

EXAMINED BY : <i>Vincent Uh</i>	EMERGING DISPLAY TECHNOLOGIES CORPORATION	FILE NO . CAS-00923
APPROVED BY: <i>Eric Lee</i>		ISSUE : DEC.15,2004
		TOTAL PAGE : 9
		VERSION : 4
CUSTOMER	ACCEPTANCE	SPECIFICATIONS
MODEL NO . : <u>1 2 A 0 0 (E L T Y P E S)</u> FOR MESSRS : _____ CUSTOMER'S APPROVAL DATE : _____ BY : _____		

EMERGING DISPLAY TECHNOLOGIES CORPORATION

MODEL NO.

12A00(EL TYPES)

VERSION

4

PAGE

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RECORDS OF REVISION

DOC . FIRST ISSUE

OCT.15,1997

DATE

REVISED
PAGE
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SUMMARY

DEC.29,2003

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NUMBERING SYSTEM
DELETE

Module type : W : Wide Temp. Module

EG12A00GEW → EW12A00GEW

1

2. MECHANICAL SPECIFICATIONS

DELETE : NOTE : N.T. , NOTE : W.T.

2

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.

I T E M	OPERATING		STORAGE		REMARK
	MIN.	MAX.	MIN.	MAX.	
AMBIENT TEMPERATURE	-20 °C	60 °C	-30 °C	70 °C	

ADD NOTE(2),NOTE(3)

3

4. ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
POWER SUPPLY CURRENT (INCLUDE DC TO DC ONVERTER)	IDD	VDD-VSS=5V	—	2.5	—	mA
RESET TIME	tR	—	1.0	—	1000	μS
RECOMMENDED LCD DRIVING VOLTAGE	VDD - VO	N.T.	Ta = 0°C	—	6.0	V
			Ta = 25°C	—	5.5	V
			Ta = 50°C	—	5.0	V
	∅ = 10° θ = 0°	W.T.	Ta = -20°C	—	7.6	V
			Ta = 25°C	—	5.5	V
			Ta = 60°C	—	5.0	V

PARAMETER	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
POWER SUPPLY CURRENT (INCLUDE DC TO DC ONVERTER)	IDD	VDD-VSS=5V	—	2.5	5	mA
RESET TIME	tR	—	1.0	—	1000	μS
RECOMMENDED LCD DRIVING VOLTAGE	VDD - VO ∅ = 10° θ = 0°	Ta = -20°C	5.0	5.5	6.0	V
		Ta = 25°C	5.0	5.5	6.0	V
		Ta = 60°C	4.7	5.2	5.7	V

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6. OPTICAL CHARACTERISTICS

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	∅ = 10° θ = 0°	K	—	5	—	1
	FSTN			—	5	—	1
REPOSE TIME	N.T.	∅ = 10° θ = 0°	Ta = 25°C	—	150	—	ms
				—	150	—	
				—	1337	—	
				—	77	—	
	W.T.	∅ = 10° θ = 0°	Ta = 60°C	—	38	—	
				—	1904	—	
				—	95	—	
				—	51	—	
THE BRIGHTNESS OF BACK-LIGHT	L	IF = 120 mA	—	4	—	cd/m2	1
PEAK EMISSION WAVELENGTH	λP	IF = 120 mA	—	570	—	nm	1

I T E M		SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	NOTE	
VIEWING ANGLE	STN	∅ 2 - ∅ 1	K ≥ 1.4	40	—	—	deg.	1	
	FSTN			50	—	—	deg.	1	
CONTRAST	STN	K	∅ = 10° θ = 0°	—	5	—	—	1	
	FSTN			—	5	—	—	1	
REPOSE TIME	tr (rise)	∅ = 10° θ = 0°	Ta = -20°C	—	5538	11076	ms	1	
			Ta = 25°C	—	228	456			
			Ta = 60°C	—	150	300			
	tf (fall)		Ta = -20°C	—	2316	4632			
			Ta = 25°C	—	174	348			
			Ta = 60°C	—	110	220			
THE BRIGHTNESS OF MODULE		B	IF = 120 mA	2	4	—	cd/m2	1	

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SUMMARY

OCT.09,2004

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NUMBERING SYSTEM

LCD type+ LCD color	Code Value		LCD type+ LCD color	Code Value
STN+ Yellow-Green	Y		STN+ Yellow-Green	Y
STN+Gray	G		STN+Gray	G
FSTN+White	F	→	FSTN+White	F
			STN+Blue	B
			FSTN+Black	N

2

3.2 ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS

AMBIENT TEMPERATURE : 60°C MAX. → 50°C MAX. , 70°C MAX. → 60°C MAX

NOTE (2) : 70°C → 60°C

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4. ELECTRICAL CHARACTERISTICS

DELETE NOTE (4)

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6. OPTICAL CHARACTERISTICS

I T E M	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	NOTE
THE BRIGHTNESS OF MODULE	B	IF = 120 mA	2	4	—	cd/m ²	1

I T E M	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	NOTE
THE BRIGHTNESS OF MODULE	B	IF = 120 mA	4.5 6.8	5.5 8.3	—	cd/m ²	1, 2 1, 3

6

7. OUTLINE DIMENSIONS

MODIFY A.A. 9.04 → 9.54 , PCB PAD POSITION 1.5 → 1.8

ADD NOTE MARK Δ

NOT SPECIFIED TOLERANCE IS ± 0.3 mm → ± 0.5 mm

DEC.15,2004

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NUMBERING SYSTEM

ADD POLARIZER MODE : TRANSMISSIVE , BACKLIGHT : EL
CODE VALUE : F

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6. OPTICAL CHARACTERISTICS

I T E M	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	NOTE
CONTRAST	STN FSTN	∅ = 10° θ = 0°	— 5	5 —	— —	— —	1 1
THE BRIGHTNESS OF MODULE	B	IF = 120 mA	4.5 6.8	5.5 8.3	—	cd/m ²	1, 2 1, 3

I T E M	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	NOTE
CONTRAST	STN FSTN	∅ = 10° θ = 0°	2.0 2.0	3.5 3.5	— —	— —	1 1
THE BRIGHTNESS OF MODULE	L	∅ = 10°, θ = 0°	4.5 6.8	5.5 8.3	—	cd/m ²	1, 2 1, 3

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10. BLOCK DIAGRAM

ADD ※IC1, IC2 : SED1520D0A OR EQUIVALENT

NUMBERING SYSTEM

Polarizer Mode	Backlight	Code value
Transflective	EL	E
Transmissive	EL	F

Backlight Color	Code Value
White	W

E	W	1	2	A	0	0	G	E	W
---	---	---	---	---	---	---	---	---	---

LCD type+ LCD color	Code Value
STN+ Yellow-Green	Y
STN+Gray	G
FSTN+White	F
STN+Blue	B
FSTN+Black	N

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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 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

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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	-20°C	50°C	-30°C	60°C	NOTE(2), (3)
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		

NOTE(2) : Ta AT -30°C : 48HR MAX.

60°C : 168HR MAX.

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

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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	5	mA
LCD DISPLAY DUTY RATIO		DUTY	—	—	3 2	—	—
OSCILLATION FREQUENCY		f OSC	VDD = 5 . 0 V RF = 1 . 0MΩ	1 5	1 8	2 1	KHz
			VDD = 3 . 0 V RF = 1 . 0MΩ	1 1	1 6	2 1	KHz
RESET TIME		t R	—	1 . 0	—	1 0 0 0	uS
RECOMMENDED LCD DRIVING VOLTAGE		VDD - VO Ø= 10° θ = 0°	Ta = - 20°C	5.0	5.5	6.0	V
			Ta = 25°C	5.0	5.5	6.0	V
			Ta = 60°C	4.7	5.2	5.7	V
POWER SUPPLY FOR EL		VEL	f EL = 4 0 0 Hz	—	1 1 0	—	Vrms
		IEL	VEL = 1 1 0 V f EL = 4 0 0 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

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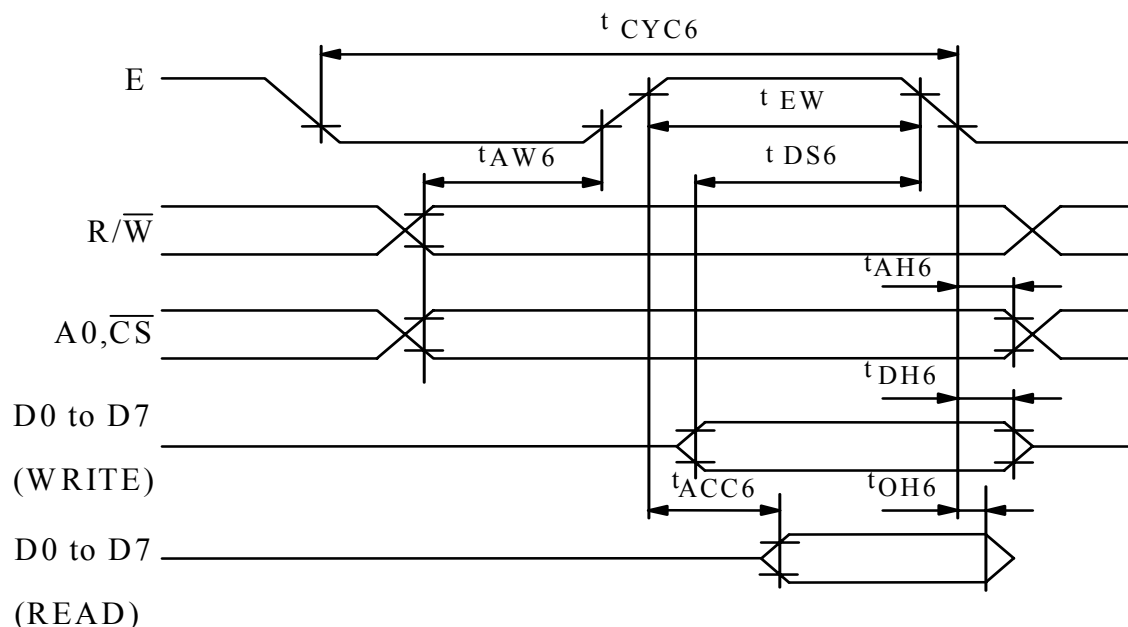
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5. TIMING CHARACTERISTICS

MPU BUS READ/WRITE (68-FAMILY MPU)



PARAMETER		SYMBOL	CONDITION	RATING		UNIT	SIGNAL
				MIN	MAX		
SYSTEM CYCLE TIME		t_{CYC6}		1000	—	nS	A0,CS,R/W
ADDRESS SETUP TIME		t_{AW6}		20	—	nS	
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 :

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

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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 ANGLE	STN	Ø 2 - Ø 1	K ≥ 1.4		4 0	—	—	deg.	1
	FSTN				5 0	—	—	deg.	1
CONTRAST	STN	K	Ø = 10° θ = 0°		2.0	3.5	—	—	1
	FSTN				2.0	3.5	—	—	1
REPOSE TIME		tr (rise)	Ø =10° θ = 0°	Ta = -20°C	—	5538	11076	ms	1
				Ta = 25°C	—	228	456		
				Ta = 50°C	—	150	300		
		tf (fall)		Ta = -20°C	—	2316	4632		
				Ta = 25°C	—	174	348		
				Ta = 50°C	—	110	220		
THE BRIGHTNESS OF MODULE		L	Ø =10° , θ = 0°		4.5	5.5	—	cd/m2	1, 2
					6.8	8.3			1, 3

NOTE (1) : PLEASE REFER TO :

CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS.

E U - 002 A

NOTE (2) : POLARIZER MODE : TRANSFLECTIVE.

NOTE (3) : POLARIZER MODE : TRANSMISSIVE.

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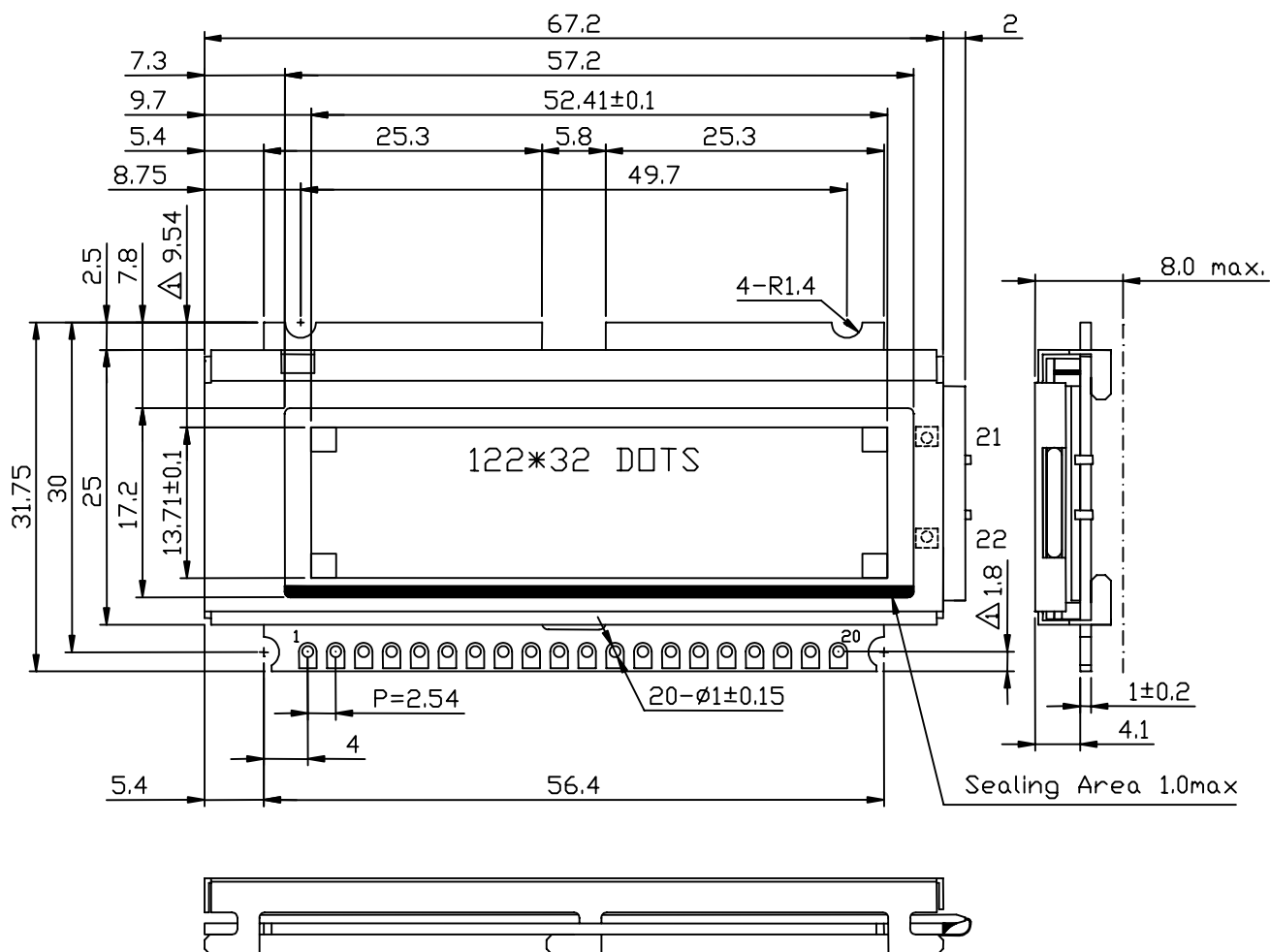
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7. OUTLINE DIMENSIONS



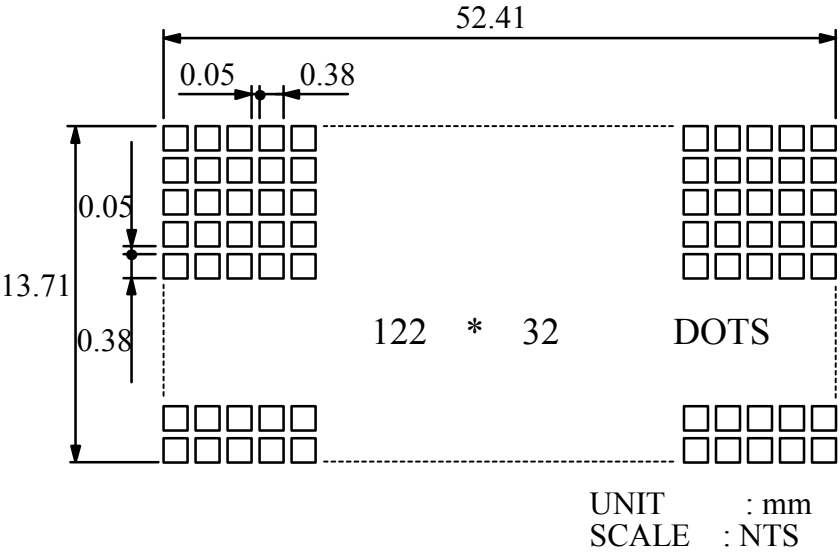
UNIT : mm

SCALE : NTS

NOT SPECIFIED TOLERANCE IS ± 0.5

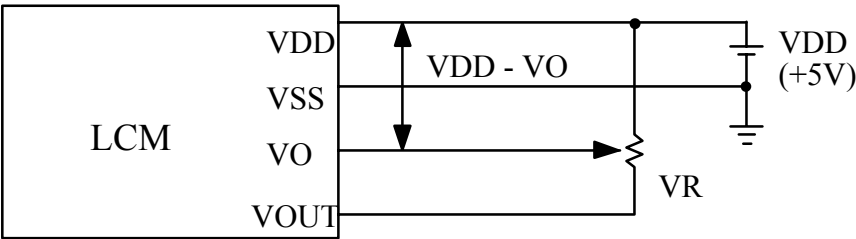
NOTE : MARK Δ MODIFY (NUMBER NOTE MODIFY VERSION)

8. DETAIL DRAWING OF DOT MATRIX



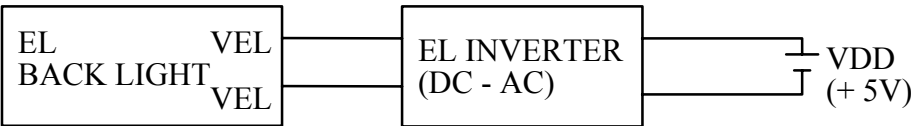
9. POWER SUPPLY

9.1 POWER SUPPLY FOR LCM



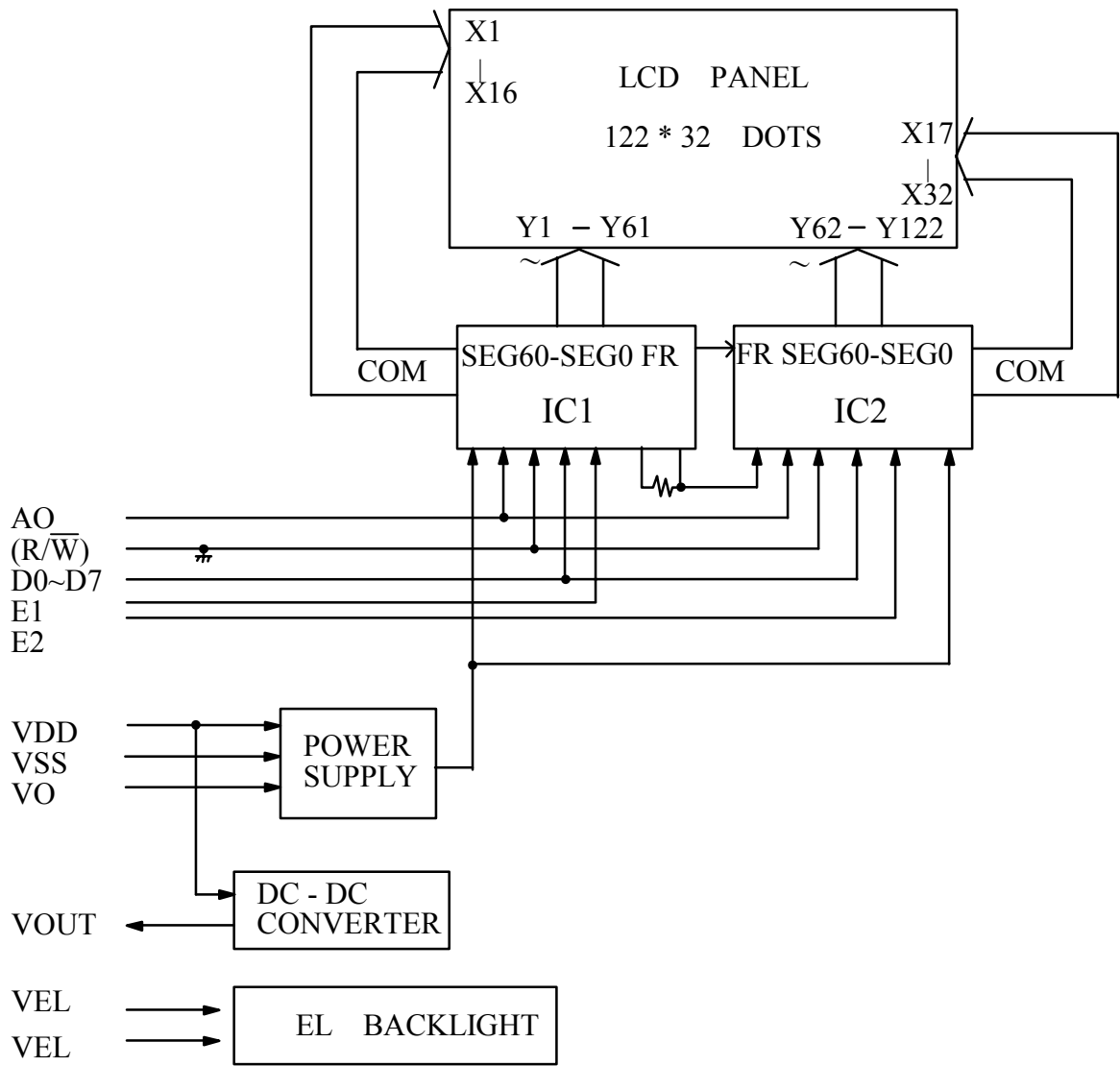
VDD-VO : LCD DRIVING VOLTAGE
VR : 10KΩ ~20KΩ

9.2 POWER SUPPLY FOR EL BACK LIGHT



RECOMMENDED INVERTER :
SOUN50150(SUPER OPTICS)

10. BLOCK DIAGRAM



※IC1,IC2 : SED1520D0A OR EQUIVALENT

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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