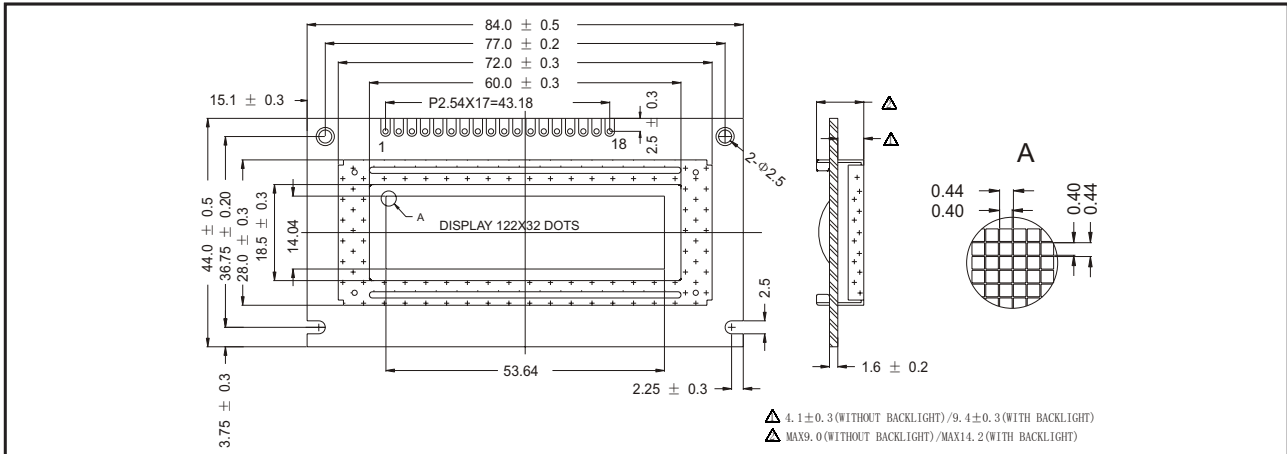


STANDARD GRAPHIC MODULES

YMS 12232-01

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

INTERFACE TIMING CHARACTERISTICS



MECHANICAL DATA

ITEM	SPECIFICATION	UNIT
Module Size (W x H x T)	84.0 x 44.0 x 9.0/14.2	mm
Viewing Area (W x H)	60.0 x 18.5	mm
Number of Dots	122 x 32	dots
Dot Pitch (W x H)	0.44 x 0.44	mm
Dot Size (W x H)	0.4 x 0.4	mm

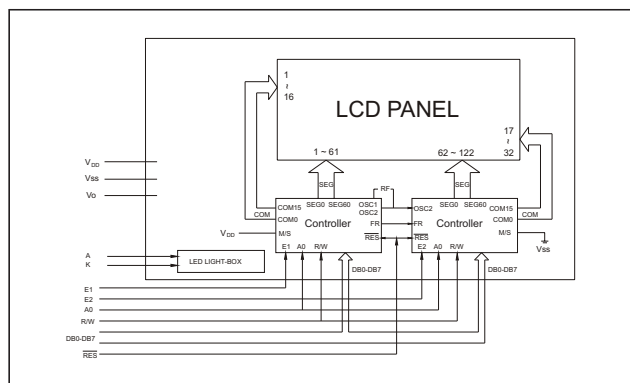
ABSOLUTE MAXIMUM RATINGS

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	16.5	V
Input Voltage	V_{IN}	-0.3	$V_{DD} + 0.3$	V
Operating Temperature		See page 8		
Storage Temperature				

PIN CONFIGURATION

PIN	SYMBOL	LEVEL	SIGNAL DESCRIPTION
1	V_{SS}	0V	GND (0 V)
2	V_{DD}	+5V	Supply voltage for Logic and LCD
3	V_0		Operating Voltage for LCD (variable)
4	A0	H/L	Register Select - LOW = Instruction, HIGH=DATA
5	E1	H/L	Enable R/W = LOW: Data are talking over at falling edge R/W = HIGH: Data can be read at E = 1
6	E2		
7	R/W	H/L	Read / Write LOW = MPU to LCM, HIGH=Data
8	DB ₀	H/L	Data Bit 0
9	DB ₁	H/L	Data Bit 1
10	DB ₂	H/L	Data Bit 2
11	DB ₃	H/L	Data Bit 3
12	DB ₄	H/L	Data Bit 4
13	DB ₅	H/L	Data Bit 5
14	DB ₆	H/L	Data Bit 6
15	DB ₇	H/L	Data Bit 7
16	/RES	H/L	Reset Signal
17	A		Anode of LED Unit
18	K		Cathode of LED Unit

BLOCK DIAGRAM



BACKLIGHTING CHARACTERISTICS, $T_a = 25^\circ\text{C}$, LED

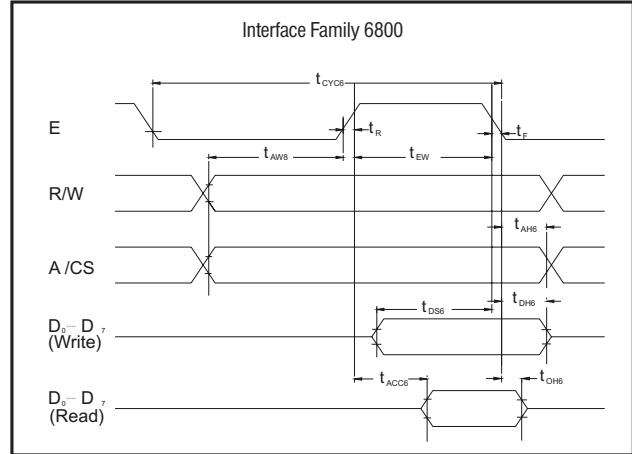
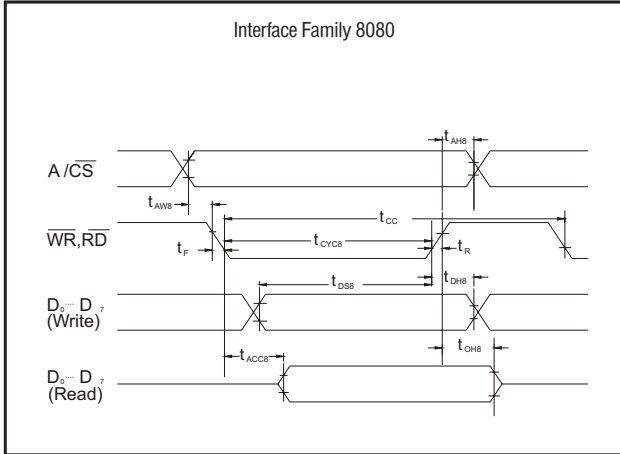
ITEM	SYMBOL	CONDITION	SPEC. VALUE			UNIT
			MIN.	TYP.	MAX.	
Supply Voltage	V_{LED}		3.95	4.1	4.25	V
Power Consumption	P_{LED}	$I_F = 90\text{mA}$		369	900	mW
Luminous	I_v	$I_F = 90\text{mA}$				cd/m ²

STANDARD GRAPHIC MODULES

YMS 12232-01

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

EXTERNAL DIMENSION AND DISPLAY PATTERN



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	$V_{DD} - V_0$	$V_{DD} = 5V$ $T_a = +25^\circ C$		5.0		V
Supply Current LCD Drive	I_0			1.0	1.5	mA

Note (1): Value is high reliability type.

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

SWITCHING TIMING CHARACTERISTICS

PARAMETER	SYMBOL	MIN.	MAX.	UNIT
Address Hold Time	t_{AH8}	10		ns
Address Setup Time	t_{AW8}	20		ns
System Cycle Time	t_{CYC8}	1000		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
Output Disable Time	t_{OH8}	10	60	ns
Rise and Fall Time	t_R, t_F		15	ns

Condition: $V_{DD} = +5.0, V_{SS} = 0V, T_a = +25^\circ C$

PARAMETER	SYMBOL	MIN.	MAX.	UNIT
Address Hold Time	t_{AH6}	10		ns
Address Setup Time	t_{AW6}	20		ns
Data Setup Time	t_{CYC6}	1000		ns
Data Hold Time	t_{DS6}	80		ns
Data Setup Time	t_{DH6}	10		ns
Output Disable Time	t_{OH6}	10	60	ns
Access Time	t_{ACC6}		90	ns
Enable Low	READ	t_{EW}	100	ns
Pulse Width	WRITE		80	ns
Rise and Fall Time	t_R, t_F		15	ns

Condition: $V_{DD} = +5.0, V_{SS} = 0V, T_a = +25^\circ C$