

## FEATURES

- Black on White Film STN Type
- Reflective Mode
- High Contrast EX STN Technology

- Low Power Consumption
- Wide Viewing Angle

## MECHANICAL DATA

Item	Value	Unit
Module Dimensions	176.9*75.2*7.8	mm
Viewing Area	155.6*59.6	mm
Resolution	640*240	dots
Dot Size	0.225*0.225	mm
Dot Pitch	0.24*0.24	mm
Weight	tbd	g

## OPTICAL DATA

Item	Symbol	Condition	Min	Typ	Max	Unit
Contrast Ratio	K	$\theta=0^\circ$ , $q=0^\circ$	-	10	-	-
Viewing Direction		-	6			o'clock
Viewing Angle	$\theta 2 - \theta 1$	$K > 2$ , Note 1	-	40	-	degree
Response Time (Rise)	tR	$\theta=0^\circ$ , $q=0^\circ$	-	250	-	ms
Response Time (Fall)	tF	$\theta=0^\circ$ , $q=0^\circ$	-	350	-	ms

## ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Condition	Min	Max	Unit
Supply Voltage (Logic)	VDD - VSS	-	-0.3	7.0	V
Supply Voltage (LC Drive)	VDD - VEE	-	0	27.5	V
Input Voltage	VI	Note 2	-0.3	0.3+VDD	V
Operating Temperature	TOP	Note 5,6	0	40	°C
Storage Temperature	TST	Note 5,6	-20	60	°C

## DATA INTERFACE PIN ASSIGNMENT

Pin No	Symbol	Level	Function
1	CP	H->L	Data Shift Clock
2	VDD	-	Power Supply for Logic
3	LOAD	H/L	Latch Clock
4	DISP OFF	H/L	Control Display Off
5	GND	-	Shield GND (Isolated from Logic Ground)
6	NC	-	No Connection
7-10	D0-D3	H/L	Display Data
11	VSS	H/L	Logic GND
12	FRAME	H	Frame Clock
13	VEE	-	Power Supply for LCD
14	NC	-	No Connection

Note 1: Definition of optical data, see page XXX

Note 2: Applied to NotDISP.OFF, FRAME, LOAD, CP, D0-D3

Note 3: fFRAME=75Hz, D0-D3=0.1.0.1...VDD-VEE=23.4V, T=25°C

Note 4: Recommended LC driving voltage may fluctuate about +1.0V by each module

## ELECTRICAL CHARACTERISTICS

Item	Symbol	Condition	Min	Typ	Max	Unit
Supply Voltage (Logic)	VDD - VSS	-	3.0	3.3	3.6	V
Supply Voltage (LC Drive)	VEE - VSS	-	-	-20.1	-	V
Supply Current	IDD	Note 3	-	2.5	-	mA
	IEE	Note 3	-	1.5	-	mA
Input Voltage (High Level)	VIH	High Level, Note 2	0.8* VDD	-	VDD	V
Input Voltage (Low Level)	VIL	Low Level, Note 2	0	-	0.2* VDD	V
Frame Frequency	fFLM	Note 8	70	75	140	Hz
Duty Ratio		-		1/240		-
Recommended LC Drive Voltage	VDD - VEE	Duty=1/24 0 T=0°, $\theta=0^\circ$ , Note 4	-	24.5	-	V
		Duty=1/24 0 T=25°C, $\theta=0^\circ$ , Note 4	-	23.4	-	V
		Duty=1/24 0 T=40°C, $\theta=0^\circ$ , Note 4	-	22.0	-	V

## TIMING CHARACTERISTICS

Item	Symbol	Min	Typ	Max	Unit
Clock Frequency	fCP	-	-	4.0	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	twc	125	-	-	ns

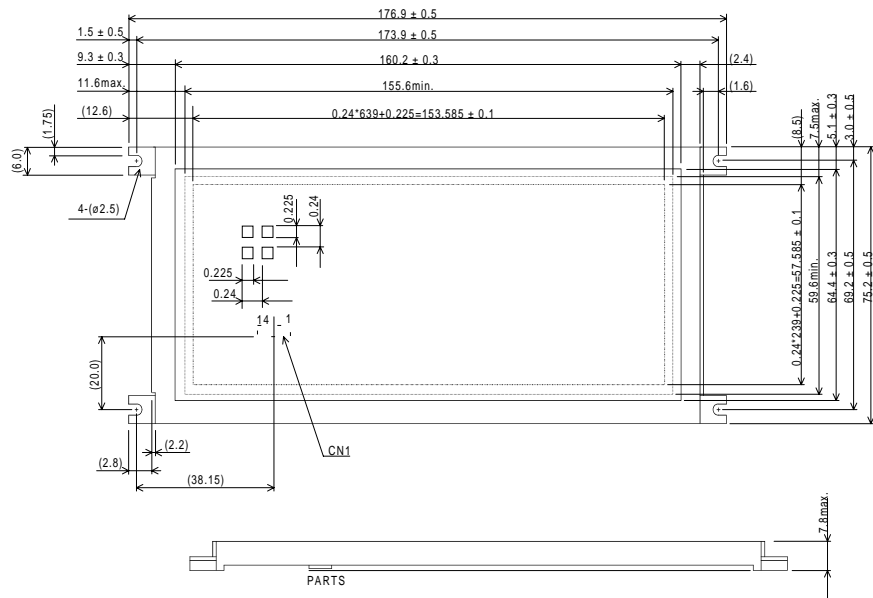
## INVERTER AND CONNECTORS

Recommended Inverter	Starter Kit
Not required	TBD
Data Connector	Data Housing Connector
MOLEX 52745-1490	-

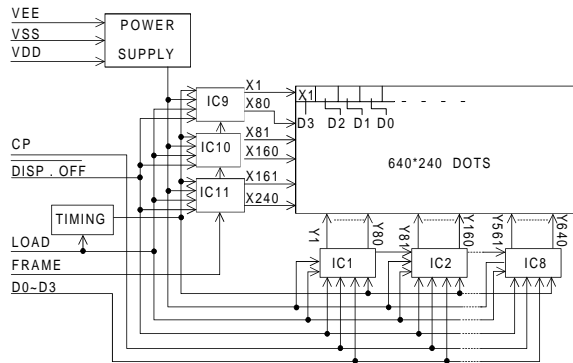
Note 5: Background colour of the LCD changes depending on temperature. Between 40-50°C optical characteristics of the LCD like contrast and viewing angle change but the LCD remains readable.

Note 6: Storage at -20°C < 48 hrs at 60°C < 168 hr  
Storage at 50°C, 85%RH < 48 hrs

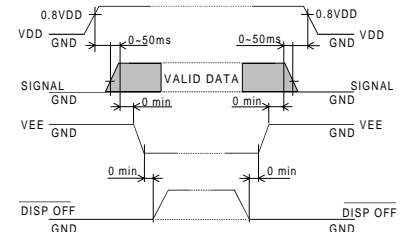
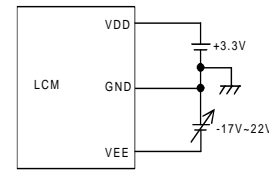
## MECHANICAL DIMENSIONS



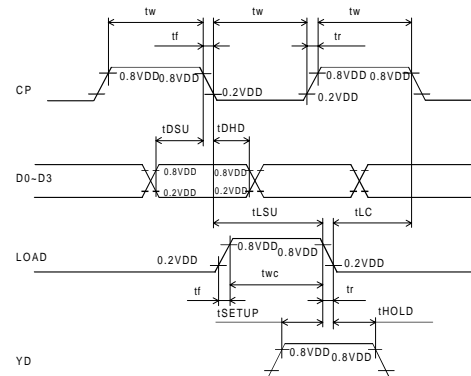
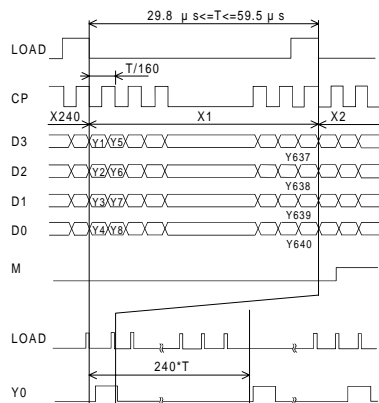
## BLOCK DIAGRAM



## POWER SUPPLY / POWER UP TIMING DIAGRAM



## INTERFACE TIMING DIAGRAM



**VGA RESOLUTION DISPLAYS OVERVIEW**

ITEM	SP19V001	LMG5278XUFC00T	LMG7550XUFC	UNIT
Display Type	Black and White Film STN Transmissive			-
Resolution	640 x 480			dots
Size	7.5	9.4	10.4	inch
Dot Size	0.214 x 0.214	0.27 x 0.27	0.3 x 0.3	mm
Dot Pitch	0.237 x 0.237	0.3 x 0.3	0.33 x 0.33	mm
External Dimensions	197 x 145 x 8.5	258 x 174 x 6.7	274 x 183 x 9	mm
Active Display Area	115.74 x 153.7	196 x 148	215.2 x 162.4	mm
Backlight	CFL (1Tube)			-
Backlight Lifetime	typ.10.000			hrs
Brightness	70	60	100	cd/m <sup>2</sup>
Duty Ratio	1:480 (Single Scan)	1:240 (Dual Scan)		-
Contrast	15:1	18 : 1		-
Response Time (Rise)	270	160		ms
Response Time (Fall)		110		ms
Operating Voltage	3.3	3.3/5	3.3/5	V
Power Consumption	1.7	1.8	2	W
Operating Temperature	+5 - +50	0 - +50		°C
Storage Temperature	-20 - + 60			°C

**Features**

All VGA displays employ film compensated STN technology with the newest high contrast LC materials, thus offering the following feature:

- High Contrast Ratio of up to 18 : 1
- High Brightness up to 100 cd/sqm
- Wide Viewing Angle
- Fast Response Time of 270 ms (Rise and Fall Time)