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CUSTOMER	ACCEPTANCE	SPECIFICATIONS
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MODEL NO. :

1 2 A 0 0 (E L T Y P E S)

FOR MESSRS :

CUSTOMER'S APPROVAL

DATE :

BY :

EMERGING DISPLAY
TECHNOLOGIES CORPORATION

MODEL NO.
12A00(EL TYPES)

VERSION
1

RECORDS OF REVISION

DOC . FIRST ISSUE

DATE	REVISED PAGE NO.	SUMMARY

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NUMBERING SYSTEM

Polarizer Mode	Backlight	Code value
Transflective	EL	E

Backlight Color	Code Value
White	W

Module type : W : Wide Temp. Module

E G 1 2 A 0 0 G E W

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 : SED1520D0A

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 |
| (9) VIEWING DIRECTION | ----- | 6 O' CLOCK |
| (10) BACK LIGHT * | | |

* PLEASE REFER TO NUMBERING SYSTEM

NOTE : N.T. : NORMAL TEMPERATURE

NOTE : W.T. : WIDE TEMERATUER

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)
POWER SUPPLY FOR EL BACKLIGHT	VEL	—	AC 200	Vrms	f EL = 1.0 KHZ 60 SEC. MAX
	f EL	—	2.0	KHZ	AC115 Vrms 60 SEC. MAX

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	0 °C	50 °C	-20 °C	60 °C	FOR N.T.
	-20°C	60 °C	-30 °C	70 °C	FOR W.T.
HUMIDITY	—	90 % RH	—	90 % RH	WITHOUT CONDENSATION
VIBRATION	—	4.9 m/s ² (0.5 G)	—	19.6 m/s ² (2 G)	
SHOCK	—	29.4 m/s ² (3 G)	—	490.0 m/s ² (50 G)	XYZ DIRECTIONS
CORROSIVE GAS	NOT ACCEPTABLE		NOT ACCEPTABLE		

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°	N.T.	Ta = 0°C	—	6.0	—	V
				Ta = 25°C	—	5.5	—	V
				Ta = 50°C	—	5.0	—	V
		W.T.	Ta = -20°C	—	7.6	—	V	
			Ta = 25°C	—	5.5	—	V	
			Ta = 60°C	—	5.0	—	V	
POWER SUPPLY FOR EL		VEL	f EL = 400 Hz	—	110	—	Vrms	
		IEL	VEL = 110 V f EL = 400 Hz	—	1.7	—	mA rms	

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

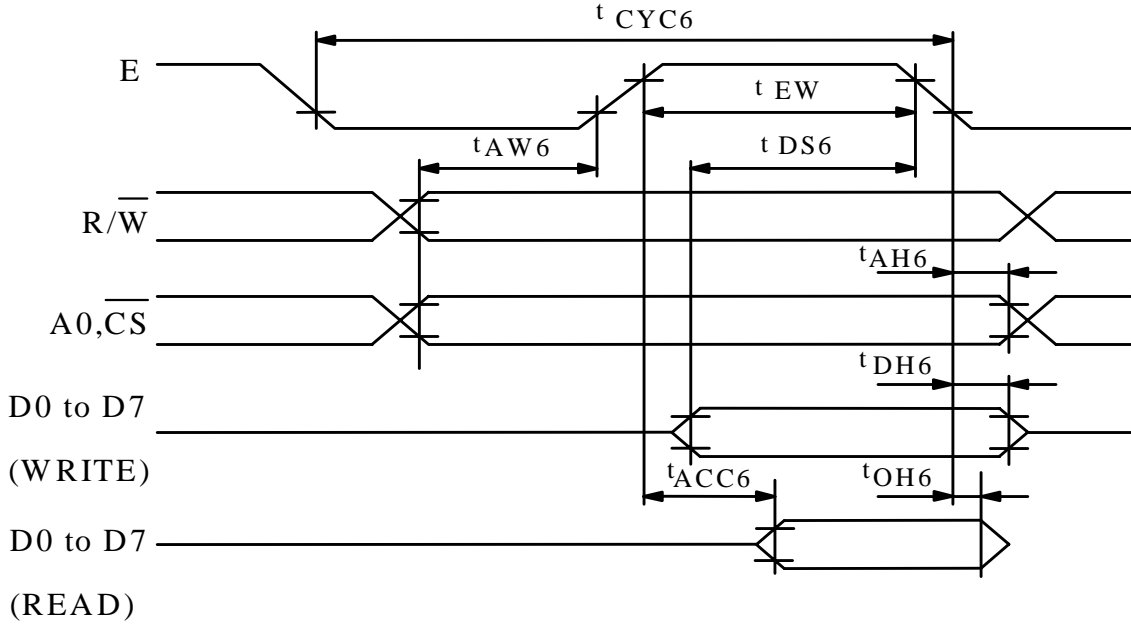
NOTE (2): APPLIED TO TERMINALS RES.

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
			MIN	MAX		
SYSTEM CYCLE TIME	t_{CYC6}		1000	—	nS	
ADDRESS SETUP TIME	t_{AW6}		20	—	nS	A0,CS,R/W
ADDRESS HOLD TIME	t_{AH6}		10	—	nS	
DATA SETUP TIME	t_{DS6}		80	—	nS	D0 to D7
DATA HOLD TIME	t_{DH6}		10	—	nS	
OUTPUT DISABLE TIME	t_{OH6}	CL = 100 pF	10	60	nS	
ACCESS TIME	t_{ACC6}		—	90	nS	
ENABLE PULSEWIDTH	READ	t_{EW}	100	—	nS	E
	WRITE		8	—	nS	

NOTES :

- t_{CYC6} IS THE CYCLE TIME OF CS E=H, NOT THE CYCLE TIME OF E.
- INCREASE PARAMETER VALUES BY 200% WHEN $V_{DD} = 3.0 V$
- ALL INPUTS MUST HAVE A RISE AND FAL TIME OF LESS THAN 15 nS .

6. OPTICAL CHARACTERISTICS

Ta = 25°C

VDD = 5.0 V

VDD-V0 = 5.5 V

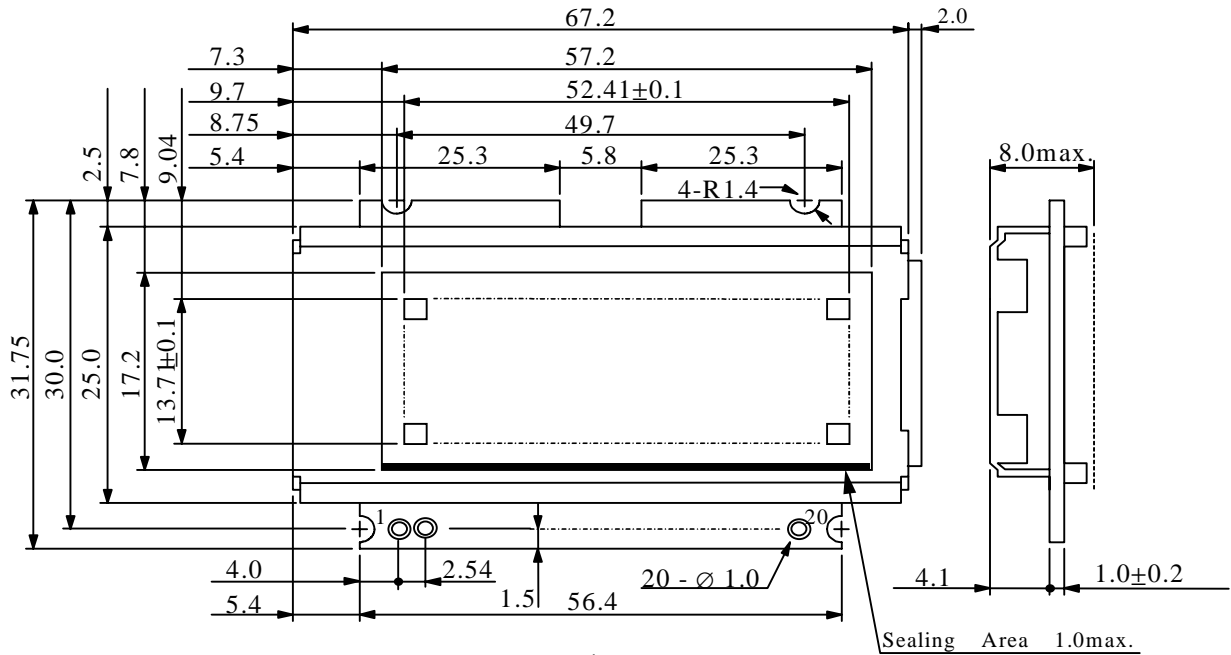
I T E M		SYMBOL	CONDITION		MIN.	TYP.	MAX.	UNIT	NOTE
VIEWING AREA	STN	∅ 2 - ∅ 1	K ≥ 1.4		40	—	—	deg.	1
	FSTN				50	—	—	deg.	1
VIEWING AREA	STN	K	∅ = 10° θ = 0°		—	5	—	—	1
	FSTN				5	—	—	—	1
REPOSE TIME	N.T.	tr (rise)	∅ = 10° θ = 0°	Ta = 25°C	—	150	—	ms	1
		tf (fall)		Ta = 25°C	—	150	—		
	W.T.	tr (rise)	Ta = -20°C	—	1337	—			
			Ta = 25°C	—	77	—			
			Ta = 60°C	—	38	—			
		tf (fall)	Ta = -20°C	—	1904	—			
			Ta = 25°C	—	95	—			
			Ta = 60°C	—	51	—			
THE BRIGHTNESS OF BACK-LIGHT		L	IF = 120 mA		—	4	—	cd/m ²	1
PEAK EMISSION WAVELENGTH		λP	IF = 120 mA		—	570	—	nm	1

NOTE (1) : PLEASE REFER TO :

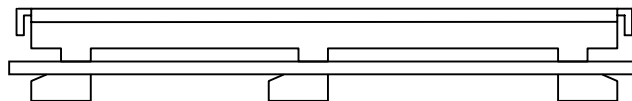
CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS.

EU - 002 A

7. OUTLINE DIMENSION



VIEWING DIRECTION (6 O'CLOCK)

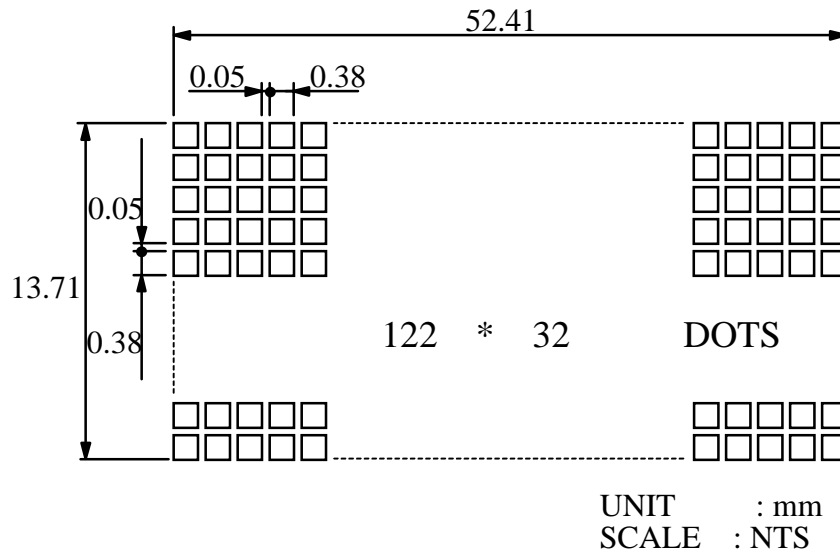


UNIT : mm

SCALE : NTS

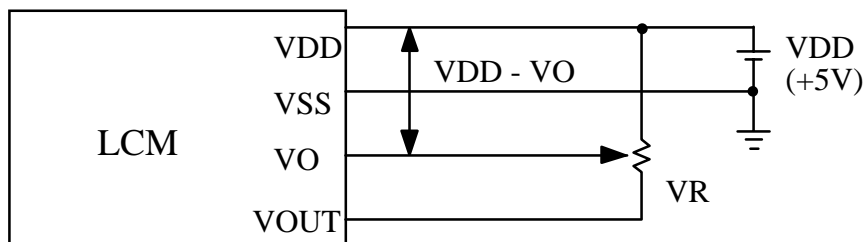
NOT SPECIFIED TOLERANCE IS ± 0.3 mm

8. DETAIL DRAWING OF DOT MATRIX



9. POWER SUPPLY

9.1 POWER SUPPLY FOR LCM



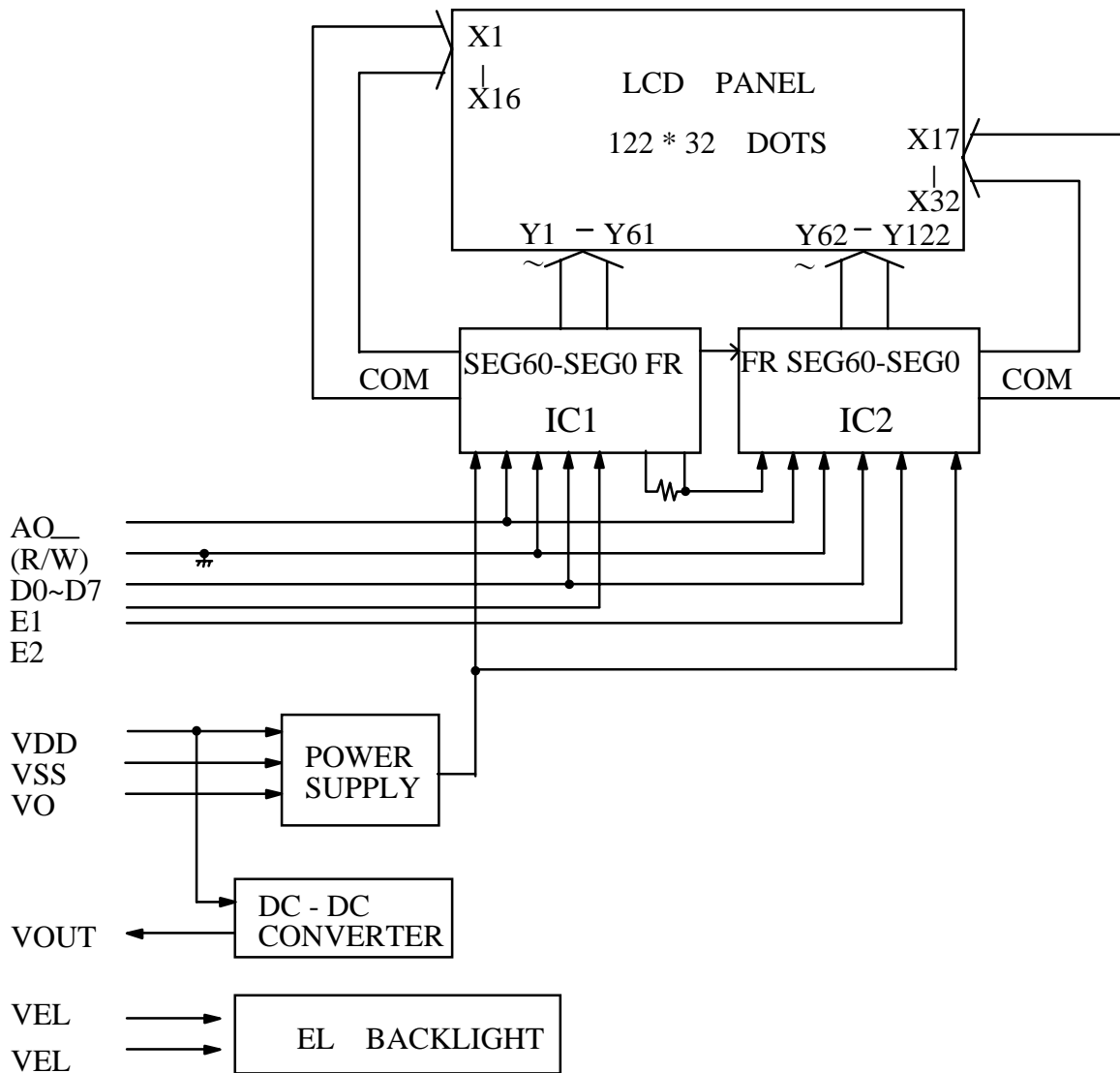
VDD-VO : LCD DRIVING VOLTAGE
VR : 10KΩ ~20KΩ

9.2 POWER SUPPLY FOR EL BACK LIGHT



RECOMMENDED INVERTER :
SOUN50150(SUPER OPTICS)

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	VOU	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	NOT USED
11	NC	NOT USED
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	NOT USED
19	VEL	POWER SUPPLY FOR EL BACK - LIGHT
20	VEL	POWER SUPPLY FOR EL BACK - LIGHT