



AND1391ST-EO

128 x 128 Dots

Intelligent Graphics Display

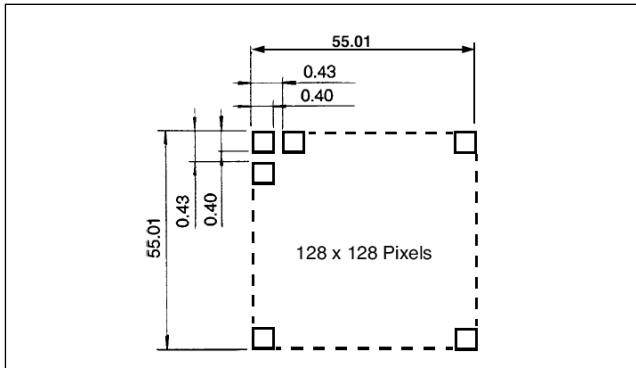
The AND1391ST-EO is a full dot matrix LCD module including an LCD controller and display RAM. This device can display graphic patterns and symbols and is suitable for a message display for various instruments such as business machine terminals.

Features

• RoHS Compliant

- Full dot-matrix structure with 128 dots x 128 dots
- 1/128 Duty, 1/12 bias
- STN LCD, positive, gray
- 6 o'clock viewing angle
- 8 bits parallel data input, w/controller IC T5953C, QFP type
- Built-in EL backlight

Dot Matrix Dimensions



Mechanical Characteristics

Item	Specification	Unit
Outline Dimensions	85.0 H x 100.0 V x 14.5 D	mm
Number of Dots	128 H x 128 V	
# of Characters	16 x 16 (256) Characters 8 x 8 dot format, alpha-numeric	
Viewing Area	62.0 H x 62.0 V	mm
Active Area	55.01 H x 55.01 V	mm
Dot Size	0.40 H x 0.40 V	mm
Dot Pitch	0.43 H x 0.43 V	mm
Weight (approx.)	82	gram

Absolute Maximum Ratings

Item	Symbol	Min.	Max.	Unit
Power Supply Voltage	V_{DD}	0	7.0	V
LCD Drive Supply Voltage	$V_{DD} - V_{EE}$	5.3	25	V
Input Voltage	V_{IN}	-0.3	$V_{DD} + 0.3$	V
Operating Temp.	T_{op}	0	50	°C
Storage Temperature	T_{stg}	-20	70	°C
Humidity	H_D	-	90	%RH

Electrical Characteristics (TA = 25°C)

Item	Symbol	Min.	Typ.	Max.	Unit
Logic Supply Voltage	V_{DD}	4.5	5.0	5.5	V
"H" Input Voltage	V_{IH}	$V_{DD} - 2.2$	-	V_{DD}	V
"L" Input Voltage	V_{IL}	0	-	0.8	V
"H" Output Voltage	V_{OH}	$V_{DD} - 0.3$	-	V_{DD}	V
"L" Output Voltage	V_{OL}	0	-	0.3	V
Supply Current	I_{DD}	-	7.0	14.0	mA
LC D Driving Voltage ($V_{DD} - V_O$)	V_{O-P}	-	18.5	-	V

Note: $V_{DD} = +5V \pm 10\%$, $V_{SS} = +0V$, $T_A = 25^\circ C$

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.



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Optical Characteristics (TA = 25°C, φ = 0°, θ = 0)

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Viewing Angle	θ	C≥2.0, φ=0°	-40	-	-	degree
Contrast	C	θ=5°, φ=0°	5	7	-	-
Response Time (rise)	T _r	θ=5°, φ=0°	-	150	-	ms
Response Time (fall)	T _f	θ=5°, φ=0°	-	300	-	ms

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

Connector Pin Assignment

Pin No.	Signal	Function
1	FGND	Frame Ground (connected to metal bezel)
2	V _{SS}	Power Supply (V _{SS} =0)
3	V _{DD}	Power Supply (V _{DD} >V _{SS})
4	V _O	Operating Voltage for LCD
5	\overline{WR}	Data Write (write data to the module at "L")
6	\overline{RD}	Data Read (read data from the module at "L")
7	\overline{CE}	Chip Enable for the modul (active at "L")
8	C/ \overline{D}	\overline{WR} = "L"; C/ \overline{D} = "H": Command Write, C/ \overline{D} = "L": Data Write \overline{RD} = "L", C/ \overline{D} = "H": Command Read C/ \overline{D} = "L": Data Read
9	NC	No connection
10	\overline{RESET}	Controller Reset (module reset)
11	D0	Data Input/Output (D0=MSB)
12	D1	Data Input/Output
13	D2	Data Input/Output
14	D3	Data Input/Output
15	D4	Data Input/Output
16	D5	Data Input/Output
17	D6	Data Input/Output
18	D7	Data Input/Output (D7=LSB)
19	FS	Font select. Open or connect to V _{DD} : 6 x 8 dot font Connect to V _{SS} : 8 x 8 dot
20	NC	No connection

Power Supply

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

Temperature Variations

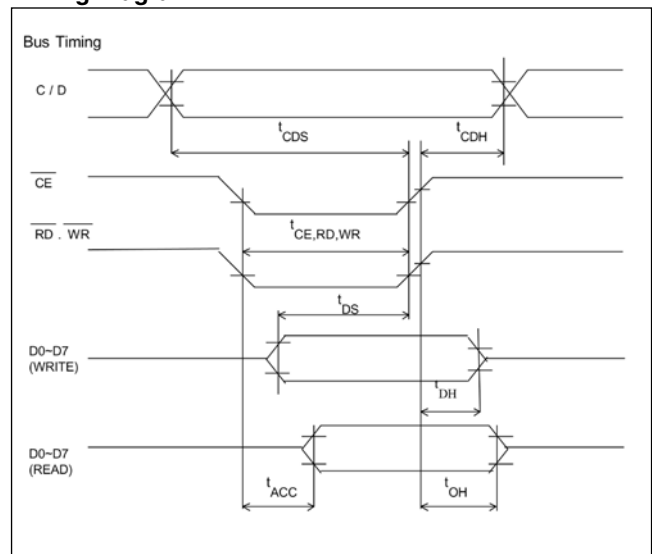
Temperature	V _{DD} -V _{EE} (EO option)
0°C	14.1
+25°C	13.0
+50°C	11.1

Timing Relationships and Diagram

Signal Timing Relationships

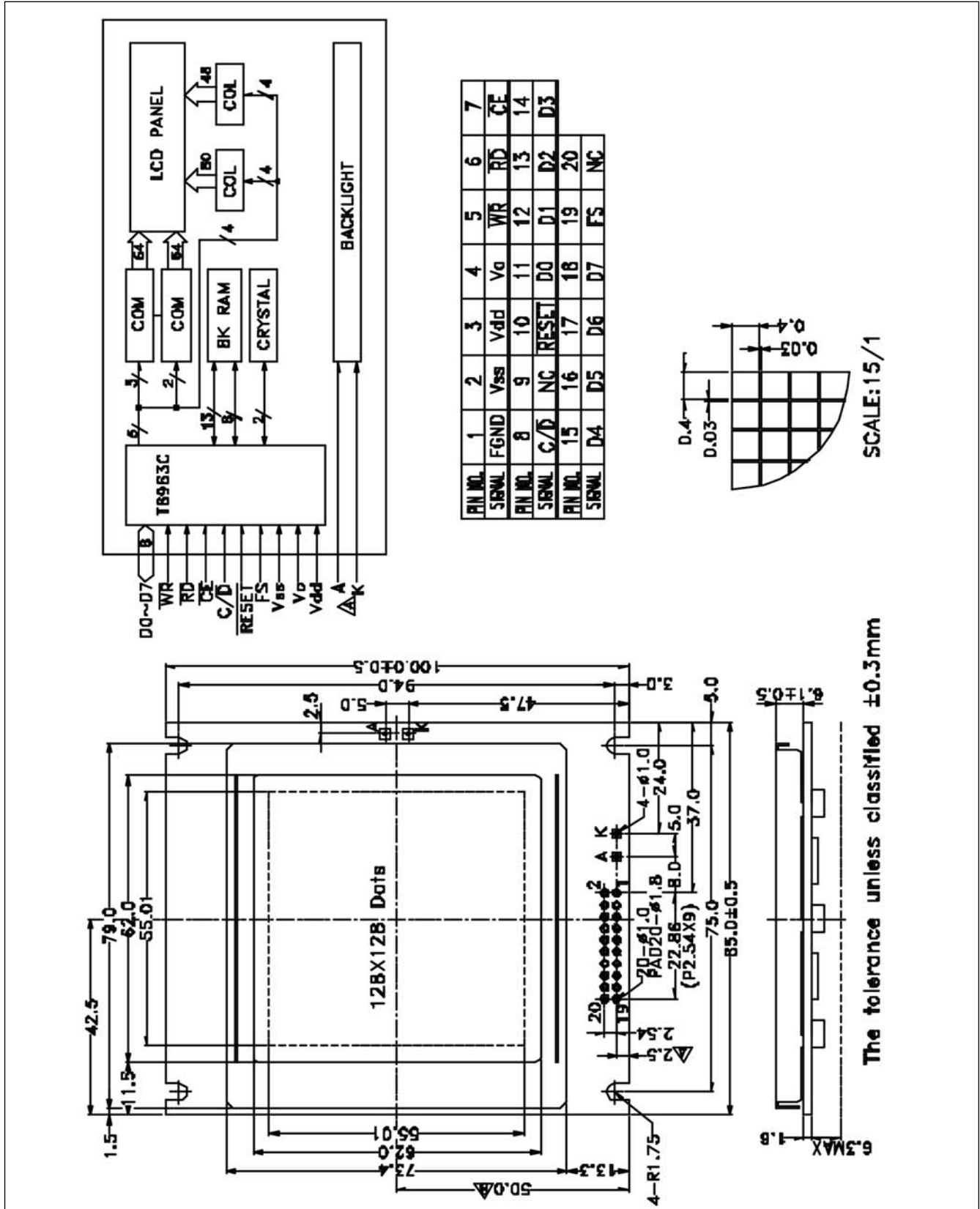
Item	Symbol	Min.	Max.	Unit
C/D Set-Up Time	t _{CDS}	100	-	ns
C/D Hold Time	t _{CDH}	10	-	
\overline{CE} , \overline{RD} , \overline{WR} Pulse Width	t _{CE} , t _{RD} , t _{WR}	80	-	
Data Set-Up Time	t _{DS}	80	-	
Data Hold Time	t _{DH}	40	-	
Access Time	t _{ACC}	-	150	
Output Hold Time	t _{OH}	10	50	

Timing Diagram





Block Diagram





Backlight Characteristics

Maximum Ratings

Item	Symbol	Max.	Unit
Supply voltage	Vmax	170	Vrms
Supply frequency	Fmax	1000	Hz
Operating Temperature	Topr	-35~+50	°C
Operating humidity	Hopr	90	%RH
Storage temperature	Tstg	-40~+60	°C
Storage humidity	Hstg	70	%RH

Using Specification

Item	Specification	Unit
Operating voltage	110	Vrms
Frequency	400	Hz

Electrical Characteristics

Item	Condition	Unit	Min.	Typ.	Max.
Initiate Intensity	(sine wave)	cd/m ²	48	60	-
CIE color coordinate	X	VAC 110	-	0.3127	-
	Y	Vrms	-	0.4072	-
Current density	Freq 400	mA/cm ²	-	0.14	-
Power density	Hz	mW/cm ²	-	2.97	-
Color	-	-	-	White	-