POWERTIP TECH. CORP.

DISPLAY DEVICES FOR BETTER ELECTRONIC DESIGN

Specification For Approval

Customer : _____

Model Type : LCD Module

Sample Code : _____

Mass Production Code : PG24064LRS-GNN-H-SA

Edit : A

Customer Sign	Sales Sign	Approved By	Prepared By

CONTENTS

1. SPECIFICATIONS

1.1 Features

- Full dot-matrix structure with 240 dots *64 dots
- 1/64 Duty, 1/9 bias
- STN LCD, positive
- Transflective LCD, gray display
- 6 o'clock viewing angle
- Serial data transmitter
- Built-in negative voltage generator circuit and LED backlight

1.2 Mechanical Specifications

- Outline dimension : 180.0mm(L)*75.0mm(W)*13.8mm max.(H)
- Viewing area : 134.0mm *40.4mm
- Active area : 127.16mm *33.88mm
- Dot size : 0.49mm *0.49mm
- Dot pitch : 0.53mm *0.53mm

1.3 Absolute Maximum Ratings

Item	Symbol	Conditions	Min.	Max.	Unit
Power supply Voltage	VDD	-	0	7.0	V
LCD drive Supply voltage	VDD-VEE	-	-	19.0	V
Input voltage	VIN	-	-0.3	VDD+0.3	V
Operating temperature	TOPR	-	-20	70	°C
Storage temperature	TSTG	-	-30	80	°C
Humidity*1	HD	-	-	90	%RH

1.4 DC Electrical Characteristics

VDD=+5V±10%,VSS=0V,TA=25°C

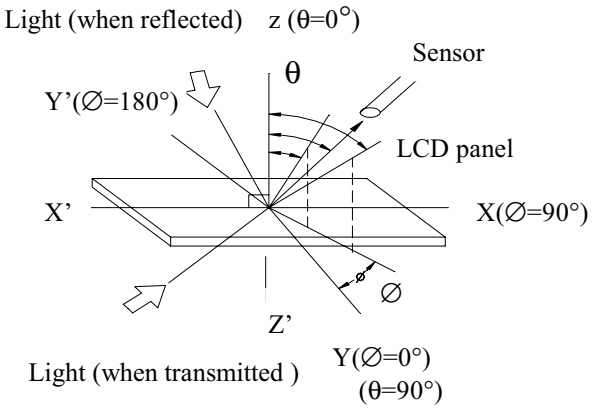
Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Logic Supply voltage	VDD	-	4.5	5	5.5	V
"H" input voltage	VIH	-	0.8VDD	-	VDD	V
"L" input voltage	VIL	-	0	-	0.2VDD	V
"H" output voltage	VOH	-	VDD-0.3	-	-	V
"L" output voltage	VOL	-	-	-	03	V
Supply current	IDD	VDD=5V	9.36	-	12.3	mA
LCD driving voltage	VOP	VDD-VO	-	13.6	-	V

1.5 Optical Characteristics

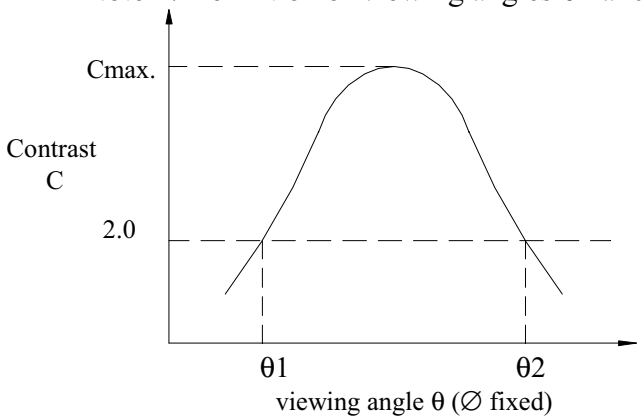
1/64 duty, 1/9 bias, Vopr=13.6V, Ta=25°C

Item	Symbol	Conditions	Min.	Typ.	Max	Reference
Viewing angle	θ	C≥2.0,∅=0°C	30°	-	-	Notes 1 & 2
Contrast	C	θ=5°, ∅=0°	2	3	-	Note 3
Response time(rise)	tr	θ=5°, ∅=0°	-	140ms	200ms	Note 4
Response time(fall)	tf	θ=5°, ∅=0°	-	300ms	500ms	Note 4

Note 1: Definition of angles θ and ∅



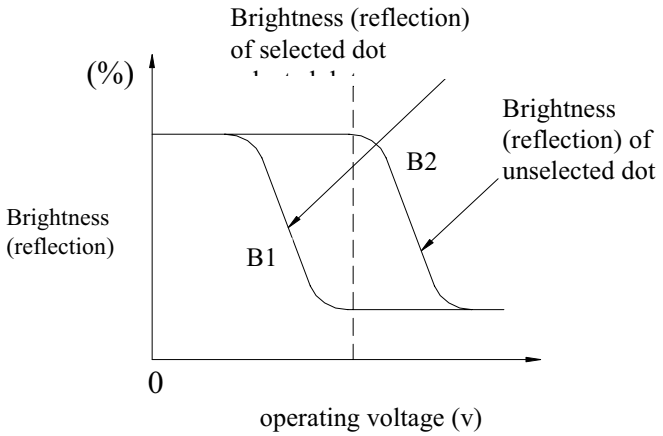
Note 2: Definition of viewing angles θ1 and θ2



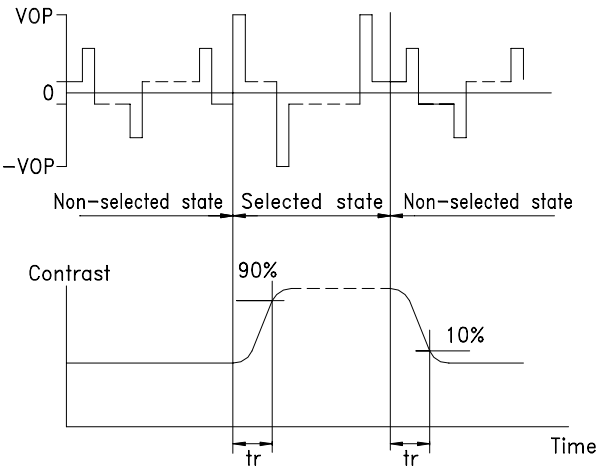
Note : Optimum viewing angle with the naked eye and viewing angle θ at Cmax. Above are not always the same

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
tr : Response time (rise)
fFRM : Frame frequency
tf : 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	-	1625	mA
Reverse voltage	Vr	Ta:25°C	-	8	V
Power dissipation	Po	Ta:25°C	-	7.4	W
Operating temperature	Topr	-	-20	70	°C
Storage temperature	Tstg	-	-40	80	°C

•.Electrical Characteristics

Ta=25°C

Item	Symbol	Condition	Min	Typ	Max.	Unit
Forward voltage	Vf	If:650 mA	-	4.2	4.6	V
Reverse current	Ir	VR: 8 V	-	-	0.2	mA
Luminous intensity	Iv	If:650 mA	-	220	-	cd/m^2
Wevelength	λ p	If:650 mA	-	570	-	nm
Color	Yellow green					

2. MODULE STRUCTURE

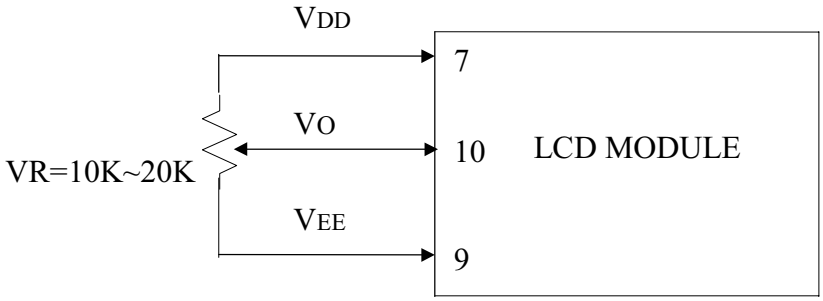
2.1 Counter Drawing

*See Appendix

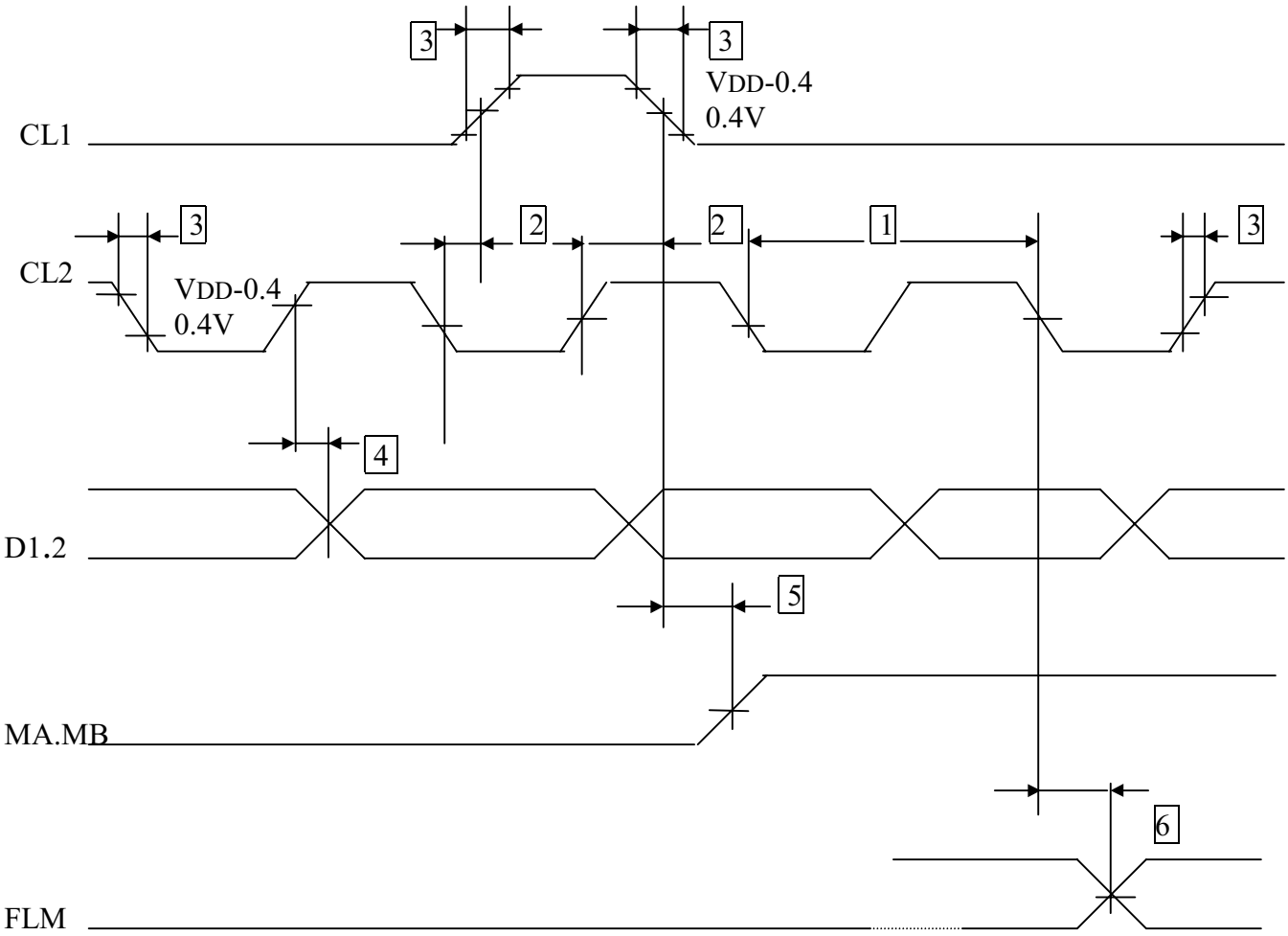
2.2 Interface Pin Description

Pin No.	Symbol	Level	Description
1	D	H/L	Serial data
2	FLM	H	Indicates the beginning of each display cycle
3	M	H/L	Control signal for AC driving
4	CL1	H→L	Control signal for latching serial data
5	CL2	H→L	Control signal for shifting serial data
6	NC	-	No connection
7	Vdd	5.0V	Supply voltage for logic and LCD (+)
8	Vss	0V	Ground
9	Vee	-15.0V	Supply voltage for LCD (-)
10	V0	-	Operation voltage for LCD (variable)

Contrast Adjust



2.3 Timing Characteristics



Vdd=+5V±10%, Vss=0V, Ta=25°C

No	Item	Symbol	Min.	Typ	Max.	Unit	Conditions
1	Clock cycle time	tCYC	400			ns	
2	Clock phase difference	tDCL			100	ns	
3	Clock rise/fall time	tCRF			30	ns	
4	D1.2 phase difference	tDD			100	ns	
5	MA.MB phase difference	tDMA			200	ns	
6	FLB phase difference	tDFM			200	ns	

Notes: (1) All output terminals are under no load.

(2) All measurement points other than those specified are at 0.5VDD.