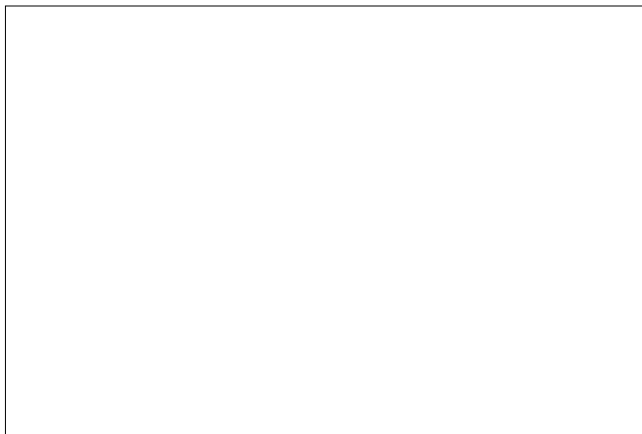




AND3222MST

320 x 240 Dots

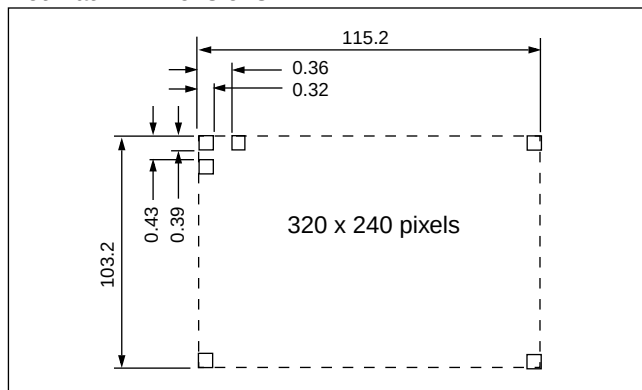
Intelligent Graphics Display

The AND3222MST display is a compact, full dot matrix, with “white page” appearance, LCD modules that have an on-board LCD controller (SED1330) and display memory (RAM). The AND3222MST can display TEXT information, numerals, letters and symbols, as well as GRAPHIC patterns. These devices are suitable for medical and measurement equipment, point-of-sale terminals, portable equipment, and marine instrumentation.

Features

- Black and white ST (MST) transmissive negative mode
- Built-in CCFL backlight
- 320 x 240 dot graphic display
- Excellent readability and high-contrast ratio
- Built-in LCD controller (SED1330)
- Wide operating temperature range (0° to 50°C)
- Available without controller (AND3222MST-C)
- 12 o'clock viewing angle with anti-glare polarizer

Dot Matrix Dimensions



Mechanical Characteristics

Item	Specification	Unit
Outline Dimensions	166.0 (W) x 134.0 (H) x 15.1 Max (D)	mm
Number of Dots	320 x 240 Dots (53 characters x 30 lines)	
# of Characters	53 x 30 (1590), 6 x 8 font	
Viewing Area	128.0 (W) x 110.0 (H)	mm
Dot Size	0.32 (W) 0.39 (H)	mm
Dot Pitch	0.36 (W) 0.43 (H)	mm
Weight (approx.)	350	gram

Absolute Maximum Ratings

Item	Absolute Maximum			Unit
	Symbol	Min	Max	
Supply Voltage	V_{DD}	0	6.0	V
	$V_{DD} - V_{LC}$	0	V_{DD}	V
CCFL Input Current	I_{FL}	—	10	mA, rms
CCFL Driving Voltage ⁽¹⁾	V_{FL}	—	1500	V_{rms}
CCFL Drive Frequency	f_{FL}	—	50	kHz
Input Voltage	V_{IN}	-0.3	V_{DD}	V
Storage Temperature	T_{stg}	-20	60	°C
Operating Temperature	T_{op}	0	50	°C
Humidity	—	10	85	% RH

Electrical Characteristics (TA = 25°C)

			Specifications			Unit
Item	Symbol	Cond.	Min	Typ	Max	
Supply Voltage	V_{DD}		4.75	5.0	5.25	V
	V_{EE}		-18.5	-18.0	-17.5	
High Level In V	V_{IN}	$V_{DD}=5.0V$	0.8	—	V_{DD}	V
Low Level In V	V_{IH}		0	—	0.8	
FL Driving V	V_{IN}	V_{FL}	—	260	290	V_{rms}
FL Input Current ⁽¹⁾	I_{FL}		4.0	4.5	5.0	mA rms
FL Starting V	V_{FLS}	$T_a = 0^{\circ}C$	850	—	1000	V_{rms}
FL Driving Frequency	$f_{FL}^{(2)}$		25	30	35	kHz
Current Consumption	I_{DD}	Typical	—	23	30	mA
	I_{LC}	Pattern ⁽³⁾	—	6	12	



AND3222MST Intelligent Graphics Display

1. Life time of backlight will change according to the FL input current.
2. Choose a driving frequency that is not in sync with the frame frequency otherwise, you may experience flickering.
3. Typical pattern is checkered.

Optical Characteristics (TA = 25°C, $\phi = 0^\circ$, $\theta = 0$)

		Specifications			
Item	Symbol	Min	Typ	Max	Unit
Viewing Angle	Right to Left	—	80	—	degree
	Up & Down	—	40	—	
Contrast Ratio	K	5	6	—	—
Response Time	T _{ON}	—	250	350	ms
	T _{OFF}	—	180	300	
Luminance I _{FL} = 4.5 mA rms	L	60	—	—	cd/m ²

Note: Refer to Applications Section for definitions of viewing angle, contrast ratio, response time (on and off) and luminance.

Connector Pin Assignment With Controller

Pin No.	Signal	Function
1	RESET	Controller Reset
2	RD	Data Read
3	WR	Data Write
4	NC	Not Connected
5	SEL1	MPU Select
6	CS	Chip Select
7	AO	Command Mode Set
8	D0	Data Input/Output (LSB)
9	D1	Data Input/Output
10	D2	Data Input/Output
11	D3	Data Input/Output
12	D4	Data Input/Output
13	D5	Data Input/Output
14	D6	Data Input/Output
15	D7	Data Input/Output (MSB)
16	V _{DD}	Power Supply (5V)
17	GND	Ground
18	V _O	Contrast Adjustment Voltage
19	V _{EE}	Power Supply for LCD Drive
20	FGND	Frame Ground

Connector Pin Assignment Without Controller

Pin No.	Signal	Function
1	NC	Not connected
2	NC	Not connected
3	NC	Not connected
4	NC	Not connected
5	NC	Not connected
6	NC	Not connected
7	INHx	Display On/Off
8	D0	Data Input/Output (LSB)
9	D1	Data Input/Output
10	D2	Data Input/Output
11	D3	Data Input/Output
12	FLM	Frame Start-up
13	M	Liquid Crystal AC
14	CL2	Display Data Shift
15	CL1	Display Data Latch
16	V _{DD}	Power Supply (5V)
17	GND	Ground
18	V _O	Contrast Adjustment Voltage
19	V _{EE}	Power Supply for LCD Drive
20	FGND	Frame Ground

FL Connector

Pin No.	Signal	Function
1	V _{FL}	Power supply for FL backlight
2	NC	Not connected
3	NC	Not connected
4	NC	Not connected
5	V _{FL}	Power supply for FL backlight

Note: Connector: IL-G-5S-S3C2, Japan Aviation Electronics Industry. Mating Housing: IL-M-5P-S3C2-PM. Contact: IL-M-C2.



LCD panel is driven by the voltage $V_{DD}-V_{EE}$, so adjustable V_{EE} is required for contrast control and temperature compensation

Temperature	$V_{DD} - V_{EE}$
0°C	24.0
+25°C	23.0
+50°C	22.0

Item	Symbol	Min.	Max.	Unit
System Cycle Time	t_{CYC}	100	—	ns
C/D Hold Time	t_{CDH}	10	—	
$\overline{CE}$, $\overline{RD}$, $\overline{WR}$ Pulse Width	$t_{CE}t_{RD}, t_{WR}$	220	—	
Data Set Up Time	t_{DS}	120	—	
Data Hold Time	t_{DH}	10	—	
Access Time	t_{ACC}	—	120	
Output Hold Time	t_{OH}	10	50	

