

LCD-Module SPECIFICATION

Approved by Customer		

AXCK320240A

APPROVED BY	CHECKED BY	ORGANIZED BY
	Jeffrey	Tina

RECORD OF REVISION

Revision Date	Page	Contents
2003/11/13	-	New Release
2003/12/31	3	Add LCD Module MTBF

1 FEATURES

- (1) Display format : 320(RGB) × 240 dot-matrix
- (2) Construction : LCD,White CCFL back-light.
- (3) Display type : CSTN , Color Transmissive type ,6 o'clock view.
- (4) Common and Segment Driver :
- (5) Besides +5V for logic circuit, -20V is needed for LCD driving.
- (6) Normal / Extended temperature type.
- (7) MTBF:LCD Module 25,000 HR

2 NUMBERING SYSTEM

AX__ - 320240A_____ - _
1 2 3 4 5 6 7

No	Code Value	Description	Remark
2	T	TN	LCD type
	H	HTN	
	S	STN yellow-green	
	G	STN Gray	
	B	STN Blue(Negative)	
	F	FSTN	
	C	STN-color	
	A	A-TFT	
	L	Ltps-TFT	
	O	OLED	
3	C	Character-COB	Display type
	D	Character-TAB	
	E	Character-COG	
	F	Character-COF	
	G	Graphic-COB	
	H	Graphic-TAB	
	K	Graphic-COG	
	L	Graphic-COF	
3	A	Reflective type / 6:00 view	Polarizer / Viewing Angle
	B	Reflective type / 12:00 view	
	C	Transflective type / 6:00 view	
	D	Transflective type / 12:00 view	
	E	Transmissive type / 6:00 view	
	F	Transmissive type / 12:00 view	

	G	Negative type / 6:00 view	
	H	Negative type / 12:00 view	
	I	Negative type / 3:00 view	
4	N	None backlight	Backlight type
	L	LED array	
	Q	LED edge	
	E	EL	
	C	CCFL	
5	None	Without backlight	Backlight color
	A	Amber	
	B	Blue	
	G	Green	
	L	Yellow	
	O	Orange	
	R	Red	
	Y	Yellow-green	
	W	White	
6	None	Normal temperature type	LCM temperature type
	H	Extended temperature type	
7	00~99		Version code

3 MECHANICAL DATA

Parameter	Stand Value	Unit
Dot size	0.09 (W) × 0.33 (H)	mm
Dot pitch	0.12 (W) × 0.36 (H)	mm
Viewing area	118.18 (W) × 89.38 (H)	mm
Module size	154.6 (W) × 114.8(H) × 8.5 max (T)	mm

4 ABSOLUTE MAXIMUM RATINGS

Parameter		Symbol	Min	Max	Unit
Logic Circuit Supply Voltage		VDD-VSS	-0.3	6.5	V
Power Supply for LCD		VEE-VSS	0	30.0	V
Input Voltage		VI	-0.3	VDD	V
Normal temp. type	Operating Temp.	TOP	0	50	°C
	Storage Temp.	TSTG	-20	70	°C
Extended temp. type	Operating Temp.	TOP	-20	70	°C
	Storage Temp.	TSTG	-30	80	°C

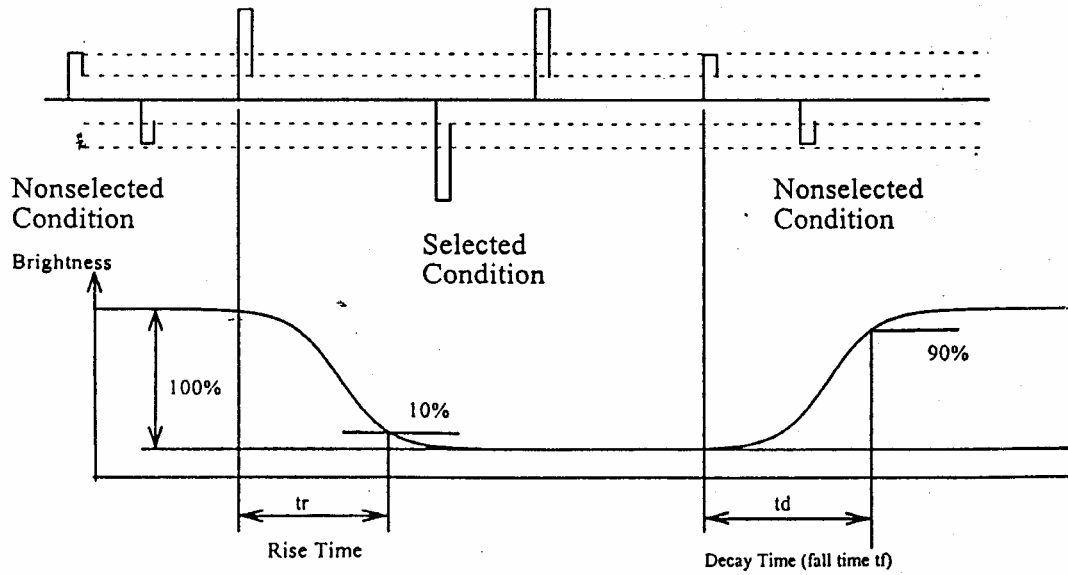
5 ELECTRO-OPTICAL CHARACTERISTICS

Parameter	Symbol	Condition	Min	Typ	Max	Unit	Note
----- Electronic Characteristics -----							
Logic Circuit Supply Voltage	VDD-VSS	--	2.7	5.0	5.5	V	
LCD Driving Voltage	VDD-VSS	0 °C	26.3	26.8	27.3	V	
		25 °C	25.7	26.2	26.7		
		50 °C	25.0	25.5	26.0		
Input Voltage	VIH	--	0.8 VDD	--	0.2VDD	V	
	VIL	--	VSS	--	0.3 VDD	V	
Logic Supply Current	IDD	VDD = 5V	--	1.0	2.0	mA	
	IVLCD	VLCD-VSS=19.4V	--	3.5	5.3		
Luminance	L	25 °C	120	180	--	Cd / m ²	
----- Optical Characteristics (CSTN) -----							
Contrast	CR	25°C	--	30.0	--		Note 1
Rise Time	tr	25°C	--	108	--	ms	Note 2
Fall Time	tf	25°C	--	502	--	ms	
Viewing Angle Range	θ f	25°C & CR≥2	--	40	--	Deg.	Note 3
	θ b		--	30	--		
	θ l		--	50	--		
	θ r		--	50	--		
Frame Frequency	fF	25°C	--	70	--	Hz	
Color	X	25°C	0.28	0.33	0.38		
	Y		0.29	0.34	0.39		

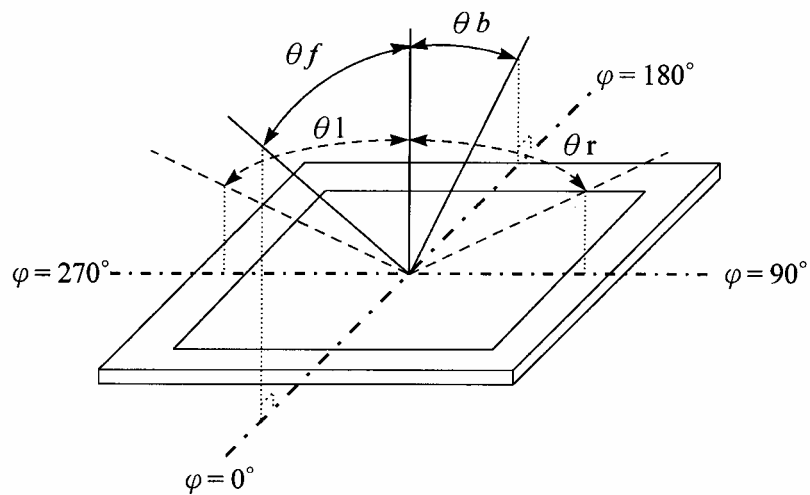
(NOTE 1) Contrast ratio :

$$CR = (\text{Brightness in OFF state}) / (\text{Brightness in ON state})$$

(NOTE 2) Response time :

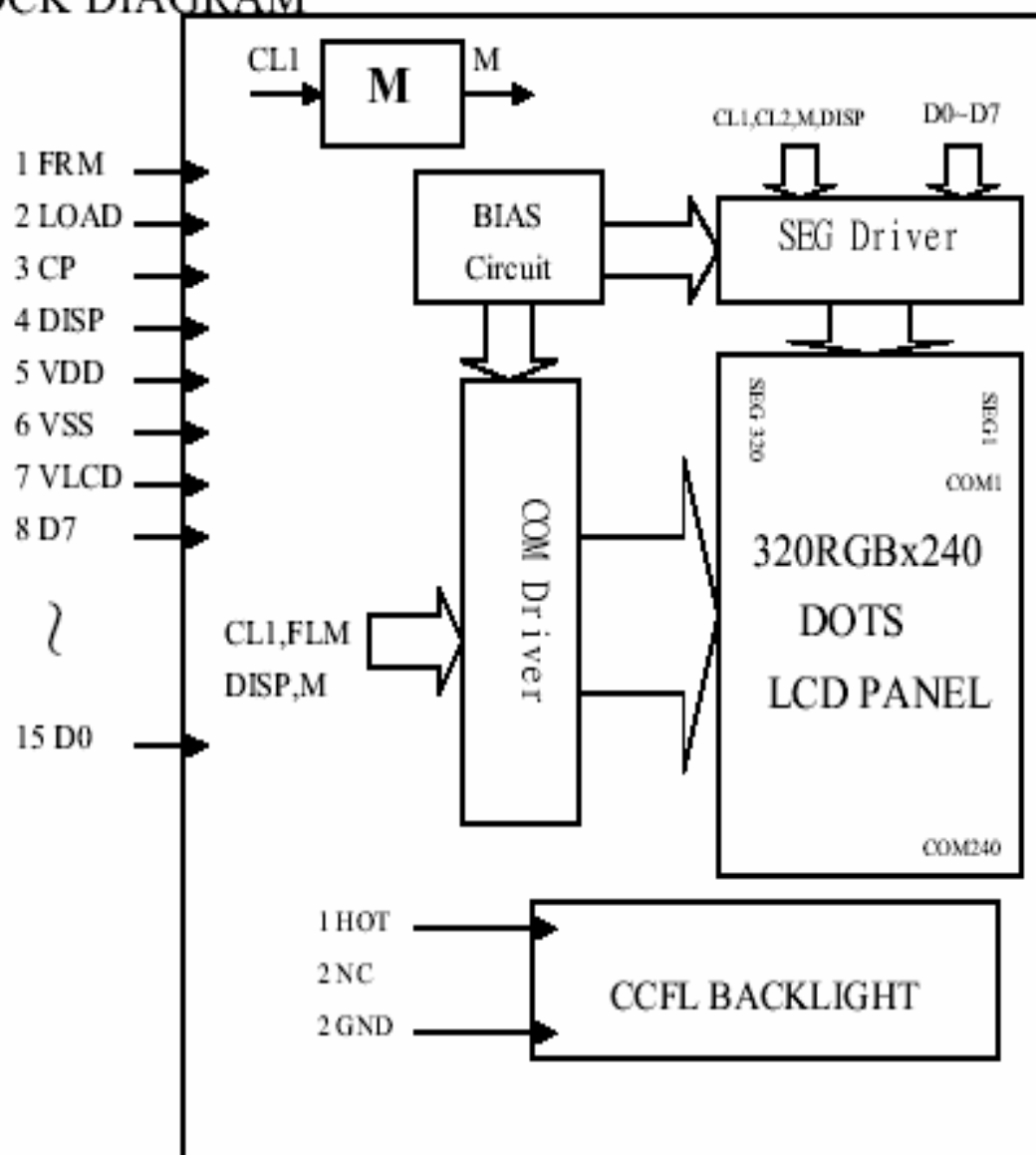


(NOTE 3) Viewing angle



6 BLOCK DIAGRAM & INTERFACE

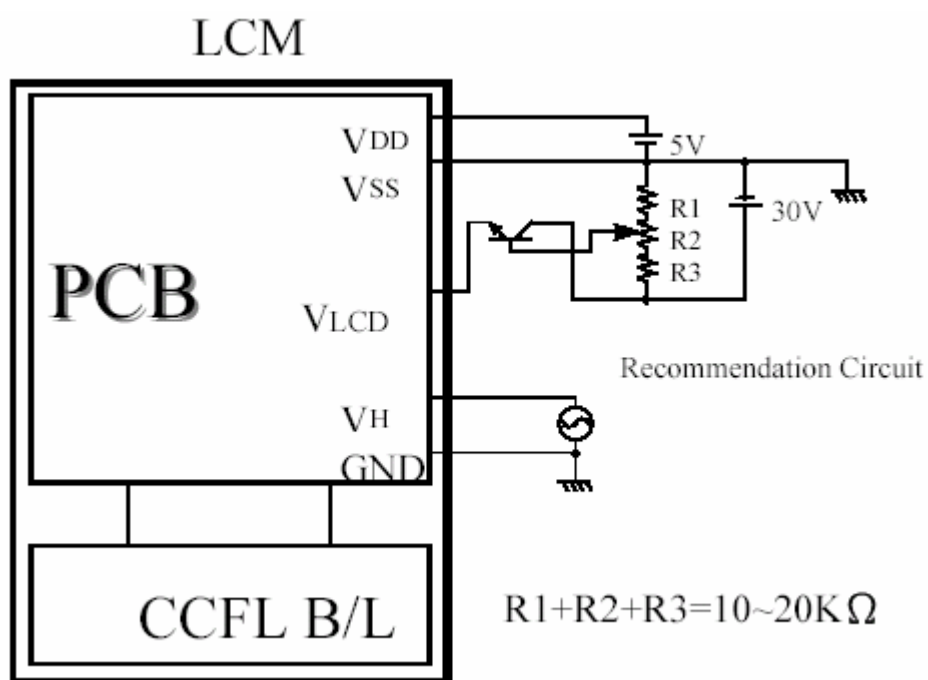
6.BLOCK DIAGRAM



Interface Pin Assignment

No.	Symbol	Level	Function
1	FLM	H/L	Scan Start-up Signal
2	CL1	H → L	Data Latch Pulse
3	CL2	H → L	Data Shift Pulse
4	DISP	H/L	H:Display On , L:Display Off
5	VDD	H/L	Power supply for logic
6	VSS	-	Power supply Ground
7	VLCD	-	Power supply for LCD
8	D7	H/L	Display data
9	D6	H/L	
10	D5	H/L	
11	D4	H/L	
12	D3	H/L	
13	D2	H/L	
14	D0	H/L	
15	D1	H/L	

7 POWER SUPPLY

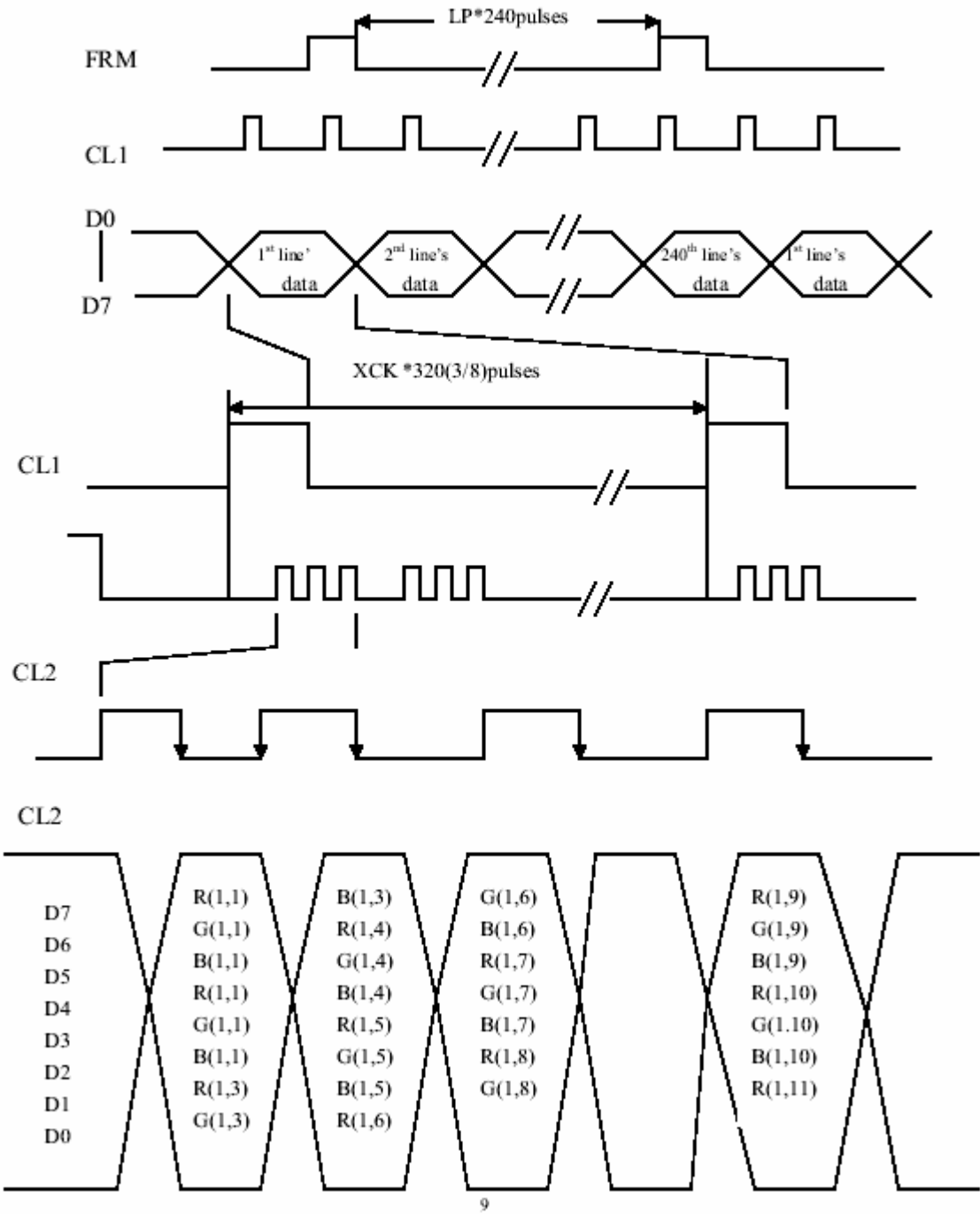


8 TIMING CHARACTERISTICS

8.1 Common & Segment interface timing:

Item	Symbol	Test Condition	Min.	Typ.	Max.	Units
Clock Cycle	tC	Fig.1	500			ns
SCP Pulse Width	tSWH,tSWL	Fig.1	240			ns
Data Set Up Time	tDSU	Fig.1 & Fig.2	240			ns
Data Hold Time	tDHD	Fig.1 & Fig.2	240			ns
SCP Rise / Fall Time	tr,tf	Fig.1 & Fig.2			50	ns
LP Rise ime	tLRP	Fig.1	240			ns
LP Fall Time	tLFP	Fig.1	240			ns
LP Pulse Width	tLW	Fig.1	240			ns
SCP To LP Delay Time	tSL	Fig.1	50			ns
LP To SCP Delay Time	tLS	Fig.1	100			ns
LP “H “ Pulse Width	tCWH	Fig.2	40			ns
LP “L “ Pulse Width	tCWL	Fig.2	170			ns

Interface timing



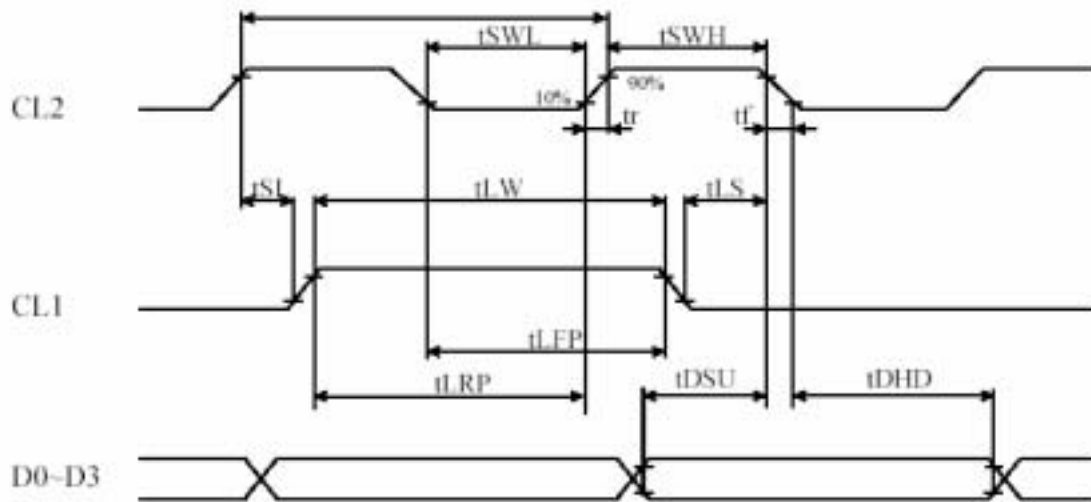


Fig 1. SEGMENT TIMING

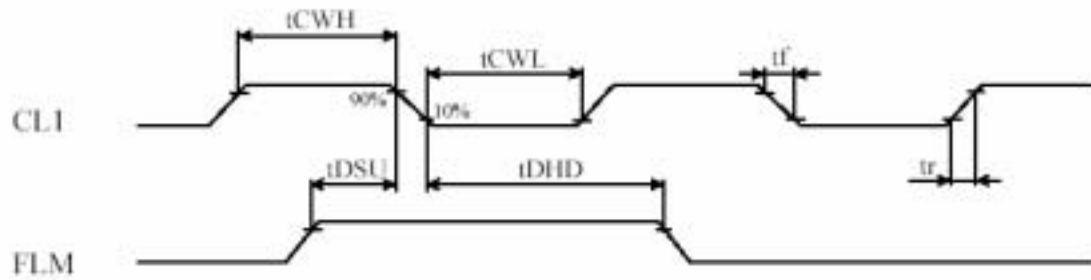
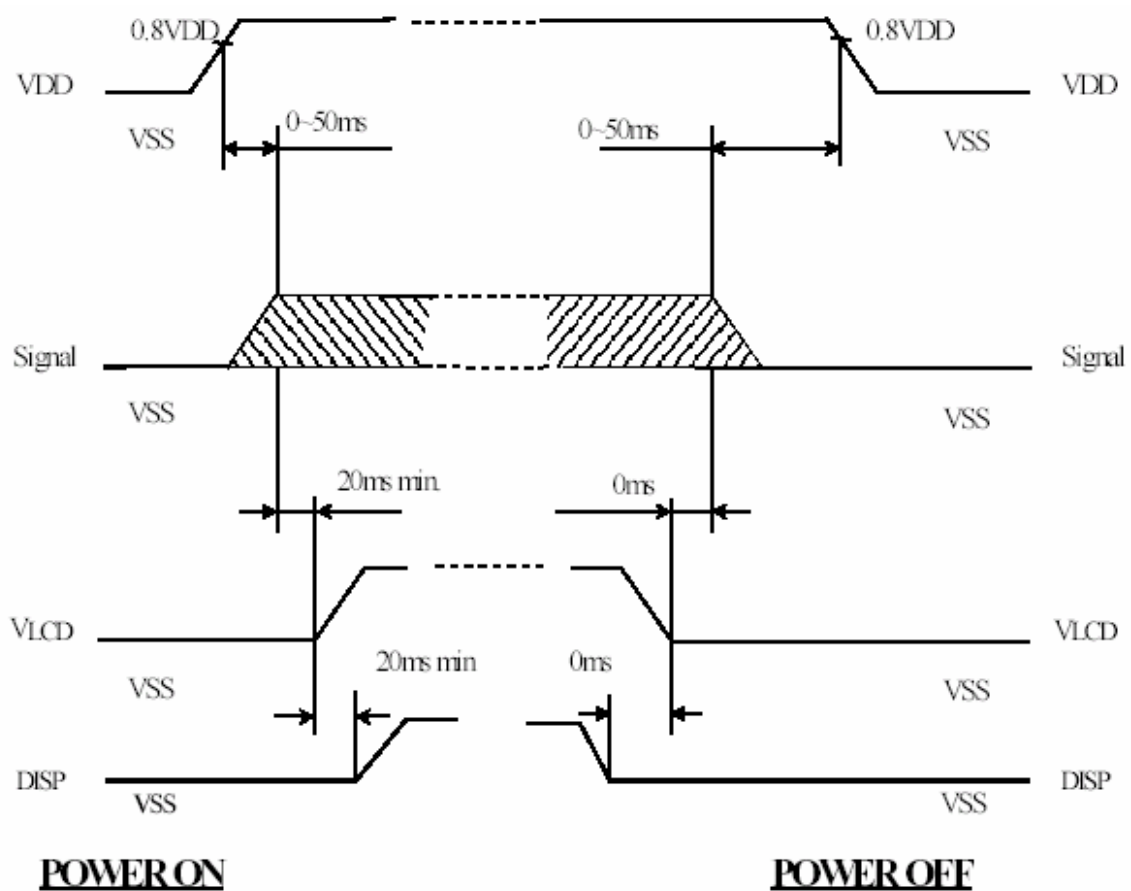


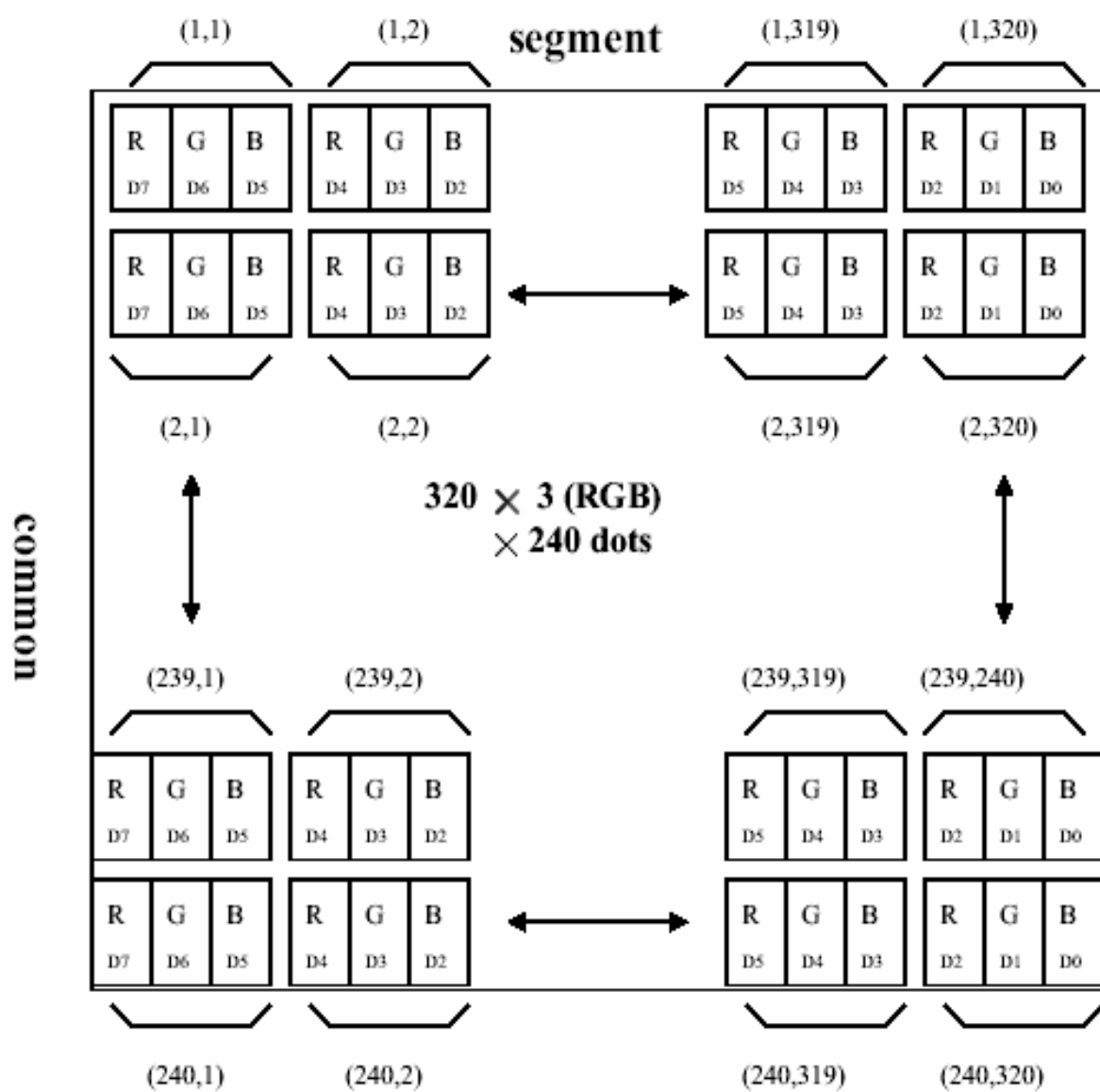
Fig 2 COMMON TIMING

8.2 POWER ON/OFF TIMING



The missing pixels may occur when the LCM is driven beyond above power interface timing sequence.

9 DISPLAY PATTERN



10 QUALITY AND RELIABILITY

10.1 TEST CONDITIONS

Tests should be conducted under the following conditions :

Ambient temperature : $25 \pm 5^{\circ}\text{C}$

Humidity : $60 \pm 25\% \text{ RH}$.

10.2 SAMPLING PLAN

Sampling method shall be in accordance with MIL-STD-105E , level II, normal single sampling plan .

10.3 ACCEPTABLE QUALITY LEVEL

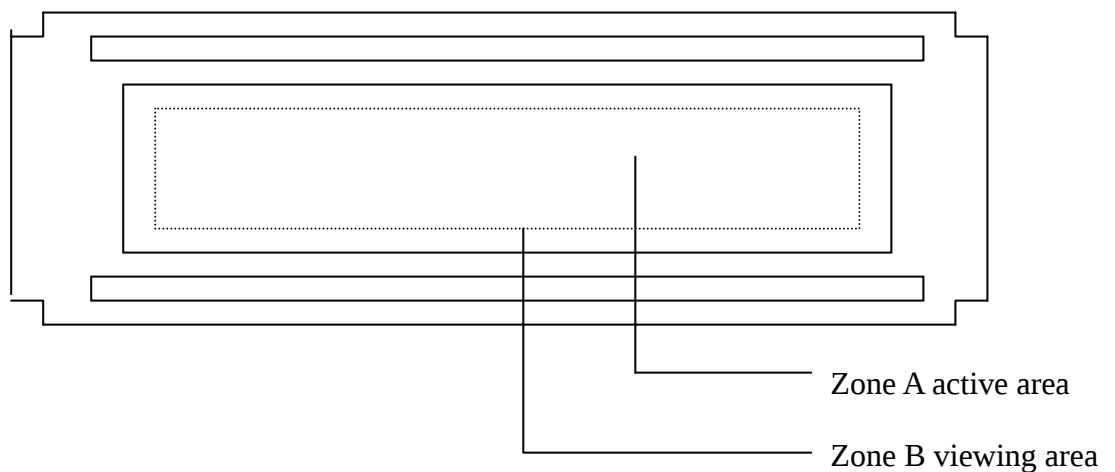
A major defect is defined as one that could cause failure to or materially reduce the usability of the unit for its intended purpose. A minor defect is one that does not materially reduce the usability of the unit for its intended purpose or is an infringement from established standards and has no significant bearing on its effective use or operation.

10.4 APPEARANCE

An appearance test should be conducted by human sight at approximately 30 cm distance from the LCD module under fluorescent light. The inspection area of LCD panel shall be within the range of following limits.

10.5 INSPECTION QUALITY CRITERIA

Item	Description of defects			Class of Defects	Acceptable level (%)	
Function	Short circuit or Pattern cut			Major	0.65	
Dimension	Deviation from drawings			Major	1.5	
Black spots	Ave . dia . D	area A	area B	Minor	2.5	
	D≤0.2	Disregard				
	0.2<D≤0.3	3	4			
	0.3<D≤0.4	2	3			
	0.4<D	0	1			
Black lines	Width W, Length L		A	B	Minor	2.5
	W≤0.03		disregard			
	0.03<W≤0.05		3	4		
	0.05<W≤0.07 , L≤3.0		1	1		
	See line criteria					
Bubbles in polarizer	Average diameter D 0.2 < D < 0.5 mm for N = 4 , D > 0.5 for N = 1			Minor	2.5	
Color uniformity	Rainbow color or newton ring.			Minor	2.5	
Glass Scratches	Obvious visible damage.			Minor	2.5	
Contrast ratio	See note 1			Minor	2.5	
Response time	See note 2			Minor	2.5	
Viewing angle	See note 3			Minor	2.5	



10.6 RELIABILITY

Test Item	Test Conditions		Note
	Normal Temp. type	Extended Temp. type	
High Temperature Operation	50±3°C , t=96 hrs	70±3°C , t=96 hrs	
Low Temperature Operation	0±3°C , t=96 hrs	-20±3°C , t=96 hrs	
High Temperature Storage	70±3°C , t=96 hrs	80±3°C , t=96 hrs	1,2
Low Temperature Storage	-20±3°C , t=96 hrs	-30±3°C , t=96 hrs	1,2
Temperature Cycle	-20°C ~ 25°C ~ 70°C 30 m in. 5 min. 30 min. (1 cycle) Total 5 cycle	-30°C ~ 25°C ~ 80°C 30 min. 5 min. 30 min. (1 cycle) Total 5 cycle	1,2
Humidity Test	40 °C, Humidity 90%, 96 hrs		1,2
Vibration Test (Packing)	Sweep frequency : 10 ~ 55 ~ 10 Hz/1min Amplitude : 0.75mm Test direction : X.Y.Z/3 axis Duration : 30min/each axis		2

Note 1 : Condensation of water is not permitted on the module.

Note 2 : The module should be inspected after 1 hour storage in normal conditions
(15-35°C , 45-65%RH).

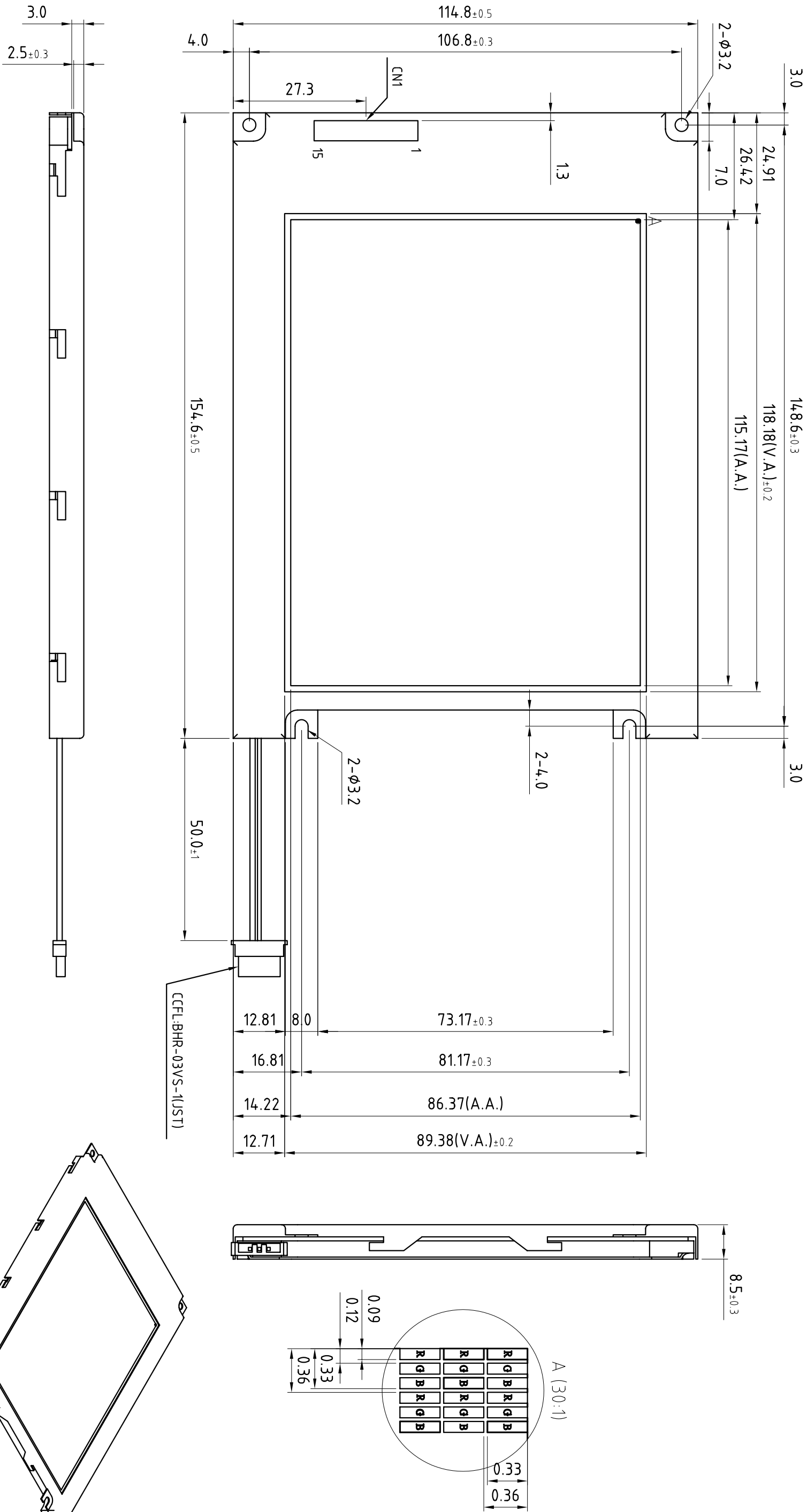
Definitions of life end point :

- Current drain should be smaller than the specific value.
- Function of the module should be maintained.
- Appearance and display quality should not have degraded noticeably.
- Contrast ratio should be greater than 50% of the initial value.

11 HANDLING PRECAUTIONS

- (1) A LCD module is a fragile item and should not be subjected to strong mechanical shocks.
- (2) Avoid applying pressure to the module surface. This will distort the glass and cause a change in color.
- (3) Under no circumstances should the position of the bezel tabs or their shape be modified.
- (4) Do not modify the display PCB in either shape or positioning of components.
- (5) Do not modify or move location of the zebra or heat seal connectors.
- (6) The device should only be soldered to during interfacing. Modification to other areas of the board should not be carried out.
- (7) In the event of LCD breakage and resultant leakage of fluid do not inhale, ingest or make contact with the skin. If contact is made rinse immediately.
- (8) When cleaning the module use a soft damp cloth with a mild solvent, such as Isopropyl or Ethyl alcohol. The use of water, ketone or aromatic is not permitted.
- (9) Prior to initial power up input signals should not be applied.
- (10) Protect the module against static electricity and observe appropriate anti-static precautions.

INTERFACE														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
FM	LOAD	CP	RSP	VDD	VSS	VIE	B7	B6	B5	B4	B3	B2	B1	B0



Recommend	Company	Parts No.
CN1	Molex	53261-1510