冀诚电子
GEM-TECH ELECTRONICS

LCD MODULE SPECIFICATIONS

Customer:
Customer Part No.:
Gem-tech Model Name: GTG-2401283V3-GR6N1C Release Date: 2014-9-29
Customer Approval: Date:
The above signature represents that the product specifications, testing regulation, and warranty in the specifications are accepted.

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1. BASIC SPECIFICATION

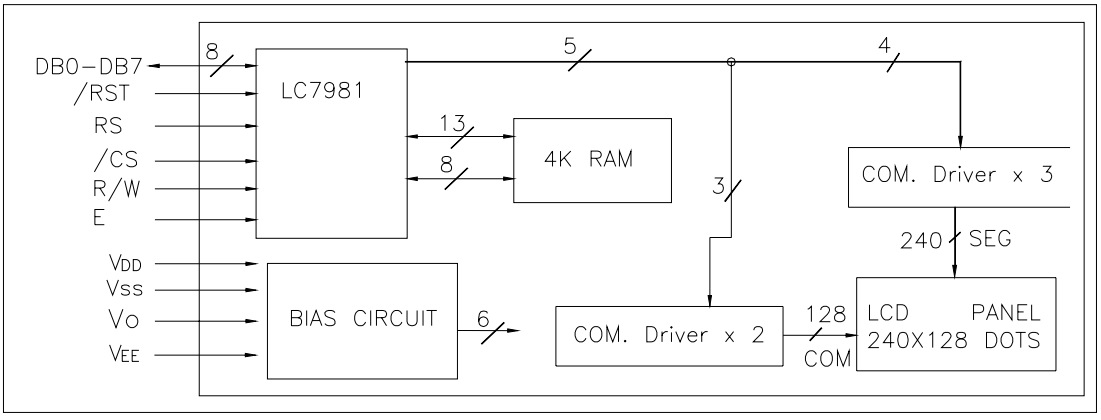
1-1 DISPLAY SPECIFICATIONS

. DISPLAY MODE : STN-REFLECTIVE-POSITIVE-GRAY
. COLOR : DISPLAY DOT: BLUE
DISPLAY BACKGROUNTND: GRAY
. DISPLAY FORMAT : 240 X 128 DOTS
. INPUT DATA : 8-BITS PARALLEL DATA INPUT FROM A MPU
. MULTIPLEXING : 1/128 DUTY
. VIEWING DIRECTION : 6 O'CLOCK
. DRIVED IC : LC7981 (OR EQV) , NT7086(OR EQV)
. BEZEL : 0.6T
. BACKLIGHT : NONE
. OTHERS :

1-2. MECHANICAL SPECIFICATION

ITEM	SPECIFICATIONS	UNIT	REMARK
DIMENSIONAL OUTLINE	159.4(W)×101.0(H)×13.0MAX.(T)		*REFERENCE
VIEW AREA	124.0(W)×70.0(H)	mm	DIMENSIONAL
EFFECTIVE V/AREA	119.97(W)×63.97(H)		OUTLINE
NUMBER OF CHARACTERS	240 DOTS ×128 DOTS	--	
DOT PITCH	0.50(W)×0.50(H)	mm	
DOT SIZE	0.47(W)×0.47(H)	mm	

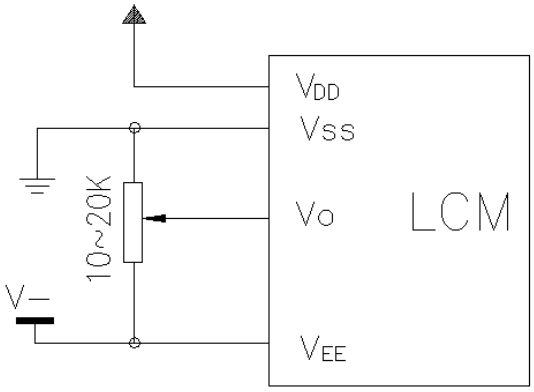
1-3 BLOCK DIAGRAM



1-4 TERMINAL FUNCTIONS

PIN NO	SYMBOL	LEVEL	DESCRIPTION
1	Vss	-	GROUND
2	V_{DD}	-	POWER SUPPLY FOR LOGIC
3	Vo	-	CONTRAST ADJUST
4	RS	H/L	H:-INSTRUCTION REGISTER, L:-DATA REGISTER
5	R/W	L	H: READ; W: WRITE
6	E	L	ENABLE SIGNAL
7 - 14	DB0 – DB7	H/L	DATA BUS
15	/CS	L	CHIP ENABLE SIGNAL
16	/RST	L	RESET SIGNAL
17	V_{EE}	-	NEGATIVE VOLTAGE SUPPLY FOR LCD
18	/DISPOFF	L	DISPLAY OFF
19	NC	-	NO CONNECTION
20	NC	-	NO CONNECTION

1-5 POWER SUPPLY CIRCUIT AND CONTRAST ADJUST



Recommended voltage: VDD-Vo = 15.6V

2. ABSOLUTE MAXIMUM RATINGS (Ta=25°C, Vss=0V)

PARAMETER	SYMBOL	RATINGS			UNITS
		MIN.	TYP.	MAX.	
POWER SUPPLY FOR LOGIC	V_{DD}-Vss	0	-	7.5	V
POWER SUPPLY FOR LCD DRIVER	V_{DD}～Vo	0	-	19.5	V
INPUT VOLTAGE	V_{IN}	Vss	-	V_{DD}	V
OPERATING TEMPERATURE	Topr	0	-	50	°C
STORAGE TEMPERATURE	Tstg	-20	-	70	°C

3.ELECTRICAL & OPTICAL CHARACTERISTICS

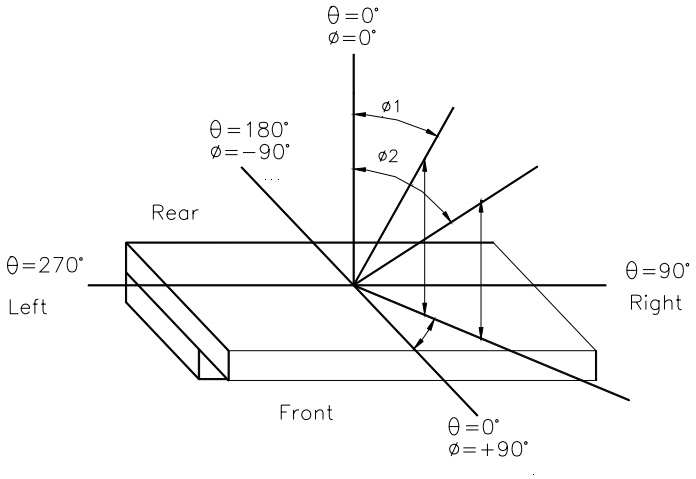
3-1 ELECTRICAL CHARACTERISTICS (Ta=25 °C)

ITEM	SYMBOL	CONDITION	MIN	TYPE	MAX.	UNIT
LOGIC CIRCUIT POWER SUPPLY VOLTAGE	V_{DD}-Vss	———	4.8	5.0	5.2	V
INPUT VOLTAGE	V_{IH}	———	0.7V_{DD}	—	V_{DD}	V
INPUT VOLTAGE	V_{IL}	———	Vss	—	0.6	V
LOGIC CIRCUIT POWER SUPPLY CURRENT	I_{DD}	V_{DD}-Vss=5.0V	——	15.0	25.0	mA
RECOMMENDED LCD DRIVING VOLTAGE	V_{LCD} ϕ=0 θ=0	Ta=25 °C	14.7	15.0	15.3	V
FRAME FREQUNCY	f_{FLM}	-	-	60	-----	Hz

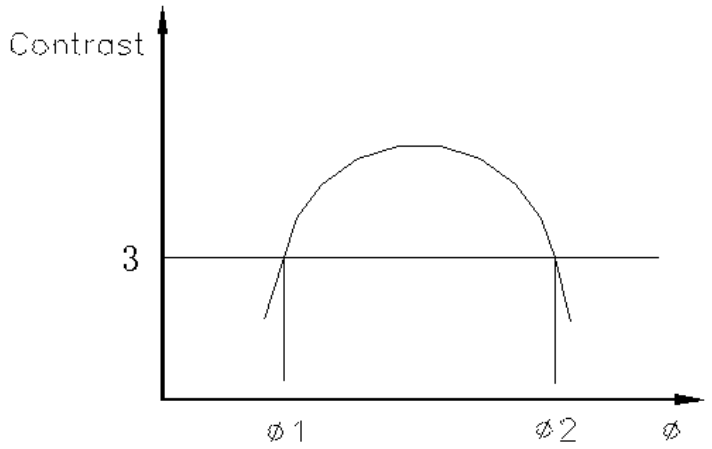
2. ELECTRO—OPTICAL CHARACTERISTICS(Ta=25 °C V_{DD}=5.0±0.25V VOP=15.6V)

ITEM	SYMBOL	CONDITION	MIN	TYPE	MAX	UNIT
VIEW ANGLE	$\Delta\phi$	θ=0°,Cr≥2 -90 ° <ϕ1, ϕ2<90 °	35	45	—	Deg
CONTRAST	Cr	ϕ=0 °,θ=0 °	3	5	—	—
RESPONSE TIME	tr(rise)	ϕ=0 °,θ=0 °	—	300	350	ms
	tf(fall)	ϕ=0 °,θ=0 °	—	300	350	ms

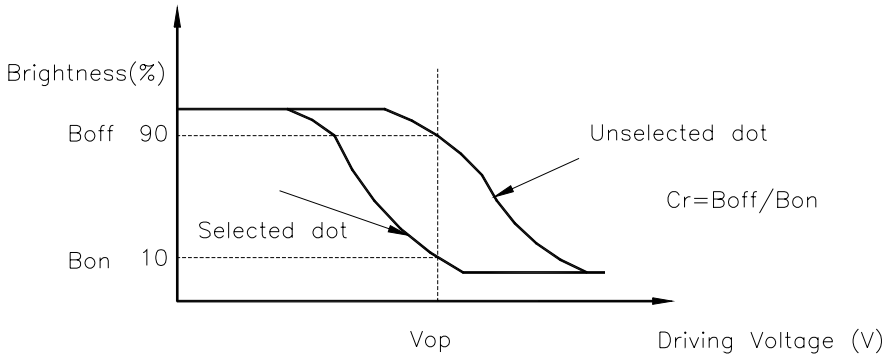
NOTE1: Definition of Viewing Angle θ,ϕ



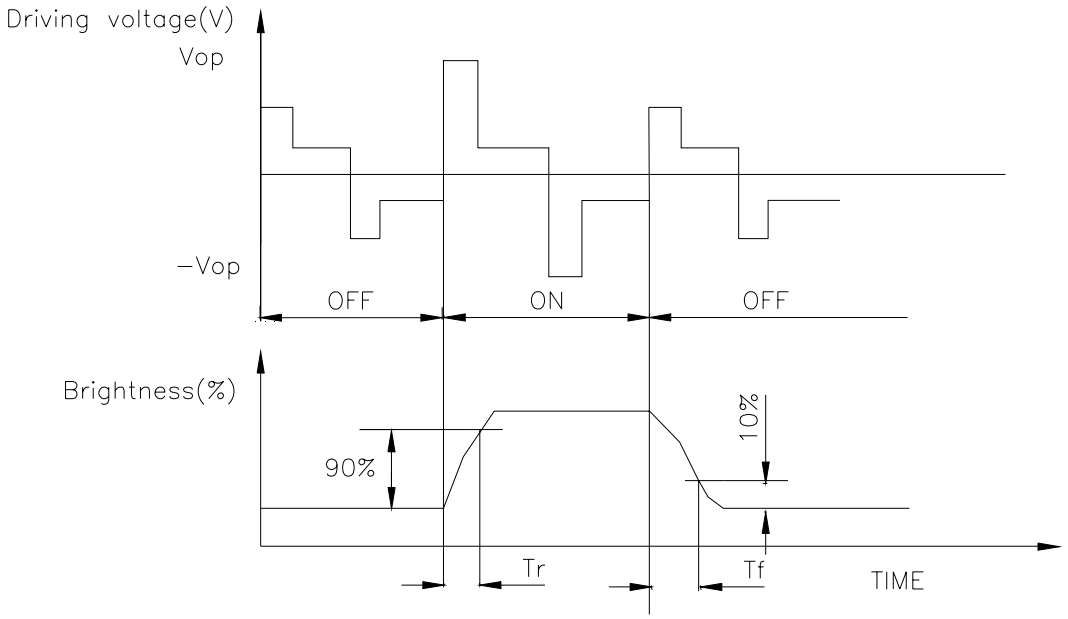
NOTE2: Definition of viewing Angle Range: $\Delta\phi=|\phi 2-\phi 1|$



NOTE3: Definition of Contrast



NOTE4: Definition of Response Time

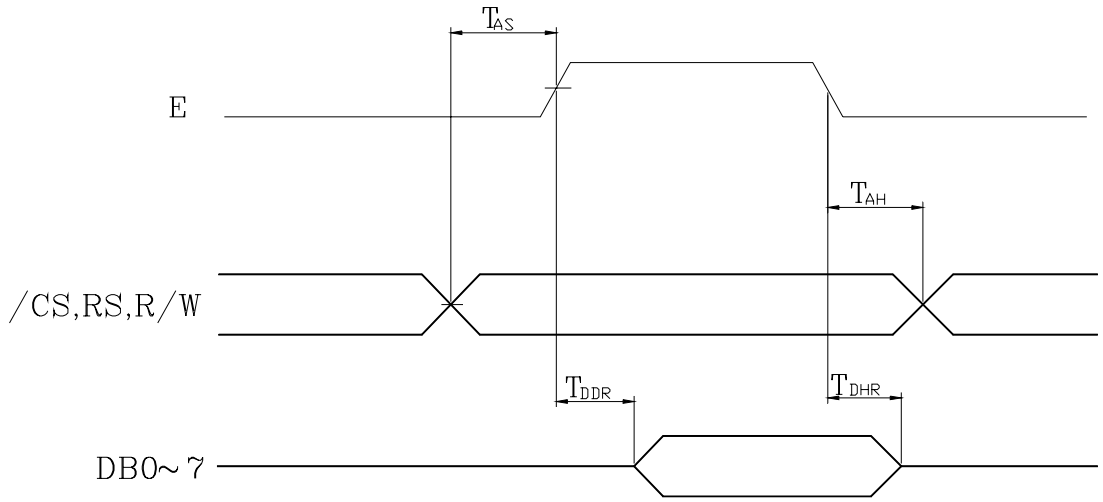


4. TIMING CHARACTERISTICS

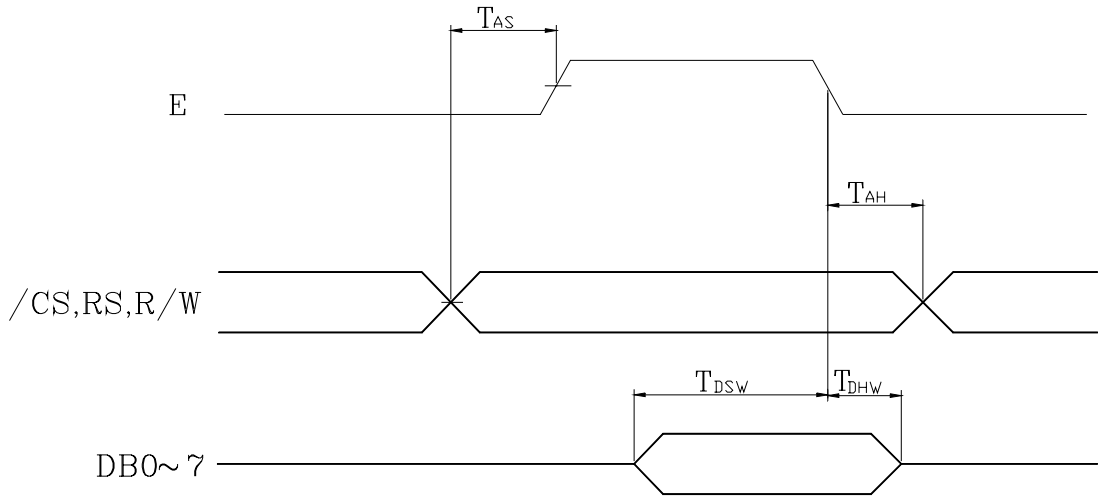
4-1. INTERFACE TIMING CHART

Characteristic	Symbol	Min.	Typ.	Max.	Unit
Address set-up time	TAS	90	---	---	ns
Address hold time	TAH	10	---	---	ns
Data delay time(read)	TDDR		---	140	ns
Data hold time(read)	TDHR	10	---		ns
Data setup time(write)	TDSW	220	---	---	ns
Data hold time(write)	TDHW	20	---	---	ns

MPU Write Timing:

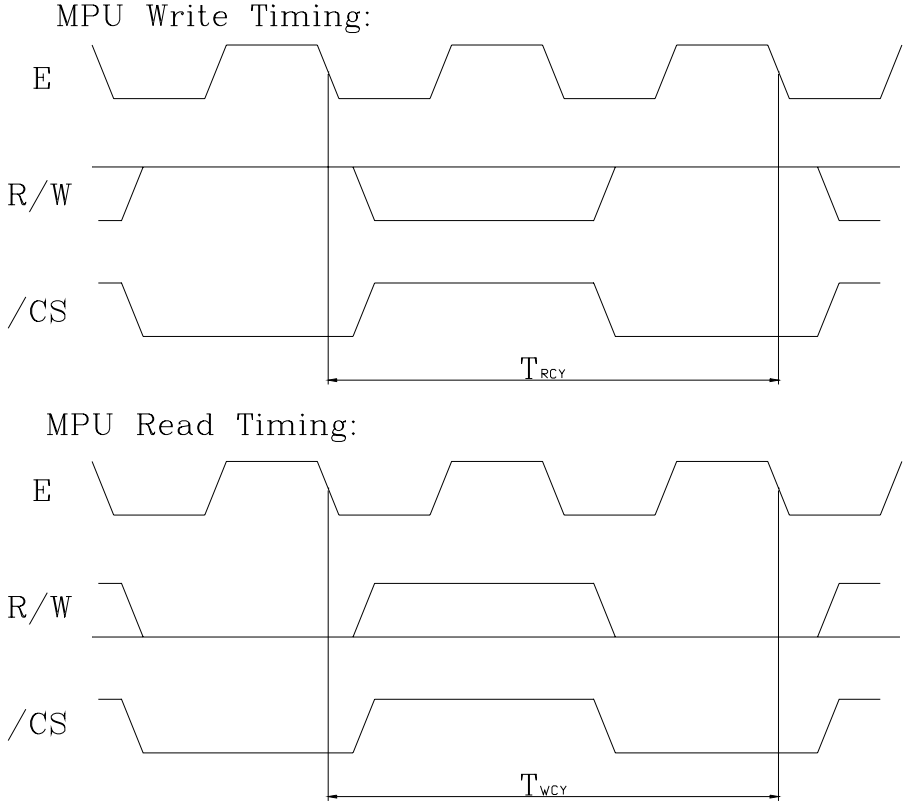


MPU Read Timing:



4-2 BUS OPERATION

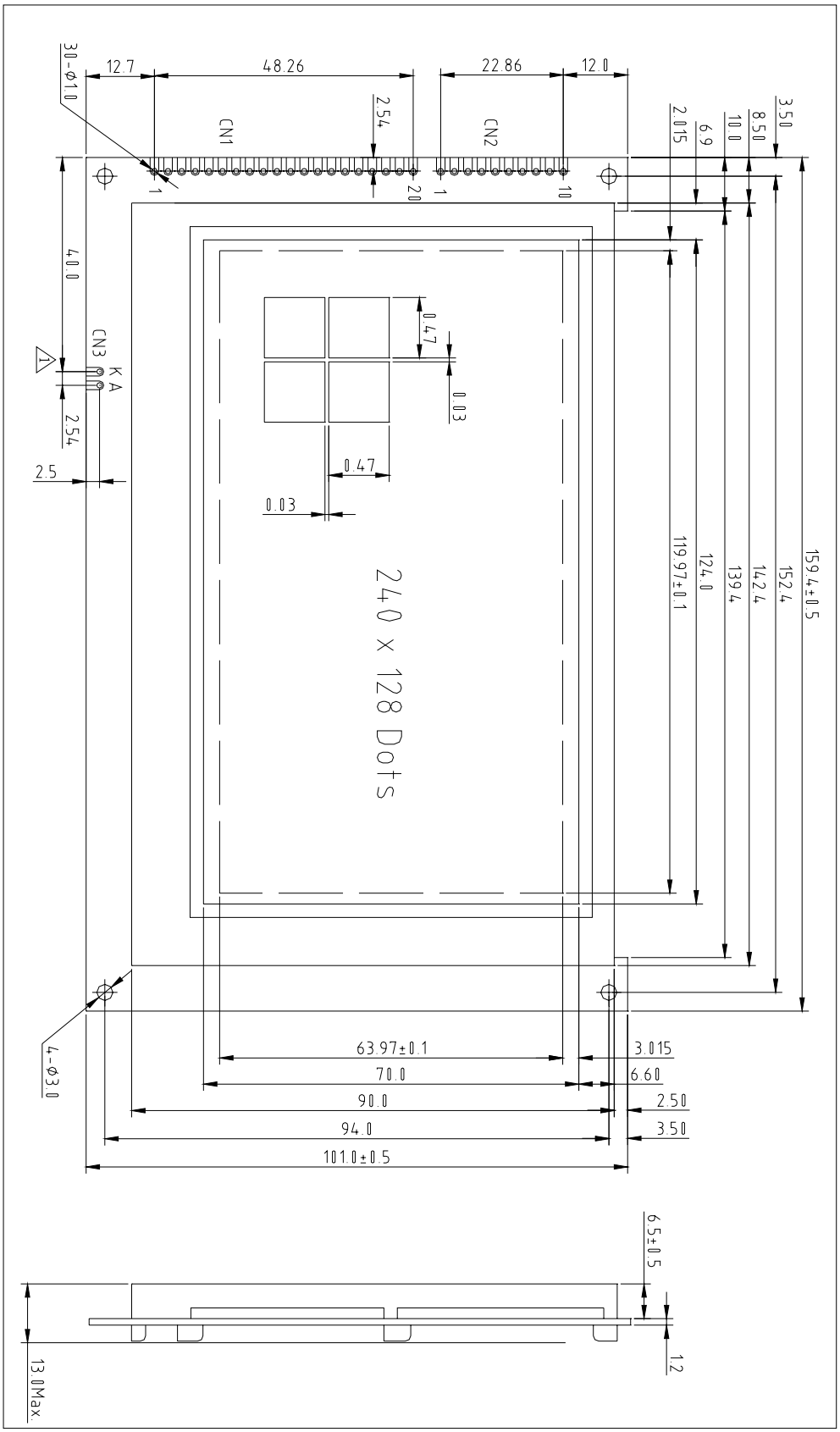
No.	Item	Symbol	Min	Typ	Max.	Unit	Instruction register value
1	Read cycle time	T_{RCY}			17	μs	0x0D
2	Write cycle time	T_{WCY1}			31	μs	0x0E, 0x0F
3	Write cycle time	T_{WCY2}			17	μs	0x0C
4	Write cycle time	T_{WCY3}			4	μs	0x00, 0x01, 0x02, 0x03, 0x04, 0x08, 0x09, 0x0a, 0x0b



5. FUNCTION DESCRIPTION& INSTRUCTION SET

Please referenced to the Controller datasheet LC7981.

6. DIMENSIONAL OUTLINE



The tolerance unless specified: ±0.3mm

7.QUALITY SPECIFICATION

7-1.ACCEPTABLE QUALITY LEVEL

Inspection items	Sampling procedures	AQL
Visual-operating (Electro-optical)	GB2828.1-2012 Inspection level Ⅱ Normal inspection Single sample inspection	0.65
Visual-not operating	GB2828.1-2012 Inspection level Ⅱ Normal inspection Single sample inspection	1.5
Dimension measurement	GB2828.1-2012 Inspection level Ⅱ Normal inspection Single sample inspection	1.5

7-2. INSPECTION CONDITIONS

7-2-1. THE ENVIRONMENTAL

-Room temperature: 25±3℃
-Humidity: 65±20%RH

7-3. INSPECTION STANDARDS

7-3-1. VISUAL WHILE OPERATING

Items to be inspected	Inspection standard
. No display	. If any pattern is not active at all, they can be rejected.
. Irregular operating	. No irregular operating are allowed . Appeared different display, which they should be chosen in the pattern, or appeared in different position where they should be chosen.
.Irregular display	. Any segment doesn't active, they can be rejected.
. Over current	. The total current required to activate the module should not be exceed the MAX current in specification.
.View angles	. Valves that don't meet the minimum value noted in the specification. they can be rejected.
.Contrast	. Valves that don't meet the minimum value noted in the specification, they can be reject.
.LCD operate voltage	. Meet the specification.

-Water
-Ketone
-Aromatics

9-3.CAUTION AGAINST STATIC CHARGE

The LCD modules use COMS LSI drivers. So we recommend that you connect any unused input terminal to Vdd or Vss, do not input any signals before power is turned on and ground your body. work/assembly table. And assembly equipment to protect against static electricity.

9-4.PACKAGING

-Modules use LCD elements, and must be treated as such avoid intense shock and falls from a height

-To prevent modules from degradation, do not operate or store them exposed directly to sunshine or high temperature/humidity.

9-5.CAUTION FOR OPERATION

-It is indispensable to drive LCM within the specified voltage limit since the higher voltage than the limit shortens LCM life.

-Response time will be extremely delayed at lower temperature than the operating temperature range and on the other hand at higher temperature LCD show dark color in them.

However those phenomena do not mean malfunction or out of order with LCD, which will come back in the specified operating temperature range.

-If the display area is pushed hard during operation. Some font will be abnormally displayed but it resumes normal condition after turning off once.

-A slight dew depositing on terminals is a cause for Electro-chemical reaction resulting in terminal open circuit.

Under the maximum operating temperature, 50%RH or less is required

9-6 STORAGE

In the case of storing for a long period of time (for instance, for years) for the purpose or replacement use. the following ways are recommended

-Storage in a polyethylene bag with the opening sealed so as not to enter fresh air outside in it, and with no desiccant.

-Placing in a dark place where neither exposure to direct sunlight nor light is, keeping temperature in the specified storage temperature range.

-Storing with no touch on polarizes surface by the anythingelse.

(it is recommended to store them as they have been contained in the inner container at the time of delivery from us.

9-7.SAFETY

-It is recommendable to crash damaged or unnecessary LCD into pieces and wash off liquid crystal by using solvents such as acetone and ethanol, which should be

burned up later.

-When any liquid crystal leaked out of a damaged glass cell comes in contact with your hands, please wash it off well with soap and water.

10.PRECAUTION FOR USE

10-1.A limit sample should be provided by the both parties on an occasion when the both parties agree its necessity.
Judgement by a limit sample shall take effect after the limit sample has been established and confirmed by the both parties.

10-2.On the following occasions, the handling of problem should be decided through discussion and agreement between representative of the both parties

-When a question is arisen in this specification.

-When a new problem is arisen which is not specified in this specifications.

-When an inspection specification change or operating condition change in customer is reported to GEM-TECH, and some problem is arisen in this specification due to the change.

-When a new problem is arisen at the customer's operating set for sample evaluation in the customer size.

11. REVISIONS HISTORY

REVISION	DATE	DESCRIPTION
1.0	2014-9-29	First release

7-3-2. Visual while not operating

Module dimension	. Meet the module outline drawing, not exceed the tolerance.
LCD panel scratch	.Following scratches inside the effective viewing area considered as the defects when their width & length are larger than the following combinations. Number: one or more Width: 0.15 length: 5.0 two or more Width: 0.10 length: 3.0 three or more Width: 0.05 length: 2.0 When the defects exceed this, it can be rejected.

8.RELIABILITY

Standard Specification for Reliability of General-purpose LCM

Test Item	Test Condition	Note
High Temperature Store	70 °C,12hr.	2
Low Temperature Store	-20 °C,4hr	2
Humidity Store	40 °C,90%RH,96hr	1,2
High Temperature Operation	50°C,typical operating conditions,48hr	
Low Temperature Operation	0°C,typical operating conditions,48hr	
Shock	Acceleration: 100m/s^2 , Pulse time: 11ms, 6 times in each direction of XYZ	
Mechanical Vibration	10~55Hz sweep, 3G, ampl.=0.75mm(max) XYZ for 20 min, each.	

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)

9. HANDLING PRECAUTION

9-1. MOUNTING METHOD

The panel of the LCD module consists of two thin glass plates with polarizes which easily get damaged since the module is fixed by utilizing fitting holes in the printed circuit board. Extreme care should be taken when handling the LCD modules.

9-2. CAUTION OF LCD HANDLING & CLEANING

When cleaning the display surface. Use soft cloth with solvent (recommended below) and wipe lightly.

-Isopropyl alcohol

-Ethyl alcohol

-Tri chlorotri fluoroethane

Do not wipe the display surface with dry or hard materials that will damage the polarizes surface.

Do not use the following solvent:

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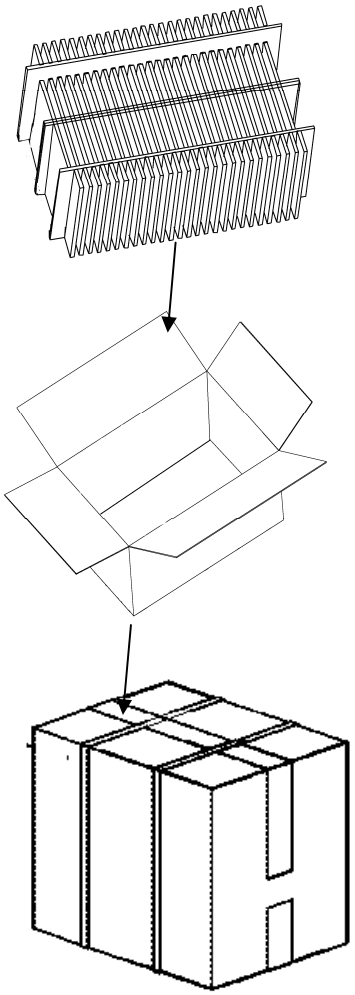
Packing Design

1. QTY/CARTON: 36 PCS
2. Dimension/Carton: 37.5 CM*32.5CM*20CM
   Weight/Carton: 7 KG



Hebei Gem-Tech Electronics Co., Ltd

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				Doc #	GTK-990-PK
				分文件号	Page 1/1
				Date	2014-09-16