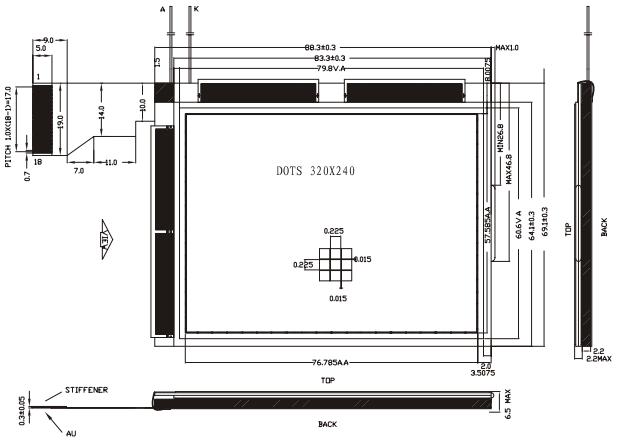
STANDARD TAB MODULES

YMS 320240-11

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

EXTERNAL DIMENSION AND DISPLAY PATTERN



MECHANICAL DATA

ITEM	SPECIFICATION	UNIT
Module Size (W x H x T)	120.3 x 69.1 x 6.5	mm
Viewing Area (W x H)	79.8 x 60.6	mm
Number of Dots	320 x 240	dots
Dot Pitch (W x H)	0.240 x 0.240	mm
Dot Size (W x H)	0.225 x 0.225	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				

PIN CONFIGURATION

PIN	SYMBOL	SIGNAL DESCRIPTION
1-6	V_{LCD} (V_1, V_6, V_3, V_4, V_5, GND (V_2)	Power Supply Pin for LCD Driver Voltage
7	GND	Ground
8	V_{DD}	Power Supply
9	FLM	Frame Signal
10	CL_2	Display Dta Shift Clock Input for Segment Mode
11	M	AC Signal
12	CL_1	Latch Pulse Input / Shift Clock Input for the Shift Register
13	/DOFF	Control Input for Output Deselect Level
14	GND	Ground
15-18	D_3-D_0	Display Data

ELECTRICAL CHARACTERISTICS, Ta = 25°C

ITEM		SYMBOL	CONDITION	SPEC. VALUE			UNIT
				MIN.	TYP.	MAX.	
Supply Voltage (Logic)		V_{DD} - V_{SS}		2.5	3.0	5.5	V
Supply Current (Logic)		I_{DD}	V_{DD} =3.0V			2.0	mA
Input Voltage	HIGH	V_{IH}		0.8 V_{DD}			V
	LOW	V_{IL}				0.2 V_{DD}	V
Output Voltage	HIGH	V_{OH}		V_{DD} -0.4			V
	LOW	V_{OL}				0.4	V
LCD Operating Voltage		V_{DD} - V_{EE}	V_{DD} =3.0V Ta=+25°C		22.0		V
Supply Current LCD Drive		I_{EE}				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.	
Forward Current	VF	IF=60 mA	2.9	3.0	3.1	V
Power Consumption	P_{LED}			180		mW
Luminous				TBD		cd/m^2

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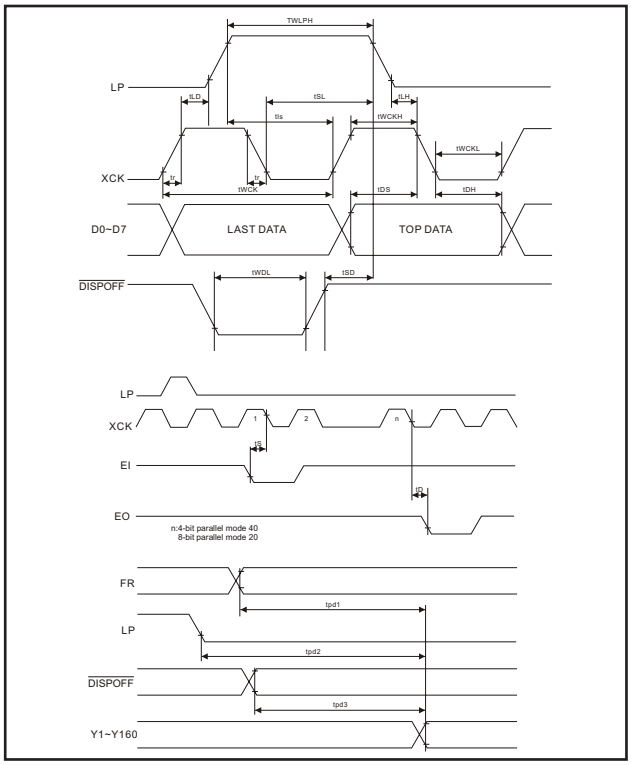
TIMING WAVEFORM OF SEGMENT MODE

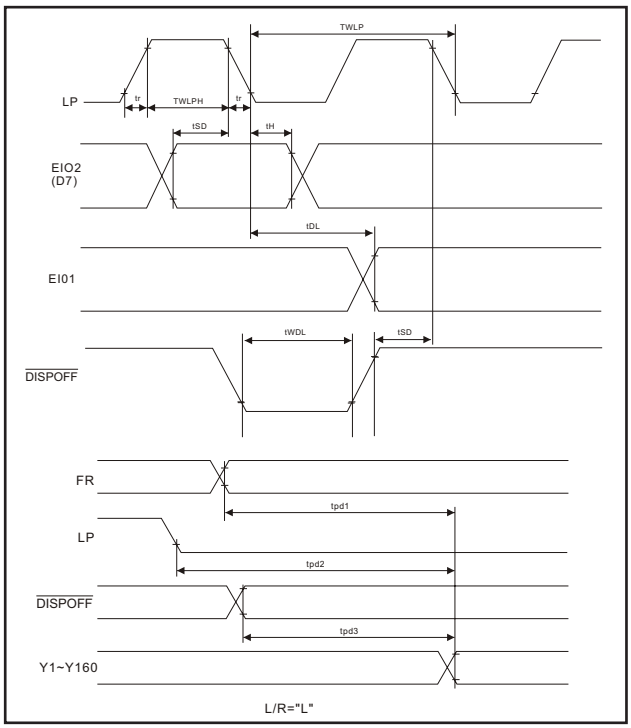


SEGMENT MODE

V_{SS}=0V, V_{DD}=2.5~4.5V, V_0=15 to 30V, Ta=-20°C to +85°C, unless othewise noted.

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITION
Shift Clock Period	t_{WCK}	125			ns	tr, tr≤11ns Note 1
Shift Clock „H" Pulse Width	t_{WCKH}	51			ns	
Shift Clock „L" Pulse Width	t_{WCKL}	51			ns	
Data Setup Time	t_{DS}	30			ns	
Data Hole Time	t_{DH}	40			ns	
Latch Pulse „H" Pulse Width	t_{WLPH}	51			ns	
Shift Clock Rise to Latch Pulse Rise Time	t_{LD}	0			ns	
Shift Clock Fall to Latch Pulse Fall Time	t_{SL}	51			ns	
Latch Pulse Rise to Shift Clock Rise Time	t_{LS}	51			ns	
Latch Pulse Fall to Shift Clock Fall Time	t_{LH}	51			ns	
Input Signal Rise Time	t_r			50	ns	Note 2
Input Signal Fall Time	t_f			50	ns	Note 2
Enable Setup Time	t_S	36			ns	
/DISPOFF Remoal Time	t_{SD}	100			ns	
/DISPOFF Enable Pulse Width	t_{WDL}	1.2			ns	
Output Delay Time (1)	t_D			78	ns	C_L=15pF
Output Delay Time (2)	t_{pd1}, t_{pd2}			1.2	µs	C_L=15pF
Output Delay Time (3)	t_{pd3}			1.2	µs	C_L=15pF

TIMING CHARACTERISTICS OF COMMON MODE



COMMON MODE

V_{SS}=0V, V_{DD}=2.5~5.5, V_0=15 to 30 and Ta=-20°C to +85°C, unless othewise noted.

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITION
Shift Clock Period	t_{WLP}	250			ns	tr, tr≤20ns Note 1
Shift Clock „H" Pulse Width	t_{WLPH}	15			ns	V_{DD}=+5.0V +/-10%
		30			ns	V_{DD}=+2.5 ~+4.5V
Data Setup Time	t_{SU}	30			ns	
Data Hole Time	t_H	50			ns	
Input Signal Rise Time	t_r			50	ns	
Input Signal Fall Time	t_f			50	ns	
/DISPOFF Remoal Time	t_{SD}	100			ns	
/DISPOFF Enable Pulse Width	t_{WDL}	1.2			ns	
Output Delay Time (1)	t_D			200	ns	C_L=15pF
Output Delay Time (2)	t_{pd1}, t_{pd2}			1.2	µs	C_L=15pF
Output Delay Time (3)	t_{pd3}			1.2	µs	C_L=15pF