

EXAMINED BY :	EMERGING DISPLAY TECHNOLOGIES CORPORATION	FILE NO . CAS-10022
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CUSTOMER	ACCEPTANCE	SPECIFICATIONS
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MODEL NO . :

24D30(EL TYPES)

FOR MESSRS :

CUSTOMER'S APPROVAL

DATE :

BY :

NUMBERING SYSTEM

Polarizer Mode	Backlight	Code value
Transflective	EL	E
Transmissive	EL	F

E W 24 D 30 G E W U

Viewing direction
NIL : 6 o'clock
U : 12 o'clock

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

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1. GENERAL SPECIFICATIONS

1.1 GENERAL SPECIFICATIONS

PLEASE REFER TO :

CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS :

EU-002A

1.2 APPLICATION NOTES FOR CONTROLLER : T6963C

PLEASE REFER TO :

CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS :

EU-T6963C

1.3 THIS INDIVIDUAL SPECIFICATION IS PRIOR TO GENERAL SPECIFICATIONS .

2. MECHANICAL SPECIFICATIONS

- (1) NUMBER OF DOTS ----- 240W * 128H DOTS
- (2) MODULE SIZE ----- 144.0W * 104.0H * 11.0D mm
- (3) EFFECTIVE AREA ----- 114.0W * 64.0H mm
- (4) ACTIVE AREA ----- 107.97W * 57.57H mm
- (5) DOT SIZE ----- 0.42W * 0.42H mm
- (6) DOT PITCH ----- 0.45W * 0.45H mm
- (7) LCD TYPE *
- (8) DRIVING METHOD ----- 1 / 128 DUTY MULTIPLEX DRIVE
- (9) VIEWING DIRECTION *
- (10) 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	6.5	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 60 SEC . MAX
	FREQUENCY	fEL	2.0	KHZ	AC115Vrms 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	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)	—	11.76 m/s ² (1.2 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

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	—	-15.5	-16.0	-16.5	V
INPUT VOLTAGE NOTE (1)	VIH	H LEVEL	2.2	—	—	V
	VIL	L LEVEL	—	—	0.8	V
OUTPUT VOLTAGE NOTE (1)	VOH	H LEVEL	2.4	—	VCC	V
	VOL	L LEVEL	0	—	0.4	V
POWER SUPPLY CURRENT FOR LOGIC NOTE (2)	IDD	VDD - VSS = 5.0 V VDD - VO = 18.2V	—	6.0	—	mA
POWER SUPPLY CURRENT FOR LCD DRIVE NOTE (2)	IEE	VDD - VSS = 5.0 V VDD - VO = 18.2V	—	5.0	—	mA
RECOMMENDED LCD DRIVING VOLTAGE NOTE (3)	VDD - VO ∅ = 10° θ* = 0°	Ta = -20 °C	—	18.2	—	V
		Ta = 25 °C	—	18.2	—	
		Ta = 60 °C	—	15.5	—	
CLOCK OSCILLATION FREQUENCY	f _{osc}	—	—	6	—	MHZ
POWER SUPPLY FOR EL BACKLIGHT	VEL	fEL=400HZ	—	100	—	V _{rms}
	IEL	VEL=100V fEL=400HZ	—	7	—	mArms

* θ = 180° WHEN VIEWING DIRECTION IS 12 O'CLOCK .

NOTE (1) : APPLIED TO TERMINALS FS , CE , WR , RD , C/D , DB0~DB7 , RES , MD2.

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

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	—	2866	—	ms	1
			Ta = 25°C	—	259	—		
			Ta = 60°C	—	156	—		
	tf (fall)		Ta = -20°C	—	2193	—		
			Ta = 25°C	—	177	—		
			Ta = 60°C	—	84	—		
THE BRIGHTNESS OF BACKLIGHT	B	Ø = 10° θ* = 0°	10	—	—	cd/m ²	2	
			25	—	—		3	

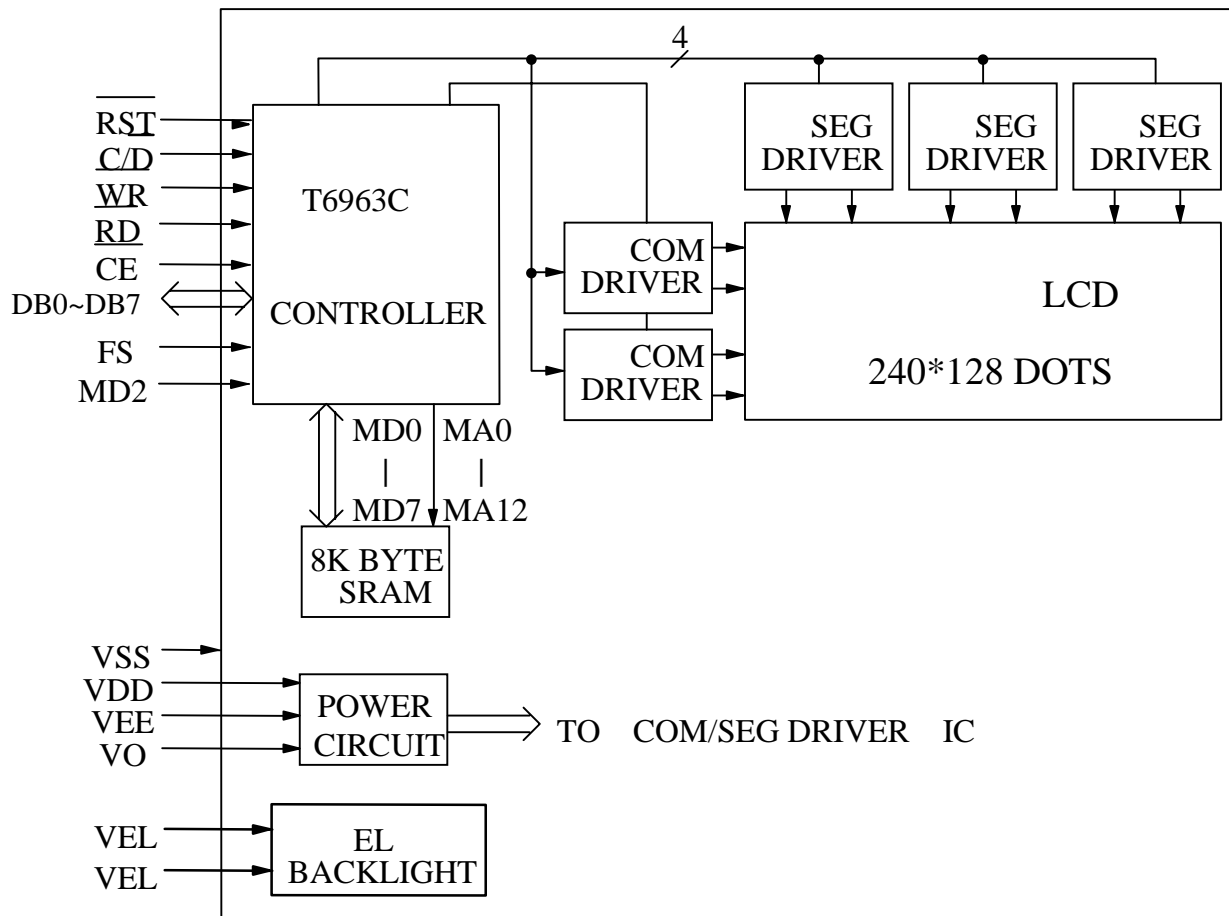
* θ = 180° WHEN VIEWING DIRECTION IS 12 O'CLOCK.

NOTE (1) : PLEASE REFER TO :
CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS.
E U - 0 0 2 A

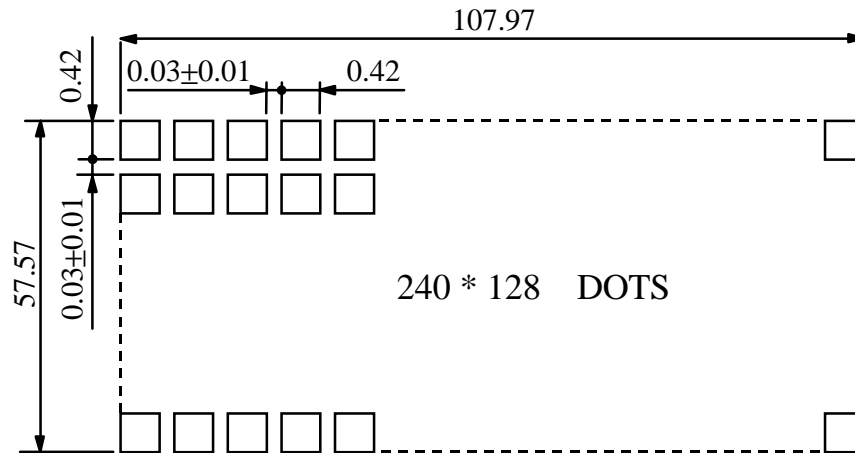
NOTE (2) : POLARIZER MODE : TRANSFLECTIVE

NOTE (3) : POLARIZER MODE : TRANSMISSIVE

7. BLOCK DIAGRAM



8. DETAIL DRAWING OF DOT MATRIX



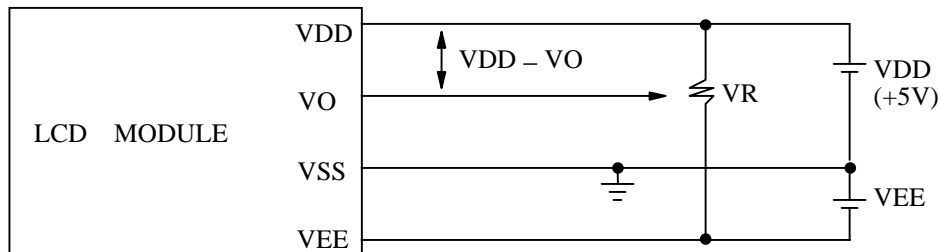
UNIT : mm
SCALE : NTS
NOT SPECIFIED TOLERANCE IS ± 0.1

9. INTERFACE SIGNALS

PIN NO	SYMBOL	LEVEL	FUNCTION
1	VSS	—	GROUND
2	VDD	—	POWER SUPPLY FOR LOGIC CIRCUIT
3	V0	—	OPERATING VOLTAGE FOR LCD DRIVE
4	$\overline{C/D}$	H / L	$\overline{WR} = "L", \overline{C/D} = "H" : \text{COMMAND WRITE}$ $\overline{C/D} = "L" : \text{DATA WRITE}$ $\overline{RD} = "L", \overline{C/D} = "H" : \text{COMMAND READ}$ $\overline{C/D} = "L" : \text{DATA READ}$
5	\overline{RD}	L	DATA READ
6	R/\overline{W}	L	DATA WRITE
7	DB0	H/L	DATA BUS LINE
14	DB7		
15	\overline{CE}	L	CHIP ENABLE
16	\overline{RST}	L	RESET
17	VEE	—	POWER SUPPLY FOR LCD DRIVE
18	MD2	H/L	COLUMNS SELECT : "H" 32 COLUMNS "L" 40 COLUMNS
19	FS	H/L	SELECT : "H" 6*8 PIXEL /FONT "L" 8*8 PIXEL/FONT
20	N.C	—	—————
21	VEL	—	POWER SUPPLY FOR EL BACKLIGHT
22	VEL		

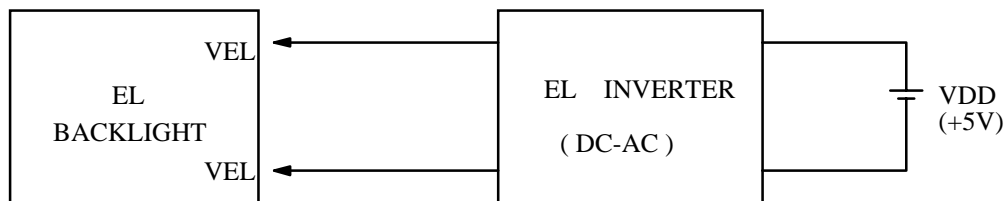
10. POWER SUPPLY

10.1 POWER SUPPLY FOR LCM



VDD - VO : LCD DRIVING VOLTAGE
VR : 20K Ω

10.2 POWER SUPPLY FOR EL BACK - LIGHT



RECOMMENDED INVERTER : SOUN50700

10.3 TIMING OF POWER SUPPLY AND INTERFACE SIGNAL

