

NAN YA PLASTICS CORP.
ELEC. MATERIALS DIV.
LCD DEPARTMENT

SPECIFICATION

SPEC. NO.: LM163-0
DATE : Jan. 11, 1999
SHEET NO. : 1/22

U.S. MARKETING ARM:

MARK PRODUCTS CORPORATION
800 N. EDGEWOOD AVENUE
WOOD DALE, IL 60191
TEL: 630-787-9089
FAX: 630-787-9015

SPECIFICATION OF
640x480 COLOR LCD MODULE
PRODUCT NO.: LCBLDT163M

SPEC. NO: LM163-0-0

CUSTOMER
APPROVED BY
DATE:

EDITED ON : Jan. 11, 1999

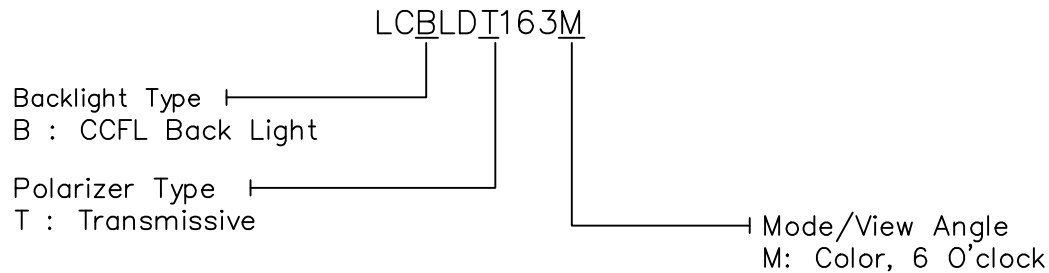
SALE MANAGER	TECHNICAL APPROVE	DESIGN MANAGER	DESIGN CHECK	DESIGNER

REV/DATE	RO/ 01.11.99'					APP	CHK	BY
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1. MECHANICAL DATA

(1) Product No.	LCBLDT163M
(2) Module Size	205.5 (W)mm x 141.0 (H)mm x MAX 7.0 (D)mm
(3) Dot Size	0.053 (W)mm x 0.21 (H)mm
(4) Dot Pitch	0.078 (W)mm x 0.235 (H)mm
(5) Number of Dots	640 (W)xRGB x 480 (H)DOTS
(6) Duty	1/240
(7) LCD	F-STN / Black and White Normal Black / Negative Image / Color Transmissive Type
(8) Viewing Direction	6 O'clock
(9) Backlight	CCFL
(10) Controller	Excluded
(11) DC/DC Converter	Excluded
(12) Weight	310 g(approx.)
(13) Recommended CCFT Inverter	TAD250 (TDK)

Note :



REV/DATE	RO/ 01.11.99'					APP	CHK	BY
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2. ABSOLUTE MAXIMUM RATINGS

(1) ELECTRICAL ABSOLUTE RATINGS

VSS=0V

ITEM	SYMBOL	MIN	MAX	UNIT	COMMENT
Power Supply for Logic	VDD-VSS	-0.3	6.5	V	
Power Supply for LCD Drive	VEE-VSS	0	42.0	V	
Input Voltage	VI	-0.3	VDD+0.3	V	
Static Electricity	-	-	-	-	Note 1

(2) ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS

ITEM	OPERATING		STORAGE	
	MIN.	MAX.	MIN.	MAX.
Ambient Temperature	0	50	-20	70
Humidity (Without Condensation)	Note 2,4		Note 3,4	
Vibration	Note 5			

Note 1 LCM should be grounded during handling LCM.

Note 2 $T_a \leq 50^\circ\text{C}$: 85%RH max

$T_a > 50^\circ\text{C}$: Absolute humidity must be lower
than the humidity of 85%RH at 50°C

Note 3 T_a at -20°C will be < 48 hrs, at 70°C will be < 120 hrs

Note 4 Background color will change slightly depending on ambient temperature.
That phenomenon is reversible.

Note 5

Frequency	5 Hz~13.95 Hz	13.95 Hz~33 Hz	33 Hz~51 Hz	51 Hz~500 Hz
Vibration Level	-	2X9.8 m/s ²	-	5x9.8 m/s ²
Vibration Width	0.2 inch	-	0.036 inch	-
Vibration Direction	X/Y/Z			
Vibration Time	20 min/cycle X 3 directions			

3. ELECTRICAL CHARACTERISTICS

3.1 ELECTRICAL CHARACTERISTICS OF LCM

ITEM		SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT		
Logic Circuit Power Supply		VDD-VSS	Ta= 25°C	4.5	5.0	5.5	V		
Input Voltage		VIH	H level	0.8VDD	-	VDD	V		
		VIL	L level	0	-	0.2VDD	V		
Recommended LCD Driving Voltage		VEE-VSS (Vop)	Duty=1/240 Bias=1/13 VDD=5.0V	0°C	22.9	23.3	23.7	V	
				25°C	22.2	22.6	23.0		
				50°C	21.0	21.4	21.8		
Supply Current for Logic		IDD	VDD-VSS=5.0V VEE-VSS=22.6V Ta=25°C	-	19.0	38.0	mA		
Supply Current for LCD		IEE	PATTERN : Start View Of Windows 95	-	8.0	16.0	mA		
LCM	Surface Luminance	L	VDD-VSS =5.0V VEE-VSS =22.6V Ta=25°C IL=5mA	PATTERN: (Dots All On of White Color) □ □ □ □ □ □ □ □		-	60.1	-	cd/m ²
				PATTERN: (Dots All Off) ■ ■ ■ ■ ■ ■ ■ ■		-	5.17	-	

3.2 ELECTRICAL CHARACTERISTICS OF BACKLIGHT

Used lamp : Rating

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	REMARK
Lamp Voltage	V _L	-	388	-	Vrms	-
Lamp current	I _L	4	5	6	mArms	(*1)
Lamp power consumption	P _L	-	1.95	-	W	(*2)
Lamp frequency	F _L	-	50	-	KHz	
Starting voltage	V _S	-	-	600	Vrms	T _a = 25°C
Color Degree	X	-	0.318	-	-	
	Y	-	0.299	-		
Lamp life time	LL	10000	-	-	hrs	

(*1) It is recommended that I_L be not more than 5.0 mArms so that heat radiation of CCFT backlight may least affect the display quality .

(*2) Power consumption excludes inverter loss .

3.3 RECOMMENDED INVERTER : TDK TAD250

3.3.1 GENERAL SPECIFICATIONS

3.3.1.1 OPERATING TEMPERATURE : 0°C~50°C

3.3.1.2 STORAGE TEMPERATURE : -20°C~80°C

3.3.1.3 DIMENSION : 95.0(L)mm x 19.5(W)mm x MAX 8.8(H)mm

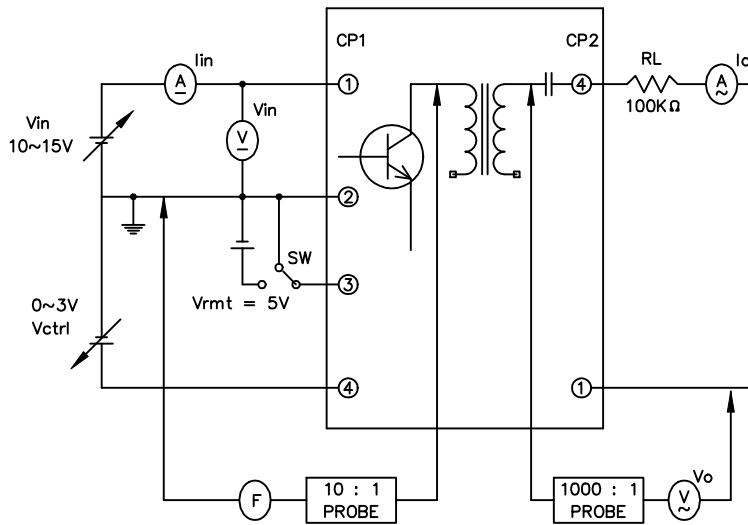
3.3.2 INPUT CHARACTERISTICS

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	REMARKS
Input Voltage	V _{in}	10	12	15	V	
Input Current	I _{in}	-	450	550	mA	RL = 100KΩ, V _{in} = 12V
Input Power	P _{in}	-	5.4	6.6	W	RL = 100KΩ, V _{in} = 12V
Standby Standby Input Current	I _{in} Standby	-	0.1	1.0	μA	OFF state
Control Terminal Input Voltage	V _{rmt}	3.5	5	10	V	ON state
		-0.5	0	0.4	V	OFF state
Control Terminal Input Current	I _{rmt}	-	0.5	1.0	mA	V _{rmt} = 5V
		-	-	-0.3	μA	V _{rmt} = 0V

3.3.3 OUTPUT CHARACTERISTICS

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	REMARKS
No Load Output Voltage	V _s	1400	-	-	V _{rms}	
Tube Current	I _L	2.7	5	6.6	mA _{rms}	
Working Frequency	f	35	45	55	kHz	

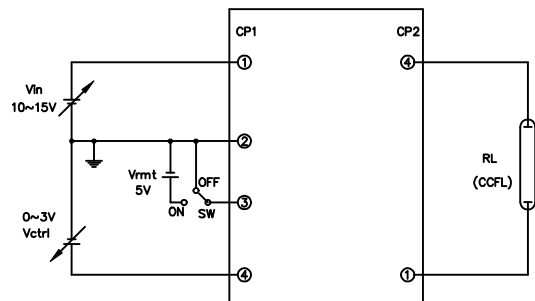
3.3.4 MEASUREMENT



3.3.5 MEASURE INSTRUMENTS

- (A) DIGITAL MULTIMETER
HP 3478A or equivalent
- (V) DIGITAL MULTIMETER
HP 3478A or equivalent
- (A) TRUE RMS MULTIMETER
FLUKE 8060A or equivalent
- (V) TRUE RMS VOLTMETER
HP 3400A or equivalent
- (F) TRUE RMS MULTIMETER
FLUKE 8060A or equivalent

3.3.6 APPLICATION EXAMPLES



3.3.7 PIN ASSIGNMENTS

INPUT (CP1) CONNECTOR :
 MOLEX 53261-0590

NO.	SIGNAL
1	Vin
2	Gnd
3	Vrms
4	Vctrl
5	NC

OUTPUT (CP2) CONNECTOR :
 MITSUMI : M60-04-30-134P

NO.	SIGNAL
1	RTN
2	NC
3	NC
4	HV

4.OPTICAL CHARACTERISTICS

4-1.Optical Char. of Normal Temp. Mode

AT Vop

ITEM		Cr(Contrast Ratio)						θ (Viewing Angle)		ϕ (Viewing Angle)	
		0 τ		25 τ		50 τ		25 τ		25 τ	
		MIN.	TYP.	MIN.	TYP.	MIN.	TYP.	MIN.	TYP.	MIN.	TYP.
T	M	-	28	-	11	-	4	-	84	-	50
note		NOTE 6						NOTE 5			

note:

T: TRANSMISSIVE
M: COLOR, 6 O'CLOCK

AT $\phi=0^\circ$ $\theta=0^\circ$

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	NOTE
Response Time (rise)	Tr	0 τ	-	1200	1800	ms	NOTE 2
		25 τ	-	220	330		
		50 τ	-	120	180		
Response Time (fall)	Tf	0 τ	-	600	900	ms	NOTE 2
		25 τ	-	340	510		
		50 τ	-	160	240		

4-2. Color of CIE Coordinate

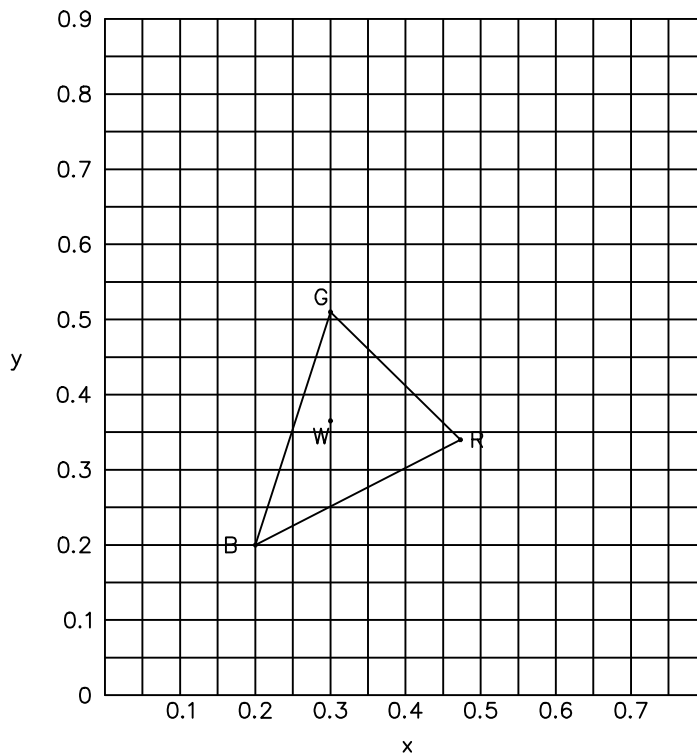
T_a = 25°C

ITEM		SYMBOL	CONDITION	VALUE	NOTE
Color of CIE Coordinate	Red	X	$\phi=0^\circ, \theta=0^\circ$	0.476	Note*
		y		0.346	
	Green	X	$\phi=0^\circ, \theta=0^\circ$	0.296	
		y		0.519	
	Blue	X	$\phi=0^\circ, \theta=0^\circ$	0.202	
		y		0.208	
	White	X	$\phi=0^\circ, \theta=0^\circ$	0.307	
		y		0.360	

Note* CIE chromaticity diagram shown on Fig.1

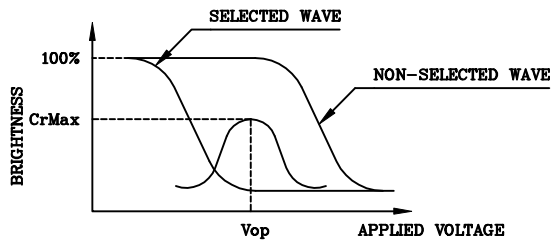
Tolerance : ± 0.05

Fig.1

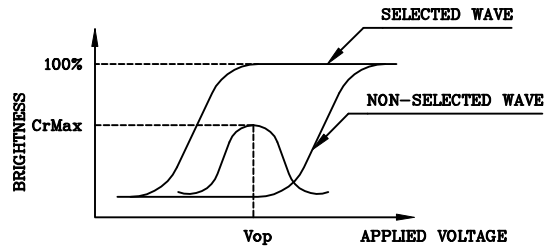


(NOTE 1)

Definition of Operation Voltage(Vop)



(positive type)



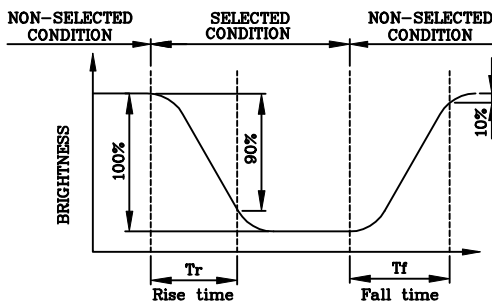
(negative type)

*Conditions

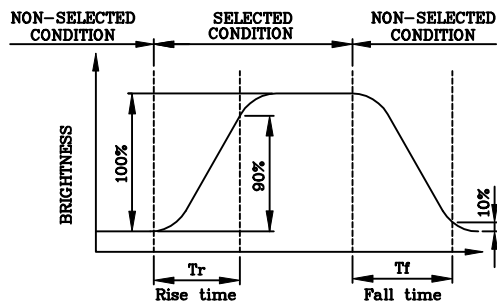
Viewing Angle : 0
Frame Frequency : 70Hz
Applied Waveform : 1/N duty, 1/a bias

(NOTE 2)

Definition of Response Time(Tr,Tf)



(positive type)



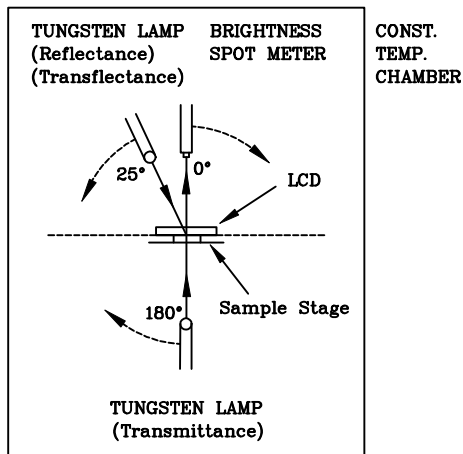
(negative type)

*Conditions

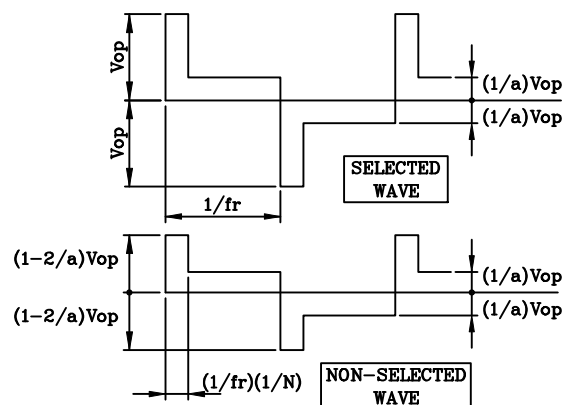
Operating Voltage : Vop
Viewing Angle (θ,φ) : (0,0)
Frame Frequency : 70Hz
Applied Waveform : 1/N duty, 1/a bias

(NOTE 3)

Description of Measuring Equipment and Driving Waveforms

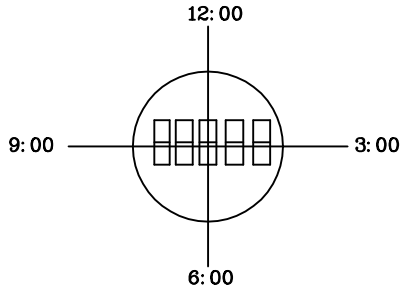


Multiplex Driving (1/N duty, 1/a bias)



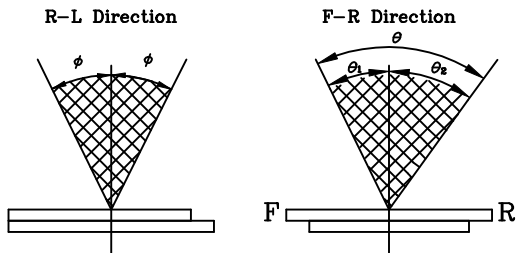
(NOTE 4)

Definition of Viewing Direction



(NOTE 5)

Definition of Viewing Angle



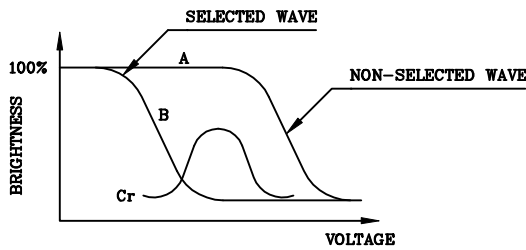
$$\theta = \theta_1 + \theta_2$$

*Conditions

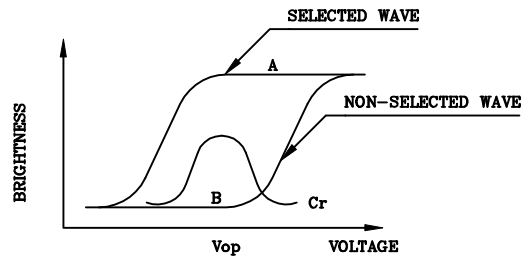
Operating Voltage : V_{op}
 Frame Frequency : 70Hz
 Applied Waveform : 1/N duty, 1/a bias
 Contrast Ratio : larger than 2

(NOTE 6)

Definition of Contrast Ratio (Cr)



(positive type)



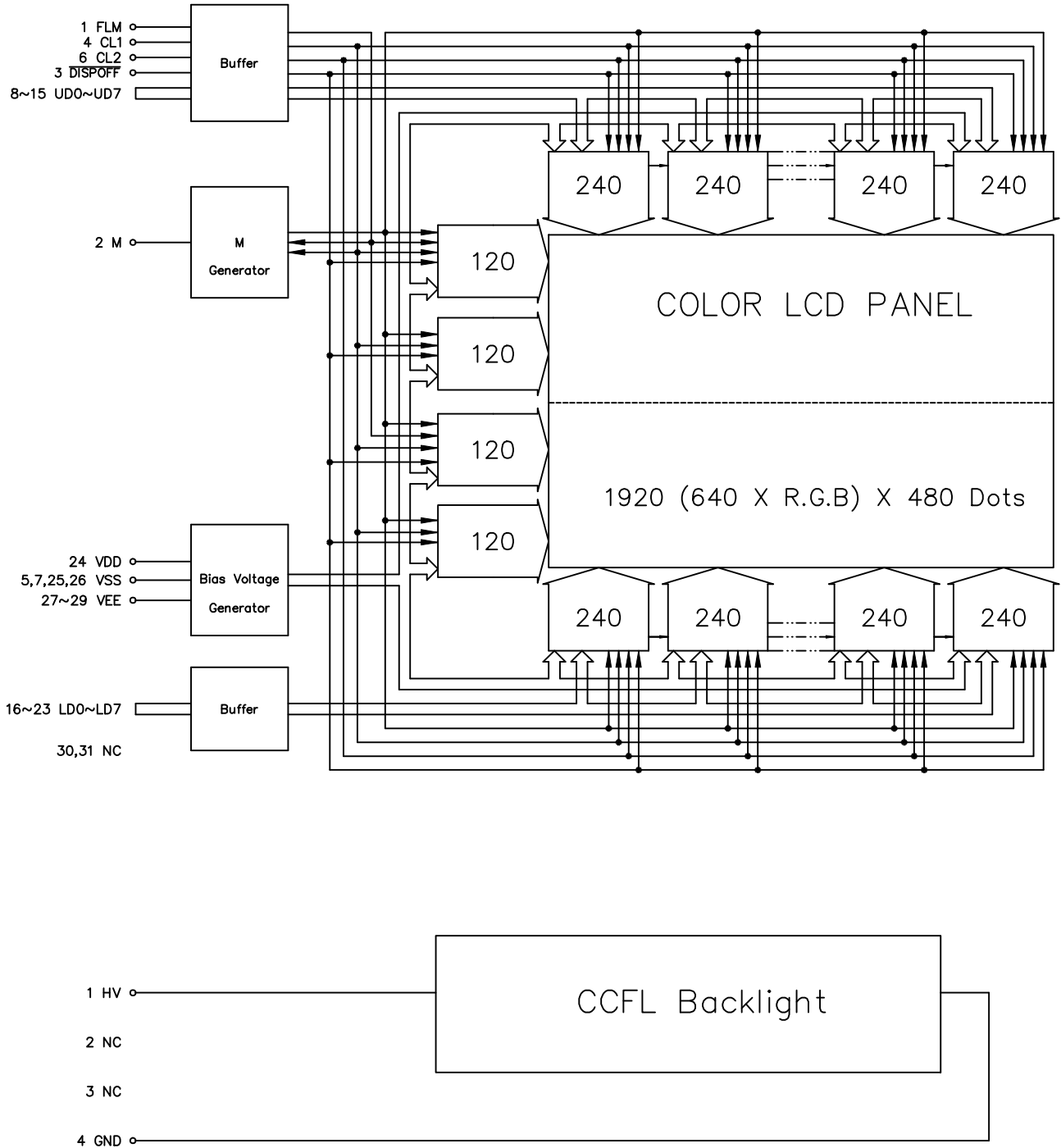
(negative type)

$$\text{Contrast Ratio : } Cr = A/B$$

*Conditions

Viewing Angle : 0
 Frame Frequency : 70Hz
 Applied Waveform : 1/N duty, 1/a bias

5. BLOCK DIAGRAM



6. INTERFACE PIN CONNECTION

USED LCD CONNECTOR :

CN1 : DF9-31P-1V (HIROSE)

MATING LCD CONNECTOR : DF9-31S-1V (HIROSE)

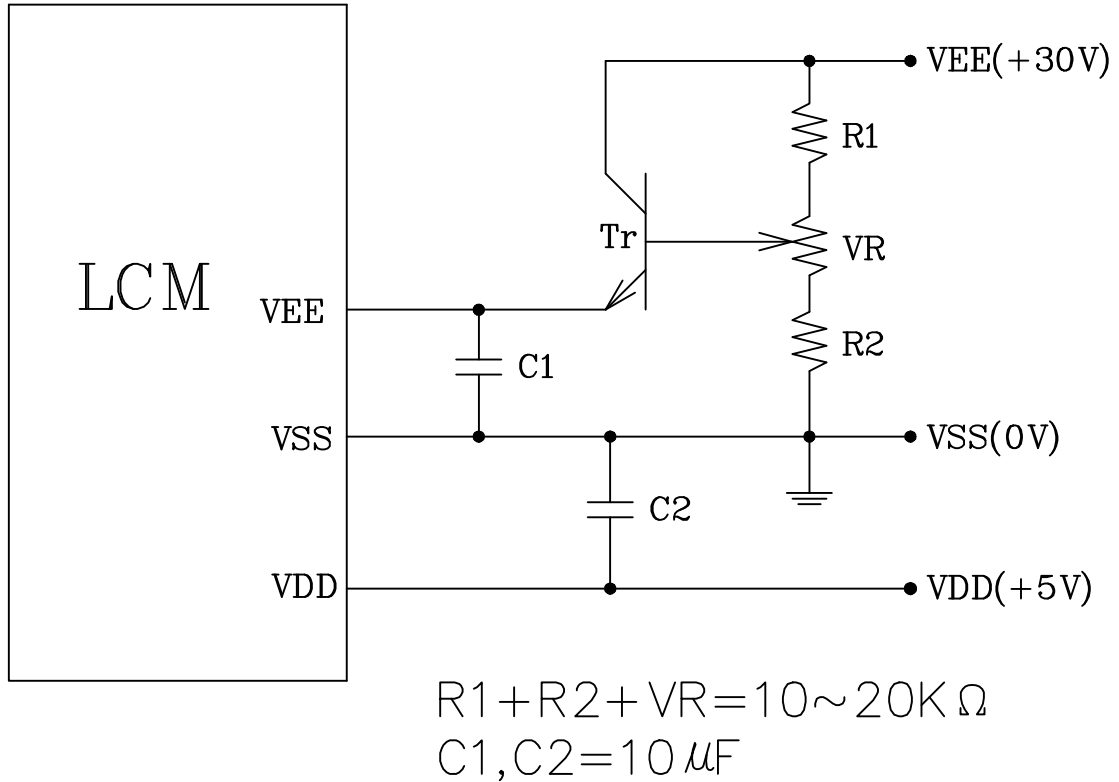
INTERFACE	PIN NO.	SYMBOL	FUNCTION	
LCM	CN1	1	FLM First Line Marker	
		2	M Alternate Signal for LCD Drive	
		3	DISPOFF Display Off ("H"=ON,"L"=OFF)	
		4	CL1 Data Latch Pulse	
		5	VSS Signal Ground (GND)	
		6	CL2 Data Shift Pulse	
		7	VSS Signal Ground (GND)	
		8	UD0	Display Upper Data
		9	UD1	
		10	UD2	
		11	UD3	
		12	UD4	
		13	UD5	
		14	UD6	
		15	UD7	Display Lower Data
		16	LD0	
		17	LD1	
		18	LD2	
		19	LD3	
		20	LD4	
		21	LD5	
		22	LD6	Power Supply for Logic
		23	LD7	
		24	VDD	
		25	VSS Signal Ground (GND)	
		26	VSS Signal Ground (GND)	
		27	VEE Power Supply for LCD (+V)	
		28	VEE Power Supply for LCD (+V)	
		29	VEE Power Supply for LCD (+V)	
		30	NC No Connection	No Connection
		31	NC	

Used CCFT Connector : MITSUMI/M63M83-04

Mating CCFT Connector : MITSUMI/M60-04-30-134P or M60-04-30-114P or M61M73-74

INTERFACE	PIN NO.	SYMBOL	FUNCTION
CCFT	1	HV	High Voltage Line (Inverter)
	2	N.C	No Connection
	3	N.C	No Connection
	4	GND	Ground Line (Inverter)

7. POWER SUPPLY

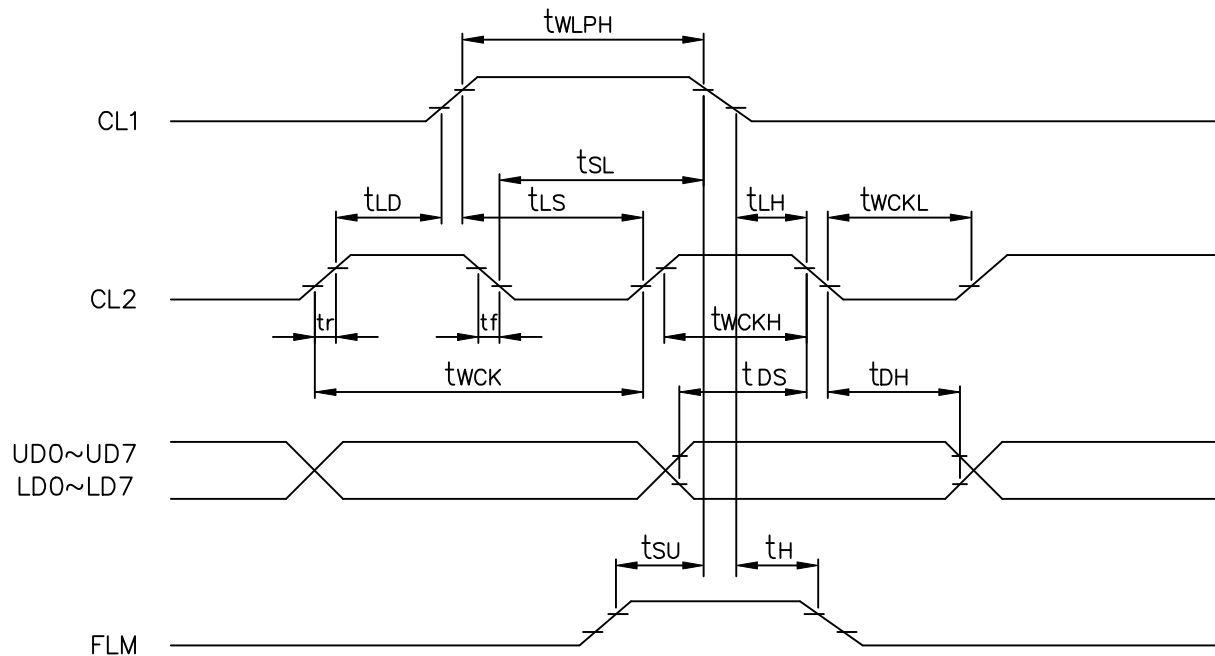


8. TIMING CHARACTERISTICS

8-1. INTERFACE TIMING

VDD=5.0V ± 10%

Parameter	SYMBOL	MIN.	MAX.	UNIT
CLOCK PULSE CYCLE TIME	t_{wck}	50	-	ns
CLOCK PULSE HIGH LEVEL WIDTH	t_{wckH}	15	-	ns
CLOCK PULSE LOW LEVEL WIDTH	t_{wckL}	15	-	ns
LATCH PULSE HIGH LEVEL WIDTH	t_{wLPH}	20	-	ns
CL2→CL1 RISE TIME	t_{LD}	0	-	ns
CL2→CL1 FALL TIME	t_{SL}	25	-	ns
CL1→CL2 RISE TIME	t_{LS}	25	-	ns
CL1→CL2 FALL TIME	t_{LH}	25	-	ns
CLOCK PULSE RISE/FALL TIME	t_r, t_f	-	30	ns
DATA SETUP TIME	t_{DS}	10	-	ns
DATA HOLD TIME	t_{DH}	10	-	ns
FLM SETUP TIME	t_{SU}	100	-	ns
FLM HOLD TIME	t_H	30	-	ns

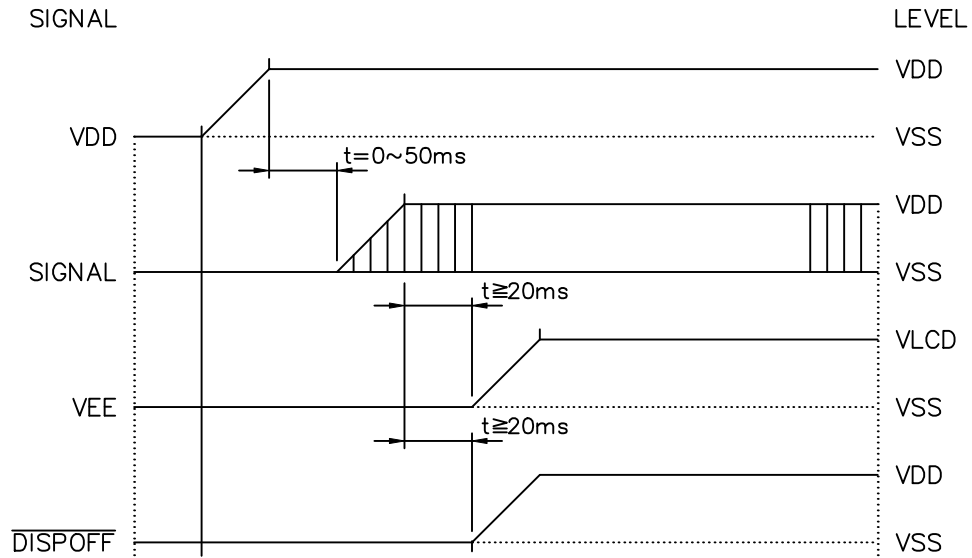


8-2. TIMING CHART

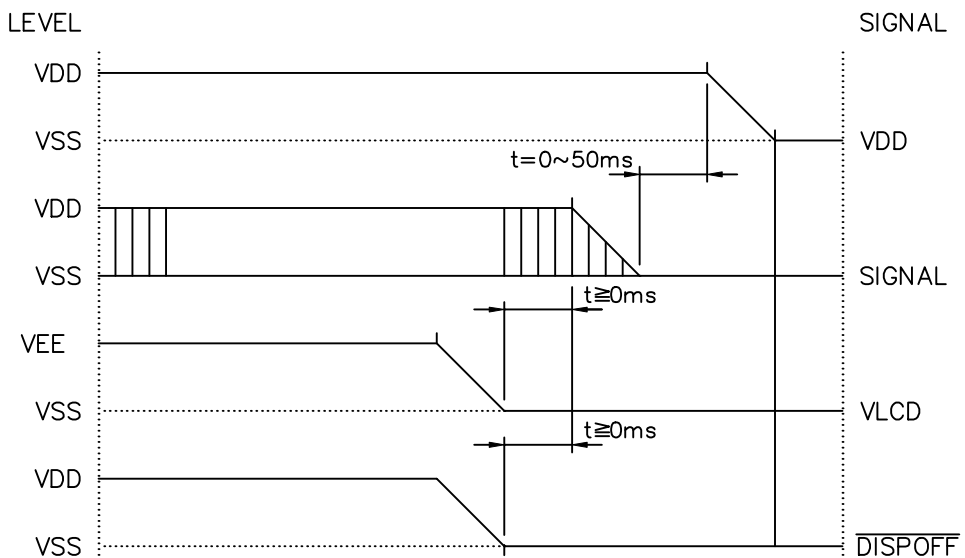


8-3. POWER ON/OFF TIMING

ON SEQUENCE



OFF SEQUENCE



Please maintain the above sequence when turning on and off the power supply of the module. If $\overline{\text{DISPOFF}}$ is supplied to the module while internal alternate signal for LCD driving(M) is unstable, DC component will be supplied to the LCD panel. This may cause damage to the LCD module.

8-4.DISPLAY PATTERN

	1	2	3	4	5	6	7	8	.....	.....	.....	1913	1914	1915	1916	1917	1918	1919	1920
1	R0 UD7	G0 UD6	B0 UD5	R1 UD4	G1 UD3	B1 UD2	R2 UD1	G2 UD0				G637 UD7	B637 UD6	R638 UD5	G638 UD4	B638 UD3	R639 UD2	G639 UD1	B639 UD0
2	R0 UD7	G0 UD6	B0 UD5	R1 UD4	G1 UD3	B1 UD2	R2 UD1	G2 UD0				G637 UD7	B637 UD6	R638 UD5	G638 UD4	B638 UD3	R639 UD2	G639 UD1	B639 UD0
.....																			
239	R0 UD7	G0 UD6	B0 UD5	R1 UD4	G1 UD3	B1 UD2	R2 UD1	G2 UD0				G637 UD7	B637 UD6	R638 UD5	G638 UD4	B638 UD3	R639 UD2	G639 UD1	B639 UD0
240	R0 UD7	G0 UD6	B0 UD5	R1 UD4	G1 UD3	B1 UD2	R2 UD1	G2 UD0				G637 UD7	B637 UD6	R638 UD5	G638 UD4	B638 UD3	R639 UD2	G639 UD1	B639 UD0
241	R0 LD7	G0 LD6	B0 LD5	R1 LD4	G1 LD3	B1 LD2	R2 LD1	G2 LD0				G637 LD7	B637 LD6	R638 LD5	G638 LD4	B638 LD3	R639 LD2	G639 LD1	B639 LD0
242	R0 LD7	G0 LD6	B0 LD5	R1 LD4	G1 LD3	B1 LD2	R2 LD1	G2 LD0				G637 LD7	B637 LD6	R638 LD5	G638 LD4	B638 LD3	R639 LD2	G639 LD1	B639 LD0
.....																			
479	R0 LD7	G0 LD6	B0 LD5	R1 LD4	G1 LD3	B1 LD2	R2 LD1	G2 LD0				G637 LD7	B637 LD6	R638 LD5	G638 LD4	B638 LD3	R639 LD2	G639 LD1	B639 LD0
480	R0 LD7	G0 LD6	B0 LD5	R1 LD4	G1 LD3	B1 LD2	R2 LD1	G2 LD0				G637 LD7	B637 LD6	R638 LD5	G638 LD4	B638 LD3	R639 LD2	G639 LD1	B639 LD0

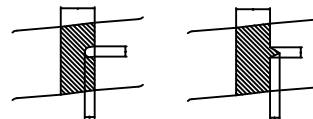
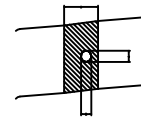
9. RELIABILITY TEST

NO	ITEM	CONDITION			STANDARD	NOTE
1	High Temp. Storage	70°C	120HR		Appearance without defect	
2	Low Temp. Storage	-20°C	120HR		Appearance without defect	
3	High Temp. & High Humidity Storage	40°C 90%RH	120HR		Appearance without defect	
4	Thermal Shock	-20°C, 30min → 25°C, 5min → 60°C, 30min → 25°C, 5min (= 1 cycle)			Appearance without defect	5 cycles

10.LCD PRODUCT QUALITY STANDARD

(1) DISPLAY APPEARANCE

NO	ITEM	C R I T E R I A													
1.	INCLUSIONS (BLACK SPOT , WHITE SPOT , DUST)	(1) ROUND TYPE													
		<table border="1"> <thead> <tr> <th colspan="2">DIAMETER mm (a*)</th> <th>NO. OF DEFECT*</th> </tr> </thead> <tbody> <tr> <td></td> <td>$a \leq 0.20$</td> <td>NEGLECT</td> </tr> <tr> <td>0.20 < a</td> <td>≤ 0.35</td> <td>5 MAX</td> </tr> <tr> <td>0.35 < a</td> <td></td> <td>NONE</td> </tr> </tbody> </table>	DIAMETER mm (a*)		NO. OF DEFECT*		$a \leq 0.20$	NEGLECT	0.20 < a	≤ 0.35	5 MAX	0.35 < a		NONE	
DIAMETER mm (a*)		NO. OF DEFECT*													
	$a \leq 0.20$	NEGLECT													
0.20 < a	≤ 0.35	5 MAX													
0.35 < a		NONE													
		(2) LINEAR TYPE													
		<table border="1"> <thead> <tr> <th>LENGTH mm(L)</th> <th>WIDTH mm(W)</th> <th>NO. OF DEFECT</th> </tr> </thead> <tbody> <tr> <td>N A</td> <td>$W \leq 0.03$</td> <td>NEGLECT</td> </tr> <tr> <td>$L \leq 3$</td> <td>$0.03 < W \leq 0.08$</td> <td>6</td> </tr> <tr> <td>$3 < L$</td> <td>$0.08 < W$</td> <td>NONE</td> </tr> </tbody> </table>	LENGTH mm(L)	WIDTH mm(W)	NO. OF DEFECT	N A	$W \leq 0.03$	NEGLECT	$L \leq 3$	$0.03 < W \leq 0.08$	6	$3 < L$	$0.08 < W$	NONE	
LENGTH mm(L)	WIDTH mm(W)	NO. OF DEFECT													
N A	$W \leq 0.03$	NEGLECT													
$L \leq 3$	$0.03 < W \leq 0.08$	6													
$3 < L$	$0.08 < W$	NONE													
2.	SCRATCH	1.SCRATCH ON PROTECTIVE FILM IS PERMITTED . 2.SCRATCH ON POLARIZER SHALL BE AS FOLLOW: (1) ROUND TYPE													
		<table border="1"> <thead> <tr> <th colspan="2">DIAMETER mm (a*)</th> <th>NO. OF DEFECT*</th> </tr> </thead> <tbody> <tr> <td></td> <td>$a \leq 0.15$</td> <td>NEGLECT</td> </tr> <tr> <td>0.15 < a</td> <td>≤ 0.20</td> <td>2 MAX</td> </tr> <tr> <td>0.20 < a</td> <td></td> <td>NONE</td> </tr> </tbody> </table>	DIAMETER mm (a*)		NO. OF DEFECT*		$a \leq 0.15$	NEGLECT	0.15 < a	≤ 0.20	2 MAX	0.20 < a		NONE	
DIAMETER mm (a*)		NO. OF DEFECT*													
	$a \leq 0.15$	NEGLECT													
0.15 < a	≤ 0.20	2 MAX													
0.20 < a		NONE													
		(2) LINEAR TYPE BE JUDGED BY 1.-(2) LINEAR TYPE													
3.	DENT	DIAMETER < 1.5mm													
4.	BUBBLE	NOT EXCEEDING 0.5mm AVERAGE DIAMETER IS ACCEPTABLE BETWEEN GLASS AND POLARIZING FILM.													
5.	PIN HOLE	(a+b)/2 \leq 0.15 mm MAXIMUM NUMBER:IGNORED													
		0.15 < (a+b)/2 \leq 0.20 MAXIMUM NUMBER:10													
6.	DOT DEFECT	(a+b)/2 \leq 0.20 mm MAXIMUM NUMBER:IGNORED													
		0.20 < (a+b)/2 \leq 0.30 MAXIMUM NUMBER:5 x = WIDTH													
7.	CONTRAST IRREGULARITY (SPOT)	DIAMETER SPEC.													
		<table border="1"> <thead> <tr> <th colspan="2">NO. OF DEFECT*</th> </tr> </thead> <tbody> <tr> <td>$a \leq 0.50$ mm</td> <td>NEGLECT</td> </tr> <tr> <td>$0.50 < a \leq 0.75$</td> <td>5</td> </tr> <tr> <td>$0.75 < a \leq 1.00$</td> <td>3</td> </tr> <tr> <td>$1.00 < a$</td> <td>NONE</td> </tr> </tbody> </table>	NO. OF DEFECT*		$a \leq 0.50$ mm	NEGLECT	$0.50 < a \leq 0.75$	5	$0.75 < a \leq 1.00$	3	$1.00 < a$	NONE			
NO. OF DEFECT*															
$a \leq 0.50$ mm	NEGLECT														
$0.50 < a \leq 0.75$	5														
$0.75 < a \leq 1.00$	3														
$1.00 < a$	NONE														
8.	DOT WIDTH	DESIGN WIDTH \pm 15%													
9.	COLOR TONE AND UNIFORMITY	OBVIOUS UNEVEN COLOR IS NOT PERMITTED													



(2) NOTE:

- SAFETY

- 1.If the LCD panel breaks, be careful not to allow the liquid crystal to touch your skin.
- 2.If the liquid crystal touches your skin or clothes, please wash it off immediately by using soap and water.

- HANDLING

- 1.Prevent all contact with static electricity, which can damage the CMOS ICs. The module is packaged in a static-shielding bag to prevent damage during shipment, warehousing and removal from the shipping carton.
- 2.Do not remove the panel or frame from the module.
- 3.The polarizing plate on the front surface of the display is very fragile and easily scratched. The module is shipped with a protective liner which must be removed from the polarizing plate prior to assembly.
- 4.Do not wipe the polarizing plate with a dry cloth, as it may easily scratch the surface of polarizing plate.
- 5.Do not use ketonics solvent or aromatic solvent on the polarizing plate. Use a soft cloth soaked with plastic-lens cleaning solution.

- STORAGE

- 1.Store the panel or module in a dark place where the temperature is $25^{\circ}\text{C}\pm 5^{\circ}\text{C}$ and the humidity is below 65% RH.
- 2.Do not place the module near organics solvents or corrosive gases.
- 3.Do not crush, shake, or jolt the module.

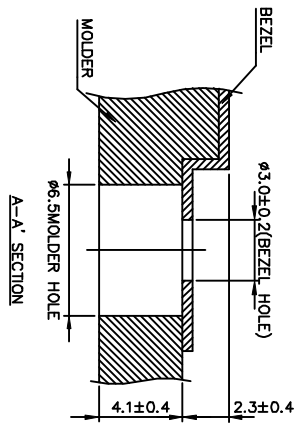
- TERMS OF WARRANTY

- 1.Acceptance inspection period
The inspection period is within one month after the arrival of the contracted goods at the buyer's factory site.
- 2.Applicable warranty period
The warranty period is within twelve months from the date of invoice under normal usage and storage conditions.

- TYPICAL OPERATING LIFETIME OF BACKLIGHT

- LED : 50,000HR
EL : 5,000HR
CCFT : 10,000HR

REV/DATE	R0/ 01.11.99'					APP	CHK	BY
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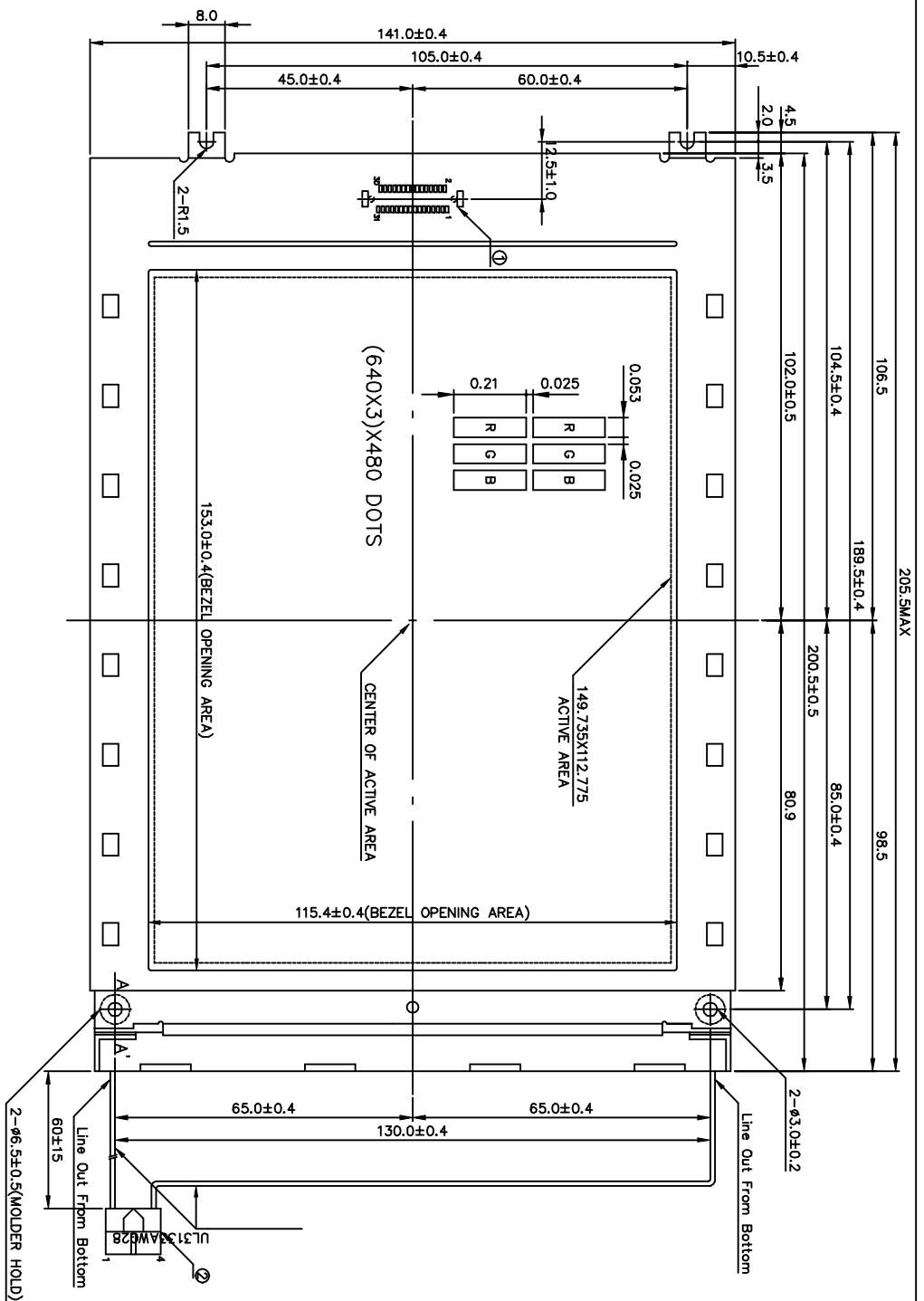
Note :

① used LCD connector : DF9-31P-1V(HIROSE)
 correspondable LCD connector : DF9-31S-1V(HIROSE)

② used CCFT connector : M63M83-04 (MITSUMI)
 correspondable CCFT connector : M60-04-30-114P (MITSUMI)
 M61M73-04 (MITSUMI)

Pin No.	Symbol	Signal Level	Function
1	FLM	H/L	First Line Marker
2	M	H/L	Alternate Signal for LCD Drive
3	DISP	H/L	Display Off ("H"=ON, "L"=OFF)
4	CL1	H/L	Data Latch Pulse
5	VSS	-	Signal Ground (GND)
6	CL2	H/L	Data Shift Pulse
7	VSS	-	Signal Ground (GND)
8	UD0	H/L	Display Upper Data
9	UD1	H/L	
10	UD2	H/L	
11	UD3	H/L	Display Lower Data
12	UD4	H/L	
13	UD5	H/L	
14	UD6	H/L	Display Lower Data
15	UD7	H/L	
16	UD0	H/L	
17	LD1	H/L	Display Lower Data
18	LD2	H/L	
19	LD3	H/L	
20	LD4	H/L	Display Lower Data
21	LD5	H/L	
22	LD6	H/L	
23	LD7	H/L	Display Lower Data
24	VDD	-	
25	VSS	-	
26	VSS	-	Signal Ground (GND)
27	VEE	-	Signal Ground (GND)
28	VEE	-	Power Supply for LCD (+V)
29	VEE	-	Power Supply for LCD (+V)
30	NC	-	No Connection
31	NC	-	No Connection

Pin No.	Symbol	Signal Level	Function
1	HV	-	High Voltage Line (Inverter)
2	NC	-	No Connection
3	NC	-	No Connection
4	GND	-	Ground Line (Inverter)



產品編號	LCBLDT163M	南亞塑膠工業股份有限公司
NAME		NAN YA PLASTICS CORPORATION
DATE		
APPROVE		製品圖
CHECK		DWG-NO
DESIGN		CB-1163M
DRAWN	MAY PING	Rev.A
	87.09.01	UNIT : mm
		SCALE : 0.68/1