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		VERSION : 1

CUSTOMER	ACCEPTANCE	SPECIFICATIONS
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MODEL NO. :

EW 50412 BMW R

FOR MESSRS :

CUSTOMER'S APPROVAL

DATE : _____

BY : _____

EMERGING DISPLAY
TECHNOLOGIES CORPORATION

MODEL NO .	VERSION	PAGE
EW50412BMW R	1	0-1

RECORDS OF REVISION	DOC . FIRST ISSUE	DEC.04,2003
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DATE	REVISED PAGE NO.	SUMMARY

MODEL NO .	VERSION	PAGE
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1. GENERAL SPECIFICATIONS

1.1 GENERAL SPECIFICATIONS

PLEASE REFER TO :

CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS :

E U - 0 0 2 A

1.2 THIS INDIVIDUAL SPECIFICATION IS PRIOR TO GENERAL SPECIFICATIONS .

2. MECHANICAL SPECIFICATIONS

- | | | |
|-----------------------|-------|--------------------------------|
| (1) NUMBER OF DOTS | ----- | 320W * 240H DOTS |
| (2) MODULE SIZE | ----- | 160W * 109.0H * 11.0D(max.) mm |
| (3) EFFECTIVE AREA | ----- | 120.0W * 90.0H mm |
| (4) ACTIVE AREA | ----- | 115.17W * 86.37H mm |
| (5) DOT SIZE | ----- | 0.33W * 0.33H mm |
| (6) DOT PITCH | ----- | 0.36W * 0.36H mm |
| (7) LCD TYPE | ----- | STN , BLUE , TRANSMISSIVE |
| (8) DRIVING METHOD | ----- | 1 / 240 DUTY MULTIPLEX DRIVE |
| (9) VIEWING DIRECTION | ----- | 3 O'CLOCK |
| (10) BACKLIGHT | ----- | LED , WHITE |

3. ABSOLUTE MAXIMUM RATINGS

3.1 ELECTRICAL ABSOLUTE MAXIMUM RATINGS .

Ta=25°C VSS=0V

PARAMETER	SYMBOL	MIN .	MAX .	UNIT	REMARK
POWER SUPPLY FOR LOGIC	VDD – VSS	0	6.0	V	
POWER SUPPLY FOR LCD DRIVING	VDD – VEE	0	28.0	V	
INPUT VOLTAGE	VI	VSS	VDD	V	
STATIC ELECTRICITY	—	—	100	V	NOTE (1)
LED POWER DISSIPATION	PD	—	0.875	W	
LED FORWARD CURRENT	IF	—	175	mA	
LED REVERSE VOLTAGE	VR	—	6	V	

NOTE (1) : TEST METHOD AND CONDITIONS :
AFTER CHARGING UP 200 PF CAPACITOR BY STATED VOLTAGE ,
THE CAPACITOR IS CONNECTED WITH INTERFACE PINS OF THE
MODULE .

3.2 ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS .

I T E M	OPERATING		STORAGE		REMARK
	MIN .	MAX .	MIN .	MAX .	
AMBIENT TEMPERATURE	- 20 °C	70 °C	- 30 °C	80 °C	NOTE (2),(3)
HUMIDITY	—	85 % RH	—	85 % RH	WITHOUT CONDENSATION
VIBRATION	—	2.45 m/s ² (0.25 G)	—	11.76 m/s ² (1.2 G)	10~100 HZ XYZ DIRECTIONS 1 Hr. EACH
SHOCK	—	29.4 m/s ² (3 G)	—	490.0 m/s ² (50 G)	10 mSECONDS XYZ DIRECTIONS 1 TIME EACH
CORROSIVE GAS	NOT ACCEPTABLE		NOT ACCEPTABLE		

NOTE (2) : Ta AT -30 °C : 48HR MAX .
80 °C : 168HR MAX .

NOTE (3) : BACKGROUND COLOR CHANGES SLIGHTLY DEPENDING ON AMBIENT
TEMPERATURE THIS PHENOMENON IS REVERSIBLE .

4. ELECTRICAL CHARACTERISTICS

Ta = 25 °C

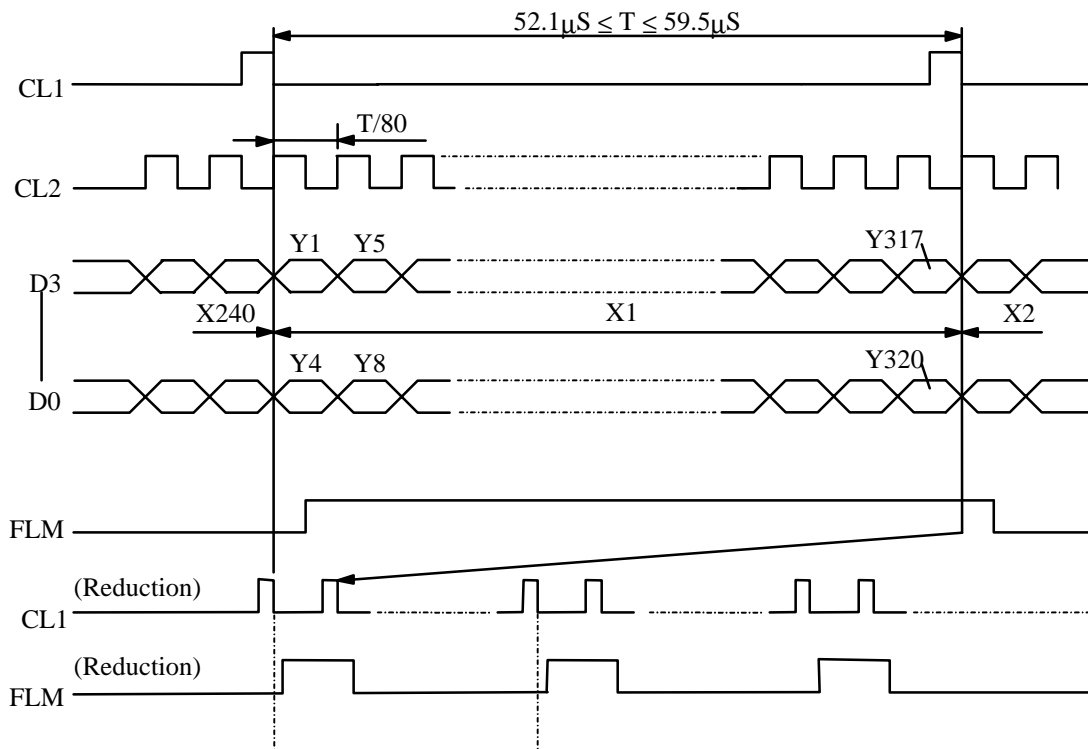
VDD = 5.0 V

PARAMETER	SYMBOL	CONDITION	MIN .	TYP.	MAX .	UNIT
POWER SUPPLY VOLTAGE FOR LOGIC	VDD – VSS	—	4.75	5.0	5.25	V
POWER SUPPLY VOLTAGE FOR LCD DRIVE	VEE – VSS	—	-21.5	-22.0	-22.5	V
INPUT VOLTAGE NOTE (1)	VIH	H LEVEL	0.8*VDD	—	—	V
	VIL	L LEVEL	—	—	0.2*VDD	V
OUTPUT VOLTAGE NOTE (1)	VOH	H LEVEL	2.4	—	—	V
	VOL	L LEVEL	—	—	VSS+0.4	V
POWER SUPPLY CURRENT FOR LOGIC NOTE (2)	IDD	VDD – VSS = 5.0 V	—	3	5.0	mA
POWER SUPPLY CURRENT FOR LCD DRIVE NOTE (2)	IEE	VDD – VO = 23.0 V	—	2.8	4.8	mA
RECOMMENDED LCD DRIVING VOLTAGE	VDD – VO ∅ = 10°, θ = 90° DUTY = 1/240	Ta = -20 °C	25.4	26.4	27.4	V
		Ta = 25 °C	22	23	24	V
		Ta = 70 °C	19.7	20.7	21.7	V
CLOCK OSCILLATION FREQUENCY	f FLM	—	70	75	80	HZ
LED FORWAD VOLTAGE	VLED – VLSS	IF=105mA	—	5.0	—	V
LED FORWAD CURRENT	IF	VLED–VLSS=5.0V	—	105	130	mA
LED REVERSE CURRENT	IR	VR=6V	—	—	0.2	mA

NOTE (1): APPLIED TO TERMINALS FLM , CL1 , CL2 , D0~D3 , DISPOFF .

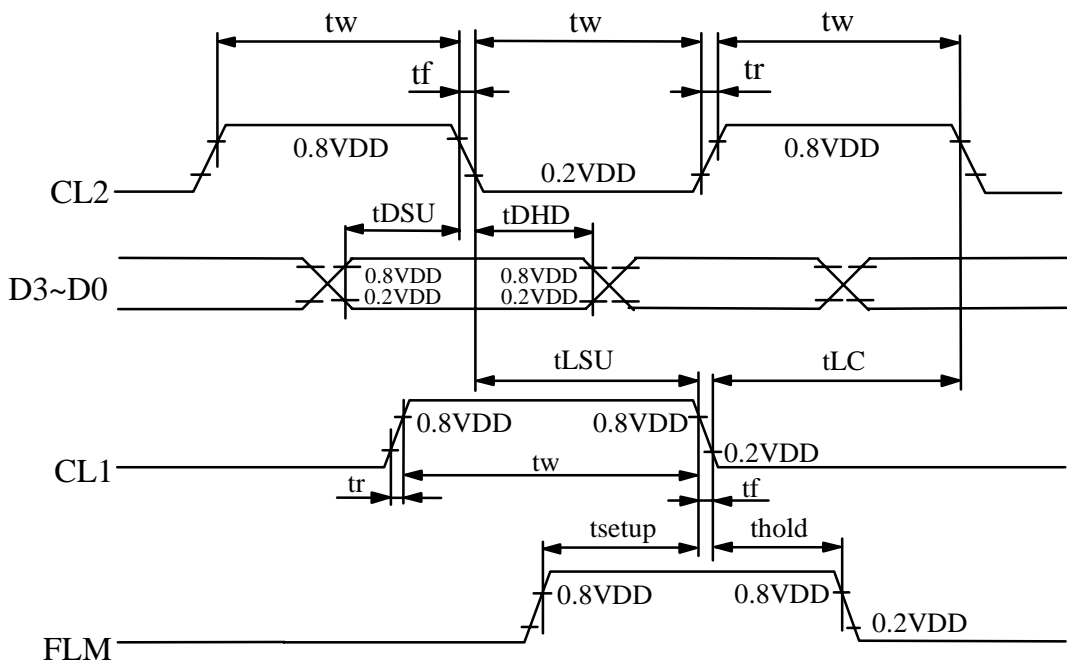
NOTE (2): THE DISPLAY PATTERN IS ALL "OFF"/ "ON" .

5. TIMING CHARACTERISTICS
5.1 INTERFACE TIMING



5.2 SWITCHING CHARACTERISTICS

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Frequency of maximum clock	fcp	—	—	8	MHz
CL1 , CL2 , pulse width	tw	45	—	—	ns
Rise , fall time	tr,tf	—	—	15	ns
Data setup time	tDSU	20	—	—	ns
Data hold time	tDHD	20	—	—	ns
CL1 setup time	tLSU	80	—	—	ns
CL1 → CL2 time	tLC	80	—	—	ns
FLM setup time	tsetup	100	—	—	ns
FLM hold time	thold	100	—	—	ns



6. OPTICAL CHARACTERISTICS

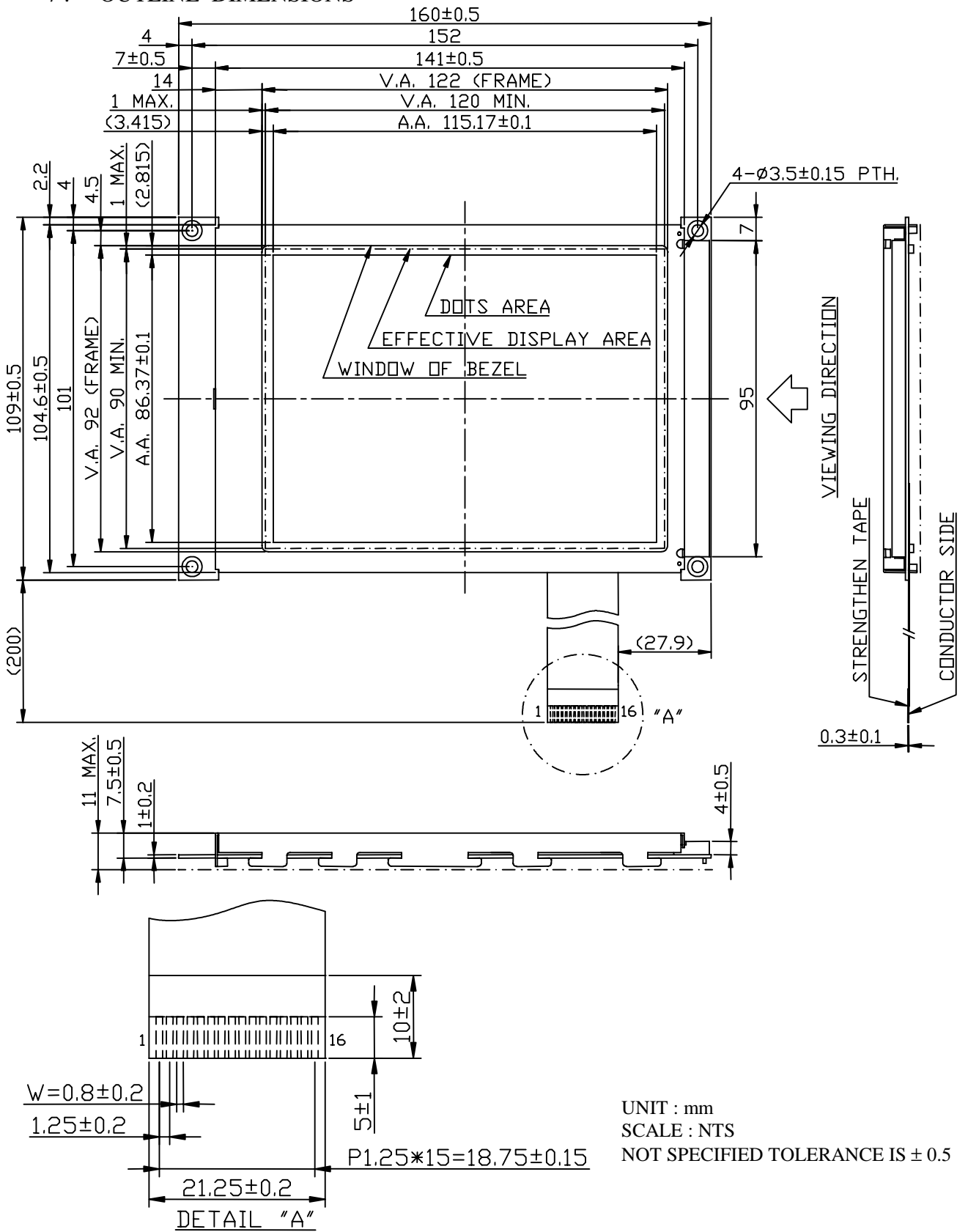
Ta = 25 °C

VDD = 5.0 V

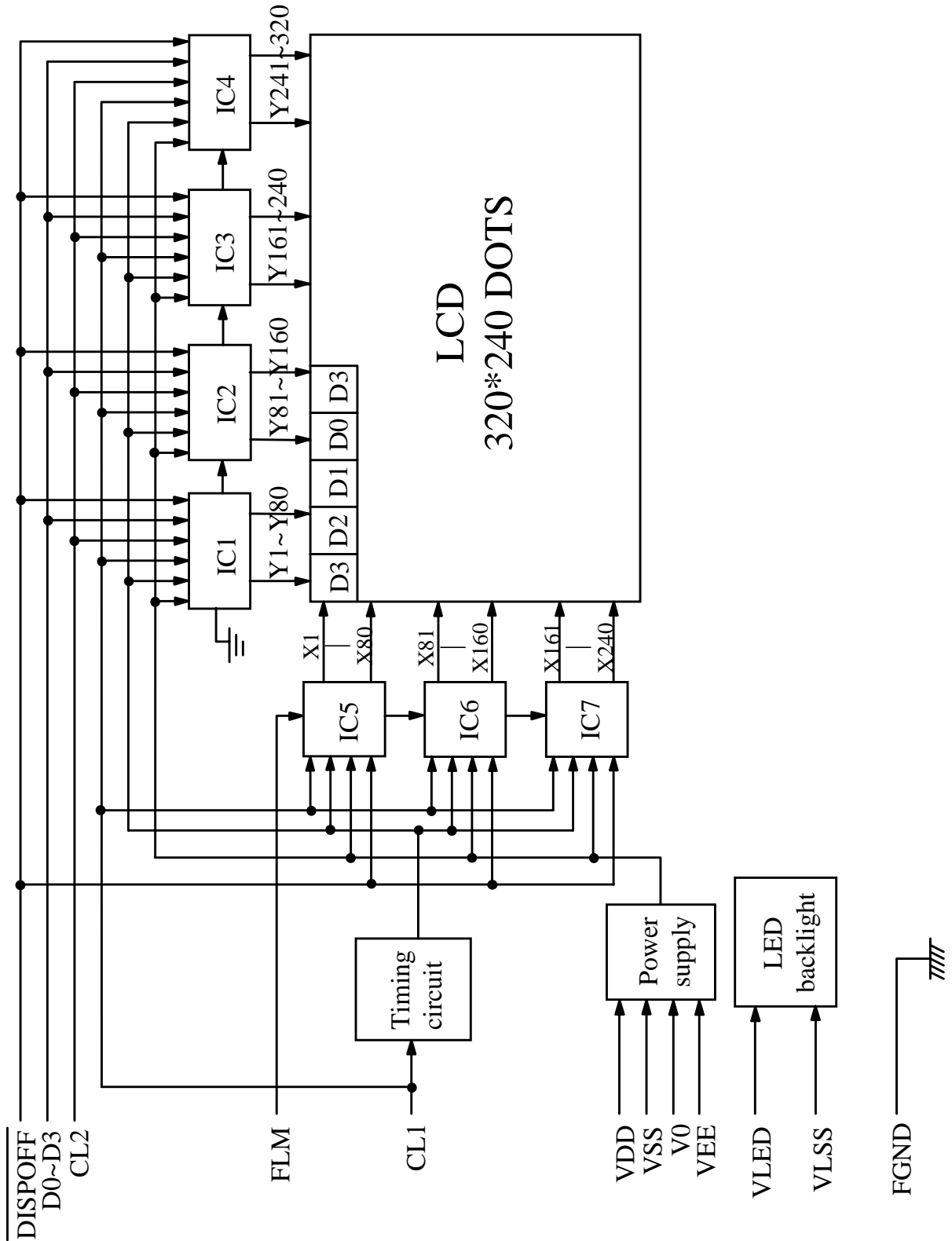
I T E M	SYMBOL	CONDITION	MIN .	TYP .	MAX.	UNIT	NOTE	
VIEWING ANGLE	$\varnothing 2 - \varnothing 1$	$K \geq 2.0$	—	50	—	deg .	1	
CONTRAST RATIO	K	$\varnothing = 10^\circ, \theta = 90^\circ$	—	3	—	—	1	
RESPONSE TIME	tr (rise)	$\varnothing = 10^\circ$ $\theta = 90^\circ$	Ta = -20 °C	—	3370	6740	ms	1
			Ta = 25 °C	—	203	406		
			Ta = 70 °C	—	86	172		
	tf (fall)		Ta = -20 °C	—	2870	5740		
			Ta = 25 °C	—	190	380		
			Ta = 70 °C	—	93	186		
BRIGHTNESS OF MODULE	L	VLED - VLSS = 5.0 V	(18)	(24)	—	cd / m ²	1	

NOTE (1) : PLEASE REFER TO :
CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS. (EU - 002A)

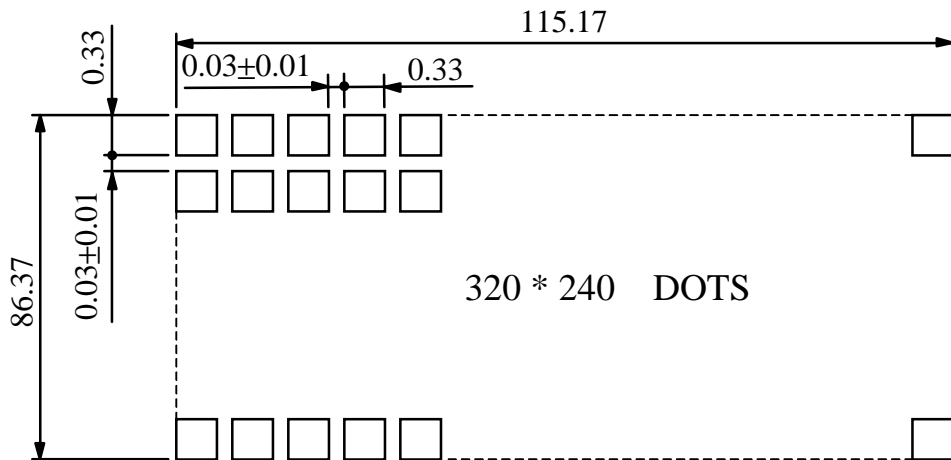
7. OUTLINE DIMENSIONS



8. BLOCK DIAGRAM



9. DETAIL DRAWING OF DOT MATRIX



UNIT : mm
SCALE : NTS
NOT SPECIFIED TOLERANCE IS ± 0.1

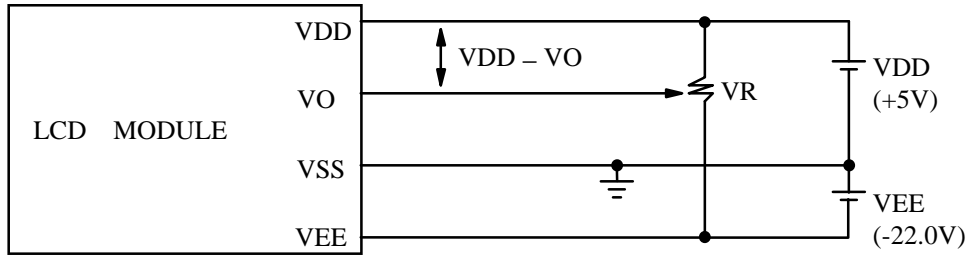
10. INTERFACE SIGNALS

IF1 :

PIN NO	SYMBOL	LEVEL	FUNCTION
K	VLSS	—	POWER SUPPLY FOR LED BACKLIGHT
A	VLED	—	POWER SUPPLY FOR LED BACKLIGHT
1	D0	H / L	DISPLAY DATA
2	D1	H / L	
3	D2	H / L	
4	D3	H / L	
5	DISPOFF	H / L	H : DISPLAY ON , L : DISPLAY OFF
6	FLM	H	THE FLM SIGNAL INDICATING THE BEGINNING OF EACH DISPLAY CYCLE
7	NC	—	NO CONNECTION
8	CL1	H → L	DISPLAY DATA LATCH
9	CL2	H → L	DISPLAY DATA SHIFT
10	VDD	—	POWER SUPPLY FOR LOGIC CIRCUIT
11	VSS	—	GROUND
12	VEE	—	POWER SUPPLY FOR LCD DRIVING
13	VO	—	OPERATING VOLTAGE FOR LCD DRIVING
14	FGND	—	FRONT PANEL GROUND

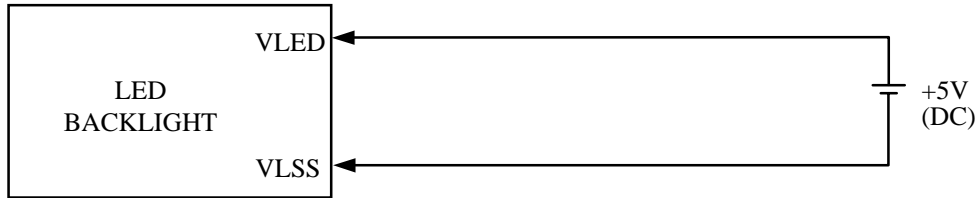
1 1 . POWER SUPPLY

1 1 . 1 POWER SUPPLY FOR LCM



VDD - VO : LCD DRIVING VOLTAGE
VR: 20KΩ

1 1 . 2 POWER SUPPLY FOR LED BACK - LIGHT



1 1 . 3 TIMING OF POWER SUPPLY AND INTERFACE SIGNAL

