



AND711AST-30/-EO

240 x 64 Dots

Intelligent Graphic Display

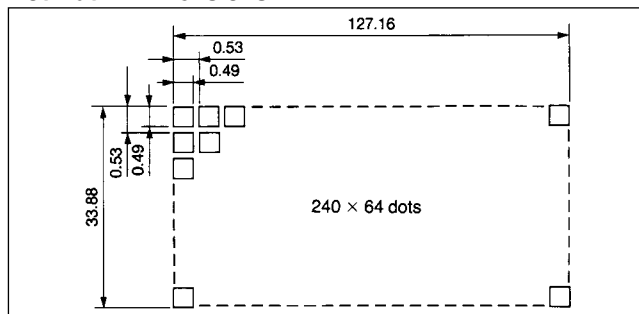
The AND711AST-30/-EO is a full dot matrix LCD module including an LCD controller and display RAM. This device can display graphic patterns and symbols and is suitable for a message display for various instruments such as business machine terminals.

Features

• RoHS Compliant

- Super twist
- 40 character x 8 line capability
- Excellent readability and high contrast ratio
- 8-bit parallel bus for read/write data by CPU interface
- Built-in LCD controller and display RAM (8k byte)
- Character mode, graphic mode, and character and graphic combination mode
- RoHS compliant
- Wide operating temperatures range (0°C to +50°C)
- Compact and easily mounted on any equipment
- User-selectable font—6 x 8 or 8 x 8
- Available with EL backlighting attached (-EO option)

Dot Matrix Dimensions



Mechanical Characteristics

Item	Specification	Unit
Outline Dimensions	180 (W) x 65 (H) x 10 (D)	mm
Number of Dots	240 (W) x 64 (H)	
# of Characters	40 x 8 (320) Characters 6 x 8 dot format, alpha-numeric	
Viewing Area	132 (W) x 39 (H)	mm
Bezel Opening	132 (W) x 39 (H)	mm
Dot Size	0.49 (W) x 0.49 (H)	mm
Dot Pitch	0.53 (W) x 0.53 (H)	mm
Weight (approx.)	120/150 (ST/EO)	gram

Absolute Maximum Ratings

Item	Symbol	Rating	Unit
Supply Voltage	V_{DD}	5.5	V
	V_{EE}	-19	
EL Drive Voltage ($f_{EL} = 1$ kHz)	V_{EL}	130	V_{rms}
Input Voltage	V_{IN}	$-.3 \leq V_{IN} \leq +.3$	V
Operating Temperature	T_{op}	0 to +50	°C
Storage Temperature	T_{stg}	-20 to +70	°C
EL Driving Freq. (EO)	f_{EL}	1	kHz

Electrical Characteristics (TA = 25°C)

Item	Symbol	Min.	Typ.	Max.	Unit
Supply Voltage	V_{DD}	4.5	5.0	5.5	V
	V_{EE}	-5.75	-8.5	-11.5	
High Level In Voltage ($V_{DD} = 5.0V$)	V_{IN}	2.8	—	5	V
Low Level In Voltage ($V_{DD} = 5.0V$)	V_{IL}	—	—	0.8	
High Level Output Volt. ($V_{DD} = 5.0V$)	V_{OH}	$V_{DD} - 0.3$	—	—	V
Low Level Output Volt. ($V_{DD} = 5.0V$)	V_{OL}	—	—	0.3	V
Power Consumption ⁽¹⁾	I_{DD}	—	16.0	25.0	mA
	I_{EE}	—	2.4	3.0	
	I_{EL}	—	4.0	10	

1. All dots on. ($V_{DD} = .5V$, $V_{EE} = -8.5V$, $V_{EL} = 110$, $f_{EL} = 500$ Hz or at Typ.)
2. mA rms

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, $\phi = 0^\circ$, $\theta = 0$)

Item	Symbol	Min.	Typ.	Max.	Unit
Viewing Angle	Right to Left	—	80	—	degree
	Up & Down	—	55	—	
Contrast	K	2.5	4.8	-	-
Turn On	T _{on}	-	200	350	ms
Turn Off	T _{off}	-	250	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	GND	Ground (signal)
3	V _{DD}	Power Supply for logic (5V)
4	V _{EE}	Power Supply for LCD Drive (-8.5 ±3V)
5	$\overline{WR}$	Data Write
6	$\overline{RD}$	Data Read
7	$\overline{CE}$	Chip Enable
8	C/D	$\overline{WR} = "L", C/D = "H"$: Command Write $\overline{WR} = "L", C/D = "L"$: Data Write $\overline{RD} = "L", C/D = "H"$: Status Read $\overline{RD} = "L", C/D = "L"$: Data Read
9	NC	No connection
10	$\overline{RESET}$	Controller Reset (Active Pullup Required)
11	D0	Data Input/Output
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
19	FS	Font select. Open or connect to V _{DD} : 6 x 8 dot Connect to ground: 8 x 8 dot
20	NC	No connection

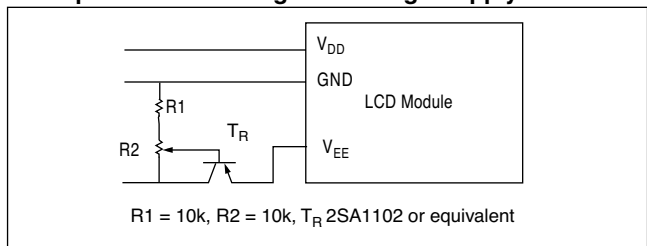
Power Supply

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}
0°C	13.9
+25°C	12.5
+50°C	10.8

Example of Variable Negative Voltage Supply

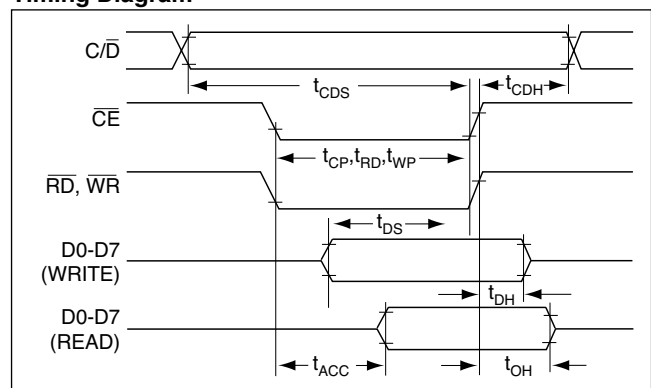


Timing Relationships and Diagram

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





The diagram shows the T6963C LCD controller interfaced to an I/O device, RAM, and an LCD panel. The controller has several input/output lines: D0-D7 (8-bit data bus), AD0-AD12 (13-bit address bus), and control lines (WR, RD, CE, C/D, RESET). It is connected to an I/O device (I/O0-I/O7) via an 8-bit data bus and to RAM (A0-A12, 8K byte) via a 13-bit address bus. The controller also has control lines (R/W, CE, ED) connected to the RAM. The controller's output lines (HSCP, FR, LP, C/D) are connected to the LCD panel via a 64-bit data bus. The LCD panel is a 240 x 64 Dots panel. The controller is also connected to an EL Backlight via V_{EL} lines.

Because signal lines are directly connected to C-MOS and are not pull-up or pull-down internally, except RESET which is pull-up to V_{DD} , you must guard all signals from external noise.

[illegible]