No.	LD-K23Z55A
DATE	Jan. 27. 2012



MODEL No. LK695D3LA58

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DEVELOPMENT DEPARTMENT 2 LIQUID CRYSTAL DISPLAY DIVISION LARGE LIQUID CRYSTAL DISPLAY BUSINESS GROUP SHARP CORPORATION

RECORDS OF REVISION

Model: LK695D3LA58

SPEC No.	DATE	REVISED	PAGE	SUMMARY	NOTE
		No.			
LD-K23Z55	Dec. 16. 2011	-	-	-	1st. Issue
	Jan. 27. 2012	А	ALL	Fixed model name "LK695D3LA58"	2 nd Issue
			1,7,8,9,	Added specifications at portrait installation	
			18		
			10	Changed Input voltage sequence of C-PWB	
			5,6	Deleted the function of "DIM_SEL(CN101	
				No.13)of LED driver circuit	
			12	Changed current dissipation	
				of LED driving of Back Light	
			16	Revised contrast and chromaticity spec.	
			22	Revised figure	
				of MODULE OUTLINE DIMENSION	
			23	Added material indication of Packing box	

1. Application

This technical literature is applied to the color 69.5" TFT-LCD module LK695D3LA58.

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2. Overview

This module is a color active matrix LCD module incorporating amorphous silicon TFT (<u>Thin Film Transistor</u>). It is composed of a color TFT-LCD panel, driver ICs, control circuit, LED driver circuit, and edge-light LED system etc. Graphics and texts can be displayed on a $1920 \times RGB \times 1080$ dots panel with 16.7 million colors (RGB 8bits) by using LVDS (Low Voltage Differential Signaling) to interface, +12V of DC supply voltages.

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.

With this technology, image signals can be set so that liquid crystal response completes within one frame. As a result, motion blur reduces and clearer display performance can be realized.

This LCD-module can be installed by both installation direction "landscape" and "portrait" based on Section 5. \blacktriangle A

Parameter	specifications	Unit	remark
Display size	176.563 (Diagonal)	cm	
Display Size	69.513 (Diagonal)	inch	
Active area	1538.880 (H) x 865.620 (V)	mm	[Note2]
Dival Format	1920(H) x 1080(V)	nivol	[Note2]
Fixer Format	(1pixel = R + G + B dot)	pixer	
Pixel pitch	0.802(H) x 0.802 (V)	mm	[Note2]
Pixel configuration	R, G, B vertical stripe		[Note2]
Display mode	Normally black		
Outline Dimensions [Note 1]	1566(W) x 901.8(H) x 29.6(D)	mm	[Note2]
Mass	(27.5 ± 1.0)	kg	
Surface treatment	Low-Haze Anti Glare		
	Hard coating: 2H and more		

3. Mechanical Technical literatures

[Note 1] Detail outline is shown in figure "MODULE OUTLINE DIMENSION".

[Note 2] In case of Landscape installation $\blacktriangle A$

4. Input Terminals

4.1. TFT panel driving

CN1	(Interface	signals a	nd +	12V	DC po	wer	supply)	

(interface signals	and 12 the point suppry	
Using connector	: 91213-0510Y (ACES)	
Mating connector	: 91214-05130 (ACES),	FI-RNE51HL/FI-RNE51CL(JAE)
Mating IVDS transn	vitter · THC63LVD1	023 or equivalent device

Mating LV	DS transmitte	er : IHC63LVD1023 or equivalent device	~ .
Pin No.	Symbol	Function	Remark
1	GND	(It is not necessary to connect.)	
2	Reserved	It is required to set non-connection(OPEN)	
3	Reserved	It is required to set non-connection(OPEN)	
4	Reserved	It is required to set non-connection(OPEN)	
5	Reserved	It is required to set non-connection(OPEN)	
7	Reserved	It is required to set non-connection(OPEN)	
8	Reserved	It is required to set non-connection(OPEN)	
0	Reserved	It is required to set non-connection(OFEN)	
10	Reserved	It is required to set non-connection(OPEN)	
10	GND	(It is not necessary to connect.)	
12	Reserved	It is required to set non-connection(OPEN)	
13	Reserved	It is required to set non-connection(OPEN)	
14	Reserved	It is required to set non-connection(OPEN)	
15	Reserved	It is required to set non-connection(OPEN)	
16	Reserved	It is required to set non-connection(OPEN)	
17	Reserved	It is required to set non-connection(OPEN)	
18	GND	(It is not necessary to connect.)	
10	Reserved	It is required to set non-connection(OPEN)	
20	Reserved	It is required to set non-connection(OPEN)	
20	GND	(It is not necessary to connect.)	
21	Pasaruad	It is required to set non-connection(OPEN)	
22	Reserved	It is required to set non-connection(OPEN)	
23	Reserved	It is required to set non-connection(OPEN)	
24	Reserved Deserved	It is required to set non-connection(OPEN)	
25	CNID	(t is required to set non-connection(OPEN)	
20	GND	(It is not necessary to connect.)	
27	GND	(It is not necessary to connect.)	
20	Reserved	It is required to set non-connection(OPEN)	
29	Reserved	It is required to set non-connection(OPEN)	
30	Reserved	It is required to set non-connection(OPEN)	
22	Reserved	It is required to set non-connection(OPEN)	
32	Reserved	It is required to set non-connection(OPEN)	
33	Reserved	It is required to set non-connection(OPEN)	
34	GND	(It is not necessary to connect.)	
35	Reserved	It is required to set non-connection(OPEN)	
36	Reserved	It is required to set non-connection(OPEN)	
3/	GND	(It is not necessary to connect.)	
38	Reserved	It is required to set non-connection(OPEN)	
39	Reserved	It is required to set non-connection(OPEN)	
40	Reserved	It is required to set non-connection(OPEN)	
41	Reserved	It is required to set non-connection(OPEN)	
42	GND		
43	GND		
44	GND		
45	GND		
46	GND		
47	VCC	+12V Power Supply	
48	VCC	+12V Power Supply	
49	VCC	+12V Power Supply	
50	VCC	+12V Power Supply	
51	VCC	+12V Power Supply	

CN2 (Interface signals and +12V DC power supply)

Using connector

Mating connector

: 91213-0410Y (ACES) : 91214-04130 (ACES), FI-RNE41HL/FI-RNE41CL(JAE)

Pin No.	Symbol	Function	Remark
1	N.C	Non connection	
2	N.C	Non connection	
3	N.C	Non connection	
4	N.C	Non connection	
5	Reserved		
6	Reserved		
7	Reserved		
8	Reserved		
9	GND		
10	AIN0-	Aport (-)LVDS CH0 differential data input	
11	AIN0+	Aport (+)LVDS CH0 differential data input	
12	AIN1-	Aport (-)LVDS CH1 differential data input	
13	AIN1+	Aport (+)LVDS CH1 differential data input	
14	AIN2-	Aport (-)LVDS CH2 differential data input	
15	AIN2+	Aport (+)LVDS CH2 differential data input	
16	GND		
17	ACK-	Aport LVDS Clock signal(-)	
18	ACK+	Aport LVDS Clock signal(+)	
19	GND		
20	AIN3-	Aport (-)LVDS CH3 differential data input	
21	AIN3+	Aport (+)LVDS CH3 differential data input	
22	GND		
23	GND		
24	GND		
25	GND		
26	BIN0-	Bport (-)LVDS CH0 differential data input	
27	BIN0+	Bport (+)LVDS CH0 differential data input	
28	BIN1-	Bport (-)LVDS CH1 differential data input	
29	BIN1+	Bport (+)LVDS CH1 differential data input	1
30	BIN2-	Bport (-)LVDS CH2 differential data input	1
31	BIN2+	Bport (+)LVDS CH2 differential data input	1
32	GND		
33	BCK-	Bport LVDS Clock signal(-)	
34	BCK+	Bport LVDS Clock signal(+)	1
35	GND		1
36	BIN3-	Bnort (-)LVDS CH3 differential data input	1
37	BIN3+	Bport (+)LVDS CH3 differential data input	1
38	GND	Bport (1) By Bo or B unforential data input	
39	GND		
40	GND		
41	GND		
41	GND		

[Note1] GND of a liquid crystal panel drive part has connected with a module chassis.

LVDS Data order

Data	[JEIDA]
TA0	R2
TA1	R3
TA2	R4
TA3	R5
TA4	R6
TA5	R7(MSB)
TA6	G2
TB0	G3
TB1	G4
TB2	G5
TB3	G6
TB4	G7(MSB)
TB5	B2
TB6	B3
TC0	B4
TC1	B5
TC2	B6
TC3	B7(MSB)
TC4	NA
TC5	NA
TC6	DE(*)
TD0	R0
TD1	R1
TD2	G0
TD3	Gl
TD4	B0
TD5	B1
TD6	N/A

NA: Not Available

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

LVDS = JEIDA only



DE: Display Enable, NA: Not Available (Fixed Low)



4.3. Backlight driving ▲A

CN101 (+24V DC power supply and inverter control) Using connector: 20022WR-14B1(YEONHO)

Mating connector: 20022HS-14L (YEONHO) or equivalent connector.

Pin No.	Symbol	I/O	Function	Default(OPEN)	Input Impedance	Remark
1	VIED	In	+24V	_	(11111)	
2	VLED	In	+24V	-		
3	VLED	In	+24V	_		
4	VLED	In	+24V	-		
5	VLED	In	+24V	-		
6	GND	In	GND	-		
7	GND	In	GND	-		
8	GND	In	GND	-		
9	GND	In	GND	-		
10	GND	In	GND	-		
11	Error_out	Out	Error Detection	(Open Co	llector)	[Note 1]
12	Von/off	In	LED driver On/Off	LED driver Off	10k-ohm pull-down to GND	[Note 2]
13 ▲A	NC	-	-	-	-	-
14	EX_DIM	In	Brightness Control (PWM 1~100%)	3.3V : pull up Brightness 100%	10k-ohm pull-up to 3.3V	[Note 3] Pulse Dimming

[Note 1] Error Detection

	MIN	ТҮР	MAX
Normal	-	-	1.0V
Abnormal	(Open Collector)		

[Note 2] LED driver ON/OFF

Input voltage	Symbol	Function
High voltage	V _{ON}	LED driver : On
Low voltage	V _{OFF}	LED driver : Off

[Note 3] Pulse Dimming

Pin No.14 'EX_DIM' is used for the pulse dimming control by the PWM duty with input pulse from (90Hz) to (360Hz).

Input PWM waveform High voltage Low voltage T T T High voltage: 2.4~3.6V Low voltage: -0.3~0.8V

		MIN	ТҮР	MAX	Remark
Pulse signal	[Hz]	(90)	-	(360)	
DUTY(Ton/T)	[%]	(1)	-	(100)	Ta=25°C
Dimming level	[%]	-	-	(100)	$T_{a} - 25^{\circ}C$
(luminance ratio)					1a-25 C

5. Installation and Display direction ▲A

5.1 Installation direction

This module can be installed by both installation direction "landscape" and "portrait" as follows.

[Landscape direction]

[Portrait direction]

In front view, CPWB is located BOTTOM





In front view, CPWB is located Left-side

[Note] Other installation direction

Since the other installation direction cannot be guaranteed the characteristic and reliability, NOT recommended.





5.2 Display direction

Each subpixel R, G, B is aligned as follows.

[Landscape direction]



LCD subpixel alignment in Landscape installaion

[Note] PWB layout

In Landscape installation,

Four S-PWBs and three LED-PWBs are layout at the bottom side of the screen.



[Portrait direction]



LCD subpixel alignment in Portrait installaion

6. Absolute Maximum Ratings

Parameter	Symbol	Condition	Ratings	Unit	Remark
12V supply voltage (for Control PWB)	VCC	Ta=25 °C	0 ~ + 14	V	
24V supply voltage (for LED Driver)	V _{LED}	Ta=25 °C	0~+29.0	V	
Input voltage (for LED Driver)	Von /Voff VDIMH /VDIML	Ta=25 °C	-0.3 ~ +3.9	V	[Note 1]
Storage temperature	Tstg	-	-25 ~ +60	°C	[Note 2]
Operation temperature (Ambient)	Тора	-	$0 \sim +50$	°C	[note 2]

[Note 1] Von/off, EX_DIM in CN101.

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

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

7. Electrical Characteristics

7.1. Control circuit driving

								Ta=25 °C
Р	arame	eter	Symbol	Min.	Тур.	Max.	Unit	Remark
	Su	upply voltage	Vcc	11.4	12	12.6	V	[Note 1]
+12V supply voltage	Curi	rent dissipation	Icc	-	(0.75)	2.0	А	[Note 2]
	Īn	rush current	I _{RUSH} 1	-	4.4	-	А	t1=500us [Note3]
	11	il usil current	I _{RUSH} 2	-	2.4	-	А	t1>5ms
Permissible	input	ripple voltage	Vrp	-	-	100	mVP-P	Vcc = +12.0V
Differential in	nput	High	Vth	-	-	100	mV	$V_{CM} = +1.2V$
threshold voltage Low		Low	VTL	-100	-	-	mV	[Note 4]
Terminal resistor			Rт	-	100	-	Ω	Differential input

[Note]VCM: Common mode voltage of LVDS driver.

[Note 1] ▲A

Input voltage sequences	Dip conditions for supply voltage
50us $<$ t1 \leq 20ms	a) 9.1V \leq Vcc < 10.8V
20ms $< t2 \leq 5 \text{s}$	td \leq 10ms
$0 < t3 \leq 1s$	b) $Vcc < 9.1V$
$1s \leq t4$	Dip conditions for supply voltage is
$0 \leq t5$	based on input voltage sequence.
$1s \leq t6$	
AAN/00	



Data1: ACK±, AIN0±, AIN1±, AIN2±, AIN3±, BCK±, BIN0±, BIN1±, BIN2±, BIN3±
 *V_{CM} voltage pursues the sequence mentioned above

[Note]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: 1024 gray-bar patterns. Vcc = +12.0VThe explanation of RGB gray scale is seen in section 8.



[Note 3] Vcc 12V inrush current waveform (I_{RUSH}1)



LD-K23Z55A-12

Pa	rameter	Symbol	Min.	Тур.	Max.	Unit	Remark
+24V supply voltage	Current dissipation	I _{LEDD}	-	(7.8)	(8.6)	А	V _{LED} = 24V, Ta=25°C DUTY =100%
	Irush current	I _{RUSH}	-	(22.0)	(24.0)	А	[Note 1]
	Supply voltage	V _{LED}	21.6	24.0	26.4	V	24V±10%
Permissible in	nput ripple voltage	Vrp	-	-	1	VP-P	$V_{LEDD} = +24.0V$
Input v	voltage (On)	Von	2.4	3.0	3.6	V	V _{ON/OFF,}
Input v	voltage (Off)	Voff	-0.3	0	0.8	V	EX_DIM

7.2. LED driving for Back Light **A**

[Note 1] 1) VLED-turn-on condition



2) VLED-turn-off condition



7.3 LED lifetime

LED light system is side-edge type. The characteristics of the LED are shown in the following table. The value mentioned below is at the case of one LED.

	Item	Symbol	Min.	Тур.	Max.	Unit	Remarks
Γ	Life time	T _{LED}	(30000)	-	-	Hour	[Note]

[Note]

LED life time is defined as the time when brightness becomes 50% of the original value in the continuous operation under the condition of $Ta = 25^{\circ}C$

[Operation condition]

- ambient temperature Ta= 25° C

Ta=25 °C

8 Timing characteristics of input signals

8.1. Timing characteristics

Timing diagrams of input signal are shown in Fig.2.

	Parameter	Symbol	Min.	Ту	p.	Max.	Unit	Remark
		~)		50Hz	60Hz			
Clock	Frequency	1/Tc	60	74.25	74.25	76	MHz	
	Horizontal period	тн	1050	1100	1100	1404	Clock	
	Horizontal period	111	14.2	14.8	14.8	18.9	μs	
Data enable	Horizontal period (High)	THd	960	960	960	960	Clock	
signal	Vertical period	τV	1109	1350	1125	1436	Line	
	vertical period	1 V	47	50	60	63	Hz	
	Vertical period (High)	TVd	1080	1080	1080	1080	line	

[Note]-When vertical period is very long, flicker and etc. 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.



Fig.2 Timing characteristics of input signals

8.2. LVDS signal characteristics



Item		Symbol	Min.	Тур.	Max.	Unit
	Delay time, CLK rising edge to serial bit position 0	tpd0	-0.25	0	0.25	
	Delay time, CLK rising edge to serial bit position 1	tpd1	1*t _{CLK} /7-0.25	1*t _{CLK} /7	1*t _{CLK} /7+0.25	
Data position	Delay time, CLK rising edge to serial bit position 2	tpd2	2*t _{CLK} /7-0.25	2*t _{CLK} /7	2*t _{CLK} /7+0.25	
	Delay time, CLK rising edge to serial bit position 3	tpd3	3*t _{CLK} /7-0.25	3*t _{CLK} /7	3*t _{CLK} /7+0.25	ns
	Delay time, CLK rising edge to serial bit position 4	tpd4	4*t _{CLK} /7-0.25	4*t _{CLK} /7	4*t _{CLK} /7+0.25	
	Delay time, CLK rising edge to serial bit position 5	tpd5	5*t _{CLK} /7-0.25	5*t _{CLK} /7	5*t _{CLK} /7+0.25	
	Delay time, CLK rising edge to serial bit position 6	tpd6	6*t _{CLK/} 7-0.25	6*t _{CLK} /7	6*t _{CLK} /7+0.25	

	Colors &												Data	ı sig	nal											
	Gray scale	Gray	R0	R1	R2	R3	R4	R5	R6	R7	G0	G1	G2	G3	G4	G5	G6	G7	B0	B12	B2	В3	B4	В5	B6	B7
	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
or	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
Col	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
asic	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
В	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
	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
р	仓	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
f Re	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
le o	仓	\downarrow					\downarrow							`	Ļ								Ļ			
Sca	Û	\downarrow					\downarrow							``	Ļ								Ļ			
ìray	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
\cup	Û	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
	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
en	仓	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
Gre	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
e of	仓	\downarrow					\downarrow							`	Ļ								Ļ			
Scal	Û	\downarrow					\downarrow							,	Ļ								\downarrow			
ray	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
G	Û	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
	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
le	仓	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
Blu	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
le of	Û	\rightarrow					Ļ							`	Ļ								Ļ			
Sca	Û	\downarrow					\downarrow							`	Ļ								\downarrow			
ìray	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
9	Û	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

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

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

Each basic color can be displayed in 256 gray scales from 8 bits data signals. According to the combination of total 24 bits data signals, 16.7 million-color display can be achieved on the screen.

10 Optical characteristics

Frama	rata.60Hz	(typical)	
Frame	rate:ounz	(typical)	

Param	eter	Symbol	Condition	Min.	Тур.	Max.	Unit	Remark
Viewing angle	Horizontal	$\begin{array}{c} \theta 21 \\ \theta 22 \end{array}$	CP > 10	70	88	-	Deg.	[Note1 4]
range	Vertical	θ 11 θ 12	CK≟10	70	88	-	Deg.	
Contrast ra	tio ▲A	CRn		4000	5000	-	-	[Note2,4]
Dospons	a tima	-		-	6	-	ma	Ta=35°C [Note3,4,5]
Kespons	e time	$ au_{\mathrm{DRV}}$		-	8	-	1115	Ta=25°C [Note3,4,5]
	White	Х		(0.284)	(0.318)	(0.344)	-	
	w mite	у		(0.294)	(0.335)	(0.354)	-	
	Red	Х		(0.617)	(0.647)	(0.677)	-	
Chromaticity		у	$y \qquad \theta = 0 \ deg$		(0.347)	(0.377)	-	
▲A	Cream	Х	0 0 deg.	(0.288)	(0.318)	(0.348)	-	[Note/1]
	Green	у		(0.616)	(0.646)	(0.676)	-	
	Dhua	Х		(0.127)	(0.157)	(0.187)	-	
	Blue	у		(0.040)	(0.070)	(0.100)	-	
Luminance	White	Y _L		560	700	-	cd/m ²	
Luminance uniformity	White	δw		-	1.33	-	-	[Note 6]

- Measurement condition: Set the value of backlight control voltage to maximum luminance of white.

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

[Note]The optical characteristics are measured by following equipment:



*Measurement of viewing angle range and Response time.

- -Viewing angle range: EZ-CONTRAST
- Response time: Photodiode

*Measurement of Contrast, Luminance, Chromaticity.

[Note 1]Definitions of viewing angle range:

[Note 2]Definition of contrast ratio :

The contrast ratio is defined as the following.

Luminance (brightness) with all pixels white

Contrast Ratio=

Luminance (brightness) with all pixels black

[Note3] Definition of response time

The response time (τ_{rd}) is defined as the following,

 $\tau_{rd} = \{\sum (tr: x - y) + \sum (td: x - y)\}/20$

 τ_{rd} is the average value of the switching time from five gray levels (0%, 25%, 50%, 75% and 100%) to five gray levels (0%, 25%, 50%, 75% and 100%).

			Gray level of End (y)										
		0%	25%	50%	75%	100%							
1	0%		tr: 0%-25%	tr: 0%-50%	tr: 0%-75%	tr: 0%-100%							
eve (x)	25%	td: 25%-0%		tr: 25%-50%	tr: 25%-75%	tr: 25%-100%							
y le tar	50%	td: 50%-0%	td: 50%-25%		tr: 50%-75%	tr: 50%-100%							
Gra f S	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%								

[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~E)

Maximum luminance of five points (brightness)

 $\delta_{W} \!=\!$

Minimum luminance of five points (brightness)

11 Packing form

a) Piling number of cartons
b) Packing quantity in one carton
c) Carton size
d) Total mass of one carton filled with full modules
c) 2 Maximum
c) 10pcs
c) 1772(W) ×1110(D)×1153(H)
c) 350kg

12 Carton storage con	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 production 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 keeping off a wall.			
	Please take care of ventilation in storehouse and around cartons, and control temperature within the natural environment.			
Storage life	1 year.			

13 Reliability test item

No.	Test item	Condition
1	High temperature storage test	Ta=60°C 240h
2	Low temperature storage test	Ta=-25°C 240h
3	High temperature and high humidity	Ta=40°C ; 95%RH 240h
	operation test	(No condensation)
4	High temperature operation test	Ta=50°C 240h
5	Low temperature operation test	Ta=0°C 240h
	Vibration test	Frequency: 10~57Hz/Vibration width (one side): 0.075mm
6	(non-operation)	: 58~500Hz/Acceleration: 9.8 m/s ²
0		Sweep time: 11 minutes
		Test period: 3 hours (1h for each direction of X, Y, Z)
		At the following conditions, it is a thing without incorrect
7		operation and destruction.
		(1)Non-operation: Contact electric discharge ±10kV
	ESD	Non-contact electric discharge ±20kV
		(2)Operation Contact electric discharge $\pm 8kV$
		Non-contact electric discharge ±15kV
		Conditions: 150pF, 330ohm

[Result evaluation criteria]

Under the display quality test condition with normal operation state, there shall be no change, which may affect practical display function.

14 Others

14.1. Serial label

The label that displays SHARP, product model LK695D3LA58, a product number is stuck on the back of the module.

a) Overview

This label is stuck on the backlight chassis.

ex) LK695D3LA58 [Factory "A" production]

How to express Production No.

[Note1] Serial No.

- 1st ~ 99,999th/month :00001~99999

- 100,000th ~ 109,999th/month :A0000~A9999

- 110,000th ~ 119,999th/month :B0000~B9999

----- (without "I","O")

<u>0</u>)	0	00000	<u>0</u>	
					Suffix code
					Serial No. [Note1]
				Production	place code [Note2]
				Production	month (1~9,X,Y,Z)
Production year (the last figures of the Christian Era					

[Note2] Production place code

Code	Place	Model No. & Suffix Code
T.B.D	Factory "A"	LK695D3LA58 (T.B.D)

14.2. Packing Label

This label is stuck on each packing box.

ex) LK695D3LA58 (T.B.D.)

- ① Model No.& Suffix Code
- ② Lot No.
- ③ Quantity

15 Precautions

- 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) The module has some printed circuit boards (PCBs) on the back 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.
- i) Observe all other precautionary requirements in handling components.
- j) 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.
- k) When giving a touch to the panel at power on supply, it may cause some kinds of degradation. In that case, once turn off the power supply, and turn on after several seconds again, and that is disappear.
- When handling LCD module 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.
- m) This LCD module is designed to prevent dust from entering into it. However, there would be a possibility to have a bad effect on display performance in case of having dust inside of LCD module. Therefore, please ensure to design your TV set to keep dust away around LCD module.
- n) This LCD module passes over the rust.
- o) Adjusting Vcom has been set optimally before shipment, so do not change any adjusted value. If adjusted value is changed, the technical literature may not be satisfied.
- p) Disassembling the module can cause permanent damage and should be strictly avoided.
- q) Please be careful since image retention may occur when a fixed pattern is displayed for a long time.
- r) The chemical compound, which causes the destruction of ozone layer, is not being used.
- s) In any case, please do not resolve this LCD module.
- t) This module is corresponded to RoHS.
- u) When any question or issue occurs, it shall be solved by mutual discussion.

▲A LK695D3LA58 MODULE OUTLINE DIMENSIONS

