LCD / LCM SPECIFICATION



WINSTAR Display Co.,Ltd.
華凌光電股份有限公司

Represented by:

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SPECIFICATION

CUSTOMER : _____

MODULE NO.: WH4004A1-TFH-ET#

APPROVED BY:	
(FOR CUSTOMER USE ONLY)	PCB VERSION: DATA:

SALES BY	APPROVED BY	CHECKED BY	PREPARED BY

VERSION	DATE	REVISED PAGE NO.	SUMMARY
0	2023/01/18		First issue

Winstar Display Co., LTD	MODLE NO：
RECORDS OF REVISION	**DOC. FIRST ISSUE**

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General Specification

Item	Dimension	Unit
Number of Characters	40 characters x 4Lines	—
Module dimension	190.0 x 54.0 x 13.6 (MAX)	mm
View area	147.0 x 29.5	mm
Active area	140.45 x 23.16	mm
Dot size	0.50 x 0.55	mm
Dot pitch	0.57 x 0.62	mm
Character size	2.78 x 4.89	mm
Character pitch	3.53 x 6.09	mm
LCD type	FSTN Positive Transflective (In LCD production, It will occur slightly color difference. We can only guarantee the same color in the same batch.)	
Duty	1/16	
View direction	6 o'clock	
Backlight Type	LED, White	
IC	ST7066U	
Interface	68 series	

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Absolute Maximum Ratings

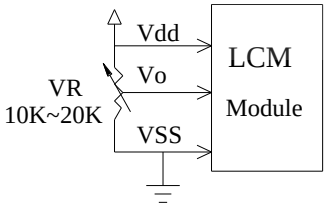
Item	Symbol	Min	Typ	Max	Unit
Operating Temperature	T_{OP}	-20	—	+70	℃
Storage Temperature	T_{ST}	-30	—	+80	℃
Input Voltage	V_I	V_{SS}	—	V_{DD}	V
Supply Voltage For Logic	V_{DD}-V_{SS}	-0.3	—	7	V
Supply Voltage For LCD	V_{DD}-V_o	-0.3	—	13	V

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Electrical Characteristics

Item	Symbol	Condition	Min	Typ	Max	Unit
Supply Voltage For Logic	V_{DD}-V_{SS}	—	4.5	5.0	5.5	V
Supply Voltage For LCD *Note	V_{DD}-V_0	Ta=-20℃ Ta=25℃ Ta=70℃	— 4.2 3.8	— 4.35 —	5.7 4.5 —	V V V
Input High Volt.	V_{IH}	—	0.7 V_{DD}	—	V_{DD}	V
Input Low Volt.	V_{IL}	—	V_{SS}	—	0.6	V
Output High Volt.	V_{OH}	—	3.9	—	V_{DD}	V
Output Low Volt.	V_{OL}	—	0	—	0.4	V
Supply Current	I_{DD}	V_{DD}=5.0V	1.8	3.5	7.0	mA

* Note: Please design the VOP adjustment circuit on customer's main board

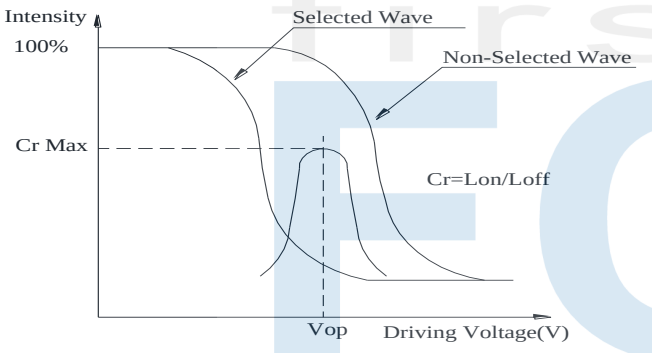


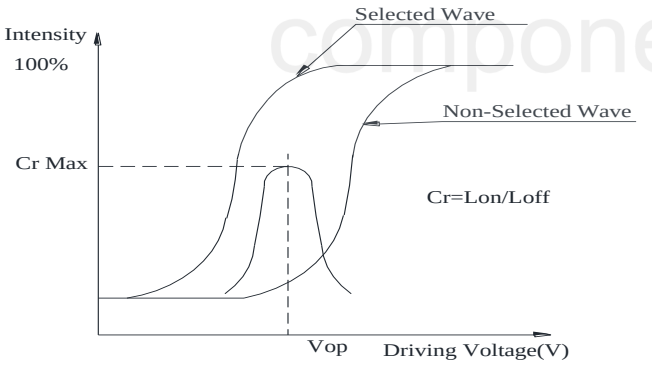
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Optical Characteristics

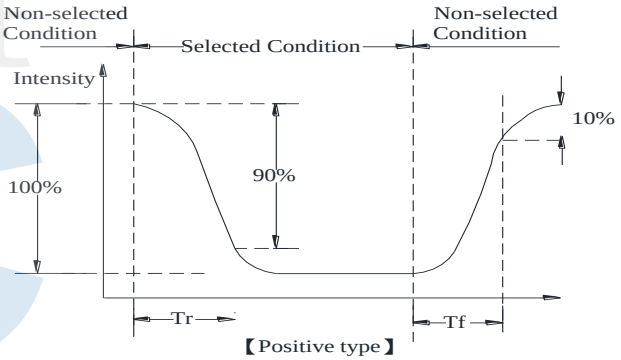
Item	Symbol	Condition	Min	Typ	Max	Unit
View Angle	θ	CR≧2	0	—	30	ψ = 180°
	θ	CR≧2	0	—	60	ψ = 0°
	θ	CR≧2	0	—	45	ψ = 90°
	θ	CR≧2	0	—	45	ψ = 270°
Contrast Ratio	CR	—	—	5	—	—
Response Time	T rise	—	—	150	200	ms
	T fall	—	—	150	200	ms

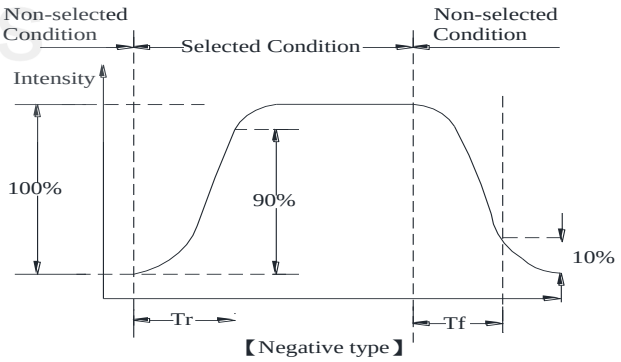
Definition of Operation Voltage (Vop)





Definition of Response Time (Tr , Tf)



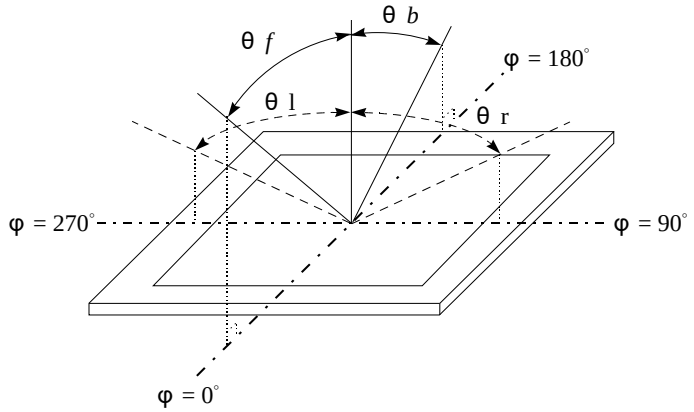


Conditions :

Operating Voltage : Vop　　Viewing Angle(θ ，φ) : 0°， 0°

Frame Frequency : 64 HZ　　Driving Waveform : 1/N duty , 1/a bias

Definition of viewing angle(CR≧2)

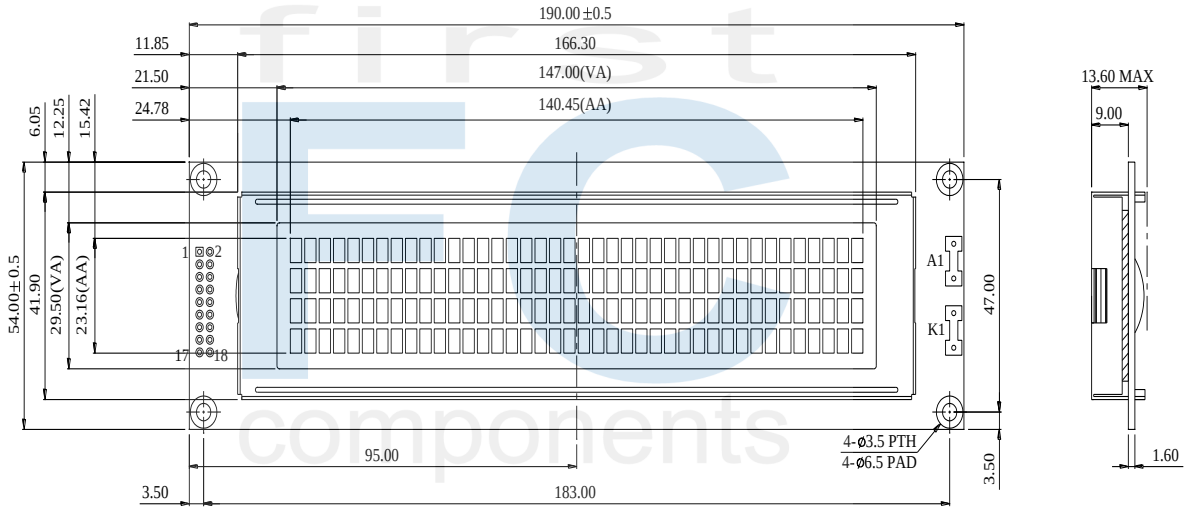


Interface Pin Function

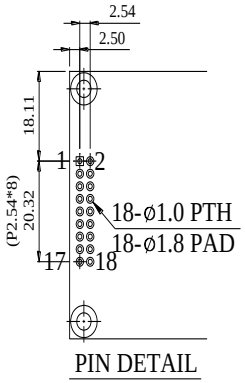
Pin No.	Symbol	Level	Description
1	DB7	H/L	Data bus line
2	DB6	H/L	Data bus line
3	DB5	H/L	Data bus line
4	DB4	H/L	Data bus line
5	DB3	H/L	Data bus line
6	DB2	H/L	Data bus line
7	DB1	H/L	Data bus line
8	DB0	H/L	Data bus line
9	E1	H,H→L	Chip enable signal
10	R/W	H/L	H: Read(Module→MPU) L: Write(MPU→Module)
11	RS	H/L	H: DATA, L: Instruction code
12	VO	(Variable)	Operating voltage for LCD
13	V_{SS}	0V	Ground
14	V_{DD}	5.0V	Supply Voltage for logic
15	E2	H,H→L	Chip enable signal
16	NC	—	NC
17	A	—	Power Supply for LED+
18	K	—	Power Supply for LED-

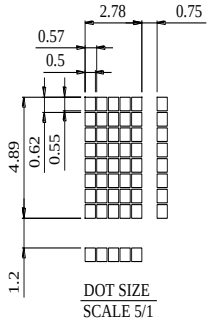
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Contour Drawing &Block Diagram



PIN NO.	SYMBOL
1	DB7
2	DB6
3	DB5
4	DB4
5	DB3
6	DB2
7	DB1
8	DB0
9	E1
10	R/$\overline{W}$
11	RS
12	Vo
13	Vss
14	Vdd
15	E2
16	NC
17	A
18	K





The non-specified tolerance of dimension is ±0.3 mm .