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APPROVED BY:  <i>David Chang</i>		ISSUE : SEP.20,1999
		TOTAL PAGE : 9
		VERSION : 3

CUSTOMER	ACCEPTANCE	SPECIFICATIONS
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MODEL NO. :

12A00(REFLECTIVE TYPES)

FOR MESSRS :

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CUSTOMER'S APPROVAL

DATE :

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BY :

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EMERGING DISPLAY  
TECHNOLOGIES CORPORATION

MODEL NO . 12A00(REFLECTIVE TYPES)	VERSION 3
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RECORDS OF REVISION	DOC . FIRST ISSUE OCT.22,1997
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DATE	REVISED PAGE NO.	SUMMARY
NOV.11,1998	2	3.2 ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS AMBIENT TEMPERATURE : OPERATING FOR W.T. : 60°C MAX. → 70°C MAX. STORAGE FOR W.T. : 70°C MAX. → 80°C MAX.
	3	4. ELECTRICAL CHARACTERISTICS RECOMMENDED LCD DRIVING VOLTAGE : VDD-VO W.T. : Ta=60°C → Ta=70°C
	5	6. OPTICAL CHARACTERISTICS RESPONSE TIME W.T. : Ta=60°C → Ta=70°C
SEP.20,1999	2,3,5	THE ENTIRE PAGES REVISED

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NUMBERING SYSTEM

Polarizer Mode	Backlight	Code value
Reflective	—	R

E	W	1	2	A	0	0	G	R
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LCD type + color	Code Value
STN + Yellow-Green	Y
STN + Gray	G
FSTN + White	F

1. GENERAL SPECIFICATIONS

1.1 GENERAL SPECIFICATIONS

PLEASE REFER TO :

CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS :

E U - 0 0 2 A

1.2 APPLICATION NOTES FOR CONTROLLER / DRIVER :

PLEASE REFER TO :

CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS :

E U - S E D 1 5 2 0 D 0 A

1.3 THIS INDIVIDUAL SPECIFICATIONS IS PRIOR TO GENERAL SPECIFICATIONS .

2. MECHANICAL SPECIFICATIONS

- (1) NUMBER OF DOTS ----- 122 \* 32 DOTS
- (2) MODULE SIZE ----- 69.2W \* 31.75H \* 8.0D (MAX. ) mm
- (3) EFFECTIVE AREA ----- 57.2W \* 17.2H mm
- (4) ACTIVE AREA ----- 52.41W \* 13.71H mm
- (5) DOT SIZE ----- 0.38W \* 0.38H mm
- (6) DOT PITCH ----- 0.43W \* 0.43H mm
- (7) LCD TYPE \*
- (8) DRIVING METHOD ----- 1 / 32 DUTY MULTIPLEX DRIVER

\* PLEASE REFER TO NUMBERING SYSTEM

### 3. ABSOLUTE MAXIMUM RATINGS

#### 3.1 ELECTRICAL ABSOLUTE MAXIMUM RATINGS. ( AT Ta = 25 °C )

PARAMETER	SYMBOL	MIN .	MAX .	UNIT	REMARK
SUPPLY VOLTAGE FOR LOGIC	VDD-VSS	0	8.0	V	
INPUT VOLTAGE	VI	VSS	VDD	V	
STATIC ELECTRICITY	—	—	100	V	NOTE (1)

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	
HUMIDITY	—	90 % RH	—	90 % RH	WITHOUT CONDENSATION
VIBRATION	—	4.9 m/s <sup>2</sup> (0.5 G)	—	19.6 m/s <sup>2</sup> (2 G)	
SHOCK	—	29.4 m/s <sup>2</sup> (3 G)	—	490.0 m/s <sup>2</sup> (50 G)	XYZ DIRECTIONS
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

PARAMETER		SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
POWER SUPPLY VOLTAGE	RECOMMENDED	VDD-VSS	—	4.5	5.0	5.5	V
	ALLOWABLE	VDD-VSS	—	2.4	—	7.0	V
HIGH LEVEL INPUT VOLTAGE	FOR TTL	VIHT	NOTE (1)	2.0	—	VDD	V
	FOR CMOS	VIHC	NOTE (2)	4.0	—	VDD	V
LOW LEVEL INPUT VOLTAGE	FOR TTL	VILT	NOTE (1)	0	—	0.8	V
	FOR CMOS	VILC	NOTE (2)	0	—	1.0	V
HIGH LEVEL OUTPUT VOLTAGE	FOR TTL	VOHT	IOH= -3.0 mA NOTE (3)	2.4	—	—	V
LOW LEVEL OUTPUT VOLTAGE	FOR TTL	VOLT	IOL= 3.0 mA NOTE (3)	—	—	0.4	V
POWER SUPPLY CURRENT (INCLUDE DC TO DC CONVERTER)		IDD	VDD-VSS=5V	—	2.5	—	mA
LCD DISPLAY DUTY RATIO		DUTY	—	—	32	—	—
OSCILLATION FREQUENCY		f OSC	VDD = 5.0 V RF = 1.0M Ω	15	18	21	KHZ
			VDD = 3.0 V RF = 1.0M Ω	11	16	21	KHZ
RESET TIME		t R	—	1.0	—	1000	uS
RECOMMENDED LCD DRIVING VOLTAGE	VDD - VO ∅ = 10° θ = 0°	Ta = -20°C	—	5.5	—	V	
		Ta = 25°C	—	5.5	—	V	
		Ta = 70°C	—	5.2	—	V	

NOTE (1): APPLIED TO TERMINALS A0, DB0~DB7, E, R/W.

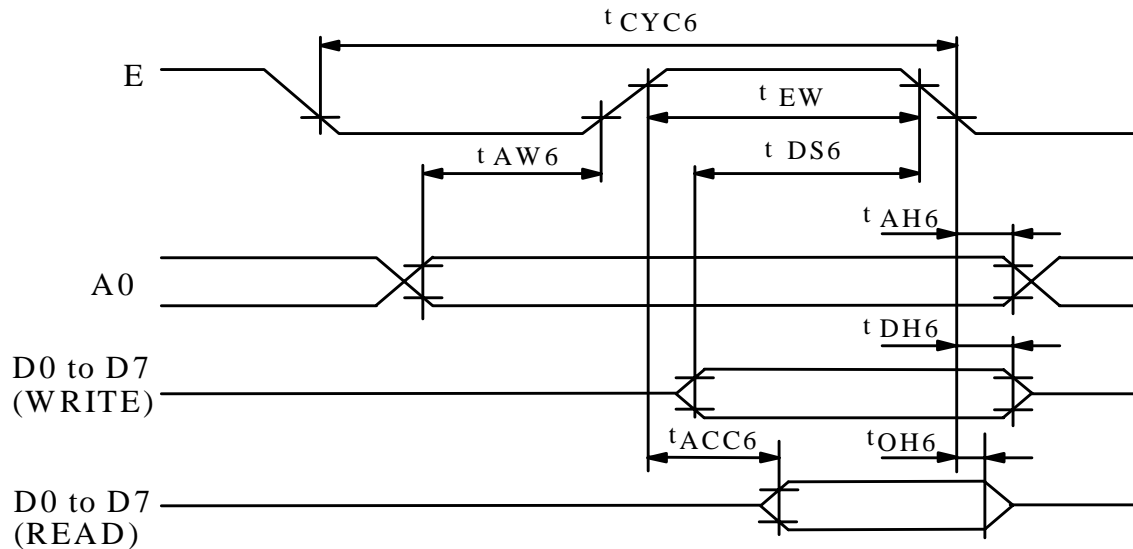
NOTE (2): APPLIED TO TERMINALS RES.

NOTE (3): APPLIED TO TERMINALS DB0~DB7

NOTE (4): RECOMMENDED LCD DRIVING VOLTGE MAY FLUCTUATE ABOUT ± 0.5V BY EACH MODULE.

5. TIMING CHARACTERISTICS

MPU BUS READ/WRITE (68-FAMILY MPU)



PARAMETER	SYMBOL	CONDITION	RATING		UNIT	SIGNAL
SYSTEM CYCLE TIME	tCYC6		1000	—	ns	A0
ADDRESS SETUP TIME	tAW6		20	—	ns	
ADDRESS HOLD TIME	tAH6		10	—	ns	
DATA SETUP TIME	tDS6		80	—	ns	D0 TOD7
DATA HOLD TIME	tDH6		10	—	ns	
OUTPUT DISABLE TIME	tOH6	CL=100PF	10	60	ns	
ACCESS TIME	tACC6		—	90	ns	
ENABLE	tEW	READ	100	—	ns	E
PULSEWIDTH		WRITE	8	—	ns	

NOTES:

- 1.tCYC6 IS THE CYCLE TIME OF CS. E=H,NOT THE CYCLE TIME OF E.
- 2.INCREASE PARAMETER VALUES BY 200% THEN VDD=3.0V.
- 3.ALL INPUTS MUST HAVE A RISE AND FALL TIME OF LESS THAN 15ns.



6. OPTICAL CHARACTERISTICS

Ta = 25 °C

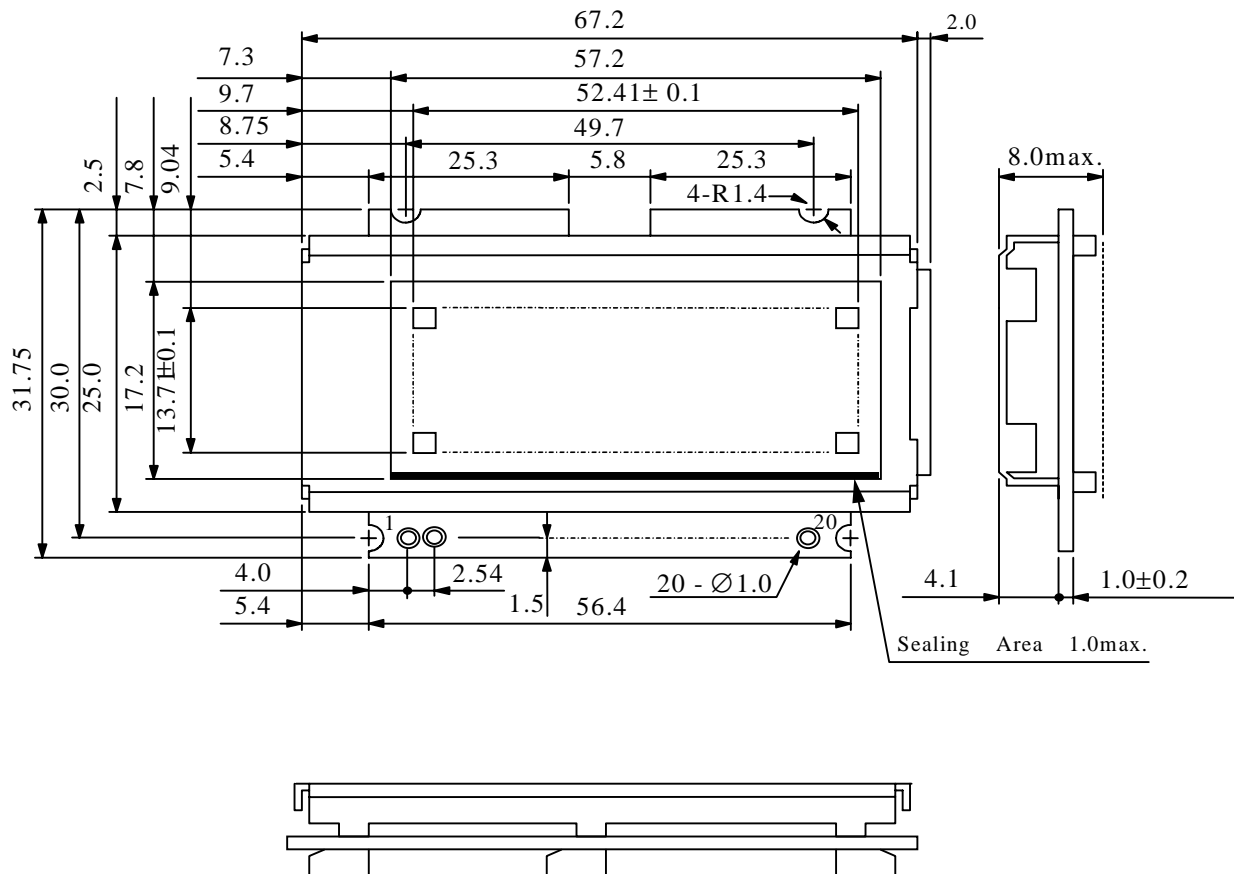
VDD = 5.0 V

VDD-V0 = 5.5 V

I T E M		SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	NOTE
VIEWING AREA	STN	∅ 2 - ∅ 1	K ≥ 1.4	40	—	—	deg.	1
	FSTN			50	—	—	deg.	1
CONTRAST RATIO	STN	K	∅ = 10° θ = 0°	—	5	—	—	1
	FSTN			5	—	—	—	1
REPOSE TIME	tr ( rise )	∅ = 10° θ = 0°	Ta = -20°C	—	5538	—	ms	1
			Ta = 25°C	—	228	—		
			Ta = 70°C	—	104	—		
	tf ( fall )		Ta = -20°C	—	2316	—		
			Ta = 25°C	—	174	—		
			Ta = 70°C	—	85	—		

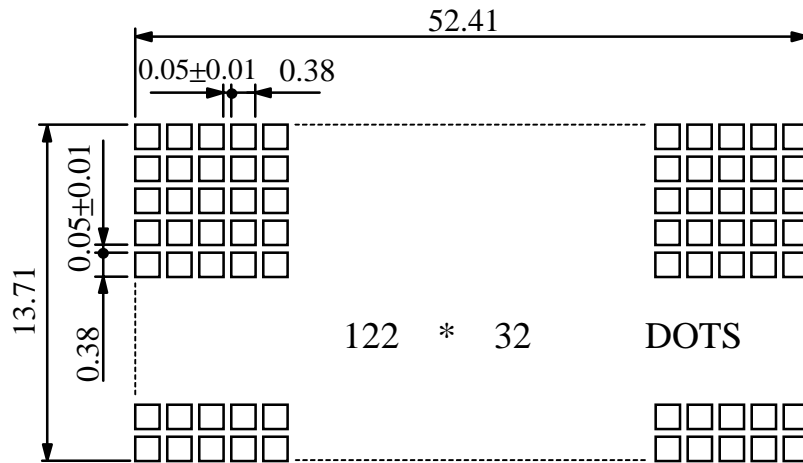
NOTE (1) : PLEASE REFER TO :  
CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS.  
E U - 00 2 A

7. OUTLINE DIMENSION



UNIT : mm  
SCALE : NTS  
NOT SPECIFIED TOLERANCE IS ± 0.3 mm

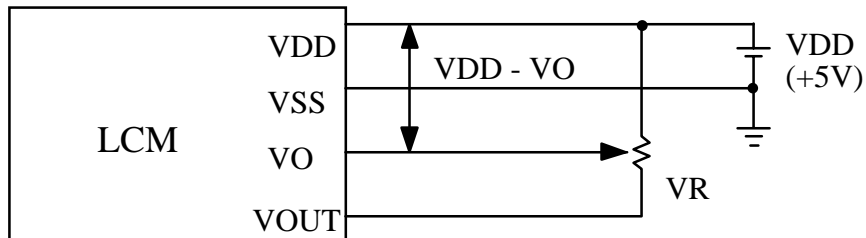
8. DETAIL DRAWING OF DOT MATRIX



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

9. POWER SUPPLY

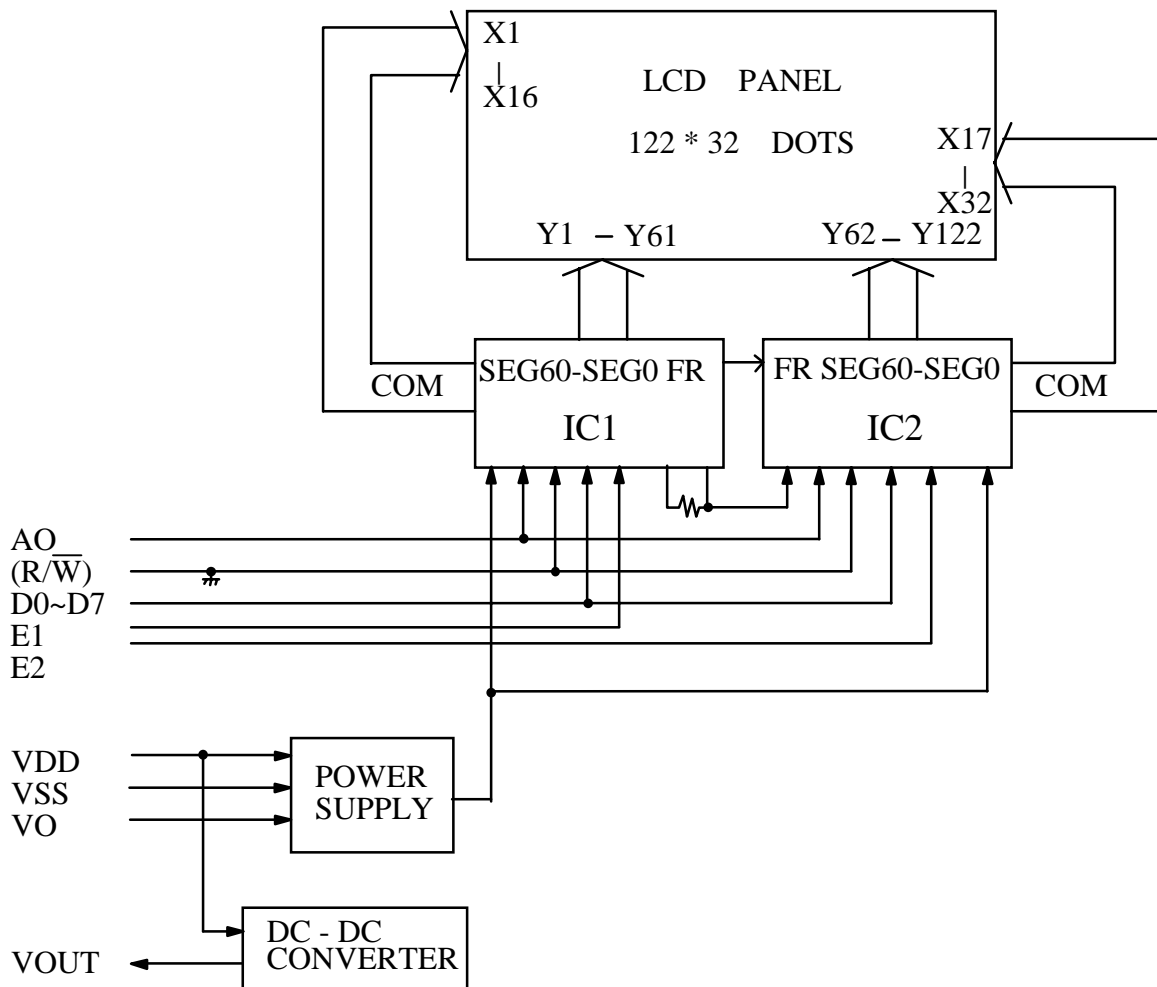
9.1 POWER SUPPLY FOR LCM



VDD-VO : LCD DRIVING VOLTAGE

VR : 10KΩ~20KΩ

10. BLOCK DIAGRAM



11. INTERFACE SIGNALS .

PIN NO .	SYMBOL	DESCRIPTION
1	VSS	GROUND ( 0V )
2	VDD	POWER SUPPLY FOR LOGIC CIRCUIT
3	V0	OPERATING VOLTAGE FOR LCD DRIVING
4	VOUT	POWER SUPPLY FOR LCD DRIVING ( GENERATED BY DC - DC , -5V )
5	A0	DATA/COMMAND SELECT INPUT A0 = 0 : COMMAND A0 = 1 : DATA
6	E1	ENABLE CLOCK INPUT FOR IC1
7	E2	ENABLE CLOCK INPUT FOR IC2
8	DB0	TRI - STATE , BI - DIRECTIONAL I/O BUS
9	DB1	TRI - STATE , BI - DIRECTIONAL I/O BUS
10	NC	NO CONNECTION
11	NC	NO CONNECTION
12	DB2	TRI - STATE , BI - DIRECTIONAL I/O BUS
13	DB3	TRI - STATE , BI - DIRECTIONAL I/O BUS
14	DB4	TRI - STATE , BI - DIRECTIONAL I/O BUS
15	DB5	TRI - STATE , BI - DIRECTIONAL I/O BUS
16	DB6	TRI - STATE , BI - DIRECTIONAL I/O BUS
17	DB7	TRI - STATE , BI - DIRECTIONAL I/O BUS
18	NC	NO CONNECTION
19	NC	_____
20	NC	_____