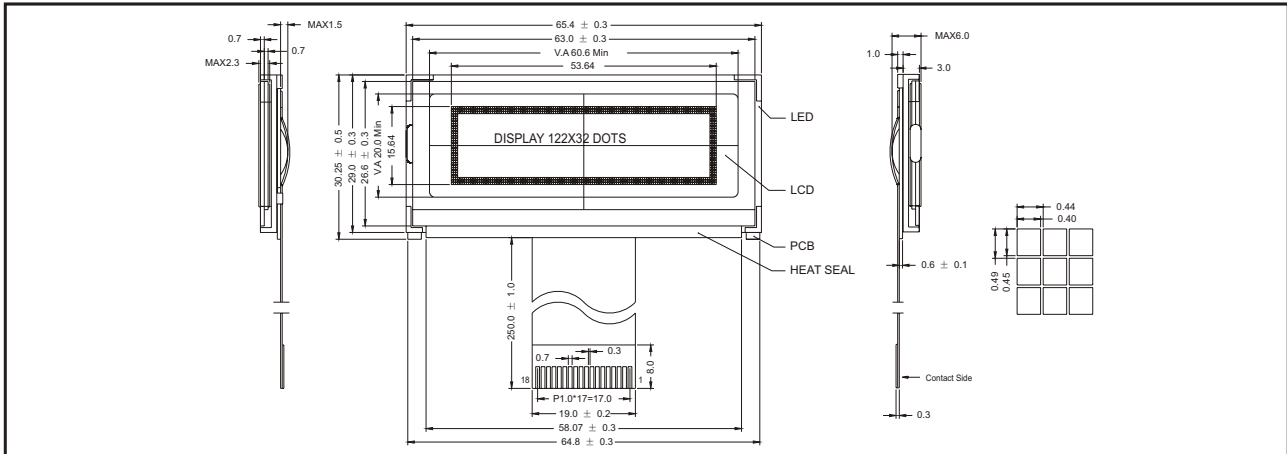


STANDARD GRAPHIC MODULES

YMC 12232-03

122 X 32 DOTS, 1/32 DUTY, 1/5 BIAS

EXTERNAL DIMENSION AND DISPLAY PATTERN



MECHANICAL DATA

ITEM	SPECIFICATION	UNIT
Module Size (W x H x T)	65.4 x 30.25 x 6.0	mm
Viewing Area (W x H)	60.6 x 20.0	mm
Number of Dots	122 x 32 with cursor	dots
Dot Pitch (W x H)	0.40 x 0.45	mm
Dot Size (W x H)	0.44 x 0.49	mm

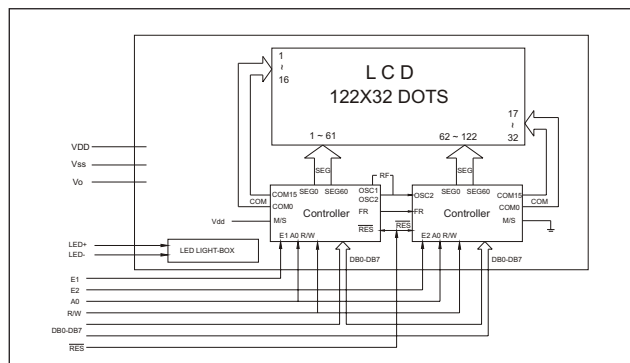
ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	MIN.	MAX.	UNIT
Supply Voltage Logic	$V_{DD} - V_{SS}$	-0.3	8.0	V
Supply Voltage Drive	$V_{DD} - V_{EE}$	-0.3	13.5	V
Input Voltage	V_{IN}	-0.3	$V_{DD} + 0.3$	V
Operating Temperature	See page 8			
Storage Temperature				

PIN CONFIGURATION

PIN	SYMBOL	SIGNAL DESCRIPTION
1	V_{DD}	Logic Supply Voltage (+5.0V)
2	V_{SS}	Ground (0V)
3	V_0	Power Supply for LCD Driving
4	RES	Reset Signal
5	E1	Enable Clock
6	E2	Enable Clock
7	R/W	Read / Write Select
8	A_0	Identify the Data or a Command
9-16	DB ₀ - DB ₇	Data Bus Line
17-18	LED+, LED-	LED Backlight

BLOCK DIAGRAM



ELECTRICAL CHARACTERISTICS, Ta = 25°C

ITEM	SYMBOL	CONDITION	SPEC. VALUE			UNIT
			MIN.	TYP.	MAX.	
Supply Voltage (Logic)	$V_{DD} - V_{SS}$		4.5	5.0	5.5	V
Supply Current (Logic)	I_{DD}	$V_{DD} = 5V$		0.5	1.0	mA
Input Voltage	HIGH	V_{IH}		$0.8 V_{DD}$	V_{DD}	V
	LOW	V_{IL}		V_{SS}	$0.3 V_{DD}$	V
Output Voltage	HIGH	V_{OH}	$I_{OH} = 3.0mA$	$V_{DD} + 2.4$		V
	LOW	V_{OL}	$I_{OL} = 3.0mA$		$V_{DD} + 0.4$	V
LCD Operating Voltage	$V_{DD} - V_0$			5.0		V
Supply Current LCD Drive	I_{EE}	$V_{DD} = 5V$ $T_a = +25^\circ C$		1.0	1.5	mA

Note (1): Value is high reliability type.

Note (2): Electro-Optical Characteristics: See page 5.

BACKLIGHTING CHARACTERISTICS, Ta = 25°C, LED

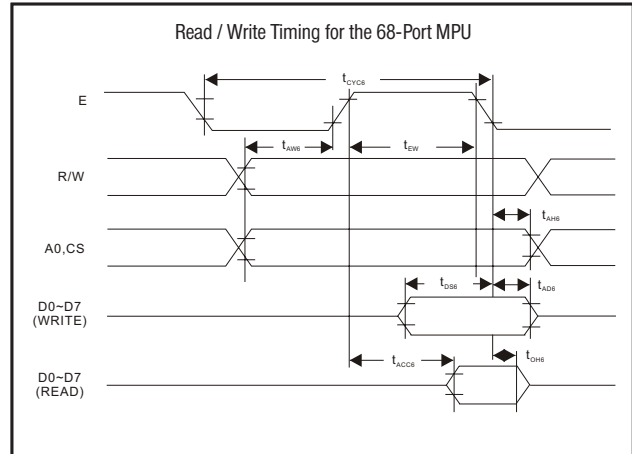
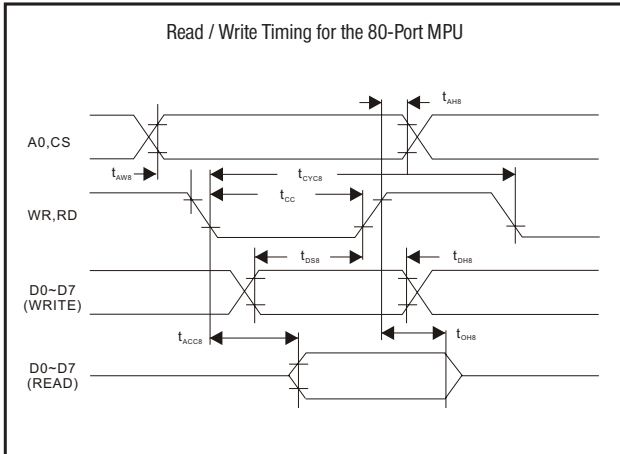
ITEM	SYMBOL	CONDITION	SPEC. VALUE			UNIT
			MIN.	TYP.	MAX.	
Supply Voltage	V_{LED}	$I_F = 140mA$		2.1	2.3	V
Power Consumption	P_{LED}	$I_F = 140mA$		0.29		W
Luminous	I_V	$I_F = 140mA$		25		cd/m ²

STANDARD GRAPHIC MODULES

YMC 12232-03

122 X 32 DOTS, 1/32 DUTY, 1/5 BIAS

INTERFACE TIMING CHARACTERISTICS



SWITCHING TIMING CHARACTERISTICS: READ/WRITE TIMING FOR THE 80-PORT MPU, $T_a = -25^\circ\text{C} \sim 75^\circ\text{C}$

PARAMETER	SIGNAL	SYMBOL	CONDITION	RATING			
				MIN.	TYP.	MAX.	UNIT
Address Hold Time	A ₀ , CS	t_{AH8}	$V_{SS} = -5V$	10			ns
			$V_{SS} = -3V$	20			
Address Setup Time	A ₀ , CS	t_{AW8}	$V_{SS} = -5V$	20			ns
			$V_{SS} = -3V$	40			
System Cycle Time	WR, RD	t_{CYC8}	$V_{SS} = -5V$	1000			ns
			$V_{SS} = -3V$	2000			
Control Pulse Width	WR, RD	t_{CC}	$V_{SS} = -5V$	200			ns
			$V_{SS} = -3V$	400			
Data Setup Time	D ₀ - D ₇	t_{DS8}	$V_{SS} = -5V$	80			ns
			$V_{SS} = -3V$	160			
Data Hold Time		t_{DH8}	$V_{SS} = -5V$	10			ns
			$V_{SS} = -3V$	20			
RD Access Time	D ₀ - D ₇	t_{ACC8}	$V_{SS} = -5V$			90	ns
			$V_{SS} = -3V$			180	
Output Disable Time	D ₀ - D ₇	t_{OH8}	CL = 100pF	10		60	ns
			CL = 100pF, $V_{SS} = -3V$	20		120	

SWITCHING TIMING CHARACTERISTICS: READ/WRITE TIMING FOR THE 68-PORT MPU, $T_a = -25^\circ\text{C} \sim 75^\circ\text{C}$

PARAMETER	SIGNAL	SYMBOL	CONDITION	RATING			
				MIN.	TYP.	MAX.	UNIT
Address Hold Time	A ₀ , CS, R/W	t_{AH6}	$V_{SS} = -5V$	10			ns
			$V_{SS} = -3V$	30			
Address Setup Time			$V_{SS} = -5V$	20			
		$V_{SS} = -3V$	40				
System Cycle Time	R/W	t_{CYC6}	$V_{SS} = -5V$	1000			ns
			$V_{SS} = -3V$	2000			
Control Pulse Width	R/W	t_{DS6}	$V_{SS} = -5V$	80			ns
			$V_{SS} = -3V$	160			
Data Setup Time	R/W	t_{DH6}	$V_{SS} = -5V$	10			ns
			$V_{SS} = -3V$	20			
Data Hold Time		t_{OH6}	CL = 100pF, $V_{SS} = -5V$	10		60	ns
			$V_{SS} = -3V$	20		120	
RD Access Time	R/W	t_{ACC6}	CL = 100pF, $V_{SS} = -5V$			90	ns
			$V_{SS} = -3V$			180	
Enable/Disable Time	READ WRITE	E	$V_{SS} = -5V$	100			ns
			$V_{SS} = -3V$	200			
			$V_{SS} = -5V$	80			
			$V_{SS} = -3V$	160			

Condition: t_{CYC6} indicates the cycle during which CS/E are high; it doesn't indicate are cycle of the E signal.