



Features

- Transflective (high transmissive) display mode
- White LED backlight (low voltage, no noise occurrence & 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.

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 occurrence and 20K hours of life. These features make it ideal for marine applications, handle instruments and big machinery.

Electrico-Optical Characteristics (V_{OP}=22.4V, T_a=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	V _{OP} =21.4V ø = 0	-	210	-	Msec
				Tf	-	300	
	Tr	25	V _{OP} =20.0V ø = 0	-	210	-	
				Tf	-	300	
Viewing Angle Range	θ x1 θ x2 θ y1 θ y2	25	Cr ≥ 2 V _{OP} =20.0V	26	-	-	Deg
				40	-	-	
				47	-	-	
				32	-	-	
Contrast	Cr	25	V _{OP} =20.0V	-	6.0	-	-
Capacitance	Clc	25	All seg.	-	-	-	Nf
Current Cons.	Ic	25	All seg.	-	-	-	Ma

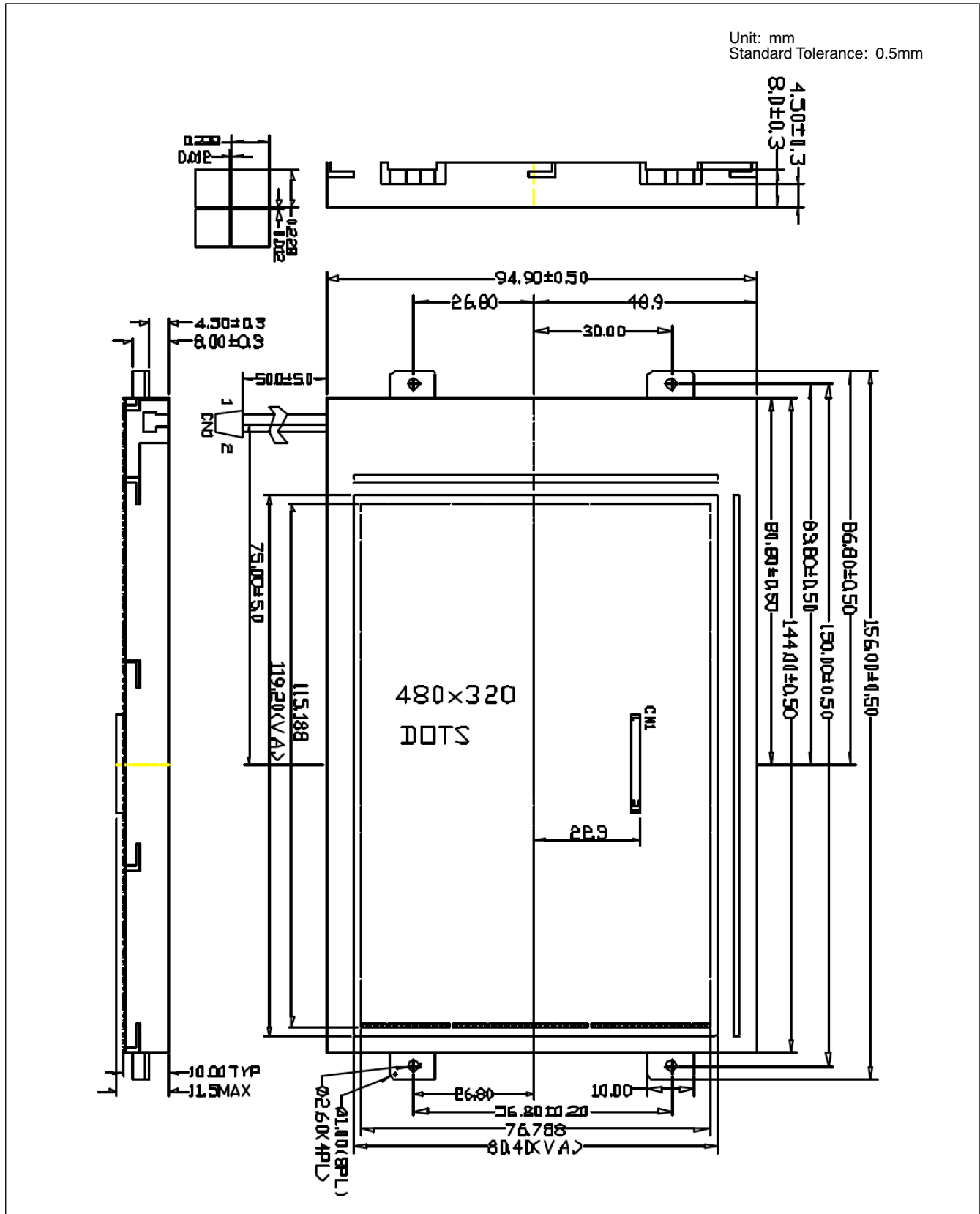
DC Characteristics

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

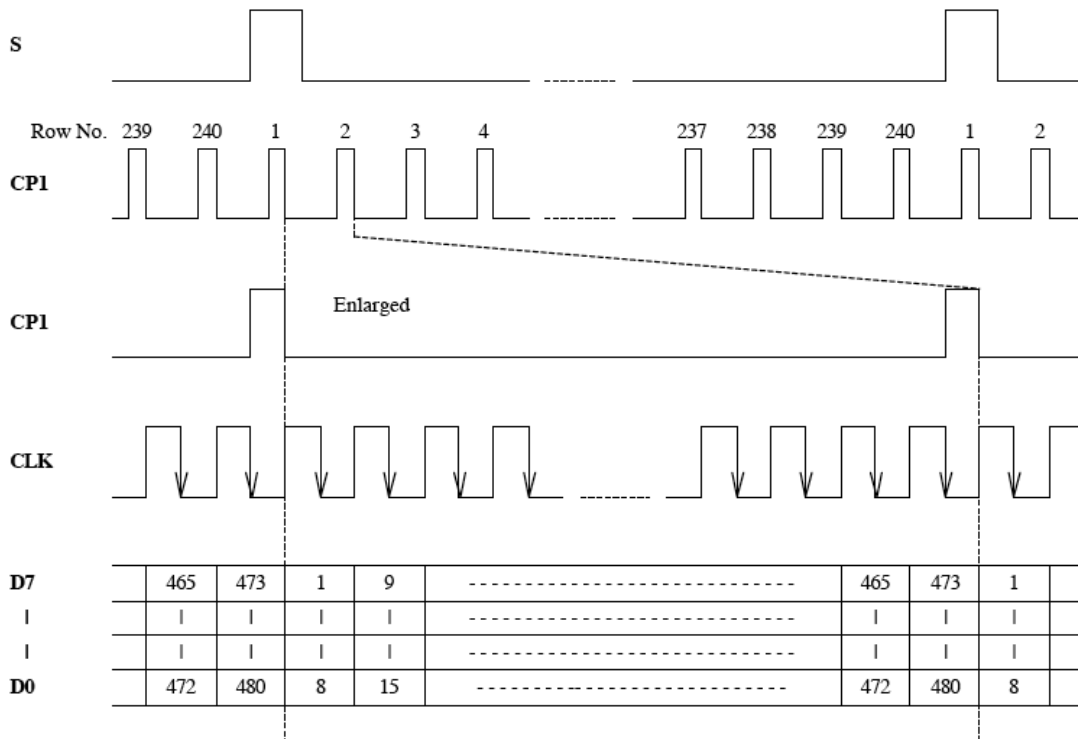
CP1 Pulse	t _w	-	-	23	-	-	ns
Clock Cycle	f _{cp}	-	-	71	-	-	ns
CLK pulse	t _{wc}	-	-	23	-	-	ns
Clock set up	t _{LSU}	-	-	25	-	-	ns
Clock hole	t _{LC}	-	-	25	-	-	ns
Clock rise/fall	t _r , t _f	-	-	-	-	50	ns
Data set up	t _{DSU}	-	-	10	-	-	ns
Data hold	t _{DHD}	-	-	20	-	-	ns
'M' set up	t _{setup}	-	-	25	-	-	ns
'M' hold	t _{hold}	-	-	25	-	-	ns

Dimensional Outline

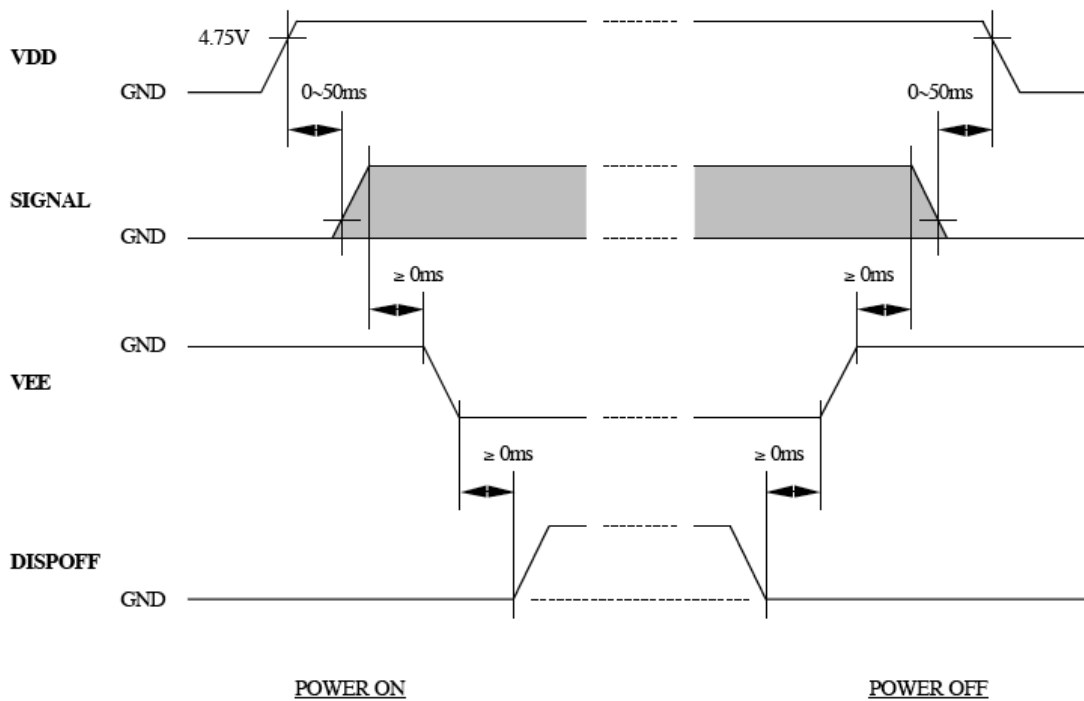


Timing Chart

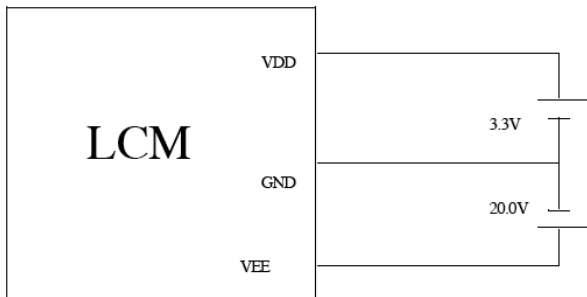
Timing Chart of Input Signal



Timing of Power Supply



Power Supply

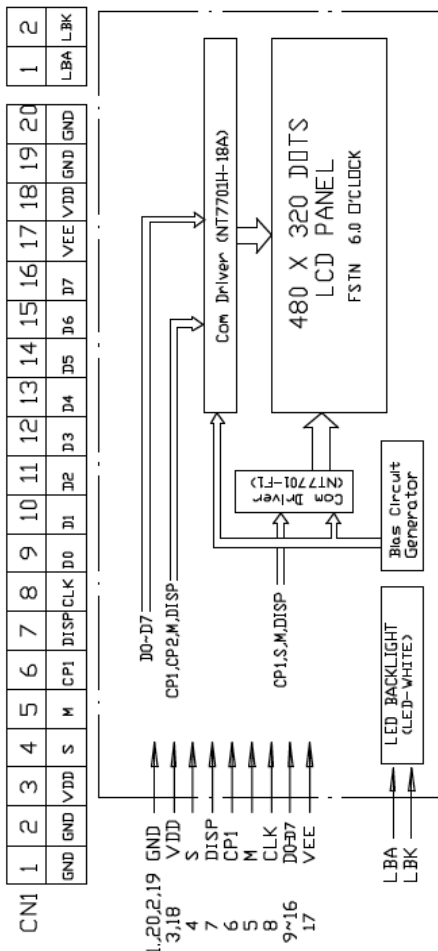


Connector Pin Assignment for Interface

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

Block Diagram



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: $T_a \leq 70^\circ\text{C}$: 75RH max

$T_a > 70^\circ\text{C}$: absolute humidity must be lower than the humidity of 75%RH at 70°C

For Wide Storage Temp: T_a at -30°C will be $< 48\text{hrs}$, at 80°C will be $< 120\text{hrs}$

Display Data Pattern

	S1	--	--	S8	S9	••••••	S472	S473	--	--	S480	SEG																																			
C1	D7	--	--	D0	D7	••••••	D0	D7	--	--	D0																																				
C2	D7	--	--	D0	D7	••••••	D0	D7	--	--	D0																																				
•	<table border="1"> <thead> <tr> <th>Input data</th> <th colspan="6">Dots on display</th> </tr> </thead> <tbody> <tr> <td>D0</td> <td>Dot 8</td> <td>Dot 15</td> <td>•••</td> <td>Dot 472</td> <td>Dot 480</td> <td></td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td>•••</td> <td> </td> <td> </td> <td></td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td>•••</td> <td> </td> <td> </td> <td></td> </tr> <tr> <td>D7</td> <td>Dot 1</td> <td>Dot 9</td> <td>•••</td> <td>Dot 465</td> <td>Dot 473</td> <td></td> </tr> </tbody> </table>												Input data	Dots on display						D0	Dot 8	Dot 15	•••	Dot 472	Dot 480					•••							•••				D7	Dot 1	Dot 9	•••	Dot 465	Dot 473	
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Timing Specifications

