POWERTIP TECH. CORP.

DISPLAY DEVICES FOR BETTER ELECTRONIC DESIGN

Specification For Approval

Customer : _____

Model Type : LCD Module

Sample Code : _____

Mass Production Code : PG320240LRU-DE4-B-S0

Edit : 0

Customer Sign	Sales Sign	Approved By	Prepared By

CONTENTS

1. SPECIFICATIONS

1.1 Features

- Full dot-matrix structure with 320 dots *240 dots
- 1/240 Duty, 1/13 bias
- STN LCD, positive, gray, Transflective LCD
- 6 o'clock viewing angle
- 8 bits parallel data input ,controller IC SED1330, QFP type
- Built-in negative voltage generator circuit and LED backlight
- Temperature compensation

1.2 Mechanical Specifications

- Outline dimension : 148.02mm(L)*120.24mm(W)*20.3mm max.(H)
- Viewing area : 120.14mm *92.14mm
- Active area : 115.17mm *86.37mm
- Dot size : 0.33mm *0.33mm
- Dot pitch : 0.36mm *0.36mm

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}	-	-	30	V
Input voltage	V_{IN}	-	-0.3	V_{DD}+0.3	V
Operating temperature	T_{OPR}	-	0	50	°C
Storage temperature	T_{STG}	-	-20	70	°C
Humidity*1	H_D	-	-	90	%RH

1.4 DC Electrical Characteristics

V_{DD}=+5V±10%,V_{SS}=0V,T_A=25°C

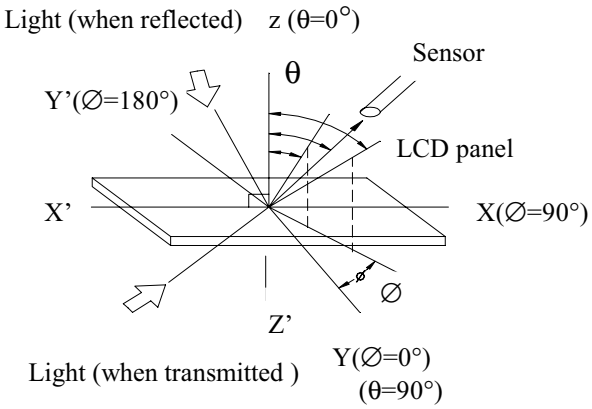
Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Logic Supply voltage	V_{DD}	-	4.5	5	5.5	V
"H" input voltage	V_{IH}	-	0.8V_{DD}	-	V_{DD}	V
"L" input voltage	V_{IL}	-	0	-	0.2V_{DD}	V
"H" output voltage	V_{OH}	-	V_{DD}-0.4	-	-	V
"L" output voltage	V_{OLI}	-	-	-	0.4	V
Supply current	I_{DD}	V_{DD}=5V		13.5		mA
LCD driving voltage	V_{OP}	V_{DD}-V_O		21.5		V

1.5 Optical Characteristics

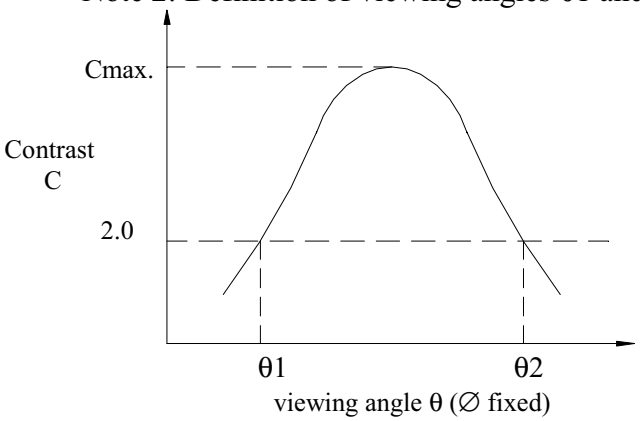
1/240 duty, 1/13 bias, Vopr=21.5V, Ta=25°C

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°	-	130ms	200ms	Note 4
Response time(fall)	tf	θ=5°, ∅=0°	-	280ms	420ms	Note 4

Note 1: Definition of angles θ and ∅



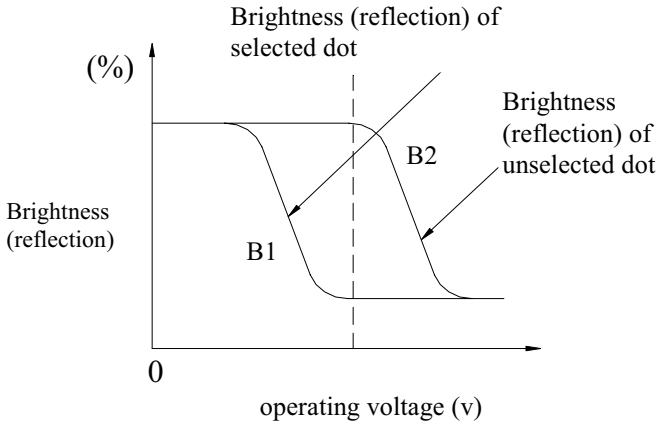
Note 2: Definition of viewing angles θ1 and θ2



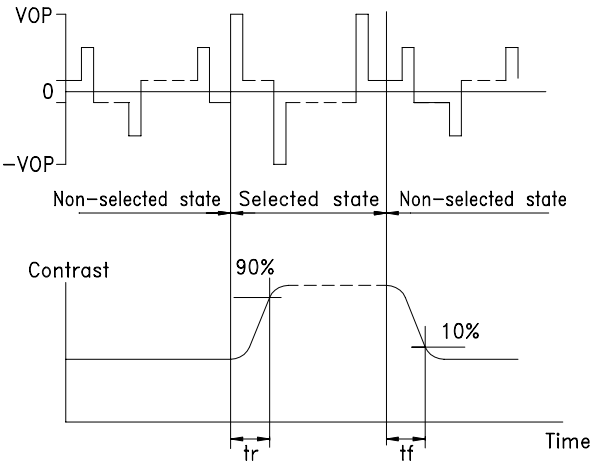
Note : Optimum viewing angle with the naked eye and viewing angle θ at Cmax. Above are not always the same

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 cm^2

V_{OPR} : Operating voltage
t_r : Response time (rise)
f_{FRM} : Frame frequency
t_f : Response time (fall)

1.6 Backlight Characteristic

The LCD Module is backlight using a LED panel

- .Maximum Ratings

Item	Symbol	Conditions	Min.	Max.	Unit
Forward current	IF	TA=25°C	-	500	mA
Reverse voltage	VR	TA=25°C	-	8	V
Power dissipation	PO	TA=25°C	-	2.2	W
Operating Temperature	TOPR	-	-20	70	°C
Storage temperature	TSTG	-	-40	80	°C

- .Electrical Ratings

TA=25℃

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Forward voltage	VF	IF=200mA	-	4.0	4.4	V
Reverse current	IR	VR=8V	-	-	0.2	mA
Luminous intensity	IV	IF=200mA	9.6	12	-	cd/m^2
Wavelength	HUE	IF=200mA	-	570	-	nm
Color	Yellow Green					

2. MODULE STRUCTURE

2.1 Counter Drawing

*See Appendix

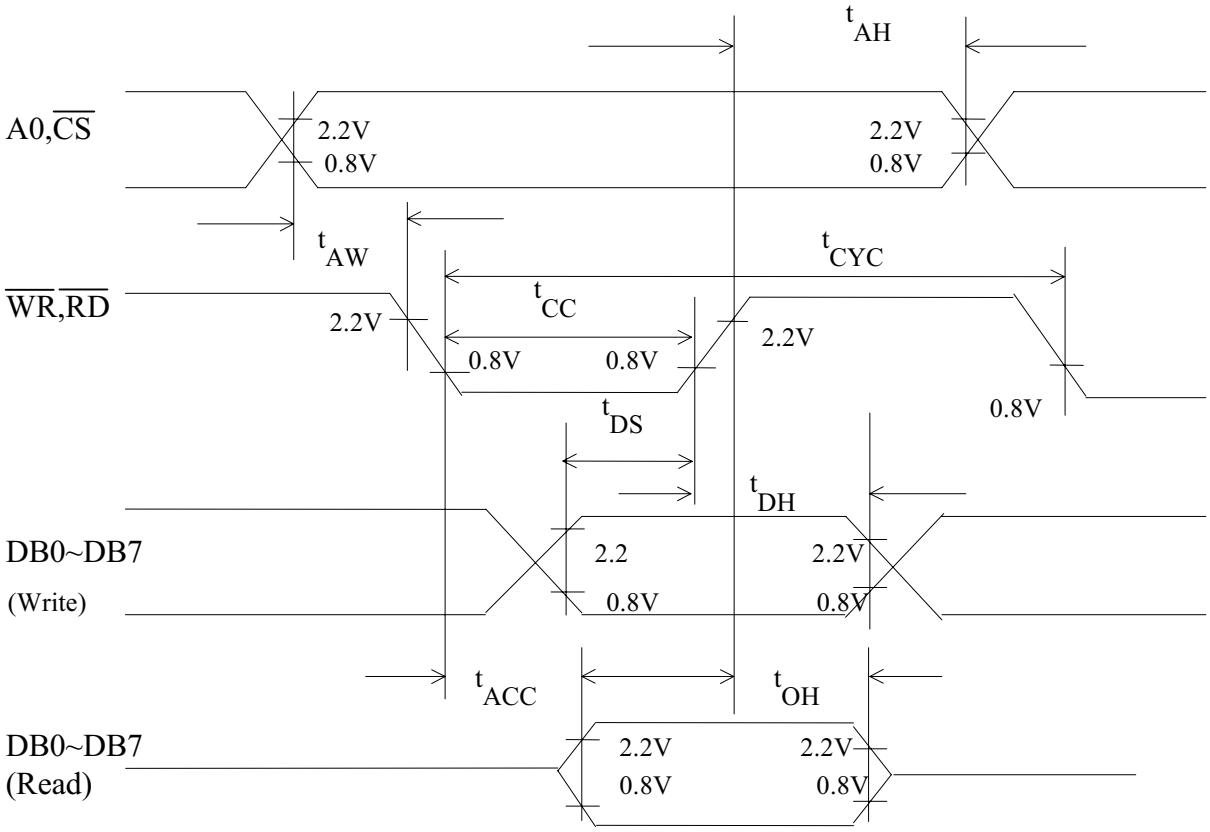
2.2 Interface Pin Description

Pin No.	Symbol	Function
1	VSS	Signal ground (GND)
2	Vdd	Power supply for logic (+5V)
3	VLCD	Supply Voltage (LCD Driver); Not connection※
4	$\overline{RD}$	Data read (write data to the module at "L")
5	$\overline{WR}$	Data write (read data from the module at "L")
6	A0	MPU address A0
7~14	DB0~DB7	Data bus (D0=MSB, D7=LSB)
15	$\overline{CS}$	SED1330 chip select
16	$\overline{RES}$	SED1330 rest input
17	VEE	Negative voltage supply ; Not connection※
18	FG	Frame ground (connected to metal bezel)
19	A	LED backlight(+)
20	K	LED backlight(-)

※ Built in negative voltage generator circuit

2.3 Timing Characteristics

8080 System bus Read/Write timing



Item	Symbol	Min.	Typ.	Max.	Unit
System cycle time	T_{CYC}	575	-	-	ns
Control pulse width	T_{CC}	220	-	-	ns
Address setup time	t_{AW}	30	-	-	ns
Address hold time	t_{AH}	10	-	-	ns
Data setup time	t_{DS}	120	-	-	ns
Data hold time	t_{DH}	10	-	-	ns
RD access time	t_{ACC}	-	-	120	ns
Output disable time	t_{OH}	10	-	50	ns