T-41-39

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, transflective

MECHANICAL DATA (Nominal Dimensions)

Module size ..... 167.1W x 109.0H x 11.0D mm
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

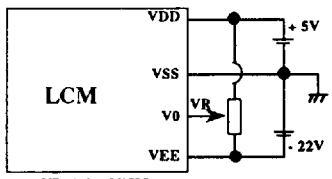
Pin No.	Symbol	Level	Function
1	D0	H/L	Display Data
2	D1		
3	D2		
4	D3		
5	DISP OFF	H/L	H: ON / L: OFF
6	FRAME	H	First Line Marker
7	N.C.	-	
8	LOAD	H→L	Data Latch
9	CP	H→L	Data Shift
10	VDD	-	Power Supply for Logic
11	VSS	-	GND
12	VEE	-	Power Supply for LC
13	V0	-	Operating LC Driving Voltage
14	FGND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

CFL I/F

Interface		Pin No.	Signal	Level	Function
LCM	I/F 1	1	D0	H/L	Display Data
		2	D1		
		3	D2		
		4	D3		
		5	DISP OFF	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	FGND		Front Panel Ground

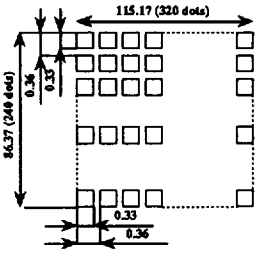
Interface		Pin No.	Signal	Level	Function
CFL	CFL I/F	1	VCFL		Power Supply for CFL
		2	N.C		
		3	N.C	-	
		4	VCFL	-	CFL GND

Power Supply



VR: (10 ~ 20)KΩ
VDD - V0: LCD Driving Voltage

Display Pattern

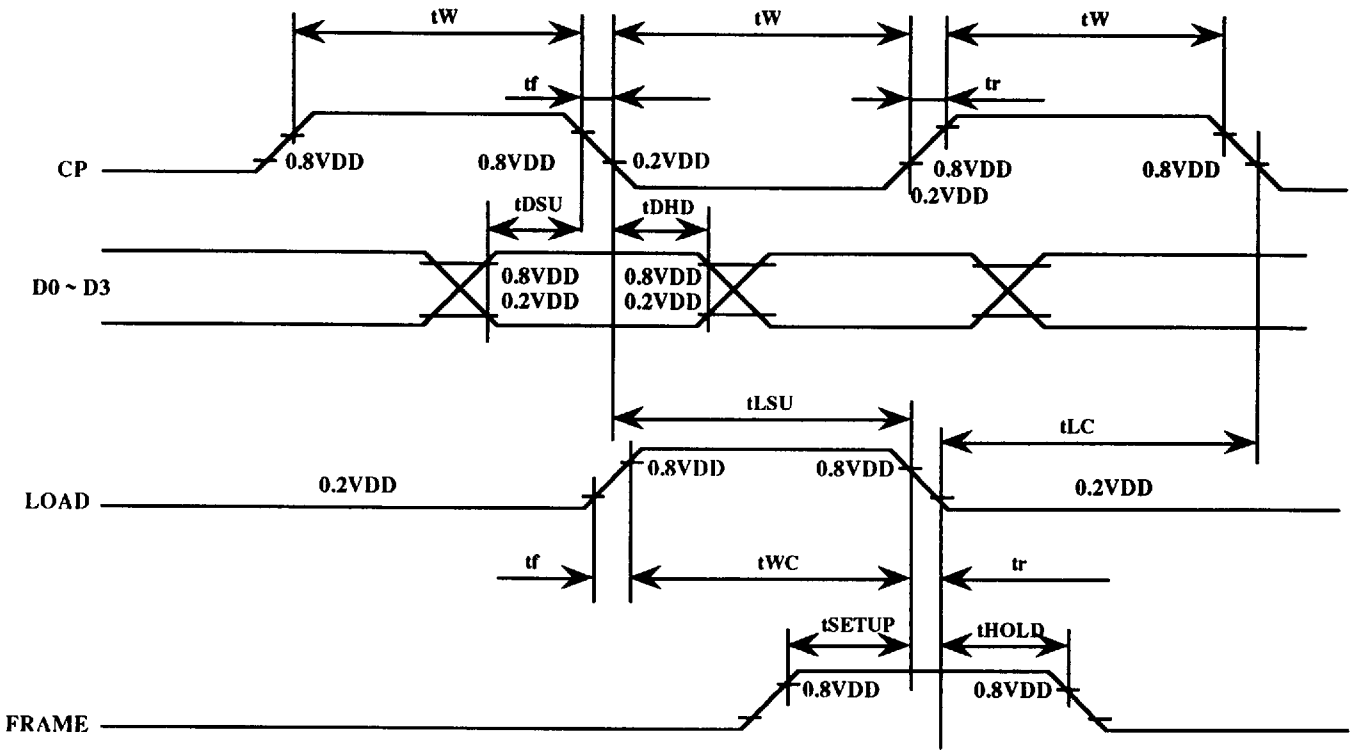


Electrical Characteristics

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

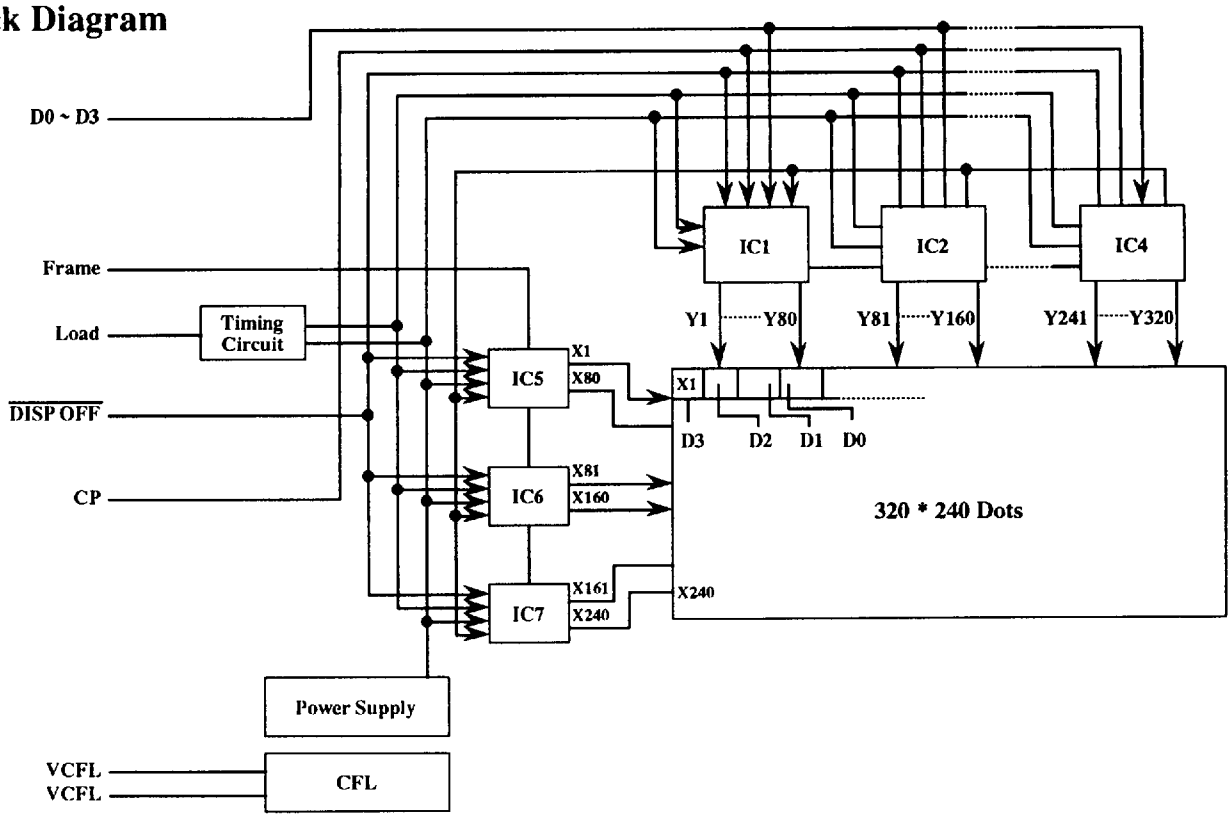
Interface Timing (MPU ↔ LMG)



Timing Characteristics

Item	Symbol	Min	Typ	Max	Unit
Clock Frequency	FCP	-	-	6.5	MHz
Clock Pulse Width	tw	63	-	-	ns
Clock Rise, Fall Time	tr, tf	-	-	20	ns
Data Set-Up Time	tDSU	50	-	-	ns
Data Hold Time	tDHD	50	-	-	ns
Load Set-Up Time	tLSU	80	-	-	ns
Load → Clock Time	tLC	80	-	-	ns
"FRAME" Set-Up Time	tSETUP	100	-	-	ns
"FRAME" Hold Time	tHOLD	100	-	-	ns
"LOAD" Pulse Width	twi	125	-	-	ns

Block Diagram



External Dimensions