

SPECIFICATION

GRAPHIC TYPE

DOT MATRIX LCD MODULE

ITEM NUMBER:	FDCG12864B SERIES
INITIAL ISSUED DATE:	1999. 6
1ST REVISED DATE:	2002. 10
CHECKED BY:	WU WEIJIA
APPROVED BY:	LU BOO

BOOKBINDING AREA



FORDATA ELECTRONIC CO.,LTD
PROFESSIONAL LCD SUPPLIER FROM CHINA

**STANDARD
DOC.**

REVISION RECORD

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NO.	DATE	DESCRIPTION	ITEM	PAGE	APPROVED
1	1999.06	INITIAL ISSUED	ALL	ALL	WULUBING
2	2002.10	MODIFY NUMBER SYSTEM	-----	2	LUBOO
3	2002.10	TIDY EXTENAL DRAWING	7	7	LUBOO
4	2002.10	ADD PACKING DETAIL PAGE	17	17	LUBOO

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NUMBER SYSTEM

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1	2	3	4	5	6	7	8	9	10	11	12
FD	C	C	08	01	A	F	L	Y	Y	T	S

Part No.	Remarks	Code	Description
1	Company Name Abbreviated	FD	FORDATA
2	IC packing	C	Chip on Board
		G	Chip on Glass
		F	Chip on Film
		T	Tape Carrier Package
3	LCM type	C	Character
		G	Graphic
		D	Custom Design
4	Character	08, 10, 12, 16, 20, 24, 40,	Characters Per Line
	Graphic	80, 100, 120, 122, 128, 160	Row Dots Number
5	Character	01, 02, 04,	Lines
	Graphic	32, 64, 80, 128, 160	Column Dots Number
6	Serial Number	A ~ Z	
7	Polarizer type	R	Reflective
		F	Transflective
		M	Transmissive, Positive
		N	Transmissive, Negative
8	Backlight type	N	Without backlight
		L	LED backlight (array)
		S	LED backlight (side)
		E	EL backlight
		C	CCFL backlight
9	Backlight color	N	Without backlight
		Y	Yellow-green
		W	White
		R	Red
		A	Amber
		C	Blue-green
		B	Blue
		G	Green
10	LCD panel type	T	TN type LCD
		H	HTN type LCD
		Y	STN yellow-green type LCD
		G	STN gray type LCD
		B	STN blue type LCD
		F	FSTN type LCD
11	Viewing angle	B	Bottom View (6:00)
		T	Top View (12:00)
12	Operation temperature range	S	Standard temp. range w/single supply voltage
		D	Standard temp. range w/dual supply voltages
		W	Wide temp. range w/single supply voltage
		H	Wide temp. range w/dual supply voltage



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1. GENERAL SPECIFICATIONS

ITEM	NOMINAL DIMENSIONS / AVAILABLE OPTIONS
DISPLAY FORMAT	128 X 64 DOT MATRIX
LCD PANEL OPTIONS	STN, FSTN
POLARIZER OPTIONS	Positive, Negative, Reflective, Transflective, Transmissive
BACKLIGHT OPTIONS	LED, EL, CCFL
VIEWING ANGLE OPTIONS	6:00 (Bottom) , 12:00 (Top)
TEMPERATURE RANGE OPTIONS	Normal temp. range (0°C ~ 50°C), Wide temp. range (-20°C ~ 70°C)
CONTROLLER IC	S6B0107 (KS0107B) and S6B0108 (KS0108B)
DISPLAY DUTY	1/64
DRIVING BIAS	1/9

2. MECHANICAL SPECIFICATIONS

OVERALL SIZE	LED backlight version : 93.0 x 70.0 x max 13.0 EL backlight / reflective version : 93.0 x 70.0 x max 9.0				mm
VIEWING AREA	72.0W x 40.0H	mm	HOLE-HOLE	88.0W x 64.0H	mm
DOT SIZE	0.48W x 0.48H	mm	DOT PITCH	0.04W x 0.04H	mm
WEIGHT (EL BKL)	60.0	g	WEIGHT (LED BKL)	83.0	g

3. ABSOLUTE MAXIMUM RATINGS

ITEM	SYMBOL	CONDITION	MIN	MAX	UNIT
POWER SUPPLY (LOGIC)	Vdd	25°C	-0.3	7.0	V
POWER SUPPLY (LCD)	V0	25°C	Vdd -19.0	Vdd +0.3	V
INPUT VOLTAGE	Vin	25°C	-0.3	Vdd +0.3	V
OPERATING TEMPERATURE	Vopr	—	0	50	°C
STORAGE TEMPERATURE	Vstg	—	-20	70	°C

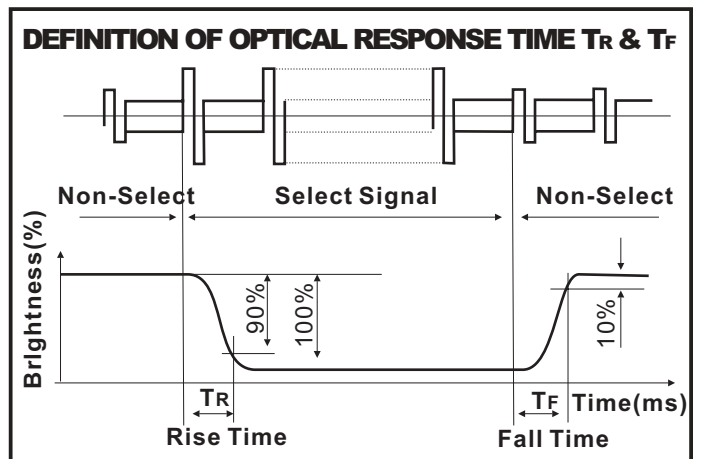
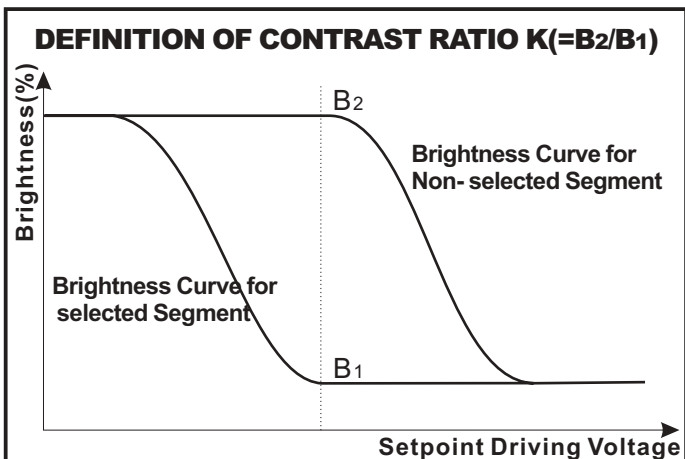
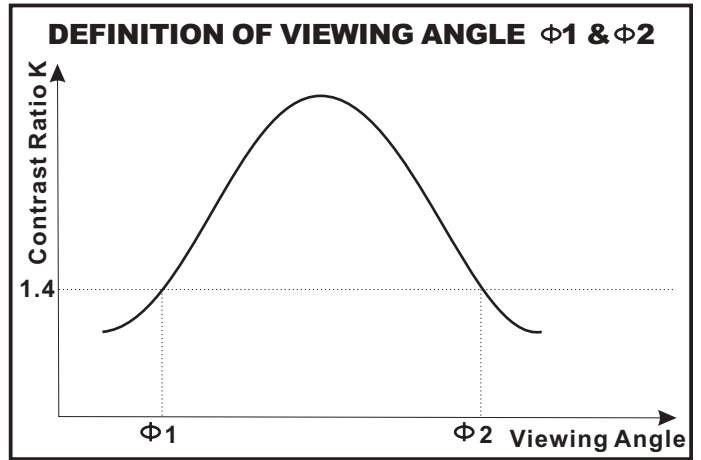
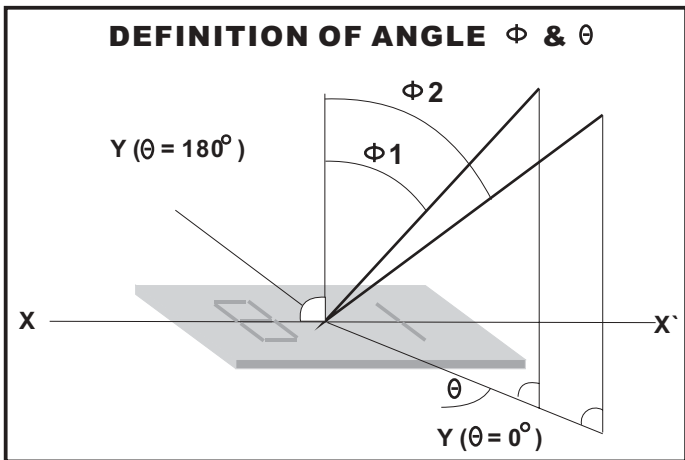
4. ELECTRONICAL CHARACTERISTIC

ITEM	SYMBOL	CONDITION	STANDARD			UNIT
			MIN	TYP	MAX	
Input voltage	Vdd	+5V	4.7	5.0	5.5	V
Supply current	Idd	Vdd=5V	—	8.0	—	mA
Recommended LCD driving voltage for normal temp. Version module	Vdd - V0	0°C	—	9.8	—	V
		25°C	—	9.5	—	
		50°C	—	9.3	—	
LED forward voltage	VF	25°C	—	4.2	4.5	V
LED forward current	IF	25°C	—	360	—	mA

5. OPTICAL CHARACTERISTICS

FOR TN TYPE LCD MODULE ($T_A=25^\circ\text{C}$, $V_{dd}=5.0\text{V} \pm 0.25\text{V}$)						
ITEM	SYMBOL	CONDITION	MIN	TYP	MAX	UNIT
VIEWING ANGLE	$\Phi 2-\Phi 1$	K=4	30	---	---	deg
	θ		25			
CONTRAST RATIO	K	---	---	2	---	---
RESPONSE TIME(RISE)	T_R	---	---	120	150	ms
RESPONSE TIME(FALL)	T_F	---	---	120	150	ms

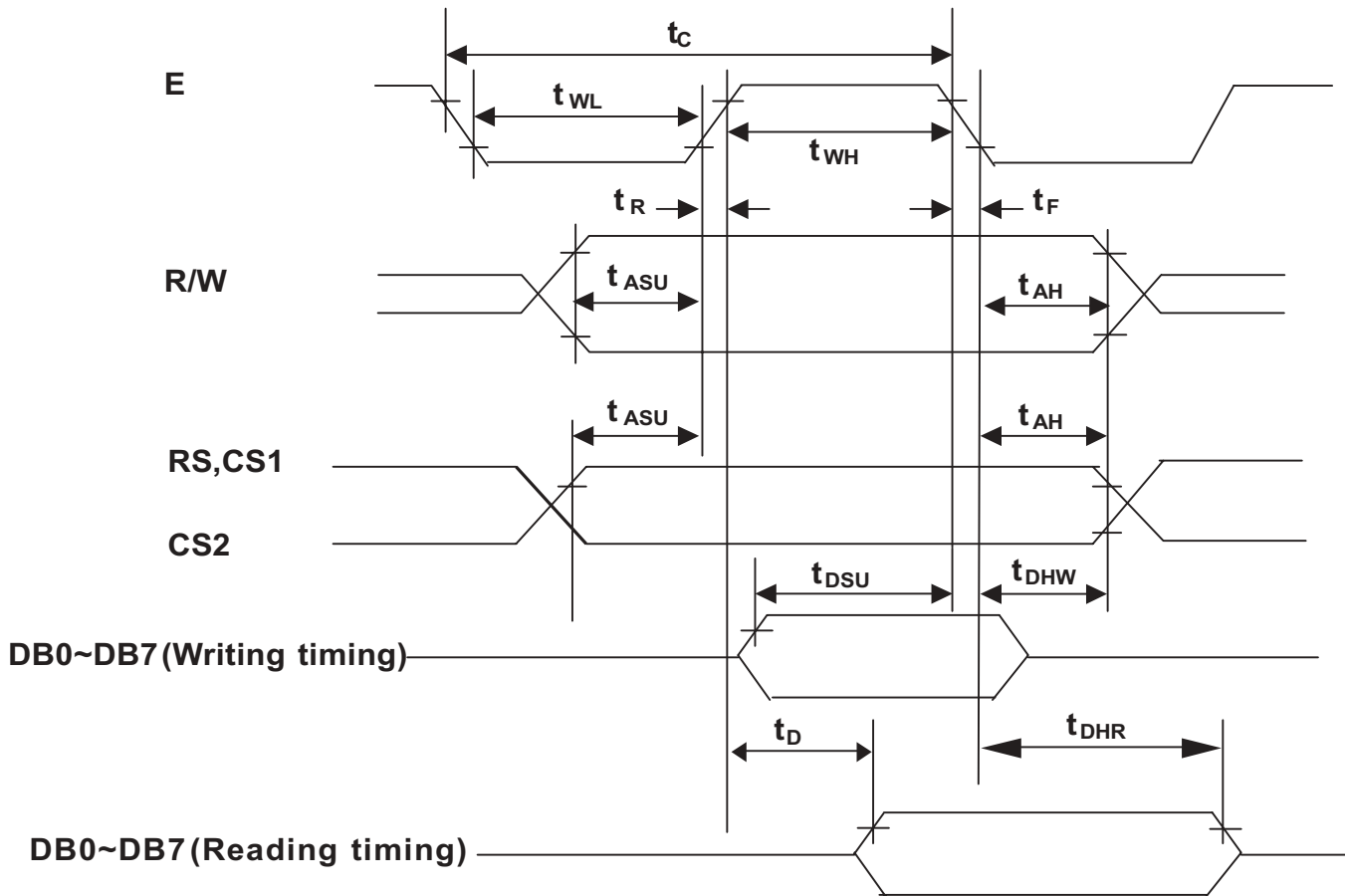
FOR STN TYPE LCD MODULE ($T_A=25^\circ\text{C}$, $V_{dd}=5.0\text{V} \pm 0.25\text{V}$)						
ITEM	SYMBOL	CONDITION	MIN	TYP	MAX	UNIT
VIEWING ANGLE	$\Phi 2-\Phi 1$	K=4	40	---	---	deg
	θ		60			
CONTRAST RATIO	K	---	---	6	---	---
RESPONSE TIME(RISE)	T_R	---	---	150	250	ms
RESPONSE TIME(FALL)	T_F	---	---	150	250	ms





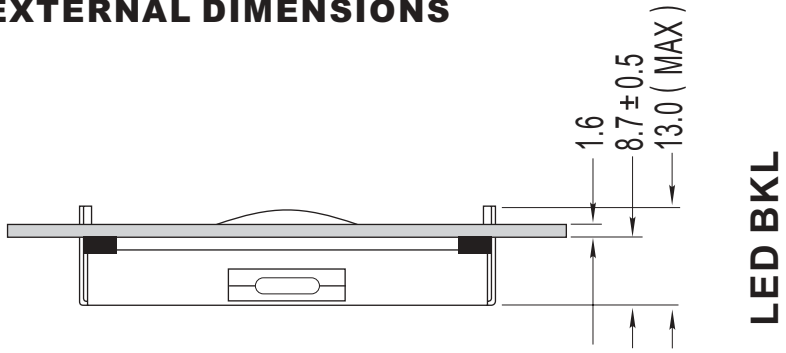
6. AC CHARACTERISTIC

Characteristic	Symbol	Min	Typ	Max	Unit
E Cycle	t_c	1000	—	—	ns
E High Level Width	t_{WH}	450	—	—	ns
E Low Level Width	t_{WL}	450	—	—	ns
E Rise Time	t_R	—	—	25	ns
E Fall Time	t_F	—	—	25	ns
Address Setup Time	t_{ASU}	140	—	—	ns
Address Hold Time	t_{AH}	10	—	—	ns
Data Setup Time	t_{DSU}	200	—	—	ns
Data Delay Time	t_D	—	—	320	ns
Data Hold Time (Write)	t_{DHW}	10	—	—	ns
Data Hold Time (Read)	t_{DHR}	20	—	—	ns

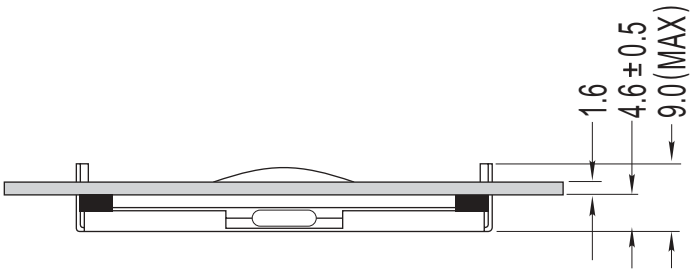
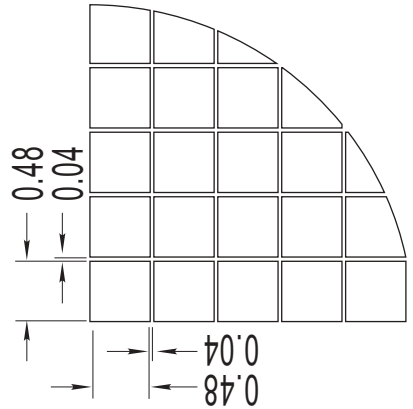
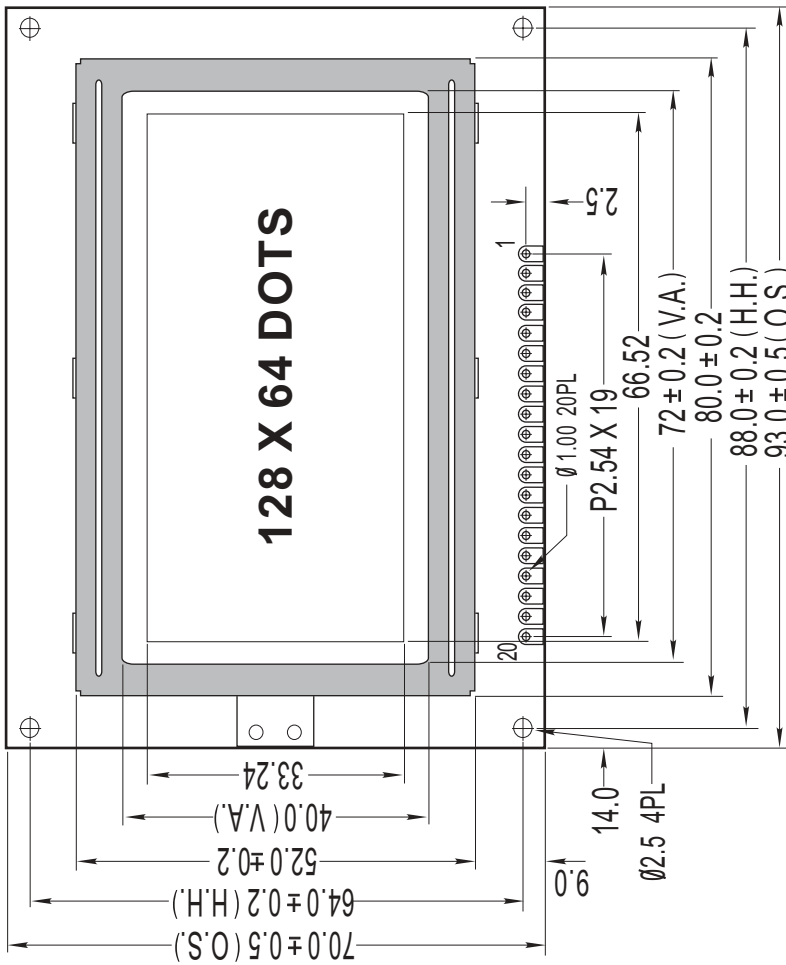


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7.EXTERNAL DIMENSIONS



LED BKL

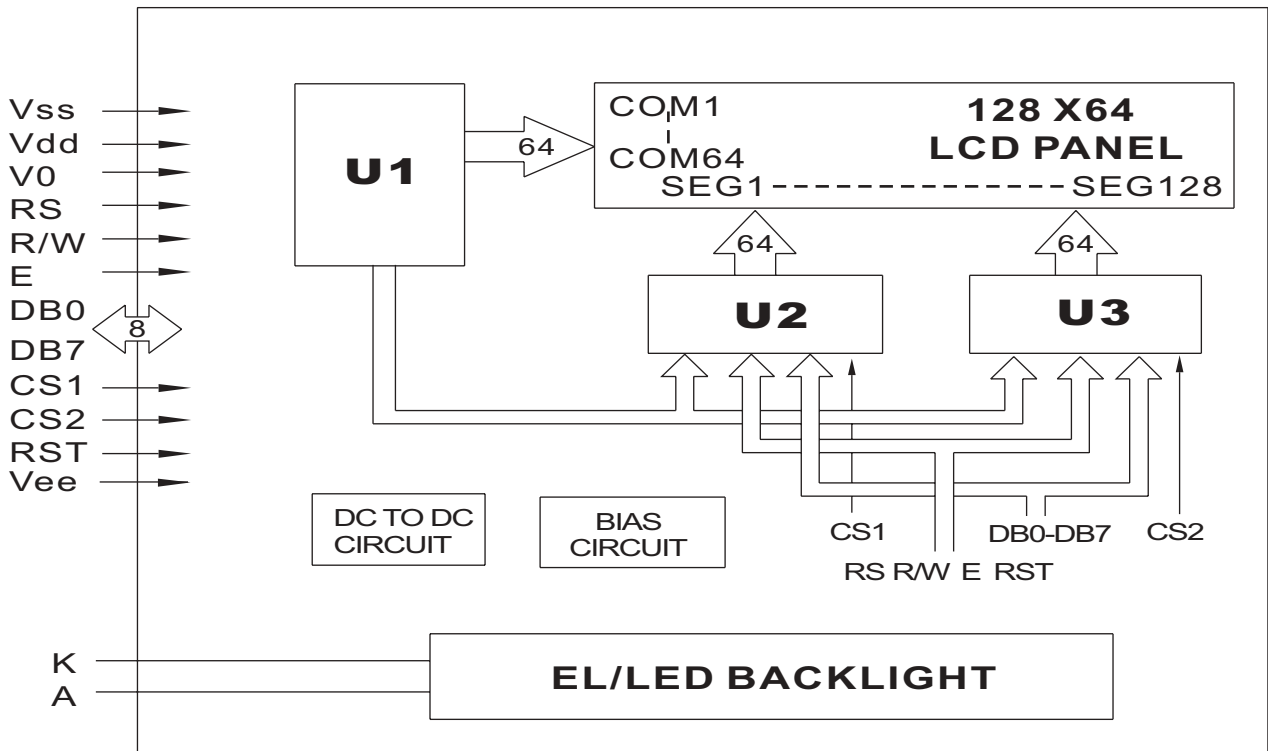


EL BKL OR WITHOUT BKL

8. PIN ASSIGNMENT

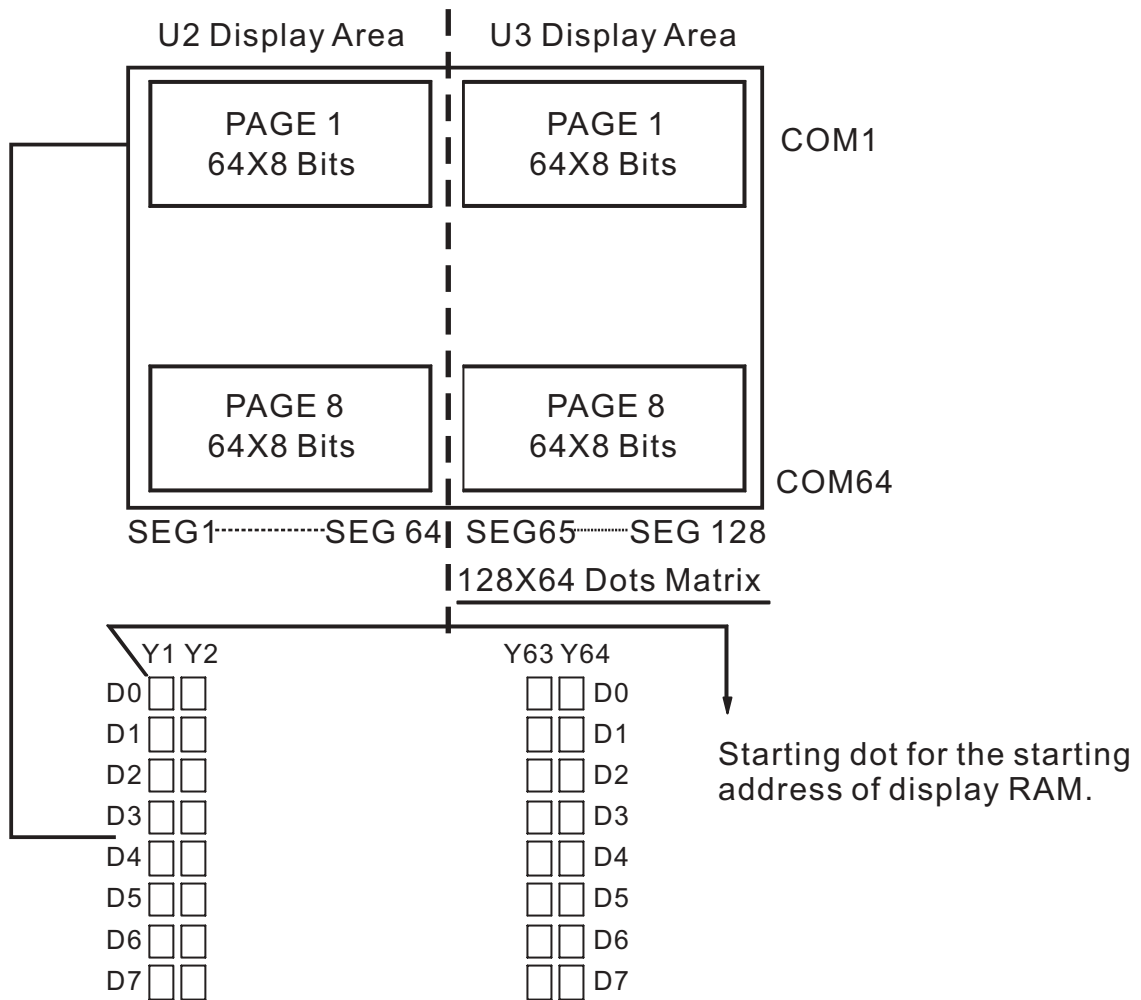
PIN NO.	SYMBOL	FUNCTION	REMARK	
1	Vss	Power Supply		
2	Vdd			0V
3	V0			+5V
4	RS	Register Select signal		
5	R/W	Read / Write		
6	E	Chip Enable signal		
7	DB0	Data Bit 0		
8	DB1	Data Bit 1		
9	DB2	Data Bit 2		
10	DB3	Data Bit 3		
11	DB4	Data Bit 4		
12	DB5	Data Bit 5		
13	DB6	Data Bit 6		
14	DB7	Data Bit 7		
15	CS1	Chip select for IC1		
16	CS2	Chip select for IC2		
17	RST	Reset signal		
18	Vee	Negative voltage output		
19(A)	LED+	Anode of LED Unit		
20(K)	LED-	Cathode of LED Unit		

9. BLOCK DIAGRAM

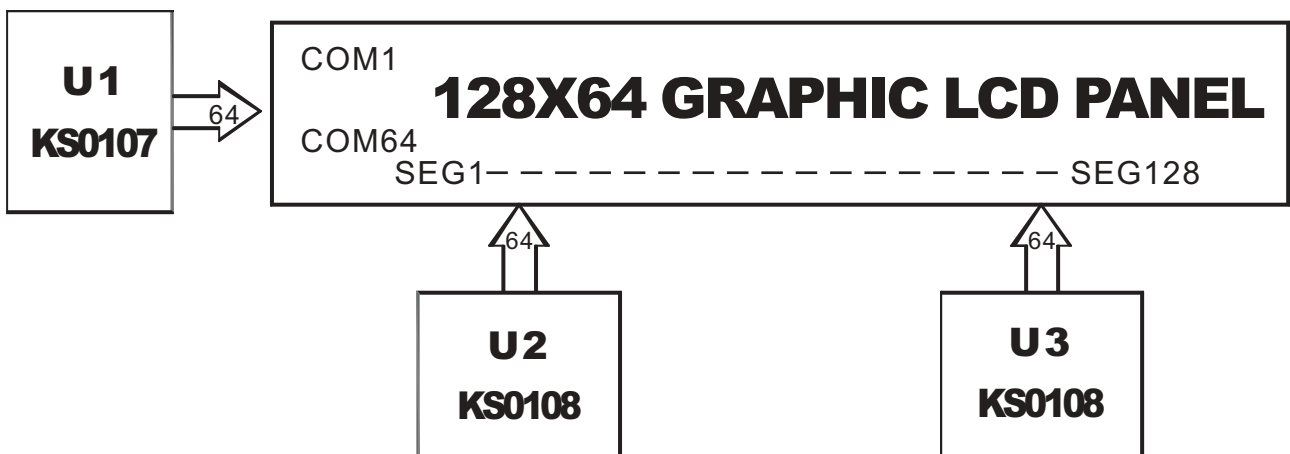




10. RELATION BETWEEN DISPLAY PATTERN AND DRIVERS



Each segment driver has 8 pages RAM, and each page has 64x8 bits RAM. D0~D7 are 8 bits transmitted data, where D0 is LSB and D7 is MSB.





11. INSTRUCTION

Instruction	RS	R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0	Function	
Display ON/OFF	L	L	L	L	H	H	H	H	H	L/H	Controls the display on or off. Internal status and display RAM data is not affected. L:OFF H:ON	
Set address (Y address)	L	L	L	H	Y address (0~63)						Sets the Y address in the Y address counter.	
Set Page (X address)	L	L	H	L	H	H	H	Page (0~7)			Sets the X address at the X address register.	
Display Start Line (Z address)	L	L	H	H	Display start line (0~63)						Indicates the display data RAM displayed at the top of the screen.	
Status Read	L	H	B U S Y	L	O N / O F F	R E S E T	L	L	L	L	BUSY L:Ready H:In operation ON/OFF L:Display ON H:Display OFF RESET L:Normal H:Reset	
Write Display Data	H	L	Write Data									Writes data (DB0:7) into display data RAM,After writing instruction,Y address is increased by 1 automatically.
Read Display Data	H	H	Read Data									Reads data (DB0:7) from display data RAM to the data bus.



12. DESCRIPTION OF COMMAND

Display On/Off

RS	R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
0	0	0	0	1	1	1	1	1	D

The display data appears when D is 1 and disappears when D is 0.

Though the data is not on the screen with D=0, it remains in the display data RAM.

Therefore, you can make it appear by changing D=0 into D=1.

Set Address(Y Address)

RS	R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
0	0	0	1	AC5	AC4	AC3	AC2	AC1	AC0

Y address (AC0-AC5) of the display data RAM is set in the Y address counter.

An address is set by instruction and increased by 1 automatically by read or write operations of display data.

Set Page(X Address)

RS	R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
0	0	1	0	1	1	1	AC2	AC1	AC0

X address (AC0-AC2) of the display data RAM is set in the X address register.

Writing or reading to or from MPU is executed in this specified page until the next page is set.

Display Start Line(Z Address)

RS	R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
0	0	1	1	AC5	AC4	AC3	AC2	AC1	AC0

Z address (AC0-AC5) of the display data RAM is set in the display start line register and displayed at the top of the screen.

When the display duty cycle is 1/64 or others(1/32-1/64), the data of total line number of LCD screen, from the line specified by display start line instruction, is displayed.



Status Read

RS	R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
0	1	BUSY	0	ON/OFF	RESET	0	0	0	0

● **BUSY**

When BUSY is 1, the Chip is executing internal operation and no instructions are accepted.
 When BUSY is 0, the Chip is ready to accept any instructions.

● **ON/OFF**

When ON/OFF is 1, the display is on.
 When ON/OFF is 0, the display is off.

● **RESET**

When RESET is 1, the system is being initialized.
 In this condition, no instructions except status read can be accepted.
 When RESET is 0, initializing has finished and the system is in the usual operation condition.

Write Display Data

RS	R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
1	0	D7	D6	D5	D4	D3	D2	D1	D0

Writes data (D0-D7) into the display data RAM.
 After writing instruction, Y address is increased by 1 automatically.

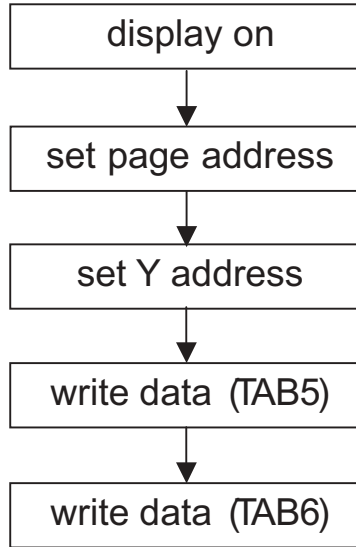
Read Display Data

RS	R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
1	1	D7	D6	D5	D4	D3	D2	D1	D0

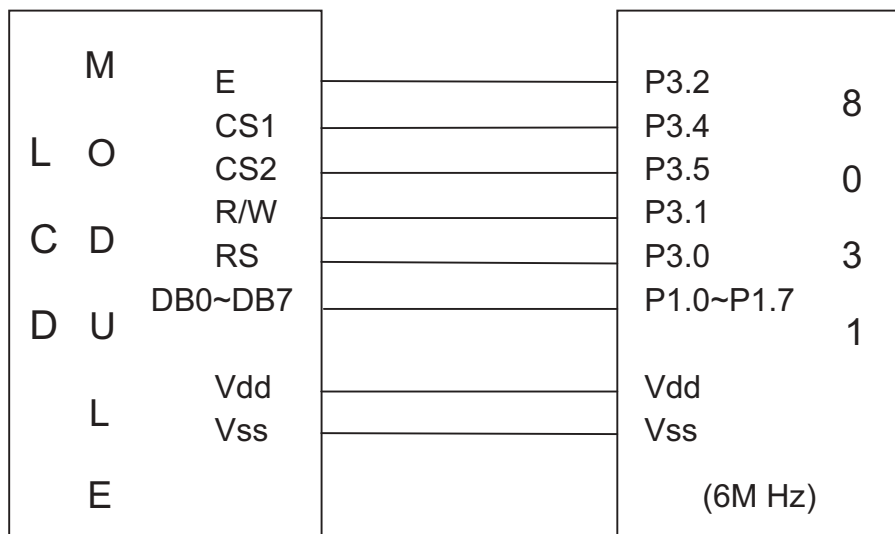
Reads data (D0-D7) from the display data RAM.
 After reading instruction, Y address is increased by 1 automatically.

13. APPLICATION EXAMPLE

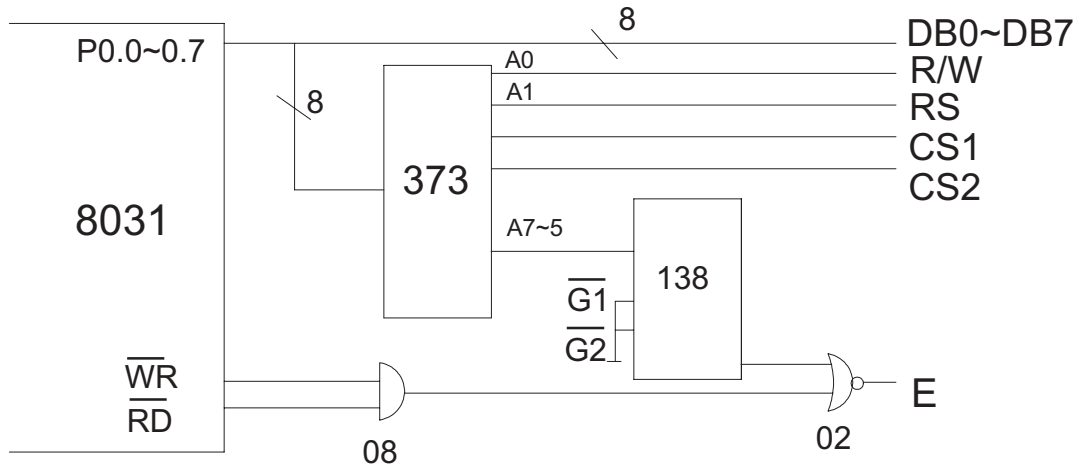
Application Flowchart



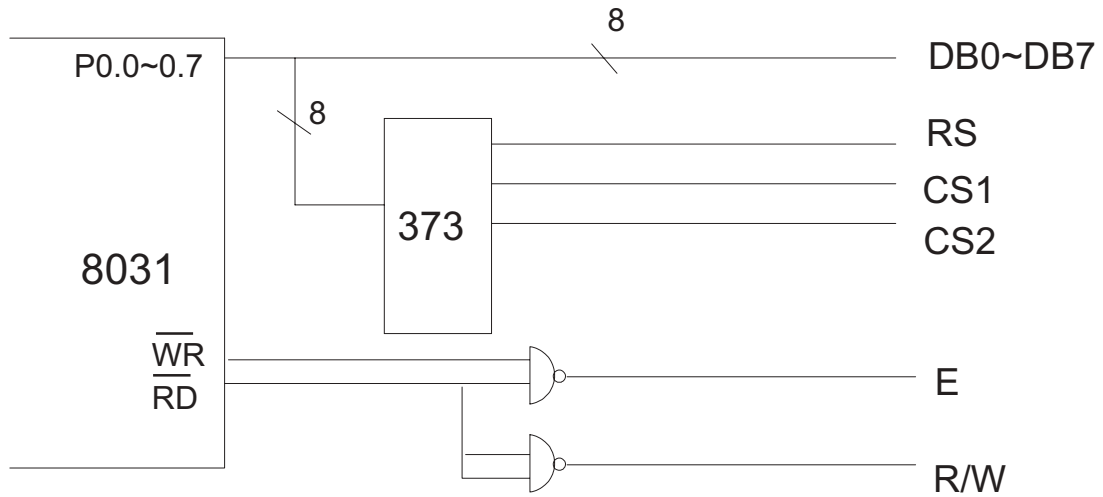
Application Circuit



Application Circuit 1



Application Circuit 2

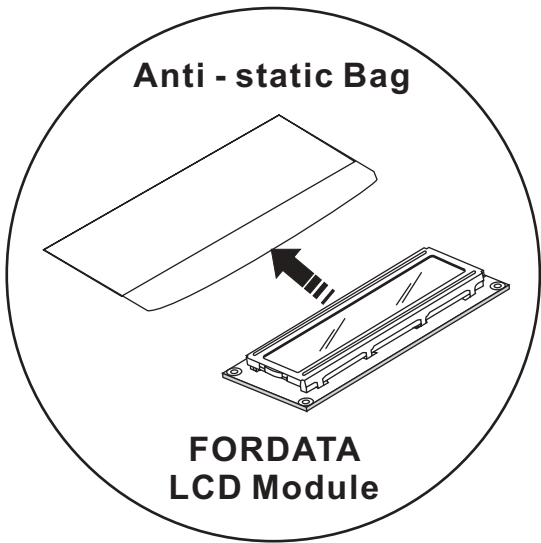


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		FDCG12864B	

14. PACKING DETAIL

WITH LED BKL	WITHOUT LED BKL
25 PCS/BOX	30 PCS/BOX
8 BOXES/CARTON	8 BOXES/CARTON
200 PCS/CARTON	240 PCS/CARTON
19.00 KGS/CTN(G.W.)	19.00 KGS/CTN(G.W.)
0.07 M ³ /CARTON	0.07 M ³ /CARTON

NOTE
1. The weight is estimated for reference only.
2. Packing detail may be changed without notice.
3. FORDATA prefer 240PCS order quantity to 250PCS for full packing cause.



BOX 

CARTON 

