POWERTIP TECH. CORP.

DISPLAY DEVICES FOR BETTER ELECTRONIC DESIGN

Specification for Approval

Customer : _____

Model Type : LCD Module

Model Number : PG240128LRS-BNN-H-P1

Edi : 0

Customer Sign	Sales Sign	Approved By	Prepared By

CONTENTS

1. SPECIFICATIONS

1.1 Features

- Full dot-matrix structure with 240 dots *128 dots
- 1/128 Duty, 1/12 bias
- STN LCD, positive,gray
- Transflective LCD
- 6 o'clock viewing angle
- 4 bits parallel data input ,without controller IC
- Built-in negative voltage and LED backlight

1.2 Mechanical Specifications

- Outline dimension : 144.0mm(L)*104.0mm(W)*15.0mm max.(H)
- Viewing area : 114.0mm *64.0mm
- Active area : 107.95mm *57.55mm
- Dot size : 0.4mm *0.4mm
- Dot pitch : 0.45mm *0.45mm

1.3 Absolute Maximum Ratings

Item	Symbol	Conditions	Min.	Max.	Unit
Power supply Voltage	V_{DD}	-	0	7.0	V
LCD drive Supply voltage	V_{DD}-V_{EE}	-	-	28.0	V
Input voltage	V_{IN}	-	-0.3	V_{DD}+0.3	V
Operating temperature	T_{OPR}	-	-20	70	°C
Storage temperature	T_{STG}	-	-30	85	°C
Humidity*1	H_D	-	-	90	%RH

1.4 DC Electrical Characteristics

V_{DD}=+5V±10%,V_{SS}=0V,T_A=25°C

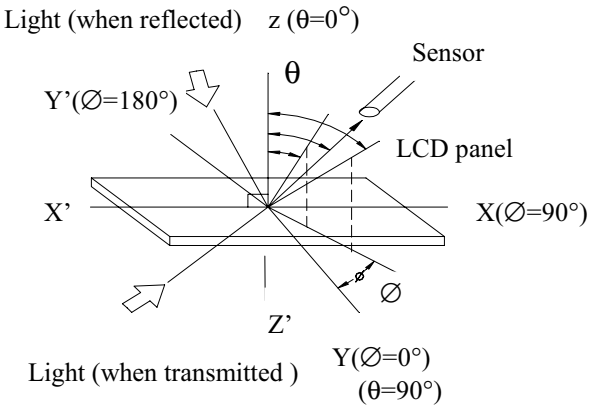
Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Logic Supply voltage	V_{DD}	-	4.5	5	5.5	V
"H" input voltage	V_{IH}	-	0.8V_{DD}	-	V_{DD}	V
"L" input voltage	V_{IL}	-	0	-	0.2V_{DD}	V
"H" output voltage	V_{OH}	-	V_{DD}-0.3	-	-	V
"L" output voltage	V_{OL}	-	-	-	0.3	V
Supply current	I_{OP}	V_{DD}=5V	-	-	13	mA
LCD driving voltage	V_{LCD}	V_{DD}-V_O	-	17.5	-	V

1.5 Optical Characteristics

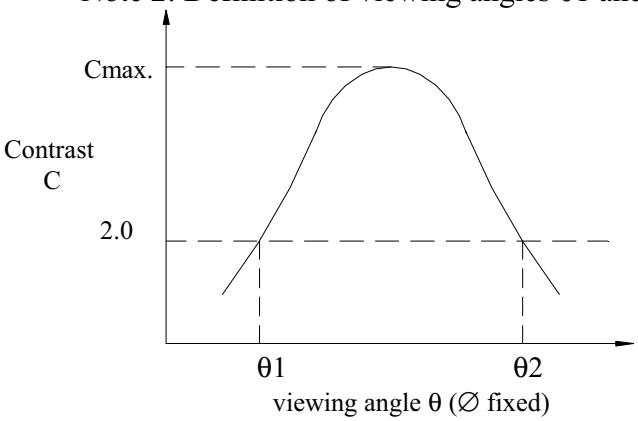
1/128 duty, 1/12 bias, Vopr=17.5V, Ta=25°C

Item	Symbol	Conditions	Min.	Typ.	Max	Reference
Viewing angle	θ	C≥2.0,∅=0°C	20°	-	-	Notes 1 & 2
Contrast	C	θ=5°, ∅=0°	-	2.5	-	Note 3
Response time(rise)	ton	θ=5°, ∅=0°	-	230ms	350ms	Note 4
Response time(fall)	toff	θ=5°, ∅=0°	-	225ms	340ms	Note 4

Note 1: Definition of angles θ and ∅



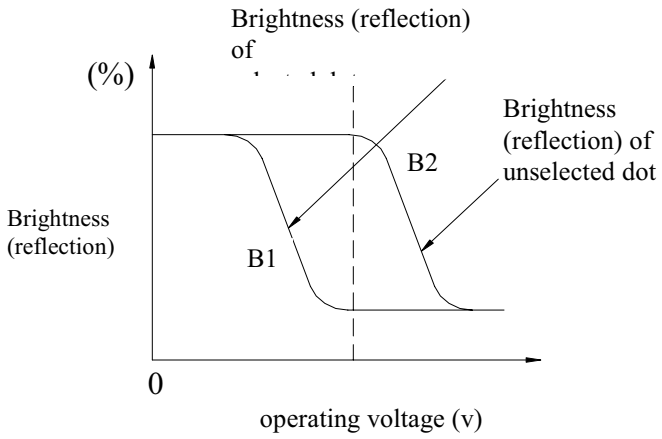
Note 2: Definition of viewing angles θ1 and θ2



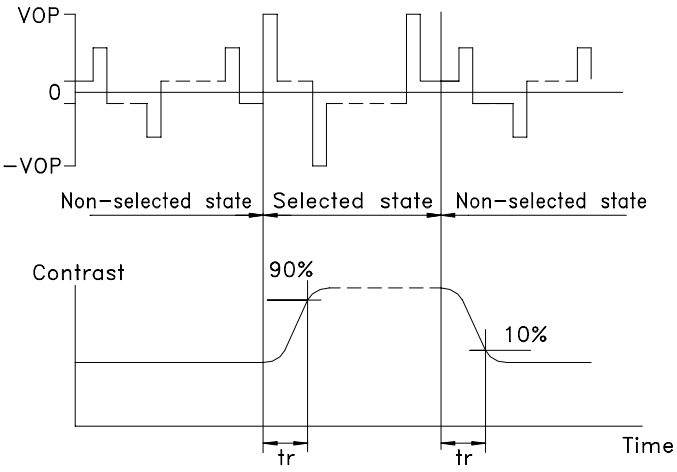
Note : Optimum viewing angle with the naked eye and viewing angle θ at Cmax. Above are not always the

Note 3: Definition of contrast C

$$C = \frac{\text{Brightness (reflection) of unselected dot (B2)}}{\text{Brightness (reflection) of selected dot (B1)}}$$



Note 4: Definition of response time



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

Vopr : Operating voltgae
ton : Response time (rise)
fFRM : Frame frequency
toff : Response time (fall

1.6 Backlight Characteristic

The LCD Module is backlight using a LED panel

•.Maximum ratings

Item	Symbol	Condition	Min.	Max.	Unit
Forward current	If	Ta:25°C	-	2250	mA
Reverse voltage	Vr	Ta:25°C	-	8	V
Power dissipation	Po	Ta:25°C	-	10.3	W
Operating temperature	Topr	-	-20	70	°C
Storage temperature	Tstg	-	-40	80	°C

•.Electrical characteristics

Item	Symbol	Condition	Min.	Typ	Max.	Unit
Forward voltage	Vf	If:900mA	-	4.35	4.6	V
Reverse current	Ir	VR: 8V	-	-	0.2	mA
Luminous intensity	Iv	If:900mA	-	170	-	cd/m^2
Wevelength	λp	If:900mA	-	570	-	nm
Color	Yellow Green					

2. MODULE STRUCTURE

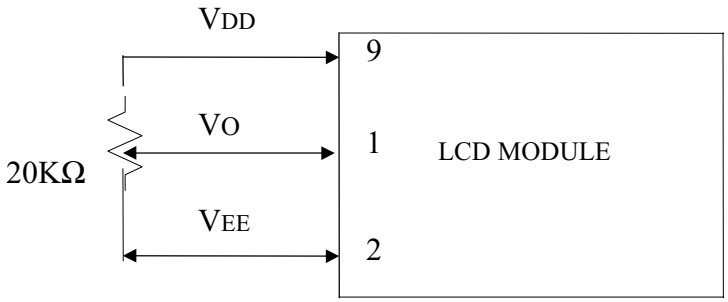
2.1 Counter Drawing

*See Appendix

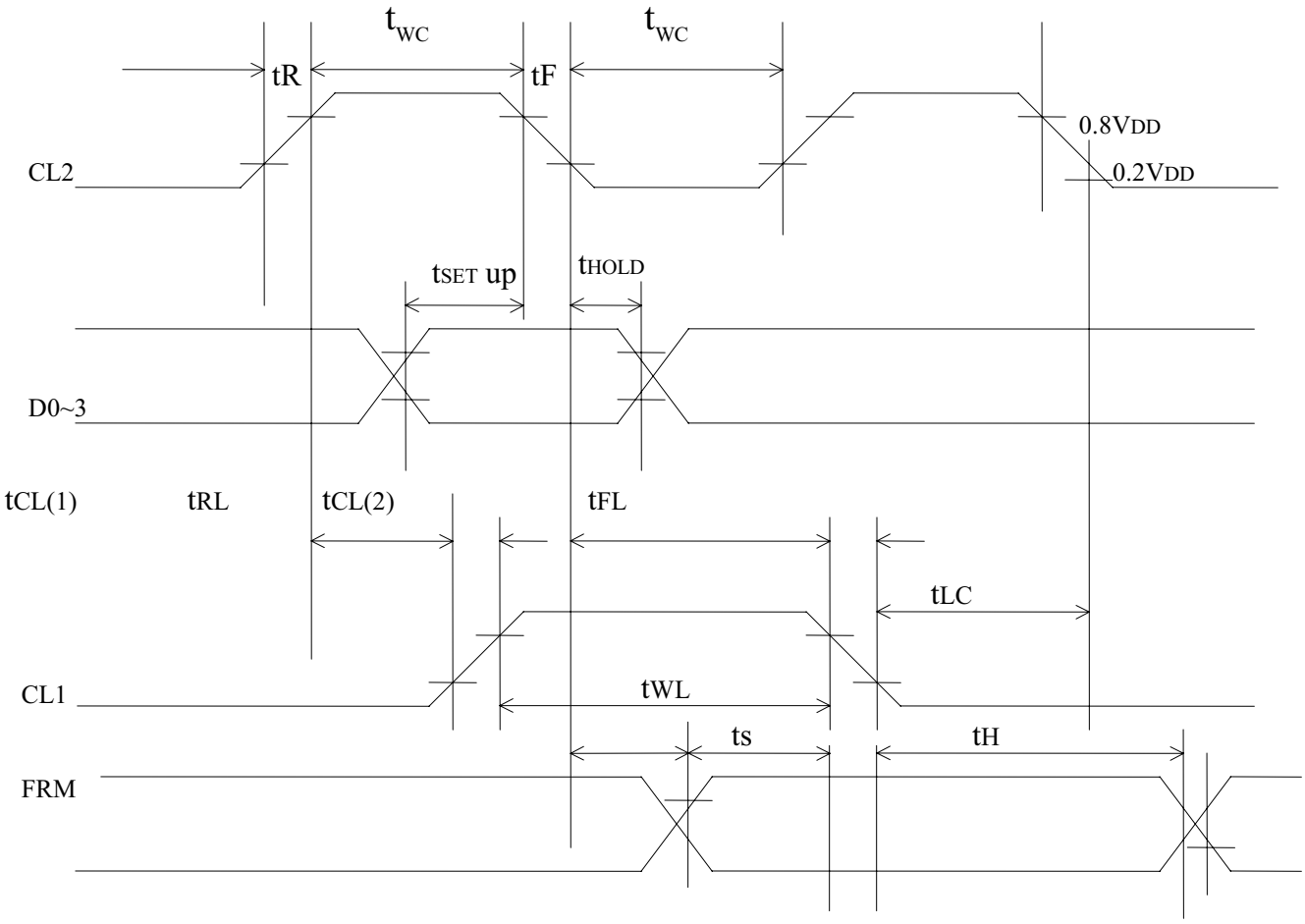
2.2 Interface Pin Description

Pin No.	Symbol	Level	Function
1	VO	-	Operating voltage for LC driving.
2	VEE	-	Power supply for LC driving.
3	D3	H/L	Data bit 3 H:ON(White) L:OFF(Black)
4	D2	H/L	Data bit 2 H:ON(White) L:OFF(Black)
5	D1	H/L	Data bit 1 H:ON(White) L:OFF(Black)
6	D0	H/L	Data bit 0 H:ON(White) L:OFF(Black)
7	M	H/L	Liquid crystal AC drive control signal
8	VSS	0V	Ground
9	VDD	+5V	Power supply voltage for logic.
10	CL2	H,H→L	Clock signal for shifting the serial data.
11	CL1	H,H→L	The CL1 latches the serial data in the shift registers.
12	FRM	H/L	Indicates the beginning for each display cycle.
13	D-OFF	H/L	Display enable signal. H:ON L:OFF
14	FG	-	Frame ground

Contrast Adjust



2.3 Timing Characteristics



V_{DD}=+5V±10%,V_{SS}=0V,T_A=25°C

Item	Symbol	Conditions	Min.	Max	Unit
CL2 shift clock frequency	fCP	-	-	3.3	MHz
CL2 pulse width	tWC	-	100	-	ns
CL1 pulse width	tWL	-	100	-	ns
D0~D3 to CL2 setup time	tSETUP	-	80	-	ns
D0~D3 to CL2 hold time	tHOLD	-	80	-	ns
CL2 to CL1 time	tCL1	-	0	-	ns
	tCL2	-	100	-	
CL1 to CL2 time	tLC	-	100	-	ns
CL2 rise time	tR	-	-	50	ns
CL2 fall time	tF	-	-	50	ns
CL1 rise time	tRL	-	-	50	ns
CL1 fall time	tFL	-	-	50	ns
FRM setup time	tS	-	100	-	ns
FRM Hold time	tH	-	100	-	ns