

LCM SPECIFICATIONS

(using)

LCM MODE: GRAPHIC

PRODUCTION CODE: G12232-29

REVISION: ver3.0

DATE: 2012/03/23

EXTERNAL DIMENSIONS

Display Type	STN/BLUE
Operating Method	NEGATIVE, TRANSMISSIVE
Viewing Angle	1/32 DUTY, 1/5 BIAS
LCD Driver IC	IL1520
Logic Supply Voltage	VDD=5.0V
LCD Driving Voltage	VLCD=5V (VDD-V0)
Operation Temperature	-20°C TO 70°C
Storage Temperature	-30°C TO 80°C
Backlight	WHITE(WF=5Vf=60mA)
RoHS	YES

PIN NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
SYMBOL	VDD	VSS	VLCD/RET	E1	E2	R/W	A0	DB0	DB1	DB2	DB3	DB4	DB5	DB6	DB7	SLA	SLK	

设计																		
校对																		
审核																		
会签																		
批准																		

名称

更改标记

更改单号

签名

外形图

代号

型号

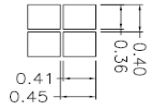
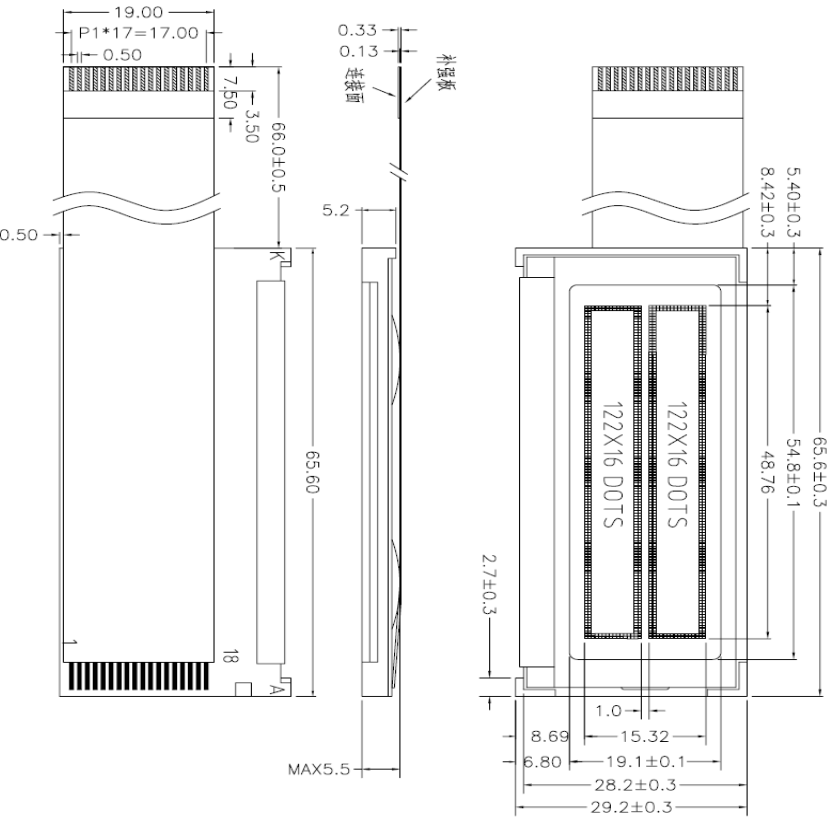
标记

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第版

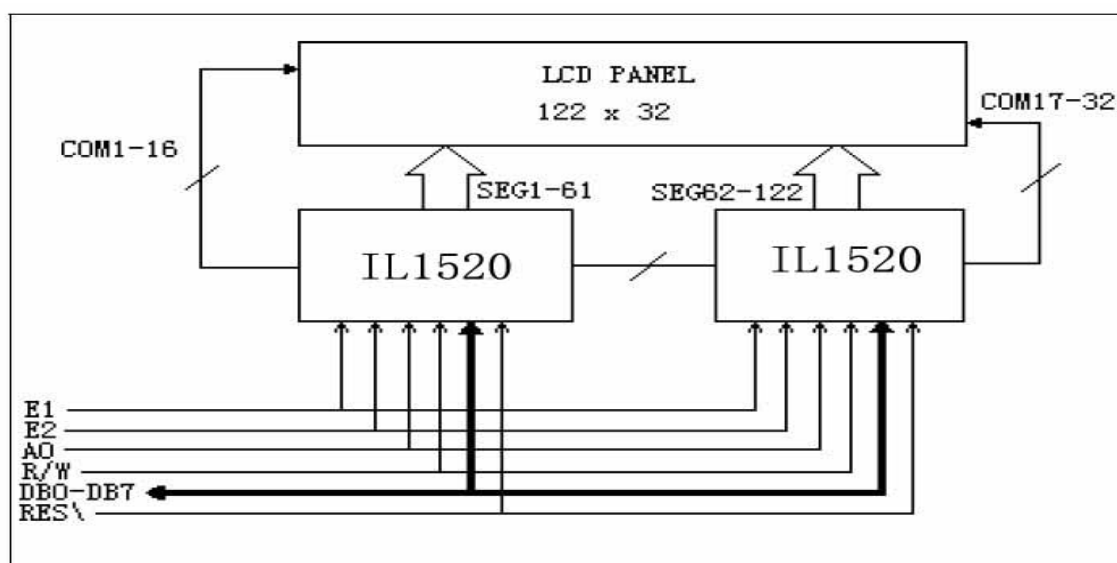
单位: mm



■ PHYSICAL DATA

Item	Contents	Unit
LCD type	STN /BLUE	---
LCD duty	1/32	---
LCD bias	1/5	---
Viewing direction	6	---
Module size (W×H×T)	65.6 × 29.2 × 5.5MAX	mm
Viewing area (W×H)	54.8 × 19.1	mm
Number of Dots	122 × 32	dots
Dot size (W×H)	0.36 × 0.41	mm
Dot pitch (W×H)	0.40 × 0.45	mm

■ BLOCK DIAGRAM



■ INTERFACE PIN CONNECTIONS

Pin NO.	Symbol	Level	Description
1	VDD		Power supply voltage (+5V)
2	VSS		Ground
3	VLCD		Power supply for LCD driving(Built-in)
4	/RET		Input the Reset signal.
5	E1		Input chip enable signal 1, which generates right display screen; When connected to the 68 type MPU: active "H"; when connected to the 80 type MPU, active "L"
6	E2		Input chip enable signal 2, which generates the left display screen; When connected to the 68 type MPU: active "H"; when connected to the 80 type MPU, active "L"
7	R/W		Input the READ/WRITE selected signal: H: Read; L: Write
8	A0		Input display data and instruction selected signal: Active H: Data; active L: Instruction code
9-16	D0~D7		Tri-state bilateral Data Bus, by which the data transmission between MPU and the module is executed.
17	SLA		Power supply for Backlight (+5V)
18	SLK		Power supply for Backlight

■ **ELECTRICAL CHARACTERISTICS** (VDD = +5V±10% , VSS = 0V, Ta = 25° C)

1. Electro-Optic Characteristics(module unit):

ITEM	SYMBOL	MIN	TYP	MAX	Unit	CONDITION
Input high voltage	V _{IH}	0.7VDD	-	VDD	V	
Input low voltage	V _{IL}	0	-	0.3VDD	V	
Output high voltage	V _{OH}	2.4	-	-	V	
Output low voltage	V _{OL}	-	-	0.4	V	
Frame frequency	F _f	-	70	-	Hz	F _{OSC} =430 KHz
Oscillation frequency	F _{OSC}	15	18	21	KHz	VDD=5V Rf=1MΩ ±2%

Condition:TEMP=(23±3)°C

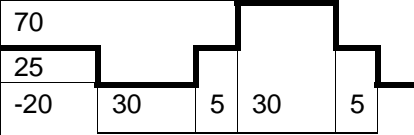
No.	ITEM	SYMBOL	MIN	TYP	MAX	Unit	CONDITION	
1	Supply voltage(Logic)	VDD-VSS	4.5	5.0	5.5	V		
2	Supply current (Logic)	IDD		0.5		mA	VDD=5V	
3	LCD operating voltage	VDD-V0		5.5		V	0°C	
			4.9	5.2	5.5	V	25°C	
				4.7		V	50°C	
4	Response time	Ton		176		ms		
		Toff		77		ms		
5	Contrast	CR	3					
6	Viewing angel	12H	θ 1		54		Deg.	(CR≥3.0)
		6H	θ 2		43			
		3H	θ 3		60			
		9H	θ 4		60			

2. Electrical-optical Characteristics(LED unit):

PARAMETER	SYMBOL	LIGHT SOURCE	STANDARD VALUE			UNIT
			MIN	TYP	MAX	
FORWARD VOLTAGE	V _f	WHITE	—	5.0	—	V
FORWARD CURRENT	I _f	WHITE	50	60	70	mA

■ **RELIABILITY TEST**

图形点阵模块

No.	ITEM	TEST CONDITION	EQUIPMENT	TEST RESULT
1	High Temp Storage	Temp:70±2℃ Time:96h Restore:24h	Tenny	Passed
2	Low Temp Storage	Temp:-20±3℃ ime:96h Restore:24h	Tenny	Passed
3	High Temp Static drive	Temp:50±2℃ Vop:5V Time:24h Restore:24h	Tenny	Passed
4	Low Temp Static drive	Temp:0±3℃ Vop:5V Time:24h Restore:24h	Tenny	Passed
5	High Temp High Hum Storage	Temp:40±2℃ Hum:95%Rh Time:96h Restore:24h	Tenny	Passed
6	Thermal Shock	Temp:(°C)  5 Cycles Restore:24h	Tenny	Passed

■ ABSOLUTE MAXIMUM RATINGS (Ta = 25° C)

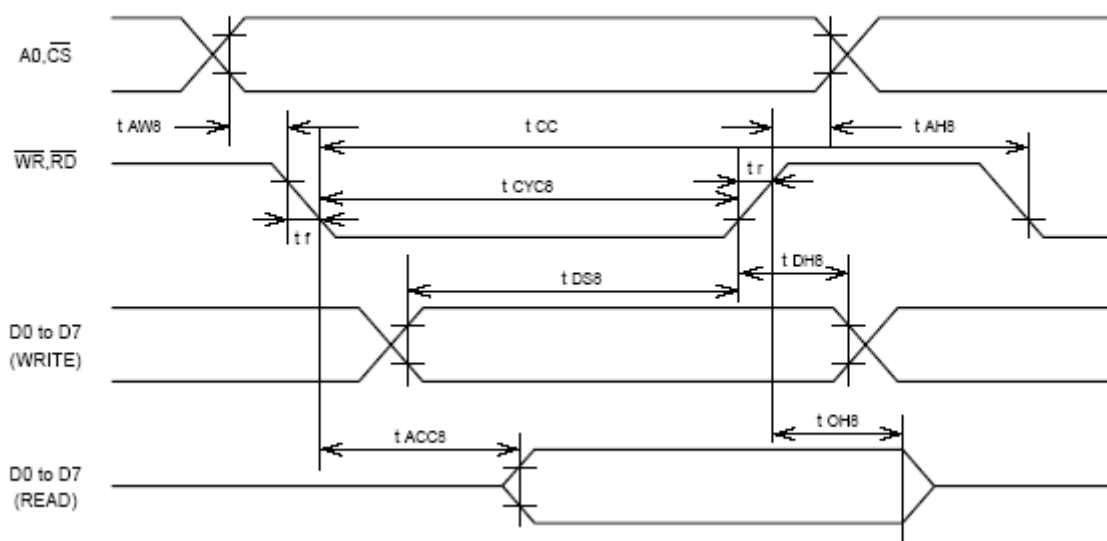
PARAMETER	SYMBOL	MIN	MAX	Unit
Supply voltage for logic	VDD	-0.3	7.0	V
Supply voltage for LCD	VDD - VO	-0.3	6.0	V
Input voltage	VI	VSS-0.3	0.3	V
Operating temperature	TOP	-20	70	° C
Storage temperature	TST	-30	80	° C

■ TIMING CHARACTERISTICS (VDD=4.5 to 5.5V)

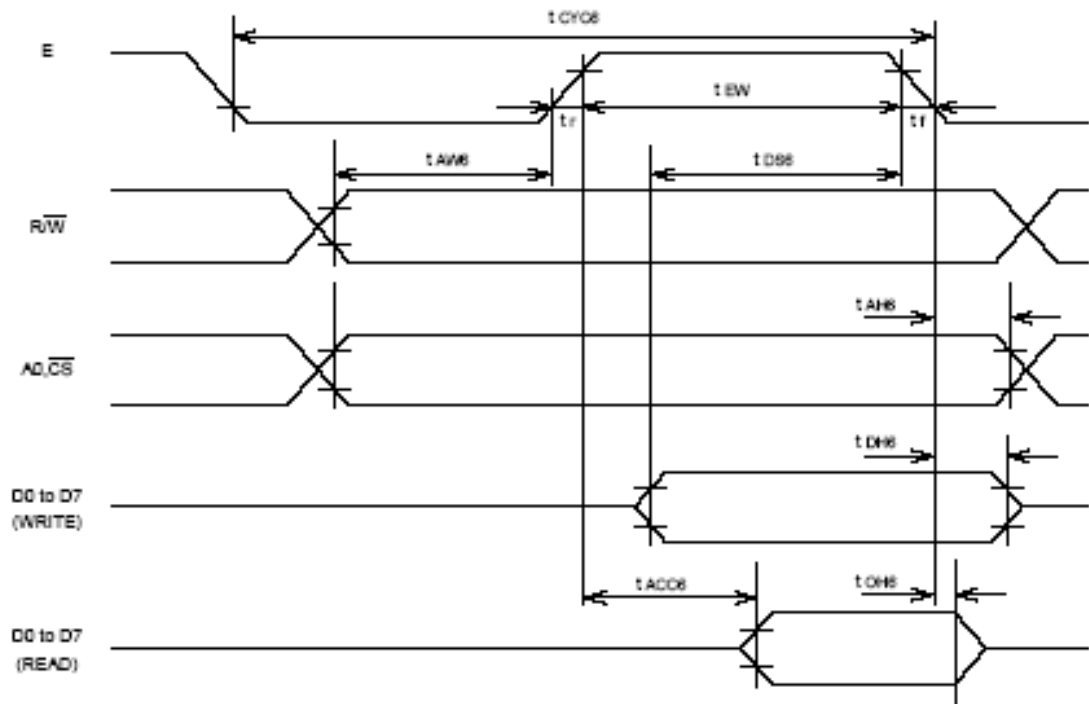
Write operation and Read operation

Parameter	Symbol	Condition	Rating		Unit	Signal
			Min.	Max.		
Address hold time	tAH8		10	—	ns	A0, \overline{CS}
Address setup time	tAW8		20	—	ns	
System cycle time	tCYC8		1000	—	ns	
Control pulsewidth	tCC		200	—	ns	\overline{WR} , \overline{RD}
Data setup time	tDS8		80	—	ns	D0 to D7
Data hold time	tDH8		10	—	ns	
\overline{RD} access time	tACC8	CL = 100 pF	—	90	ns	
Output disable time	tCH8		10	60	ns	
Rise and fall time	tr, tf	—	—	15	ns	

• MPU Bus Read/Write I (80-family MPU)



• MPU Bus Read/Write II (68-family MPU)



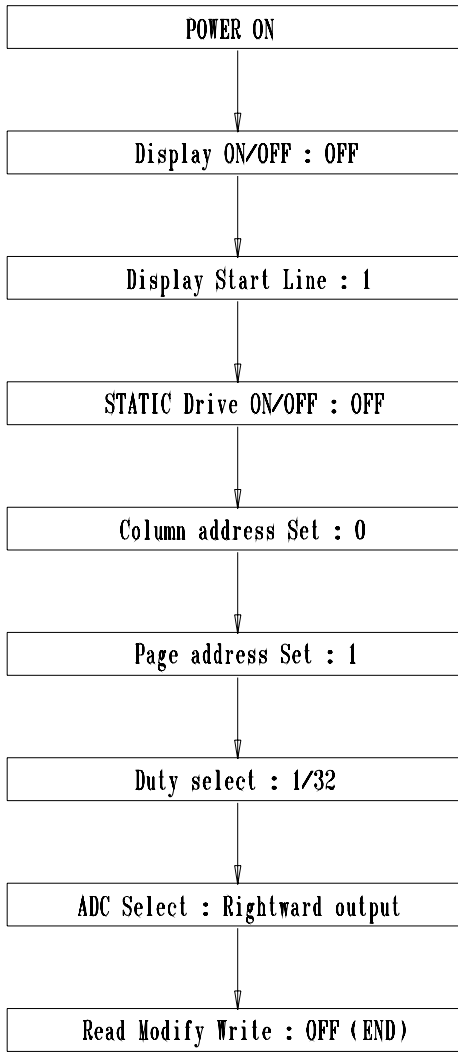
■ INSTRUCTION SETS

COMMANDS

Summary

Command	Code											Function	
	A0	RD	WR	D7	D6	D5	D4	D3	D2	D1	D0		
Display On/OFF	0	1	0	1	0	1	0	1	1	1	0/1	Turns display on or off. 1: ON, 0: OFF	
Display start line	0	1	0	1	1	0	Display start address (0 to 31)				0	Specifies RAM line corresponding to top line of display.	
Set page address	0	1	0	1	0	1	1	1	0	Page (0 to 3)		Sets display RAM page in page address register.	
Set column (segment) address	0	1	0	0	Column address (0 to 79)						0	Sets display RAM column address in column address register.	
Read status	0	0	1	Busy	ADC	ON/OFF	Reset	0	0	0	0	Reads the following status: BUSY 1: Busy 0: Ready ADC 1: CW output 0: CCW output ON/OFF 1: Display off 0: Display on RESET 1: Being reset 0: Normal	
Write display data	1	1	0	Write data									Writes data from data bus into display RAM.
Read display data	1	0	1	Read data									Reads data from display RAM onto data bus.
Select ADC	0	1	0	1	0	1	0	0	0	0	0/1	0: CW output, 1: CCW output	
Static drive ON/OFF	0	1	0	1	0	1	0	0	1	0	0/1	Selects static driving operation. 1: Static drive, 0: Normal driving	
Select duty	0	1	0	1	0	1	0	1	0	0	0/1	Selects LCD duty cycle 1: 1/32, 0: 1/16	
Read-Modify-Write	0	1	0	1	1	1	0	0	0	0	0	Read-modify-write ON	
End	0	1	0	1	1	1	0	1	1	1	0	Read-modify-write OFF	
Reset	0	1	0	1	1	1	0	0	0	1	0	Software reset	

▼ Initialization



RES :  (with MPU)

DB7.....DB0

1	0	1	0	1	1	1	0
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DB7.....DB0

1	1	0	0	0	0	0	0
---	---	---	---	---	---	---	---

DB7.....DB0

1	0	1	0	0	1	0	0
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DB7.....DB0

0	0	0	0	0	0	0	0
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DB7.....DB0

1	0	1	1	1	0	1	1
---	---	---	---	---	---	---	---

DB7.....DB0

1	0	1	0	1	0	0	1
---	---	---	---	---	---	---	---

DB7.....DB0

1	0	1	0	0	0	0	0
---	---	---	---	---	---	---	---

DB7.....DB0

1	1	1	0	1	1	1	0
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