

LCD-63

1. General Specifications

Operating Temp.	:	min. 0°C ~ max. 50°C
Storage Temp.	:	min. -20°C ~ max. 70°C
Display Format	:	20 characters × 2 lines
Display Fonts	:	5 × 8 dots (1 character)
Viewing Area	:	83.0 (W) × 18.6 (H) mm
Outline Dimensions	:	116.0* (W) × 37.0 (H) × (11.0) (D) mm
Weight	:	45g max.
LCD Type	:	FRD-7057 (TN / Clear-mode / Reflective)
Viewing Angle	:	6:00
Backlight	:	None LED
Drawings	:	Dimensional Outline UE-30779A



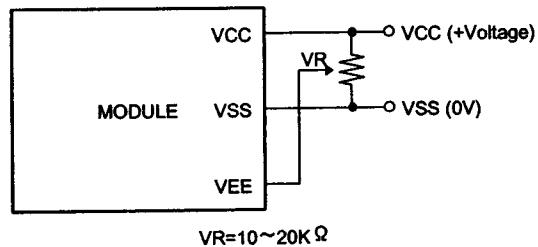
4. I/O Terminal

4.1. Pin Assignment

No.	Symbol	Level	Function
1	V _{SS}	—	Power Supply (0V, GND)
2	V _{CC}	—	Power Supply for Logic
3	V _{EE}	—	Power Supply for LCD Drive
4	RS	H / L	Register Select Signal
5	R/W	H / L	Read/Write Select Signal H : Read L : Write
6	E	H / L	Enable Signal (No pull-up Resister)
7	DB0	H / L	Data Bus Line / Non-connection at 4-bit operation
8	DB1	H / L	Data Bus Line / Non-connection at 4-bit operation
9	DB2	H / L	Data Bus Line / Non-connection at 4-bit operation
10	DB3	H / L	Data Bus Line / Non-connection at 4-bit operation
11	DB4	H / L	Data Bus Line
12	DB5	H / L	Data Bus Line
13	DB6	H / L	Data Bus Line
14	DB7	H / L	Data Bus Line

4.2. Example of Power Supply

It is recommended to apply a potentiometer for the contrast adjust due to the tolerance of the driving voltage and its temperature dependence.



2. Electrical Specifications

2.1. Absolute Maximum Ratings

V_{SS}=0V

Parameter	Symbol	Conditions	Min.	Max.	Units
Supply Voltage (Logic)	V _{CC} -V _{SS}	—	-0.3	7.0	V
Supply Voltage (LCD Drive)	V _{CC} -V _{EE}	—	0	13.0	V
Input Voltage	V _I	—	-0.3	V _{CC} +0.3	V

2.2. DC Characteristics

T_a=25°C, V_{SS}=0V

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Supply Voltage (Logic)	V _{CC} -V _{SS}	—	4.5	—	5.5	V
Supply Voltage (LCD Drive)	V _{CC} -V _{EE}	Shown in 3.1				V
High Level Input Voltage	V _{IH}	V _{CC} =5.0V±10%	2.2	—	V _{CC}	V
Low Level Input Voltage	V _{IL}	V _{CC} =5.0V±10%	-0.3	—	0.6	V
High Level Output Voltage	V _{OH}	I _{OH} =-0.205mA	2.4	—	—	V
Low Level Output Voltage	V _{OL}	I _{OL} =1.2mA	—	—	0.4	V
Supply Current	I _{CC}	V _{CC} -V _{SS} =5.0V	—	2.0	5.0	mA



2.3.AC Characteristics

V_{CC}=5.0V ± 10%

Parameter	Symbol	Conditions	Min.	Max.	Units
Enable Cycle Time	t _{CYC}	Fig.1, 2	500	—	ns
Enable Pulse Width	P _{WEH}	Fig.1, 2	230	—	ns
Enable Rise/Fall Time	t _{ER} , t _{EF}	Fig.1, 2	—	20	ns
Address Setup Time	t _{AS}	Fig.1, 2	40	—	ns
Address Hold Time	t _{AH}	Fig.1, 2	10	—	ns
Write Data Setup Time	t _{DSW}	Fig.1	80	—	ns
Write Data Hold Time	t _{DHW}	Fig.1	10	—	ns
Read Data Delay Time	t _{DDR}	Fig.2	—	160	ns
Read Data Hold Time	t _{DHR}	Fig.2	5	—	ns

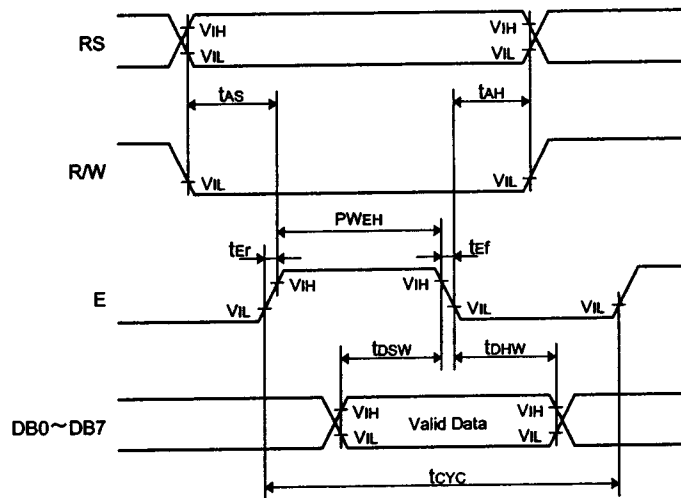


Fig.1 Write Operation Timing

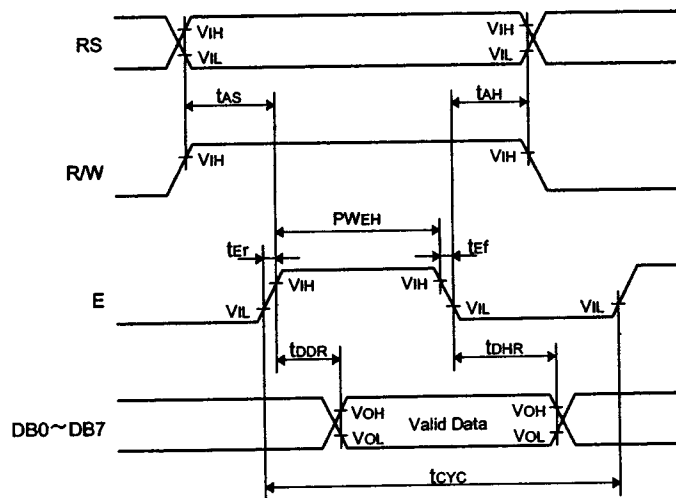


Fig.2 Read Operation Timing

3. Optical Specifications

3.1. LCD Driving Voltage

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Recommended LCD Driving Voltage Note 1	V _{CC-V_{EE}}	T _a = 0°C	—	—	5.0	V
		T _a =25°C	4.0	4.3	4.6	V
		T _a =50°C	3.6	—	—	V

Note 1 : Voltage (Applied actual waveform to LCD Module) for the best contrast. The range of minimum and maximum shows tolerance of the operating voltage. The specified contrast ratio and response time are not guaranteed over the entire range.

3.2. Optical Characteristics

T_a=25°C, 1/16 Duty, 1/5 Bias, V_D=4.3V (Note 4), θ=10°, φ=270°

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Contrast Ratio Note 1	CR	θ=20°, φ=270°	—	3.5	—	
Viewing Angle		Shown in 3.3				
Response Time	Rise Note 2	T _{ON}	—	180	270	ms
	Decay Note 3	T _{OFF}	—	130	200	ms

Note 1 : Contrast ratio is defined as follows.

$$CR = L_{OFF} / L_{ON} \quad CR = L_{ON} / L_{OFF}$$

L_{ON} : Luminance of the ON segments

L_{OFF} : Luminance of the OFF segments

Note 2 : The time that the luminance level reaches 90% of the saturation level from 0% when ON signal is applied.

Note 3 : The time that the luminance level reaches 10% of the saturation level from 100% when OFF signal is applied.

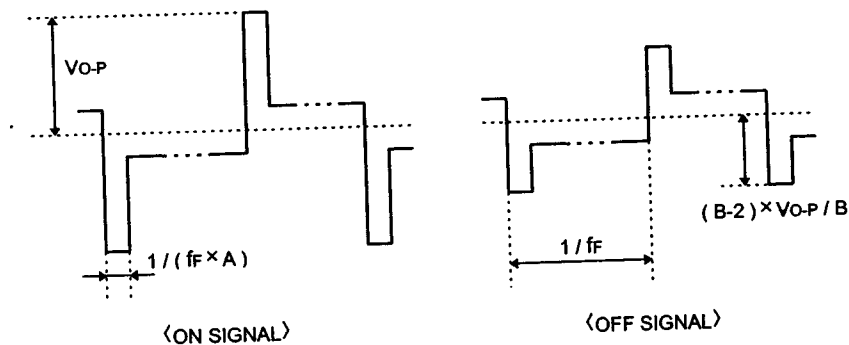
Note 4 : Definition of Driving Voltage V_D

Assuming that the typical driving waveforms shown below are applied to the LCD Panel at 1/A Duty - 1/B Bias (A : Duty Number, B : Bias Number). Driving voltage V_D is defined as follows.

$$V_D = (V_{th1} + V_{th2}) / 2$$

V_{th1} : The voltage V_{O-P} that should provide 50% of the saturation level in the luminance measured at θ = 10°, φ = ° on the segment which the ON signal is applied to.

V_{th2} : The voltage V_{O-P} that should provide 26% of the saturation level in the luminance measured at θ = 40°, φ = ° on the segment which the OFF signal is applied to.



LED

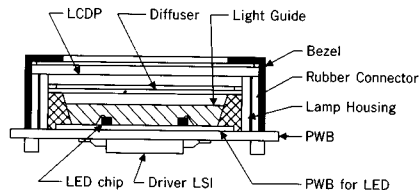
Long life, low power consumption and simple power supply. Three different colors of red, green and orange are available, or color can be changed alternatively. 2 back light methods are available, beneath illumination and side illumination.

Features

- Low voltage driving(DC) is available without inverter.
- Long life time 100,000 hours (average)
- No noise occurrence.

■ Beneath Illumination

Less quantity of chip offers even illumination.



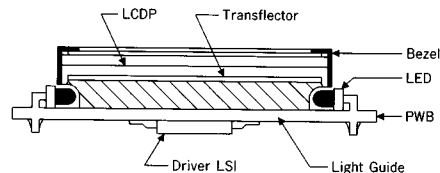
- Various color of red, green and orange etc.

(multi-color by alternative switch is also available)

- Operating characteristics of DMC16202-LY is 3.9V, 70 mA, 50cd/m²

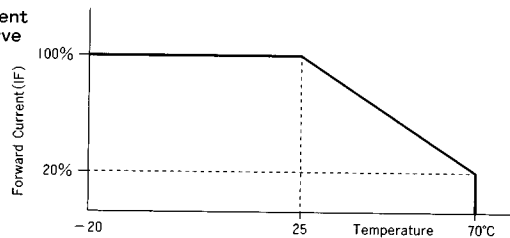
■ Side Illumination

Combination LED with light guide offers thin structure type of illumination.



Electrical Characteristics (Reference Data)

- Forward Current Derating Curve



- Wave Length vs Relative Light Intensity

