LCD PANEL

Types of Fisplay

Positive Type

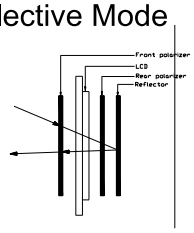
*It is necessary to use Type under ambient light conditions

Negative Type

*Negative type is most applicable for back-lighting system and is capable of muliti-color displaying.

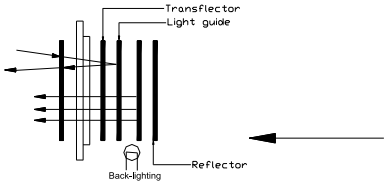
Lighting Methods

(1)Reflective Mode



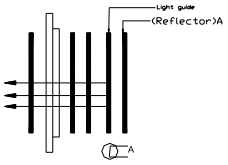
*It is necessary to use type under ambient light condition.

(2)Transflective Mode



*Ambient light is taken from the outside during day or in the dark and a back light is used in the dark.

(3)Transmissive Mode



Back-lighting only. In case of B,no reflector is used.
*A back light is always used

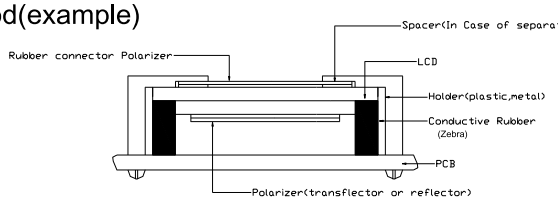
Connector and LCD Mounting Method

To connect LCD to the drive circuit, following connectors are available.

Rubber Connector

LCD Mounting Method(example)

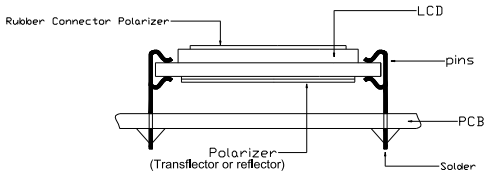
Structure:
Alternalte lamination of conductive rubber and insulting rubber:
Connecting Method:
Mechanical compression.
Pitch(mm)
Min 0.4



Easy to assemble
Adopted for many year.
Applicable even to narrow pads.
Printed circuit boards need gold plating or graphite coating.

Pin connector

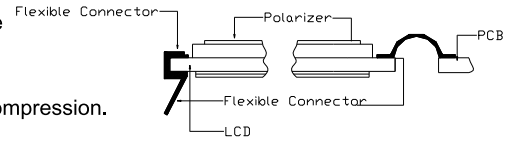
LCD Mounting Method(example)
Structure:
pads.
Metal pins fit onto the panel terminal
Connecting Method:
Soldering.
Pitch(mm):
1.8,2.0,2.54



Suitable for small production runs.

Flexible Connector

LCD Mounting Method(example)
Structure:
Film with electroconductive thin film or printed
Connecting Method:
Heat and pressure fiting,
Soldering or mechanical compression.
Pitch(mm):
Anisotropic Type: Min 1.25



*Resin on connecting point.

A thin structure can be achieved.
Possible to bend.
Free trimming possible.

LCD PANEL

LCD GROUP

Characteristics

Items				Unit	Fluid type / Reliability grade	Static C	Static HR	1/2 Multiplex C	1/2 Multiplex HR	1/3 Multiplex C	1/3 Multiplex HR	1/4 Multiplex C	1/4 Multiplex HR	1/8 Multiplex C	1/16 Multiplex C
Absolute maximum ratings	Applied Voltage,AC			V		15		15		15		15		15	
	Applied Voltage,DC			V		3.0		3.0		3.0		3.0		3.0	
	Operating Temperature Range			C		0~40	-30~80	0~40	-30~80	0~40	-30~80	0~40	-30~80	0~50	
	Storage Temperature Range			V		-25~70	-40-85	-25~70	-40~85	-20~70	-40~85	-20~70	-40~85	-20~70	
Typical operating characteristics	Operating Voltage			V		3.0	5.0	3.0	5.0	3.0	5.0	3.0	5.0	5.0	
	Response time	tr	25 ℃	ms		30	80	60	50	100	70	100	70	100	200
			0 ℃			100	150	350	150	600	150	600	150	500	600
			-30 ℃				1500		2000		2500		2500		
		tf	25 ℃			100	50	100	30	100	30	100	30	150	150
			0℃			300	150	300	100	250	100	250	100	400	500
			-30 ℃				2000		1200		1000		1000		
Expcted life under normal use				hour		50,000	100,000	50,000	100,000	50,000	100,000	50,000	100,000	_____	

Note: C: Consumer,HR: High Reliability

Reliability Grade

Fluid type Reliability grade	Static	1/2 Multiplex	1/3 Multiplex	1/4 Multiplex	1/8 Multiplex	1/16 Multiplex
Commercial grade	●	●	●	●	●	●
High reliability	●	●	●	●	●	●

Note : Available

Environmaental Characteristics (without polarizers)

Items	Conditions
Storage at high temperature	(A) Storage 250 Hrs 95°C surrounding temp. (Power off) (B) Storage 500 Hrs 95°C surrounding temo. (power off)
storage at low temperature	(A) Storage 250Hrs at -25°C surrounding temp. (Power off) (B) Storage 500Hrs at -40°C surrounding temp. (Power off)
Damp Heat	(A) Storage 250Hrs at 80°C and 90% RH surrounding condition (B)Storage 500 Hrs at 80°C and 90°C Surrounding condition
Thermal Shock	(A) (-40 C 30 minutes→ 25° C 5 minutes→85 C 30 minutes→ 5 C° 5 minutes) 20 cycles (B)(-40 C 30 minutes→25° C 5 minutes→85 C° 30 minutes→25 C° 5 minutes) 200 cycles
Operation at high temperature	(A) Operating 250 Hrs at 60 C surrounding temp. (3Vop,32Hz) (B) Operating 500 Hrs at 80 C surrounding temp, (5Vop, 32Hz)
Operation at Damp Heat	(A) Operating 259 Hrs at 40 C and 90 RH Surrounding Condition (3Vop, 32Hz) (B) Operating 500 Hrs 60 C and 90 RH Surrounding Condition (%Vop, 64Hz)

DC TEST→* Operating 72 Hrs at 45 °C Surrounding Condition.(12VDC)
U.V TEST→*Operating 300 Hrs at 63 °C Surrounding Condition temp.

Note:(A):Consumer (B):High Reliability