

TFT-Display Datenblatt

Modell OT028AQUDDN-00

Kurzdaten

Hersteller	ONation
Diagonale	2,8" / 7,1 cm
Format	3:4
Auflösung	240 x 320
Backlight	LED / 200 cd/m ²
Interface	RGB
Touchscreen	nein
Temperatur	-20... +70°C (Betrieb)



ONation Corporation

CUSTOMER' S APPROVAL SPECIFICATIONS

MODEL: OT028AQUDDN-00
(Complied with RoHS)

CUSTOMER: _____

Version:P0.1

C O N T E N T S

ISSUE:MAR.21.2011

Spec Condition:preliminary

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CUSTOMER	ONATION		
APPROVAL	APPROVAL	CHECKER	PREPARE
	<i>ch lee</i>	<i>ch lee</i>	<i>lun</i>

3.MECHANICAL SPECIFICATIONS

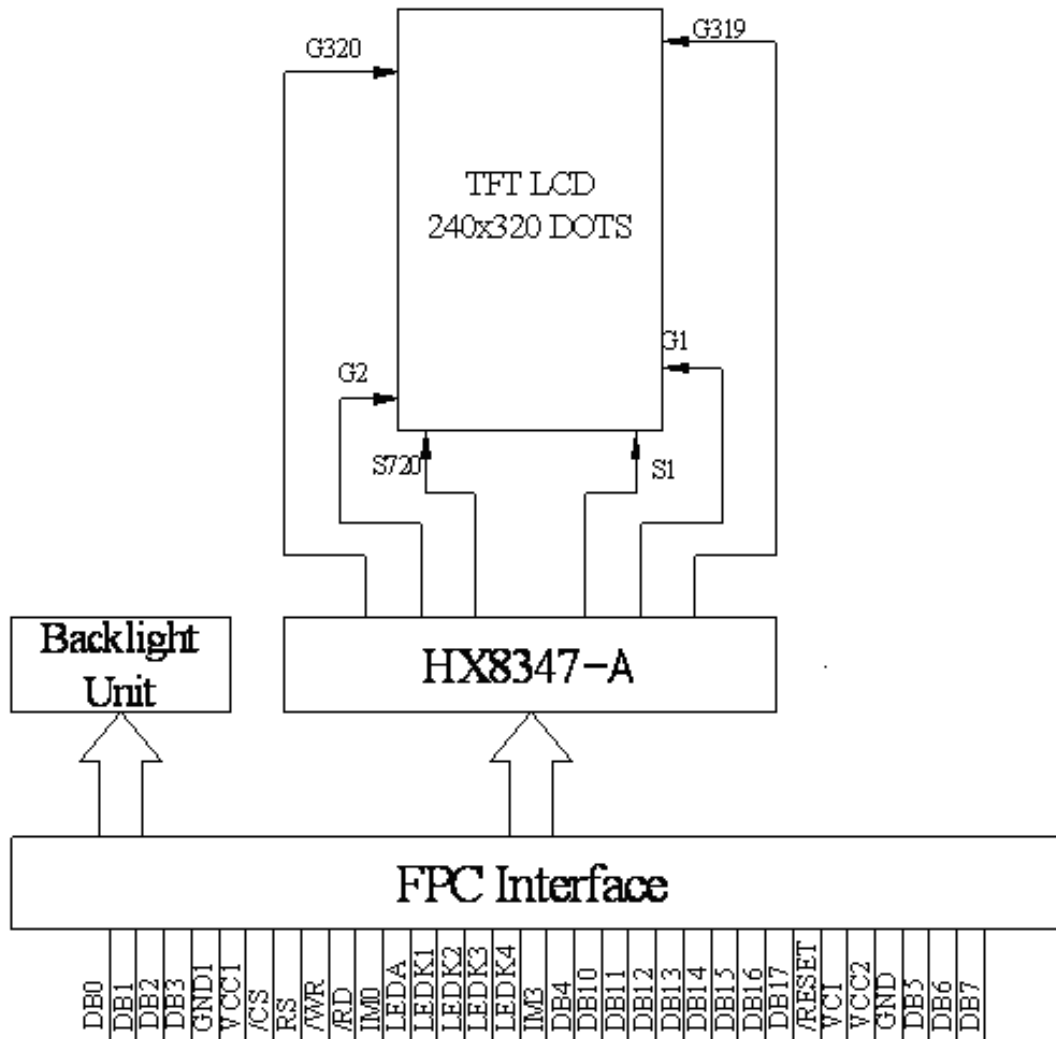
No.	Item	Specification
(1)	Number Of Dots (Dots)	240 X RGB X 320
(2)	Module Size(mm)	50(V) X 69.2(H) X1.85(D)
(3)	Active Area(mm)	43.2(H) X 57.6(V)
(4)	Pixel Pitch(mm)	0.18 (H) X 0.18(V)
(5)	LCD Model	Normally White
(6)	LED Backlight Color	White
(7)	Viewing Direction	12 O'clock
(8)	Color Configuration	R.G.B. Vertical Stripe
(9)	Driving Method	COG TYPE
(10)	Driver IC	HX8347-A
(11)	Module Weight(g)	(13.2)

5. INTERFACE PIN CONNECTION

5.1 LCM PANEL DRIVING SECTION

Pin No	Symbol	Function	Remark
1	DB0	IC data Bit0	
2	DB1	IC data Bit1	
3	DB2	IC data Bit2	
4	DB3	IC data Bit3	
5	GND1	System Ground	
6	VCC1	Power Supply Voltage	
7	/CS	Chip select	
8	RS	Register select	
9	/WR	Write signal	
10	/RD	Read signal	
11	IM0	DUMMY	
12	NC	No connection	
13	NC	No connection	
14	NC	No connection	
15	NC	No connection	
16	LEDA	Backlight unit(+)	
17	LEDK1	Backlight unit(-)	
18	LEDK2	Backlight unit(-)	
19	LEDK3	Backlight unit(-)	
20	LEDK4	Backlight unit(-)	
21	IM3	DUMMY	
22	DB4	IC data Bit4	
23	DB10	IC data Bit8	
24	DB11	IC data Bit9	
25	DB12	IC data Bit10	
26	DB13	IC data Bit11	
27	DB14	IC data Bit12	
28	DB15	IC data Bit13	
29	DB16	IC data Bit14	
30	DB17	IC data Bit15	
31	/RESET	Hardware Reset	
32	VCI	Power Supply Voltage	
33	VCC2	Power Supply Voltage	
34	GND	System Ground	
35	DB5	IC data Bit5	
36	DB6	IC data Bit6	
37	DB7	IC data Bit7	

6. BLOCK DIAGRAM



7. ABSOLUTE MAXIMUM RATINGS

7.1 ELECTRICAL ABSOLUTE MAXIMUM RATING

ITEM	SYMBOL	Values		UNIT	Remark
		MIN.	MAX.		
Power Supply Voltages	VCC	-0.3	+4.6	V	AV _{SS} =0
	VCI	-0.3	+4.6	V	GND=0
Input Signal Voltage	VI	-0.3	VCI+0.3	V	
LED Forward Voltage	VF	3.2		V	
LED Forward Current	IF	18		mA	One LED

7.2 ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS

ITEM	OPERATING		STORAGE		UNIT	Remark
	MIN.	MAX.	MIN.	MAX.		
Ambient Temperature	-20	70	-30	80	[°C]	Note 1,2,3
Humidity		90	-	90	[%RH]	Note 4

Note 1 : The response time will become lower when operated at low temperature.

Note 2 : Background color changes slightly depending on ambient temperature.

Note 3 : Operation Ta=70°C & -20°C ≤ 240Hrs.

Note 4 : Operation Ta=70°C & H=90% ≤ 240Hrs.

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8.ELECTRICAL CHARACTERISTICS

8.1 LCM ELECTRICAL CHARACTERISTICS

Ta=25°C)

Item	Symbol	Values			Unit
		Min.	Typ.	Max.	
Power supply for LCD	VCC	1.4	2.8	3.6	V
	I _{CC} **	-	(4.82)	-	mA
Input high voltage	V _{IH}	0.8*VCC	-	VCC	V
Input low voltage	V _{IL}	-0.3	-	0.2*VCC	V
Output high voltage	V _{OH}	0.8*VCC	-	VCC	V
Output low voltage	V _{OL}	0	-	0.2*VCC	V

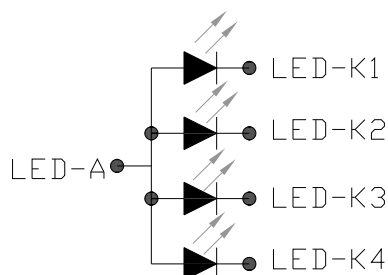
**Test pattern:Black

8.2 BACKLIGHT UNITS

Ta=25°C

Item	Symbol	Values			Unit
		Min	Typ	Max.	
LED Driving Voltage	V _{LED}	-	3.2	-	V
	I _{LED}	-	72	-	mA

Note 1:LED Number



9.OPTICAL CHARACTERISTICS

Ta=25°C

Item	Symbol	Conditions	Specifications				REMARK
			Min.	Typ.	Max.	Unit	
Contrast Ratio	CR	At optimized Viewing angle	200	250	-	-	Note (1)
Response Time (Tr+Tf)		T=0	-	50	-	ms	Note (2)
Brightness		Center	150	200	-	cd/m2	ILED=72mA
Uniformity		ILED=72mA	80	85	-	%	Note (5)
Color Chromaticity	Red	XR	(0.605)	(0.655)	(0.705)	-	Note (4)
		YR	(0.256)	(0.306)	(0.356)		
	Green	XG	(0.323)	(0.373)	(0.423)	-	
		YG	(0.523)	(0.573)	(0.623)		
	Blue	XB	(0.071)	(0.121)	(0.171)	-	
		YB	(0.036)	(0.086)	(0.136)		
	White	XW	(0.26)	(0.31)	(0.36)	-	
		YW	(0.26)	(0.31)	(0.36)		
Viewing Angle		CR ≥ 10	-	35	-	Deg.	Note (3)
			-	15	-		
			-	45	-		
			-	45	-		

*Note (1) Definition of Contrast Ratio (CR):

The contrast ratio can be calculated by the following expression.

$$\text{Contrast Ratio (CR)} = L63 / L0$$

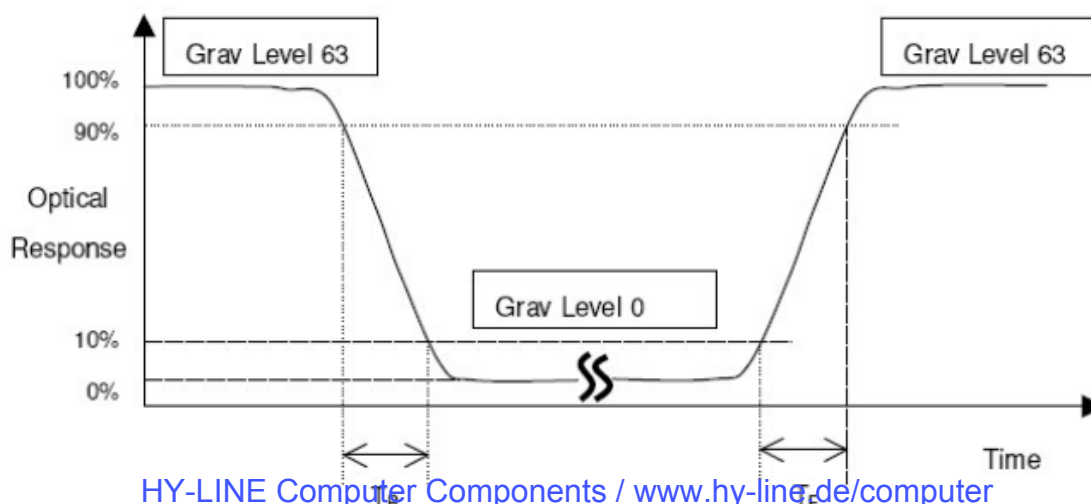
L63: Luminance of gray level 63

L 0: Luminance of gray level 0

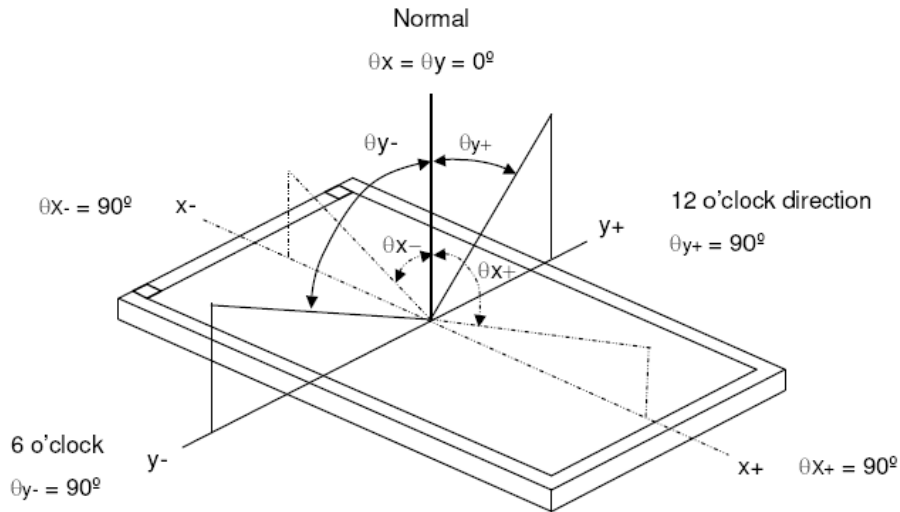
$$\text{CR} = \text{CR} (5)$$

CR (X) is corresponding to the Contrast Ratio of the point X at Figure in Note (5).

*Note (2) Definition of Response Time (TR, TF):

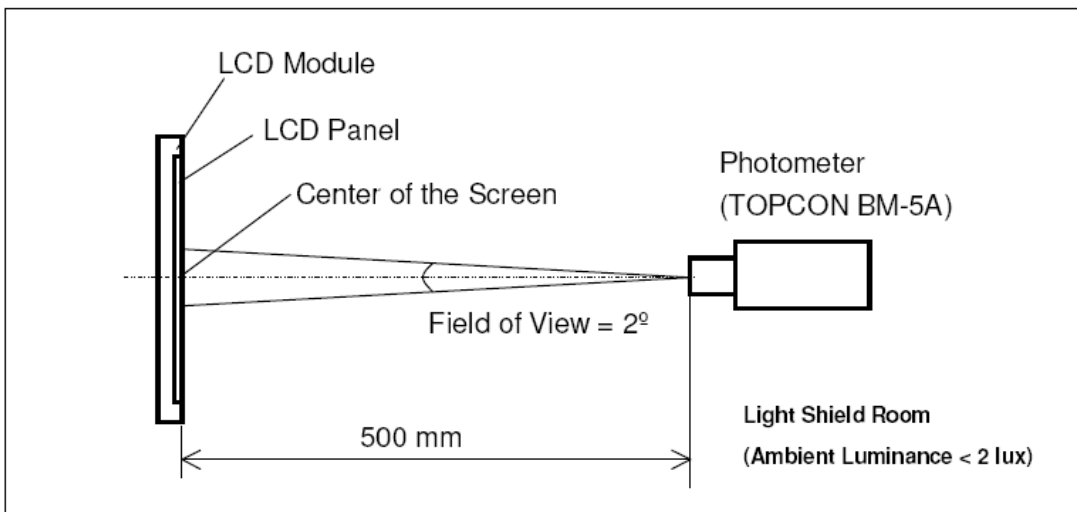


*Note(3) Definition of Viewing Angle

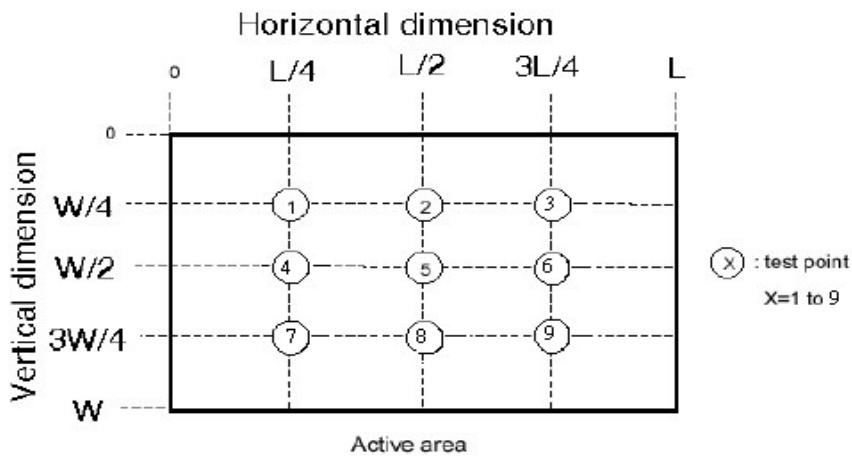


*Note (4) Measurement Set-Up:

The LCD module should be stabilized at a given temperature for 20 minutes to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting Backlight for 20 minutes in a windless room.



*Note(5)



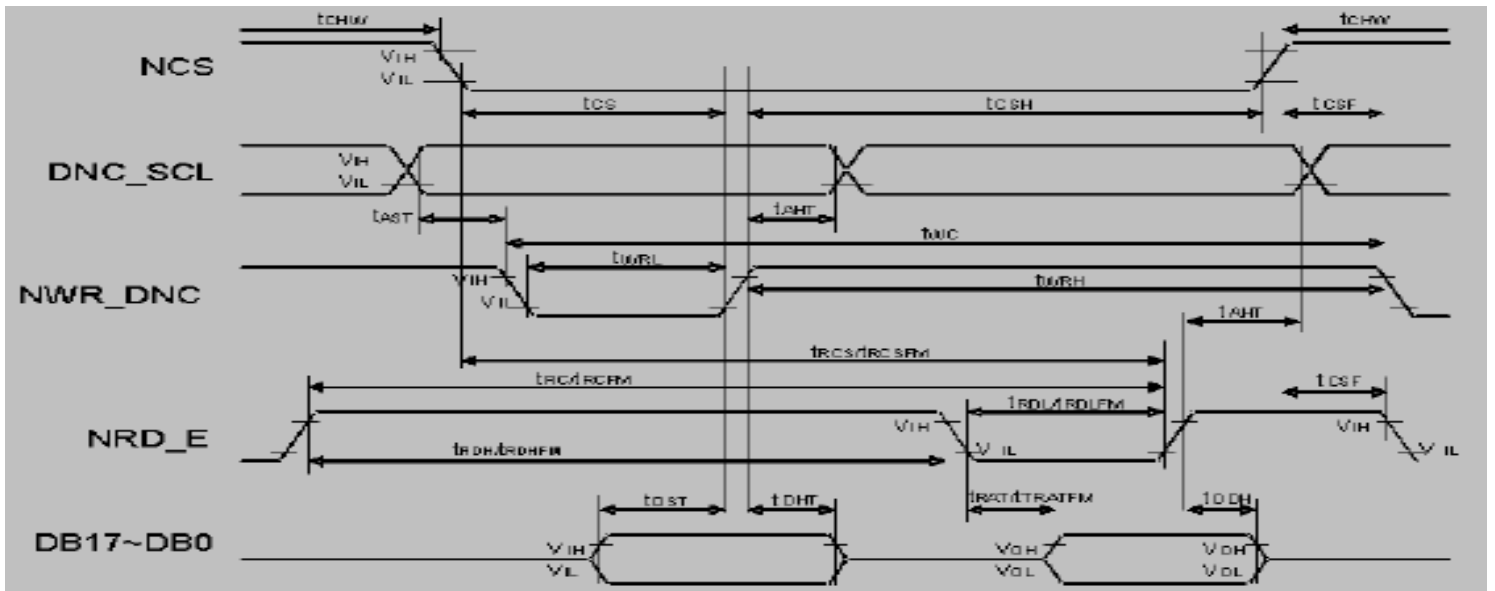
$$\left[1 - \frac{\text{MAX Luminance} - \text{Average Luminance}}{\text{Average Luminance}} \right] \times 100\% > \mathbf{80\%}$$

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10. AC ELECTRICAL CHARACTERISTICS

10.1 AC TIMING DIAGRAMS

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Address setup time	t _{AST}	10	-		ns	
Address hold time (Write/Read)	t _{AHT}	10	-		ns	
Chip select "H" pulse width	t _{CHW}	0	-		ns	
Chip select setup time (Write)	t _{CS}	35	-		ns	
Chip select setup time	t _{RCSEFM}	355	-		ns	
Chip select wait time (Write/Read)	t _{CSF}	10	-		ns	
Chip select hold time	t _{CSH}	10	-		ns	
Write cycle	t _{WC}	100	-		ns	
Control pulse "H" duration	t _{WRH}	35	-		ns	
Control pulse "L" duration	t _{WRL}	35	-		ns	
Read cycle	t _{RCFM}	450	-		ns	
Control pulse "H" duration	t _{RDHFEM}	90	-		ns	
Control pulse "L" duration	t _{RDLFEM}	355	-		ns	
Data setup time	t _{DST}	15	-		ns	
Data hold time	t _{DHT}	10	-		ns	
Read access time	t _{RATFM}	-	-	340	ns	
Output disable time	t _{ODH}	20	-	80	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 Operation	70°C	240HRS	
4	Low Temperature Operation	-20°C	240HRS	
5	Temperature Cycle	-30°C ←→ 80°C (30min) (30min)	100CYCLE	
6	High Temperature Humidity Operation	60°C 90%RH	240HRS	

NOTE (1): a. THE MODULE SHOULD WORK PROPERLY.

b. BEFORE AND AFTER FUNCTION TEST, THE DIFFERENCE OF CONSUMPTIVE CURRENT SHOULD BE WITHIN 10%

NOTE (2) : a. THE MODULE SHOULD WORK PROPERLY.

b. THE MODLUE WON'T BE DEFORMATIVE, COLOR CHANGEABLE OR BROKEN.

c. THE MODULES CAN'T BE APART.

NOTE (3) :TEH IIS INSPECTION STANDARD PLEASE REFER TO THE MATERIAL WHICH QC PROVIDES.

12. PRECAUTIONS FOR USE

12.1 Safety

- (1) Do not swallow any liquid crystal, even if there is no proof that liquid crystal is poisonous.
- (2) If the LCD panel breaks, be careful not to get liquid crystal to touch your skin.
- (3) If skin is exposed to liquid crystal, wash the area thoroughly with alcohol or soap.

12.2 Storage Conditions

- (1) Store the panel or module in a dark place where the temperature is $23\pm 5^{\circ}\text{C}$ and the humidity is below $50\pm 20\%\text{RH}$.
- (2) Store in anti-static electricity container.
- (3) Store in clean environment, free from dust, active gas, and solvent.
- (4) Do not place the module near organics solvents or corrosive gases.
- (5) Do not crush, shake, or jolt the module.

12.3 Handling Precautions

- (1) Avoid static electricity which can damage the CMOS LSI.
- (2) The polarizing plate of the display is very fragile. So, please handle it very carefully.
- (3) Do not give external shock.
- (4) Do not apply excessive force on the surface.
- (5) Do not wipe the polarizing plate with a dry cloth, as it may easily scratch the Surface of plate.
- (6) Do not use ketonics solvent & Aromatic solvent, use with a soft cloth soaked with a cleaning naphtha solvent.
- (7) Do not operate it above the absolute maximum rating.
- (8) Do not remove the panel or frame from the module.
- (9) When the module is assembled, it should be attached to the system firmly, Be careful not to twist and bend the module.
- (10) Wipe off water droplets or oil immediately . If you leave the droplets for a long time, staining and discoloration may occur.
- (11) If the liquid crystal material leaks from the panel, it should be kept away from the eyes or mouth. In case of contact with hands, legs or clothes, it must be washed away thoroughly with soap.

12.4 Warranty

- (1) The period is within twelve months since the date of shipping out under normal using and storage conditions.
- (2) Do not repaired or modified the LCM . It may cause function to lose efficacy , Onation does not warrant the LCM.
- (3) All process and material comply ROHS.