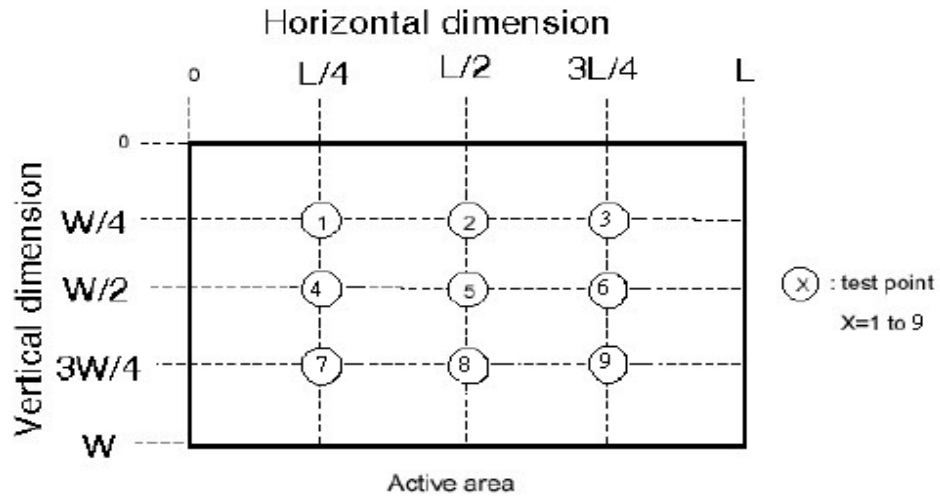


Note (4) Measurement of the following 9 points on the display.



Note (5) The Brightness should be the average Brightness of point ① ~ ⑨.

Note (6) Definition of the luminance uniformity .

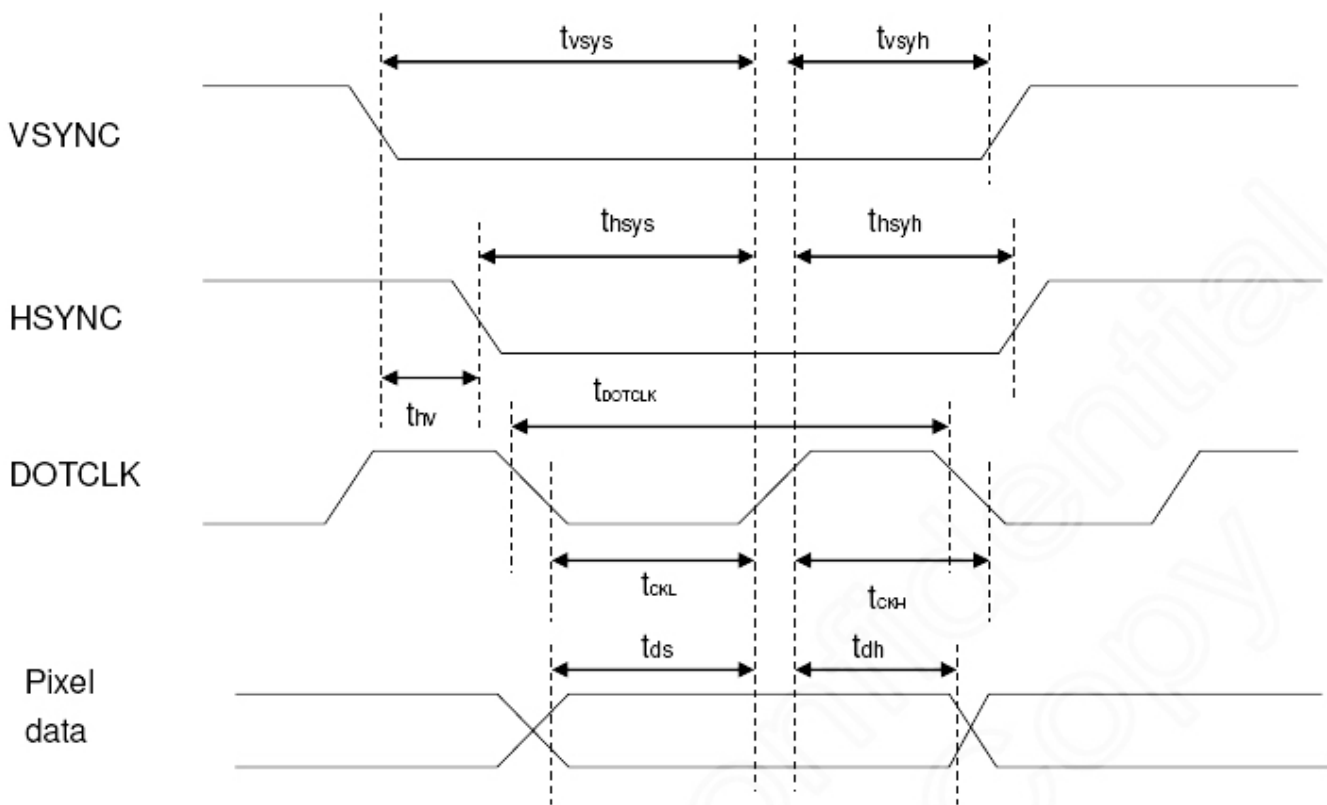
$$\left[1 - \frac{\text{MAX Luminance} - \text{Average Luminance}}{\text{Average Luminance}} \right] \times 100\% > 80\%$$

10. AC CHARACTERISTICS

10.1 Timing Requirement

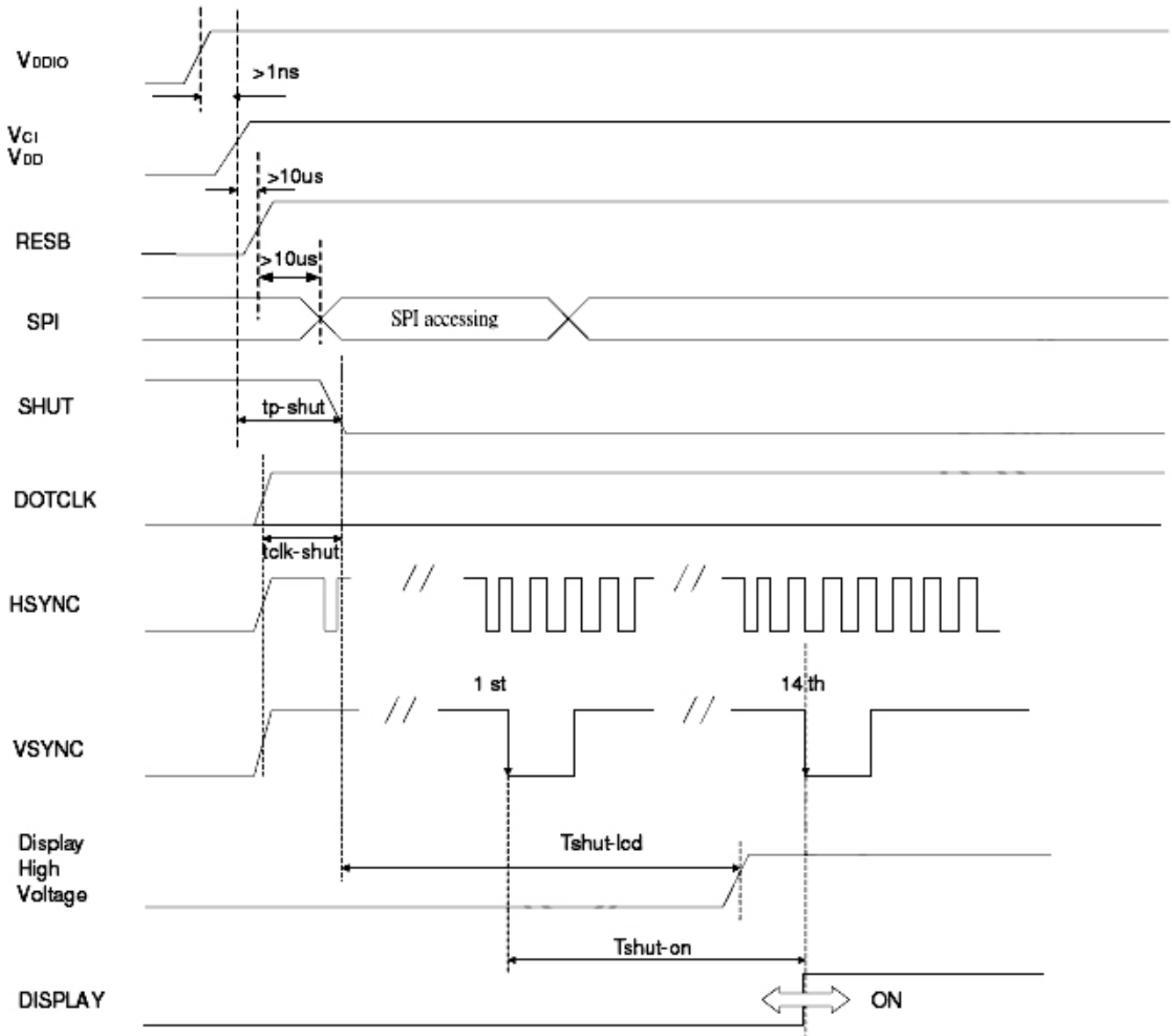
(VCC=2.5V to 3.6V)

Parameter	Symbol	Min	Typ	Max	Unit	Remark
DOTCLK Frequency	fDOTCLK	-	6.5	10	MHz	
DOTCLK Period	tDOTCLK	100	154	-	ns	
Vertical Sync Setup Time	tvsys	20	-	-	ns	
Vertical Sync Hold Time	tvsyh	20	-	-	ns	
Horizontal Sync Setup Time	thsys	20	-	-	ns	
Horizontal Sync Hold Time	thsyh	20	-	-	ns	
Phase difference of Sync Signal Falling Edge	thv	1	-	240	tDOTCLK	
DOTCLK Low Period	tCKL	50	-	-	ns	
DOTCLK High Period	tCKH	50	-	-	ns	
Data Setup Time	tds	12	-	-	ns	
Data Hold Time	tdh	12	-	-	ns	
Reset Pulse Width	tRES	10	-	-	us	



Pixel Timing

10.2 Power Sequence



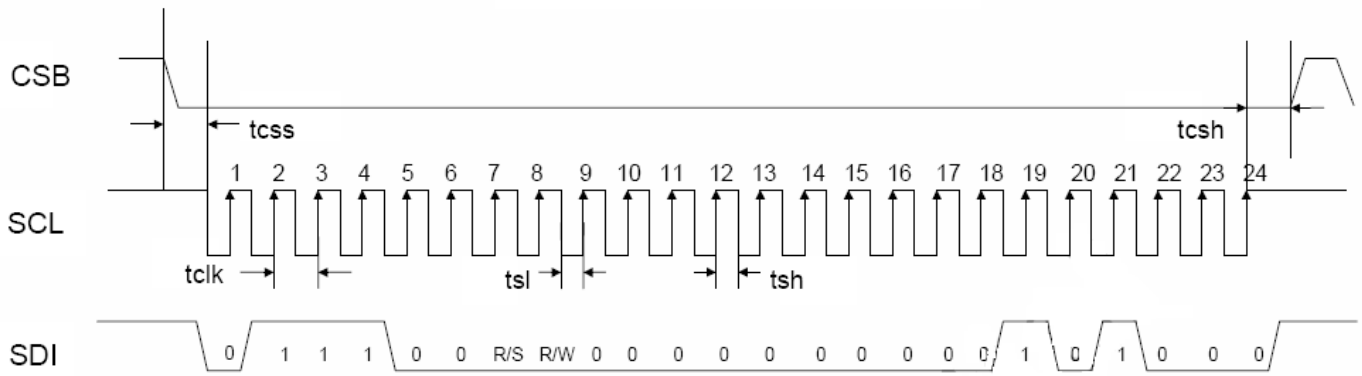
VDDIO=VCI=VDD=VCC

SHUT must connect to GND for normal operating mode

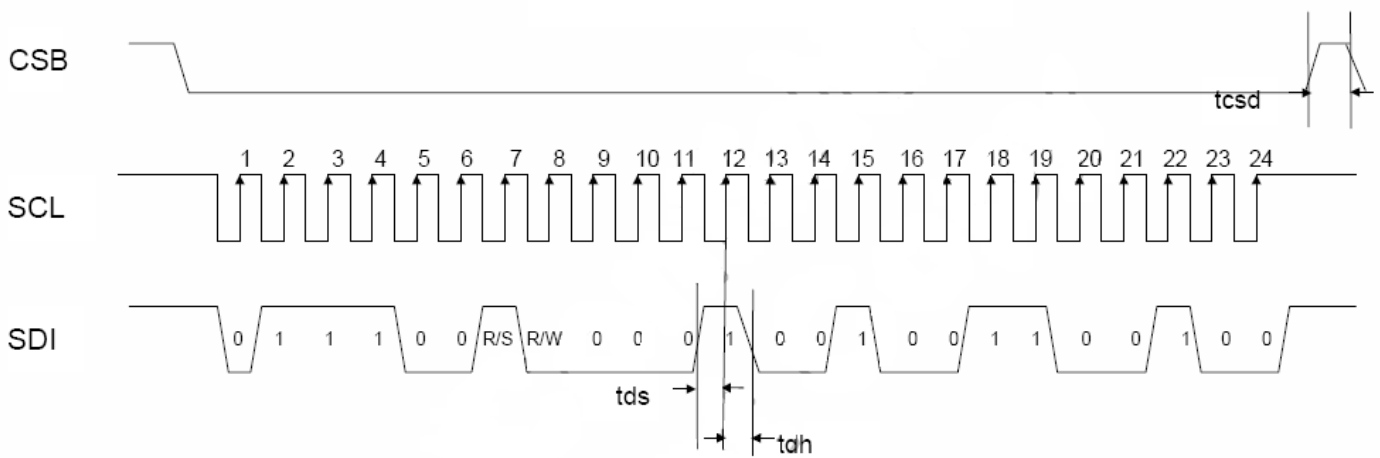
Characteristics	Symbol	Min	Typ	Max	Units
VDDD / VDDIO on to falling edge of SHUT	$t_{p\text{-shut}}$	1	-	-	us
DOTCLK	$t_{\text{clk-shut}}$	1	-	-	clk
Falling edge of SHUT to LCD power on	$t_{\text{shut-lcd}}$	-	-	128	ms
Falling edge of SHUT to display start	$t_{\text{shut-on}}$	-	-	14	frame
- 1 line: 408 clk		-	166	232.4	ms
- 1 frame: 262 line -DOTCLK = 6.5MHz		-	-	-	-

10.3 SPI interface timing diagram & transaction example

First Transmission (Register)



Second Transmission (Data)



Characteristics	Symbol	Min.	Typ.	Max.	Unit
Serial Clock Frequency	fclk	-	-	20	MHz
Serial Clock Cycle Time	tclk	50	-	-	ns
Clock Low Width	tsl	25	-	-	ns
Clock High Width	tsh	25	-	-	ns
Clock Rising Time	trs	-	-	30	ns
Clock Falling Time	tfl	-	-	30	ns
Chip Select Setup Time	tcss	0	-	-	ns
Chip Select Hold Time	tcsh	10	-	-	ns
Chip Select High Delay Time	tcsh	20	-	-	ns
Data Setup Time	tds	5	-	-	ns
Data Hold Time	tdh	10	-	-	ns

11. RELIABILITY TEST

Environmental Test				
NO.	ITEM	CONDITIONS	TIME PERIOD	REMARK
1	High Temperature Storage	80°C	240HRS	
2	Low Temperature Storage	-30°C	240HRS	
3	High Temperature Humidity Operation	60°C/90%RH	240HRS	
4	High Temperature Operation	70°C	240HRS	
5	Low Temperature Operation	-20°C	240HRS	
6	Temperature Cycle	-30°C ← 25°C → 80°C (30min) (5min) (30min)	100CYCLE	

※(Supply voltage for logic system = 3.3V. Supply voltage for LCD system = Operating voltage at 25°C)

12. LCM INSPECTION

12.1 Description

This document shall be applied to TFT-LCD Module for OT035AQDDDN-00 .

12.2 Inspection and Environment Conditions Description

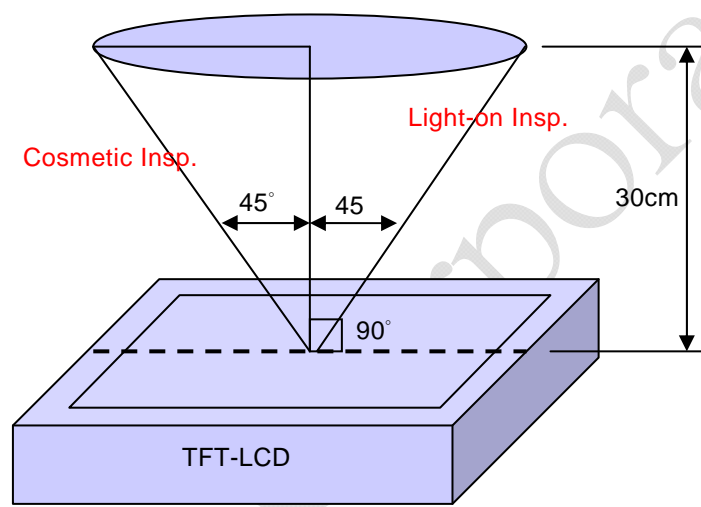
12.2.1 Inspection Conditions:

(1) Inspection Distance: 30cm~35cm

(2) View Angle:

Light-on Inspection Angle : 45°

Cosmetic Inspection Angle : 45°



(perpendicular to LCD panel surface)

12.2.2 Environment Conditions:

Ambient Temperature		23±5°C
Ambient Humidity		50±20%RH
Ambient Illumination	Cosmetic Inspection	300~500Lux
	Functional Inspection	300~500Lux

12.2.3 Sampling Conditions:

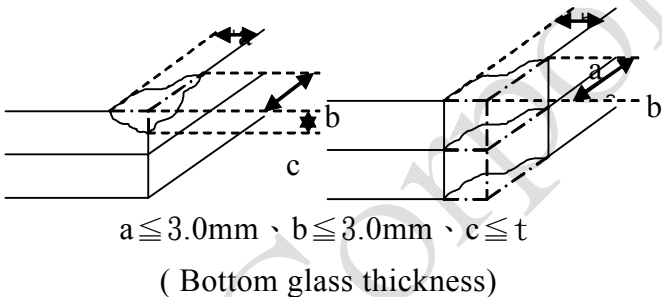
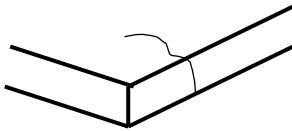
- (1) Lot Size: Quantity of shipment lot per model
- (2) Sampling Method:

Sampling Plan		MIL-STD-105E
		Normal Inspection, Single Sampling
		Level II
AQL	Major Defect	0.65%
	Minor Defect	1.5%

- (3) The classification of Major(MA) and Minor(MI) defects is shown as 12.3 Inspection Criteria.

12.3 Inspection Criteria

12.3.1 Cosmetic Inspection(Panel):

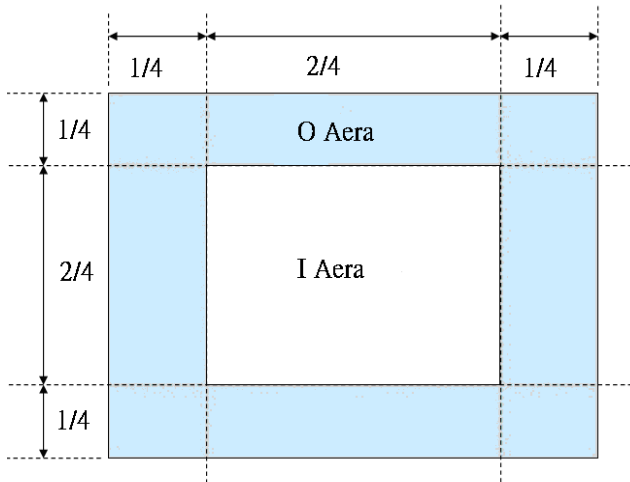
Item	Judgment Criteria	Classification
Chipping on Panel/Touch Panel	 <p>$a \leq 3.0\text{mm}$、$b \leq 3.0\text{mm}$、$c \leq t$ (Bottom glass thickness)</p>	MA
Scratch on Panel/Touch Panel *Note-2	$W \leq 0.05\text{mm}$ and $L \leq 8\text{mm}$: Ignored $0.05\text{mm} < W \leq 0.1\text{mm}$ and $L \leq 8\text{mm}$: $N \leq 3$ $W > 0.1\text{mm}$ or $L > 8\text{mm}$, Not allowed	MI
Bubble or Dent on Panel/Touch Panel *Note-3	$D \leq 0.2\text{mm}$: Ignored $0.2\text{mm} < D \leq 0.6\text{mm}$: $N \leq 4$ $D > 0.3\text{mm}$: Not allowed	MI
Panel/Touch Panel Crack	 <p>Not Allowed crack</p>	MA
Bezel Deformation	Obvious deformation is not allowed	MI
Bezel Oxidation	Not allowed if it rusts continuously over 1 cm (It is out of warranty with rusted tin plate)	MI

Bezel Scratch	$L \leq 20\text{mm}$, $W \leq 0.3 \text{ mm}$, $N \leq 7$	MI
Metal Squash Dent /Flange(Front Side)	$D(W) \leq 1 \text{ mm}$, $L \leq 3$, $N \leq 4$;	MI
B/L High Voltage Wire Denudation	Not allowed	MA
Polarizer flaw or leak out resin	Defect is defined as the active area.	MI
Outline Dimension	Must in Spec, refer to related product spec.	MI

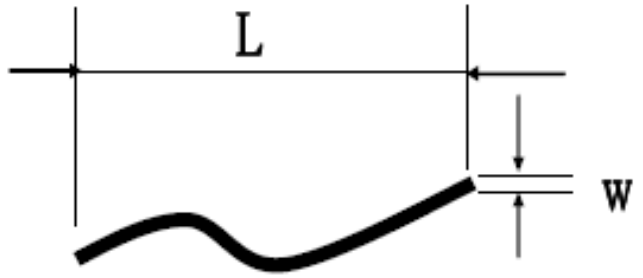
12.3.2 Functional Inspection:

Item	Judgment Criteria		Classification	
Point Defect	Bright dot	Random	2	MI
		2 dots adjacent	1	
		3 dots adjacent or more	0	
	Dark dot	Random	3	
		2 dots adjacent	2	
		3 dots adjacent or more	0	
Total Dot Defect		4		
Line Defect	Obvious vertical or horizontal line defect is not allowed.		MA	
Mura	Not allowed if it can be observed through ND Filter 6 %		MI	
Foreign Material in spot shape *Note-3	$D \leq 0.2\text{mm}$: Ignored $0.2\text{mm} < D \leq 0.3\text{mm}$: $N \leq 4$, $0.3\text{mm} < D \leq 0.5\text{mm}$: $N \leq 3$ $D > 0.5\text{mm}$: Not allowed		MI	
Foreign Material in line or spiral shape *Note-4	$W \leq 0.03\text{mm}$ or $L \leq 3\text{mm}$: Ignored $0.03\text{mm} < W \leq 0.05\text{mm}$ and $L \leq 3\text{mm}$: $N \leq 4$ $0.05\text{mm} < W \leq 0.1\text{mm}$ and $L \leq 2\text{mm}$: $N \leq 2$ $W > 0.1\text{mm}$ Not allowed		MI	
Display Function Abnormal	No Malfunction can be allowed		MA	

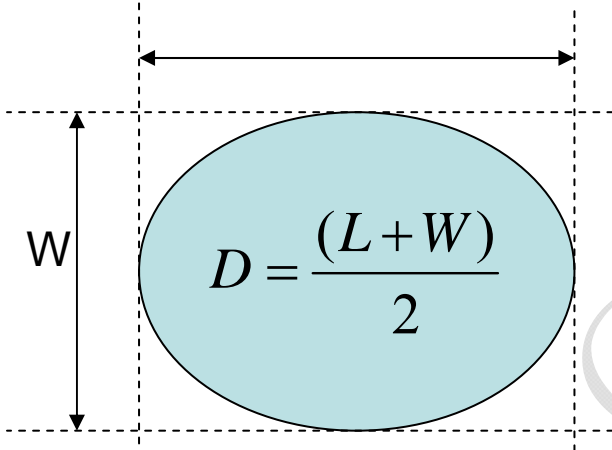
Note-1 : I/O Area Definition



Note-2 : Polarizer Scratch



Note-3 : Spot Foreign Material
($W \geq L / 4$)



Note-4 : Line or Spiral Foreign Material
($W < L / 4$)

