

PLCM-1610 DOT MATRIX LCD MODULE (CHARACTER TYPE)

SCOPE

This specification is applied to the liquid crystal display module PLCM-1610CT/CTL/CS/CSL* with 1/16 duty.

CT: Bonding IC + TN + LCD; CTL: Bonding IC + TN LCD + LED Backlight

CS: Bonding IC + STN + LCD; CSL: Bonding IC + STN LCD + LED Backlight

FEATURES

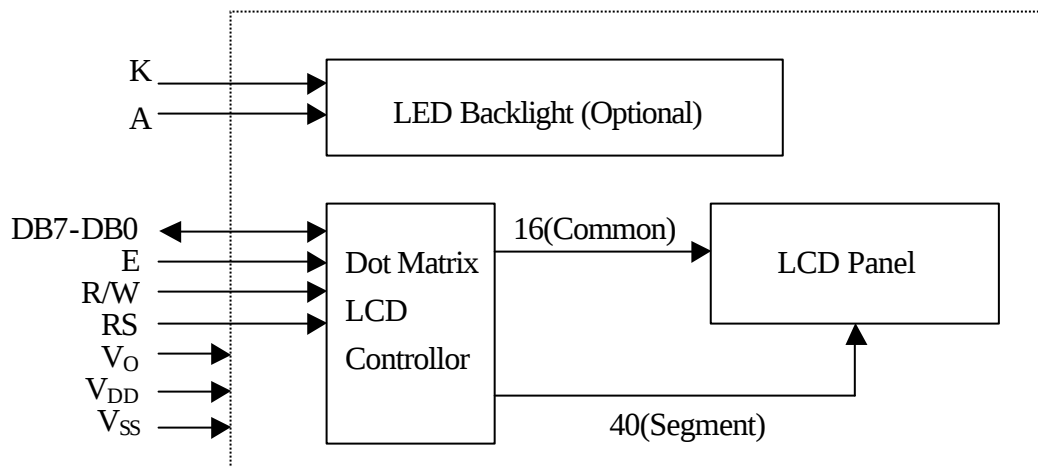
- Display Mode: TN/STN, Positive
- Display Format: 16 Characters x 1 Line
- Input Data: 4-Bits or 8-Bits interface available
- Display Font: 5 x 8 Dots
- Power Supply: Single Power Supply [5V (+/-)5%]
- Driving Scheme: 1/16 Duty, 1/5 Bias
- Backlight: LED/4.4VDC(Max.)

MECHANICAL CHARACTERISTICS

Item	Description	Unit
Outline Dimension	80(L) x 36(W) x 9.0/14.5(H)*	mm ³
Viewing Area	64.5(L) x 13.8(W)	mm ²
Weight	30/40*	g

* CS,CSL: H=9mm, 30g; CTL,CSL: H=14.5mm, 40g

System Block Diagram



ABSOLUTE MAXIMUM

Item	Symbol	Min.	Max.	Unit
Power Supply for Logic	V_{dd}	-0.3	0.7	V
Power Supply for LCD Drive	V_{lcd}	$V_{dd} - 13.5$	$V_{dd} + 0.3$	V
Input Voltage	V_i	-0.3	$V_{dd} + 0.3$	V
Operating Temperature	T_a	0	50	Deg C
Storage Temperature	T_{stg}	-10	60	Deg C

ELECTRICAL CHARACTERISTICS

($T_a = 25$ Deg C; $V_{dd} = 5.0V$ (+/-) 5%, otherwise specified)

Item	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Power Supply for Logic	V_{dd}		4.5	--	5.5	V
Operating Voltage for LCD	$V_{dd} - V_o$		--	5.0	--	V
Input “High” Voltage	V_{ih}		2.2	--	V_{dd}	V
Input “Low” Voltage	V_{il}		-0.3	--	0.6	V
Output “High” Voltage	V_{oh}	$-I_{oh} = 0.2mA$	2.4	--	--	V
Output “Low” Voltage	V_{ol}	$I_{ol} = 1.2mA$	--	--	0.4	V
Power Supply Current	I_{dd}	$V_{dd} = 5.0V$	--	1.0	3.0	mA

PIN ASSIGNMENT

No	Symbol	Level	Function	
1	V_{dd}	--	0V	Power Supply
2	V_{ss}	--	+5V	
3	V_o	--	For LCD	
4	RS	H/L	Register	H: Data Input
5	R/W	H/L	H--Read	L—Write
6	E	H, H-L	Enable Signal	
7	DB0	H/L	Data bus used in 8 bit tranfer	
8	DB1	H/L		
9	DB2	H/L		
10	DB3	H/L		
11	DB4	H/L	Data bus for both 4 and 8 bit transfer	
12	DB5	H/L		
13	DB6	H/L		
14	DB7	H/L		
15	A	--	LED Backlight (+)	
16	K	--	LED Backlight (-)	

LED BACKLIGHT (Optional)

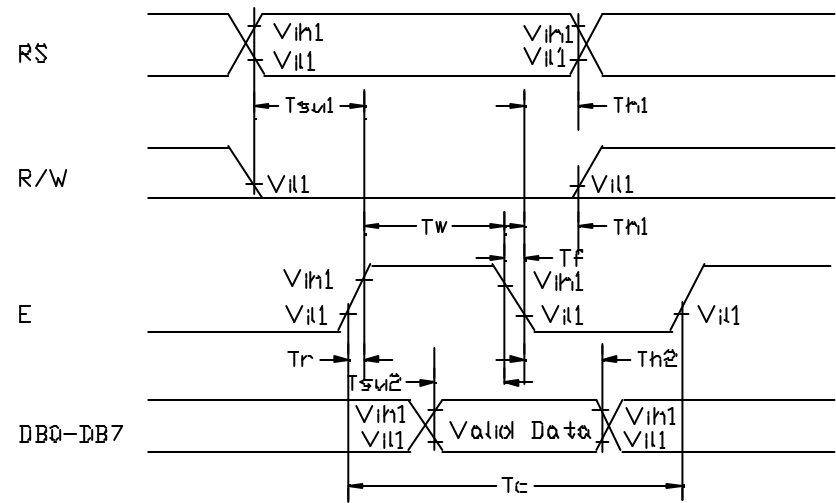
Characteristic	Symbol	Min.	Typ.	Max.	Unit	Conditions
Forward Voltage	VF	3.8	4.1	4.4	V	IF = 10mA
Forward Current	IF	--	--	200	mA	--
Reverse Voltage	VR			10	V	--
Reverse Current	IR	--	--	100	uA	VR = 10V
Brightness	B	60	--	--	cd/m ²	IF = 100mA

AC CHARACTERISTICS

(V_{dd} = 5V (+/-) 10%, V_{ss} = 0V, T_a = 25 Deg C)

Characteristic	Symbol	Min.	Typ.	Max.	Unit	Test Pin
E cycle time	T _c	500	--	--	ns	E
E rise time	T _r	--	--	25	ns	E
E fall time	T _f	--	--	25	ns	E
E pulse width (High, Low)	T _w	220	--	--	ns	E
R/W and RS set-up time	T _{su1}	40	--	--	ns	R/W, RS
R/W and RS hold time	T _{h1}	10	--	--	ns	R/W, RS
Data set-up time	T _{su2}	60	--	--	ns	DB0 ~ DB7
Data hold time	T _{h2}	10	--	--	ns	DB0 ~ DB7

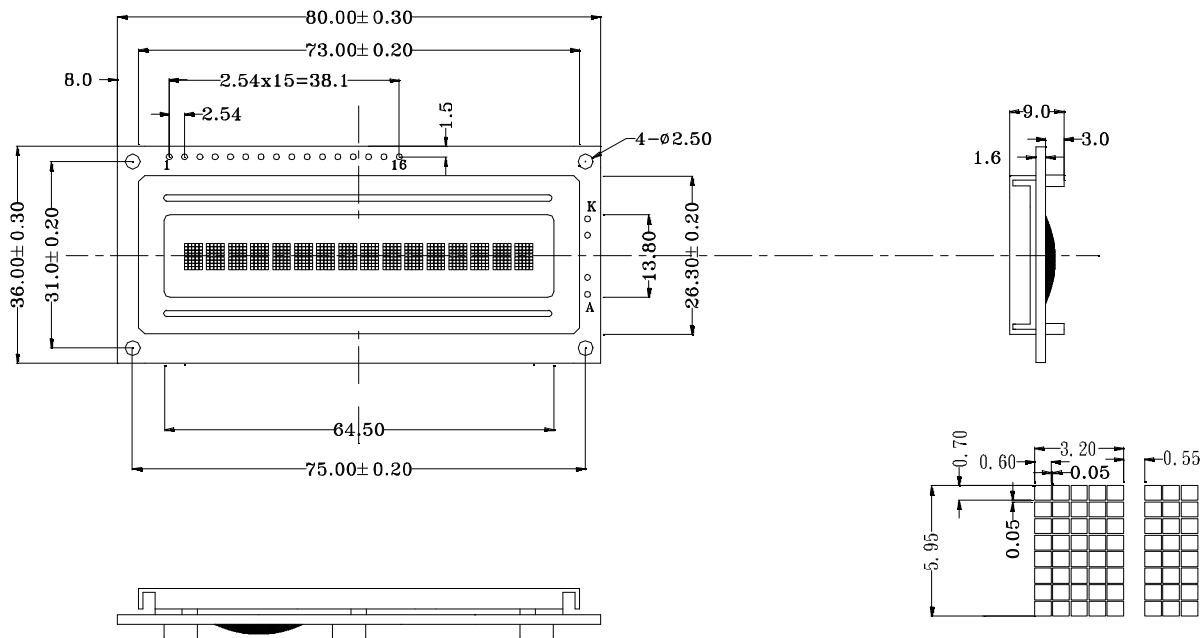
TIMING CHART



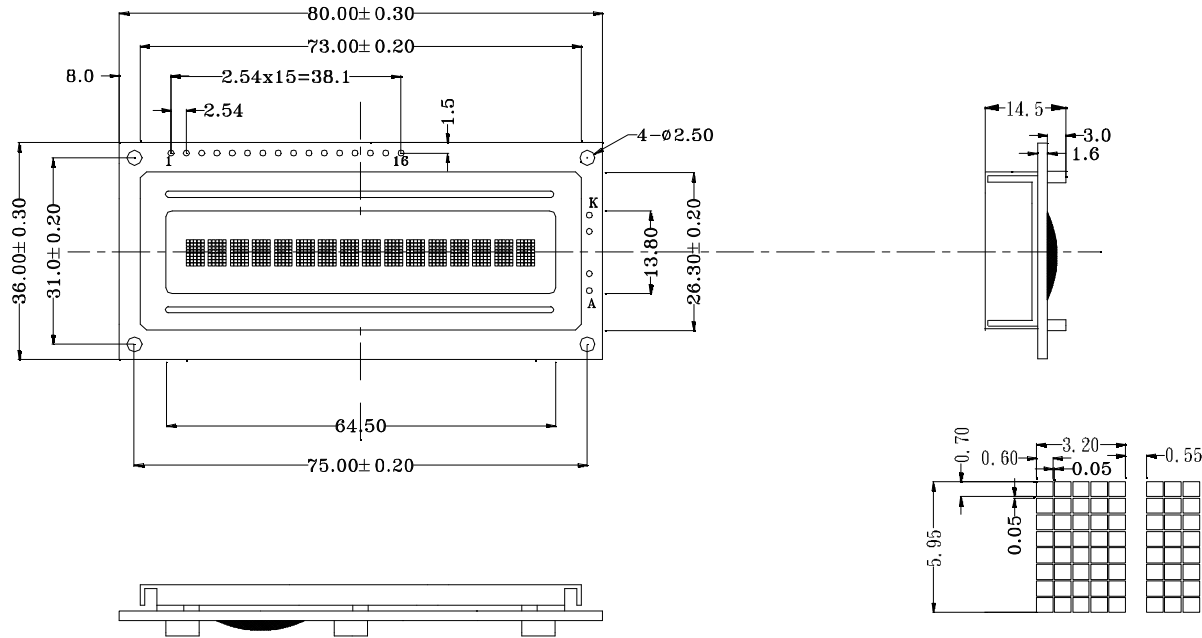
CONTROL AND DISPLAY COMMAND

Command	RS	R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0	Remark	
Display Clear	L	L	L	L	L	L	L	L	L	H		
Return Home	L	L	L	L	L	L	L	L	L	H	X	Cursor move to first digit
Entry Mode Set	L	L	L	L	L	L	L	L	L	I/D	SH	I/D: set cursor move direction H-Increase; L-Decrease SH: Specifies shift of display H- Display is shifted L- Display is not shifted
Diplay On/Off	L	L	L	L	L	L	L	H	D	C	B	D: Display (H-on; L-off) C: Cursor (H-on; L-off) B: Blinking (H-On; L-off)
Shift	L	L	L	L	L	L	H	S/C	R/L	X	X	SC: (H-Display shift; L-Cursor move) R/L: (H-Right shift; L-Left shift)
Set Function	L	L	L	L	H	DL	N	F	X	X	X	DL: (H-8 bits interface; L-4 bits interface) N: (H-2 line display; L-1 line display) F: (H-5 x 10 dots; L-5 x 7 dots)
Set CG RAM Address	L	L	L	H	CG RAM address (corresponds to address)						CG RAM Data is sent and received after this setting	
Set DD RAM Address	L	L	H	DD RAM address						DD RAM Data is sent and received after this setting		
Read Busy Flag & Address	L	H	BF	Address Counter used for Both DD & CG RAM address						BF: (H-Busy; L-Ready) --Reads BF indication internal operating is being performed -- Reads address counter contents		
Write Data	H	L	Write Data						Write data into DD or CG RAM			
Read Data	H	H	Read Data						Read data into DD or CG RAM			

ASSEMBLY DIAGRAM



1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Vss	Vdd	Vo	RS	R/W	E	DB0	DB1	DB2	DB3	DB4	DB5	DB6	DB7	A	K



1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Vss	Vdd	Vo	RS	R/W	E	DB0	DB1	DB2	DB3	DB4	DB5	DB6	DB7	A	K

K, A: LED Backlight

Note: QFP Package IC also available