

ILLUMINANT 北極光企業有限公司

PRODUCT SPECIFICATION FOR TFT LCM

CUSTOMER:	
MODEL NO:	I2421-7IPN2432A
ACCEPTED BY:	

APPROVED BY:	CHECKED BY:	ORGANIZED BY:
		

- Approval for Specifications Only**
 Approval for Specifications and Sample

- Note: 1. Version of Specifications : 1**
2. Others: Rohs Compliment

TAIWAN

1F, #15, LANE 75, MIN CHUAN E. RD., SEC 3, TAIPEI, TAIWAN.

Tel +886-2-25175115 Fax +886-2-25175099

CHINA

5F DONGWU COMMERCIAL BLDG, LANSHAN RD., NORTH DISTRICT, HI-TECH INDUSTRIAL PARK, SHENZHEN, PRC.

TEL + 86-755-86154466 FAX +86-755-86154366

KOREA

RM 1201, IT MIRAE TOWER, 60-21, GASAN-DONG, GEUMCHEON-GU, SEOUL, 153-801, KOREA

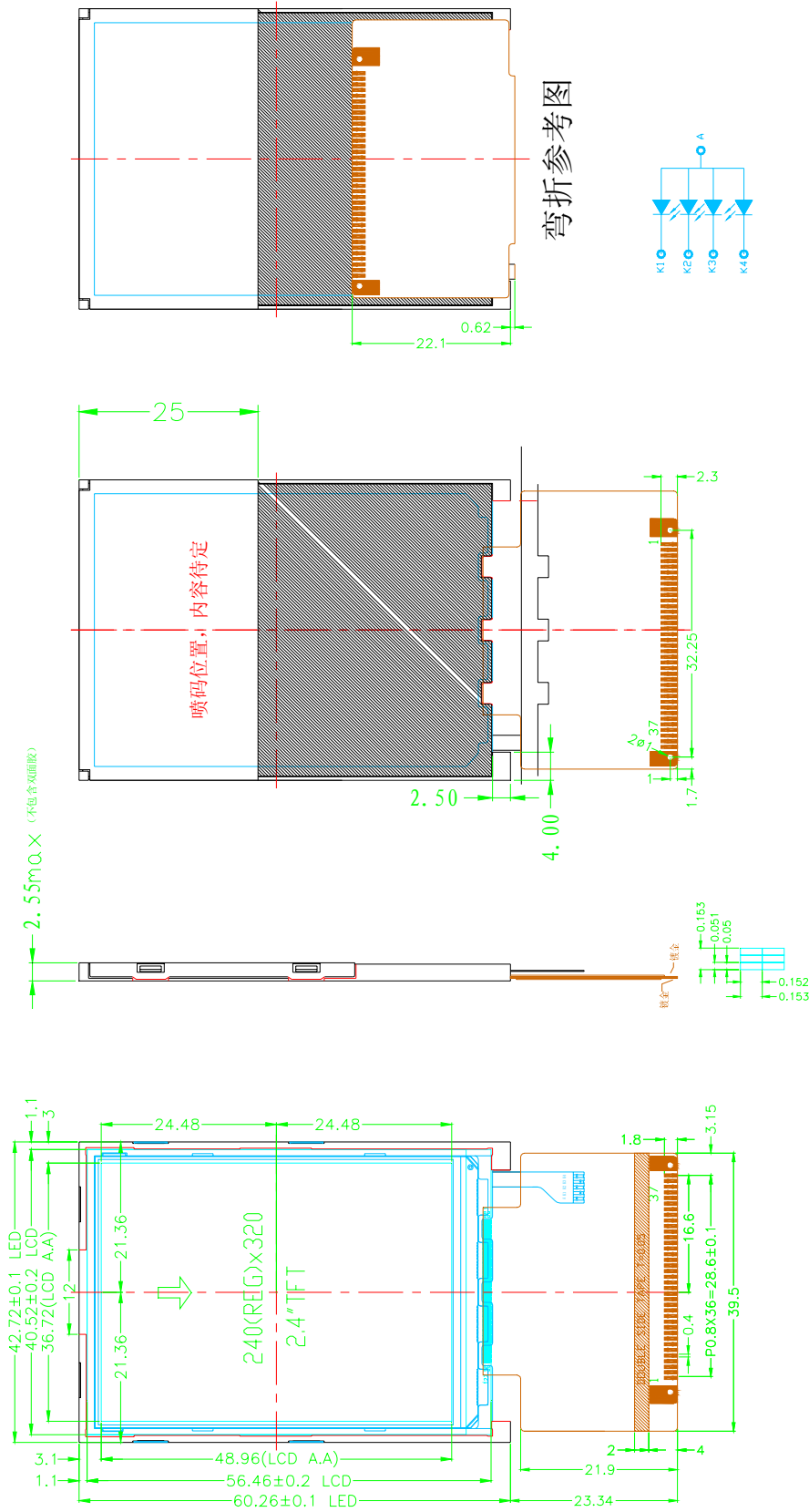
CONTENTS

- 1. Mechanical Specification**
- 2. Absolute Maximum Ratings**
- 3. Electrical Characteristics**
- 4. Optical Characteristics**
- 5. Interface**
- 6. Block Diagram**
- 7. Timing Characteristics**
- 8. Backlight**

1.Mechanical Specification:

Item	Standard Value	Unit
Display size	2.4	inch
Module Dimension	42.72(W)*60.26(H)*2.55MAX(D)	mm
Active Area	36.72(W)*48.96(H)	mm
Number of Dots	240RGB*320Dots	Dot
Pixel pitch	0.153(W)mm*0.153(H)mm	mm
LCD Type	Normally White	-
Viewing Direction	12H	-
Driver	ILI9328	-
Approx. Weight	TBD	g
Various color Display	262	k
Brightness	200	cd/m2
Backlight Type	4-LED parallel	
Backlight Color	white	

No:	PIN NAME
1	DB0
2	DB1
3	DB2
4	DB3
5	GND1
6	VCCI
7	/CS
8	RS
9	/WR
10	/RD
11	IM0
12	NC
13	NC
14	NC
15	NC
16	LED-A
17	LED-K1
18	LED-K2
19	LED-K3
20	LED-K4
21	IM3
22	DB4
23	DB8
24	DB9
25	DB10
26	DB11
27	DB12
28	DB13
29	DB14
30	DB15
31	/RESET
32	VCI
33	VCC2
34	GND
35	DB5
36	DB6
37	DB7



ILLUMINANT CO., LTD
北极光企业有限公司

REVISED RECORD

NOTE: ILI9328

REVISED RECORD		ILLUMINANT CO., LTD 北极光企业有限公司			
A		Drawn	Page: 1 of 5	Unit: mm	Date: 2009-7-8
B		Check	Rev: 1.0	Scale: 1/1	Projection:
C		Approve	Dwn.No 12421-71PN2432A		
D					
E					

1. DISPLAY TYPE	262K TFT	5. OPERATIVE VOLTAGE	3.0v
2. VIEWING DIRECTION	12 O' CLOCK	6. OPERATIVE TEMP	-20° C ~ 70° C
3. POLARIZER MODE	TRANSMISSIVE	7. STORAGE TEMP	-30° C ~ 80° C
4. BACKLIGHT TAPE	WHITE LED	8. CONNECTOR	TCP

2. Absolute Maximum Ratings:

Item	Symbol	Min.	Typ.	Max.	Unit	Remark
Supply Voltage for Logic	V _{DD}	-0.3		+4.0	V	
Input voltage	V _{in}	-0.5		V _{DD} +0.5	V	
Operating Temperature	T _{OP}	-20	-	+70	°C	-
Storage Temperature	T _{ST}	-30	-	+80	°C	-

*NOTE: Based on V_{SS}=0V.

3. Electrical Characteristics:

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Supply Voltage for Logic	V _{DD}	T _a =25°C	2.2	2.8	3.3	V
High-level input voltage	V _{IHC}	V _{DD} =3.0V	0.8V _{DD}		V _{DD}	
Low-level input voltage	V _{ILC}	V _{DD} =3.0V	-0.3		0.2V _{DD}	
TFT Gate ON Voltage	V _{GH}	V _{DD} =3.0V	--	15	--	-
TFT Gate OFF Voltage	V _{GL}	V _{DD} =3.0V	--	-10	--	V
Power Supply Current for V _{DD}	I _{DD}	V _{DD} =3.0V	-	8.5		mA

4. Optical Characteristics:

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Luminance	I	180	200		cd/m	
Contrast Ratio	C/R	200	250			
Response time	Tr+Tf		30	50	ms	Fig.3
*1) Viewing angle	Θ_l	-	40	-	Degree	C/R>10 Fig.4
	Θ_r	-	40	-		
	Θ_u	-	40	-		
	Θ_d	-	40	-		

Notes :

1. Contrast Ratio(CR) is defined mathematically as :

$$\text{Contrast Ratio} = \frac{\text{Surface Luminance with all white pixels}}{\text{Surface Luminance with all black pixels}}$$

2. Surface luminance is the center point across the LCD surface 500mm from the surface with all pixels displaying white. For more information see FIG 1.

3. Response time is the time required for the display to transition from to black(Rise Time, TrR) and from black to white(Decay Time, TrD). For additional information see FIG 3.

4. Viewing angle is the angle at which the contrast ratio is greater than 10. The angles are determined for the horizontal or x axis and the vertical or y axis with respect to the z axis which

is normal to the LCD surface. For more information see FIG 5.

5. Optimum contrast is obtained by adjusting the LCD Threshold voltage(Vth & Vsat)

FIG. 1 Optical Characteristic Measurement Equipment and Method

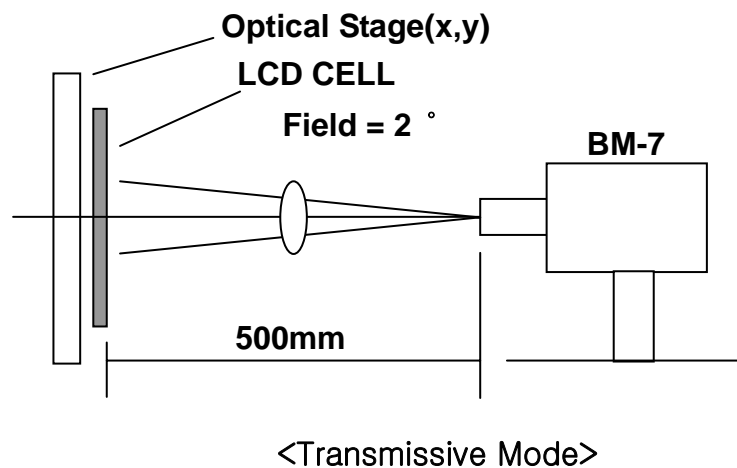


FIG. 2 The definition of V_{th} and V_{sat}

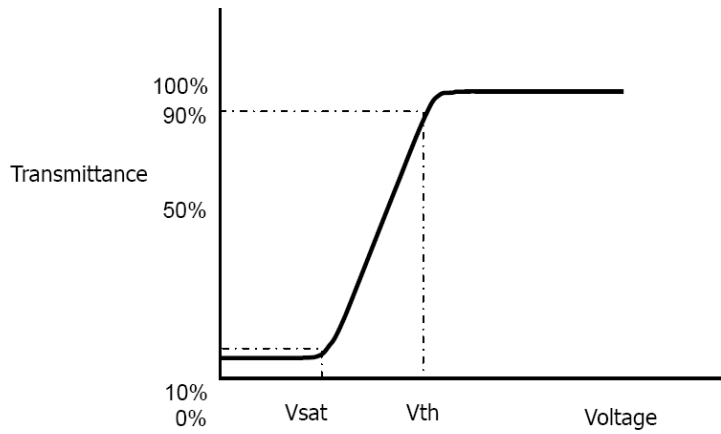


FIG. 3 The definition of Response Time

The response time is defined as the following figure and shall be measured by switching the input signal for “black” and “white”.

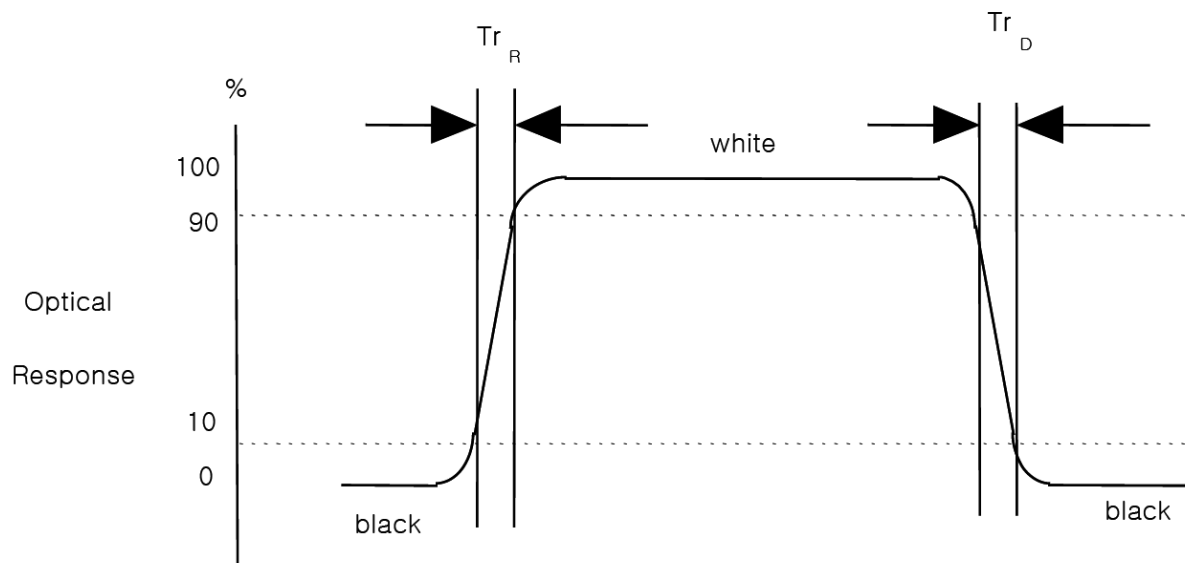
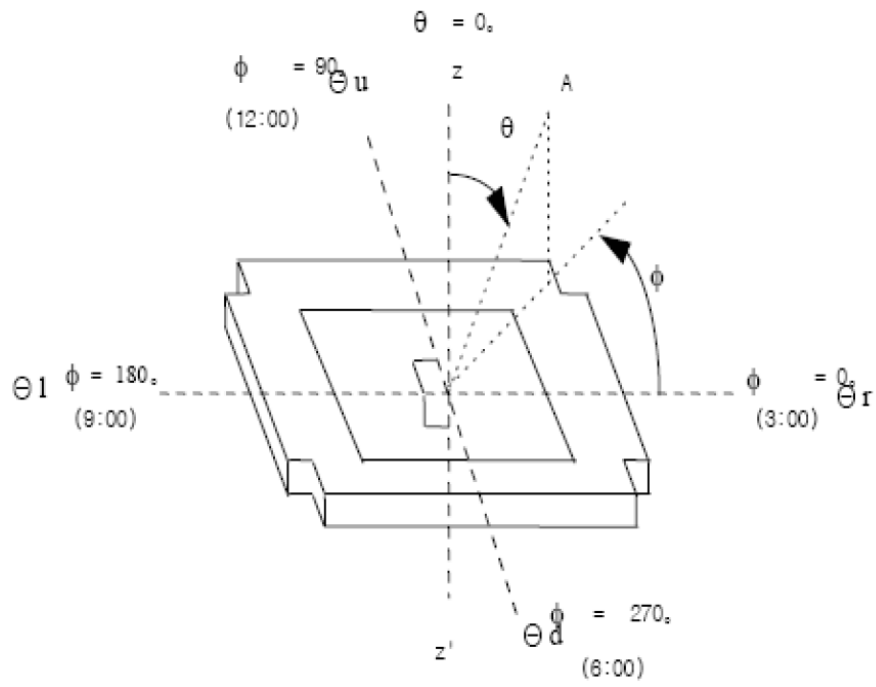


FIG. 4 The definition of viewing angle

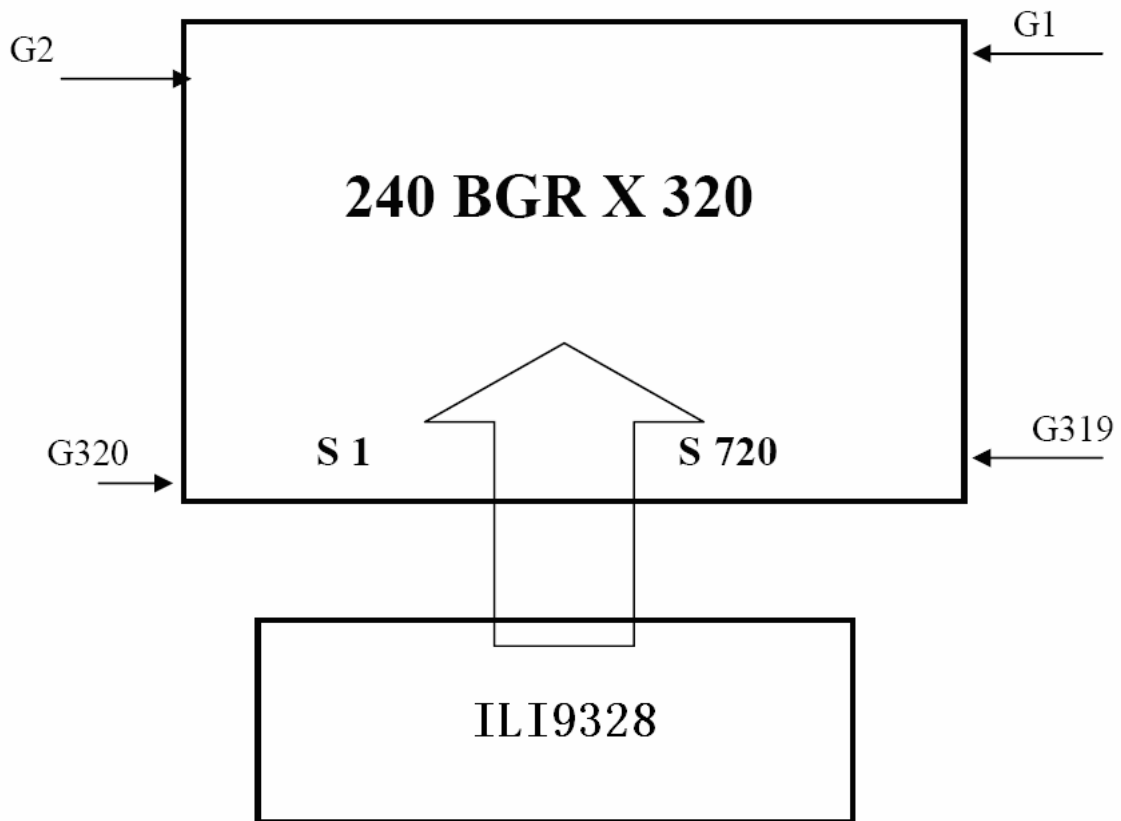
<dimension of viewing angle range>



5. Interface:

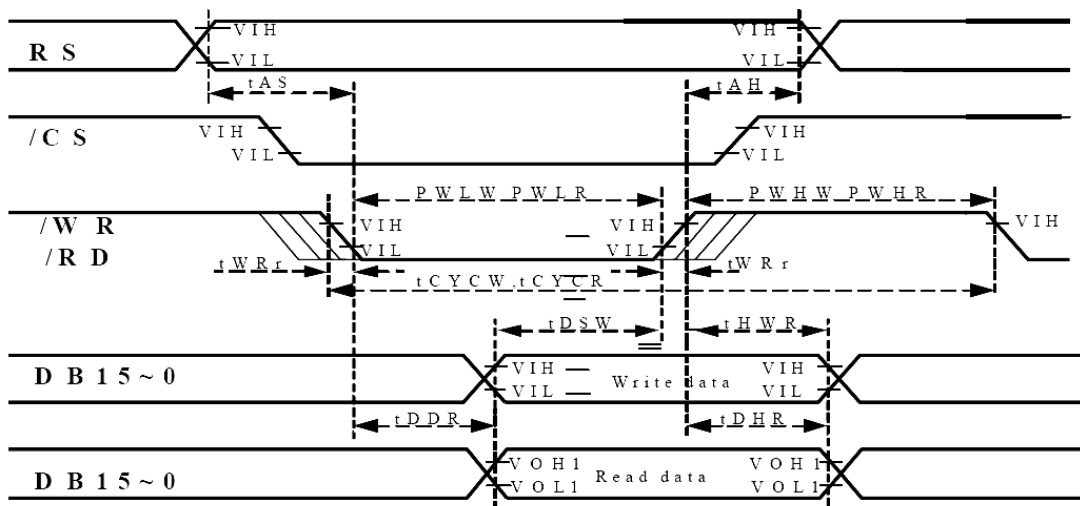
Pin No	Symbol	Function	Notes
1-4	DB0~DB3	data bus	
5	GND1	Gound	
6	VCC1	Power supply	
7	/CS	Chip select pin	
8	RS	Command/Display data select pin	
9	/WR	Write enable clock input pin	
10	/RD	Read enable clock input pin	
11	IM0	8/16 bit select pin	
12	NC	NC	
13	NC		
14	NC		
15	NC		
16	LEDA	The LED power supply (+)	
17-20	LEDK1~K4	The LED power supply (-)	
21	NC		
22	DB4	data bus	
23-30	DB10~DB17	data bus	
31	/RESET	Reset pin.	
32	VCI	Power supply	
33	VCC2	Power supply	
34	GND	Gound	
35-37	DB5~DB7	data bus	

6. Block Diagram



7. Timing Control:

Item	Symbol	Values			Unit	Remark
		Min	Typ	Max.		
Bus cycle time	Write	t_{CYCW}	100	-	-	ns
	Read	t_{CYCR}	300	-	-	ns
Write low-level pulse width	$PWLW$	50	-	500		ns
Read low-level pulse width	$PWLR$	150	-	-		ns
Write high-level pulse width	$PWHW$	50	-	-		ns
Read high-level pulse width	$PWHR$	150	-	-		ns
Write/Read rise/fall time	$t_{WRr,WRf}$	-	-	25		ns
RS,CS and WR Setup time	t_{AS}	5	-	-		ns
Address hold time	t_{AH}	5	-	-		ns
Write data setup time	t_{DSW}	10	-	-		ns
Write data hold time	t_{HWR}	15	-	-		ns
Read data delay time	t_{DDR}	-	-	100		ns
Read data hold time	t_{DHR}	5	-	-		ns



8.Backlight:

8.1 Standard Lamp Styles (Edge Lighting Type):

The LED chips are distributed over the edge light area of the illumination unit, which gives the less power consumption:

8.2 The Main Advantages of the LED Backlight are as Following:

The brightness of the backlight can simply be adjusted.

By a resistor or a potentiometer.

8.3 Data About LED Backlight:

Item	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Forward voltage	Vf	If =72	-	3.2	3.5	V
Forward current	If		-	72		mA
Uniformity	-	If=72	80%	-	-	-
Luminous color	-	White				
Chip connection	-	4-LED parallel connection				

NOTE:

- 1.Backlight Only
- 2.Average Luminous Intensity of P1-P9
- 3.Uniformity = $\text{Min}(P1\sim P9)/\text{Max}(P1\sim P9) * 100\% > 80\%$

8.4 Measured Method:

P1 ○	P2 ○	P3 ○
P4 ○	P5 ○	P6 ○
P7 ○	P8 ○	P9 ○

(Effective spatial Distribution)

Hole Diameter $\pm 1\phi$; 1 to 9 per Position Measured Luminou