晶采光電科技股份有限公司
AMPIRE CO., LTD.

SPECIFICATIONS FOR
LCD MODULE

CUSTOMER	
CUSTOMER PART NO.	
AMPIRE PART NO.	**AG-16080BYILY-30H-A(R)**
APPROVED BY	
DATE	

☐ Approved For Specifications

☐ **Approved For Specifications & Sample**

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APPROVED BY	CHECKED BY	ORGANIZED BY

RECORD OF REVISION

DATE	SUMMARY	Editor
2006/1/23	NEW RELEASE	Lorry

FEATURES

(1) Display format : 160 × 80dot-matrix ; 1/80 duty.

(2) Construction : STN LCD, Bezel, Heat Seal, Zebra, LED Yellow-Green and PCB.

(3) Display type: STN Yellow-Green, Transflective 6 o'clock.

(4) Controller : LC7981.

(5) +5V single power input. Built-in DC/DC converter for LCD driving.

(6) Extended temperature type.

(7) ROHS compliant.

1 MECHANICAL DATA

Parameter	Stand Value	Unit
Dot size	0.39(W) × 0.39(H)	mm
Dot pitch	0.42(W) × 0.42(H)	mm
Viewing area	72.3(W) × 37.8(H)	mm
Module size (LED back-light)	100.0(W) × 54.0(H) × 15.3 max (T)	mm

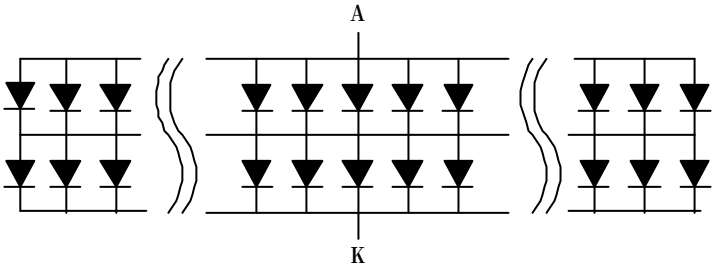
2 ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Min	Max	Unit
Logic Circuit Supply Voltage	VDD-VSS	0	7.0	V
LCD Driving Voltage	VDD-VO	0	16	V
Input Voltage	VI	VSS	VDD	V
Operating Temperature	TOP	-20	70	°C
Storage Temperature	Tstg	-30	80	°C

3 ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Condition	Min	Typ	Max	Unit	Note
----- Electronic Characteristics -----							
Logic Circuit Supply Voltage	VDD-VSS	--	4.5	5.0	5.5	V	
LCD Driving Voltage	VDD-VO	25℃	--	12.6	--	V	
Input Voltage	VIH	--	0.7 VDD	--	VDD	V	
	VIL	--	VSS	--	0.3 VDD	V	
Logic Supply Current	IDD	VDD = 5V	--	6.0	10.0	mA	
----- Optical Characteristics -----							
Contrast	CR	STN type	--	5	--	--	Note 1
Rise Time	tr	25°C	--	250	750	ms	Note 2
Fall Time	tf	25°C	--	300	900	ms	
Viewing Angle Range	θ f	25°C & CR≥2	--	35	--	Deg.	Note 3
	θ b		--	35	--		
	θ l		--	35	--		
	θ r		--	35	--		
Frame Frequency	fF	25°C	--	70	--	Hz	
----- LED Back-light Characteristics -----							
Parameter	**Symbol**	**Condition**	**Min**	**Typ**	**Max**	**Unit**	**Note**
Forward Voltage	VF	--	--	4.05	4.2	V	Supply Voltage between A&K
Forward Current	IF	VF=4.05V	--	360	--	mA	
LCM Luminous intensity		IF=360mA	--	30	--	cd/m^2	

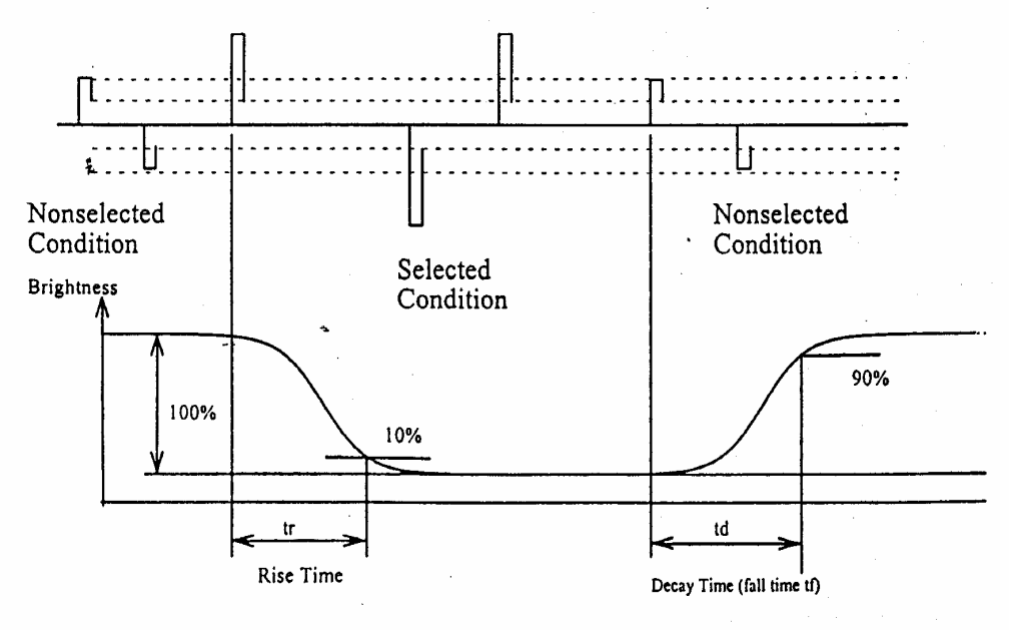
2×36= 72 (Dice numbers)



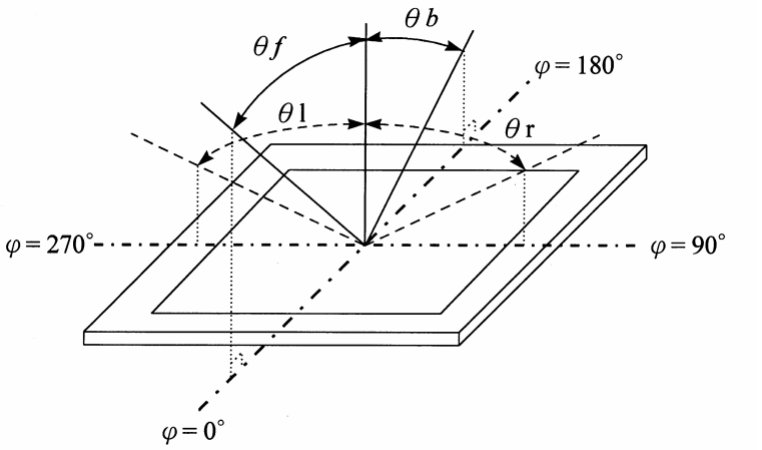
(NOTE 1) Contrast ratio :

CR = (Brightness in OFF state) / (Brightness in ON state)

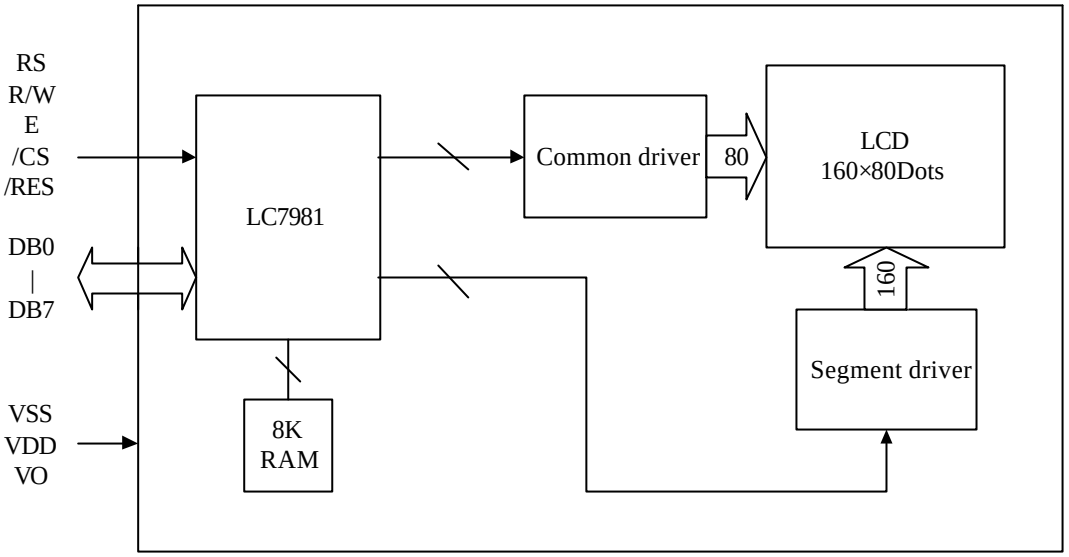
(NOTE 2) Response time :

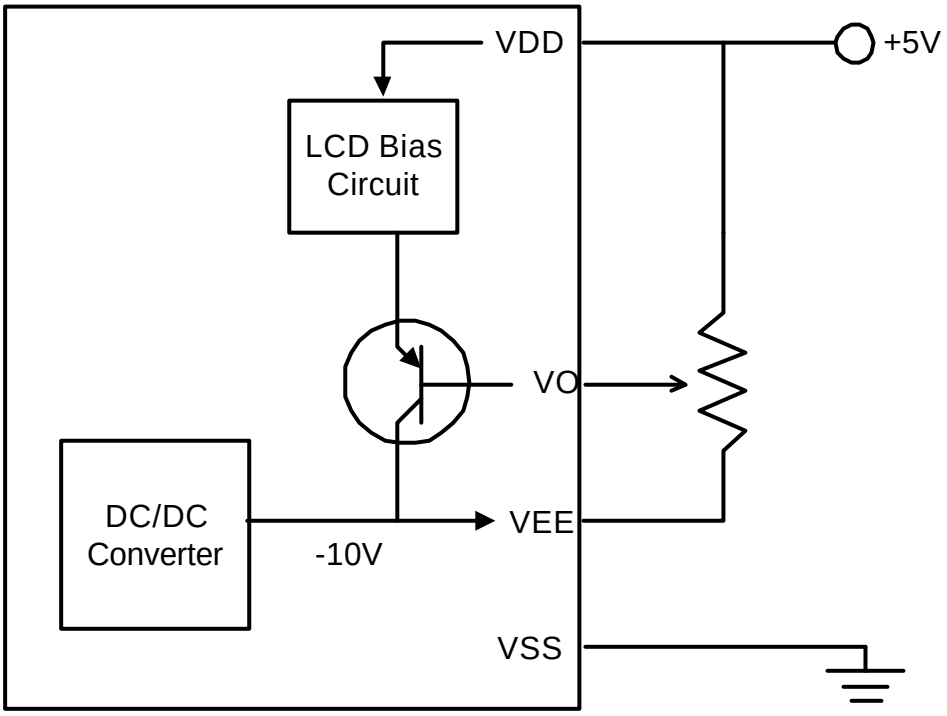


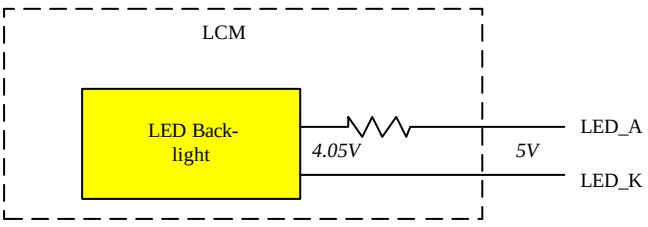
(NOTE 3) Viewing angle



4 BLOCK DIAGRAM & POWER SUPPLY



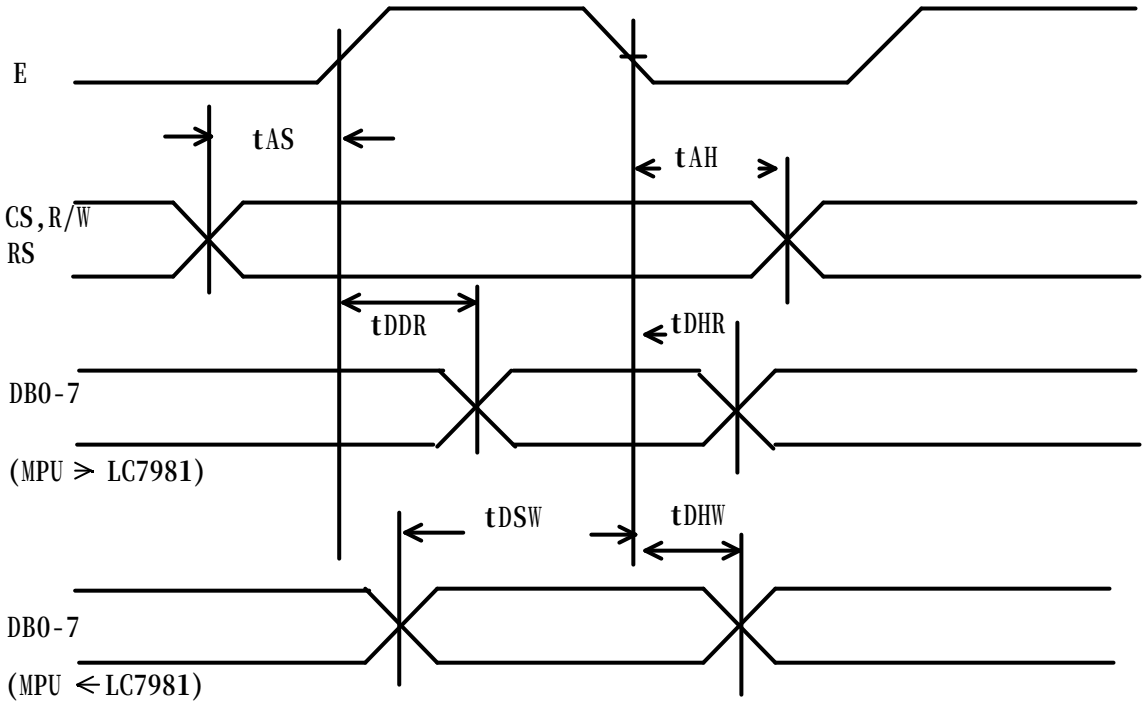




5 PIN CONNECTIONS

No.	Symbol	Function
1	VSS	Ground (0V)
2	VDD	Power Supply for Logic(+5V)
3	VO	Contrast adjustment
4	RS	H- Instruction Input , L- Data Input
5	R/W	H-Data Read , L-Data Write
6	E	Chip Enable
7~14	DB0~DB7	Data Bus Line
15	/CS	Chip Enable
16	/RES	Reset
17	VEE	Negative power supply output(-10V)
18	/DISPOFF	Display off control signal
19	LEDA	LED Supply Voltage +(5V)
20	LEDK	LED Supply Voltage -(5V)

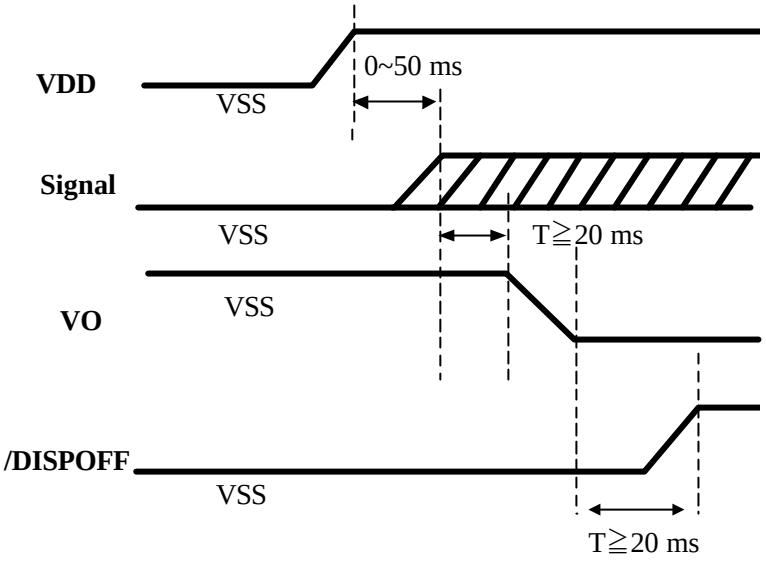
6 TIMING CHARACTERISTICS



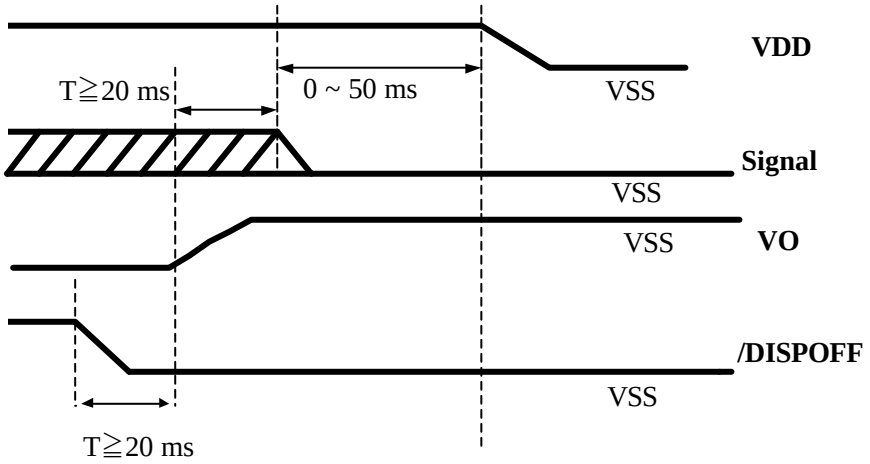
ITEM	SYMBOL	MIN	TYP	MAX	UNIT
Address set-up time	tAs	90	--	--	ns
Address hold time	tAH	10	--	--	ns
Data set-up time	tDSW	220	--	--	ns
Data hold time	tDHR	10	--	--	ns
Data delay time	tDDR	--	--	140	ns
Data hold time	tDHW	20	--	--	ns

7 Power ON/OFF Sequence

POWER ON SEQUENCE



POWER OFF SEQUENCE



8 QUALITY AND RELIABILITY

8.1 TEST CONDITIONS

Tests should be conducted under the following conditions :

Ambient temperature : 25 ± 5°C

Humidity : 60 ± 25% RH.

8.2 SAMPLING PLAN

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

8.3 ACCEPTABLE QUALITY LEVEL

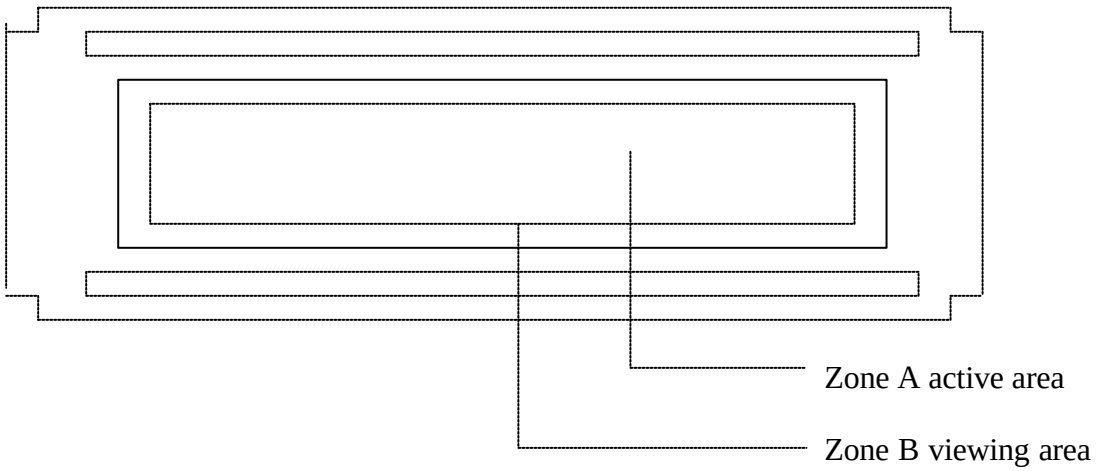
A major defect is defined as one that could cause failure to or materially reduce the usability of the unit for its intended purpose. A minor defect is one that does not materially reduce the usability of the unit for its intended purpose or is an infringement from established standards and has no significant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

8.4 APPEARANCE

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

8.5 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



8.6 RELIABILITY

Test Item	Test Conditions	Note
	Extended Temp. type	
High Temperature Operation	70±3°C , t=96 hrs	
Low Temperature Operation	-20±3°C , t=96 hrs	
High Temperature Storage	80±3°C , t=96 hrs	1,2
Low Temperature Storage	-30±3°C , t=96 hrs	1,2
Temperature Cycle	-30°C ~ 25°C ~ 80°C 30 m in. 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.
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9 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.

10 ATTACHED DRAWING