高華電子顯示（深圳）有限公司
CLOVER CHINA DISPLAY (SHENZHEN) LTD.

LCD MODULE SPECIFICATION

Model : ZCV12864N- _ _ - _ _ - _ _ - _

Specification Revision	00
Engineering	PANWU
Date	09 MAY 12
Our Reference	

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MODE OF DISPLAY

Display mode	**Display condition**	**Viewing direction**
STN : ☐ Yellow green	☐ Reflective type	☐ 6 O' clock
☐ Grey	☐ Transflective type	☐ 12 O' clock
☐ Blue (negative)	☐ Transmissive type	☐ 3 O' clock
☐ FSTN positive	☐ Others	☐ 9 O' clock
☐ FSTN negative		

LCD MODULE NUMBER NOTATION:

ZCV12864N - M Y- S F- N 6 – T

(1) (2)(3) (4)(5) (6)(7) (8)

*(1)---Model number of standard LCD modules

*(2)---Backlight type
- N – No backlight
- E – EL backlight
- L – Side-lited LED backlight
- M– Array LED backlight
- C – CCFL

*(3)---Backlight color
- N – No backlight
- A – Amber
- B – Blue
- O– Orange
- W–White
- Y – Yellow green

*(4)---Display mode
- T – TN
- V – TN (Negative)
- S – STN Yellow green
- G – STN Grey
- B – STN Blue (Negative)
- F – FSTN
- N – FSTN (Negative)

*(5)---Rear polarizer type
- R – Reflective
- F – Transflective
- T – Transmissive

*(6)---Temperature range
- N – Normal
- W– Extended

*(7)---Viewing direction
- 6 – 6 O'clock
- 2 – 12 O'clock
- 3 – 3 O'clock
- 9 – 9 O'clock

*(8)---Special code for other requirements
(Can be omitted if not used)

GENERAL DESCRIPTION

Display mode : 128 x 64 dots COB LCD module

Interface : 8-bit parallel

Driving method : 1/64 duty, 1/9 bias

Driver IC : AIP31107 or equivalence
For the detailed information, please refer to the IC specifications.

MECHANICAL DIMENSIONS

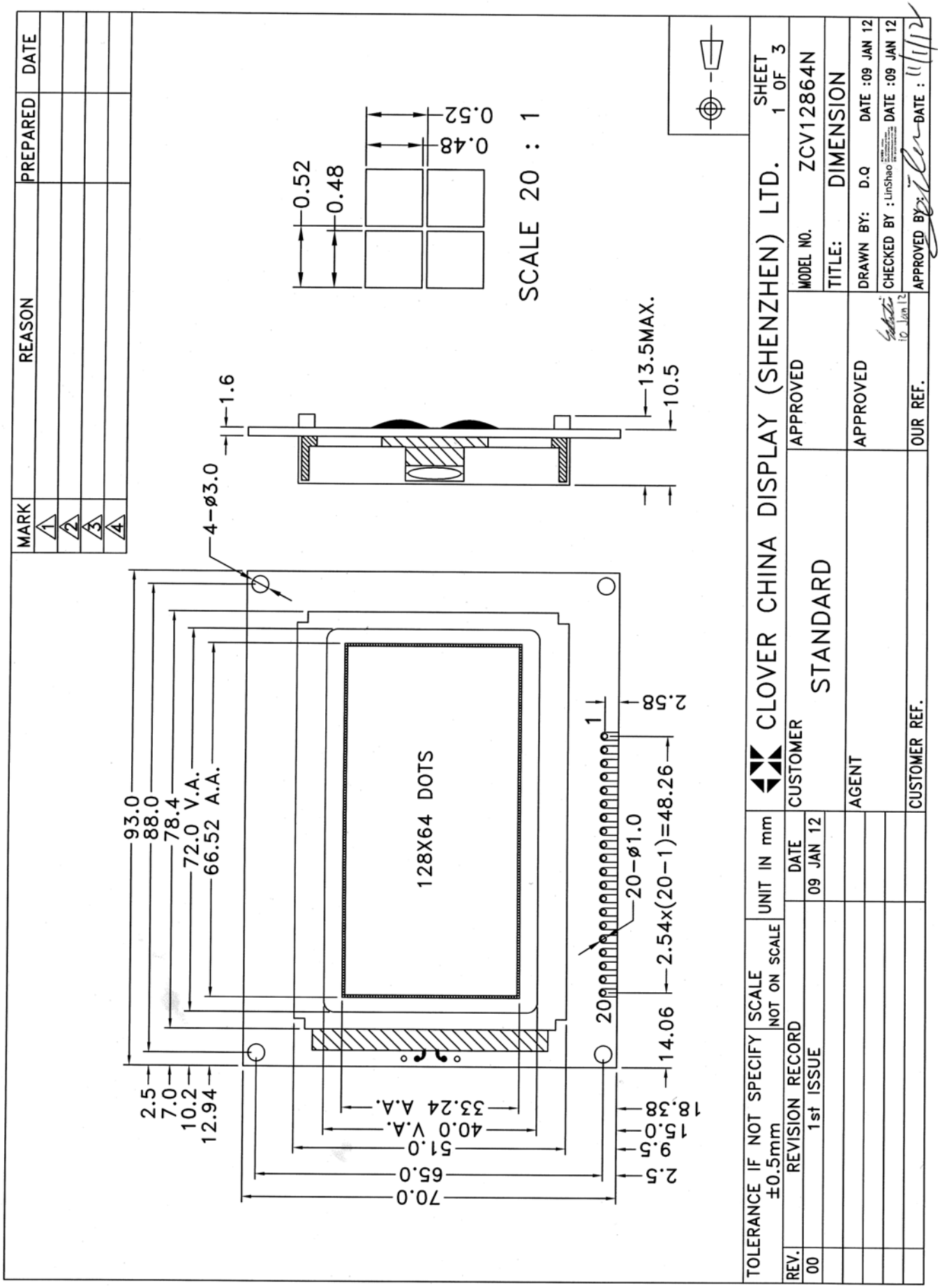
Item	Dimension	Unit	Item	Dimension	Unit
Outline Dimension	93.0(L)x70.0(W)x 13.5Max(H)	mm	Dot Size	0.48(L)x0.48(W)	mm
Viewing Area	72.0(L)x40.0(W)	mm	Dot Pitch	0.52(L)x0.52(W)	mm

CONNECTOR PIN ASSIGNMENT

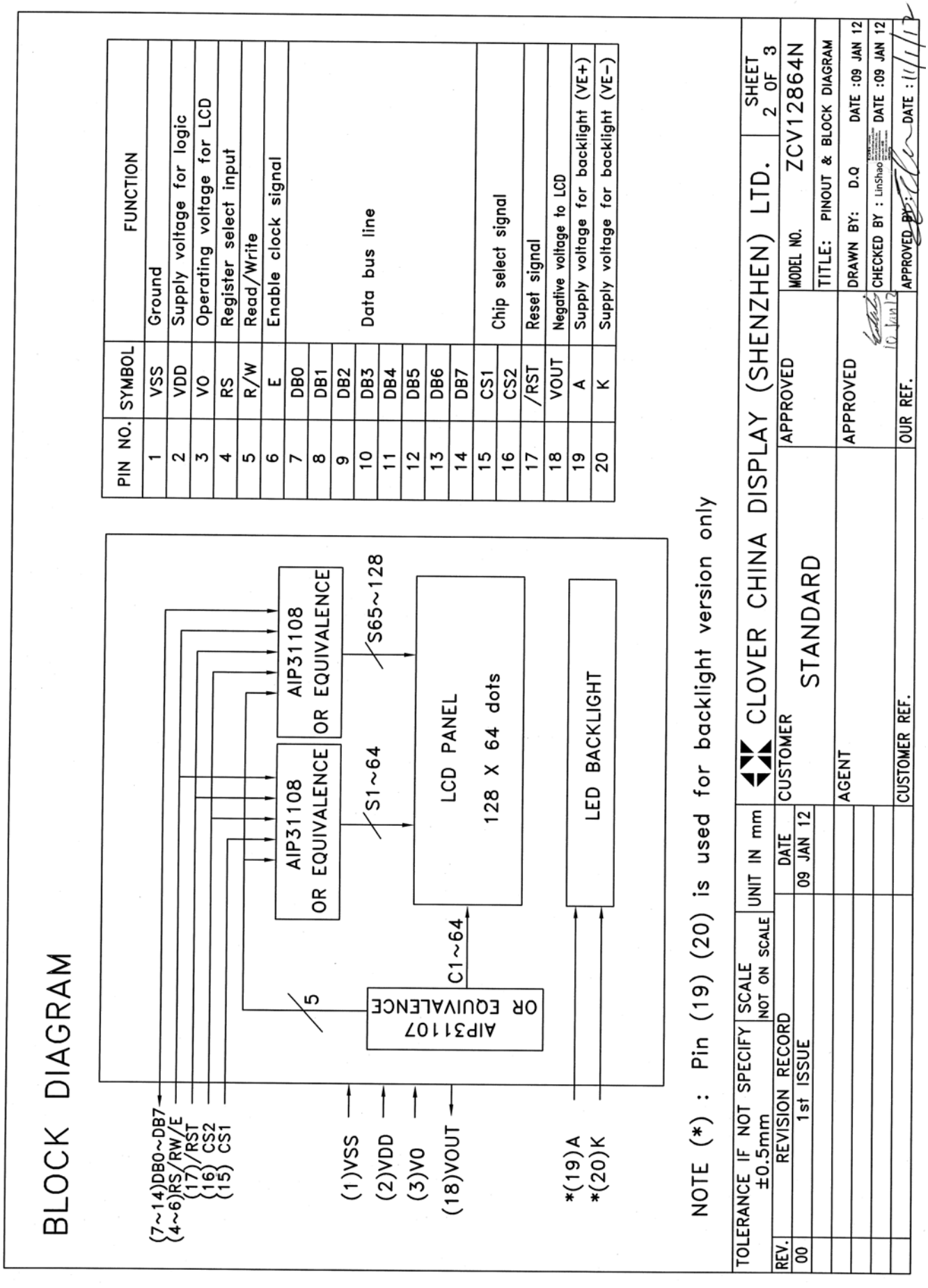
Pin No.	Symbol	Function
1	VSS	Ground (0V)
2	VDD	Supply voltage for logic
3	VO	Supply voltage for LCD
4	RS	Register select signal
5	R/W	Data read / Write
6	E	Enable clock
7	D0	Data bus line
8	D1	
9	D2	
10	D3	
11	D4	
12	D5	
13	D6	
14	D7	
15	CS1	Chip enable
16	CS2	
17	/RST	Reset signal
18	VOUT	Negative voltage to LCD
*19	A	Supply voltage for backlight(+VE)
*20	K	Supply voltage for backlight(-VE)

Note (*) : Pin 19, 20 are used for backlight version

COUNTER DRAWING OF MODULE DIMENSION



COUNTER DRAWING OF PIN OUT & BLOCK DIAGRAM



ELECTRICAL CHARACTERISTICS

Conditions: VSS=0V, @Ta=25℃

Item	Symbol	MIN.	TYP.	MAX.	Unit
Supply Voltage for Logic	VDD	4.75	5.0	5.25	V
Supply Current for Logic	IDD	–	12.75	13.2	mA
Supply Voltage for LCD(*)	VLCD	8.55	9.0	9.45	V
"H"Level Input Voltage	VIH	0.7VDD	–	VDD	V
"L"Level Input Voltage	VIL	VSS	–	0.3VDD	V

Note (*): There is tolerance in optimum LCD driving voltage during production and it will be within the specified range.

Side-lited LED backlight:

Constant voltage driving:

Item	Symbol	MIN.	TYP.	MAX.	Unit	Condition
White	I_{BL}	–	60	–	mA	V_{BL} = 5.0V
Blue	I_{BL}	–	60	–	mA	V_{BL} = 5.0V
Yellow Green	I_{BL}	–	60	–	mA	V_{BL} = 5.0V

Array LED backlight:

Constant voltage driving:

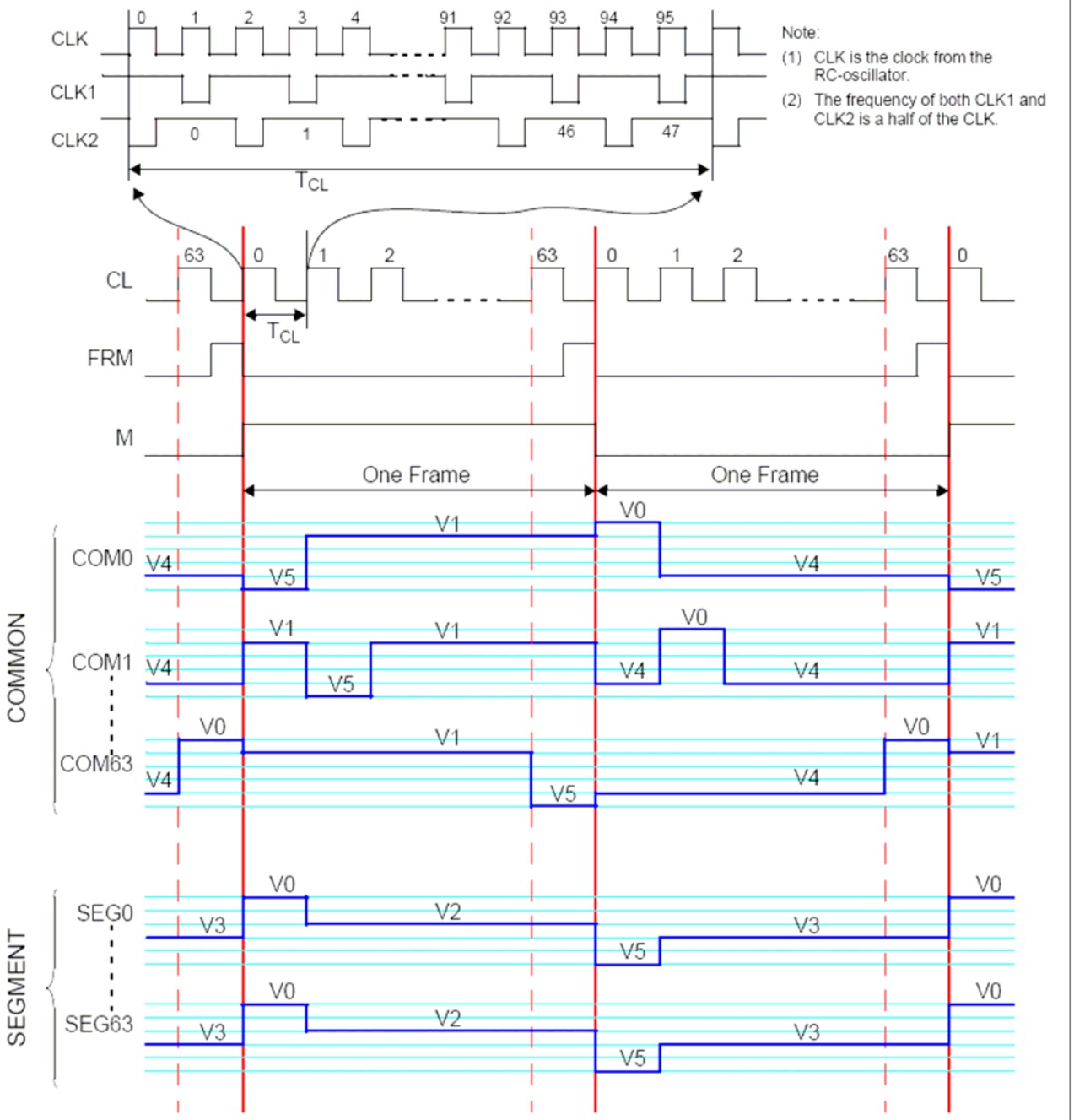
Item	Symbol	MIN.	TYP.	MAX.	Unit	Condition
Red	I_{BL}	–	360	–	mA	V_{BL} = 5.0V
Yellow Green	I_{BL}	–	360	–	mA	V_{BL} = 5.0V

ABSOLUTE MAXIMUM RATINGS

Please make sure not to exceed the following maximum rating values under the worst application conditions.

Item	Symbol	Rating (for normal temperature)	Rating (for wide temperature)	Unit
Supply Voltage for Logic	VDD	-0.3 to 7.0	-0.3 to 7.0	V
Input Voltage for Logic	VIN	-03 to VDD+0.3	-03 to VDD+0.3	V
Operating Temperature	Topr	0 to 50	-20 to 70	℃
Storage Temperature	Tstg	-10 to 60	-30 to 80	℃

TIMING CHART



Note:

COMMON is the scan signal for horizontal display line.
SEGMENT is the display data from the on-chip display data. The wave form of this example shows that only the top line of the panel is turned ON.

Fig.20 Timing diagram for 1/64 display duty

MPU Interface

Characteristic	Symbol	Min	Typ	Max	Unit
E cycle	t_C	1000	-	-	ns
E high level width	t_{WH}	450	-	-	ns
E low level width	t_{WL}	450	-	-	ns
E rise time	t_R	-	-	25	ns
E fall time	t_F	-	-	25	ns
Address set-up time	t_{ASU}	140	-	-	ns
Address hold time	t_{AH}	10	-	-	ns
Data set-up time	t_{DSU}	200	-	-	ns
Data delay time	t_D	-	-	320	ns
Data hold time (write)	t_{DHW}	10	-	-	ns
Data hold time (read)	t_{DHR}	20	-	-	ns

Microcontroller interface timing for writing to the SBN0064G

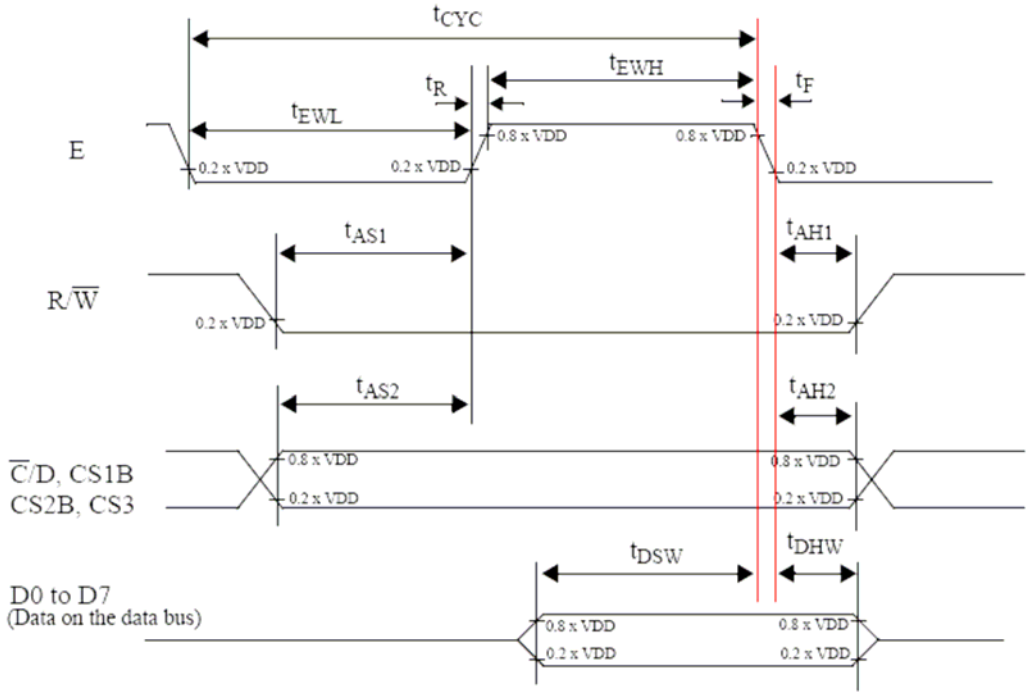


Fig.16 AC timing for writing to the SBN0064G

Microcontroller interface timing for reading from the SBN0064G

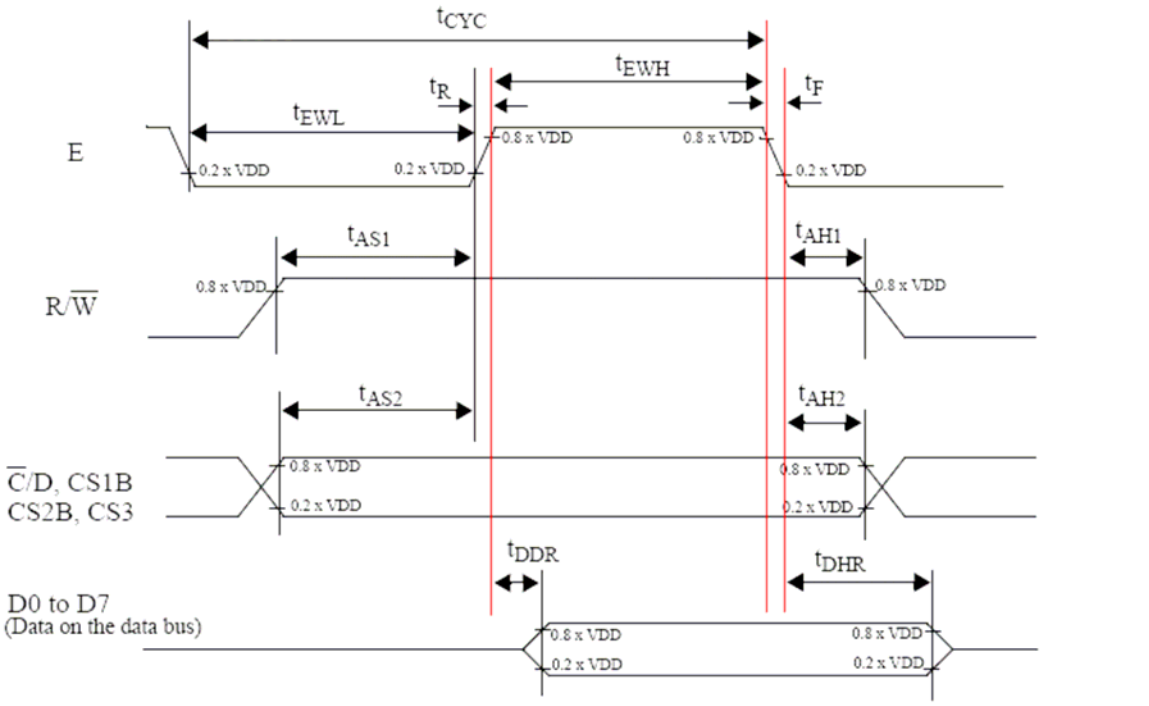


Fig.17 AC timing for reading from the SBN0064G

ELECTRO-OPTICAL CHARACTERISTICS

MEASURING CONDITION: POWER SUPPLY = VOP / 64 Hz
TEMPERATURE = 22 ± 5 °C
RELATIVE HUMIDITY = 60 ± 15 %

Item	Symbol	Unit	TYP. STN
RESPONSE TIME	Ton	ms	220
	Toff	ms	280
CONTRAST RATIO	Cr	-	12
VIEWING ANGLE (6 O'clock) (Cr ≥ 2)	V3:00	°	40
	V6:00	°	70
	V9:00	°	40
	V12:00	°	50

THE ELECTRO-OPTICAL CHARACTERISTICS ARE MEASURED VALUE BUT NOT GUARANTEED ONES.

RELIABILITY OF LCD MODULE

ITEM	TEST CONDITION FOR NORMAL TEMPERATURE	TEST CONDITION FOR WIDE TEMPERATURE	TIME
High temperature operating	50°C	70°C	240 hours
Low temperature operating	0°C	-20°C	240 hours
High temperature storage	60°C	80°C	240 hours
Low temperature storage	-10°C	-30°C	240 hours
Temperature-humidity storage	40°C 90% R.H.	60°C 90% R.H.	96 hours
Temperature cycling	-10°C to 60°C 30 Min Dwell	-30°C to 80°C 30 Min Dwell	5 cycle
Vibration Test at LCM Level	Freq 10-55 Hz Sweep rate: 10-55-10 at 1 min Sweep mode Linear Displacement: 2 mm p-p 1 Hour each for X, Y, Z	Freq 10-55 Hz Sweep rate: 10-55-10 at 1 min Sweep mode Linear Displacement: 2 mm p-p 1 Hour each for X, Y, Z	—

QUALITY STANDARD OF LCD MODULE

1.0	**Sampling Method**		
	Sampling Plan : MIL STD 105 E Class of AQL : Level II/Single Sampling Critical : 0.25% Major 0.65% Minor 1.5%		
2.0	**Defect Group**	**Failure Category**	**Failure Reasons**
	Critical Defect 0.25%(AQL)	Malfunction	Open Short Burnt or dead component Missing part/improper part P.C.B. Broken
	Major Defect 0.65%(AQL)	Poor Insulation	Potential short High current Component damage or scratched or Lying too close improper coating
		Poor Conduction	Damage joint Wrong polarity Wrong spec. part Uneven/intermittent contact Loose part Copper peeling Rust or corrosion or dirt‘s
	Minor Defect 1.5%(AQL)	Cosmetic Defect	Minor scratch Flux residue Thin solder Poor plating Poor marking Crack solder Poor bending Poor packing Wrong size

HANDLING PRECAUTIONS

(1) CAUTION OF LCD HANDLING & CLEANING

The polarizing plate on the surface of the panel is made from organic substances. Be very careful for chemicals not to touch the plate or it leads the polarizing plate to deteriorate.

If the use of a chemical is unavoidable, wipe the panel lightly with soft materials, such as gauze and absorbent cotton, soaked in a solvent.

*Usable solvent: Alcohol (ethanol, IPA and the like)
*Appropriate solvent: Ketones, ethyl alcohol

Avoid wiping with a dry cloth, since it could damage the surface of the polarizing plate and others.

(2) CAUTION AGAINST STATIC CHARGE

The LCD modules use CMOS LSI drivers, so customers are recommended that any unused input terminal would be connected to V_{DD} or V_{SS}, do not input any signals before power is turned on, and ground your body, work/assembly areas, assembly equipment to protect against static electricity.

(3) PACKAGING

Avoid intense shock and falls from a height and do not operate or store them exposed to direct sunshine or high temperature/humidity for long periods.

(4) CAUTION FOR OPERATION

Driving voltage should be kept within specified range, excess voltage shortens display life.

Response time increases with decrease in temperature.

Display may turn black or dark Blue at temperature above its operational range; this is however not destructive and the display will return to normal once the temperature falls back to range.

Mechanical disturbance during operation (such as pressing on the viewing area) may cause the segments to appear “fractured”. They will recover once the display is turned off.

Condensation at terminals will cause malfunction and possible electrochemical reaction. Relative humidity of the environment should therefore be kept below 60%.

(5) SAFETY

Liquid crystal may leak out of a damaged LCD, it is recommended to wash off the liquid crystal by using solvents such as acetone or ethanol and should be burned up later.

If any liquid leaks out of a damaged glass cell comes in contact with your hands, wash it off with soap and water immediately.

WARRANTY

CLOVER CHINA will replace or repair any of her LCD module in accordance with her LCD specification for a period of one year from date of shipment. The warranty liability of CLOVER CHINA is limited to repair and/or replacement. CLOVER CHINA will not be responsible for any subsequent or consequential event.