DISPLAY Elektronik GmbH

DATA SHEET

LCD MODULE

DEM 240128D SBH-PW-N

Product Specification   *Version: 5.1.3*

02/Sep/2009

GENERAL SPECIFICATION

MODULE NO. :

DEM 240128D SBH-PW-N

CUSTOMER   P/N

Version No.	Change Description	Date
0	ORIGINAL VERSION	15.04.2005
1	CHANGE SERIES	30.04.2005
2	CHANGE BACKLIGHT DATA	04.08.2005
3	CHANGE MODEL AND PCB DRAWING	01.09.2005
4	MODIFY DESCRIPTION	09.02.2006
5	REVISED LED-RESISTORS	27.04.2007
5.1.2	CHANGE DRIVER	04.08.2008
5.1.3	IMPROVE LED-BACKLIGHT	02.09.2009

PREPARED BY: HCL   DATE: 02.09.2009

APPROVED BY: MH   DATE: 02.09.2009

CONTENTS

1. FUNCTIONS &FEATURES

MODULE NAME	LCD Type
DEM 240128D SBH-PW-N	STN-Blue Transmissive Negative Mode

- Glass Thickness   : 1.1mm
- Viewing Direction   : 6 o'clock
- Driving Scheme   : 1/128Duty, 1/12 Bias
- Power Supply for logic   : 5.0 Volt (typ.)
- Backlight Color   : LED, Lightguide, White
- Display Content   : 240 x 128 Dots
- V_{LCD} : 20.0 Volt (typ.)
- Operation Temperature   : -20°C to +70°C
- Storage Temperature   : -25°C to +75°C
- Controller IC   : T6963C (Toshiba)

2. MODULE ARTWORK
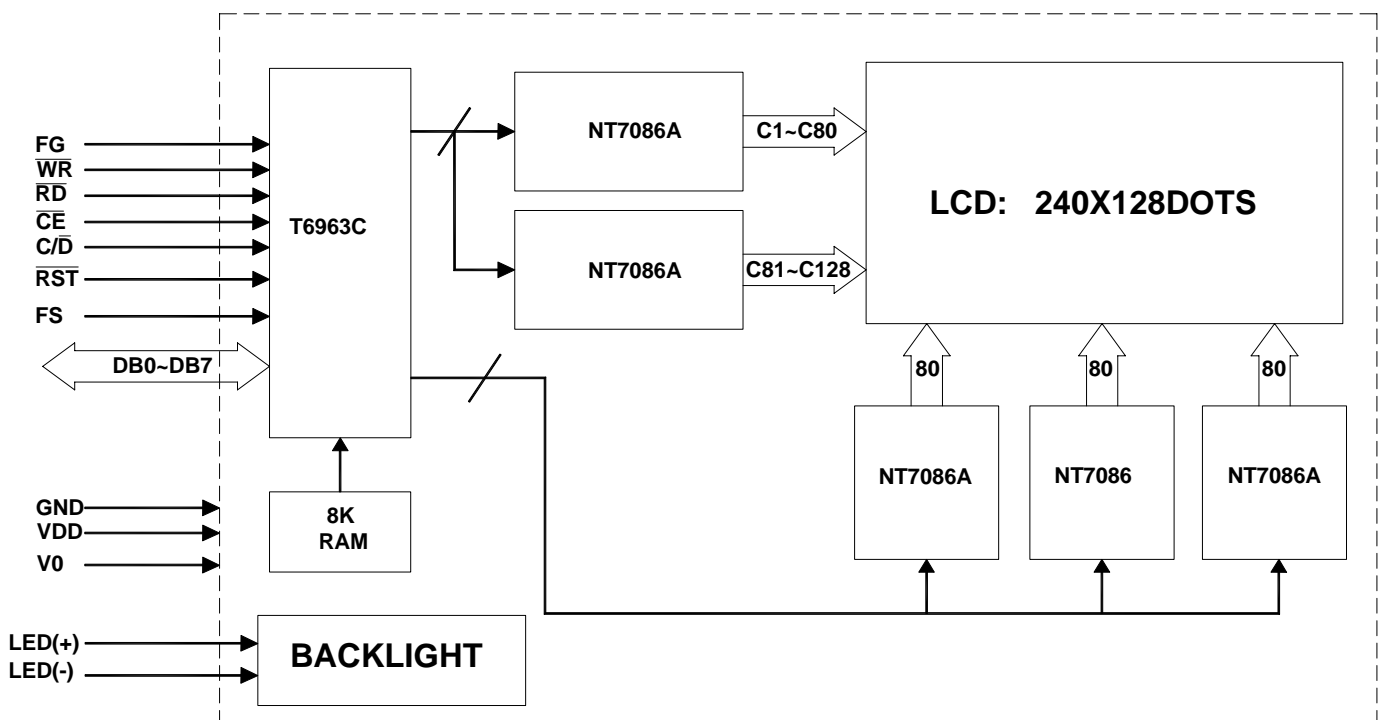
- Module Size   : 144.00 x 104.00 x 14.10 mm
- Viewing Area   : 114.00 x 64.00 mm
- Active Area   : 107.95 x 57.55 mm
- Dot Pitch   : 0.45 x 0.45 mm
- Dot Size   : 0.40 x 0.40 mm
- Dot Gap   : 0.05 mm

3. EXTERNAL DIMENSIONS
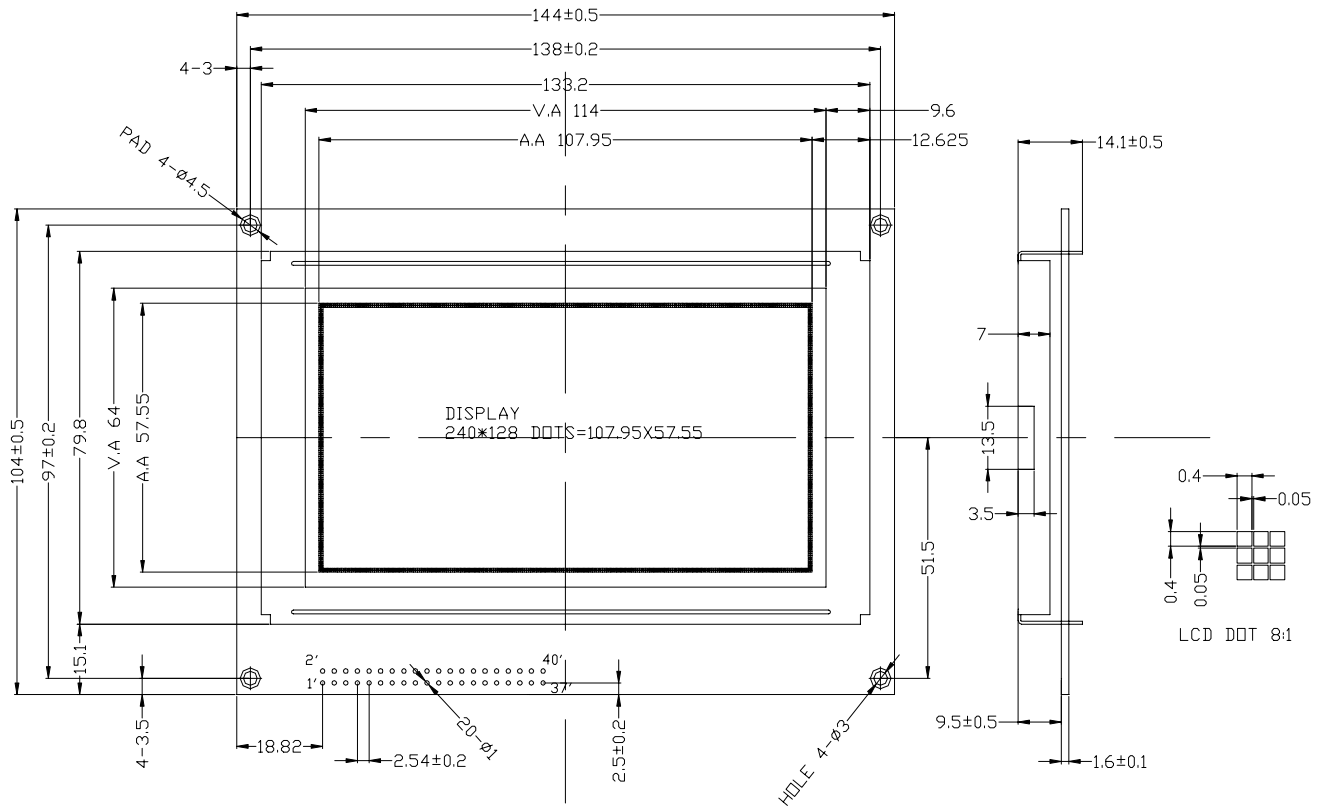
UNLESS TOLERANCE IS ±0.3
THE MATERIAL IS LEAD-FREE

4. BLOCK DIAGRAM

5. PIN ASSIGNMENT

No.	Symbol	Function
1	FG	Frame ground (see note 1)
3	VSS	Ground (0V)
5	VDD	Power Supply(+5V)
7	V0	Power Supply for LCD Drive(-15V)
9	/WR	Data write. Write data to controller T6963C when "L"
11	/RD	Data read. Read data from controller T6963C when "L"
13	/CE	Chip enable of controller when "L"
15	C/ D	Command/Data read/write. "H" for command read/write and "L" for data read/write
17	/RST	Controller reset when "L"
19	DB0	Data input/output(LSB)
21	DB1	Data input/output
23	DB2	Data input/output
25	DB3	Data input/output
27	DB4	Data input/output
29	DB5	Data input/output
31	DB6	Data input/output
33	DB7	Data input/output(MSB)
35	FS	Font select. "H" for 6x8 font & "L" for 8x8 font
37	LED+(A)	Please refer to item 7.1 PCB drawing and description
39	LED-(K)	

Note: This pin is electrically connected to the metal bezel (frame),but, is otherwise not connected. User can choose to connect this pin to ground or leave it open.

6. POWER SUPPLY
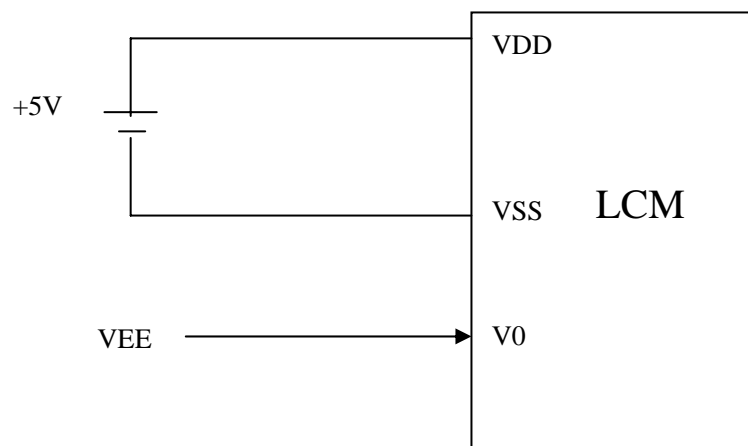
7.1 PCB DRAWING AND DESCRIPTION
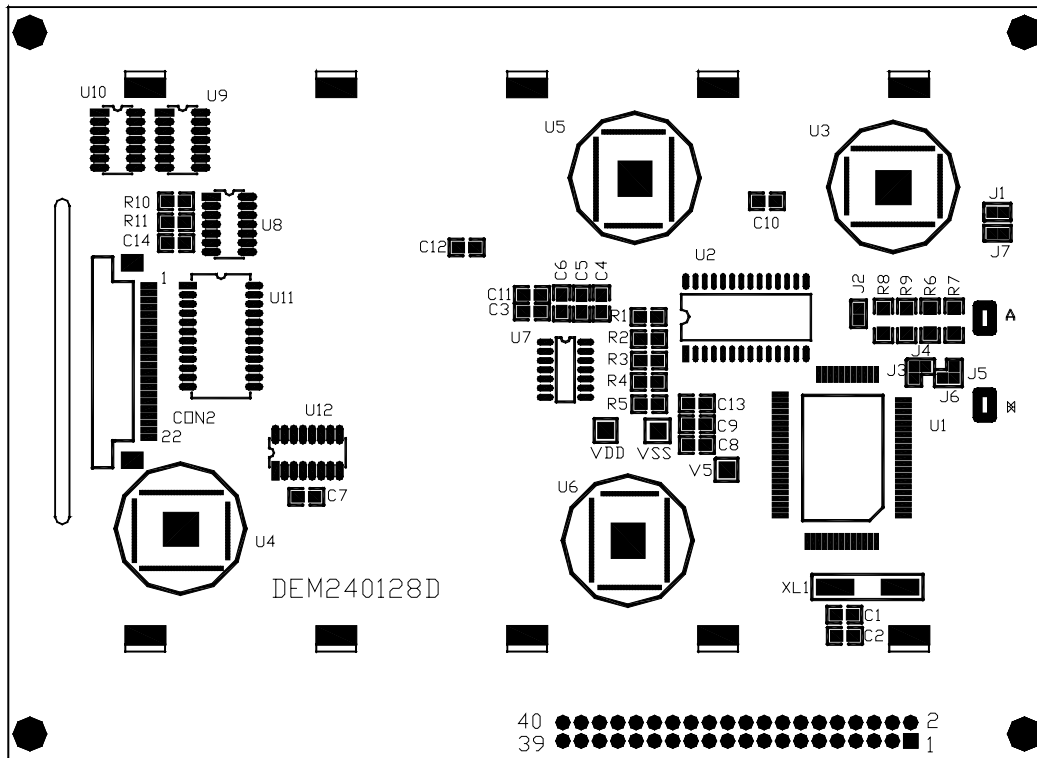
DESCRIPTION:

7-1-1.The polarity of the pin 37 and the pin 39:

J3,J5	J6, J4	LED Polarity	
		37 Pin	**39 Pin**
Each open	Each closed	Anode	Cathode
Each closed	Each open	Cathode	Anode

Note: In application module, J3=J5 = open, J4=J6= closed

7-1-2. The J1 is metal-bezel GND to module GND and J7 is mounting holes GND to module GND.

Note: In application module, J1= J7=closed,

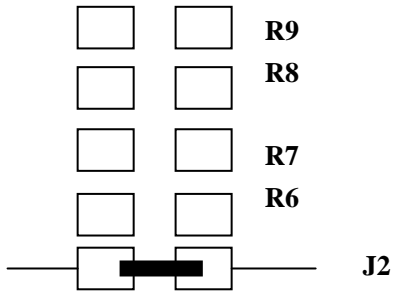**7-1-3.The LED resistor should be bridged when J2 is closed**

Note: In application module, J2=open

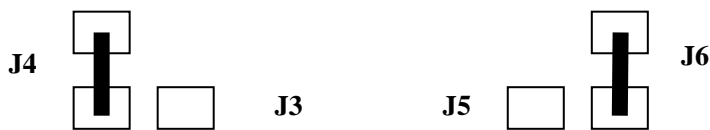**7-1-4.The R6 and the R7, R8, R9 are the LED resistor.**

Note: In application module, R6=R7= open, R8=R9=82 Ohm;

7.2 EXAMPLE APPLICATION

7-2-1. The LED resistor should be bridged as following.

R9
R8
R7
R6
J2

7-2-2. The 37 pin is the anode and the 39 pin is the cathode as following.

J4   J3   J5   J6

7-2-3.The 37 pin is the cathode and the 39 pin is the anode as following.

J4   J3   J5   J6

7-2-4.The metal-bezel is on ground as following.

J1

7-2-5.The holes is on ground as following

J7

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

Parameter	Symbol	Rating	Unit
Supply Voltage (Logic)	V_{DD}	-0.3 to 7.0	V
Input voltage	V_{IN}	-0.3 to VDD +0.3	V
Operating Temperature	Topr	-20 to +70	°C
Storage Temperature	Tstg	-25 to +75	°C

9. ELECTRICAL Characteristics

9.1 DC Characteristics

Ta=25°C, V_{SS}=0V

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Supply Voltage (Logic)	V_{DD}-V_{SS}	-	4.5	5.0	5.5	V
High Level Input Voltage	V_{IH}	V_{DD}=5.0V±10%	V_{DD}-2.2	-	V_{DD}	V
Low Level Input Voltage	V_{IL}	V_{DD}=5.0V±10%	0	-	0.8	V
High Level Output Voltage	V_{OH}	I_{OH}=0.75mA	V_{DD}-0.3	-	V_{DD}	V
Low Level Output Voltage	V_{OL}	I_{OL}=0.75mA	0	-	0.3	V
Current Consumption(Operating)	$I_{DD(1)}$	V_{DD}=5.0V f_{OSC} = 3.0 MHz	-	3.3	6.0	mA
Current Consumption(Halt)	$I_{DD(2)}$	V_{DD}=5.0V			3	uA

9.2 AC Characteristics

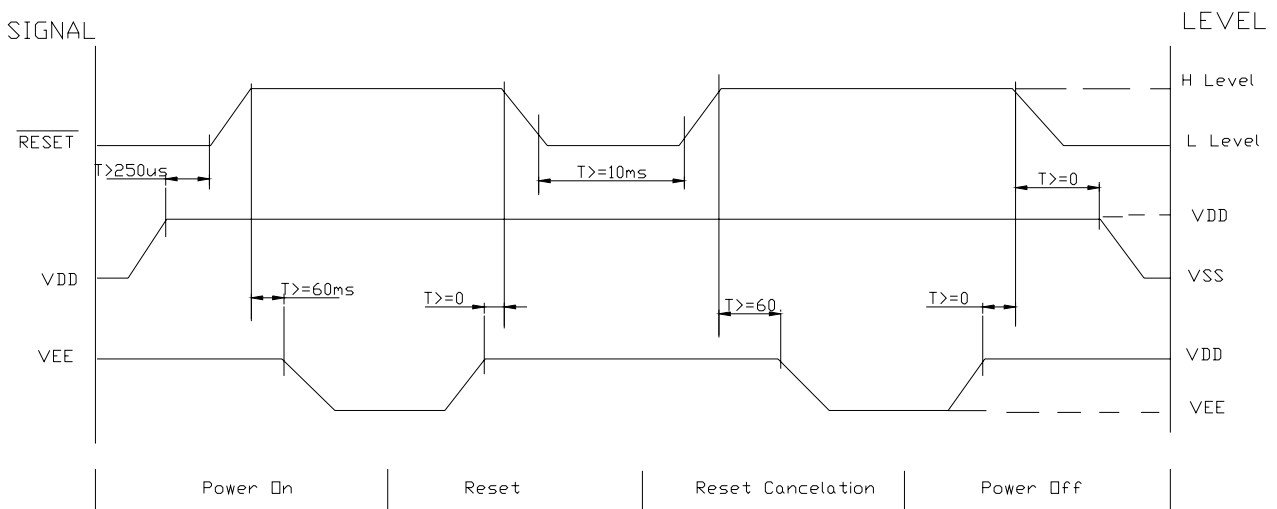| Parameter	Symbol	Min.	Max.	Units
C/D Setup Time	t_{CDS}	100	-	ns
C/D Hold Time	t_{CDH}	10	-	ns
CE, RD, WR Pulse Width	t_{CE}, t_{RD}, t_{WR}	80	-	ns
Data Setup Time	t_{DS}	80	-	ns
Data Hold Time	t_{DH}	40	-	ns
Access Time	t_{ACC}	-	150	ns
Output Hold Time	t_{OH}	10	50	ns
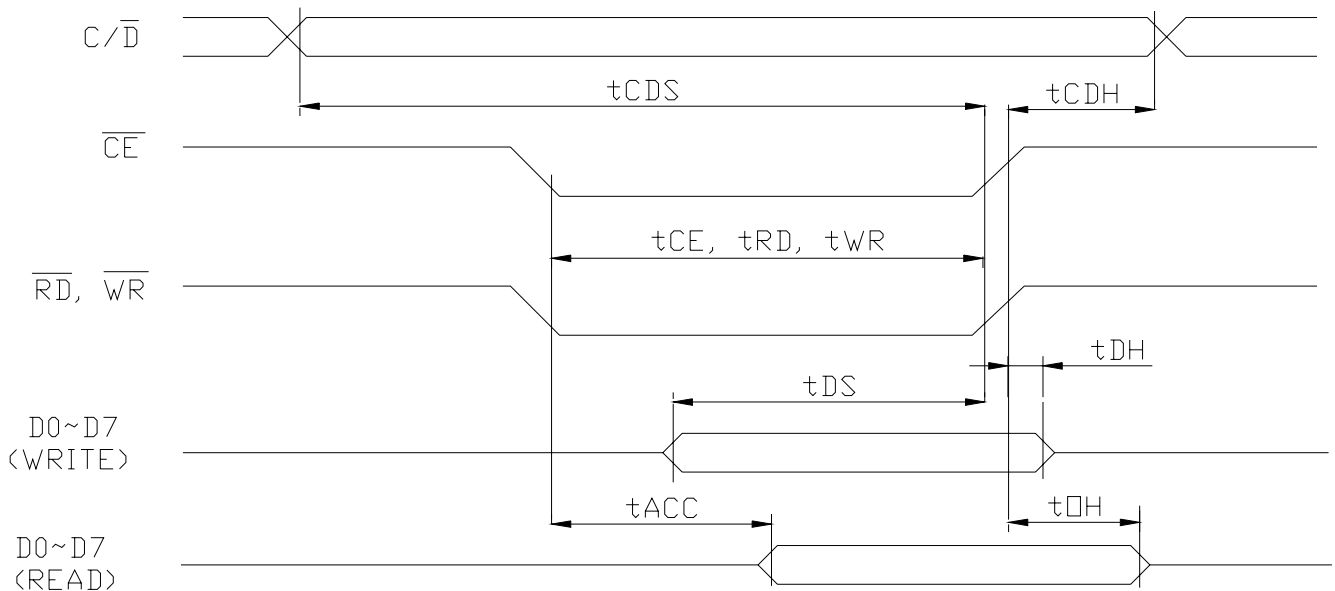
9.3 Power Supply ON/OFF Sequence

ON Sequence
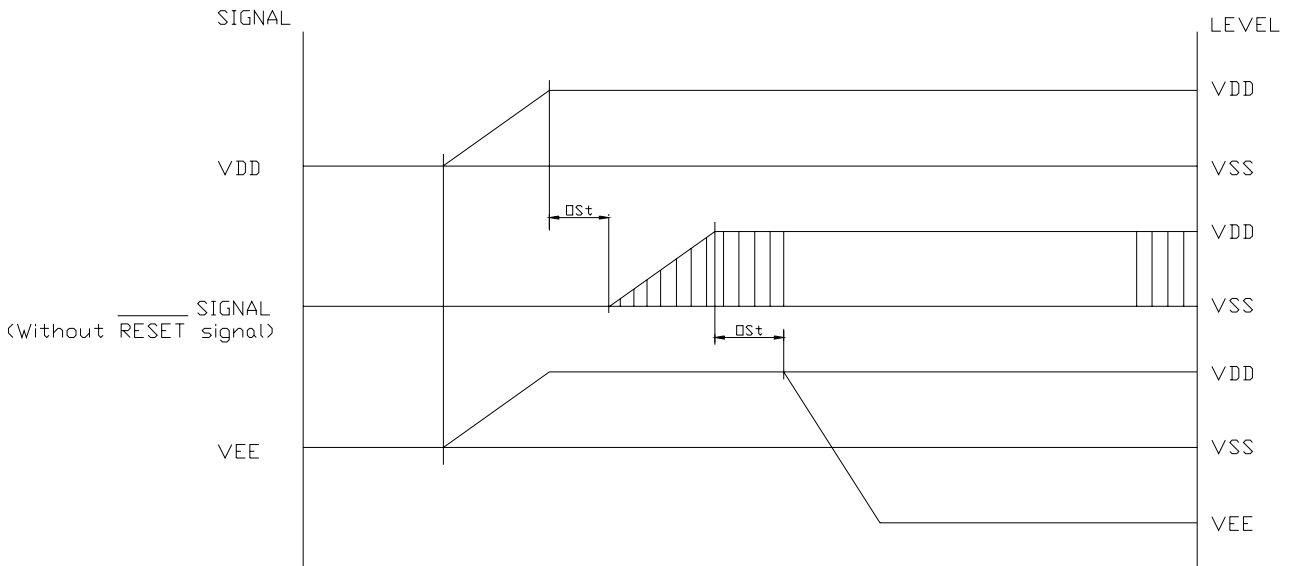

### OFF Sequence
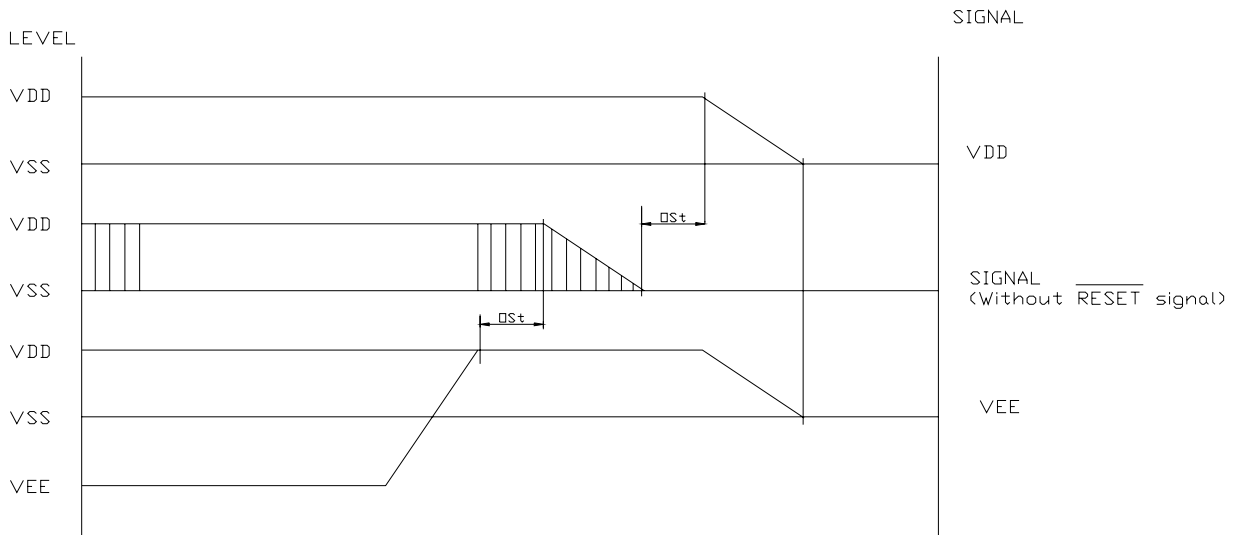
Reset Sequence

Please maintain the above sequence when turning on and off the power supply of the module.

If V_{EE} is supplied to the module while internal alternate signal for LCD driving (M) is unstable or RESET is active, DC component will be supplied to the LCD panel. This may cause damage to the LCD module.

10. BACKLIGHT ELECTRICAL/OPTICAL SPECIFICATIONS

ELECTRICAL-OPTICAL CHARACTERISTICS

Item	Symbol	min.	typ.	max.	Unit	Condition
Forward Voltage	Vf	2.9	3.2	3.4	V	If= 45 mA
Reverse Current	Ir		30		μA	Vr= 0.8 V
Luminance	Lv	165	220		cd/m²	If= 45 mA
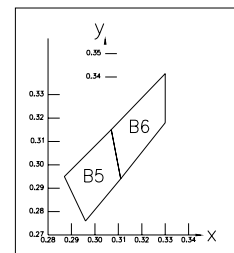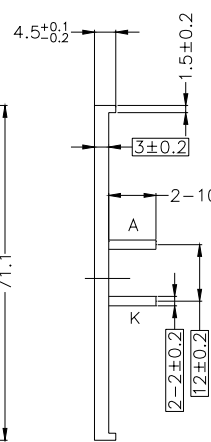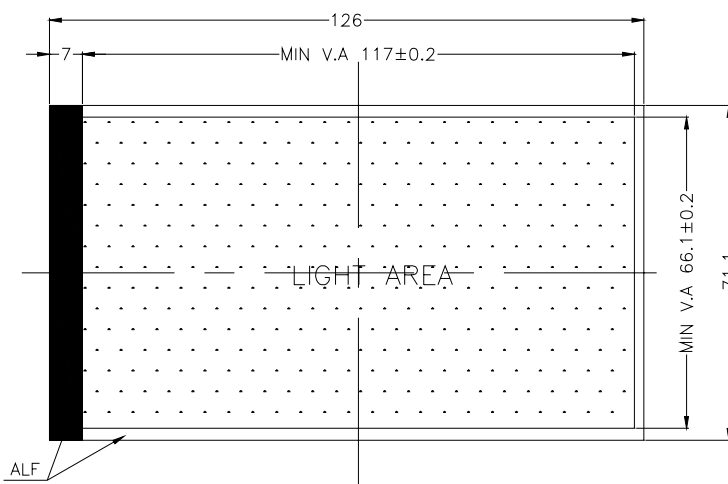
CHROMATICS COORDINATES

x	0.296	0.287	0.330	0.330
y	0.276	0.295	0.339	0.318

TOLERANCE IS ±0.01

Remarks:
1.Unmarked tolerance is ±0.3
2.Color:white
3.All materials comply with RoHs

1x3=3
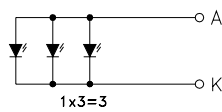
11. LCD MODULES HANDLING PRECAUTIONS

- Please remove the protection foil of polarizer before using.
- The display panel is made of glass. Do not subject it to a mechanical shock by dropping it from a high place, etc.

- If the display panel is damaged and the liquid crystal substance inside it leaks out, do not get any in your mouth. If the substance come into contact with your skin or clothes promptly wash it off using soap and water.

- Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary.

- The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarize carefully.

- To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.
  -Be sure to ground the body when handling the LCD module.
  -Tools required for assembly, such as soldering irons, must be properly grounded.
  -To reduce the amount of static electricity generated, do not conduct assembly and other work under dry conditions.
  -The LCD module is coated with a film to protect the display surface. Exercise care when peeling off this protective film since static electricity may be generated.

- Storage precautions
  When storing the LCD modules, avoid exposure to direct sunlight or to the light of fluorescent lamps. Keep the modules in bags designed to prevent static electricity charging under low temperature / normal humidity conditions (avoid high temperature / high humidity and low temperatures below 0°C). Whenever possible, the LCD modules should be stored in the same conditions in which they were shipped from our company.

12. OTHERS

- Liquid crystals solidify at low temperature (below the storage temperature range) leading to defective orientation of liquid crystal or the generation of air bubbles (black or white). Air bubbles may also be generated if the module is subjected to a strong shock at a low temperature.

- If the LCD modules have been operating for a long time showing the same display patterns may remain on the screen as ghost images and a slight contrast irregularity may also appear. Abnormal operating status can be resumed to be normal condition by suspending use for some time. It should be noted that this phenomena does not adversely affect performance reliability.

- To minimize the performance degradation of the LCD modules resulting from caused by static electricity, etc. exercise care to avoid holding the following sections when handling the modules:
  - Exposed area of the printed circuit board
  - Terminal electrode sections