

User's Guide

GXM12232-2

Liquid Crystal Display Module

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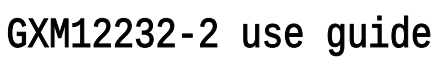
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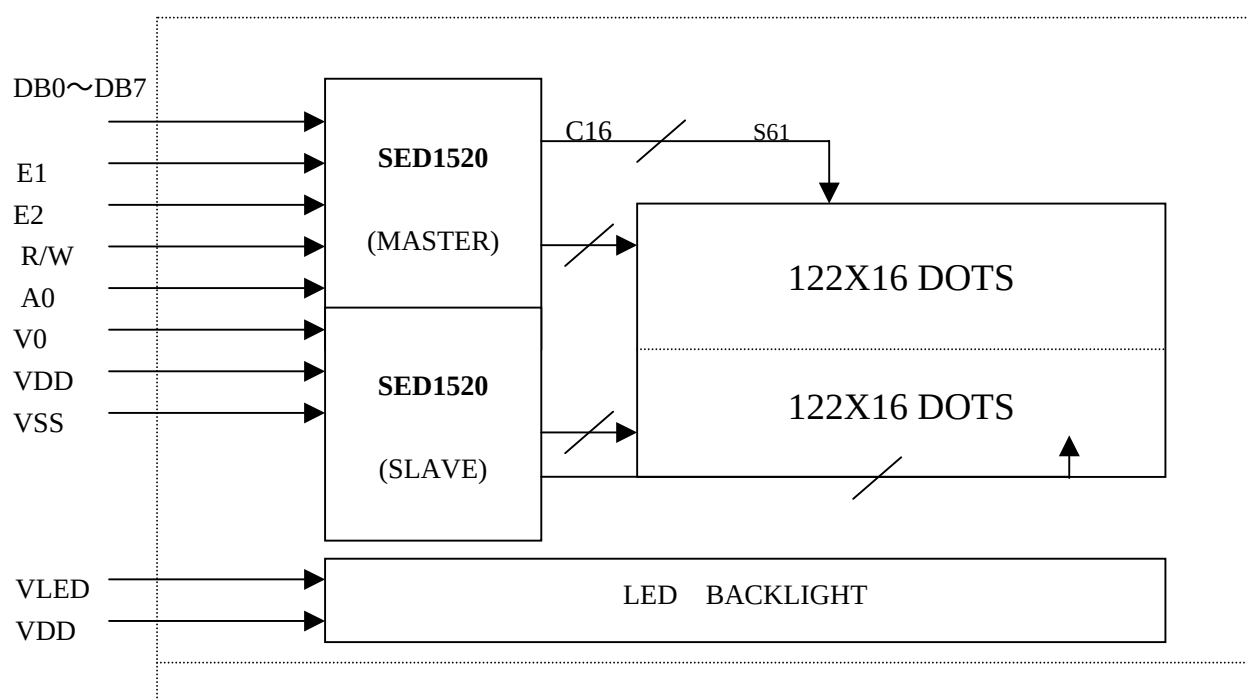
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GXM12232-2 use guide



■BLOCK DIAGRAM



1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
/Vled	VSS	VDD	V0	A0	E1	E2	DB0	DB1	DB2	DB3	DB4	DB5	DB6	DB7	RW

■ABSOLUTE MAXIMUM RATINGS(Ta=25°C)

Parameter	Symbol	Min	Max	Unit
Supply Voltage for logic	VDD	0	6.7	V
Supply Voltage for LCD	VDD-V0	0	10	V
Input voltage	VI	0	VDD	V
Operating Temp.	TOP	-20°C	+70°C	°C
Storage Temp.	TST	-25°C	+80°C	°C

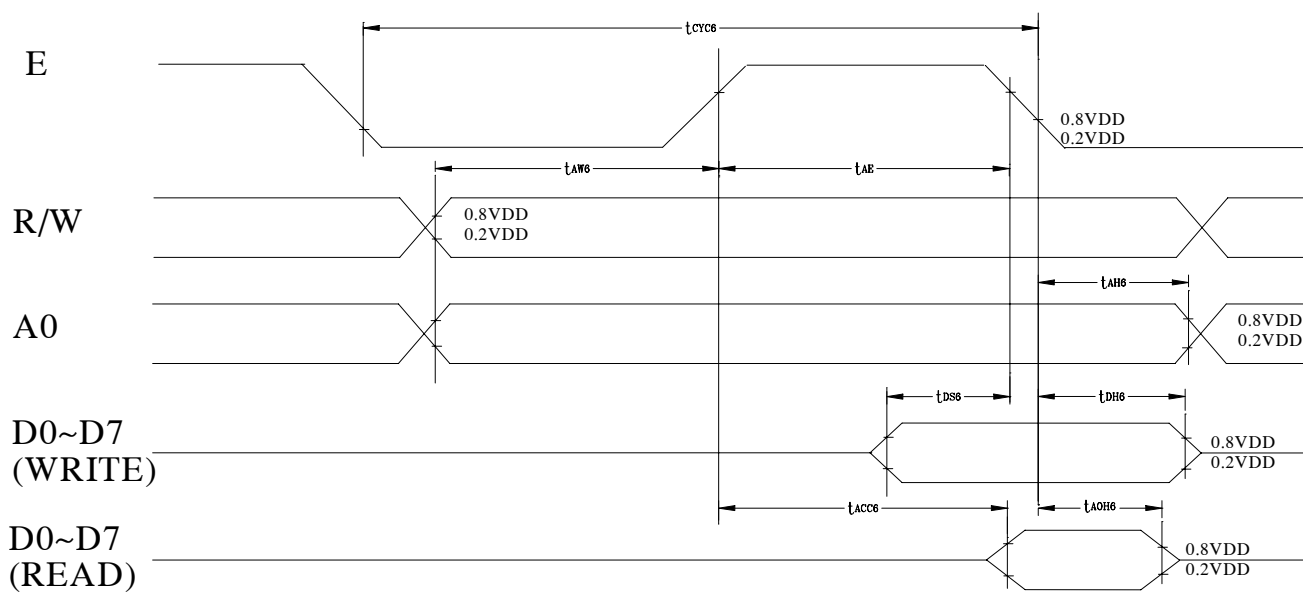
■ELECTRICAL CHRACTERISTICS(VDD=+5V±10%,VSS=0V,Ta=25°C)

▼DC Characteristics

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Supply voltage for logic	VDD	----	4.5	5.0	5.5	V
Supply current for logic	IDD	----	----	0.8	1.5	mA
Operating voltage for LCD	VDD-V0	25°C	----	5	----	V
Supply voltage for LED backlight	VBL	----	----	4.0	----	V
Supply current for LED backlight	ILED	VLED=4.0V	----	20.0	----	mA

▼ AC Characteristics

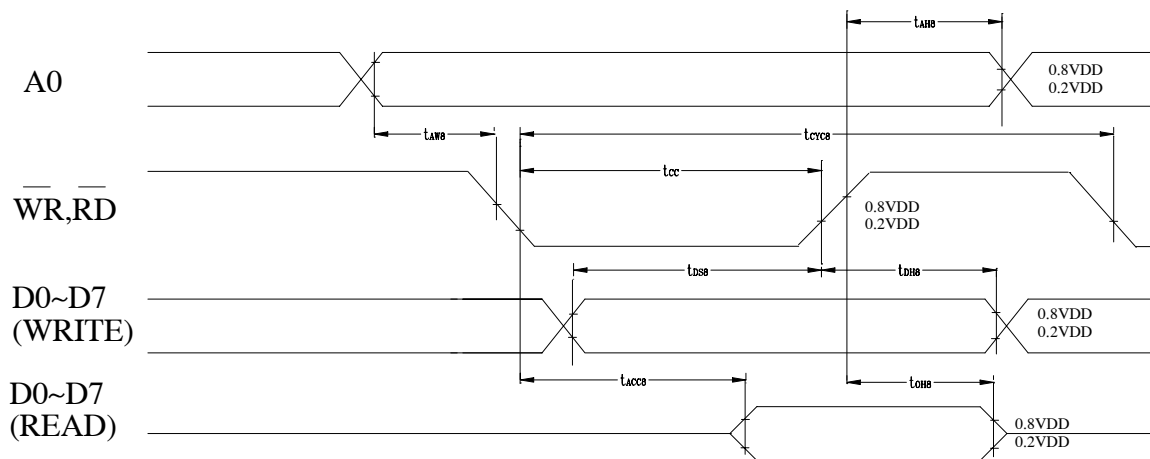
⊙ Read/Write operation sequence(68 Type MPU)



Ta=-20 to +75°C, VDD=5.0V±10%, VSS=0V

Parameter		Symbol	Min	Max	unit	Condition
System cycle time		t_{CYC6}	1000	-----	ns	
Address setup time		t_{AW6}	20	-----	ns	
Address hold time		t_{AH6}	10	-----	ns	
Enable pulse width	Read	t_{EW}	100	-----	ns	
	Write	t_{EW}	80	-----	ns	
Data setup time		t_{DS6}	80	-----	ns	
Data hold time		t_{DH6}	10	-----	ns	
Access time		t_{ACC6}	----	90	ns	CL=100Pf
Output disable time		t_{OH6}	10	60	ns	
Input wave form rise time		t_r	----	15	ns	

⊙ Read/Write operation sequence(80 Type MPU)



Ta=-20 to +75°C, VDD=5.0V±10%, VSS=0V

Parameter	Symbol	Min	Max	unit	Condition
System cycle time	t_{CYC8}	1000	-----	ns	
Address setup time	t_{AW8}	20	-----	ns	
Address hold time	t_{AH8}	10	-----	ns	
Control pulse width	t_{CC}	200	-----	ns	
Data setup time	t_{DS8}	80	-----	ns	
Data hold time	t_{DH8}	10	-----	ns	
RD access time	t_{ACC8}	----	90	ns	CL=100Pf
Output disable time	t_{CH8}	10	60	ns	

■ OPERATING PRINCIPLES & METHODS

▼Control and Display Command

Command	R/W	RD	A0	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0	Function
Display ON/OFF	0	1	0	1	0	1	0	1	1	1	0/1	Whole display ON/OFF 1: ON , 0: OFF(Power Save mode if the static drive on)
Display start line	0	1	0	1	1	0	Display start line (0 to 31)				Determine the display line correspond to the com0.	
Set page address	0	1	0	1	0	1	1	1	0	Page(0 to 3)		Set the page of display .Data RAM to the Column Register
Set column address	0	1	0	0	Column address (0 to 79)							Set the Column Address of Display data RAM to the column register
Read status	0	0	1	Busy	ADC	On/ Off	Reset	0	0	0	0	Read the status. BUSY 1: Working 0: Ready ADC 1: Clockwise output 0: Counter clockwise ON/OFF 1: Display off 0: Display on RESET 1: Reset 0: Normal
Write display data	1	1	0	Write data							Write data from data bus into display RAM	
Read display data	1	0	1	Read data							Read data from display RAM onto data bus	
Select ADC	0	1	0	1	0	1	0	0	0	0	0/1	Determine the clockwise or counterclockwise reading of the display data RAM 0: Clockwise Output 1: Counterclockwise Output
Static drive ON/OFF	0	1	0	1	0	1	0	0	1	0	0/1	Select the dynamic or static driving 1: Static driving(Power save) 0: Dynamic driving
Select duty	0	1	0	1	0	1	0	1	0	0	0/1	Select the duty ratio 1: 1/32 duty 0: 1/16 duty
Read-Modify-Write	0	1	0	1	1	1	0	0	0	0	0	Increment the column address register when writing but no-change when reading.
Reset	0	1	0	1	1	1	0	0	0	1	0	Set the display start line register to 1st line ,Column add. Counter and page add. register to "0".
End	0	1	0	1	1	1	0	1	1	1	0	Release from the Read Modify Write Mode.

■ DIAPLAY DATA RAM ADDRESS MAP

Page	Data			Com NO.	Driver
1	DB0 DB7	122×16 Pixels		0 15	Master
2	DB0 DB7				
3	DB0 DB7	122×16 Pixels		16 31	Slave
4	DB0 DB7				
	Seg NO.	0 ----- 60	0----- 60		
	Driver	Master	Slave		