

DISPLAY Elektronik GmbH

DATA SHEET

LCD MODULE

**DEM 128128B1 FGH-PW
(A-TOUCH)**

Product Specification

Version: 1

31.08.2017

GENERAL SPECIFICATION

MODULE NO. :

**DEM 128128B1 FGH-PW
(A-TOUCH)**

CUSTOMER P/N

VERSION NO.	CHANGE DESCRIPTION	DATE
0	ORIGINAL VERSION	25.08.2017
1	CORRECT TECHNOLOGY	31.08.2017

PREPARED BY: HZ

DATE: 31.08.2017

APPROVED BY: MH

DATE: 31.08.2017

CONTENTS

1. FUNCTIONS & FEATURES	LCD TYPE:	2
2. MODULE ARTWORK	2	
3. EXTERNAL DIMENSIONS	3	
4. BLOCK DIAGRAM	3	
5. PIN ASSIGNMENT	5	
6. POWER SUPPLY	5	
7. ABSOLUTE MAXIMUM RATINGS	6	
8. PCB DRAWING AND DESCRIPTION	6	
9. BACKLIGHT ELECTRICAL/OPTICAL SPECIFICATIONS	7	
10. TOUCH PANEL DRAWING	8	
11. ELECTRICAL CHARACTERISTICS	9	
12. QUALITY DESCRIPTION	11	
13. MODULE ACCEPT QUALITY LEVEL (AQL)	12	
14. RELIABILITY TEST	12	
15. LCD MODULES HANDLING PRECAUTIONS	13	
16. OTHERS	13	

1. FUNCTIONS & FEATURES LCD TYPE:

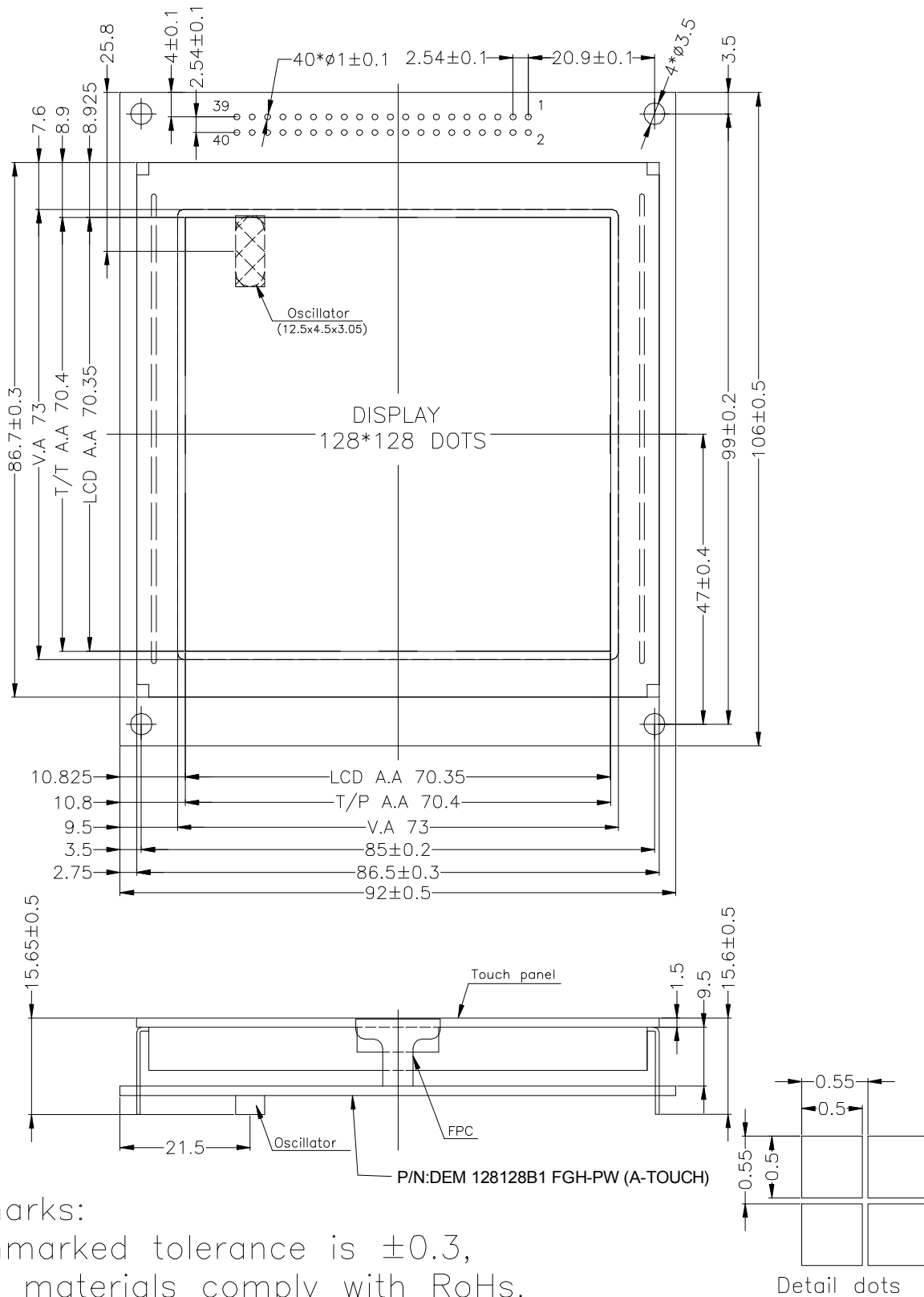
MODULE NAME	LCD TYPE
DEM 128128B1 FGH-PW(A-TOUCH)	FSTN Transflective Positive Mode

- Glass Thickness : 1.1 mm
- Viewing Direction : 6 O'clock
- Driving Scheme : 1/128Duty, 1/12 Bias
- Power Supply for logic : 5.0 Volt (typ.)
- Backlight Color : LED, Lightbox, White
- Display Format : 128 x 128 Dots
- $V_{LCD}(V_{LCD}=VDD-V5)$: 18.5 Volt (typ.)
- Driver IC : NT7086
- Controller IC : UCi6963 (Ultrachip)
- With touch panel : 4-Wire-Resistive, Antiglare

2. MODULE ARTWORK

- Module Size : 106.00 x 92.00 x 15.65 mm
- Viewing Area : 73.00 x 73.00 mm
- Active Area : 70.35 x 70.35 mm
- Dot Pitch : 0.55 x 0.55 mm
- Dot Size : 0.50 x 0.50 mm
- Dot Gap : 0.05 mm

3. EXTERNAL DIMENSIONS

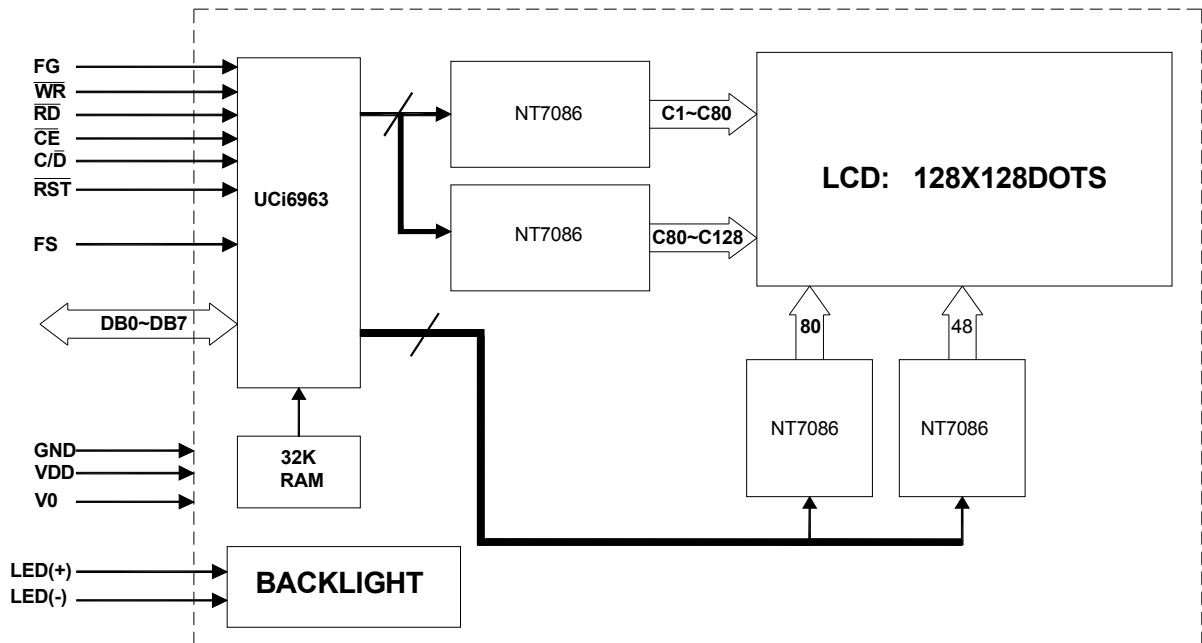


Remarks:

- 1, Unmarked tolerance is ± 0.3 ,
- 2, All materials comply with RoHs.

4. BLOCK DIAGRAM

4.1 Block Diagram of LCD Module



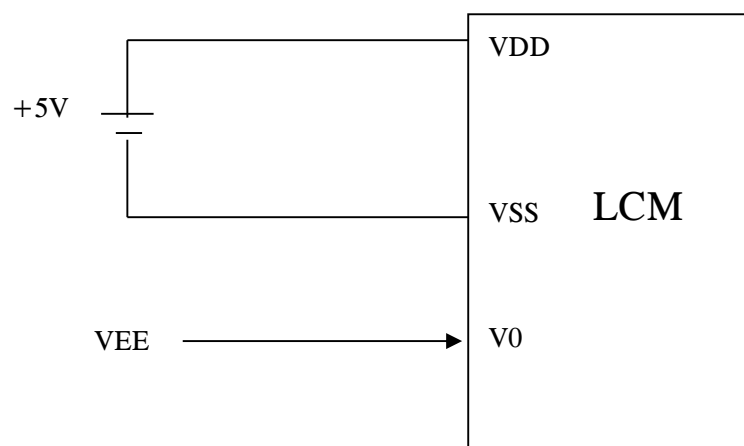
4.2 Analog Touch Screen Auto-Scanning Block Diagram



5. PIN ASSIGNMENT

NO.	SYMBOL	FUNCTION
1	FG	Frame ground
2	Y-	Y- Position Input
3	VSS	Ground(0V)
4	X+	X+ Position Input
5	VDD	Power supply for logic(+5V)
6	Y+	Y+ Position Input
7	V0	Power supply for LCD drive(-14V)
8	X-	X- Position Input
9	/WR	Write Command or data to module when “L”
10,12,14,16, 18,20,22,24, 26,28,30,32, 34,36,38,40	NC	
11	/RD	Read Command or data from module when “L”
13	/CE	Enable LCD controller when “L”
15	C//D	Command/data select. “H” for command read/write. “L” for data read/write
17	/RST	LCD Controller reset. Controller initialize and DB00-DB07 are set to be high impedance when/RST is “L”
19,21,23,25, 27,29,31,33,	DB0~DB7	LCD data input/output. DB0(pin10) is LSB and DB7(pin17) is MSB.
35	FS	Font select. “H” for 6x8 font & “L” for 8x8 font
37	LED+(A)	Please refer to item 8 PCB drawing and description
39	LED-(K)	

6. POWER SUPPLY

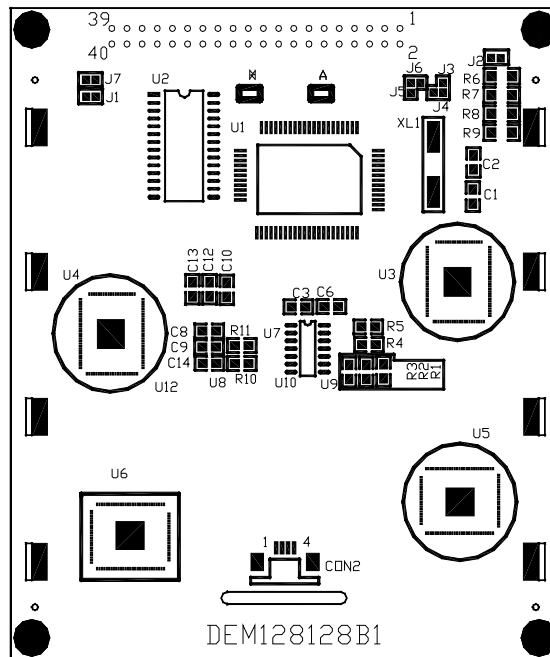


7. ABSOLUTE MAXIMUM RATINGS (V_{ss}=0V, Ta=25°C)

PARAMETER	SYMBOL	RATING	UNIT
Supply Voltage (Logic)	V _{DD}	-0.3 to 7.0	V
Input Voltage	V _{IN}	-0.3 to V _{DD} +0.3	V
Operating Temperature	T _{opr}	-20 to +70	°C
Storage Temperature	T _{stg}	-25 to +75	°C

8. PCB DRAWING AND DESCRIPTION

8.1. PCB DRAWING



8.2 DESCRIPTION:

8-2-1. The polarity of the pin 37 and the pin 39:

symbol state	J3, J5	J6, J4	LED Polarity	
			37Pin	39 Pin
Each solder-bridge	Each closed	Each open	Anode	Cathode
Each solder-bridge	Each open	Each closed	Cathode	Anode

Note: In application module, J3=J5=0 Ohm, J4=J6=open.

8-2-2. The J1 is metal-bezel GND to module GND and J7 is mounting holes GND to module GND.

Note: In application module, J1= J7=0 Ohm,

8-2-3. The LED resistor on board are used when J2 is open

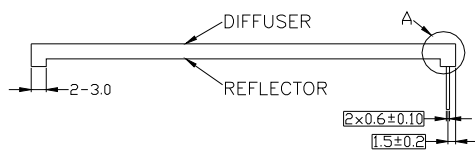
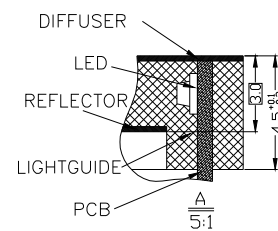
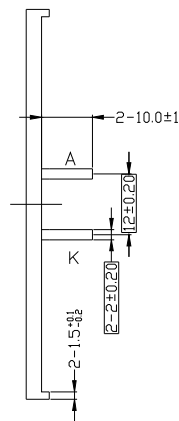
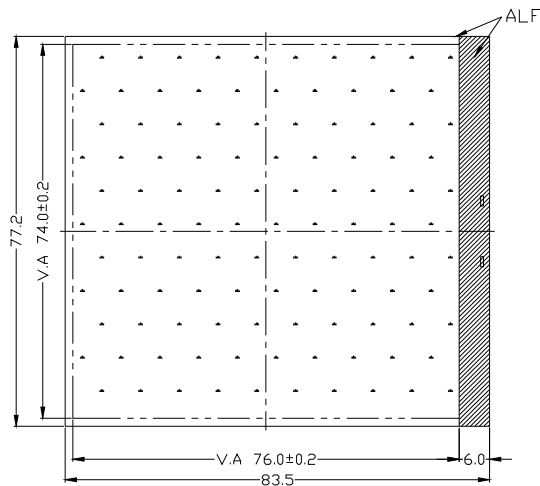
Note: In application module, J2=open

8-2-4. The R6 and the R7, R8, R9 are the LED resistor.

Note: In application module, R6=470hm, R7=680hm, R8=820hm, R9=open

9. BACKLIGHT ELECTRICAL/OPTICAL SPECIFICATIONS

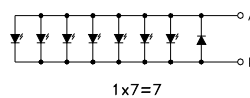
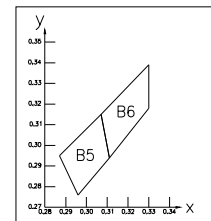
Item	Symbol	min.	typ.	max.	Unit	Condition
Forward Voltage	Vf	2.9	3.2	3.5	V	If= 105 mA
Reverse Current	Ir		30		μ A	Vr= 0.8 V
Luminance	Lv	175	250		cd/m ²	If= 105 mA



CHROMATICS COORDINATES

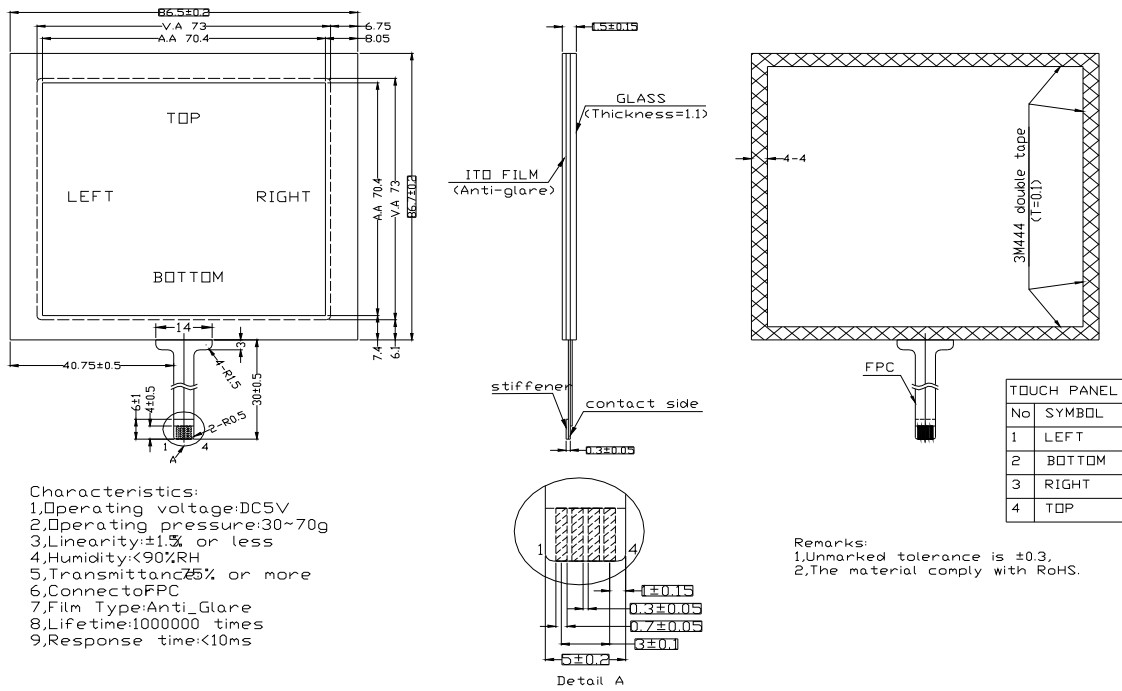
x	0.296	0.287	0.330	0.330
y	0.276	0.295	0.339	0.318

TOLERANCE IS ±0.01



Remarks:
 1, Unmarked tolerance is ±0.3;
 2, The color is white;
 3, All material is lead-free

10. TOUCH PANEL DRAWING



- Characteristics:
- 1, Operating voltage: DC5V
 - 2, Operating pressure: 30~70g
 - 3, Linearity: ±1.5% or less
 - 4, Humidity: <90%RH
 - 5, Transmittance: 75% or more
 - 6, Connector: FPC
 - 7, Film Type: Anti_Glare
 - 8, Lifetime: 1000000 times
 - 9, Response time: <10ms

- Remarks:
- 1, Unmarked tolerance is ±0.3.
 - 2, The material comply with RoHS.

11. ELECTRICAL Characteristics

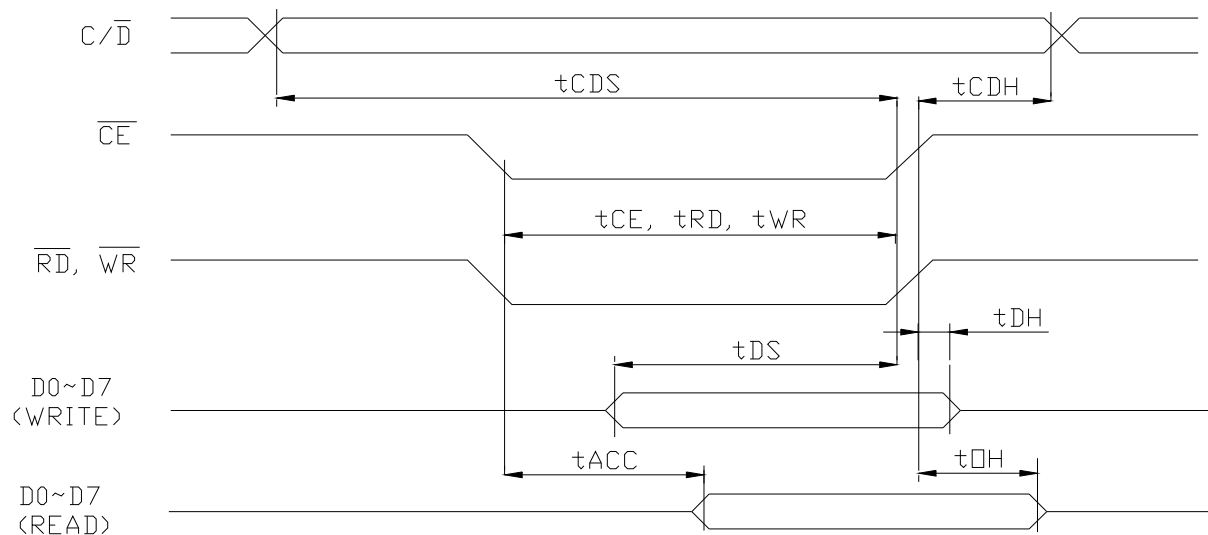
11.1 DC Characteristics

Ta=25°C, VSS=0V

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Supply Voltage (Logic)	V _{DD} -V _{SS}	-	4.5	5.0	5.5	V
Current Consumption(Operating)	I _{DD(1)}	V _{DD} =5.0V f _{OSC} = 3.0 MHz	-	TBD		mA
Current Consumption(Halt)	I _{DD(2)}	V _{DD} =5.0V		TBD		uA
Power Supply for LCD	V _{lcd}	VLCD=VDD-V5	18.2	18.5	18.8	V

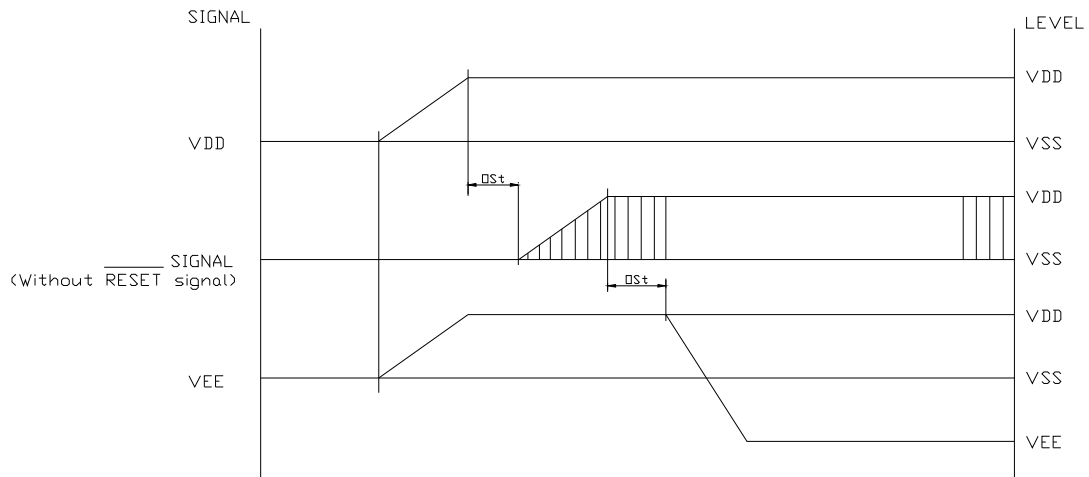
11.2 AC Characteristics

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

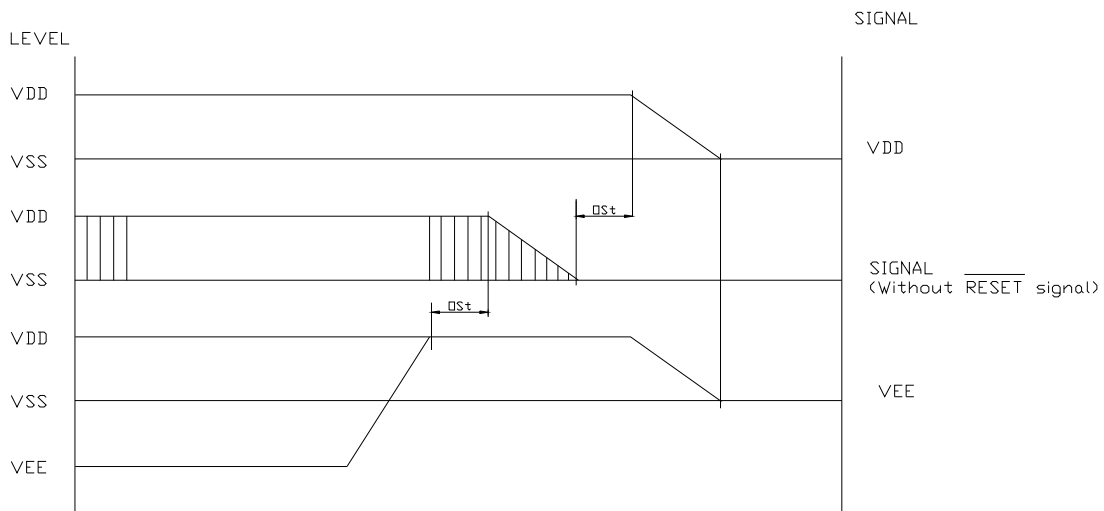


11.3 Power Supply ON/OFF Sequence

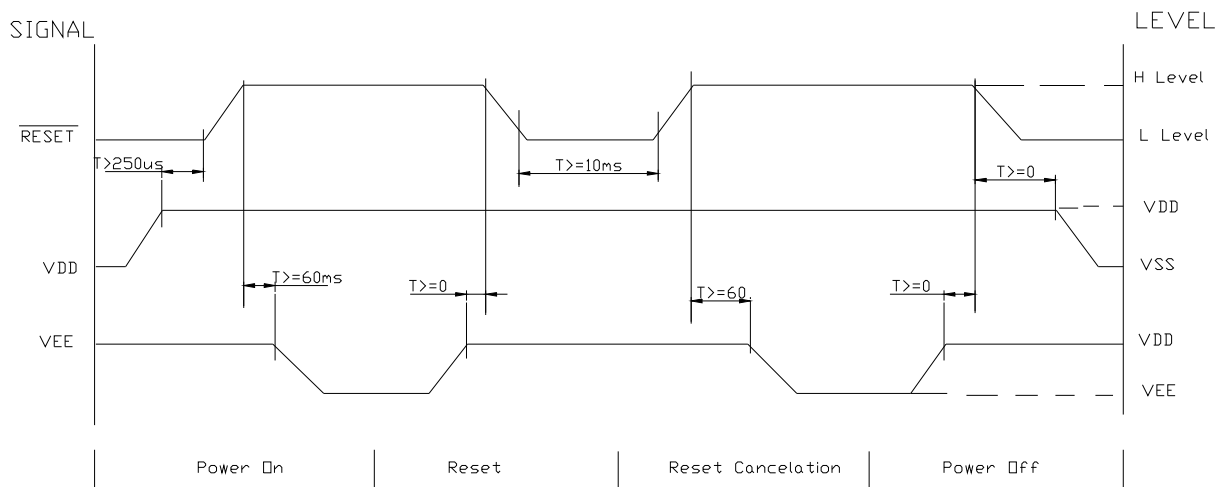
● ON Sequence



● OFF Sequence



● Reset Sequence



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

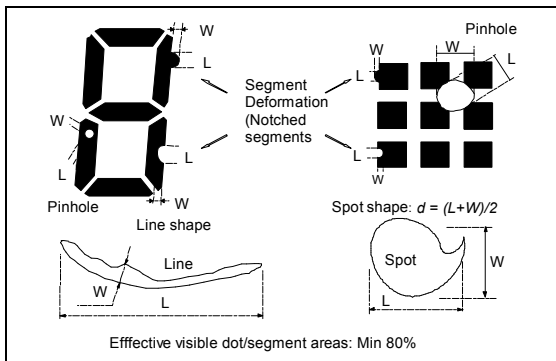
If VEE is supplied to the module while internal alternate signal for LCD driving (M) is unstable or RESET is active, DC component will be supplied to the LCD panel. This may cause damage to the LCD module.

12. QUALITY DESCRIPTION

DEFECT SPECIFICATION:

Specific type-related items are covered in this sheet.

- a: Table for Cosmetic defects
(Note: nc = not counted).
Sizes and number of defects
(Max. Qty)

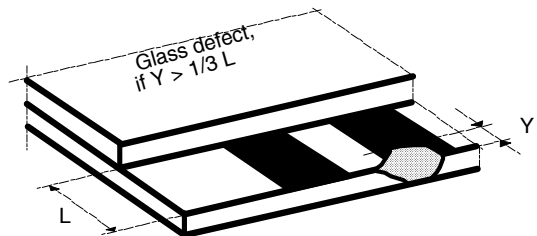


Examples/ Shapes

- b: Glass defects
- b1: Glass defects at contact ledge

b2: Glass chipping in other areas shall not be in conflict with the product's function.

Defect Type	Max. defect size [μm] d or L W	Max. Quantity
Black or White Spots	$d \leq 150$	nc
	$150 < d \leq 300$	5
Black or White Lines	-- $W \leq 10$	nc
	$L \leq 5000$ $W \leq 30$	3
Pinhole	$L \leq 2000$ $W \leq 50$	2
	$d \leq 150$ $150 < d \leq 300$	nc 1/segment
(Total defects)		(5)
Segment Deformation	$W \leq 100$	nc
Bubble (e.g. under pola)	$d \leq 150$	nc
	$200 < d \leq 400$	3
	$400 < d \leq 600$	1



13. MODULE ACCEPT QUALITY LEVEL (AQL)

13.1 AQL Standard Value: Fatal Defect =0.1, Major Defect=0.65; Minor Defect =2.5.

13.2 Curtailed Inspection Scheme

Type	Batch Qty	inspection Qty	AQL value	pass	Reject
module product	350PCS< 1000PCS	125pcs	0.1	0	1
			0.65	2	3
			2.5	7	8
	200PCS< 350PCS	80pcs	0.1	0	1
			0.65	1	2
			2.5	5	6
	<200PCS	32pcs	0.1	0	1
			0.65	0	1
			2.5	4	5
Module sample	<200PCS	All inspected	/	/	The sample will be reject when the fateful defect>2pcs or main defect>5pcs.
	>200PCS	125pcs			

- Notes:**
- 1). Batch QTY is the production amount that Production department ship to QA department.
 - 2). All of product will be inspected if the batch QTY less than inspected QTY.
 - 3). Each batch fixed to be 500pcs.

14. RELIABILITY TEST

Operating life time: Longer than 50000 hours (at room temperature without direct irradiation of sunlight)

Reliability characteristics shall meet following requirements.

TEMPERATURE TESTS	NORMAL GRADE
High Temperature Storage	+75□ *96hrs (Without Polarizer)
Low Temperature Storage	-25□ * 96hrs
High Temperature Operation	+70□ *96hrs
Low Temperature Operation	-20□ *96hrs
High Temperature, High Humidity	+70□ * 95%RH *96hrs (Without Polarizer)
Thermal Shock	-20□ *30min. ← 10s ↓ 5Cycles +70□ *30min. →
Vibration Test	Frequency *Swing * Time 40Hz * 4mm * 4hrs
Drop Test	Drop height*Times 1.0m * 6times

15. 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□). Whenever possible, the LCD modules should be stored in the same conditions in which they were shipped from our company.

16. 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