



CLOVER DISPLAY LTD.

LCD MODULE SPECIFICATION

Model : CV640200A - _ _ - _ _ - _ _ - _ _

Revision	03
Engineering	ALLEN NG
Date	04 September 2014
Our Reference	X4944

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MODE OF DISPLAY**Display mode**

- STN : Yellow green
 Grey
 Blue (negative)
 FSTN positive
 FSTN negative

Display condition

- Reflective type
 Transflective type
 Transmissive type
 Others

Viewing direction

- 6 O' clock
 12 O' clock
 3 O' clock
 9 O' clock

LCD MODULE NUMBER NOTATION:

CV640200A- MY - 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

* (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)

- T – Touch panel (Analog)
P – Touch panel (Digital)

GENERAL DESCRIPTION

Display mode	:	640 x 200 dots, graphic LCD module
Interface	:	4-bit data transfer
Driving method	:	1/200 duty, 1/15 bias
Driver IC	:	AVANT SDN8080G or equivalent For the detailed information, please refer to the IC specifications.

MECHANICAL DIMENSIONS

Item	Dimension	Unit	Item	Dimension	Unit
Outline Dimension		mm	Viewing Area	232.16(L)x106.17(W)	mm
No Backlight	256.29(L)x128.02(W)x10.0 MAX	mm	Dot pitch	0.35(L)x0.49(W)	mm
Sided Backlight	256.29(L)x128.02(W)x13.5 MAX	mm	Dot size	0.30(L)x0.44(W)	mm

CONNECTOR PIN ASSIGNMENT**CN1**

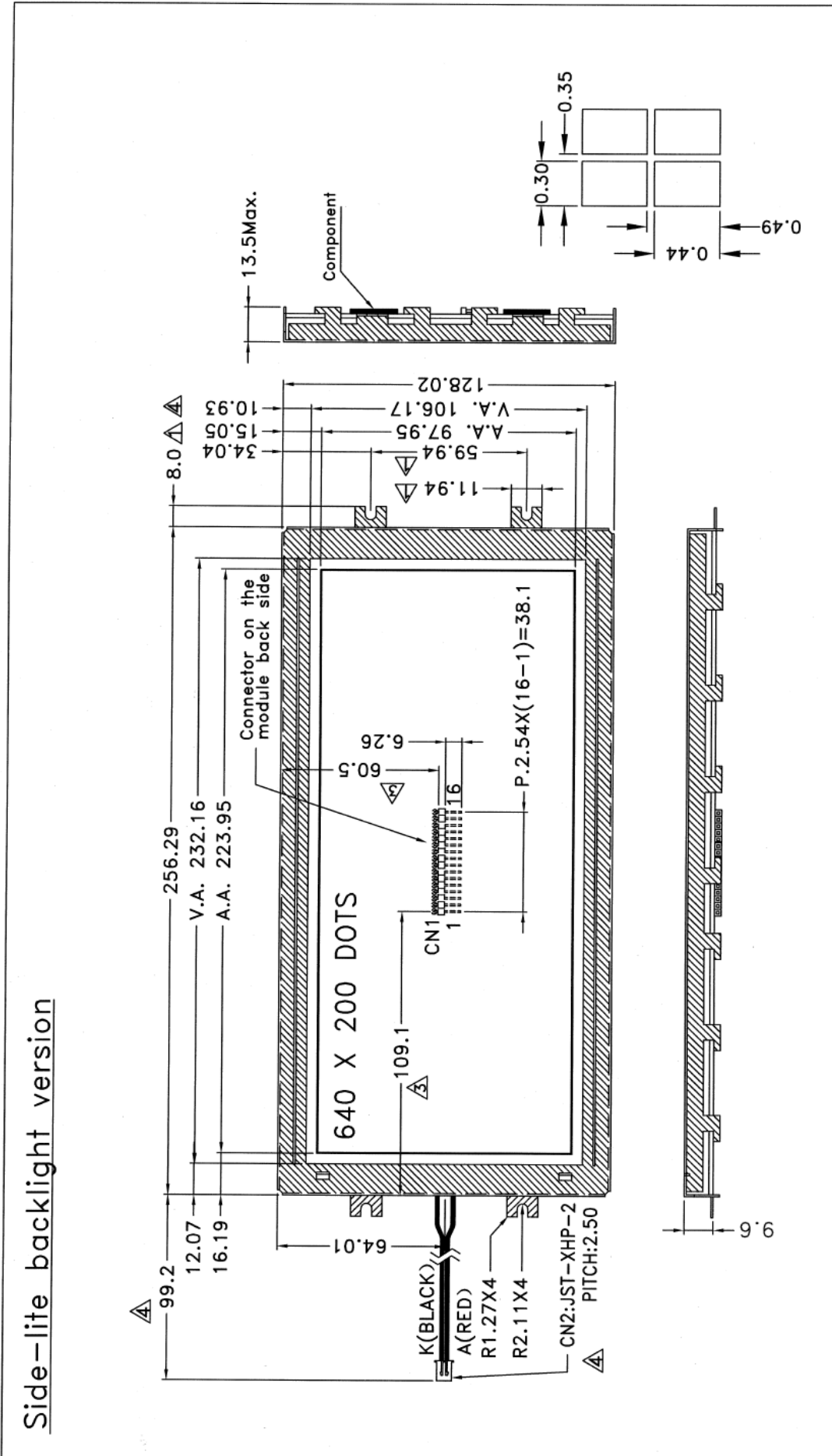
Pin No.	Symbol	Function	Pin No.	Symbol	Function
1	FLM	First line marker	9	D0	Data Bus Line
2	CLK1	Data Latch Signal	10	D1	Data Bus Line
3	CLK2	Data Input Clock Signal	11	D2	
4	M	DC Alternating Waveform Signal	12	D3	
5	VO	LCD Contrast Adjustment	13	/DISPOFF	Display Off
6	VDD	Supply Voltage for logic	14	NC	No Connection
7	VSS	Ground	15	TSENSE	Optional Temperature Sensor Output
8	VEE	Power Supply for LCD Control	16	VSS	Ground

CN2

Pin No.	Symbol	Function
1 RED	A	Supply voltage for backlight (BL+)
2 BLACK	K	Supply voltage for backlight (BL-)

COUNTER DRAWING OF MODULE DIMENSION

(WITH SIDE-LITE BACKLIGHT VERSION)



TOLERANCE IF NOT SPECIFY ±0.5mm		SCALE N.T.S.	UNIT IN mm	CLOVER DISPLAY LTD. (HK)		SHEET 2 OF 4
REV.	REVISION RECORD	DATE	CUSTOMER	APPROVED		
00	1st ISSUE	22 SEP 05	CUSTOMER	MODEL NO. CV640200A		
01	Change design of the backlight, bezel and pin header	26 OCT 05	AGENT	TITLE: MODULE DIMENSION WITH CCFL BACKLIGHT		
02	Update version	13 MAR 06		DRAWN BY: LINSHAO DATE: 22 JUL 11		
03	Change driver IC & CN1 location	18 NOV 08		CHECKED BY: DATE: 26 Jul 11		
04	Add side lite backlight version & conceal CCFL backlight version	22 JUL 11		APPROVED BY: DATE: 26/7/11		
			CUSTOMER REF.	OUR REF. X4944		

COUNTER DRAWING OF PINOUT & BLOCK DIAGRAM

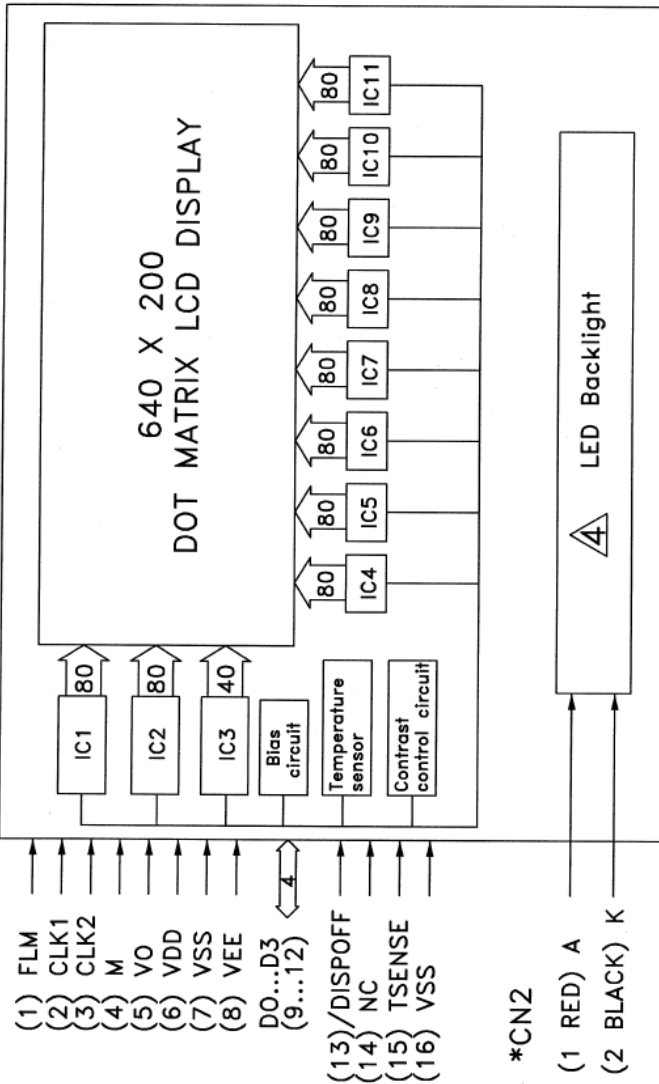
CN1

PIN NO.	SYMBOL	FUNCTION
1	FLM	First line marker
2	CLK1	Data latch signal
3	CLK2	Data input clock signal
4	M	DC alternating waveform signal
5	VO	LCD contrast adjustment
6	VDD	Supply voltage for logic
7	VSS	Ground
8	VEE	Power supply for LCD control
9	D0	Data bus line
10	D1	
11	D2	
12	D3	
13	/DISPOFF	Display off
14	NC	No connection
15	TSENSE	Optional temperature sensor output
16	VSS	Ground

*CN2

PIN NO.	SYMBOL	FUNCTION
1.(RED)	A	Supply voltage for backlight (BL+)
2.(BLACK)	K	Supply voltage for backlight (BL-)

CN1



*CN2

- (1) RED) A
- (2) BLACK) K

Note: IC1 to IC11 (SDN8080G or equivalent)

*CN2 is used for Side-lite backlight version only

TOLERANCE IF NOT SPECIFY ±0.5mm		SCALE N.T.S.	UNIT IN mm	CLOVER DISPLAY LTD. (HK)		SHEET 3 OF 4
REV.	REVISION RECORD	DATE	CUSTOMER	APPROVED	MODEL NO.	CV640200A
00	1st ISSUE	22 SEP 05	CUSTOMER	Standard	TITLE:	PIN OUT & BLOCK DIAGRAM
01	Change design of the backlight, bezel and pin header	26 OCT 05	AGENT	APPROVED	DRAWN BY:	LINSHAO DATE: 22 JUL 11
02	Update version	13 MAR 06	AGENT		CHECKED BY:	DATE: 26 JUL 11
03	Change driver IC & CN1 location	18 NOV 08			APPROVED BY:	DATE: 26 JUL 11
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ELECTRICAL CHARACTERISTICS

Conditions: VSS=0V, @Ta=25°C

Item	Symbol	MIN.	TYP.	MAX.	Unit
Supply Voltage for Logic	VDD	4.50	5.0	5.50	V
Supply Current for Logic	IDD	—	9.35	—	mA
Supply Voltage for LCD (*)	VEE	-24.0	—	-19.0	V
'High' Level Input Voltage	VIH	0.8VDD	—	VDD	V
'Low' Level Input Voltage	VIL	0.0	—	0.2VDD	V
Contrast Adjust	VO	0.0	+2.1	+5.0	V

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

Side-lite backlight

Constant voltage driving:

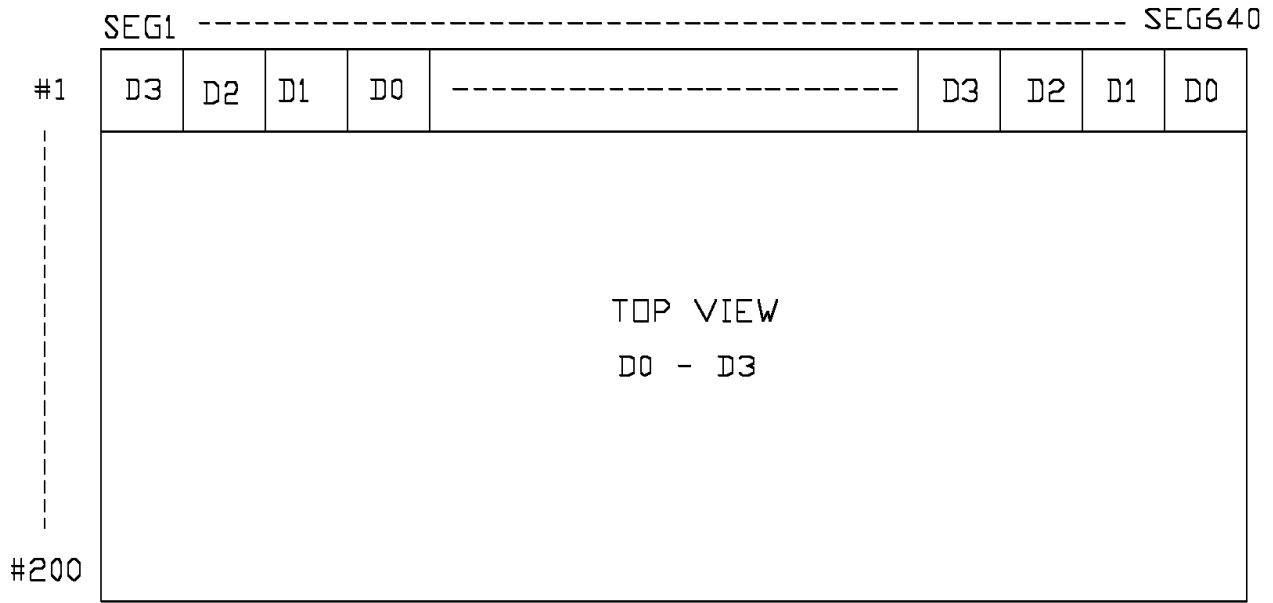
Item	Symbol	MIN.	TYP.	MAX.	Unit	Condition
White color	I _{BL}	—	192.5	220	mA	V _{BL} = 5.0V

ABSOLUTE MAXIMUM RATINGS

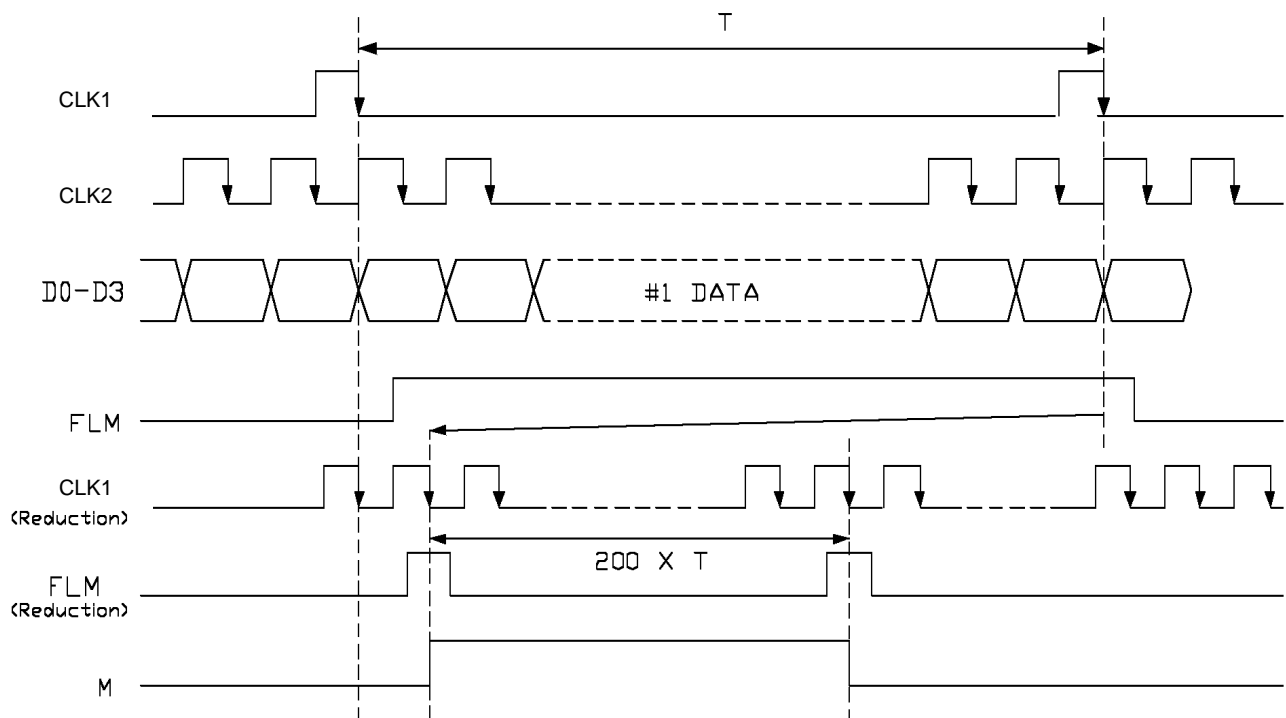
Please make sure not to exceed the following maximum rating values under the worst application conditions

Item	Symbol	Rating (for normal temperature)	Rating (for wide temperature)	Unit
Supply Voltage	VDD	-0.3 to 7.0	-0.3 to 7.0	V
Input Voltage	VT	-0.3 to VDD+0.3	-0.3 to VDD+0.3	V
Operating Temperature	T _{opr}	0 to 50	-20 to 70	°C
Storage Temperature	T _{stg}	-10 to 60	-30 to 80	°C

DISPLAY AND DATA



TIMING CHART

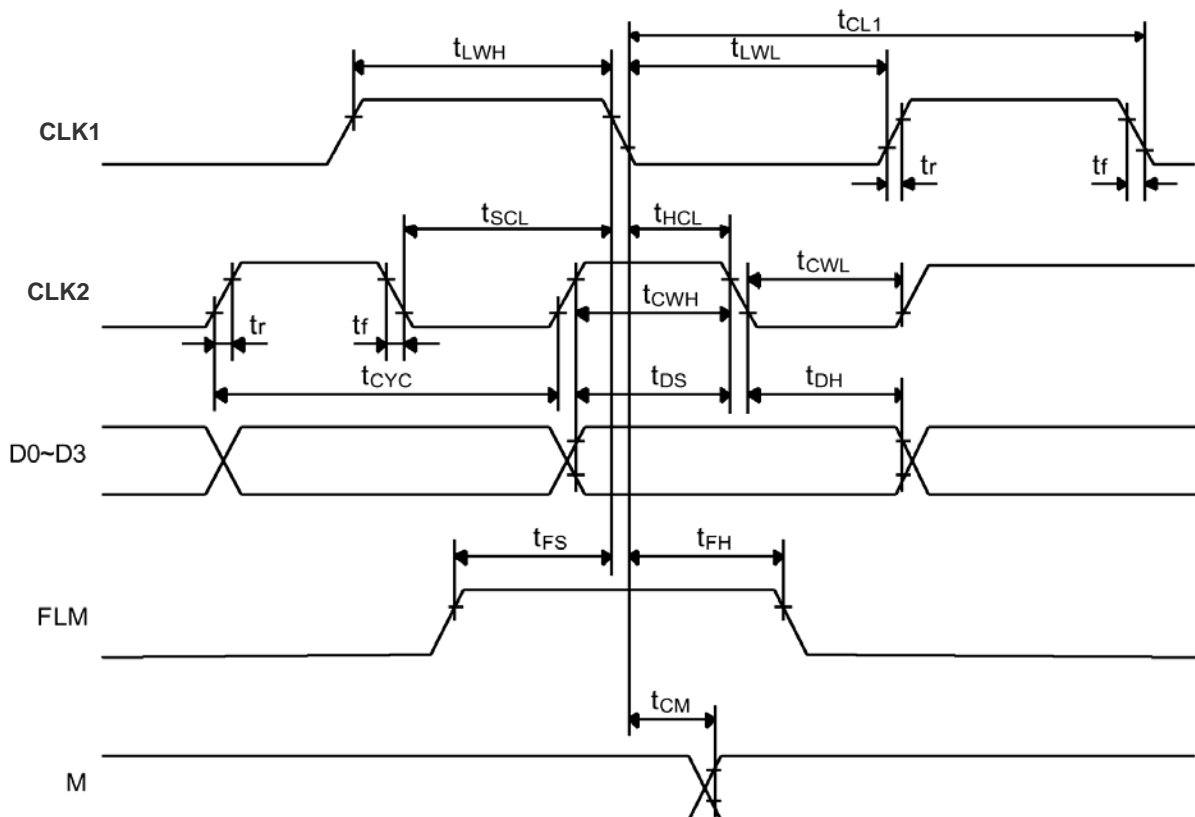


AC CHARACTERISTICS

Parameter	Symbol	Min.	Max.	Units															
Clock Pulse Cycle Time	t_{CYC}	167	—	ns															
Clock Pulse High Level Width	t_{CWH}	50	—	ns															
Clock Pulse Low Level Width	t_{CWL}	50	—	ns															
Clock Pulse Setup Time	t_{SCL}	80	—	ns															
Clock Pulse Hold Time	t_{HCL}	80	—	ns															
Clock Pulse Rise/Fall Time	t_r, t_f	—	50	ns															
LP High Level Width	t_{LWH}	50	—	ns															
LP Low Level Width	t_{LWL}	50	—	ns															
LP Cycle Time	t_{CL1}	250	—	ns															
Data Setup Time	t_{DS}	30	—	ns															
Data Hold Time	t_{DH}	30	—	ns </tr <tr> <td>FLM Data Setup Time</td> <td>t_{FS}</td> <td>100</td> <td>—</td> <td>ns</td> </tr> <tr> <td>FLM Data Hold Time</td> <td>t_{FH}</td> <td>100</td> <td>—</td> <td>ns</td> </tr> <tr> <td>M Phase Difference</td> <td>t_{CM}</td> <td>—</td> <td>250</td> <td>ns</td> </tr>	FLM Data Setup Time	t_{FS}	100	—	ns	FLM Data Hold Time	t_{FH}	100	—	ns	M Phase Difference	t_{CM}	—	250	ns
FLM Data Setup Time	t_{FS}	100	—	ns															
FLM Data Hold Time	t_{FH}	100	—	ns															
M Phase Difference	t_{CM}	—	250	ns															

Note : Please satisfy the following conditions (1), (2) in the same time.

- (1) $t_r, t_f < (t_{CYC} - t_{CWH} - t_{CWL}) / 2$
- (2) $t_r, t_f \leq 50$



ELECTRO-OPTICAL CHARACTERISTICS

MEASURING CONDITION: POWER SUPPLY = $V_{OP} / 64 \text{ Hz}$
 TEMPERATURE = $23 \pm 5 \text{ }^\circ\text{C}$
 RELATIVE HUMIDITY = $60 \pm 20\%$

ITEM	SYMBOL	UNIT	TYP.
RESPONSE TIME	Ton	ms	370
	Toff	ms	470
CONTRAST RATIO	Cr	-	7
VIEWING ANGLE (6 O'clock) (Cr \geq 2)	V3:00	$^\circ$	40
	V6:00	$^\circ$	50
	V9:00	$^\circ$	40
	V12:00	$^\circ$	30

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 $^\circ\text{C}$	70 $^\circ\text{C}$	240 hours
Low temperature operating	0 $^\circ\text{C}$	-20 $^\circ\text{C}$	240 hours
High temperature storage	60 $^\circ\text{C}$	80 $^\circ\text{C}$	240 hours
Low temperature storage	-10 $^\circ\text{C}$	-30 $^\circ\text{C}$	240 hours
Temperature-humidity storage	40 $^\circ\text{C}$ 90% R.H.	60 $^\circ\text{C}$ 90% R.H.	96 hours
Temperature cycling	-10 $^\circ\text{C}$ to 60 $^\circ\text{C}$ 30 Min Dwell	-30 $^\circ\text{C}$ to 80 $^\circ\text{C}$ 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 Critical Defect 0.25%(AQL)	Failure Category Malfunction	Failure Reasons 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

The viewing angle can be adjusted by varying the LCD driving voltage V_O .

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 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 is limited to repair and/or replacement. Clover will not be responsible for any subsequent or consequential event.

FOR INTERNAL USE ONLY

SPECIFICATION REVISION RECORD

Revision No.	Description	Date(DD/MM/YY)
00	1 st Issue	17/03/06
01	Update General Description on page 2, Update Counter Drawing to 03 on page 3-4, Update Electrical Characteristics on page 6 & Update Electro Optical Characteristics on page 9	18/11/08
02	Update Mechanical Dimensions on page 2, Update Counter Drawing to 04 on page 3-5, Update Electrical Characteristics on page 6	28/07/11
03	Update CN2 connector pin assignment on page 2,	02/09/14