AND Displays

AND480320MST

6” FSTN LCD Module

The AND480320MST is 480 x 320 transflective display that uses X-driver and Y-driver circuits The benefits of this display are increased viewing angle, better contrast ratio and a wide temperature range. The rugged and reliable white LED backlight provides low voltage, no noise occurance and 20K hours of life. These features makes it ideal for marine applications, handle instruments and big machinery.

Features

- Transflective (high transmissive) display mode
- White LED backlight (low voltage, no noise occurance & 20K hours of life)
- Black/White (normally white background/black character)
- 480 (H) x 320 (V) pixels
- 3.3 V for Logic power supply
- Viewing angle is 6 o’clock
- Lightweight and durable

Mechanical Characteristics

Item	Specification	Unit
Outline Dimensions	156 (H) x 95 (V) x 11.5 max (D)	mm
Number of Pixels	480 (H) x 320 (V)	pixels
Active Area	119 (H) x 80 (V)	mm
Pixel Size	0.228 (H) x 0.228 (V)	mm
Pixel Pitch	0.24 (H) x 0.24 (V)	mm
Type	FSTN	–
Duty	1/320	–
Bias	1/11.7	–
Weight (approx.)	131	gram
Backlight	LED	–

Absolute Maximum Ratings

Item	Symbol	Min.	Max.	Unit
Power Supply for Logic	V_{DD}	-0.3	6.5	V
Power Supply for LCD	$V_{EE} - V_{SS}$	-0.3	35.0	V
Input Voltage	V_I	-0.3	$V_{DD+0.3}$	V
Wide Operating Temp**	T_{op}	-20	70	°C
Wide Storage Temp**	T_{st}	-30	80	°C

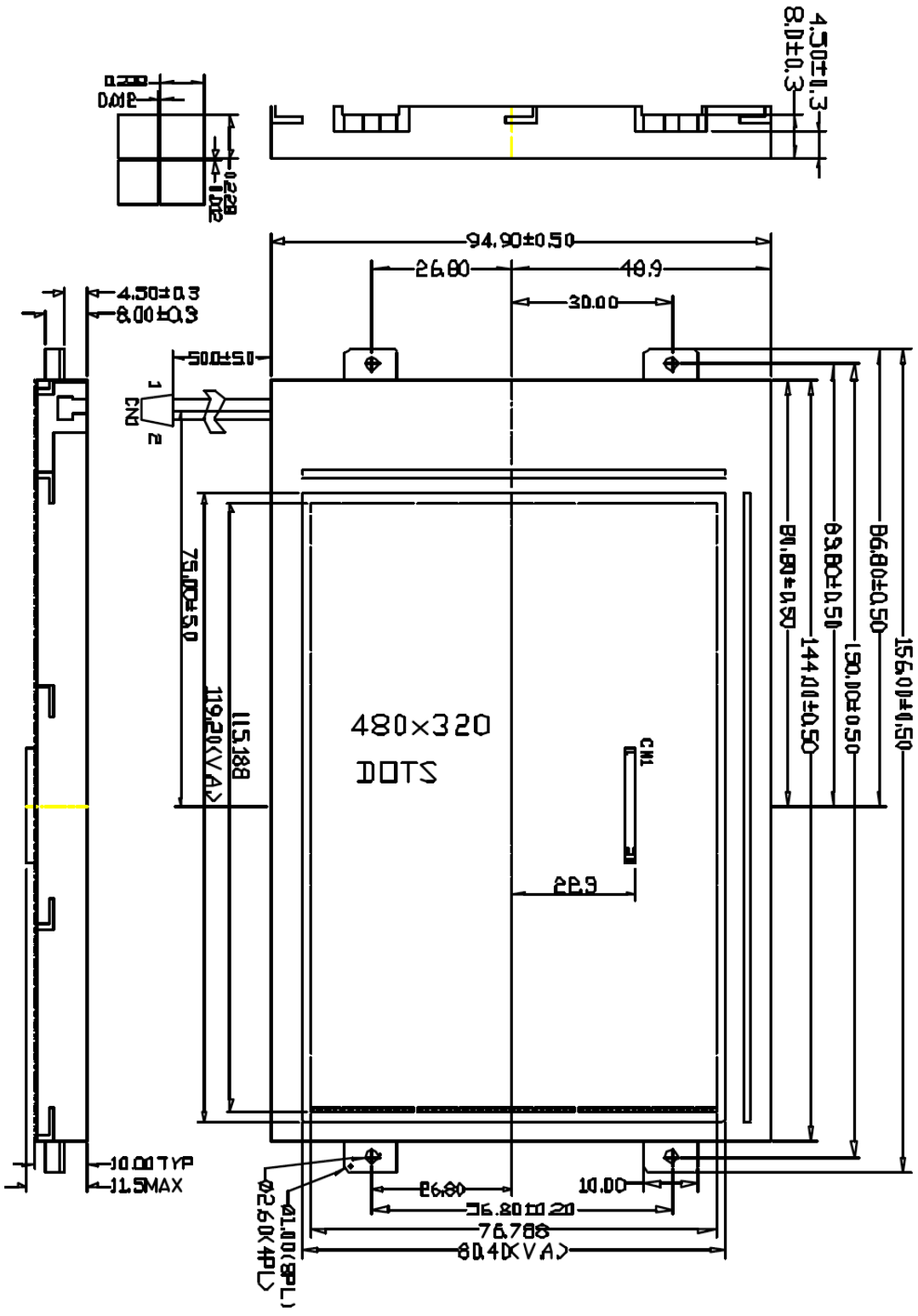
Product specifications contained herein may be changed without prior notice. It is therefore advisable to contact Purdy Electronics before proceeding with the design of equipment incorporating this product.

Electrico-Optical Characteristics (V_{OP}=22.4V, Ta=25°C)

Item	Sym	°C	Condition	Min.	Typ.	Max.	Unit
Operating Voltage	V_{OP}	-20	ø = 0 Cr: max	21.0	21.4	21.8	V
		25		19.6	20.0	20.4	V
		70		18.9	19.3	19.7	V
Response Time	Tr	-20	ø = 0 V_{OP}=21.4V	–	210	–	Msec
	Tf			–	300	–	
	Tr	25	ø = 0 V_{OP}=20.0V	–	210	–	
	Tf			–	300	–	
Viewing Angle Range	$\theta x1$	25	Cr ≥ 2 V_{OP}=20.0V	26	–	–	Deg
	$\theta x2$			40	–	–	
	$\theta y1$			47	–	–	
	$\theta y2$			32	–	–	
Contrast	Cr	25	V_{OP}=20.0V	–	6.0	–	–
Capacitance	Clc	25	All seg.	–	–	–	Nf
Current Cons.	Ic	25	All seg.	–	–	–	Ma
DC Characteristics							
Supply for Logic	V_{DD}	–	–	2.7	3.3	5.5	V
Operating Voltage for LCD	V_{EE}-V_{SS}	-20	–	22.0	22.4	24.8	V
		25	–	19.6	20.0	20.4	V
		50	–	17.9	18.3	18.7	V
Power Supply Curr. for Logic	I_{DD}	–	–	–	0.3	0.6	mA
	I_{EE}	25	–	2.2	7.1	15.6	mA
Input Voltage	V_{IL}	25	L Level	0.7 V_{DD}	–	V_{DD}	V
	V_{IH}	25	H Level	0	–	0.3 V_{DD}	V
Timing Specifications							
CP1 Pulse	t_W	–	–	23	–	–	ns
Clock Cycle	fcp	–	–	71	–	–	ns
CLK pulse	t_{WC}	–	–	23	–	–	ns
Clock set up	t_{LSU}	–	–	25	–	–	ns
Clock hole	t_{LC}	–	–	25	–	–	ns
Clock rise/fall	t_r, t_f	–	–	–	–	50	ns
Data set up	t_{DSU}	–	–	10	–	–	ns
Data hold	t_{DHD}	–	–	20	–	–	ns
‘M’ set up	t_{setup}	–	–	25	–	–	ns
‘M’ hold	t_{hold}	–	–	25	–	–	ns

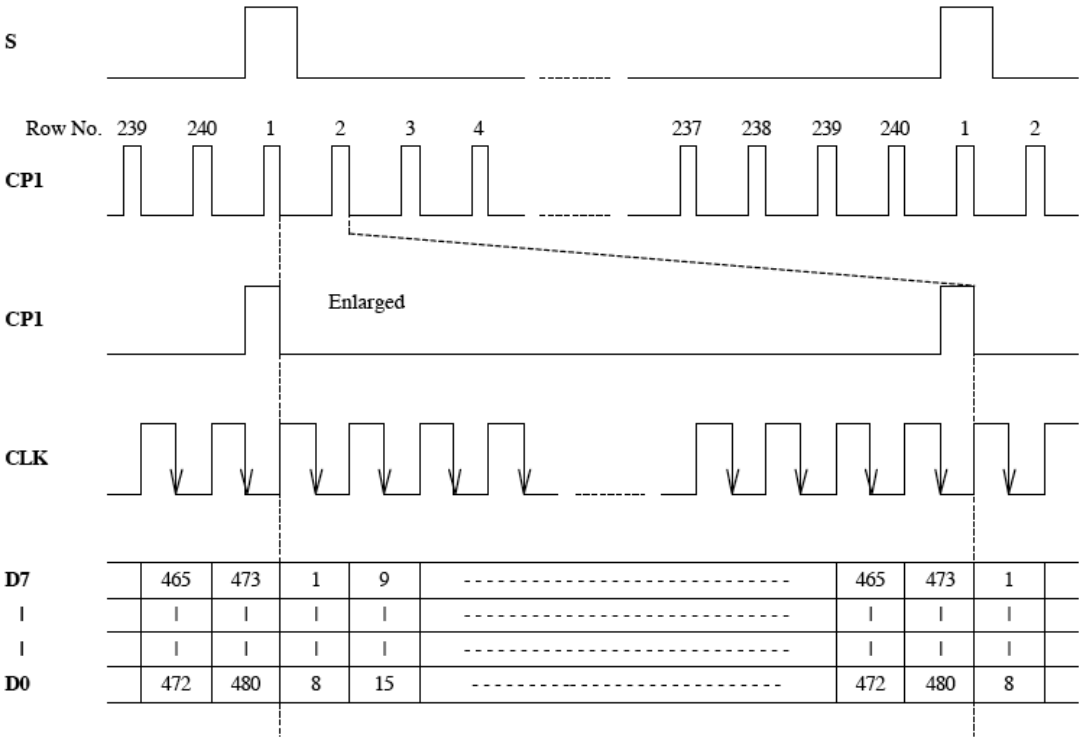
Dimensional Outline

Unit: mm
Standard Tolerance: 0.5mm

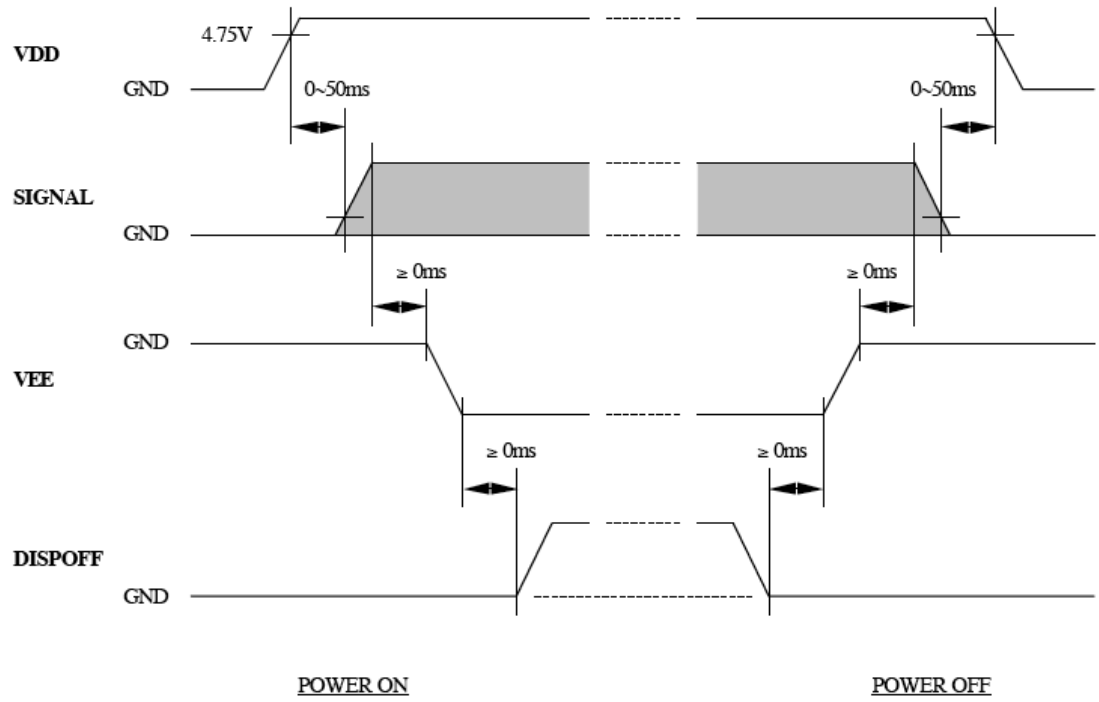


Timing Chart

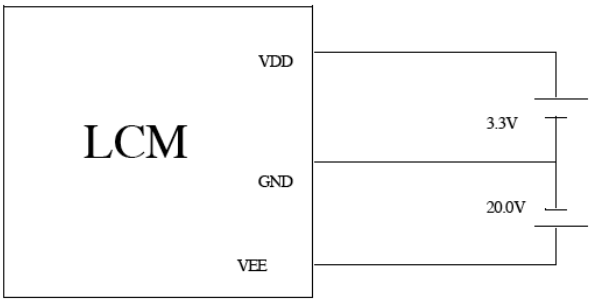
Timing Chart of Input Signal



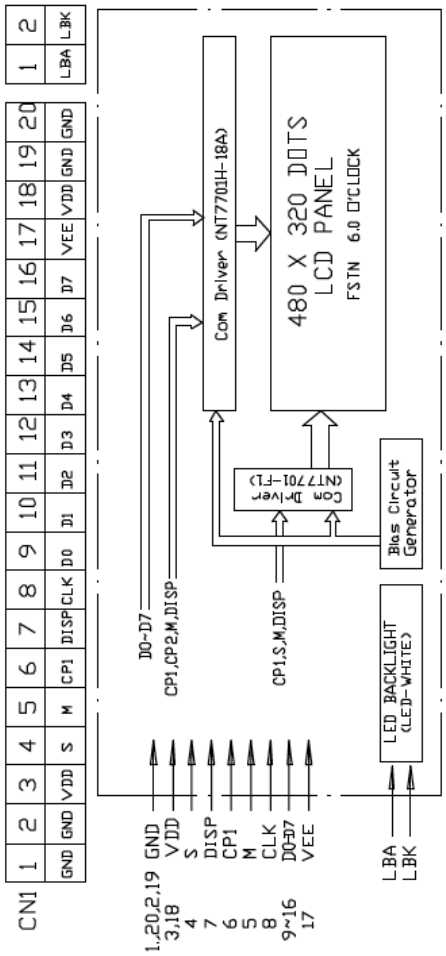
Timing of Power Supply



Power Supply



Block Diagram



Connector Pin Assignment for Interface

Interface Pin Connections

Pin No.	Symbol	Level	Description
1	GND	0V	Ground
2	GND	0V	Ground
3	V_{DD}	3.3V	Supply Voltage for Logic
4	S	H	Frame Signal
5	M	H/L	Alternate for LCD Drive
6	CP1	H–>L	Data Latch Signal
7	DISP	H/L	H: Display On, L: Display Off
8	CLK	H–>L	Clock Signal for Shifting Serial Data
9	D0	H/L	Data Bit 0
10	D1	H/L	Data Bit 1
11	D2	H/L	Data Bit 2
12	D3	H/L	Data Bit 3
13	D4	H/L	Data Bit 4
14	D5	H/L	Data Bit 5
15	D6	H/L	Data Bit 6
16	D7	H/L	Data Bit 7
17	V_{EE}	20.0V	Supply Voltage for LCD
18	V_{DD}	3.3V	Supply Voltage for Logic
19	GND	0V	Ground
20	GND	0V	Ground

Notes on Humidity without Condensation

For Wide Operating and Wide Storage Temp: Background color changes slightly depending on ambient temperature. This phenomenon is reversible.

For Wide Operating Temp: Ta ≤ 70ºC: 75RH max
Ta > 70ºC: absolute humidity must be lower than the humidity of 75%RH at 70ºC

For Wide Storage Temp: Ta at -30ºC will be < 48hrs, at 80 ºC will be < 120hrs

Display Data Pattern

	S1	--	--	S8	S9	• • • • • •	S472	S473	--	--	S480	SEG
C1	D7	--	--	D0	D7	• • • • • •	D0	D7	--	--	D0	
C2	D7	--	--	D0	D7	• • • • • •	D0	D7	--	--	D0	
•												
•												
•												
•												
•												
•												
•												
C319	D7	--	--	D0	D7	• • • • • •	D0	D7	--	--	D0	
C320	D7	--	--	D0	D7	• • • • • •	D0	D7	--	--	D0	
COM												

Input data	Dots on display				
D0	Dot 8	Dot 15	• • •	Dot 472	Dot 480
|	|	|	• • •	|	|
|	|	|	• • •	|	|
D7	Dot 1	Dot 9	• • •	Dot 465	Dot 473

Timing Specifications