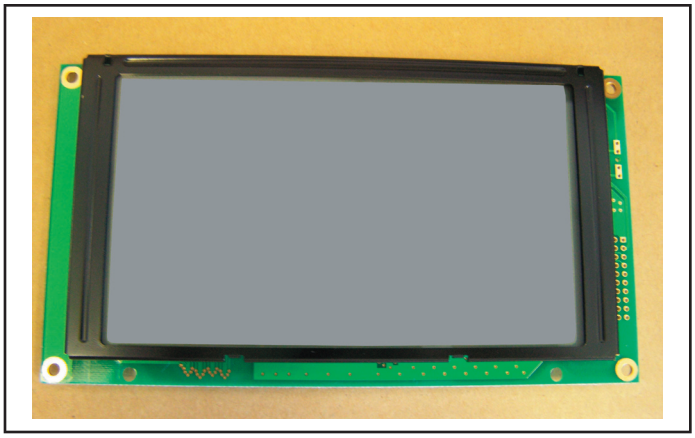


AND1013ST-EO2

Intelligent Character Display

The AND1013ST-EO2 is an STN, Gray, Transflective, Positive, Extended Temperature liquid crystal display. It has a transflective rear polarizer, white EL backlight, 6 o-clock viewing angle and a 6 o'clock viewing direction.

Features

- STN, Gray, Transflective, Positive, Extended Temperature
- 160 x 128 Dots
- White EL Backlight
- 6 O'clock Viewing Direction
- Wide Temperature Range
- LCD Module 1/64 Duty, 1/9 Bias
- 175 Gram Weight
- **ROHS Compliant**

Mechanical Characteristics

Item	Standard Value	Unit
Outline Dimensions	129.0 (L) * 104.5 (W) * 14.0 (H) max	mm
Viewing Area	101.0 (L) * 82.0 (W)	mm
Active	95.96 (L) * 76.76 (W)	mm
Dot Size	0.56 (L) * 0.56 (W)	mm
Dot Pitch	0.6 (L) * 0.6 (W)	mm

Note: For detailed information, please refer to LCM drawing.

Absolute Maximum Ratings

Item	Symbol	Min.	Max.	Unit	Condition
Power Supply for Logic	VDD	-0.3	7.0	V	
Input Voltage	VIN	-0.3	VDD + 0.3	V	
Operating Temperature	TOP	-20	70	ºC	Excluded B/L
Storage Temperature	TST	-30	80	ºC	Excluded B/L
Storage Humidity	HD	–	90	%RH	Ta < 40 ºC

Electrical Characteristics (VDD=5.0V ± 10%, VSS = 0V, Ta = 25ºC)

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Logic Supply Voltage	VDD	–	4.5	5.0	5.5	V
"H" Input Voltage	VIH	L Level	VDD - 2.2	–	VDD	V
"L" Input Voltage	VIL	H Level	0	–	0.8	V
"H" Output Voltage	VOH	Ta = -20ºC	VDD -0.3	–	VDD	V
"L" Output Voltage	VOL	Ta = 25ºC	0	–	0.3	V
Supply Current	IDD	VDD = 5V	–	7.5	10.0	mA
LCM Driver Voltage	VOP	-20 ºC	–	–	–	V
		25 ºC *	12.3	12.7	13.1	
		70 ºC	–	–	–	

* The VOP test point is VDD-VLCD.

Optical Specifications (LCD Module 1/64 Duty, 1/9 Bias, VOP = 12.0V, Ta = 25 ºC)

Item	Symbol	Remarks	Specifications Min.	Typ.	Max.
Viewing Angle	θ	C ≥ 2, ϕ = 0º	0º	–	40º
Contrast Ratio	C	θ = 25º, ϕ = 0º	4	6	–
Response Time (Rise)	tr	θ = 25º, ϕ = 0º	–	90 ms	135ms
Response Time (Fall)	tf	θ = 25º, ϕ = 0º	–	210 ms	315 ms

Backlight Characteristics (LCD Module with EL Backlight - Maximum Ratings)

Item	Symbol	Maximum	Unit
Supply Voltage	Vmax	170	Vrms
Supply Frequency	Fmax	1000	Hz
Operating Temperature	Topr	–35 ~ +50	ºC
Operating Humidity	Hopr	90	%RH
Storage Temperature	Tstg	–40 ~ +60	ºC
Storage Humidity	Hstg	70	%RH

Using Specification

Item	Specification	Unit
Operating Voltage	110	Vrms
Frequency	400	Hz

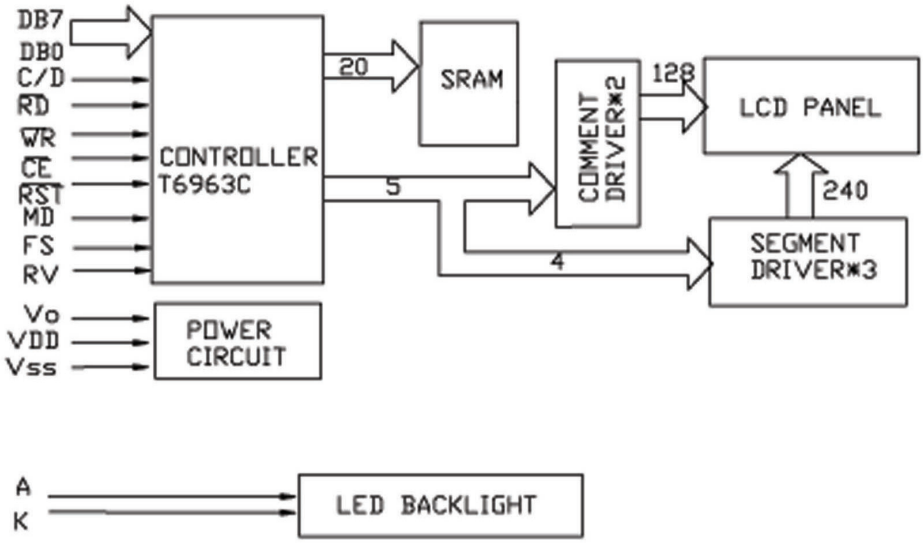
Electrical Characteristics

Item		Condition	Unit	Min.	Typ.	Max.
Initiate Intensity		(sine wave) VAC 110 Vrms Freq 400 Hz	cd/m^2	48	60	–
CIE Color Coordinate	X				0.3086	
	Y				0.3926	
Current Density			mA/cm^2		0.143	
Power Density			mW/cm^2		2.88	
Color					White	

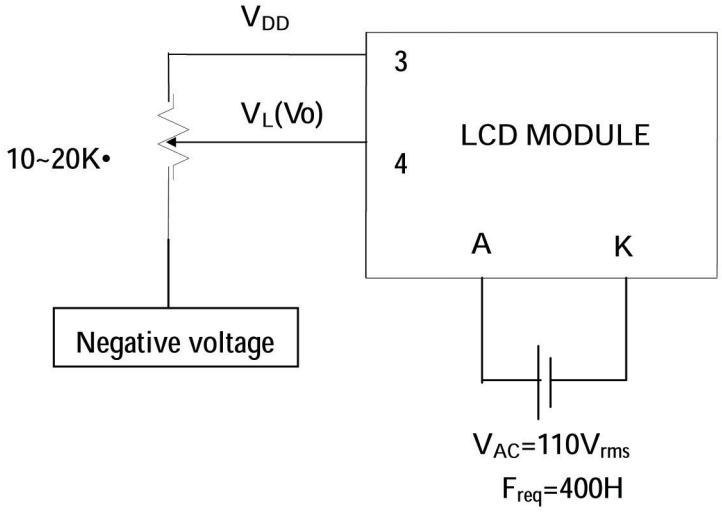
Interface Pin Assignment

Pin No.	Pin Out	Function Description		Pin No	Pin Out	Function Description
1	FG	Frame Ground		11	DB0	Data Bit 0 LSB
2	VSS	Power Supply (VSS = 0)		12	DB1	Data Bit 1
3	VDD	Power Supply (VDD > VSS)		13	DB2	Data Bit 2
4	VL(VO)	Operating Voltage for LCD		14	DB3	Data Bit 3
5	/WR	Data Read (Read Data from the Modle at 'L")		15	DB4	Data Bit 4
6	/RD	Data Read (Read Data from the Modle at 'L")		16	DB5	Data Bit 5
7	/CE	Chip enable for the module (active at "L")		17	DB6	Data Bit 6
8	C/D	Wr = "I", C/D = "H": Command Write; WR = "L", C/D = "L:": Data Write; RD = "L", C/D = "H": Status Read; RD = "L", C/D = "L": Data Read		18	DB7	Data Bit 7 MSB
9	NC	No Connection		19	FS	Font select: J6 short (8*8 dots font)
10	/RST	Controller reset (module reset)		20	N/C	No connection

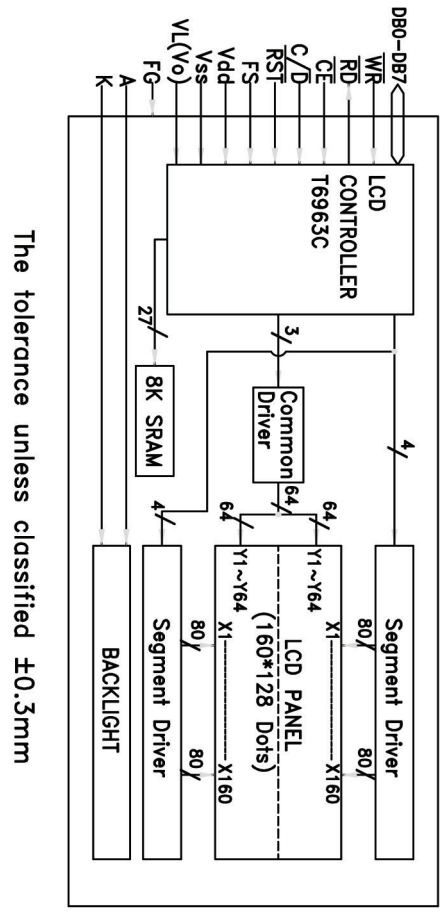
Block Diagram

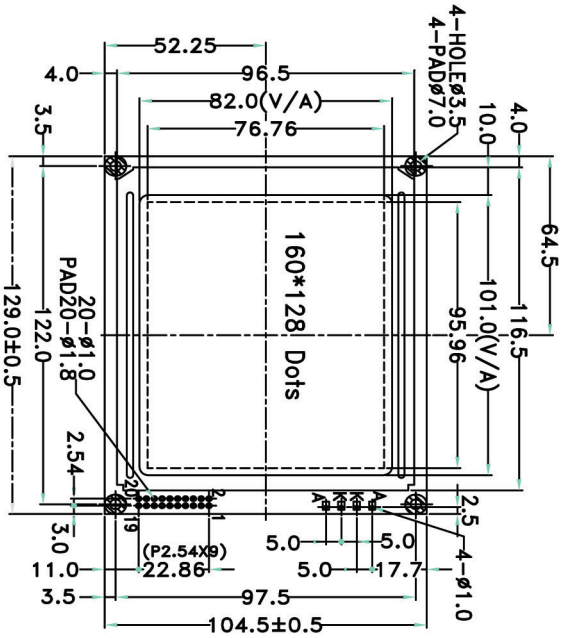


Power Supply



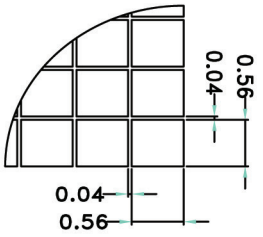
Power Supply

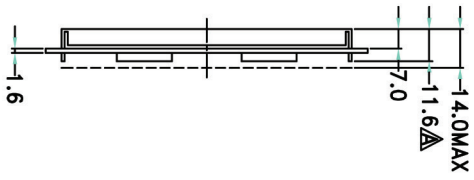




The tolerance unless classified ±0.3mm

SCALE:15/1





PIN NO.	SIGNAL
1	FG
2	Vss
3	Vdd
4	VL(Vo)
5	WR
6	RD
7	CE
8	C/D
9	N/C
10	RST
11	DB0
12	DB1
13	DB2
14	DB3
15	DB4
16	DB5
17	DB6
18	DB7
19	FS
20	N/C