

FEATURES

- ◆ Blue on Grey STN Type
- ◆ Transflective Mode

- ◆ Low Power EL Backlight
- ◆ Built in LCD Controller HD61830

MECHANICAL DATA

Item	Value	Unit
Module Dimensions	160*68*9.5	mm
Viewing Area	126.3*37.0	mm
Resolution	256*64	dots
Dot Size	0.44*0.44	mm
Dot Pitch	0.47*0.47	mm
Weight	115	g

OPTICAL DATA

Item	Symbol	Condition	Min	Typ	Max	Unit
Contrast Ratio	K	∅=10°, Q=0°, Note 1	-	3.0	-	-
Brightness	-	-	-	10	-	cd/m ²
Viewing Direction	-	-	6			o'clock
Viewing Angle	∅2 - ∅1	K=1.4, Note 1	-	40	-	degree
Response Time (Rise)	t _R	∅=10°, Q=0°, Note 1	-	250	400	ms
Response Time (Fall)	t _F	∅=10°, Q=0°, Note 1	-	300	450	ms

ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Condition	Min	Max	Unit
Supply Voltage (Logic)	V _{DD} - V _{SS}	-	0	7	V
Supply Voltage (LC Drive)	V _{DD} - V _{EE}	-	0	22	V
Input Voltage	V _I	-	V _{SS}	V _{DD}	V
Operating Temperature	T _{OP}	Note 4,5	0	50	°C
Storage Temperature	T _{ST}	Note 4,5	-20	60	°C

DATA INTERFACE PIN ASSIGNMENT

Pin No	Symbol	Level	Function
A1	VSS	-	Ground
A2	VDD	-	Power supply for logic
A3	V0	-	Power supply for LCD drive
A4	RS	-	Register select
A5	R/W	-	Read / Write
A6	E	-	Enable
A7-A14	DB0 - DB7	-	Display data
A15	Not CS	-	Chip select
A16	Not RES	-	Reset
A17	VEE	-	Power supply for LCD
A18-A20	NC	-	No connection
E1-E2	VEL	-	Power supply for EL driving

ELECTRICAL CHARACTERISTICS

Item	Symbol	Condition	Min	Typ	Max	Unit
Supply Voltage (Logic)	V _{DD} - V _{SS}	-	4.75	5.0	5.25	V
Supply Voltage (LC Drive)	V _{EE} - V _{SS}	-	-12.5	-13.0	-13.5	V
Supply Current	I _{DD}	-	-	35	-	mA
	I _{EE}	-	-	2	-	mA
Input Voltage (High Level)	V _{IH}	High Level, Note 2	0.8*V _{DD}	-	V _{DD}	V
Input Voltage (Low Level)	V _{IL}	Low Level, Note 2	0	-	0.2*V _{DD}	V
Frame Frequency	f _{FLM}	-	-	-	-	Hz
Duty Ratio	-	-	-	1/64	-	-
Recommended LC Drive Voltage	V _{DD} - V _O	Duty=1/64, T=0°C, ∅=10°, Note 3	-	16.2	-	V
		Duty=1/64, T=25°C, ∅=10°, Note 3	-	15.3	-	V
		Duty=1/64, T=40°C, ∅=10°, Note 3	-	14.7	-	V
Backlight Lamp Voltage	V _{BL}	F _{EL} =400Hz	-	100	-	V _{rms}
Backlight Lamp Frequency	f _{BL}	-	-	400	-	Hz
Backlight Lamp Current	I _{BL}	V _{EL} =100V _{rms} , F _{EL} =400Hz	-	-	100	mA _{rms}

TIMING CHARACTERISTICS

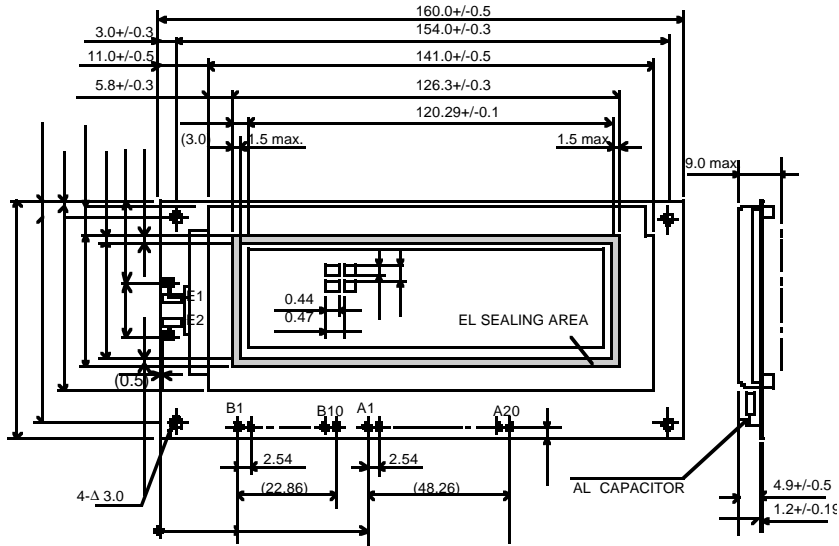
Item	Symbol	Min	Typ	Max	Unit
Enable cycle time	t _{CYC}	1000	-	-	ns
Enable pulse width (High level)	t _{WEH}	450	-	-	ns
Enable pulse width (Low level)	t _{WEL}	450	-	-	ns
Enable rise time	t _{Er}	-	-	25	ns
Enable fall time	t _{Ef}	-	-	25	ns
Set up time	t _{AS}	140	-	-	ns
Data set up time	t _{DSW}	225	-	-	ns
Data delay time	t _{DDR}	-	-	225	ns
Hold time of Data	t _H	10	-	-	ns
Address hold time	t _{AH}	10	-	-	ns
Data hold time	t _{DH}	20	-	-	ns

INVERTER AND CONNECTORS

Recommended Inverter	Connector
NEC NEL-D32-48	No special connector required

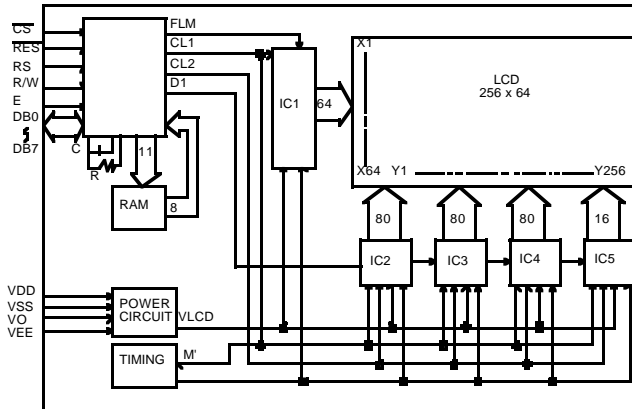
- Note1: Definition of optical data, see page 84
- Note 2: Applied to DB0-DB7, NotCS, E, R/W, RS
- Note 3: Recommended LC driving voltage may fluctuate about +/- 0.5V by each module
- Note 4: Background colour of the LCD changes depending on temperature. Between 40-50°C optical characteristics of the LCD like contrast and viewing angle change but the display remains readable.
- Note 5: Storage at -20°C < 48 hr.

MECHANICAL DIMENSIONS

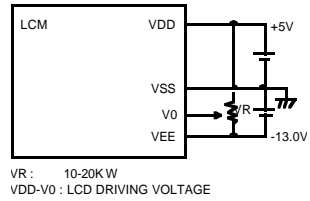


NOTE: PADS A1-A20 SHOULD NOT BE USED
USE PADS B1-B10 FOR INTERFACE

BLOCK DIAGRAM

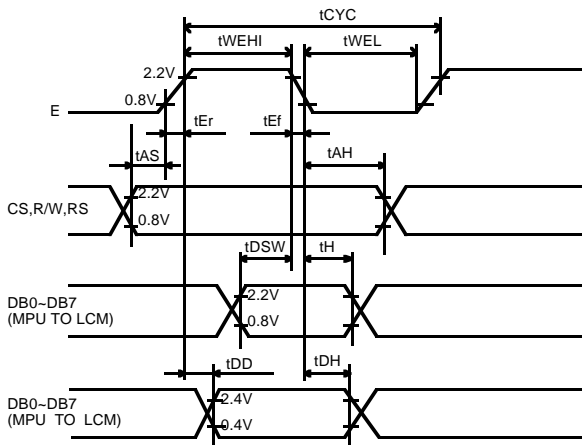


POWER SUPPLY



VR : 10-20K W
VDD-V0 : LCD DRIVING VOLTAGE

INTERFACE TIMING DIAGRAM



POWER UP TIMING DIAGRAM

