

LMG691X Family

FEATURES

- 320 dot(W) x 240 dot(H) graphic & alpha-numeric display
- Controller LSI HD63645 compatible
- Colour Tone :
 - LMG6910RPGR New grey mode, reflective
 - LMG6911RPBC Blue & white, transmissive (negative type)
 - LMG6912RPFC Black & white, transmissive (negative type)
 - LMG6915RPFF Black & white, transreflective

MECHANICAL DATA (Nominal Dimensions)

Module size 167.1W x 109.0H x 11.0D mm
 Effective display area 160.0W LMG6910
 Effective display area 120.0W x 90.0H mm
 Number of dots 320W x 240H dot
 Dot size 0.33W x 0.33H mm
 Dot pitch 0.36W x 0.36H mm
 Weight about 200g
 Duty 1 / 240

ABSOLUTE MAXIMUM RATINGS

	min	max
Power supply for logic (VDD - VSS)	0	6.5 V
Power supply for LCD drive (VDD - VSS).....	0	27.5 V
Input Voltage (Vi)	-0.3	VDD

OPTICAL DATA See Page 4

Note : Contrast ratio K = (4) typ for LMG6915RPFF
 Contrast ratio K = (8) typ for LMG6912RPFC
 Contrast ratio K = (6) typ for LMG6911RPBC
 Contrast ratio K = (3) typ for LMG6910RPGR

Pin Assignment

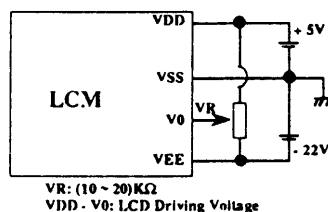
Pin No.	Symbol	Level	Function
1	D0	H/L	Display Data
2	D1		
3	D2		
4	D3		
5	DISP/OPP	H/L	H: ON / L: OFF
6	FRAME	H	First Line Marker
7	NC	-	
8	LOAD	H → L	Data Latch
9	CP	H → L	Data Shift
10	VDD	-	Power Supply for Logic
11	VSS	-	GND
12	VEE	-	Power Supply for LC
13	V0	-	Operating LC Driving Voltage
14	PGND	-	Front Panel Ground

CFL I/F

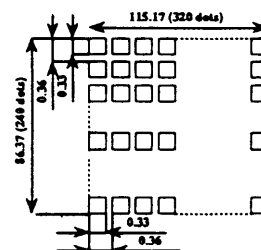
Interface	Pin No.	Signal	Level	Function
LCM	1	D0	H/L	Display Data
	2	D1		
	3	D2		
	4	D3		
	5	DISP/OPP	H/L	H: ON / L: OFF
	6	FRAME	H	First Line Marker
	7	NC	-	
	8	LOAD	H → L	Data Latch
	9	CP	H → L	Data Shift
	10	VDD	-	Power Supply for Logic
	11	VSS	-	GND
	12	VEE	-	Power Supply for LC
	13	V0	-	Operating Voltage LC Driving
	14	PGND	-	Front Panel Ground

Interface	Pin No.	Signal	Level	Function
CFL	1	VCFL	-	Power Supply for CFL
	2	N - C	-	
	3	N - C	-	
	4	VCFL	-	CFL GND

Power Supply



Display Pattern



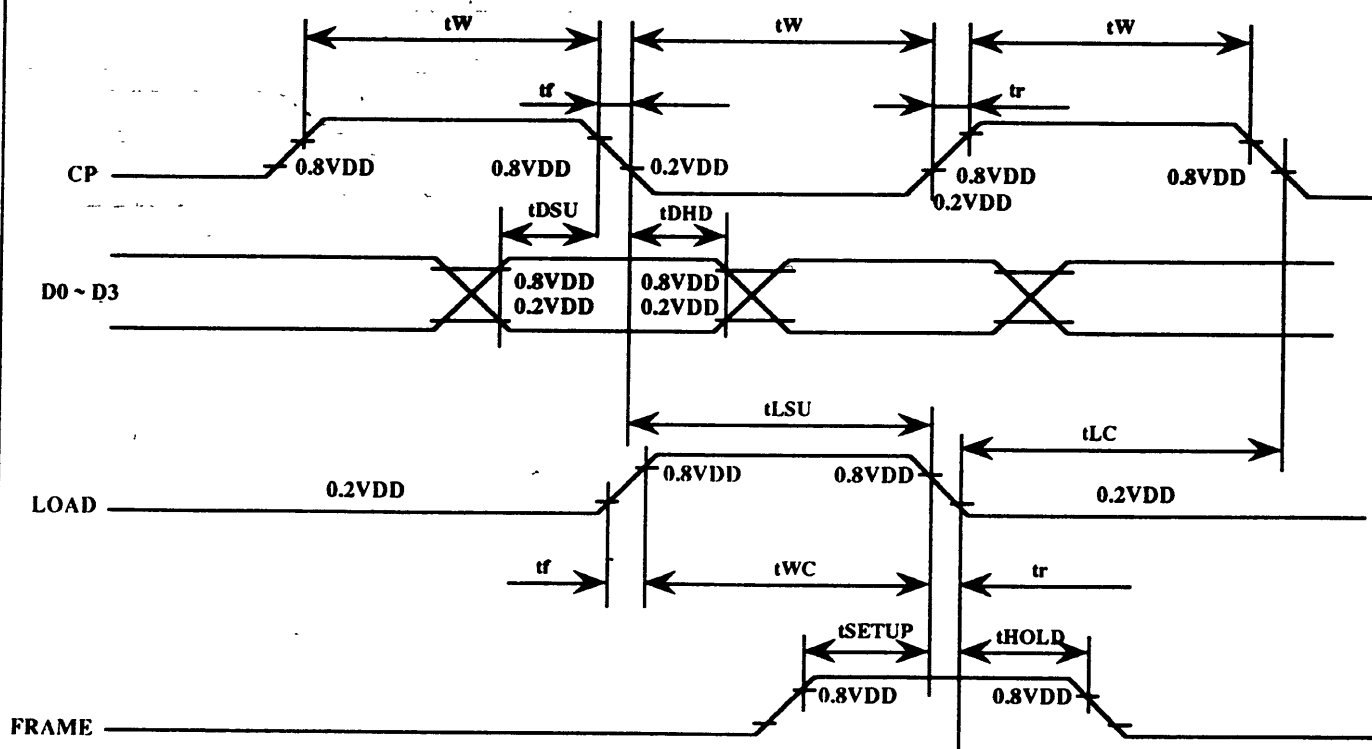
Electrical Characteristics

Item	Symbol	Condition	Min	Typ	Max	Unit	
Power Supply Voltage for Logic	VDD - VSS	-	4.75	5.0	5.25	V	
Power Supply Voltage for LC Driving	VEE - VSS	-	-	-22.0	-	V	
Input Voltage	VI	H Level	0.8 VDD	-	VDD	V	
		L Level	0	-	0.2 VDD	V	
Power Supply Current (Note 1)	IDD	VDD - VSS = 5.0V VEE - VSS = -22.0V	-	(20.0)	-	mA	
	IEE	VDD - VSS = 5.0V VEE - VSS = -22.0V	-	(15.0)	-	mA	
Recommended LC Driving Voltage (Note 2)	VDD - V0	Ta = 10°C, Ø = 10°	-	(24.6)	-	V	
		Ta = 25°C, Ø = 10°	-	(23.7)	-	V	
		Ta = 40°C, Ø = 10°	-	(22.8)	-	V	
Frame Frequency		fFRAME	-	(70)	(75)	(80)	Hz
Power Supply for CFL	Voltage	VCFL	-	-	(300)	-	V
	Frequency	VCFL	-	-	(70)	(85)	Hz

Note 1: fFRAME = 75Hz, D0 ~ D3 = 0, 1, 0, 1, ... VDD - V0 = (23.7), Ta = 25°C

Note 2: Recommended LC Driving Voltage fluctuates about ± 1.0V by each module

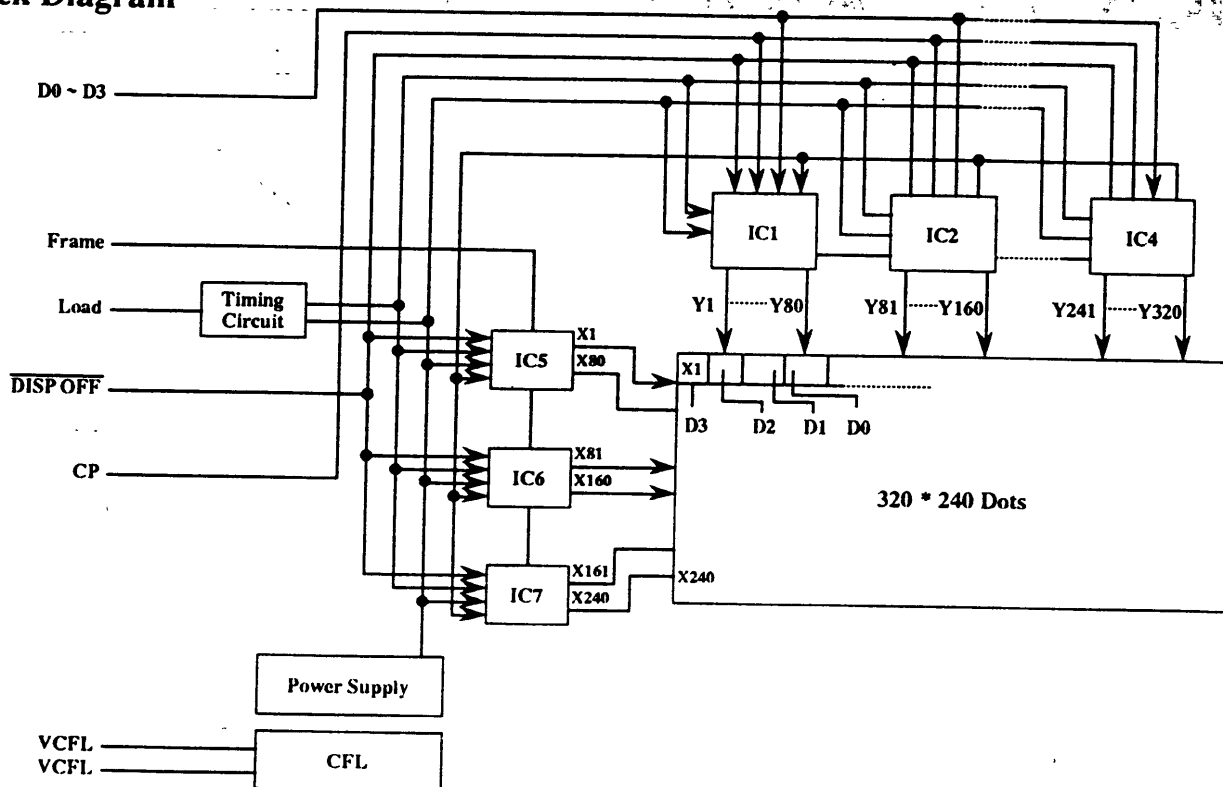
Interface Timing (MPU ↔ LMG)



Timing Characteristics

Item	Symbol	Min	Typ	Max	Unit
Clock Frequency	FCP	-	-	6.5	MHz
Clock Pulse Width	t_w	63	-	-	ns
Clock Rise, Fall Time	t_r, t_f	-	-	20	ns
Data Set-Up Time	t_{DSU}	50	-	-	ns
Data Hold Time	t_{DHD}	50	-	-	ns
Load Set-Up Time	t_{LSU}	80	-	-	ns
Load → Clock Time	t_{LC}	80	-	-	ns
"FRAME" Set-Up Time	t_{SETUP}	100	-	-	ns
"FRAME" Hold Time	t_{HOLD}	100	-	-	ns
"LOAD" Pulse Width	t_{wi}	125	-	-	ns

Block Diagram



External Dimensions

