

Polarizer Mode	Backlight	Code value
Transflective	EL	E

Backlight Color	Code Value
White	W

E W 1 3 D 0 0 G E W

LCD type + LCD color	Code Value
STN + Gray	G
FSTN + White	F

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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 : T6963C

PLEASE REFER TO :

CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS :

E U - T 6 9 6 3 C

1.3 THIS INDIVIDUAL SPECIFICATION IS PRIOR TO GENERAL SPECIFICATIONS .

2. MECHANICAL SPECIFICATIONS

- | | | |
|--------------------|-------|--------------------------------|
| (1) NUMBER OF DOTS | ----- | 128W * 128H DOTS |
| (2) MODULE SIZE | ----- | 84.4W * 100.0H * 14.0D(max) mm |
| (3) VIEWING AREA | ----- | 62.0W * 62.0H mm |
| (4) ACTIVE AREA | ----- | 55.01W * 55.01H mm |
| (5) DOT SIZE | ----- | 0.4W * 0.4H mm |
| (6) DOT PITCH | ----- | 0.43W * 0.43H mm |
| (7) LCD TYPE * | | |
| (8) DRIVING METHOD | ----- | 1 / 128 DUTY MULTIPLEX DRIVE |
| (9) BACKLIGHT | ----- | EL , COLOR:WHITE |

* PLEASE REFER TO NUMBERING SYSTEM .

3. ABSOLUTE MAXIMUM RATINGS

3.1 ELECTRICAL ABSOLUTE MAXIMUM RATINGS .

PARAMETER		SYMBOL	MIN .	MAX .	UNIT	REMARK
POWER SUPPLY FOR LOGIC		VDD — VSS	0	7.0	V	
POWER SUPPLY FOR LCD DRIVING		VDD — VEE	0	22.0	V	
INPUT VOLTAGE		VI	VSS	VDD	V	
STATIC ELECTRICITY		—	—	100	V	NOTE (1)
POWER SUPPLY FOR EL BACKLIGHT	VOLTAGE	VEL	—	AC200	Vrms	fEL=1.0KHZ 60SEC . MAX
	FREQUENCY	fEL	—	2.0	KHZ	AC115 Vrms 60SEC . 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°	60 °C	-30 °C	70 °C	NOTE (2) , (3)
HUMIDITY	—	85 % RH	—	85 % RH	WITHOUT CONDENSATION
VIBRATION	—	2.45 m/s ² (0.25 G)	—	19.6 m/s ² (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 .
70°C: 48HR 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

VEE - VSS = -12.5V

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	—	-9.0	-12.5	-16.0	V
INPUT VOLTAGE NOTE (1)	VIH	H LEVEL	VDD-2.2	—	VDD	V
	VIL	L LEVEL	0	—	0.8	V
OUTPUT VOLTAGE NOTE (1)	VOH	H LEVEL	VDD-0.3	—	VDD	V
	VOL	L LEVEL	0	—	0.3	V
POWER SUPPLY CURRENT FOR LOGIC NOTE (2)	IDD	VDD - VSS = 5.0 V VDD - VEE = 17.5 V	—	9.0	—	mA
POWER SUPPLY CURRENT FOR DRIVE NOTE (2)	IEE	VDD - VSS = 5.0 V VDD - VEE = 17.5 V	—	3.0	—	mA
RECOMMENDED LCD DRIVING VOLTAGE NOTE (3)	VDD - VEE ∅ = 10° θ = 0°	Ta = -20 °C	—	17.5	—	V
		Ta = 25 °C	—	17.5	—	
		Ta = 60 °C	—	16.5	—	
CLOCK OSCILLATION FREQUENCY	f _{osc}	—	—	5.0	—	MHZ
POWER SUPPLY FOR EL BACKLIGHT	VEL	f _{EL} = 400 HZ	—	100	—	V _{rms}
	IEL	VEL = 100 V f _{EL} = 400 HZ	—	7	—	mA _{rms}

NOTE (1): APPLIED TO TERMINALS \overline{WR} , \overline{RD} , \overline{CE} , $\overline{C/D}$, \overline{RST} , FS, DB0~DB7.

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

NOTE (3): RECOMMENDED LCD DRIVING VOLTAGE MAY FLUCTUATE ABOUT ±1.0V BY EACH MODULE.

5. OPTICAL CHARACTERISTICS

Ta = 25 °C

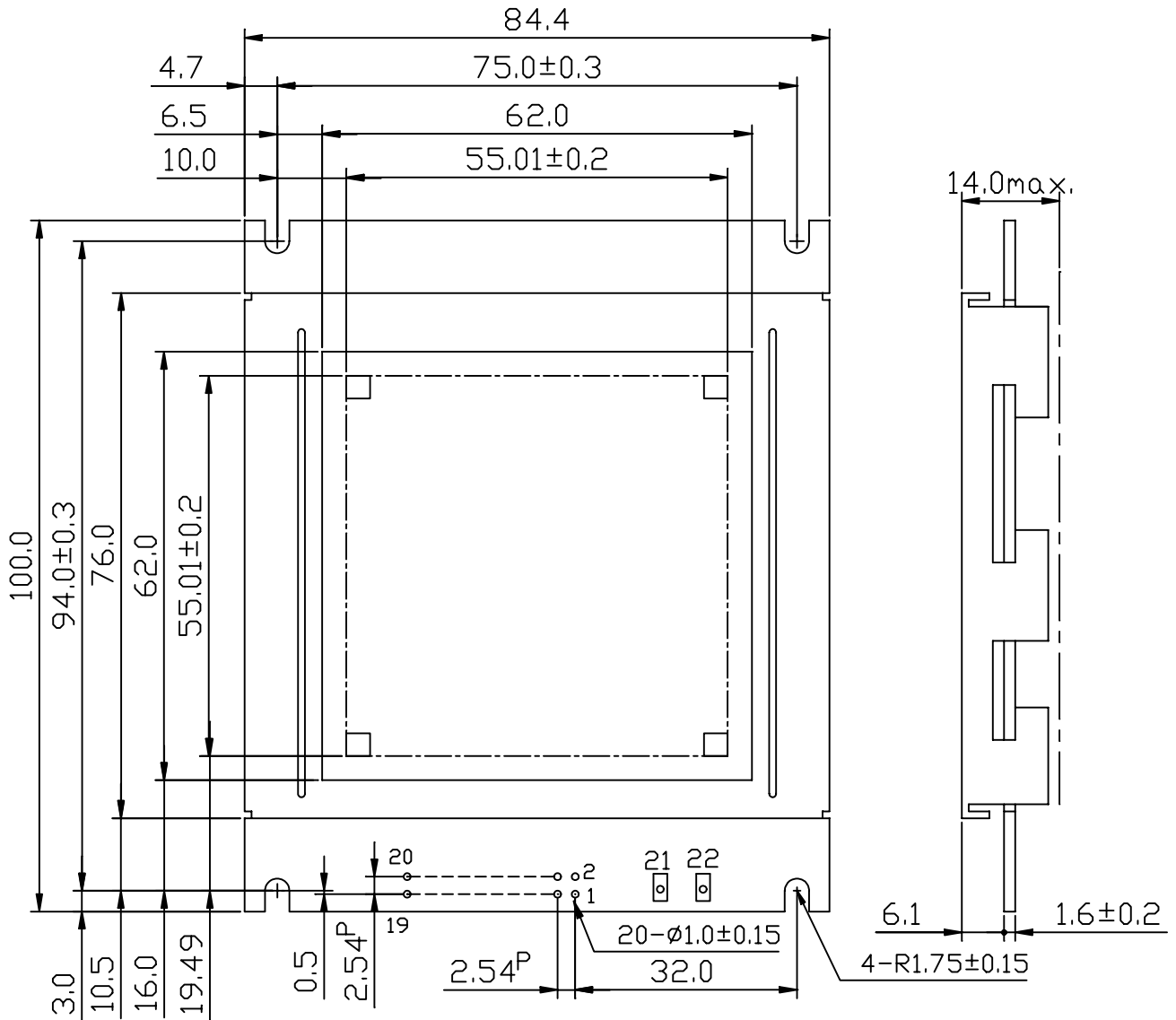
VDD = 5.0 V

VDD-VEE = 17.5V

I T E M		SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	NOTE
VIEWING AREA	STN	Ø2 - Ø1	K ≥ 1.4	40	—	—	deg.	1
	FSTN			50	—	—	deg.	1
CONTRAST RATIO	STN	K	Ø = 10° θ = 0°	—	5	—	—	1
	FSTN			5	—	—	—	1
RESPONSE TIME	tr (rise)	Ø=10° θ = 0°	Ta = -20°C	—	2886	—	ms	1
			Ta = 25°C	—	259	—		
			Ta = 60°C	—	184	—		
	tf (fall)		Ta = -20°C	—	293	—		
			Ta = 25°C	—	177	—		
			Ta = 60°C	—	110	—		
THE BRIGHTNESS OF BACK-LIGHT	B	Ø = 10° θ = 0°	10	—	—	cd/m ²	1	

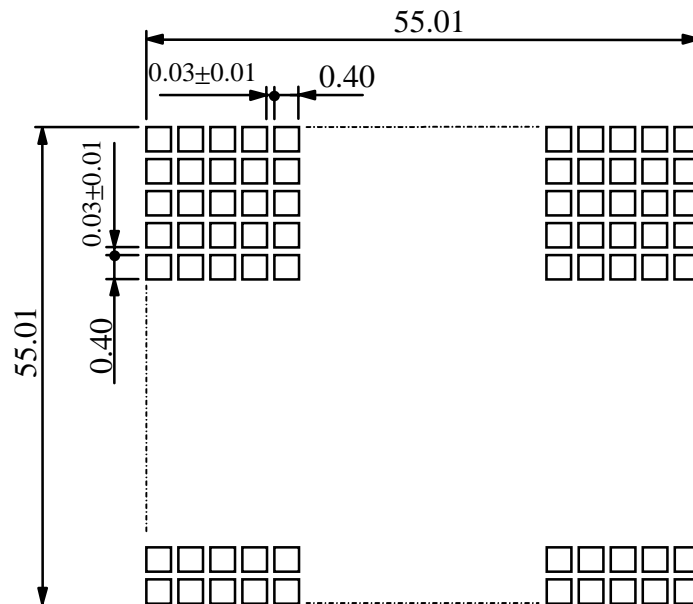
NOTE (1) : PLEASE REFER TO :
CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS.
EU - 002 A

6. OUTLINE DIMENSION



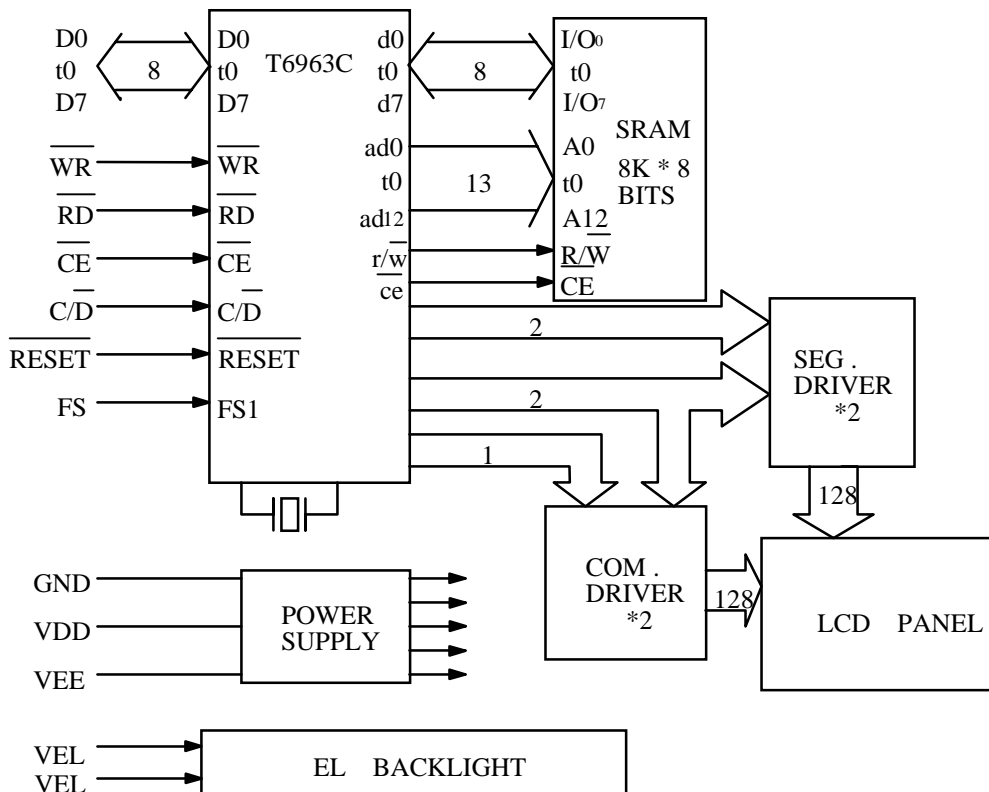
UNIT : mm
SCALE : NTS
NOT SPECIFIED TOLERANCE IS ± 0.5

7. DETAIL DRAWING OF DOT MATRIX



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

8. BLOCK DIAGRAM

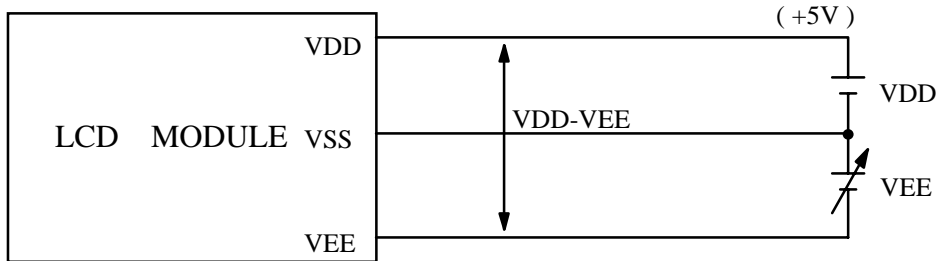


9. INTERFACE SIGNALS

PIN NO.	SIGNAL	FUNCTION
1	FGND	FRAME GROUND (0V)
2	GND	GROUND
3	VDD	POWER SUPPLY FOR LOGIC (+5V)
4	VEE	POWER SUPPLY FOR LCD DRIVE
5	$\overline{\text{WR}}$	DATA WRITE
6	$\overline{\text{RD}}$	DATA READ
7	$\overline{\text{CE}}$	CHIP ENABLE
8	$\overline{\text{C/D}}$	$\overline{\text{WR}} = "L", \overline{\text{C/D}} = "H" : \text{COMMAND WRITE}$ $\overline{\text{C/D}} = "L" : \text{DATA WRITE}$ $\overline{\text{RD}} = "L", \overline{\text{C/D}} = "H" : \text{STATUS READ}$ $\overline{\text{C/D}} = "L" : \text{DATA READ}$
9	NC	—————
10	$\overline{\text{RESET}}$	CONTROLLER RESET
11~18	D0~D7	DATA INPUT/OUTPUT
19	FS	FONT SELECT : CONNECT TO VDD : 6*8 PIXEL/FONT CONNECT TO GND : 8*8 PIXEL/FONT
20	NC	—————
21	VEL	POWER SUPPLY FOR EL BACKLIGHT
22	VEL	POWER SUPPLY FOR EL BACKLIGHT

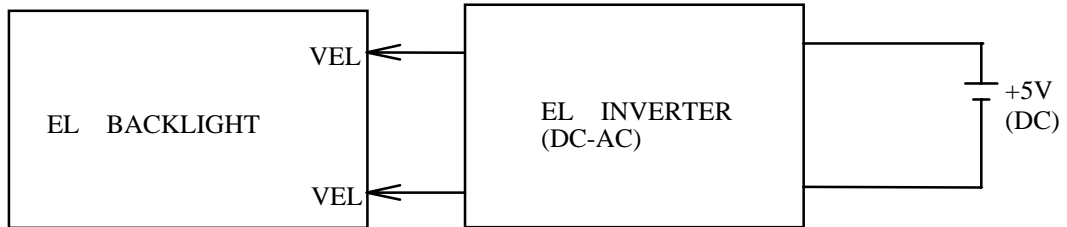
10. POWER SUPPLY

10.1 POWER SUPPLY FOR LCM



VDD-VEE : LCD DRIVING VOLTAGE

10.2 POWER SUPPLY FOR EL BACKLIGHT



RECOMMENDED INVERTER : SOUN50350 (SUPER OPTICS)

10.3 TIMING OF POWER SUPPLY AND INTERFACE SIGNAL

