



SPECIFICATIONS

CUSTOMER : _____

MODEL NO. : **GFE122032G-BNFE**

VERSION : **B**

DATE : **2017.03.24**

CERTIFICATION : **ROHS**

CUSTOMER SIGN : _____

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Revision Record

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2017.03.24	B	修改公司抬頭、格式統一		



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1. SCOPE

This specification covers the engineering requirements for the GFE122032G-BNFE liquid crystal module.

2. PRODUCT SPECIFICATIONS

2.1 General

- 122 × 32 dot matrix LCD
- **STN (BLUE), Negative** mode LCD panel
- **Transmissive** Wide temperature type
- 6 o'clock
- Multiplexing driving : 1/32duty, 1/6bias
- Controller IC : **SBN1661G** or Compatible
- Backlight: **WHITE(EDGE)**

2.2 Mechanical Characteristics

Item	Value	Unit
Number of dots	122X32	Dot
Dot size	0.4 X0.45	mm
Dot pitch	0.44 X0.49	mm
Module dimension	77.8(W) X 27.2(H) X 13.7(T)	mm
Viewing Area	60 (W) X 18 (H)	mm
Active Area	53.64 (W) X 15.64 (H)	mm
Module	NO Connector	



2.3 Absolute Maximum Ratings (Without LED back-light)

Characteristic	Symbol	Unit	Value
Operating Voltage (logic)	V_{DD}	V	-0.3 to +7.0
Input Voltage	V_{IN}	V	-0.3 to $V_{DD}+0.3$

Note 1: Referenced to $V_{SS}=0V$

2.4 Electrical Characteristics (Without LED back-light)

Characteristic	Symbol	Condition	Min.	Typ.	Max.	Unit
Operating Voltage(logic)	$V_{DD}-V_{SS}$	--	4.7	5.0	5.3	V
Input Voltage	V_{IH}	--	$0.8V_{DD}$	--	V_{DD}	V
	V_{IL}	--	V_{SS}	--	$0.2V_{DD}$	
Output Voltage	V_{OH}	$I_{OH}=-0.1mA$	$0.8V_{DD}$	--	V_{DD}	V
	V_{HL}	$I_{OL}=0.1mA$	V_{SS}	--	$0.2V_{DD}$	

2.5 Optical Characteristics Absolute maximum ratings

Item	Symbol	Rating	Unit
Operating temperature range	Top	-20~70	°C
Storage temperature range	Tst	-30~80	°C

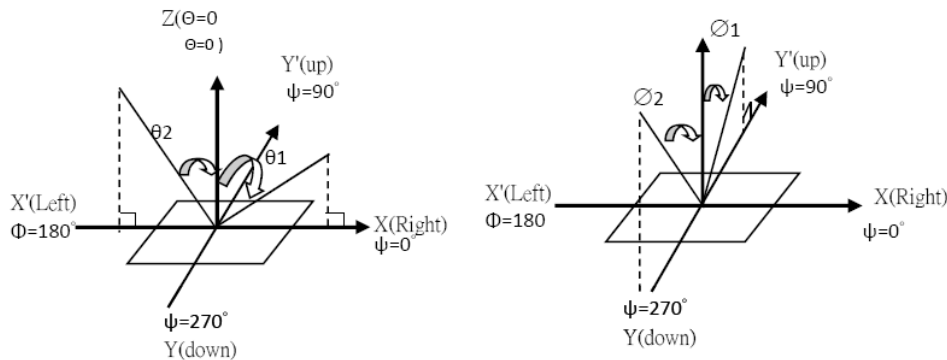


2.6. Optical Characteristics

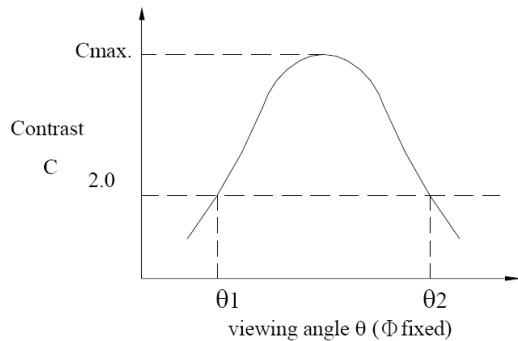
1/32 duty, 1/6 bias, Vop=4.6 V, Ta=25°C

Item	Symbol	Conditions	Min.	Typ.	Max	Reference
Driving voltage	Vop		--	4.6	--	
Viewing angle	θ_1 、 θ_2	$C \geq 2.0, \Phi = 0^\circ$ C	30°	-	-	Notes 1 & 2
Contrast	C	$\theta = 5^\circ, \Phi = 0^\circ$	2.0	-	-	Note 3
Response time(rise)	ton	$\theta = 5^\circ, \Phi = 0^\circ$	-	-	260ms	Note 4
Response time(fall)	toff	$\theta = 5^\circ, \Phi = 0^\circ$	-	-	380ms	Note 4

Note 1: Definition of angles θ and Φ

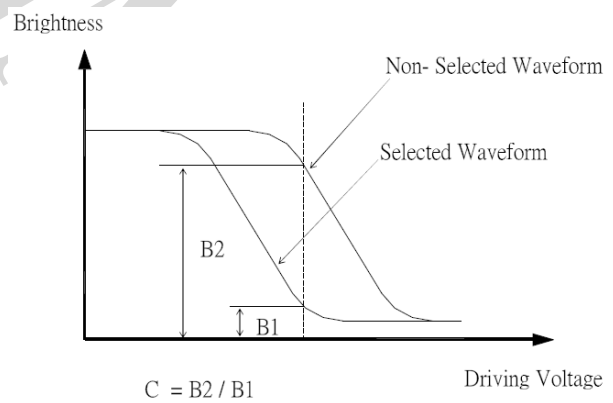


Note 2: Definition of viewing angles θ_1 and θ_2

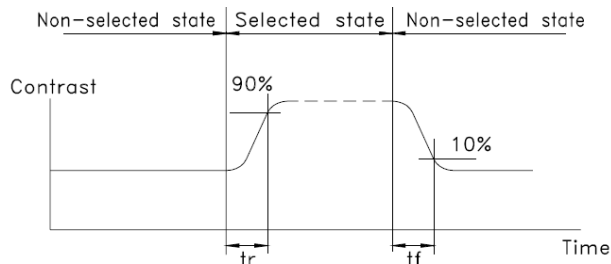


Note: Optimum viewing angle with the naked eye and viewing angle θ at Cmax. Above are not always the same

Note 3: Definition of contrast C



Note 4: Definition of response time



Note: Measured with a transmissive LCD panel which is displayed 1 cm²

V_{OPR} : Operating voltage f_{FRM} : Frame frequency
t_{ON} : Response time (rise) t_{OFF} : Response time (fall)



2.7 LED Back-light Characteristics

2.7.1 Electrical / optical specifications

Ta = 25°C

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Forward voltage	V_f	If=40mA, WHITE	2.9	3.1	3.3	V
*Luminous Intensity	I_v	If=40mA, WHITE	30	--	--	cd/m ²
Peak wavelength	λ_P	If=40mA, WHITE	--	0.28	--	nm
Spectrum Radiation Bandwidth	$\Delta\lambda$	If=40mA, WHITE	--	30	--	nm
Reverse Current	I_R	VR=5V, WHITE	--	--	0.04	mA
Luminous Uniformity	ΔL_v	If=40mA, WHITE	70			%

Note: * Please refer to CIE 1931 Chromaticity diagram.

2.7.2 LED Maximum Operating Range

Item	Symbol	Yellow-Green	Unit
Power Dissipation	P_{AD}	165	mW
Forward Current	I_F	50	mA
Reverse Voltage	V_R	5	V



3. RELIABILITY

NO.	ITEM	CONDITION		STANDARD	NOTE
1	High Temp. Storage	80°C	120 hrs	Appearance Without defect	
2	Low Temp. Storage	-30°C	120 hrs	Appearance Without defect	
3	High Temp. & High Humi. Storage	40°C 90% RH	120 hrs	Appearance Without defect	
4	High Temp. Operating Display	70°C	120 hrs	Appearance Without defect	
5	Low Temp. Operating Display	-20°C	120 hrs	Appearance Without defect	
6	Thermal Shock	-20°C, 30min. → 70°C, 30min. 		Appearance Without defect	10 cycles

** Dissipation current, contrast and display functions

** Polarizing filter deterioration, other appearance defects

** The function test shall be conducted after 4hours storage at the normal temperature and humidity after remove from the test chamber.

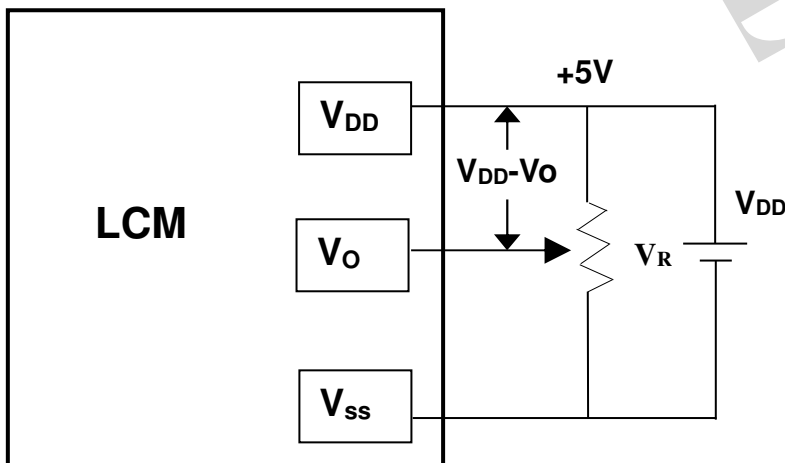


4. OPERATING INSTRUCTIONS

4.1 Input signal Function

Pin No	Symbol	Function
1	Vss	Signal ground (GND)
2	Vdd	Power supply for logic (+5V)
3	Vo	Operating voltage for LCD (variable)
4	A0	Start enable signal to read or write the data
5	E1	Chip1 enable (segment 1 to segment 64),Active high
6	E2	Chip2 enable (segment 65 to segment 128),Active high
7	NC	NC
8	NC	NC
9	R/W	Data read & write
10-13	DB0~DB3	Four low order bi-directional three-state data bus lines. Used for data transfer between the MPU and the LCD module.
14-17	DB4~DB7	Four high order bi-directional three-state data bus lines. Used for data transfer between the MPU and the LCD module. DB7 can be used as a busy flag.
18	/RST	Reset signal

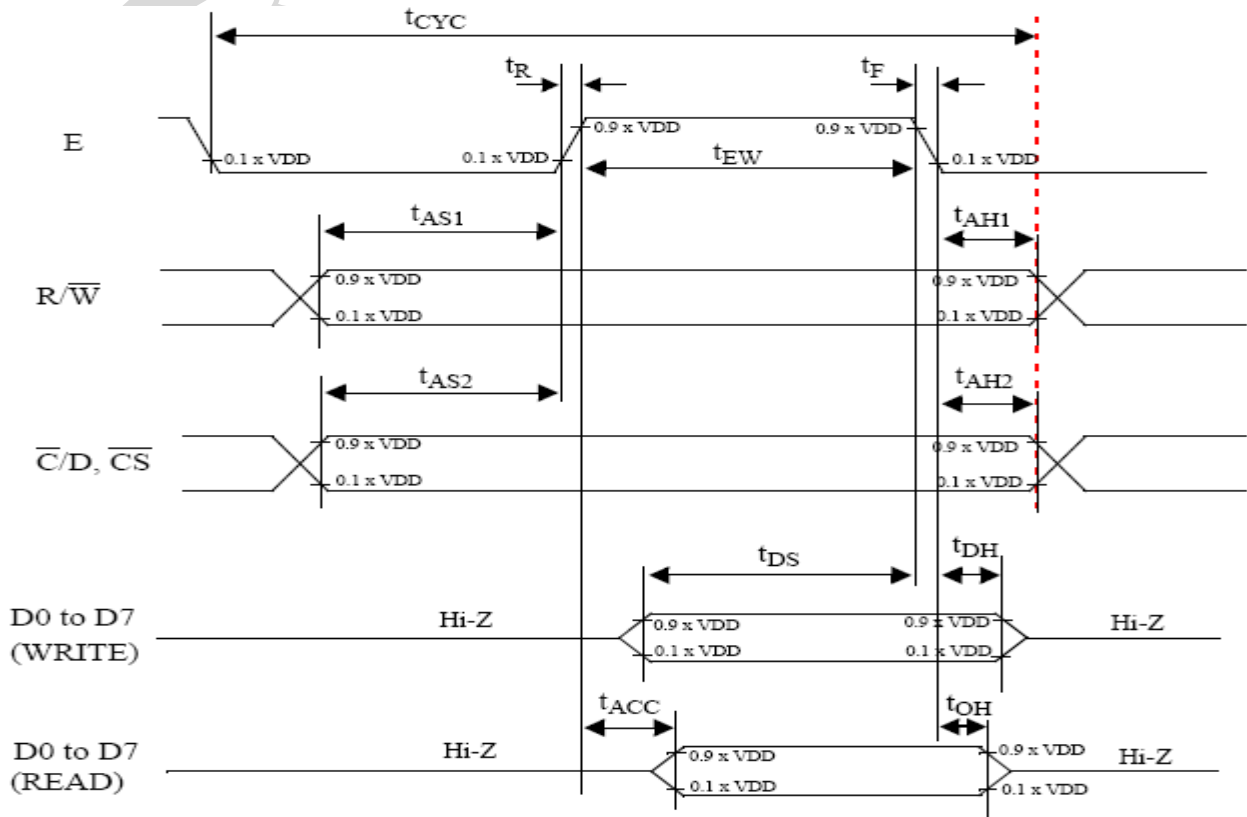
4.2 Voltage Generator Circuit



V_{DD}-V_O : LCD Driving Voltage
V_R : 10K~20K



4.3 Timing Diagram



symbol	parameter	min.	max.	test conditons	unit
t_{AS1}	Address set-up time with respect to R/W	20			ns
t_{AS2}	Address set-up time with respect to C/D, CS	20			ns
t_{AH1}	Address hold time with respect to R/W	10			ns
t_{AH2}	Address hold time respect with to C/D, CS	10			ns
t_{F}, t_{R}	Enable (E) pulse falling/rising time		15		ns
t_{CYC}	System cycle time	1000		Note 1	ns
t_{EWR}	Enable pulse width for READ	100			ns
t_{EWW}	Enable pulse width for WRITE	80			ns
t_{DS}	Data setup time	80			ns
t_{DH}	Data hold time	10			ns
t_{ACC}	Data access time		90	CL= 100 pF.	ns
t_{OH}	Data output hold time	10	60	Refer to Fig. 23.	ns

