4DLCD-32
3.2” TFT LCD Display Datasheet

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1 FEATURES

- 240 x RGB x 320 Dots TFT Transmissive Dot Matrix LCD Module
- Driving duty: 1/320 Duty
- 3.2” QVGA
- Viewing Angle: 6 O’clock
- HX8347A LCD Driver or equivalent
- Logic voltage: 2.8V
- Data interface: 80 system 16bit bus interface
- White backlight

2 SPECIFICATIONS

2.1 General Specifications

Item		Description	Unit
Display Size (Diagonal)		3.2”	Inch
Display Type		TransMissive	-
Image Mode		Normally Black	-
Active Area (HxV)		48.60(W) x 64.80(H)	mm
Number of Dots (HxV)		240 x RGB x 320	dot
Dot Pitch (HxV)		0.0675(W) x 0.2025(H)	mm
Color Arrangement		CPU vertical stripe	-
Color Numbers		262K	-
Surface treatment		Normal	-
Glass thickness		0.5	mm
Outline Dimension (HxVxT)		55.94(W) x77.60(H) x 3.70(D)	mm
Weight		TBD	g
Operation Temperature		-20~60	℃
Storage Temperature		-30~70	℃
Power Consumption	LCD Panel + T-CON L/S	TBD	mW
	Backlight	(typ.384, IF = 20mA)	

2.2 Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit	note
Supply voltage	VCC	-0.3	3.6	V	-
Backlight Current	I_B	-	20	mA	Each LED

2.3 Electrical Characteristics

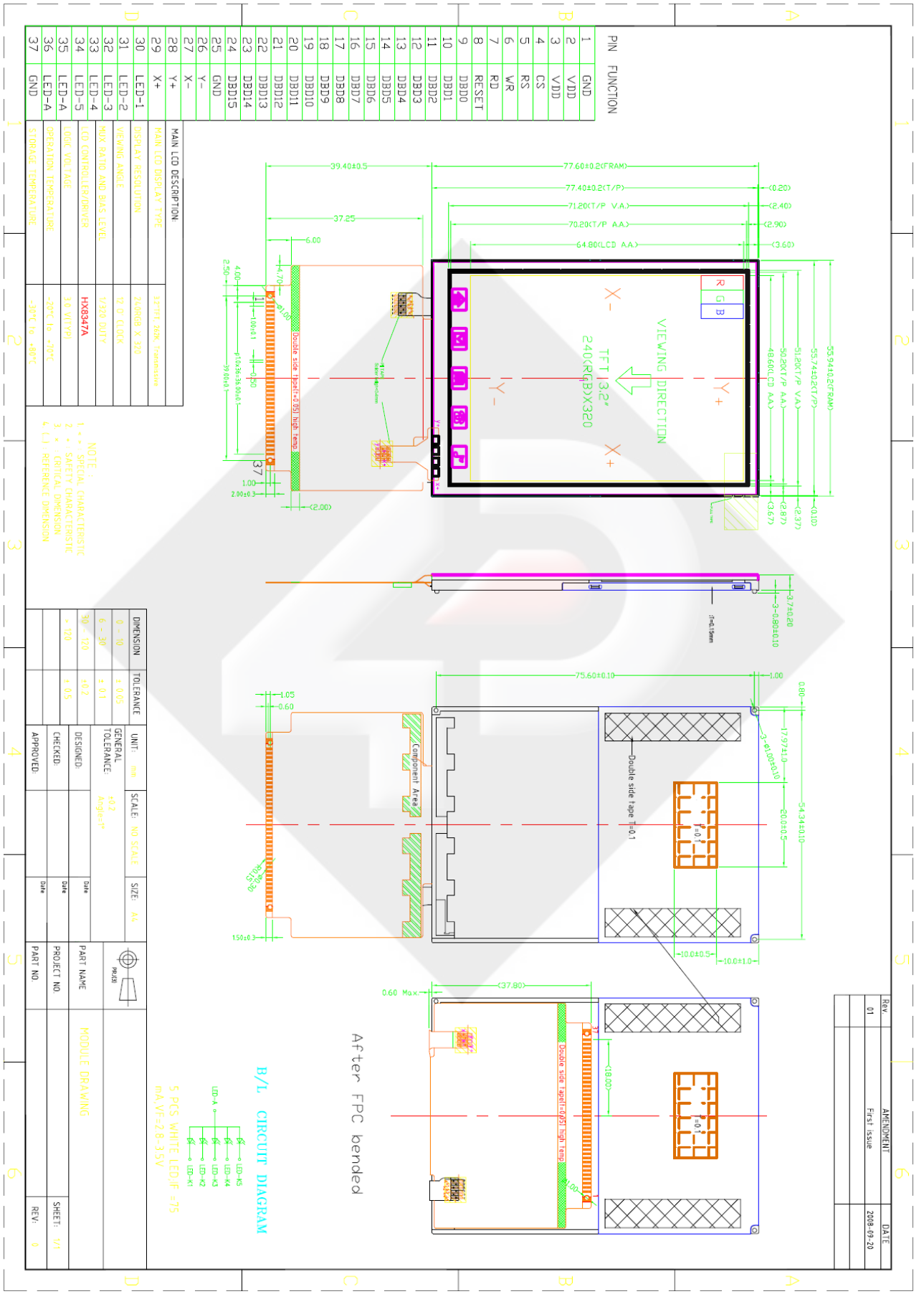
Parameter	Symbol	Min	Typ	Max	Unit	note
Supply voltage	VCC	2.7	2.8	3.3	V	-
Backlight Current	I_B	-	15		mA	For each LED

Ta=25 +-20C

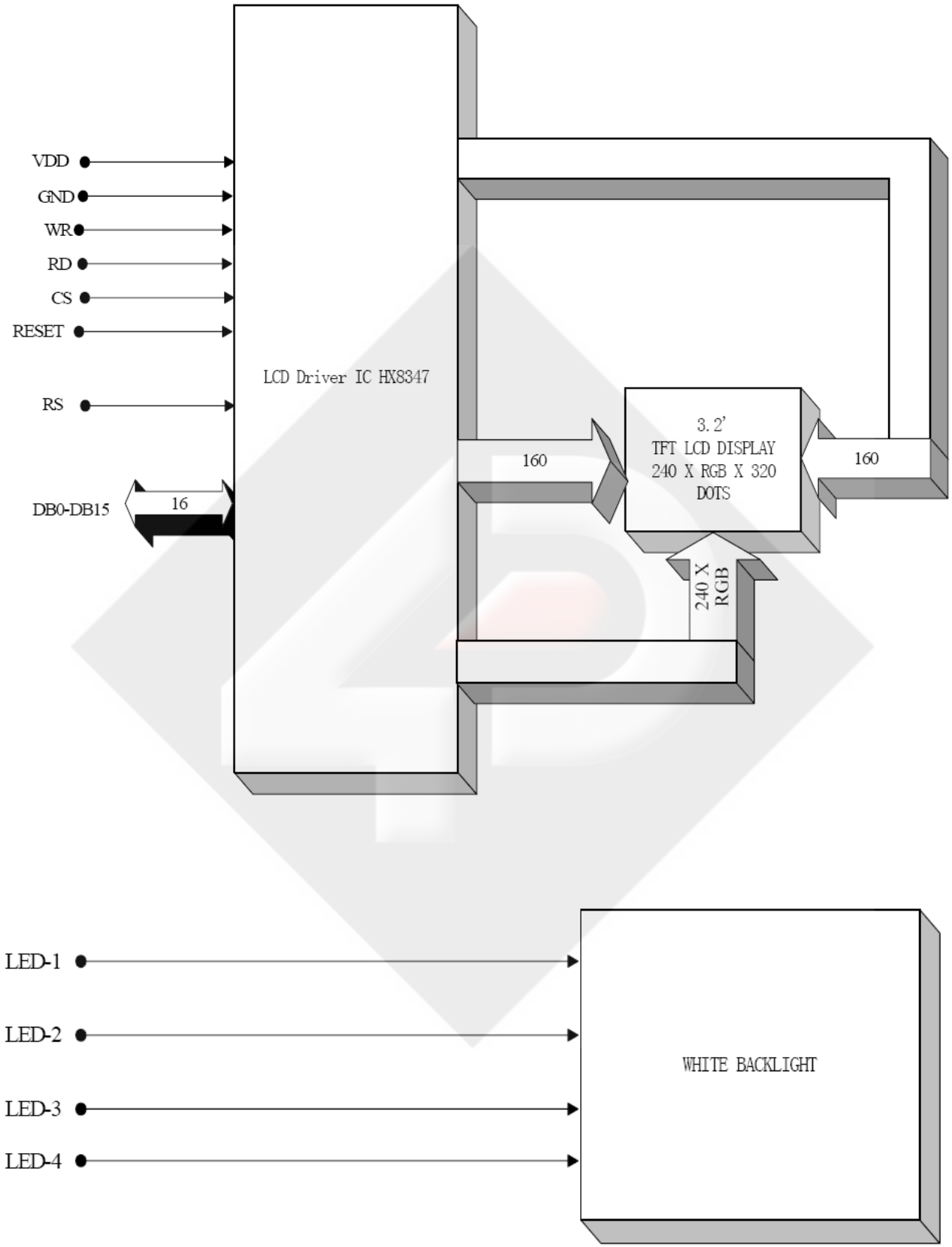
2.4 Environmental Conditions

Item	(T_{opr})		(T_{stg})		Remark
	Min	Max	Min	Max	
Ambient Temperature	-20°C	+60°C	-30°C	+70°C	
Humidity	90% max RH for Ta=25°C				No condensation
Vibration (IEC 68-2-6) cells must be mounted on a suitable connector	Frequency: 10 ~ 55 Hz Amplitude: 0.75 mm Duration: 20 cycles in each direction。				3 directions
Shock (IEC 68-2-27) Half-sine pulse shape	Pulse duration: 11 ms Peak acceleration: 981 m/s2 = 100g Number of shocks: 3 shocks in 3 mutually perpendicular axes。				3 directions

3 DIMENSIONAL DRAWING



4 BLOCK DIAGRAM



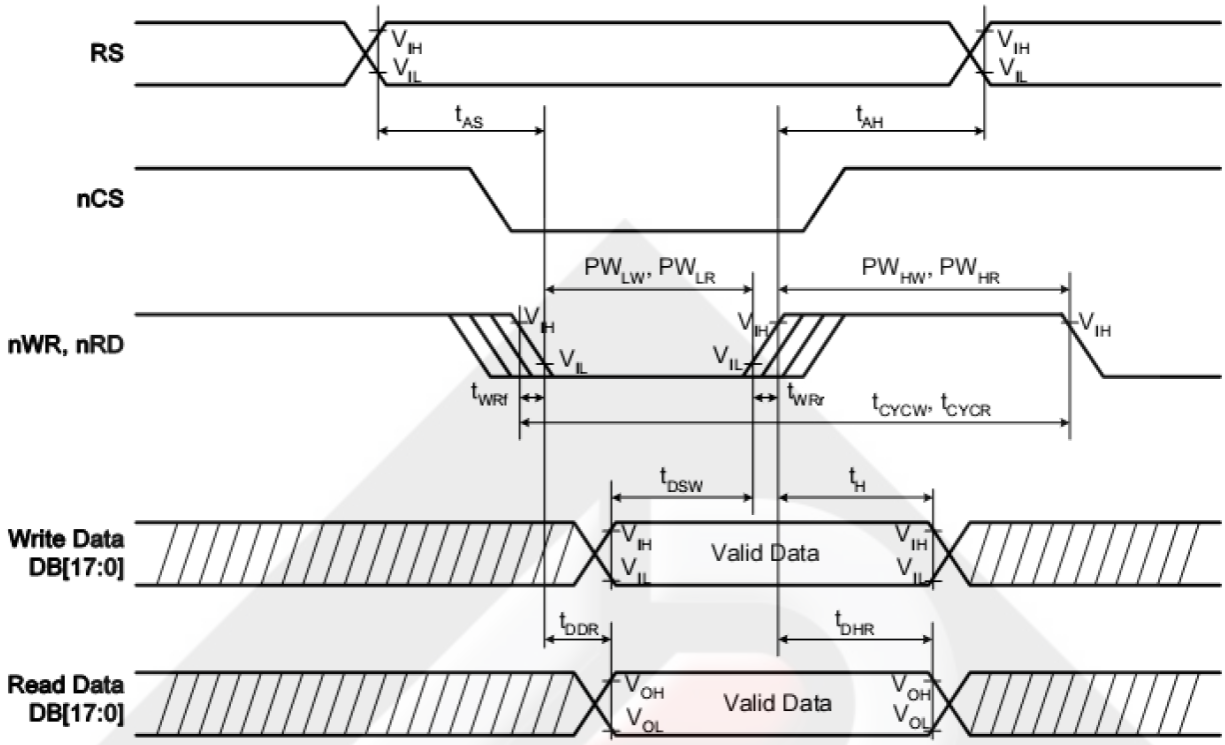
5 INTERFACE SIGNALS

Pin No.	Symbol	Description
1	GND	Ground
2	VDD	Power supply
3	VDD	Power supply
4	CS	A chip select signal
5	RS	A register select signal
6	WR	A write strobe signal
7	RD	A read strobe signal
8	RESET	System Reset
9	DB0	Data bus
10	DB1	Data bus
11	DB2	Data bus
12	DB3	Data bus
13	DB4	Data bus
14	DB5	Data bus
15	DB6	Data bus
16	DB7	Data bus
17	DB8	Data bus
18	DB9	Data bus
19	DB10	Data bus
20	DB11	Data bus
21	DB12	Data bus
22	DB13	Data bus
23	DB14	Data bus
24	DB15	Data bus
25	GND	Ground
26	Y-	Touch Panel control pin
27	X-	Touch Panel control pin
28	Y+	Touch Panel control pin
29	X+	Touch Panel control pin
30	LED-1	B/L power pin -
31	LED-2	B/L power pin -
32	LED-3	B/L power pin -
33	LED-4	B/L power pin -
34	LED-5	B/L power pin -
35	LED-A	B/L power pin +
36	LED-A	B/L power pin +
37	GND	Ground

6 TIMING CHARACTERISTICS

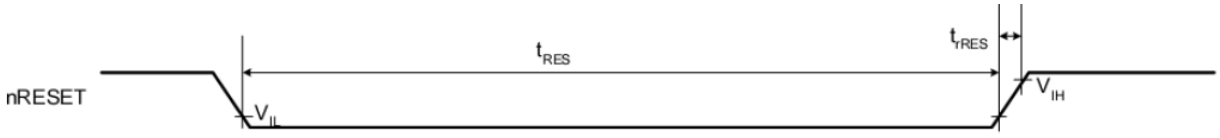
6.1 Timing Diagram

80-system bus interface operation



Items		Symbol	Unit	Min	Typ	Max	Conditions
Bus Cycle time	Write	t_{CYCW}	ns	100	-	-	-
	Read	t_{CYCR}	ns	300	-	-	-
Write Low-level pulse width		PW_{LW}	ns	50	-	500	-
Write High-level pulse width		PW_{HW}	ns	50	-	-	-
Read Low-level pulse width		PW_{LR}	ns	150	-	-	-
Read High-level pulse width		PW_{HR}	ns	150	-	-	-
Write/Read rise/fall time		t_{WRr}/t_{WRf}	ns	-	-	25	-
Setup time	Write(RS to nCS, E/nWR)	t_{AS}	ns	10	-	-	-
	Read(RS to nCS, RW/nRD)		ns	5	-	-	-
Address hold time		t_{AH}	ns	5	-	-	-
Write data setup time		t_{DSW}	ns	10	-	-	-
Write data hold time		t_H	ns	15	-	-	-
Read data delay time		t_{DDR}	ns	-	-	100	-
Read data hold time		t_{DHR}	ns	5	-	-	-

6.2 Reset Timing Diagram



Item	Symbol	Unit	Min	Typ	Max
Reset Low-level width	tRES	Ms	1	-	-
Reset rise time	trRES	µs	-	-	10

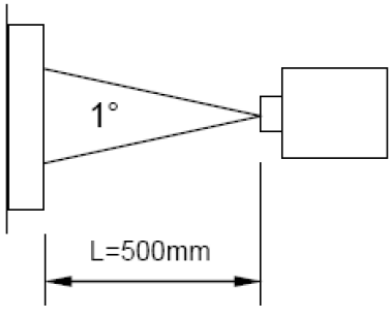
7 ELECTRO-OPTICAL CHARACTERISTICS

The following items are measured under stable conditions。 The optical characteristics should be measured in a dark room or equivalent state with the methods shown in Note (2).

Measuring equipment: LCD-7200, BM-5A, BM-7, PR-650,EZ-Contrast
Operating Conditions: Ta=25 ±2℃, Vcc =2.85V, I_B=15mA

Item		Symbol	Condition	Min	Typ	Max	Unit	Note
Contrast ratio (Center point)		C/R	Note1 B/L On	150	200	250	-	(3)
Luminance of of white (Center point)		TL		180	200	220	Cd/m2	
White uniformity		Uw					%	
Response Time	Rising: Tr	Tr+Tf		12	16		msec	(4)
	Falling Tf							
Color Chromaticity (CIE 1931)	White	Wx					-	(6)
		Wy						
	Red	Rx						
		Ry						
	Green	Gx						
		Gy						
	Blue	Bx						
		By						
Viewing angle	Left	Ø	C/R≥ 5 B/L On	-	45	-	Deg。	(5)
	Right	Ø		-	45	-		
	Up	θ		-	50	-		
	Down	θ		-	20	-		

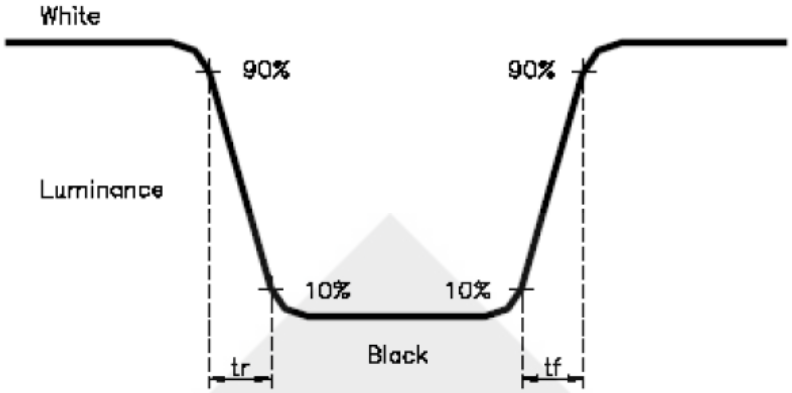
Note1. Ambient condition 25^0 +/- 2^0C, 60+/-10%RH, under 10lux in the darkroom
Note2. Measure Device: BM-5A (TOPCON), viewing cone = 1^0, i_L = 45mA after 10 min operation



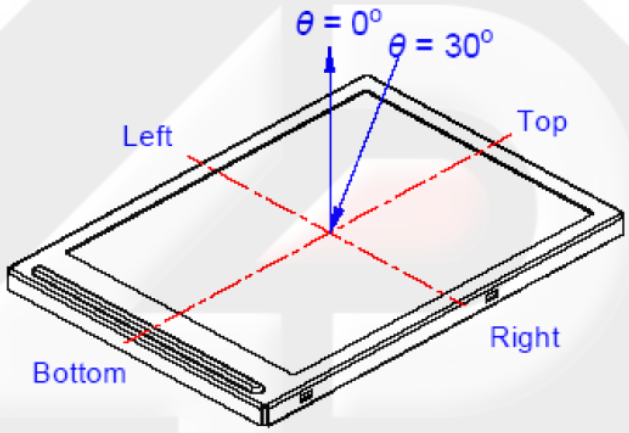
Note3. Definition of Contrast Ratio:

CR = White Luminance (ON)/ Black Luminance (OFF)

Note4. Definition of Response Time: The response time is defined as the interval between the 10% and 90% amplitudes.



Note5. Definition of Viewing Angle



Note6. Light Source: C light.

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