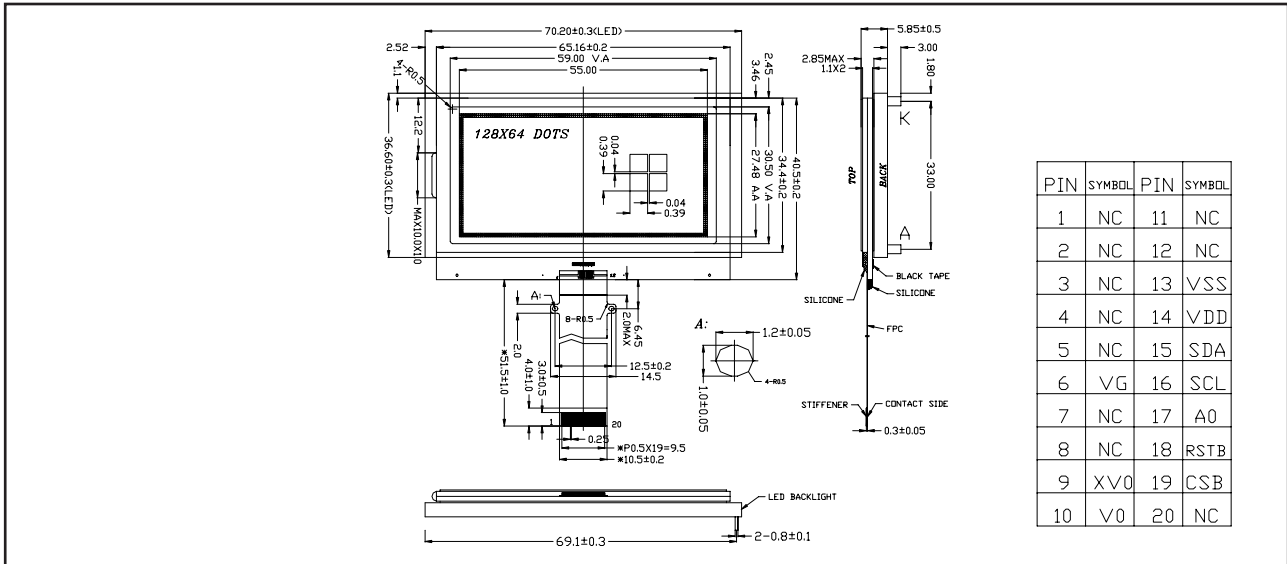


STANDARD COG MODULES

YMS 12864-20

128 X 64 DOTS, 1/65 DUTY, 1/9 BIAS

EXTERNAL DIMENSION AND DISPLAY PATTERN



MECHANICAL DATA

ITEM	SPECIFICATION	UNIT
Module Size (W x H x T)	70.2 x 40.5 x 5.85	mm
Viewing Area (W x H)	59.0 x 30.5	mm
Number of Dots	128 x 64	dots
Dot Pitch (W x H)	0.43 x 0.39	mm
Dot Size (W x H)	0.39 x 0.39	mm

ABSOLUTE MAXIMUM RATINGS

*Note1

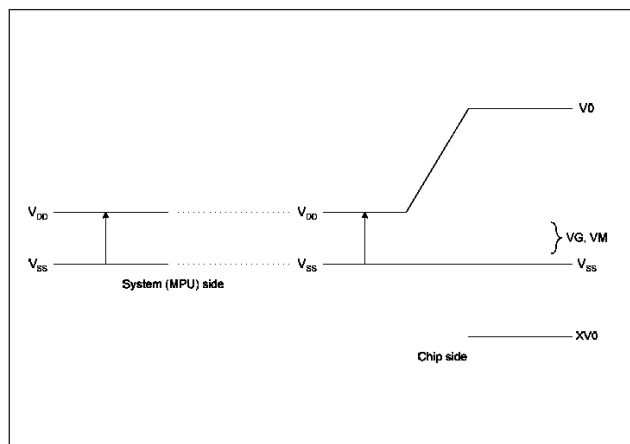
PARAMETER	SYMBOL	MIN.	MAX.	UNIT
Digital Power Supply Voltage	V _{DD1}	-0.3	3.6	V
Analog Power Supply Voltage	V _{DD2-VDD3}	-0.3	3.6	
LCD Power Supply Voltage	V ₀ - XV ₀	-0.3	1.6	V
	V _G	-0.3	3.6	
	V _M	-0.3	V _{DD2}	
Input Voltage	V _{IN}	-0.3	V _{DD1} + 0.3	V
Operating Temperature		See page 8		
Storage Temperature		See page 8		

Note (1): Stresses above those listed under Limiting Values may cause permanent damage to the device. Parameters are valid over operating temperature range unless otherwise specified. All voltages are with respect to V_{SS} unless otherwise noted. Insure the voltage levels of V₀, V_{DD2}, V_G, V_M, V_{SS} and XV₀ always match the correct relation: V₀ ≥ V_{DD2} > V_G > V_M > V_{SS} ≥ XV₀

PIN CONFIGURATION

PIN	SYMBOL	SIGNAL DESCRIPTION
1-5	NC	No Connection
6	V _G	LCD Driving Voltage for Segment Circuit
7-8	NC	No Connection
9	XV ₀	LCD Driving Voltage for Common Circuit t at Positive Frame
10	V ₀	LCD Driving Voltage for Common Circuit t at Negative Frame
11-12	NC	No Connection
13	V _{SS}	Ground
14	V _{DD}	Power Supply
15	SDA	Serial Data Input
16	SCL	Serial Clock Input
17	A ₀	Data or Command
18	RSTB	Hardware Reset Input Pin
19	CSB	Chip Select Input Pin
20	NC	No Connection

BLOCK DIAGRAM



STANDARD COG MODULES

YMS 12864-20

128 X 64 DOTS, 1/65 DUTY, 1/9 BIAS

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

ITEM	SYMBOL	CONDITION	SPEC. VALUE			UNIT
			MIN.	TYP.	MAX.	
Supply Voltage (Logic)	$V_{DD} - V_{SS}$			3.0		V
LCD Operating Voltage	$V_0 - V_{SS}$	$T_a = +25^\circ\text{C}$		8.3		V
Response Time	T_{ON} T_{OFF}			89 305		ms
Contrast	CR		2.0			
Viewing Angle	12H θ_1	CR ≥ 2.0		60		Deg.
	6H θ_2			70		
	3H θ_3			65		
	9H θ_4			65		

Note (1): Value is high reliability type.

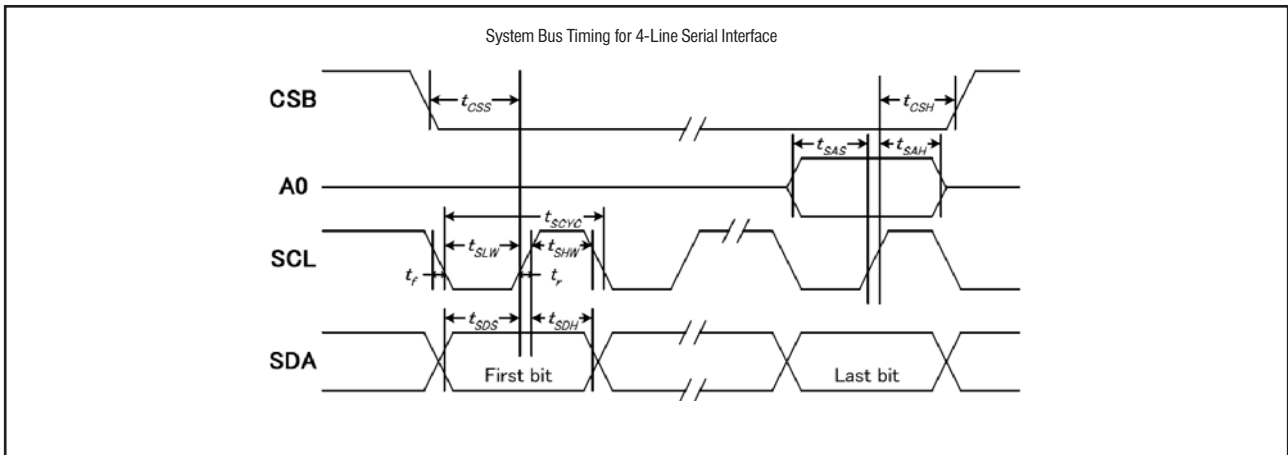
Note (2): Electro-Optical Characteristics: See page 5.

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

ITEM	SYMBOL	CONDITION	SPEC. VALUE			UNIT
			MIN.	TYP.	MAX.	
Forward Voltage	V_f	$I_f = 30\text{mA}$	4.3	4.5	4.7	V
Forward Current	I_f			30	40	mA
Power Dissipation	P_d	$I_f = 30\text{mA}$		0.135		W
Reverse Voltage	V_r			5.0		V
Reverse Current	I_r			0.2		mA
Luminous Intensity	L_v	$I_f = 30\text{mA}$	40	50		cd/m ²
Luminous Uniformity	ΔL_v	$I_f = 30\text{mA}$	70			%
Chromaticity Coordinate	X	$I_f = 15\text{mA}$ each chip	0.27		0.31	
	Y		0.27		0.31	

Note (3): Operating Temperature Range T_{op} -20°C to $+65^\circ\text{C}$; Storage Temperature Range T_{stg} -30°C to $+70^\circ\text{C}$.
Color: White.
Backlight is a kind of current device, it must connect a resistance for limiting current or it will be damaged.

INTERFACE TIMING CHARACTERISTICS



AC CHARACTERISTICS, $V_{DD} = 3.3\text{V}$, $T_a = 25^\circ\text{C}$

PARAMETER	SIGNAL	SYMBOL	MIN.	MAX.	UNIT
Serial Clock Period	SCLK	t_{SCYC}	50		ns
SCLK „H“ Pulse Width		t_{SHW}	25		ns
SCLK „L“ Pulse Width		t_{SLW}	25		ns
Address Setup Time	A ₀	t_{SAS}	20		ns
Address Hold Time		t_{SAH}	10		ns
Data Setup Time	SDA	t_{SDS}	20		ns
Data Hold Time		t_{SDH}	10		ns
CSB-SCLK Time	CSB	t_{CSS}	20		ns
CSB-SCLK Time		t_{CSH}	40		ns

Note (4): The Input Signal Rise and Fall Time (t_r , t_f) are specified at 15 ns or less.

Note (5): All Timing is specified using 20% and 80% of V_{DD} as the Standard.