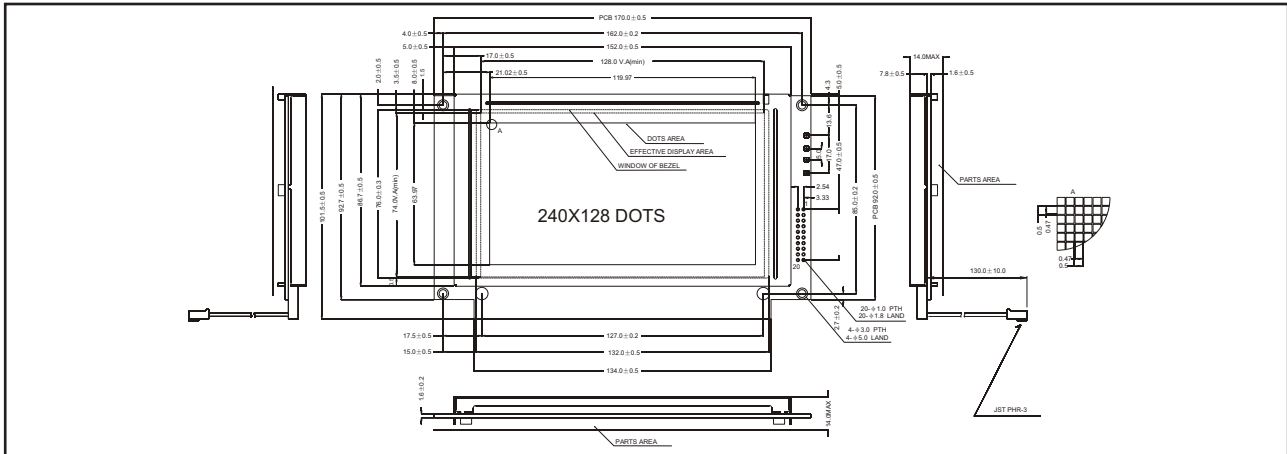


STANDARD GRAPHIC MODULES

YMS 240128-02

240 X 128 DOTS, 1/128 DUTY, 1/13 BIAS

EXTERNAL DIMENSION AND DISPLAY PATTERN



MECHANICAL DATA

ITEM	SPECIFICATION	UNIT
Module Size (W x H x T)	170.0 x 101.5 x 14.0	mm
Viewing Area (W x H)	128.0 x 74.0	mm
Number of Dots	240 x 128	dots
Dot Pitch (W x H)	0.50 x 0.50	mm
Dot Size (W x H)	0.47 x 0.47	mm

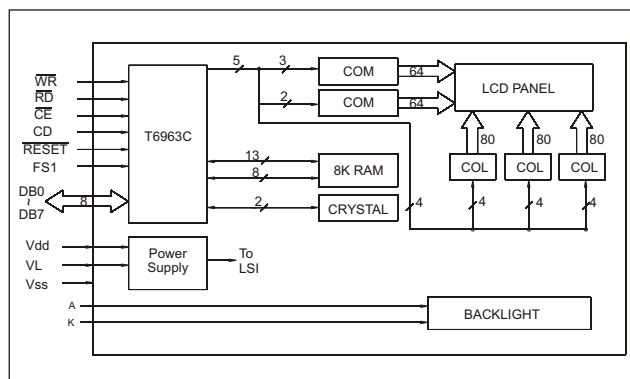
ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	MIN.	MAX.	UNIT
Supply Voltage Logic	$V_{DD} - V_{SS}$	-0.3	7.0	V
Supply Voltage Drive	$V_{DD} - V_{EE}$	-0.3	30.0	V
Input Voltage	V_{IN}	-0.3	$V_{DD} + 0.3$	V
Operating Temperature		See page 8		
Storage Temperature		See page 8		

PIN CONFIGURATION

PIN	SYMBOL	SIGNAL DESCRIPTION
1	FGND	Frame Ground
2	V_{SS}	GND (0 V)
3	V_{DD}	Supply Voltage for Logic
4	V_L	Contrast Adjust for LCD Driving
5	/WR	Write Signal
6	/RD	Read Signal
7	/CE	Chip Enable Signal
8	C/D	H: Instruction Code, L: DATA Code
9	NC	No Connection
10	/RES	Reset Signal
11-18	DB ₀ -DB ₇	Data Input / Output
19	FS1	Pins for Font Selection
20	RV	Display Data Reverse $R_V=H$: Reverse Display $R_V=L$: Normal Display

BLOCK DIAGRAM



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

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}	$V_{DD} = 5V$	3.3		6.0	mA
Input Voltage	HIGH	V_{IH}	$V_{DD} - 2.2$		V_{DD}	V
	LOW	V_{IL}	0		0.8	V
Output Voltage	HIGH	V_{OH}	$V_{DD} - 0.3$		V_{DD}	V
	LOW	V_{OL}	0		0.3	V
LCD Operating Voltage	$V_{DD} - V_{EE}$	$V_{DD} = 5V$ $T_a = +25^\circ\text{C}$		17.8		V
Supply Current LCD Drive	I_{EE}		1.8		3.4	mA

Note (1): Value is high reliability type.

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

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

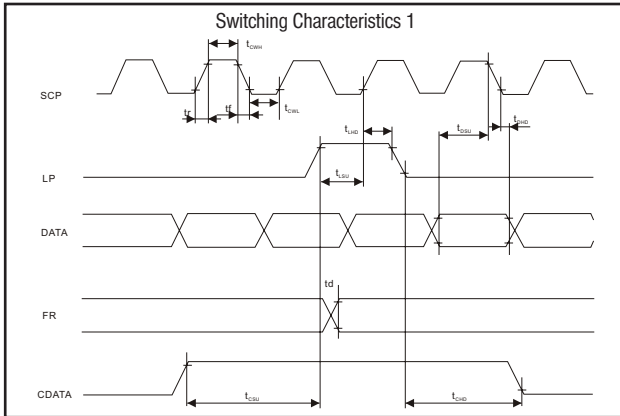
ITEM	SYMBOL	CONDITION	SPEC. VALUE			UNIT
			MIN.	TYP.	MAX.	
Supply Voltage	IF	$V_f = 3.2\text{mA}$	240	250		V
Power Consumption	P_{LED}	$V_f = 3.2\text{mA}$	768	800		mW
Luminous			TBD			cd/m ²

STANDARD GRAPHIC MODULES

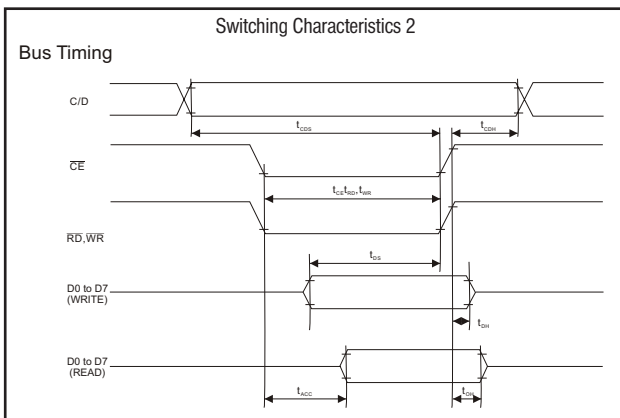
YMS 240128-02

240 X 128 DOTS, 1/128 DUTY, 1/13 BIAS

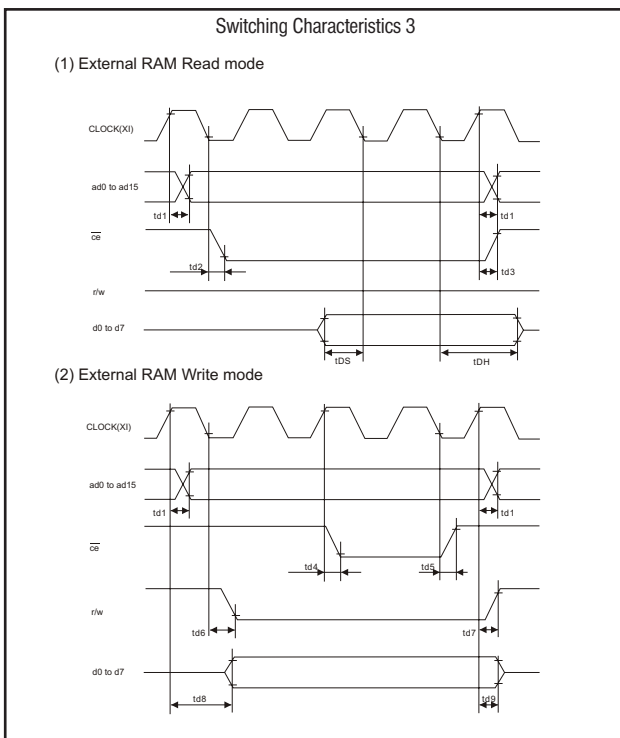
INTERFACE TIMING CHARACTERISTICS



Test Conditions: Unless otherwise noted, $V_{DD}=5.0V\pm 10\%$, $V_{SS}=0V$, $T_a=-20^{\circ}C$ to $+70^{\circ}C$					
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	MAX.	UNIT
Operating Frequency	f_{SCP}	$T_a=-10^{\circ}C$ to $+70^{\circ}C$		2.75	ns
SCP Pulse Width	t_{CWH} , t_{CWL}		150		ns
SCP Rise/Fall Time	t_r , t_f			30	ns
LP Setup Time	t_{LSU}		150	290	ns
LP Hold Time	t_{LHD}		5	40	ns
Data Setup Time	t_{DSU}		170		ns
Data Hold Time	t_{DHD}		80		ns
FR Delay Time	t_d		0	90	ns
CDATA Setup Time	t_{CSU}		450	850	ns
CDATA Hold Time	t_{CHD}		450	950	ns



Test Conditions: Unless otherwise noted, $V_{DD}=5.0V\pm 10\%$, $V_{SS}=0V$, $T_a=-20^{\circ}C$ to $+75^{\circ}C$					
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	MAX.	UNIT
C/D Setup Time	t_{CDS}		100		ns
C/D Hold Time	t_{CDH}		10		ns
/CE,/RD,/WR Pulse Width	t_{CE} , t_{RD} , t_{WR}		80		ns
Data Setup Time	t_{DS}		80		ns
Data Hold Time	t_{DH}		40		ns
Access Time	t_{ACC}			150	ns
Output Hold Time	t_{OH}		10	50	ns



Test Conditions: Unless otherwise noted, $V_{DD}=5.0V\pm 10\%$, $V_{SS}=0V$, $T_a=-20^{\circ}C$ to $+70^{\circ}C$					
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	MAX.	UNIT
Address Delay Time	t_{d1}			250	ns
CE Fall Delay Time (Read)	t_{d2}			180	ns
CE Rise Delay Time (Read)	t_{d3}			180	ns
Data Setup Time	t_{dS}		0		ns
Data Hold Time	t_{dH}		30		ns
CE Fall Delay Time (Write)	t_{d4}			200	ns
CE Rise Delay Time (Write)	t_{d5}			200	ns
R/W Fall Delay Time	t_{d6}			180	ns
R/W Rise Delay Time	t_{d7}			180	ns
Data Stable Time	t_{d8}			450	ns
Data Hold Time	t_{d9}			200	ns