EXAMINED BY : Vincent Wu	EMERGING DISPLAY	FILE NO . CAS-10251
		ISSUE : MAR.07,2003
APPROVED BY: MS Huang	TECHNOLOGIES CORPORATION	TOTAL PAGE : 7
		VERSION : 3

CUSTOMER ACCEPTANCE SPECIFICATIONS

MODEL NO. :

16290(LED TYPES)

FOR MESSRS :

_____

CUSTOMER'S APPROVAL

DATE :

_____

BY :

_____

EMERGING DISPLAY TECHNOLOGIES CORPORATION	MODEL NO. 16290(LED TYPES)	VERSION 3
RECORDS OF REVISION	DOC . FIRST ISSUE JUL.03,2001	

DATE	REVISED PAGE NO.	SUMMARY
NOV.26,2002	3	4. ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	CONDITION	MIN .	TYP .	MAX .	UNIT
H LEVEL INPUT VOLTAGE	VIH	—	2.2	—	—	V
L LEVEL INPUT VOLTAGE	VIL	—	—	—	0.6	V
H LEVEL OUTPUT VOLTAGE	VOH	–IOH = 0.2 mA	2.4	—	—	V
L LEVEL OUTPUT VOLTAGE	VOL	IOL = 1.2 mA	—	—	0.4	V
POWER SUPPLY CURRENT (LOGIC)	IDD	VDD = 5.0 V	—	2.0	5.0	mA
RECOMMENDED LCD DRIVING VOLTAGE	VDD – VO θ = 0° ∅ = 10° DUTY = 1/16	Ta = -20 °C	—	4.5	—	V
		Ta = 25 °C	—	4.5	—	V
		Ta = 70 °C	—	4.5	—	V
CLOCK OSCILLATION FREQUENCY	FOSC	Ta = 25 °C	—	270	—	KHZ
LED FORWARD VOLTAGE	VF	IF = 360 mA	—	4.2	4.6	V
LED FORWARD CURRENT	IF	—	—	360	—	mA
LED REVERSE CURRENT	IR	VR = 8 V	—	—	200	uA

PARAMETER	SYMBOL		CONDITION	MIN .	TYP .	MAX .	UNIT
H LEVEL INPUT VOLTAGE NOTE (1)	VIH	VDD=5V	—	2.2	—	VDD	V
		VDD=3.3V	—	0.7VDD	—	VDD	
L LEVEL INPUT VOLTAGE NOTE (1)	VIL	VDD=5V	—	-0.3	—	0.6	V
		VDD=3.3V	—	-0.3	—	0.55	
H LEVEL OUTPUT VOLTAGE NOTE (2)	VOH	VDD=5V	IOH = – 0.2 mA	2.4	—	—	V
		VDD=3.3V	IOH = – 0.1 mA	0.75VDD	—	—	
L LEVEL OUTPUT VOLTAGE NOTE (2)	VOL	VDD=5V	IOL = 1.2 mA	—	—	0.4	V
		VDD=3.3V	IOL = 0.1 mA	—	—	0.2VDD	
POWER SUPPLY CURRENT (LOGIC)	IDD		VDD = 5.0 V	—	2.0	5.0	mA
			VDD = 3.3 V	—	2.0	5.0	
RECOMMENDED LCD DRIVING VOLTAGE	VDD – VO θ = 0° ∅ = 10° DUTY = 1/16		Ta =-20°C	4.4	4.7	5.0	V
			Ta = 25°C	4.2	4.5	4.8	V
			Ta = 70°C	4.0	4.3	4.6	V
CLOCK OSCILLATION FREQUENCY	FOSC		Ta = 25 °C	—	270	—	KHZ
LED FORWARD VOLTAGE	VF		IF = 360 mA	—	4.2	4.6	V
LED FORWARD CURRENT	IF		—	—	360	—	mA
LED REVERSE CURRENT	IR		VR = 8 V	—	—	200	uA

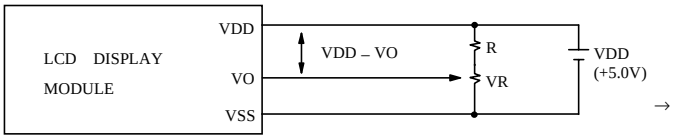
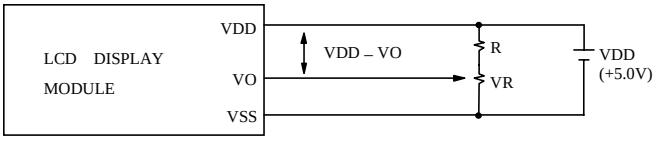
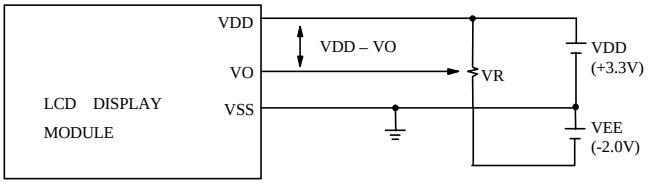
NOTE (1) : EXCEPT OSC1
NOTE (2) : APPLIED TO TERMINALS DB0~DB7
NOTE (3) : NT3881DH-01/ ST7066U-0A-B / S6A006 (VDD=5.0V) ST7066U-0A-B / S6A0069

5. OPTICAL CHARACTERISTICS

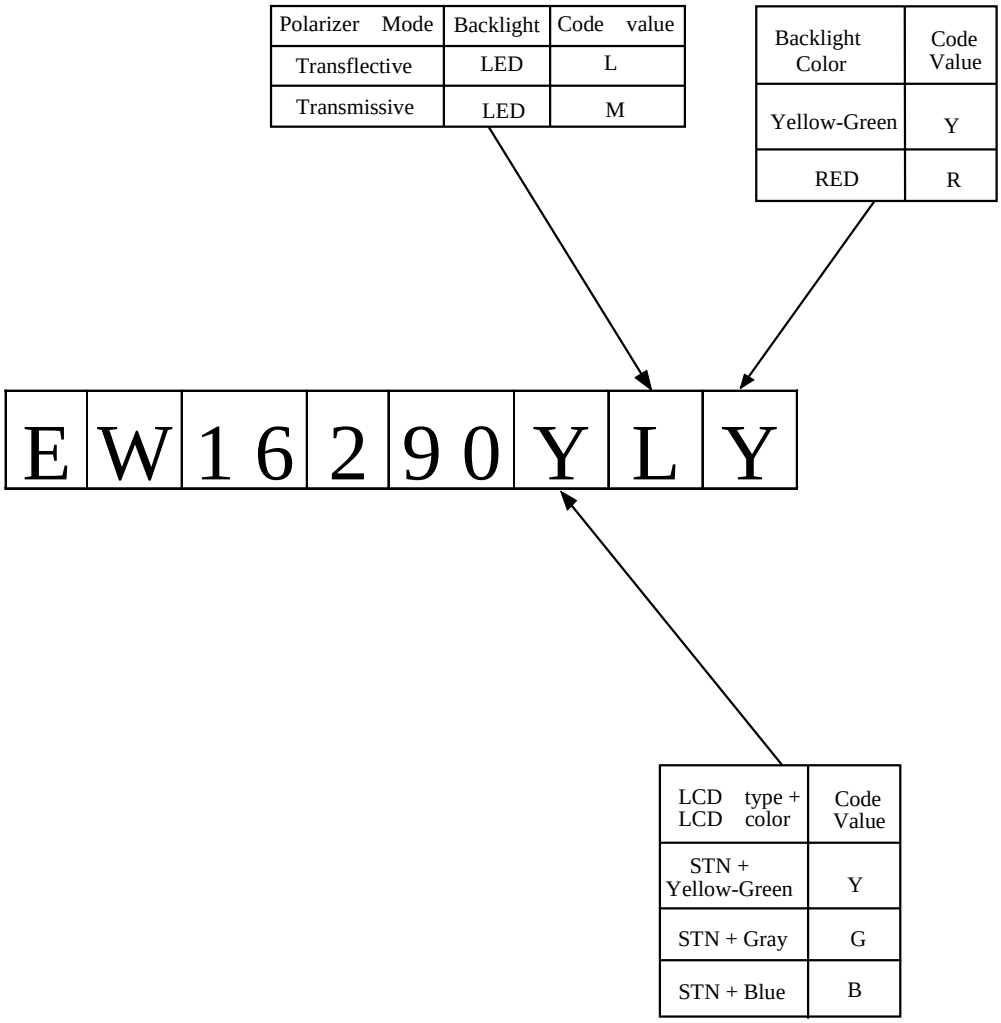
ITEM	SYMBOL	CONDITION	MIN .	TYP .	MAX .	UNIT	NOTE
THE BRIGHTNESS OF BACK- LIGHT	L	IF = 360 mA	—	15	—	cd/m^2	1, 2
			—	35	—		1, 3

ITEM	SYMBOL	CONDITION	MIN .	TYP .	MAX .	UNIT	NOTE
THE BRIGHTNESS OF MODULE	L	IF = 360 mA	15	25	—	cd/m^2	1, 2
			22	35	—		1, 3

EMERGING DISPLAY TECHNOLOGIES CORPORATION	MODEL NO. 16290(LED TYPES)	VERSION 3
RECORDS OF REVISION	DOC . FIRST ISSUE JUL.03,2001	

DATE	REVISED PAGE NO.	SUMMARY
NOV.26,2002	7	10.1 POWER SUPPLY FOR LCD MODULE  → VDD – VO: LCD DRIVING VOLTAGE VR: 10KΩ ~ 20KΩ RECOMMENDED RESISTOR R : VDD – VO ≧ 1.5 V 10.1.1 NT3881DH-01/ ST7066U-0A-B/ S6A0069  VDD – VO: LCD DRIVING VOLTAGE VR: 20KΩ RECOMMENDED RESISTOR R : VDD – VO ≧ 1.5 V 10.1.2 ST7066U-0A-B/ S6A0069  VDD – VO: LCD DRIVING VOLTAGE VR: 20KΩ
MAR.07,2003	7	10.2 POWER SUPPLY FOR LED BACK-LIGHT RECOMMENDED RESISTOR RL : 4.5Ω,1/2 WATT (CONTROLLED BY USER) → RECOMMENDED RESISTOR RL : 2.0~3.5Ω,1/2 WATT (CONTROLLED BY USER) *THE BRIGHTNESS WOULD BE ALTERED SUBJECT TO DIFFERENT VALUES OF RL

NUMBERING SYSTEM



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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 : KS0066
PLEASE REFER TO :

CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS :

E U – C S 0 0 6 6

1.3 THIS INDIVIDUAL SPECIFICATIONS IS PRIOR TO GENERAL SPECIFICATIONS .

2. MECHANICAL SPECIFICATIONS

(1)	NUMBER OF CHARACTER	16 CH * 2 LINES
(2)	MODULE SIZE	122.0W * 44.0H * 14.0D (max.) mm
(3)	EFFECTIVE AREA	99.0W * 24.0H mm
(4)	CHARACTER FONT	5 * 7 DOTS + CURSOR
(5)	CHARACTER SIZE	4.84W * 9.66H mm
(6)	CHARACTER PITCH	6.0W * 10.34H mm
(7)	DOT SIZE	0.92W * 1.10H mm
(8)	DOT PITCH	0.98W * 1.16H mm
(9)	LCD TYPE*	
(10)	DRIVING METHOD	1 / 16 DUTY MULTIPLEX DRIVE
(11)	VIEWING DIRECTION	6 O'CLOCK
(12)	BACK – LIGHT*	

* 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
POWER SUPPLY FOR LOGIC	VDD – VSS	0	7.0	V	
POWER SUPPLY FOR LCD DRIVE	VDD – VO	0	13.0	V	
INPUT VOLTAGE	VI	VSS	VDD	V	
STATIC ELECTRICITY	—	—	100	V	NOTE (1)
LED POWER DISSIPATION	PD	—	4.14	W	
LED FORWARD CURRENT	IF	—	900	mA	
LED REVERSE VOLTAGE	VR	—	8	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.

ITEM	OPERATING		STORAGE		REMARK
	MIN.	MAX.	MIN.	MAX.	
AMBIENT TEMPERATURE	-20°C	70°C	-30°C	80°C	NOTE (2), (3)
HUMIDITY	—	90 % RH	—	90 % RH	WITHOUT CONDENSATION
VIBRATION	—	4.9 m/s^2 (0.5G)	—	19.6 m/s^2 (2G)	
SHOCK	—	29.4 m/s^2 (3G)	—	490.0 m/s^2 (50G)	XYZ DIRECTIONS
CORROSIVE GAS	NOT ACCEPTABLE		NOT ACCEPTABLE		

NOTE (2) : Ta AT -20°C (-30°C FOR W.T.) : 48HR MAX.
70°C (80°C FOR W.T.) : 168HR MAX.
NOTE (3) : BACKGROUND COLOR CHANGES SLIGHTLY DEPENDING ON AMBIENT TEMPERATURE THIS PHENOMENON IS REVERSIBLE.

4. ELECTRICAL CHARACTERISTICS

Ta = 25 °C

PARAMETER	SYMBOL		CONDITION	MIN.	TYP.	MAX.	UNIT
H LEVEL INPUT VOLTAGE NOTE (1)	VIH	VDD=5V	—	2.2	—	VDD	V
		VDD=3.3V	—	0.7VDD	—	VDD	
L LEVEL INPUT VOLTAGE NOTE (1)	VIL	VDD=5V	—	-0.3	—	0.6	V
		VDD=3.3V	—	-0.3	—	0.55	
H LEVEL OUTPUT VOLTAGE NOTE (2)	VOH	VDD=5V	IOH = – 0.2 mA	2.4	—	—	V
		VDD=3.3V	IOH = – 0.1 mA	0.75VDD	—	—	
L LEVEL OUTPUT VOLTAGE NOTE (2)	VOL	VDD=5V	IOL = 1.2 mA	—	—	0.4	V
		VDD=3.3V	IOL = 0.1 mA	—	—	0.2VDD	
POWER SUPPLY CURRENT (LOGIC)	IDD		VDD = 5.0 V	—	2.0	5.0	mA
			VDD = 3.3 V	—	2.0	5.0	
RECOMMENDED LCD DRIVING VOLTAGE	VDD – VO θ = 0° ∅ = 10° DUTY = 1/16		Ta =-20°C	4.4	4.7	5.0	V
			Ta = 25°C	4.2	4.5	4.8	V
			Ta = 70°C	4.0	4.3	4.6	V
CLOCK OSCILLATION FREQUENCY	FOSC		Ta = 25 °C	—	270	—	KHZ
LED FORWARD VOLTAGE	VF		IF = 360 mA	—	4.2	4.6	V
LED FORWARD CURRENT	IF		—	—	360	—	mA
LED REVERSE CURRENT	IR		VR = 8 V	—	—	200	uA

NOTE (1) : EXCEPT OSC1

NOTE (2) : APPLIED TO TERMINALS DB0~DB7

NOTE (3) : NT3881DH-01 / ST7066U-0A-B / S6A0069 (VDD=5.0V) , ST7066U-0A-B / S6A0069 (VDD=3.3V)

5. OPTICAL CHARACTERISTICS .

Ta = 25 °C

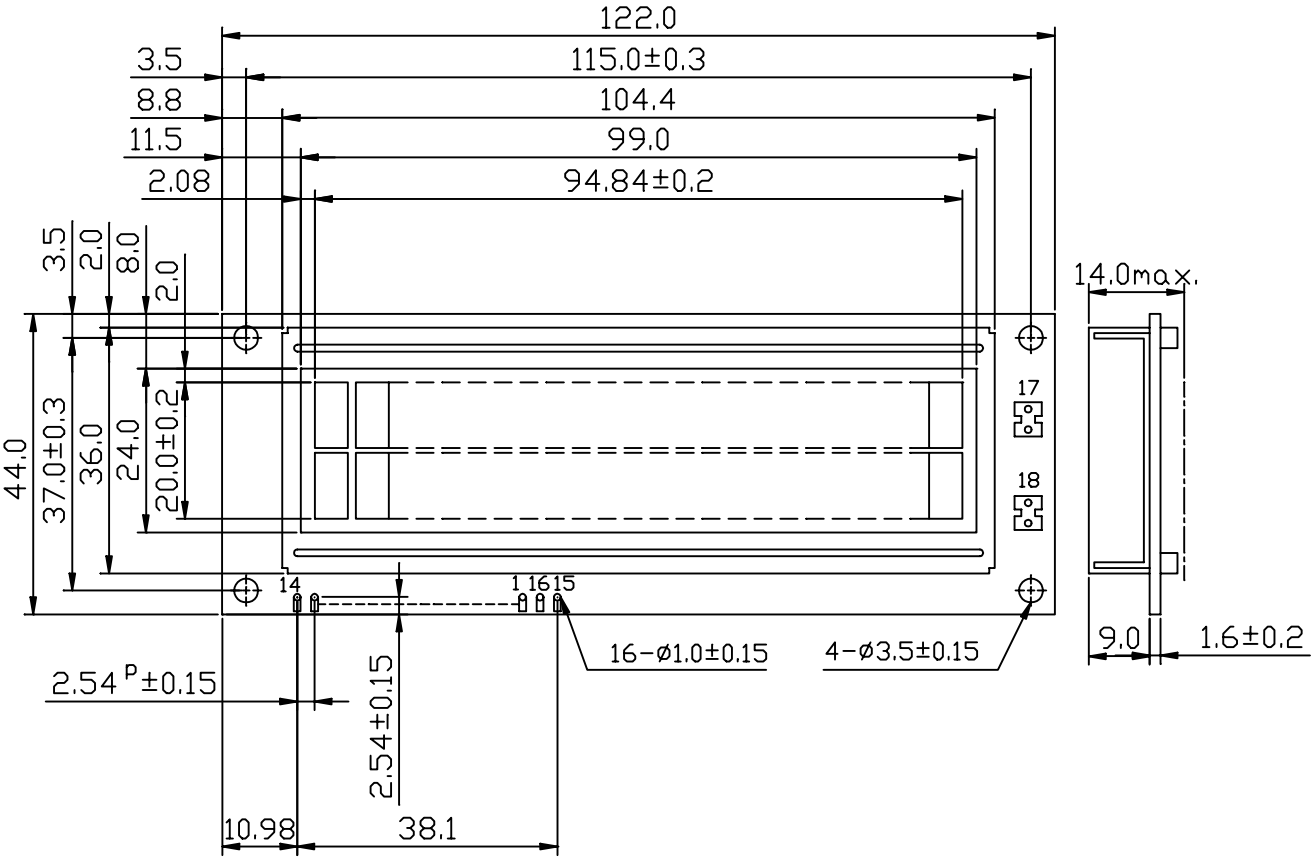
ITEM	SYMBOL	CONDITION		MIN.	TYP.	MAX.	UNIT	NOTE
VIEWING AREA	∅2 – ∅1	K≧ 1.4		30	—	—	deg.	1
CONTRAST RATIO	K	∅ = 10° θ = 0°		5	—	—		1
RESPONSE TIME	tr (rise)	∅ = 10° θ = 0°	Ta = -20°C	—	1790	—	ms	1
			Ta = 25°C	—	110	—		
			Ta = 70°C	—	50	—		
	tf (fall)		Ta = -20°C	—	1770	—		
			Ta = 25°C	—	100	—		
			Ta = 70°C	—	40	—		
THE BRIGHTNESS OF MODULE	L	IF = 360 mA		15	25	—	cd/m²	1, 2
				22	35	—		1, 3
PEAK EMISSION WAVELENGTH	λP	IF = 360 mA		—	570	—	nm	1

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

NOTE (2) : POLARIZER MODE : TRANSFLECTIVE

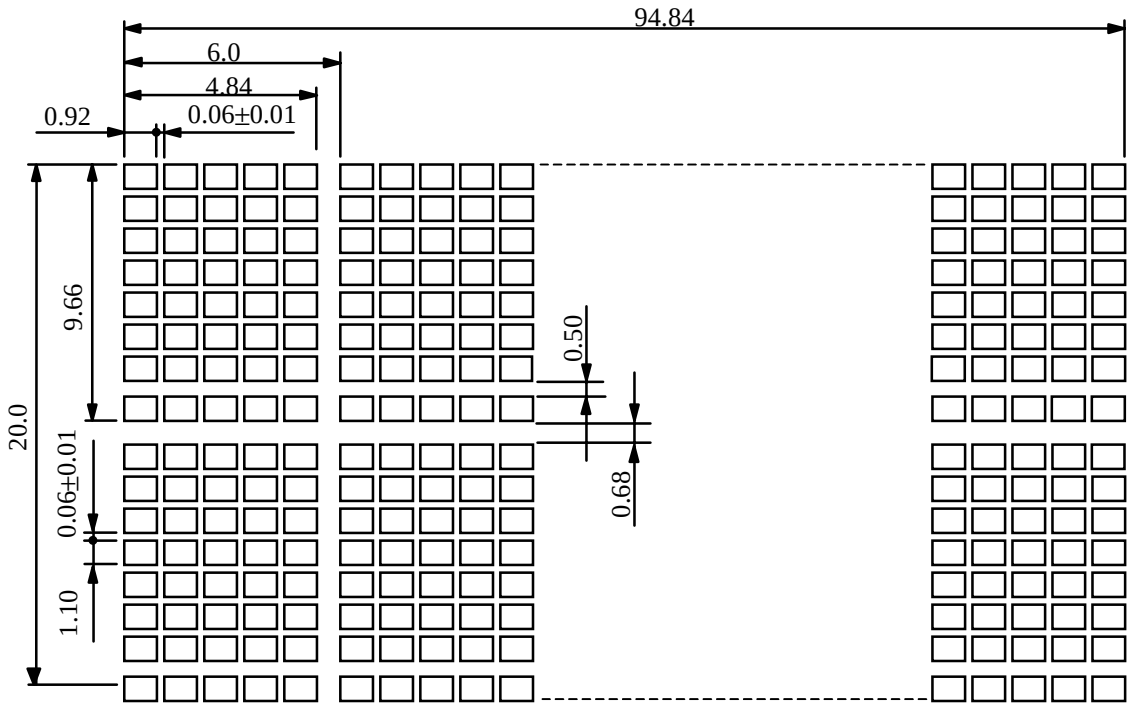
NOTE (3) : POLARIZER MODE : TRANSMISSIVE

6. OUTLINE DIMENSION



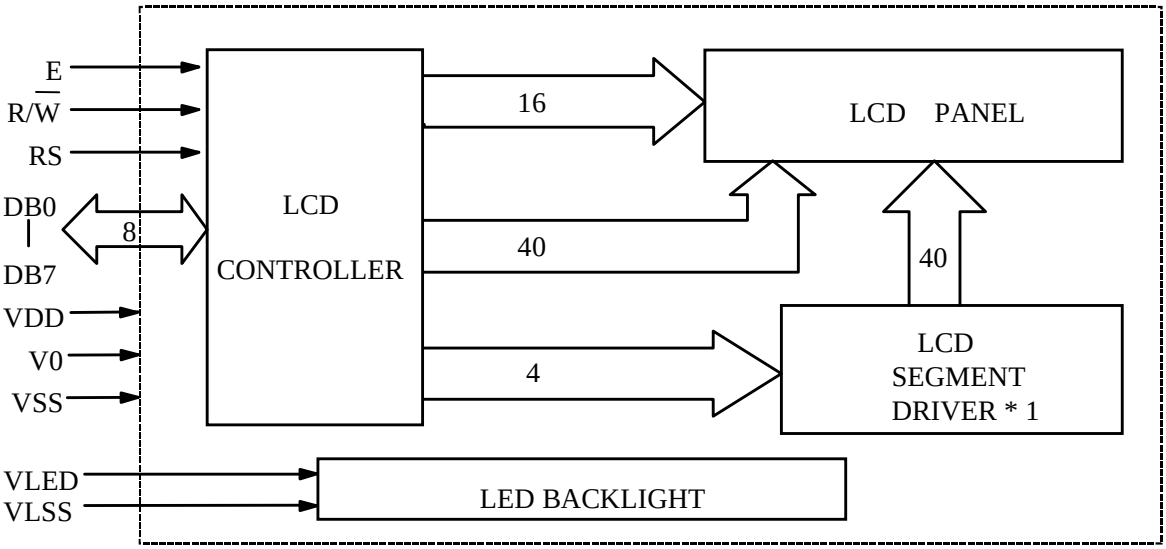
UNIT : mm
SCALE : NTS
NOT SPECIFIED TOLERANCE IS ± 0.5mm

7. DETAIL DRAWING OF DOT MATRIX



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

8. BLOCK DIAGRAM



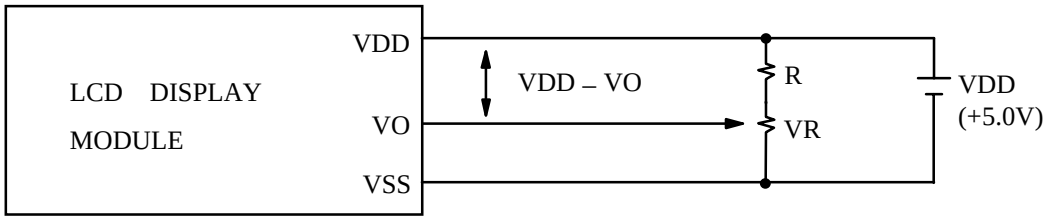
9. INTERFACE SIGNALS

PIN NO.	SYMBOL	DESCRIPTION	FUNCTION
1	VSS	GROUND	0V (GND)
2	VDD	POWER SUPPLY FOR LOGIC CIRCUIT	
3	VO	LCD CONTRAST ADJUSTMENT	
4	RS	INSTRUCTION/DATA REGISTER SELECTION	RS = 0 : INSTRUCTION REGISTER RS = 1 : DATA REGISTER
5	R / $\overline{W}$	READ/WRITE SELECTION	R / $\overline{W}$ = 0 : REGISTER WRITE R / $\overline{W}$ = 1 : REGISTER READ
6	E	ENABLE INPUT	
7	DB0	DATA INPUT/OUTPUT LINES	4 BIT/8BIT SELECTABLE 4 BIT : DB4 - DB7 8 BIT : DB0 - DB7
8	DB1		
9	DB2		
10	DB3		
11	DB4		
12	DB5		
13	DB6		
14	DB7		
15	VLED	POWER SUPPLY FOR LED BACKLIGHT (ANODE)	
16	VLSS	POWER SUPPLY FOR LED BACKLIGHT (CATHODE)	0V (GND)
17	VLED	POWER SUPPLY FOR LED BACKLIGHT (ANODE)	
18	VLSS	POWER SUPPLY FOR LED BACKLIGHT (CATHODE)	0V (GND)

10. POWER SUPPLY

10.1 POWER SUPPLY FOR LCD MODULE

10.1.1 NT3881DH-01 / ST7066U-0A-B/ S6A0069

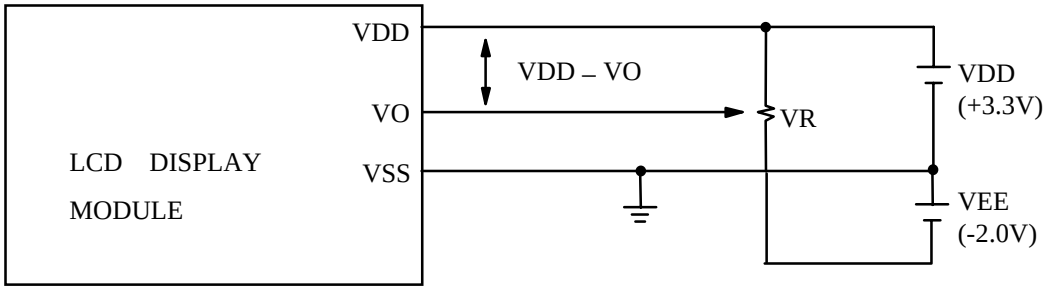


VDD – VO: LCD DRIVING VOLTAGE

VR: 20KΩ

RECOMMENDED RESISTOR R : VDD – VO ≧ 1.5 V

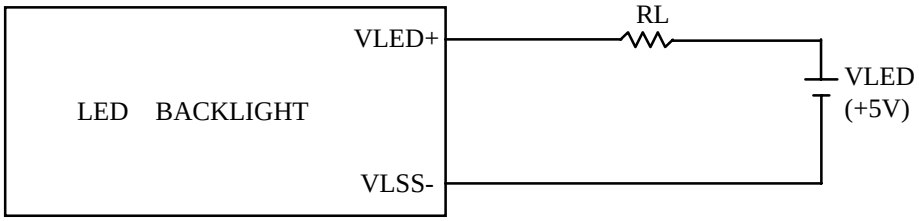
10.1.2 ST7066U-0A-B/ S6A0069



VDD – VO: LCD DRIVING VOLTAGE

VR: 20KΩ

10.2 POWER SUPPLY FOR LED BACK-LIGHT



RECOMMENDED RESISTOR RL : 2.0~3.5Ω,1/2 WATT (CONTROLLED BY USER)
*THE BRIGHTNESS WOULD BE ALTERED SUBJECT TO DIFFERENT VLUES OF RL

11. DISPLAY DATA RAM ADDRESS

CHARACTER	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
LINE 1	80	81	82	83	84	85	86	87	88	89	8A	8B	8C	8D	8E	8F
LINE 2	C0	C1	C2	C3	C4	C5	C6	C7	C8	C9	CA	CB	CC	CD	CE	CF