DISPLAY Elektronik GmbH

DATA SHEET

LCD MODULE

DEM 128064A FGH-P(RGB)

Product specification ***Version: 2***

29/Mai/2006

GENERAL SPECIFICATION

MODULE NO. :

DEM 128064A FGH-P(RGB)

CUSTOMER P/N

VERSION NO.	CHANGE DESCRIPTION	DATE
0	ORIGINAL VERSION	03/03/2006
1	CHANGE DIMENSIONS	14/03/2006
2	MODIFY SERIES	20/03/2006

PREPARED BY: HZZ DATE: 20/03/2006

APPROVED BY: MH DATE: 29/05/2006

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1. FUNCTIONS & FEATURES

- Module Series :

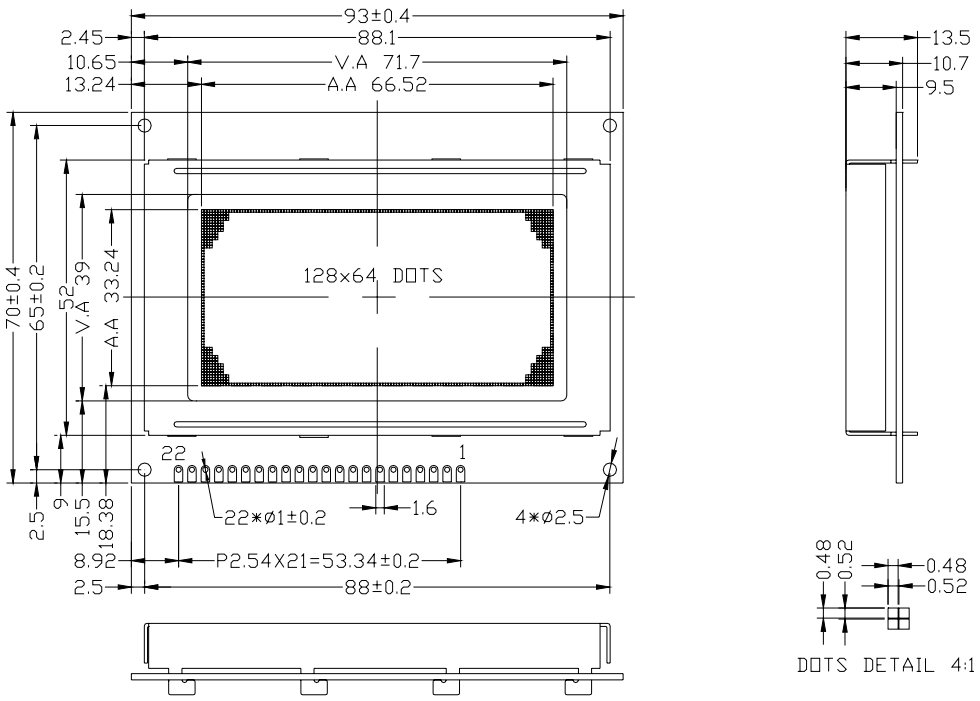
Module	LCD Type	Backlight color
DEM 128064A FGH-P(RGB)	FSTN Transflective Positive Mode	RGB backlight

- Viewing Direction : 6 o'clock
- Driving Scheme : 1/64 Duty Cycle, 1/9 Bias
- Power Supply Voltage : 5.0 Volt (typ.)
- V_{LCD} Adjustable For Best Contrast : 12.9 Volt (typ.)
- Display Contents : 128 x 64 Dots
- Backlight : RGB-LED (Lightguide)
- Interface RAM : 512 bytes (4096 bits)
- Interface : 8 bit parallel display data from MPU

2. MECHANICAL SPECIFICATIONS

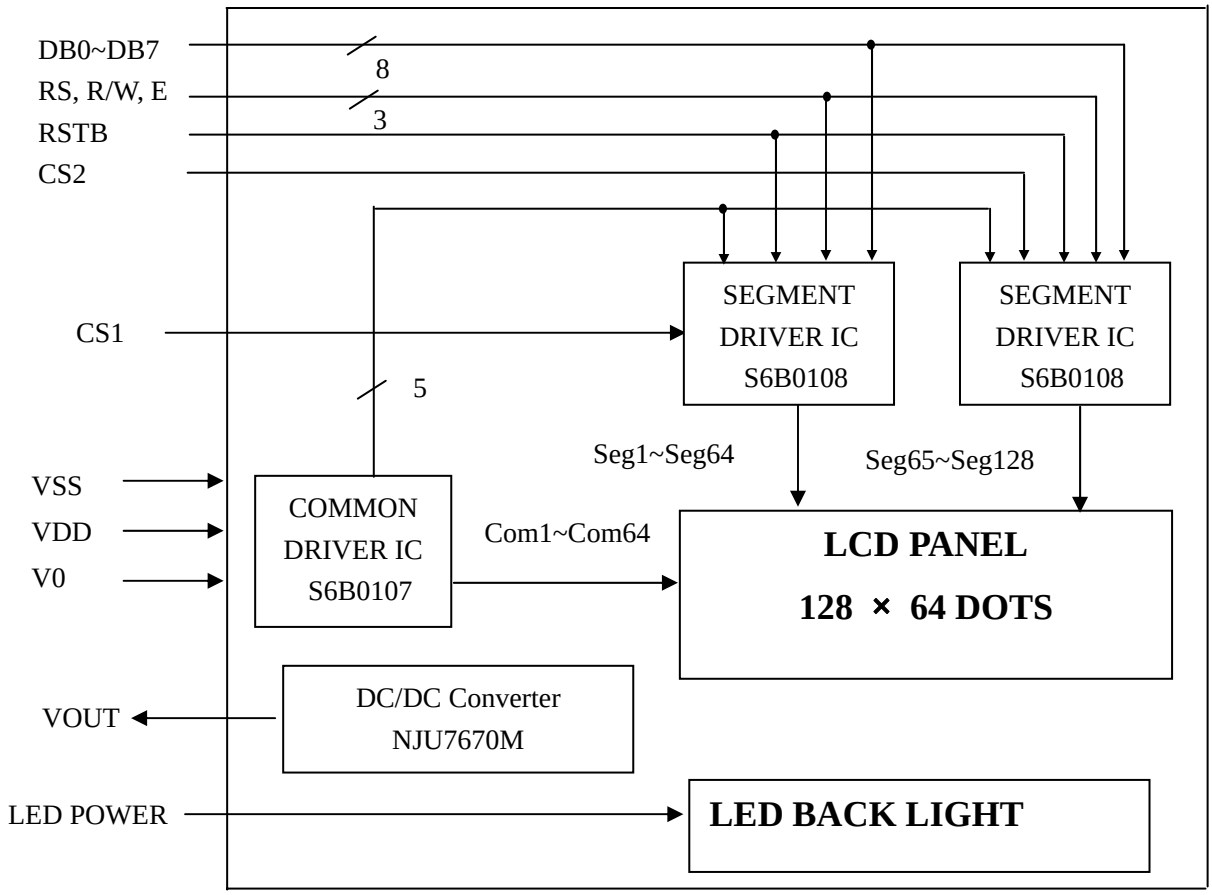
- Module Size : 93,0 x70,0 x 13.5 mm
- Dot Size : 0.48 x 0.48 mm
- Dot Pitch : 0.52 x 0.52 mm
- Dot Gap : 0.04 mm

3. EXTERNAL DIMENSIONS



REMARKS:
1,UNMARKED TOLERANCE IS ±0.3,
2,ALL METERIALS COMPLY WITH ROHS..

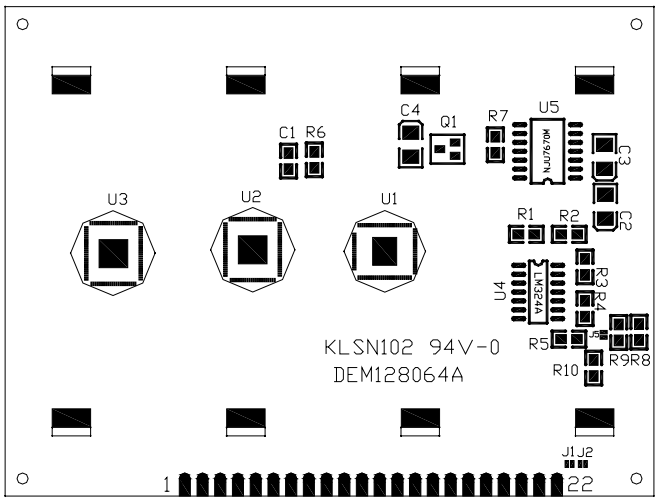
4. BLOCK DIAGRAM



5. PIN ASSIGNMENT

Pin No.	Symbol	Function
1	VSS	Ground
2	VDD	Power supply voltage for logic, + 5.0Volt.
3	V0	Input voltage for LCD
4	RS	Register select RS = 0 (Instruction register) RS = 1(Data register)
5	R/W	Read /Write R/W = 1(Read) R/W = 0(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 signal for S6B0108 (1)
16	CS2	Chip select signal for S6B0108 (2)
17	RSTB	Reset signal
18	VOUT	Output voltage for LCD,-9.5V
19	LED+(A)	LED anode
20	LED-(B)	Blue ,power supply
21	LED-(G)	Green ,power supply
22	LED-(R)	Red ,power supply

6. PCB DRAWING AND DESCRIPTION



6.1 DESCRIPTION:

6-1-1. The J1 is metal-bezel GND to module GND and J2 is mounting holes GND to module GND

- Note: in application module, J1=J2=Closed

6-1-2. The R8, R9 and R10 are the LED-resistors on board to limit the current typically.

- Note: R8 = R9 = R10 = 24Ohm (so if 5Volt at pin 19-22 the current is approx. 50mA per color)

6. 2 Example application

6-2-1.The metal-bezel is on ground as following.



J1

6-2-2.The holes is on ground as following



J2

7. BACKLIGHT ELECTRICAL/OPTICAL SPECIFICATIONS (Ta = -20 ~ +70°C)

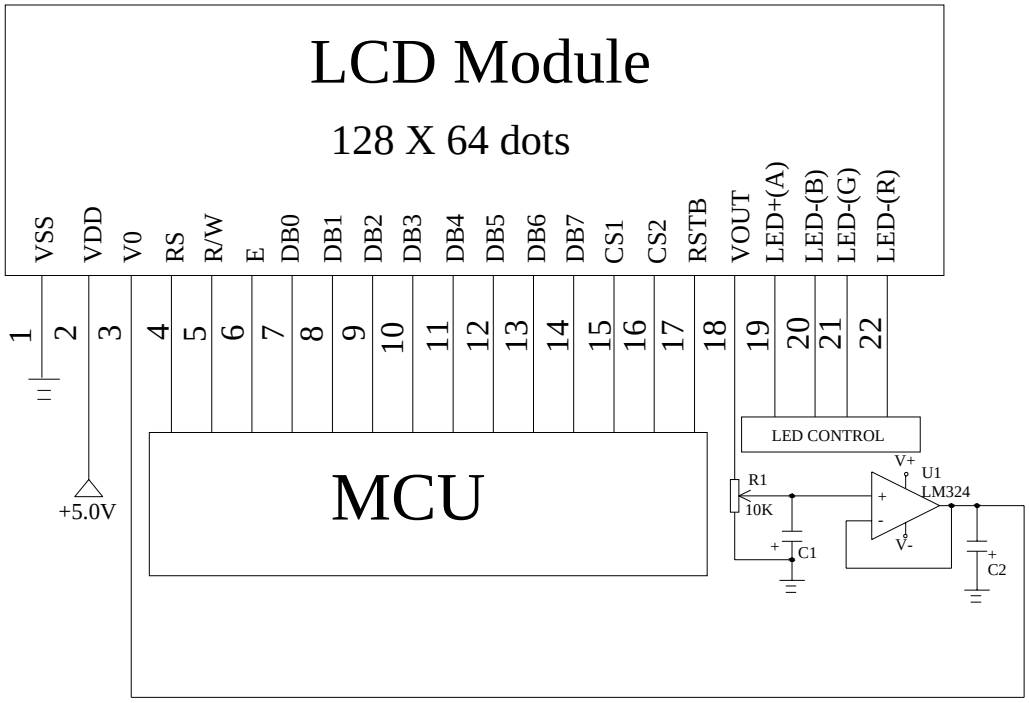
(1) Electrical/Optical Characteristics

Item	Symbol	Conditions	Rating			Unit
			Red	Green	Blue	
Absolute maximum forward current	Ifm		50*2	50*2	50*2	mA
Peak forward current	Ifp	1 msec plus 10% duty cycle	120*2	120*2	120*2	mA
Reverse voltage	Vr		4	4	4	V
Power dissipation	Pd		150*2	150*2	150*2	mW

(2) Electrical/Optical Characteristics

Item	Symbol	Red			Green			Blue			Unit	Condition
		Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.		
Forward voltage	Vf	---	25*2	30*2	---	25*2	30*2	---	25*2	30*2	V	Vf=4.0V
Reverse current	Ir	---	---	100	---	100	---	---	100	---	uA	Vr= 5.0 V
Peak wave length	λ p	600	605	610	520	525	530	465	468	472	nm	If=mA
Spectral line half width	△ λ	---	20	---	---	35	---	---	26	---	nm	If=mA
Luminance	Lv	86	115	---	100	135	---	28	38	---	cd/m^2	Vf=4.0V

8. APPLICATION CIRCUIT



NOTE: 1. R1 is the contrast resistor.

2. VOUT=-9.5V

3. Adjust R1, it will be best contrast when V0 is –7.9Volt.

9. MAXIMUM ABSOLUTE POWER RATINGS

Item	Symbol	Standard value	Unit
Supply voltage for logic	V_{DD}	-0.3~+8.0	V
Supply voltage	V_0	V_{DD} -0.3~V_{DD}+0.3	V
Driver supply voltage	V_{DD} -V_0	V_{DD}+0.3~V_{DD}+16.5	V
Operating temperature	Topr	-20~+70	°C
Storage temperature	Tstg	-25~+75	°C

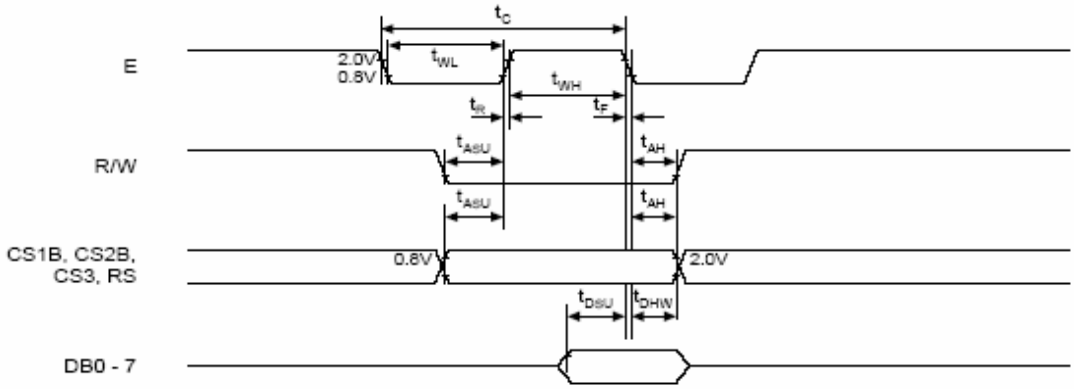
10. ELECTRICAL CHARACTERISTICS

10-1 DC Characteristics(Ta=-20~+70°C)

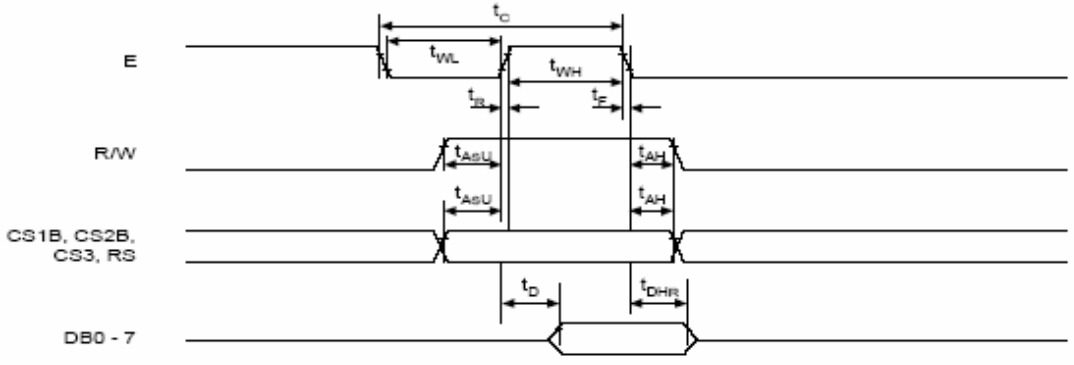
Item	Symbol	Standard Value			Unit
		MIN	TYP	MAX	
Supply current for logic	V_{DD}	2.4	5.0	7	V
Supply current for logic	I_{DD}	----	t.b.d.	--	mA
operating Voltage for LCD	V_{DD}-V_0	5.9	12.9	20	V

10-2 MPU Interface

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



MPU Write timing



MPU Read timing

11. DISPLAY CONTROL INSTRUCTION

The display control instructions control the internal state of the S6B0108. Instruction is received from MPU to S6B0108 for the display control. The following table shows various instructions.

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	Busy	L	On / Off	Reset	L	L	L	L	Read status. 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. LCD MODULES HANDLING PRECAUTIONS

- Please remove the protection foil of polarizer before using.

- The display panel is made of glass. Do not subject it to a mechanical shock by dropping it from a high place, etc.

- If the display panel is damaged and the liquid crystal substance inside it leaks out, do not get any in your mouth. If the substance come into contact with your skin or clothes promptly wash it off using soap and water.

- Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary.

- The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarize carefully.

- To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.
  -Be sure to ground the body when handling the LCD module.
  -Tools required for assembly, such as soldering irons, must be properly grounded.
  -To reduce the amount of static electricity generated, do not conduct assembly and other work under dry conditions.
  -The LCD module is coated with a film to protect the display surface. Exercise care when peeling off this protective film since static electricity may be generated.

- Storage precautions
  When storing the LCD modules, avoid exposure to direct sunlight or to the light of fluorescent lamps. Keep the modules in bags designed to prevent static electricity charging under low temperature / normal humidity conditions (avoid high temperature / high humidity and low temperatures below 0°C). Whenever possible, the LCD modules should be stored in the same conditions in which they were shipped from our company.

13. OTHERS

- Liquid crystals solidify at low temperature (below the storage temperature range) leading to defective orientation of liquid crystal or the generation of air bubbles (black or white). Air bubbles may also be generated if the module is subjected to a strong shock at a low temperature.

- If the LCD modules have been operating for a long time showing the same display patterns may remain on the screen as ghost images and a slight contrast irregularity may also appear. Abnormal operating status can be resumed to be normal condition by suspending use for some time. It should be noted that this phenomena does not adversely affect performance reliability.

- To minimize the performance degradation of the LCD modules resulting from caused by static electricity, etc. exercise care to avoid holding the following sections when handling the modules:
  - Exposed area of the printed circuit board
  - Terminal electrode sections