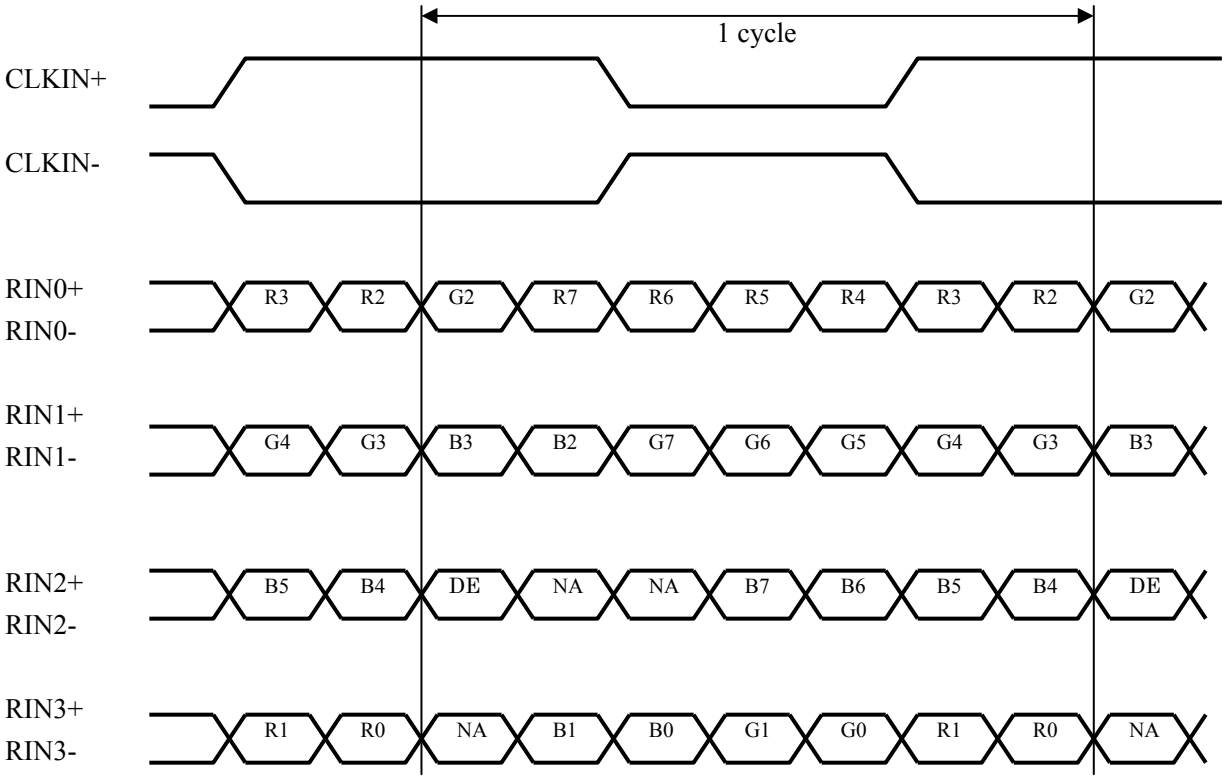
Corresponding Transmitter: THC63LVDM83R (THine) or equivalent device



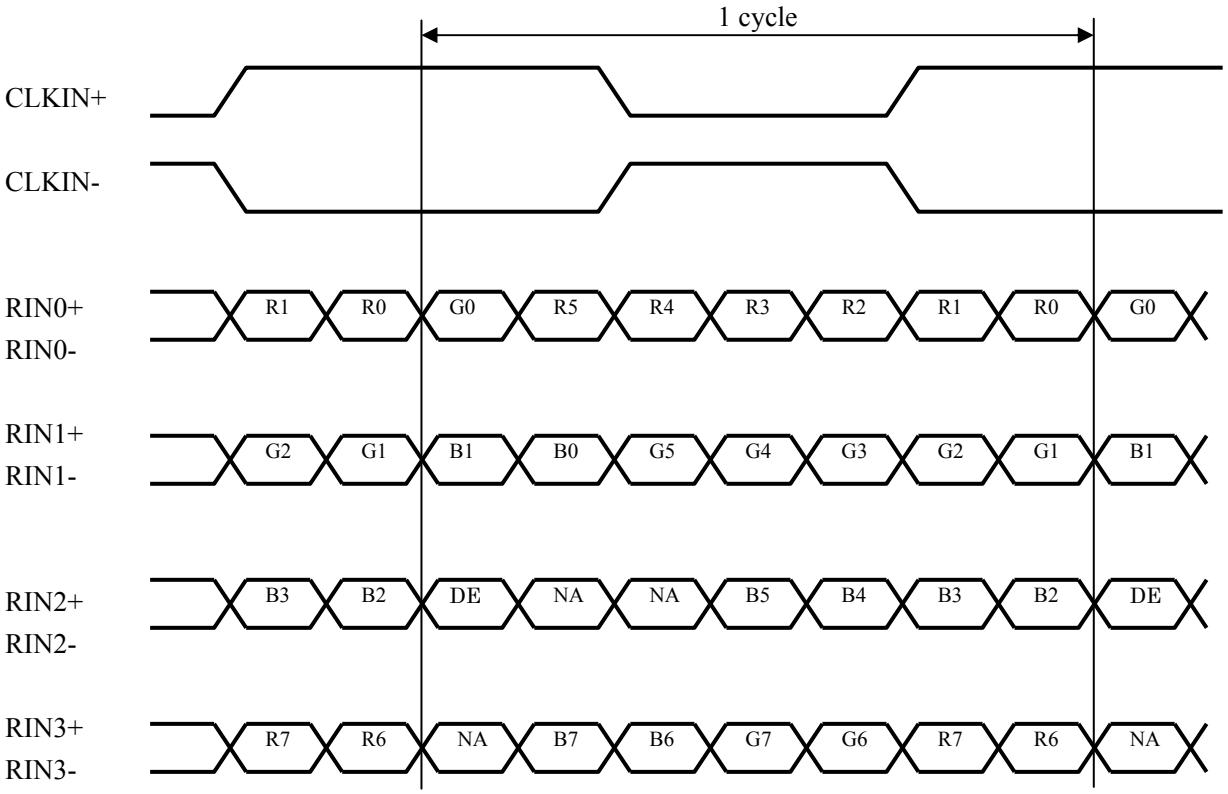
・Block Diagram (LCD Module)



SELLVDS= High (3.3V)



SELLVDS= Low(GND) or Open



DE: Display Enable

NA: Not Available (Fixed Low)

5. Absolute Maximum Ratings

Parameter	Symbol	Condition	Ratings	Unit	Remark
Input voltage (for Control)	V_I	Ta=25°C	-0.3 ~ 3.6	V	[Note 1]
+12V supply voltage (for Control)	V_{CC}	Ta=25°C	0 ~ +15	V	
Storage temperature	Tstg	-	-25 ~ +60	°C	[Note 2]
Operation temperature (Ambient)	Topa	-	0 ~ +50	°C	

[Note 1] SELLVDS

[Note 2] Humidity 95%RH Max.(Ta ≤ 40°C)

Maximum wet-bulb temperature at 39°C or less.(Ta > 40°C), No condensation.

6. Electrical Characteristics

6-1. Control circuit driving Ta=25°C

Parameter		Symbol	Min.	Typ.	Max.	Uniit	Remark
+12V supply voltage	Supply voltage	V_{CC}	+11.4	+12.0	+13.7	V	[Note 1]
	Current dissipation	I_{CC}	-	350	600	mA	[Note 2]
		I_{RUSH}	-	1500	2500	mA	[Note 5]
		T_{RUSH}	-	0.5	-	ms	[Note 5]
Permissible input ripple voltage		V_{RP}	-	-	100	mV_{P-P}	Vcc = +12.0V
Differential input threshold voltage	High	V_{TH}	-	-	100	mV	V_{CM} = +1.2V [Note 4]
	Low	V_{TL}	-100	-	-	mV	
Input Low voltage		V_{IL}	0	-	0.7	V	[Note 3]
Input High voltage		V_{IH}	2.6	-	3.3	V	
Input leak current (Low)		I_{IL}	-	-	400	μA	V_I = 0V [Note 3]
Input leak current (High)		I_{IH}	-	-	100	μA	V_I =3.3V [Note 3]
Terminal resistor		R_T	-	100	-	Ω	Differential input

[Note] V_{CM}: Common mode voltage of LVDS driver.

[Note 1]

Input voltage sequences

50 μ s < t1 ≤ 20ms

20ms< t2-1 ≤ 5s

20ms< t2-2 ≤ 5s

0 < t3 ≤ 1s

t4 ≥ 1s

t5 ≥ 300ms

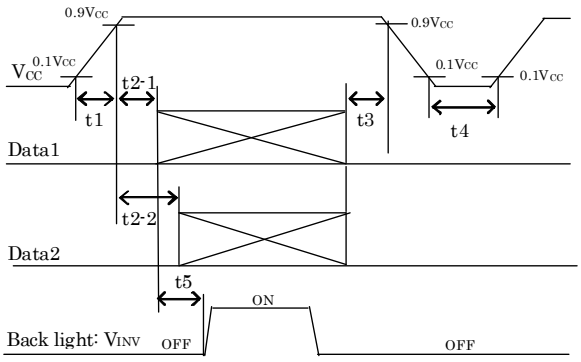
Dip conditions for supply voltage

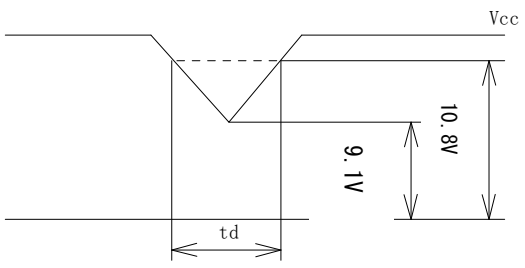
a) 9.1V ≤ V_{CC} < 10.8V

td ≤ 10ms

b) V_{CC} < 9.1V

Dip conditions for supply voltage is based on input voltage sequence.





※ Data1: CLKIN±,RIN0±,RIN1±, RIN2±, RIN3±

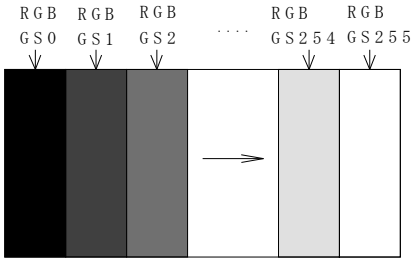
※ Data2: SELLVDS

※ About the relation between data input and back light lighting, please base on the above-mentioned input sequence.

When back light is switched on before panel operation or after a panel operation stop, it may not display normally. But this phenomenon is not based on change of an incoming signal, and does not give damage to a liquid crystal display.

[Note 2]Typical current situation: 256 gray-bar pattern (V_{CC} = +12.0V)

The explanation of RGB gray scale is seen in section 8.

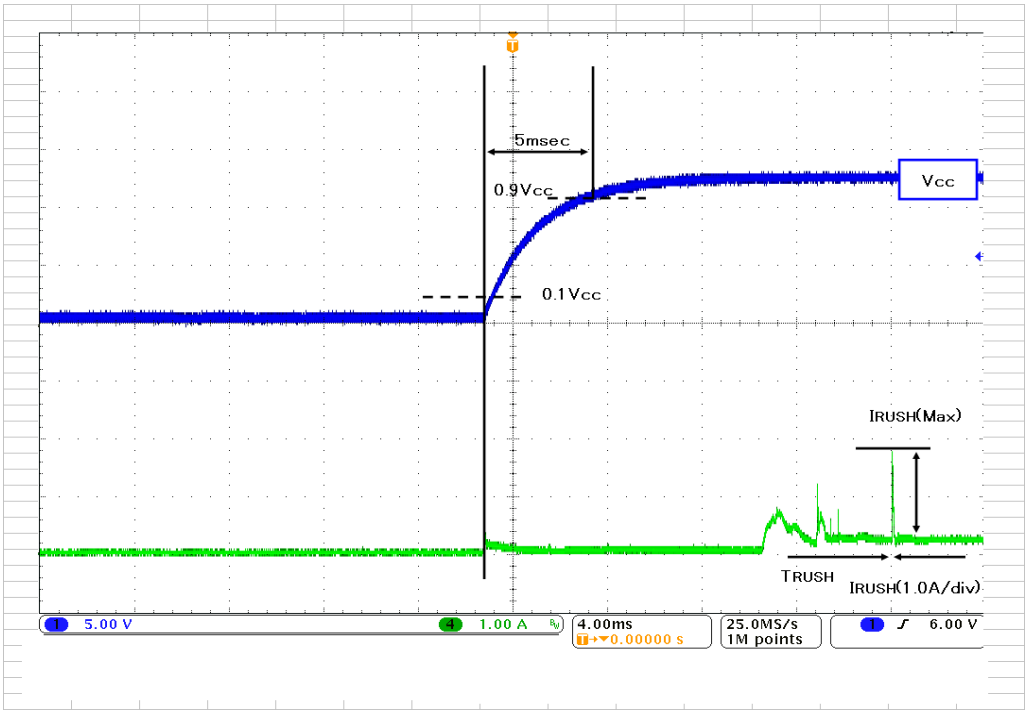


V_{CC} = +12.0V
CK = 82.0MHz
Th = 20.68μs

[Note 3] SELLVDS

[Note 4] CLKIN+/CLKIN-, RIN0+/RIN0-, RIN1+/RIN1-, RIN2+/RIN2-, RIN3+/RIN3-

[Note 5] The Rush current corrugation at the time of power on



7. Timing characteristics of input signals

7-1. Timing characteristics

Timing diagrams of input signal are shown in Fig.2

Parameter		Symbol	Min.	Typ.		Max.	Unit
				NTSC	PAL		
Clock	Frequency	1/Tc	72	82	82	85	MHz
Data enable signal	Horizontal period	TH	1540	1696	1696	1940	clock
			19.84	20.68	20.68	-	μs
	Horizontal period (High)	THd	1366	1366	1366	1366	clock
	Vertical period	TV	778	806	967	972	line
	Vertical period (High)	TVd	768	768	768	768	line

[Note] When vertical period is very long, flicker may occur.

Please turn off the module after it shows the black screen.

Please make sure that length of vertical period should become of an integral multiple of horizontal length of period. Otherwise, the screen may not display properly.

As for your final setting of driving timing, we will conduct operation check test at our side, please inform your final setting.

Vertical period must change less than 1 line each flames.

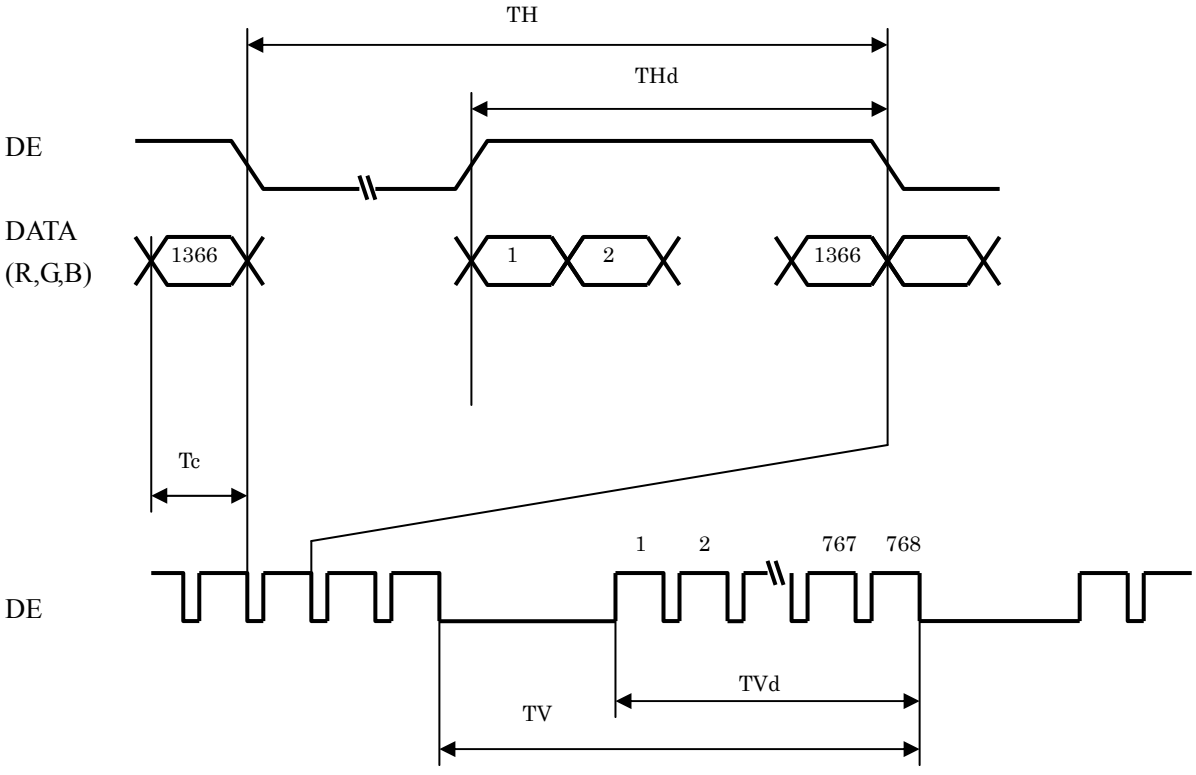
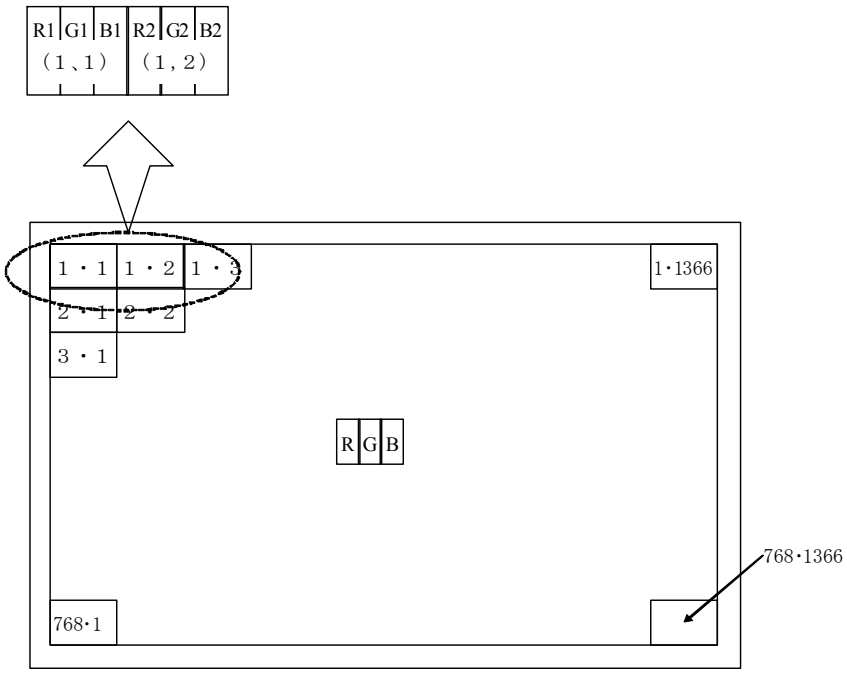


Fig.2 Timing characteristics of input signals

7-2. Input data signal and display position on the screen



Display Position of Data (V,H)

8. Input Signal, Basic Display Colors and Gray Scale of Each Color

	Colors & Gray scale	Gray Scale	Data signal																							
			R0	R1	R2	R3	R4	R5	R6	R7	G0	G1	G2	G3	G4	G5	G6	G7	B0	B1	B2	B3	B4	B5	B6	B7
Basic Color	Black	—	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Blue	—	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	Green	—	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	Cyan	—	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Red	—	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Magenta	—	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	Yellow	—	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	White	—	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Gray Scale of Red	Black	GS0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	⇧	GS1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Darker	GS2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	⇧	↓					↓								↓								↓			
	⇩	↓					↓								↓								↓			
	Brighter	GS253	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	⇩	GS254	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red	GS255	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gray Scale of Green	Black	GS0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	⇧	GS1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Darker	GS2	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	⇧	↓					↓								↓								↓			
	⇩	↓					↓								↓								↓			
	Brighter	GS253	0	0	0	0	0	0	0	0	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	⇩	GS254	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	Green	GS255	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
Gray Scale of Blue	Black	GS0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	⇧	GS1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
	Darker	GS2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
	⇧	↓					↓								↓								↓			
	⇩	↓					↓								↓								↓			
	Brighter	GS253	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1	1	1
	⇩	GS254	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1
	Blue	GS255	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1

0 : Low level voltage, 1 : High level voltage.

Each basic color can be displayed in 256 gray scales from 8 bit data signals. According to the combination of total 24 bit data signals, the 16,777,216 colors display can be achieved on the screen.

9. Optical characteristics

Ta = 25°C, Vcc = +12V

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing angle range	Horizontal	θ 21 θ 22	CR ≥ 10	70	88	-	Deg.	[Note1,4]
	Vertical	θ 11 θ 12		70	88	-	Deg.	
Contrast ratio		CRn	θ =0 deg.	3750	5000	-	-	[Note2,4]
Response time		τ_{DRV}		-	7	-	ms	[Note3,4,5]
Chromaticity of white		x		0.252	0.282	0.312	-	[Note 4]
		y		0.258	0.288	0.318	-	
Chromaticity of red		x		0.604	0.634	0.664	-	
		y		0.323	0.353	0.383	-	
Chromaticity of green		x		0.279	0.309	0.339	-	
		y		0.601	0.631	0.661	-	
Chromaticity of blue		x		0.123	0.153	0.183	-	
		y		0.031	0.061	0.091	-	
Luminance of white		Y_L		320	400	-	cd/m^2	[Note 4]
Luminance uniformity		δ_W		-	-	1.54	-	[Note 6]

Measurement condition : Back Light Unit is used for LK315T3LWD0X.

*The measurement shall be executed 60 minutes after lighting at rating.

[Note] The optical characteristics are measured using the following equipment.

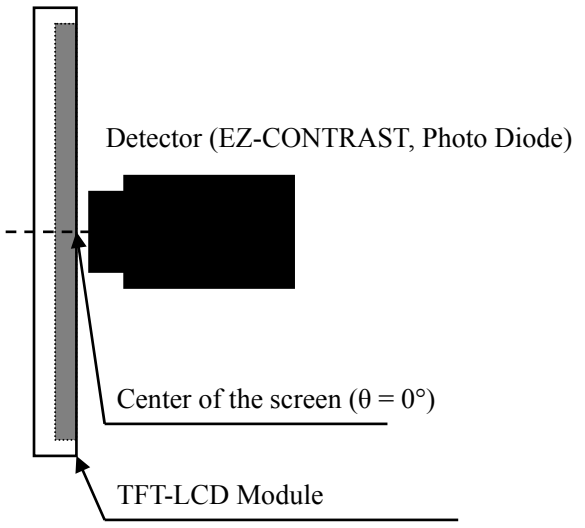


Fig.3-1 Measurement of viewing angle range and response time.
(Viewing angle range: EZ-CONTRAST
Response time: Photo Diode)

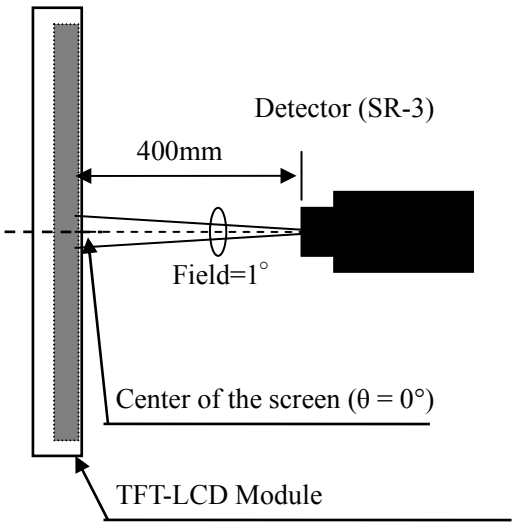
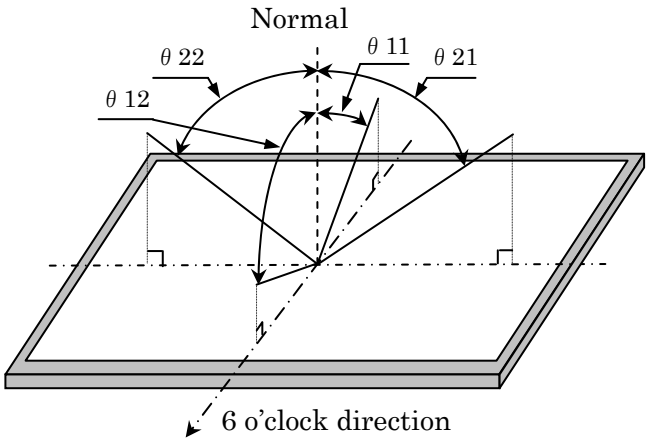


Fig.3-2 Measurement of Contrast, Luminance, and Chromaticity.

[Note 1] Definitions of viewing angle range :



[Note 2] Definition of contrast ratio :

The contrast ratio is defined as the following.

$$\text{Contrast Ratio} = \frac{\text{Luminance (brightness) with all pixels white}}{\text{Luminance (brightness) with all pixels black}}$$

[Note 3] Definition of response time

The response time (τ_{DRV}) is defined as the following figure and shall be measured by switching the input signal for "any level of gray (0%, 25%, 50%, 75% and 100%)" and "any level of gray (0%, 25%, 50%, 75% and 100%)" at panel surface temperature 45°C.

	0%	25%	50%	75%	100%
0%		tr: 0%-25%	tr: 0%-50%	tr: 0%-75%	tr: 0%-100%
25%	td: 25%-0%		tr: 25%-50%	tr: 25%-75%	tr: 25%-100%
50%	td: 50%-0%	td: 50%-25%		tr: 50%-75%	tr: 50%-100%
75%	td: 75%-0%	td: 75%-25%	td: 75%-50%		tr: 75%-100%
100%	td: 100%-0%	td: 100%-25%	td: 100%-50%	td: 100%-75%	

t*:x-y...response time from level of gray(x) to level of gray(y)

$\tau_{DRV} = \Sigma(t^*:x\text{-}y)/20$

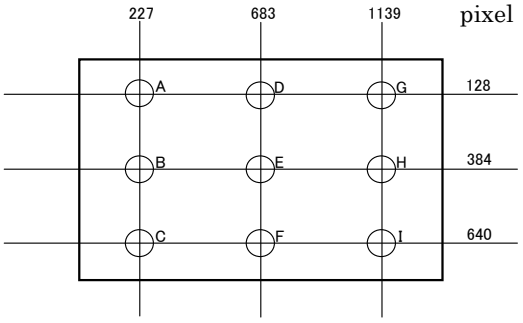
[Note 4] This shall be measured at center of the screen.

[Note 5] This value is valid when O/S driving is used at typical input time value .

[Note 6] Definition of white uniformity ;

White uniformity is defined as the following with five measurements. (A～I)

$$\delta_W = \frac{\text{Maximum luminance of Nine points (brightness)}}{\text{Minimum luminance of Nine points (brightness)}}$$



10. Handling Precautions of the module

a) Be sure to turn off the power supply when inserting or disconnecting the cable.
b) Be sure to design the cabinet so that the module can be installed without any extra stress such as warp or twist.
c) Since the front polarizer is easily damaged, pay attention not to scratch it.
d) Since long contact with water may cause discoloration or spots, wipe off water drop immediately.
e) When the panel surface is soiled, wipe it with absorbent cotton or other soft cloth.
f) Since the panel is made of glass, it may break or crack if dropped or bumped on hard surface. Handle with care.
g) Since CMOS LSI is used in this module, take care of static electricity and take the human earth into consideration when handling.
h) Please consider to minimize the influence of EMI and the exogenous noise before designing the grounding of Open-Cell.
i) The Open-Cell has some printed circuit boards (PCBs) on the side, take care to keep them form any stress or pressure when handling or installing the module; otherwise some of electronic parts on the PCBs may be damaged.
j) Observe all other precautionary requirements in handling components.
k) When some pressure is added onto the module from rear side constantly, it causes display non-uniformity issue, functional defect, etc.. So, please avoid such design.
l) When handling LCD modules and assembling them into cabinets, please be noted that long-term storage in the environment of oxidization or deoxidization gas and the use of such materials as reagent, solvent, adhesive, resin, etc. which generate these gasses, may cause corrosion and discoloration of the LCD modules.

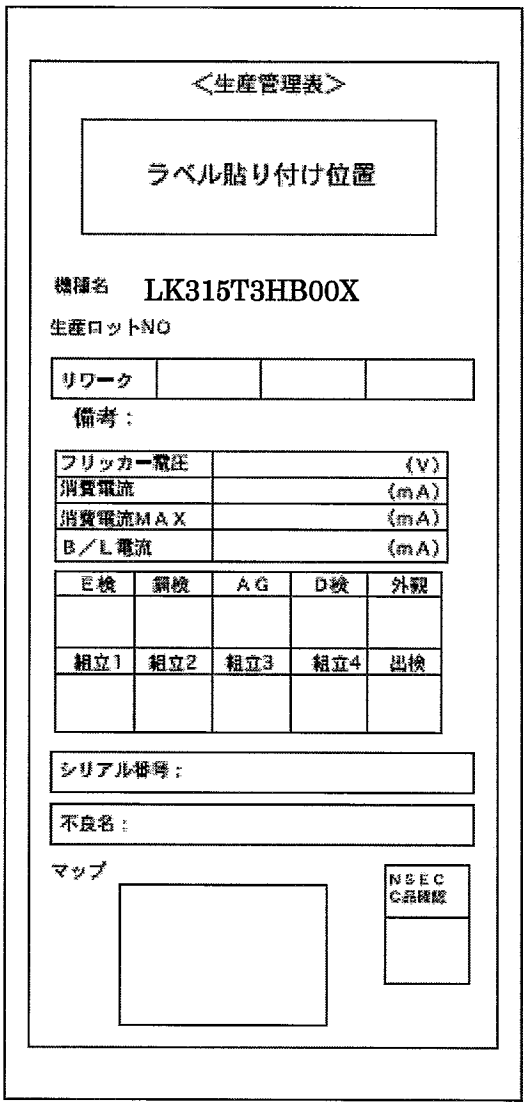
11. Reliability test item

No.	Test item	Condition
1	High temperature storage test	Ta=60°C 500h
2	Low temperature storage test	Ta=-25°C 500h
3	High temperature and high humidity operation test	Ta=40°C ; 95%RH 500h (No condensation)
4	High temperature operation test	Ta=50°C 500h （The panel surface temperature of this time is MAX60 ℃）
5	Low temperature operation test	Ta=0°C 500h （The panel surface temperature of this time is MIN0 ℃）
6	Vibration test (Cell Box with Open-Cells) (non-operation)	X and Y direction: 15min, Z direction: 60min. 5Hz to 50Hz acceleration velocity: 1.0G Sweeping ratio: 3min
7	Shock test (Cell Box with Open-Cells) (non-operation)	Maximum acceleration: 490m/s^2 Pulse width: 11ms, sinusoidal half wave Direction: +/-X, +/-Y, +/-Z, once for each direction.

12. Others

1) Lot No. Label ;

The label that displays SHARP, product model (LK315T3HB00X/T/A), a product number is stuck on the back of the module.



Model No. (MODULE NAME) and it's management No.(USER NAME)

Model Code. (MODULE NAME)	Management No. (USER NAME)	Remarks
LK315T3HB00X	R1LK315T3HB00X	Completed SL1 PANEL at KAMEYAMA
LK315T3HB00T	R1LK315T3HB00X	Completed POL PANEL at KAMEYAMA
LK315T3HB00A	R1LK315T3HB00X	Completed Open-cell at KAMEYAMA

2) Adjusting volume have been set optimally before shipment, so do not change any adjusted value.
If adjusted value is changed, the specification may not be satisfied.

3) Disassembling the Open-cell can cause permanent damage and should be strictly avoided.

4) Please be careful since image retention may occur when a fixed pattern is displayed for a long time.

5) The chemical compound, which causes the destruction of ozone layer, is not being used.

6)When any question or issue occurs, it shall be solved by mutual discussion.

7) Source/Control-PWB(SC-PWB) must be on upper side of Open-Cell when it is in the TV-set.

*:Please inform SHARP if SC-PWB is at bottom of Open-Cell when it is in the TV-set

8) This module is corresponded to RoHS.

9)Reguration to utilize an ozone depletion chemical substance.

Restricted substance : CFCs, halon, carbon, tertrachloide, and 1,1,1-trichloroethane

This product and parts don't include the above matter.

Production process of this product and parts don't include above matter.

10)When any change on the specification, material,production process of this product, and the management system,etc.need to be made, it shall be proposed beforehand together with the confirmation data of quality reliability in writing to both Engineering Section and CS Promotion Center of AV System Department of Sharp Ltd.

11) main adoption part

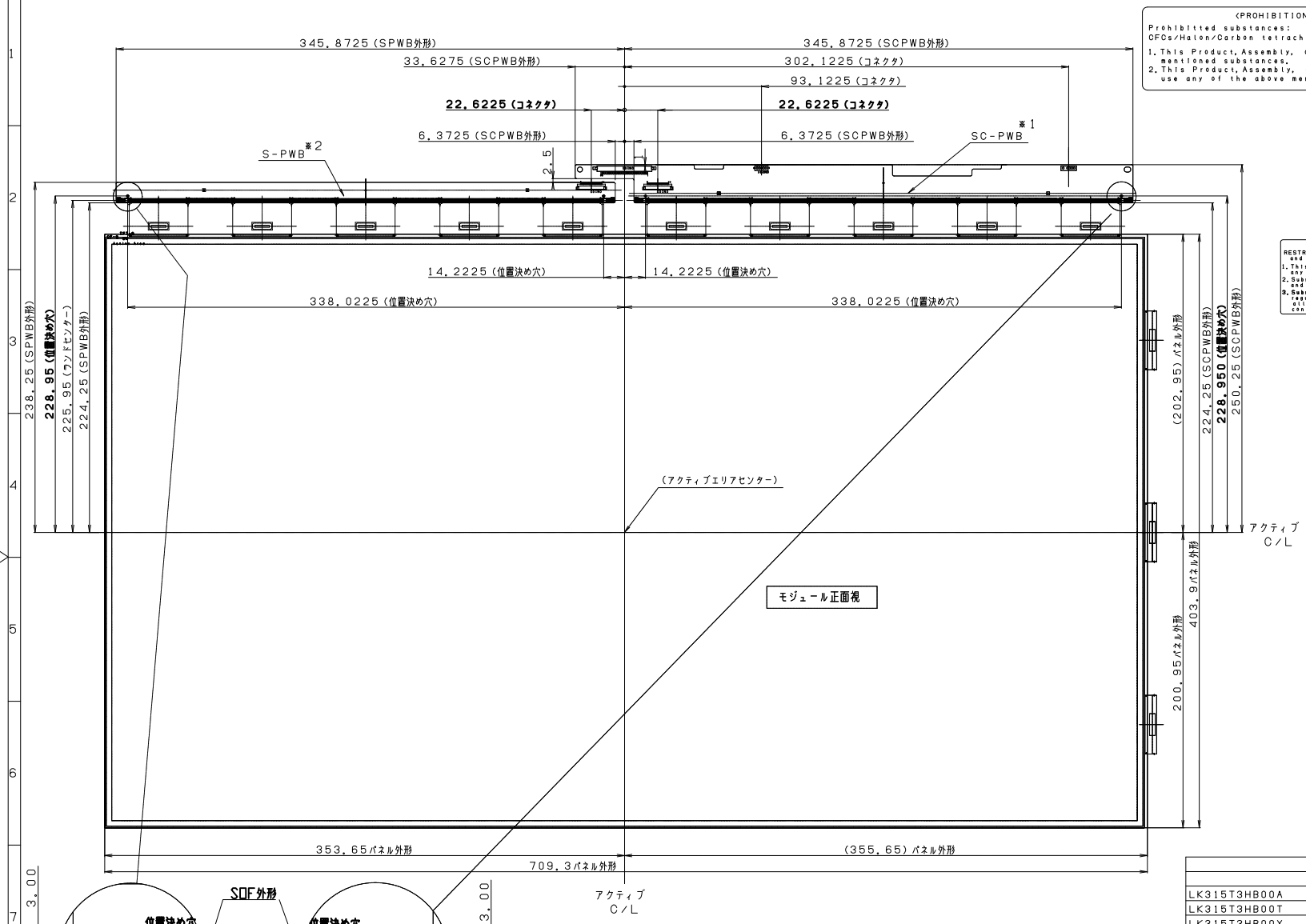
parts	Parts code	maker
SOURCE DRIVER	VHIPD259053-5L	SANSHIN ELECTRONICS CO.,LTD.
GATE DRIVER	VHILS0327B6-2L	LUSEM
SC-PWB	RUNTK5037TPZD	HOKURIKU ELECTRIC INDUSTRY
S-PWB	RUNTK5038TPZA	HOKURIKU ELECTRIC INDUSTRY

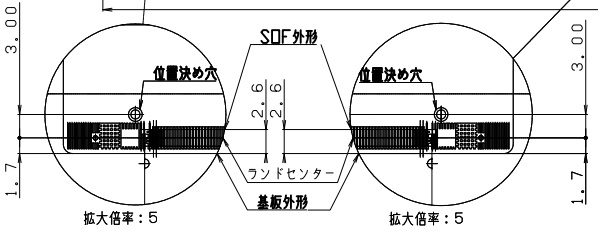
Polarizer : 2sheet type compensation film.

13.Carton storage condition

Temperature	0°C to 40°C
Humidity	95%RH or less
Reference condition	: 20°C to 35°C, 85%RH or less (summer) : 5°C to 15°C, 85%RH or less (winter) ・the total storage time (40°C,95%RH) : 240H or less
Sunlight	Be sure to shelter a product from the direct sunlight.
Atmosphere	Harmful gas, such as acid and alkali which bites electronic components and/or wires must not be detected.
Notes	Be sure to put cartons on palette or base, don't put it on floor, and store them with removing from wall Please take care of ventilation in storehouse and around cartons, and control changing temperature is within limits of natural environment
Storage life	1 year

SHARP





LK315T3HB00A	↓	↓
LK315T3HB00T	↓	↓
LK315T3HB00X	RUNTK5037TPZD	RUNTK5038TPZA
適用機種 MODEL	SC-PWB ※1	S-PWB ※2

CHECK	CHECK	APPROVE	※ CHECK	CHECK	APPROVE

CHECK	CHECK	APPROVE	※ CHECK	CHECK	APPROVE	DESIGN	TRACE	CHECK	CHECK	APPROVE

名称 NAME	部品コード PARTS CODE
PWB接続状態図（D検査図）	＊＊＊＊＊＊＊＊＊＊＊＊＊
材質 MATERIAL	仕上 FINISH
＊＊ ＊＊ ＊＊	＊＊ ＊＊ ＊＊

尺度 SCALE 1:2√2

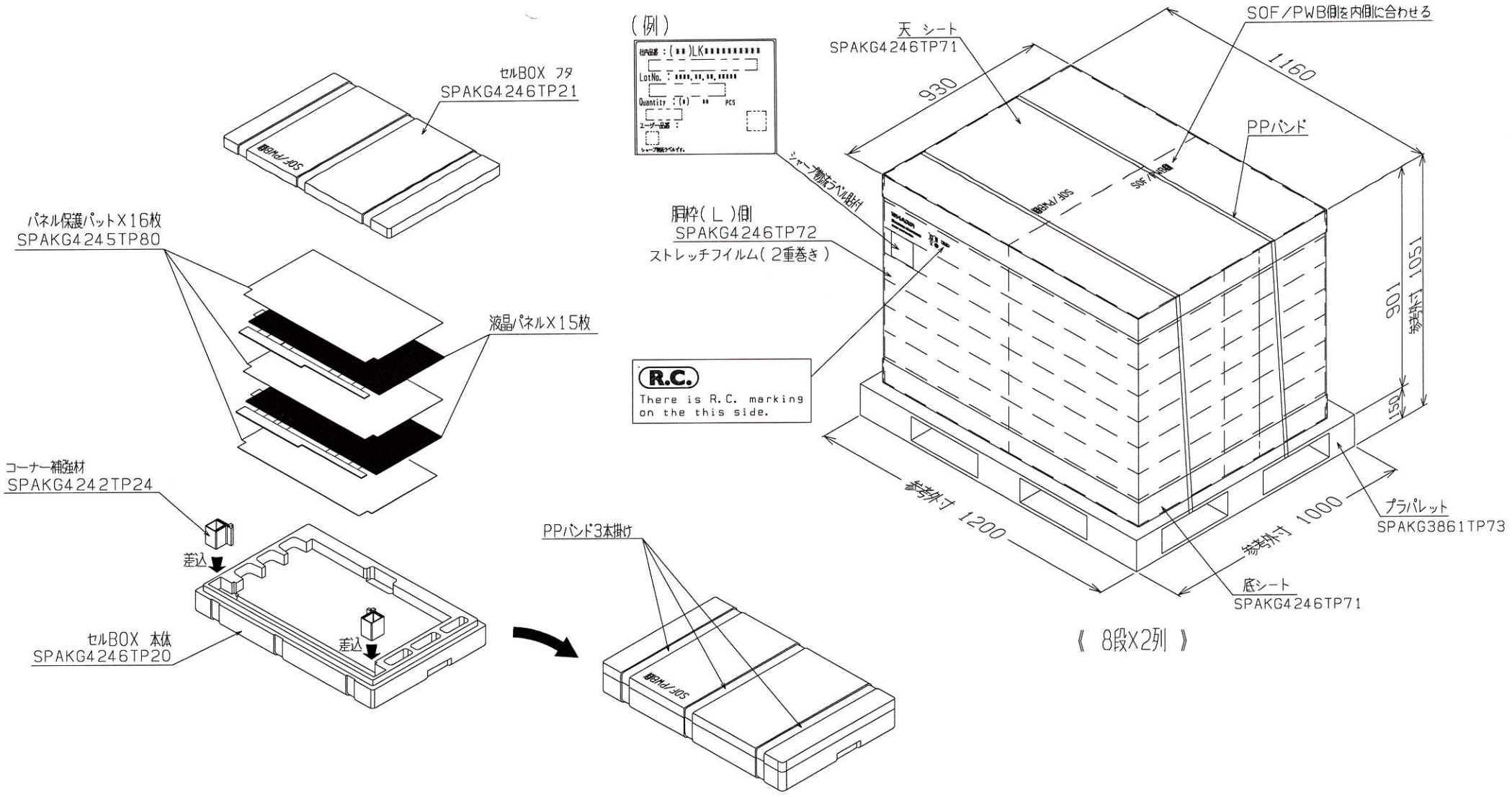
LIQUID CRYSTAL DISPLAY DIVISION Ⅱ
L.C.D GROUP
SHARP CORPORATION

⚠				
⚠				
⚠				
⚠				
⚠				
⚠	＊	＊		＊

年月日 DATE	訂正記事 REVISE	担当 DESIGN	承認 APPROVE

適用機種 MODEL	員数	＊＊
See above	作成日付 DATE	2011.12.07

A0×0.35→A3



単位 : mm

	部品名	部品コード	材質
1	32"パネル(SOF)用セルボックス(箱)	SPAKG4246TP20	EPS 30倍(帯電防止品)
2	32"パネル(SOF)用セルボックス(蓋)	SPAKG4246TP21	EPS 30倍(帯電防止品)
3	コーナー補強材	SPAKG4242TP24	LDPE
4	天/底シート	SPAKG4246TP71	C170/B級120/C170 Aフルート
5	胴枠(L)	SPAKG4246TP72	C170/B級120/C170 Aフルート
6	プラパレット(4方差)	SPAKG3861TP73	D4-1012-6(サンコー)
7	パネル保護パット	SPAKG4245TP80	PE発泡シートt1.0(帯電防止品)

	改訂日 DATE	改訂記事 REVISION	担当 SIGN
5			
4			
3			
2			
1			

作成日付 DATE	2011.01.19
名称 NAME	32型SOFパネル用セルボックス包装指図
コード CODE	CPAKG4246TP01
材質 MATERIAL	

シャープ株式会社 SHARP CORPORATION

——— 切刃 CUT
– – – 順罫(谷折) CREASE
— — — 逆罫(山折) BACK CREASE

尺度 SCALE: FREE

To: SHARP Corporation

Report on Environmental Impact Substances Contained in Parts and Materials

Date: Jan,06,2012
Company Name: SHARP CORPRATION
Department: LIQUID CRYSTAL DISPLAY GROUP

We guarantee the following verified results on the environmental impact substances:

1. Information on surveyed part:

1) Part Name	TFT Open-Cell
2) Sharp Part Code Number	R1LK315T3HB00X
3) Manufacturer's Part Code Number	LK315T3HB00X/T/A
4) Part(Material) Weight (g)	1200g

2. Ozone-depleting substances contained in the part or used in manufacturing:

No.	Substances	Details (Criteria)	Verified Result
1	Ozone-depleting substances(regulated by the Montreal Protocol (Class I and II))(*1)	Not contained in part/materials. However, use of the refrigerant (HCFC) for air-conditioners is considered as object exclusion.	Not present
		Not used in the rinse process. (Object: PWBs,) (Even if you select "Not use" that means you didn't use these substances to rinse process, you have to describe rinse solution and method of the rinse process.)	Not use/Use Rinse solution: Rinse method:

Note: When the verified results show the substances are "present", the part or material is prohibited by the SHARP standard.

3. Presence of banned substances in the part (material)

No.	Substances	Details (Criteria) (*2)	Verified Result
1	Hexavalent chromium compound	Content is 1000ppm or less. Not intentionally added. (*3)	Not present
2	Bis(tri-n-butyltin) oxide	Content is 1000ppm or less. Not intentionally added.	Not present
3	Tri-substiituted organostannic compounds	Content is 1000ppm or less. Not intentionally added.	Not present
4	Polybrominated biphenyls (PBBs)	Content is 1000ppm or less. Not intentionally added.	Not present
5	Polybrominated diphenyl ethers (PBDEs)	Content is 1000ppm or less. Not intentionally added.	Not present Not present
6	Polychlorinated biphenyls (PCBs)	Not intentionally added.	Not present
7	Polychlorinated naphthalene	Not intentionally added.(Only poly chlorinated naphthalene with three chlorines and more is subject to the regulation.)	Not present Not present
8	Short chain chlorinated paraffin	Not intentionally added. (Only C:10-13 are subject to the regulation.)	Not present
9	Asbestos	Not intentionally added.	Not present
10	Polychlorinated Terphenyls (PCTs)	Not intentionally added.	Not present
11	Phenol,2-(2H-benzotriazol-2-yl)-4,6-bis(1,1-dimethylethyl)	Not intentionally added.	Not present Not present
12	Tris (2-chloroethyl) phosphate	Content is 1000ppm or less. Not intentionally added.	Not present
13	Hexabromocyclododecane	Content is 1000ppm or less. Not intentionally added.	Not present
14	Diarsenic Pentoxide	Content is 1000ppm or less. Not intentionally added.	Not present
15	Cobalt dichloride	Content is 1000ppm or less. Not intentionally added.	Not present
16	Dimethyl fumarate	Content is 1000ppm or less. Not intentionally added.	Not present
17	Refractory Ceramic Fibres,Aluminosilicate	Not intentionally added.	Not present
18	Refractory Ceramic Fibres, Zirconia Aluminosilicate	Not intentionally added.	Not present

Note: When the verified results show the substances are "present", the part or material is prohibited by the SHARP standard.

4. Presence of banned substances depending on application

When the verified result of criteria shows the substances are "present", please complete and return the "CONFIRMATION OF USE" form which details use of each substance.

No.	Substances	Details (Criteria)(*2)	Verified Result(*5)
1	Cadmium and its compound	Content is 100ppm or less. Not intentionally added. (*3)	Not present
2	Lead and its compound	Not intentionally added. Content in plastics is 300ppm or less. Content in others is 1000ppm or less. (*3)	Present
3	Mercury and its compound	Content is 1000ppm or less. Not intentionally added. (*3)	Not present
4	Beryllium and its compound	Content is 1000ppm or less. Not intentionally added.	Present
5	Azo colorants	Not intentionally added. Content is 30ppm or less.	Present
6	Polyvinyl Chloride	Not intentionally added.	Not present
7	Phthalates	Content is 1000ppm or less. Not intentionally added.	Not present
8	Radioactive substances	Not intentionally added.	Not present
9	Perfluorooctane sulfonate(PFOSs) and its salt(*4)	Not intentionally added, and Content in substance/preparation is 50ppm or less, content of sub-product/article etc. except substance/preparation is 1000ppm or less, content of coating agent is 1μg/m^2 or less.	Not present Not present Not present
10	Formaldehyde	Wood component: atmospheric concentration is 0.1ppm or less (by the chamber method). Plastics/fibers: content is 75ppm or less.	Not present Not present Not present
11	Nickel	Not intentionally added.	Present
12	Perchlorates	Not intentionally added.(The object of survey is only battery)	Not present
13	Diarsenic trioxide	Content is 1000ppm or less. Not intentionally added.	Not present
14	Arsenic and its compound (except Diarsenic Pentoxide and Diarsenic trioxide)	Content is 1000ppm or less. Not intentionally added.	Not present Not present
15	Boric acid	Content is 1000ppm or less. Not intentionally added.	Not present
16	Disodium tetraborate,anhydrous Tetraboron disodium heptaoxide, hydrate	Content is 1000ppm or less. Not intentionally added.	Not present Not present
17	Dibutyltin (DBT) compounds	Content is 1000ppm or less of tin in a material. Not Intentionally added.	Not present
18	Dioctyltin (DOT) compounds	Content is 1000ppm or less of tin in a material. Not Intentionally added.	Not present

*1) Regarding Ozone-depleting substances, object substances are CFC, 1,1,1-trichloroethane, Carbon tetrachloride, Bromomethane,Halon HBFC, and HCFC.

*2) Unit for calculating content rate is homogenious material.

*3) For packaging part and packaging material, the total concentration of these 4 heavy metals in part/material, ink and paint which constitute a package is 100ppm or less each.

*4) Concerning "Perfluorooctane sulfonate(PFOSs) and its salt", please refer to the Web Site of Ministry of Economy, Trade and Industry of Japan.
URL: http://www.meti.go.jp/policy/chemical_management/03kanri/96list.pdf

*5) When the verified result shows the substances are "present", please complete and return the attachment 1 "CONFIRMATION OF USE FORM" which details use of each substance.

Approved: SHIGEKI TANAKA
Signature:

Written by: YOSHITAKE NAKAMURA
Signature:

To: SHARP Corporation

Attachement 1 "CONFIRMATION OF USE FORM"

(Parts and materials which are usable or prohibited according to application)

This form is to be completed when the verified results in the form *'Report on Environmental Impact Substances Contained in Parts and Materials'* have shown the presence of banned substances with restrictions depending on application.

Date: Jan,06,2012
Company Name: SHARP CORPRATION
Department: LIQUID CRYSTAL DISPLAY GROUP

1. Information on survey applicable part

1) Part Name	TFT Open-Cell
2) Sharp Part Code Number	R1LK315T3HB00X
3) Manufacturer's Part Code Number	LK315T3HB00X/T/A

2.Detail of verified result

Please indicate with a "O" in the verified results column if any of the restricted substances are used for the following reasons.

No.	Substances	Check point (criteria)	Verified Results	Adaptability under the SHARP standard
1	Cadmium and its compound	(1) Used for electric point		Usable
		(2) Used in filter glass.		
		(3) Used in a thermal cutoff of a one shot pellet type		
		(4) Battery is compliant with the EU Battery Directive (98/101/EC).		
		(5) Used in every application other than the above (1-4).		Banned
2	Lead and its compound	(1) Used in high-melting point solder (lead-based alloys containing 85 % by weight or more lead)	○	Usable
		(2) Used in electrical and electronic components in a glass or ceramic other than dielectric ceramic in capacitors, e.g. piezoelectronic devices, or in a glass or ceramic matrix compoundcompounds	○	
		(3) Used less than 0.2% by weight in glass of a fluorescent tube	○	
		(4) Contained in alloy component. (Lead content should be less than 0.35 Wt%, 0.4 Wt% and 4Wt% in steel material, aluminum material and copper material, respectively.)		
		(5) Used in solder consisting of more than two types of elements for connecting microprocessor pins and package containing less than 85wt% and more than 80wt% of lead.		
		(6) Used in solder for connecting semiconductor dies and carriers in flip chip IC packages		
		(7) Used in white glass or filter glass used for an optical purpose		
		(8) Used in coating material for thermal conduction module C-rings		
		(9) Used in shell (exterior casing) or bushing (a cylindrical component fitted inside a hole) of a bearing for a compressor containing coolant for heating,ventilation, air-conditioning, refrigeration, chilling, and HVACR		
		(10) Used in dielectric ceramic used in a capacitor with rated voltage of 125V AC or 250V DC or larger		
		(11) Used in a dielectric ceramic used in a capacitor with rated voltage less than 125V AC or 250V DC		
		(12) Used in glass used for flat fluorescent lamps used for LCD, designing, or lighting for industrial purpose		
		(13) Used in finishing agents of 0.65 mm or finer pitch components other than connectors		
		(14) Used for stabilizer or additive for non-electrolytic gold or nickel plating	○	
		(15) Battery is compliant with the EU Battery Directive (98/101/EC).		
		(16) Used in products for children 12 and under, containing lead exceeding 300ppm per surveying unit.		Banned
		(17) Used in parts/material used in toys, containing lead above 0.009% per surface treatment layer such as coating.		
		(18) Used in the other than the above (1-15).		
3	Mercury and its compound	(1) Used in single-capped fluorescent lamp that does not exceed the following limitations (per burner): (a) For general illumination less than 30W: 5mg, (b) For general illumination of 30W or higher and less than 50W: 5 mg (c) For general illumination of 50W or higher and less than 150W: 5 mg, (d) For general illumination of 150W or higher: 15mg (e) Having a circular or square structure, 17mm or less in tube diameter, and for general illumination: 7mg, (f) For a specific use: 5 mg		Usable
		(2) Used in double-capped strip fluorescent lamp (in each lamp) for general purposes that does not exceed the following limitations: (a) A three-wavelength phosphor of less than 9mm in tube diameter (e.g., T2) with normal lifetime: 5mg (b) A three-wavelength phosphor of 9mm or larger and of 17mm or less in tube diameter (e.g., T5) with normal lifetime: 5mg (c) A three-wavelength phosphor of over 17mm and 28mm or less in tube diameter (e.g., T8) with normal lifetime: 5mg (d) A three-wavelength phosphor of over 28mm in tube diameter (e.g., T12) with normal lifetime: 5mg (e) A three-wavelength phosphor with long lifetime (> 25,000 h) : 8mg		
		(3) Used in double-capped fluorescent lamp (in each individual lamp) not for general purposes under the following conditions: (a) A linear white lamp of 28mm in tube diameter (e.g., T10 and T12): mercury that does not exceed 10mg (b) Nonlinear white lamps of all shapes: mercury that does not exceed 15mg (c) Mercury contained in a nonlinear three-wavelength phosphor lamp of 17mm or larger (e.g., T9) (d) Mercury contained in a lamp for any other general illumination or specific purposes (e.g., induction lamps)		
		(4) Used in cold cathode fluorescent lamps and external electrode fluorescent lamps (CCFL and EEFL) for special purposes not exceeding (per lamp): (a)Short length (≤ 500 mm): 3.5mg, (b)Medium length (> 500 mm and ≤ 1500 mm): 5mg, (c)Long length (> 1500 mm): 13mg		
		(5) Used in low pressure discharge lamps (per lamp) other than the above(1-4)		
		(6) Used in extra-high voltage sodium (vapor) lamp for general illumination with an improved color rendering index over 60		
		(7) Used in extra-high voltage sodium (vapor) lamp for general illumination		
		(8) Used in high-pressure mercury vapor lamp (HPMV)		
		(9) Used in high-pressure mercury vapor lamp (HPMV)		
		(10) Used in metal halide lamp (MH)		
		(11) Battery is compliant with the EU Battery Directive (98/101/EC).		
		(12) Used in every application other than the above (1-11).		Banned
4	Beryllium and its compound	(1) Used in the exception items. (exception items: alloy, ceramics, glass, semiconductor)	○	Usable
		(2) Used in the parts excluding exception items		Banned
5	Azo colorants	(1) Used in a contact part with human body of a product (ex: electric carpet, earphone, strap and etc.) which is manufactured based on the premise that the product continuously contacts human body, and may produce amine when discomposed.		Banned
		(2) Used in every application other than the above (1). (Used in a part which does not continuously contact with human body.)	○	Usable
6	Polyvinyl Chloride	(1) Used in packaging material and packaging part for Sharp product.		Banned
		(2) Used for the other than the above (1).		Usable
7	Phthalate esters	(1) Bis(2-ethylhexyl)phthalate:DEHP/DOP is used intentionally.		Banned
		(2) Dibutyl phthalate:DBP, or Bis(butylbenzyl) phthalate:BBP, or Diisobutyl phthalate:DIBP is used.		
		(3) Dinonyl phthalate:DINP, or Diisodecyl phthalate:DIDP, or Di-n-octyl phthalate:DNOP is used in parts/materials that is used in products for children 12 and under.		
		(4) Bis(2-ethylhexyl)phthalate:DEHP/DOP is contained as impurities (Not intentionally added)		Usable
		(5) Used in the other than the above (1-3).		
8	Radioactive substances	(1) Used in the magnetron of a microwave oven. (Only Thorium is subject to the regulation.)		Usable
		(2) Used in the electric bulb of a LCD projector. (Only Krypton 85 is subject to the regulation.)		
		(3) Used in the other than the above (1-2).		Banned
9	Perfluorooctane sulfonate(PFOSs) and its salt	(1)Used in photoresists and rantireflection coating for the photolithography process.		Usable
		(2) Used in photo coating used in pringing plates, film, and documents.		
		(3) Used in mist suppressants for hard chrome plating, and moistening agent used in equipment for plating.		
		(4) Used in every application other than the above (1-3).		Banned
10	Formaldehyde	(1) Used in wooden parts.		Banned
		(2) Used in a direct human body contact part of a product which is intended to continuously contact with human body. (ex: electric carpet, earphone, strap and etc.)		
		(3) Used in every application other than the above (1-2).		Usable
11	Nickel	(1) Used in parts which continuously contact with human skin for a long time.		Banned
		(2) Used in the other than the above (1).	○	Usable
12	Perchlorates	(1) Contained above 6ppb by weight per battery		Usable only with statement
		(2) Contained less than 6ppb by weight per battery		Usable
13	Diarsenic trioxide	(1) Used in the lamp of LCD projector.		Usable
		(2) Used in the other than the above (1).		Banned
14	Arsenic and its compound	(1) Used for the exception items. (exception items: semiconductor, resist, magnet filter, copper foil and battery)		Usable
		(2) Used in the other than the above (1).		Banned
15	Boric acid	(1) Used in the polarizers(made of PVA) of LCD panel and glass.		Usable
		(2) Used in adhensive agent.		
		(3) Used for the other than the above (1-2).		Banned
16	Disodium tetraborate, anhydrous Tetraboron disodium heptaoxide, hydrate	(1) Used in the polarizers(made of PVA) of LCD panel and glass.		Usable
		(2) Used in adhensive agent and fibers.		
		(3) Used for the other than the above (1-2).		Banned
17	Dibutyltin (DBT) compounds	(1) Used for one-component and two-component room temperature vulcanisation sealants (RTV-1 and RTV-2 sealants) and adhesives		Usable
		(2) Used for paints and coatings containing DBT compounds as catalysts when applied on articles		
		(3) Used in stabilizer of soft polyvinyl chloride (PVC) for outdoor purpose		
		(4) Used in catalyst for polymerization of resin for toner. Content as a metal tin is 1000ppm or less.		
		(5) Used for the other than the above (1-4).		Banned
18	Dioctyltin (DOT) compounds	(1) Used for two-component room temperature vulcanisation moulding kits (RTV-2 moulding kits)		Banned
		(2) Used for the other than the above (1).		Usable

Note: When the verified results correspond to "banned", the part or material is prohibited by the SHARP standard.

Approved: SHIGEKI TANAKA
Signature:

Written by: YOSHITAKE NAKAMURA
Signature: