

LCD&LCM SPECIFICATION

液晶显示屏产品使用说明书

MODULE NO.

—————**T12864C012**—————

128x64 图形点阵

COG 工艺

Designed	Checked	Approved

revision	date	description	remark
A00	2011-10-13	First release	

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1. Feature/显示特性

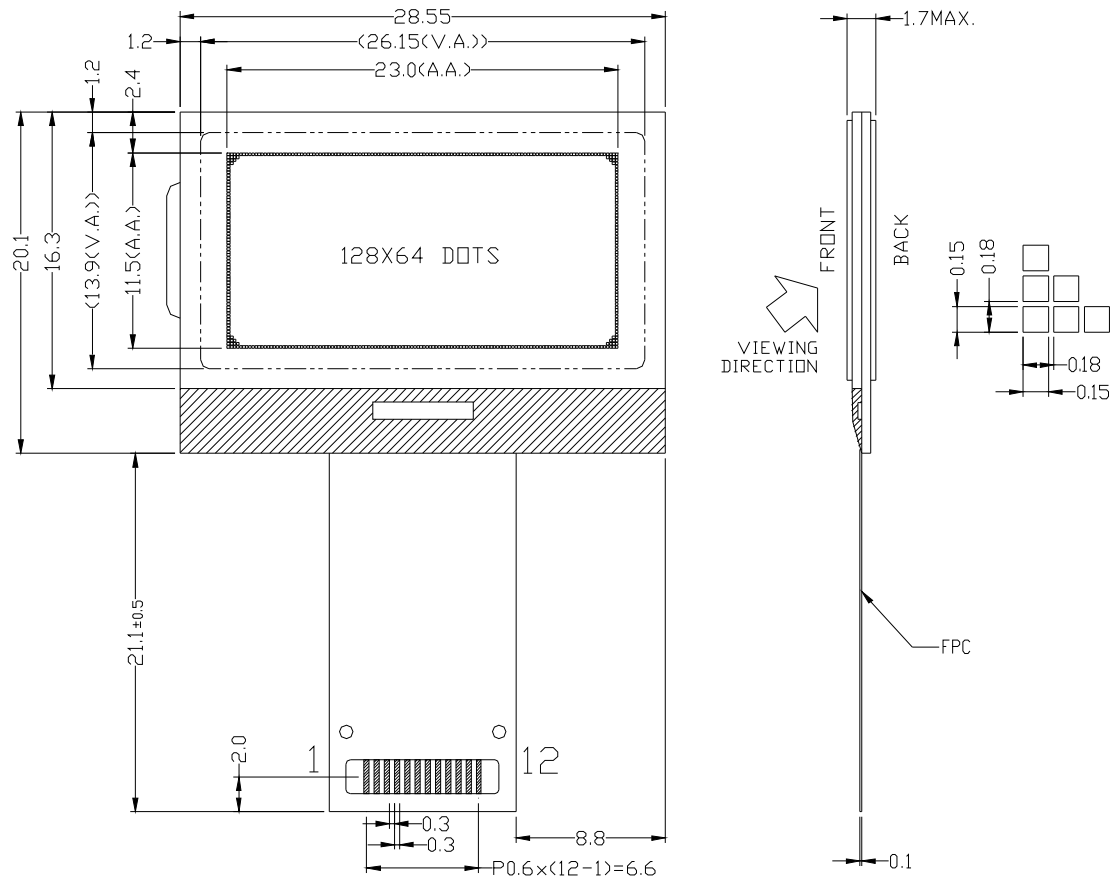
Display resolution/点阵数	: 128(w)*64(h)
Display mode/显示模式	: FSTN ,Positive(or Black-Negative), Transmissive
Driving method/驱动方式	: 1/64 Duty , 1/9 Bias
Viewing direction/视角	: 6:00 o'clock
Backlight/背光	: LED , White(or Blue,Other)
Built-in controller/控制器	: UC1701
Operation temp/工作温度	: -20℃~70℃
Storage temp/储存温度	: -30℃~80℃

2. Mechanical Specifications/外形尺寸说明

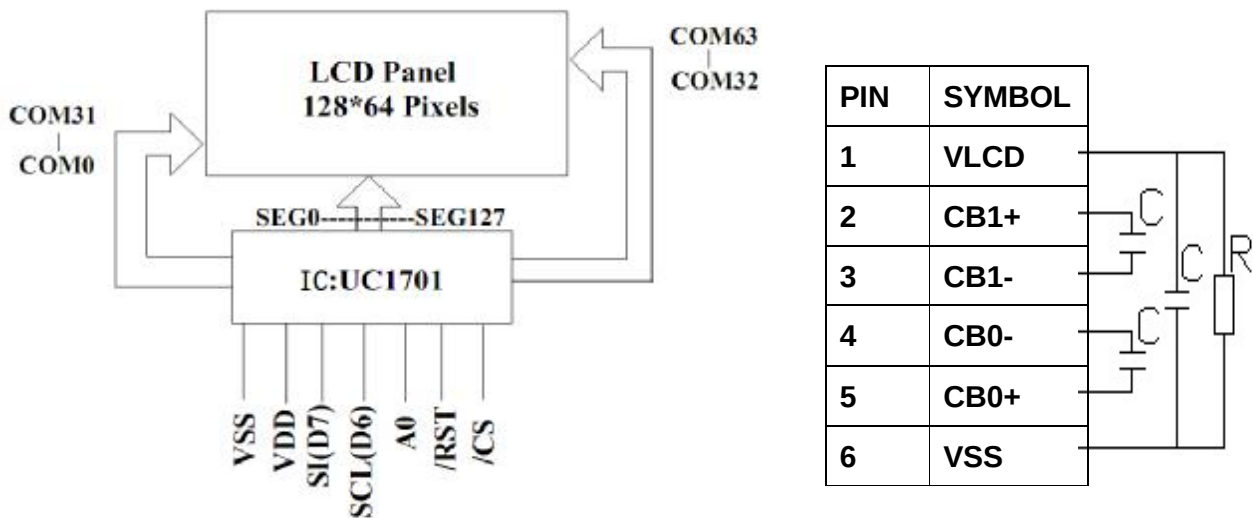
2.1 尺寸描述

Dimensional outline (W*H*T)/外形尺寸	: 28.5mm*20.0mm*1.8mm
Viewing area (W*H)/视域尺寸	: 25.5mm*13.3mm
Dot pitch (W*H)/点距	: 0.18mm*0.18mm
Dot size (W*H)/点大小	: 0.15mm*0.15mm
Weigh/重量 t	: Approx

2.2 Outline Dimension 外形尺寸图



3. Block Diagram & Power supply/电路原理图



C=1.0uF/25V

R=NC(保留电阻位以便调节)

4. Pin description/PIN 脚描述

Pin No.	Pin Name	Function
1	VLCD	Connect capacitors Ground 倍压输出
2	CB1+	Connctet capacitors between VB1+ and VB1- 接电容
3	CB1-	
4	CB0-	Connctet capacitors between VB0+ and VB0- 接电容
5	CB0+	
6	VSS	GND 0V 地
7	VDD	Power Supply. 3V 电源
8	SI (D7)	Serial data write and read input/output pin. 数据
9	SCL (D6)	Serial pixel clock signal input pin. 时钟
10	A0	Register select input, H: data; L: command 选择指令或数据
11	/RST	Reset signal (Low effective) 复位
12	/CS	Chip select input pin. 片选

5. Absolute Maximum Ratings/限定参数

Items	Symbol	MIN.	MAX.	Unit	Condition
Supply Voltage/供电电压	V _{DD}	-0.3	+3.0	V	V _{SS} = 0V
	V _{lcd}	-0.3	+8.3	V	V _{SS} = 0V
Input Voltage/输入电压	V _{IN}	-0.3	V _{DD} +0.3	V	V _{SS} = 0V
LED forward current/背光电流	I _f	0	15	mA	---
Operating Temp./工作温度	T _{OP}	0	+50	°C	---
Storage Temp./储存温度	T _{st}	-10	+60	°C	---

6. Electrical Characteristics/电气特性

6.1 Typical Electrical Characteristics

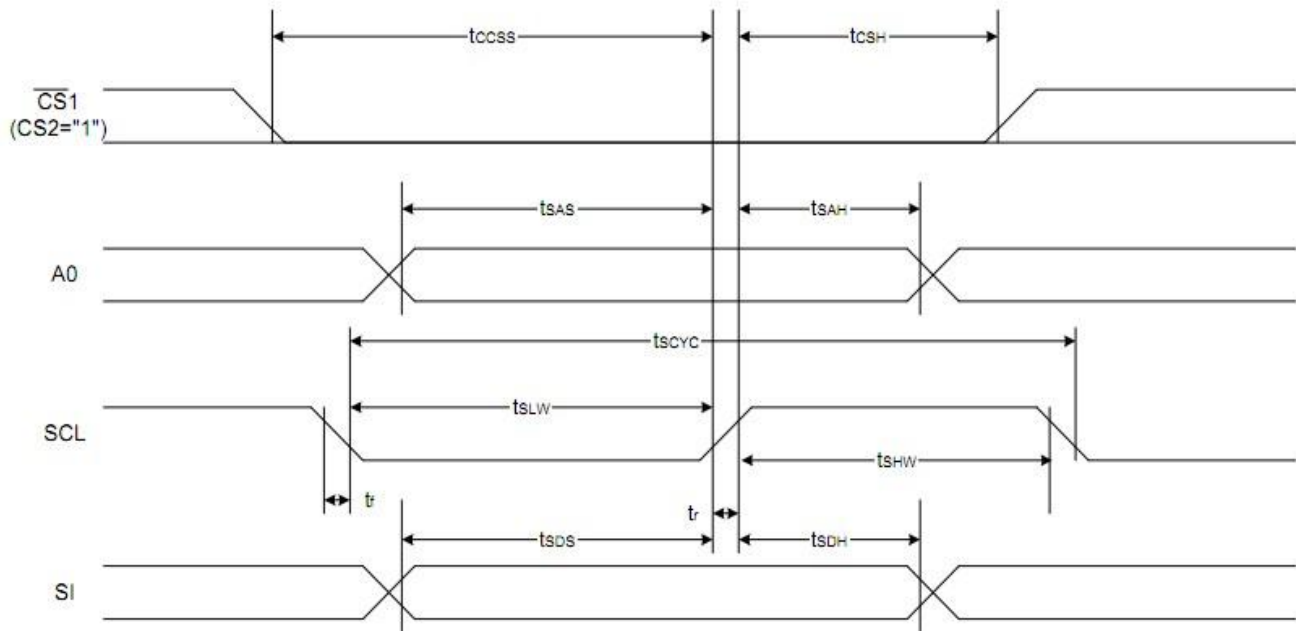
(V_{SS} = 0V, V_{DD} = 3.3V ± 10%, T_{OP} = 25°C)

Items	Symbol	MIN.	TYP.	MAX.	Unit	Condition Pin
Operating Voltage/工作电压	V _{DD}	2.7	3.0	3.3	V	V _{DD}
LCD Operating Voltage	V _{op}	-	6.5	-	V	V ₀
Input High Voltage/输入高电压	V _{IH}	0.8 V _{DD}	-	V _{DD}	V	AO,W/R,RD, D0~D7
Input Low Voltage 输入低电压	V _{IL}	0	-	0.4 V _{DD}	V	
Output High Voltage 输出高电压	V _{OH}	0.7	-	V _{DD}	V	D0~D7
Output Low Voltage 输出低电压	V _{OL}	0	-	0.2	V	D0~D7
Supply Current/供电电流	I _{DD}	---	0.6	8	mA	V _{DD} ,V _{SS}

Note 1: There is tolerance in optimum LCD driving voltage during production and it will be within the specified range.

6.2 Timing Specifications

The 4-line SPI Interface



Item	Signal	Symbol	Condition	Rating		Units
				Min.	Max.	
4-line SPI Clock Period	SCL	T_{scyc}		100	—	ns
SCL "H" pulse width		T_{SHW}		50	—	
SCL "L" pulse width		T_{SLW}		50	—	
Address setup time	A0	T_{SAS}		30	—	
Address hold time		T_{SAH}		20	—	
Data setup time	SI	T_{SDS}		30	—	
Data hold time		T_{SDH}		20	—	
CS-SCL time	CS	T_{CSS}		30	—	
CS-SCL time		T_{CSH}		60	—	

Reset timing

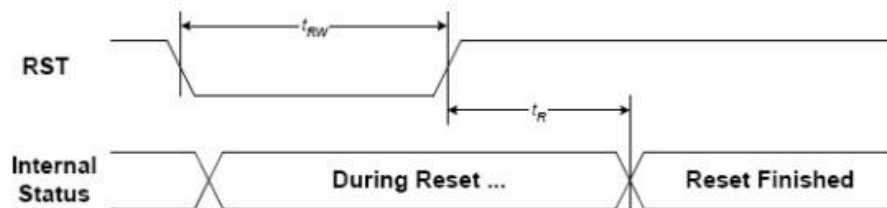


FIGURE 15: Reset Characteristics

($1.65V \leq V_{DD} < 3.3V$, $T_a = -30$ to $+85^\circ C$)

Symbol	Signal	Description	Condition	Min.	Max.	Units
t_{RW}	RST	Reset low pulse width		3	—	μS
t_R	RST,, Internal Status	Reset to Internal Status pulse delay		6	—	mS

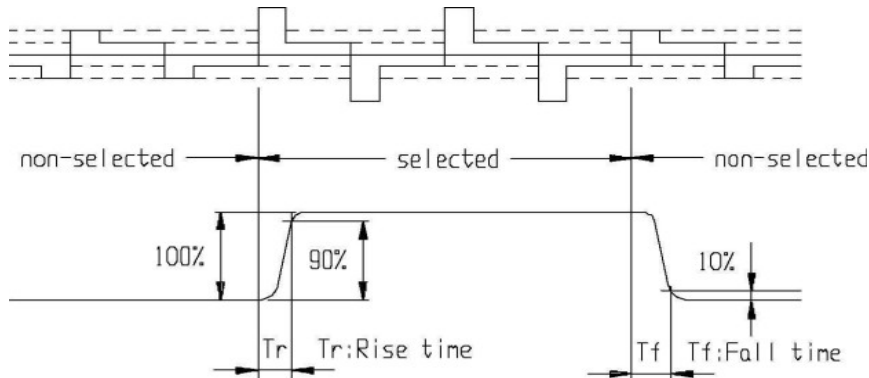
7. Backlight Characteristics/背光特性

Items	Symbol	MIN.	TYP.	MAX.	Unit	Condition
Forward Voltage/电压	Vf	2.8	3.0	3.1	V	If=10mA
Reverse current/电流	Ir	---	10	15	mA	Vr=3V
Peak wave length/波长	λ	---	---	---	nM	If=15mA
Luminance/亮度	Lv	---	---	---	Cd/m ²	If=15mA
Color /颜色	White (白色, 或者其他色)					

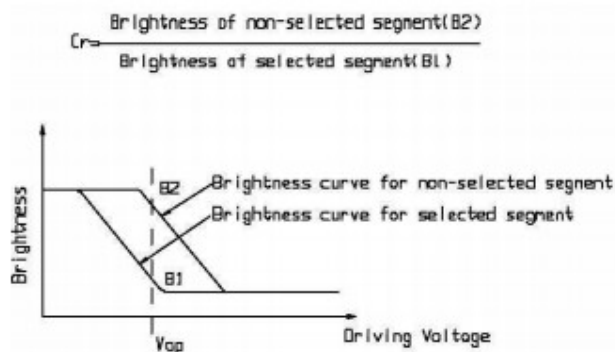
8. Electrical-Optical Characteristics/光学特性

Items	Symbol	Condition	MIN.	TYP.	MAX.	Unit	NOTE
Response time/反应时间	Tr	Ta= 25℃	---	185	---	ms	2
	Tf		---	200	---		
Contrast ratio/对比度	Cr	Ta= 25℃	---	--	---		3
Viewing angle range/视角范围	θ	Cr $\geq$ 2	-40	---	40	degree	

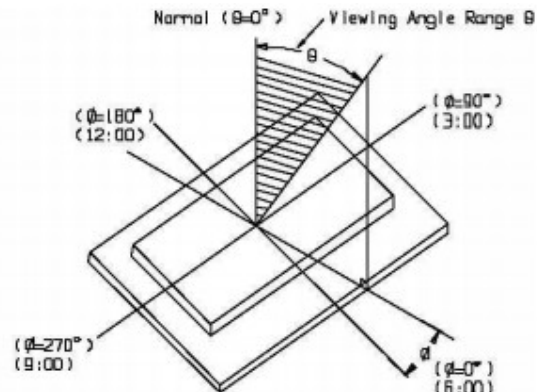
Note 1. Definition of response time



Note2 . Definition of Contrast Ratio 'Cr'



Note 3. Definition of Viewing Angle Range ' θ '



9. Control and display commands/指令描述

The following is a list of host commands supported by UC1705x

C/D: 0: Control, 1: Data
 W/R: 0: Write Cycle, 1: Read Cycle
 # Useful Data bits – Don't Care

	Command	C/D	W/R	D7	D6	D5	D4	D3	D2	D1	D0	Action	Default
1.	Write Data Byte	1	0	#	#	#	#	#	#	#	#	Write 1 byte	N/A
2.	Read Data Byte	1	1	#	#	#	#	#	#	#	#	Read 1 byte	N/A
3.	Get Status	0	1	BZ	MX	DE	RST	0	0	0	0	Get Status	--
4.	Set Column Address LSB	0	0	0	0	0	0	#	#	#	#	Set CA [3:0]	0
	Set Column Address MSB			0	0	0	1	#	#	#	#	Set CA [7:4]	0
5.	Set Power Control	0	0	0	0	1	0	1	#	#	#	Set PC[2:0]	000b
6.	Set Scroll Line	0	0	0	1	#	#	#	#	#	#	Set SL[5:0]	0
7.	Set Page Address	0	0	1	0	1	1	#	#	#	#	Set PA[3:0]	0
8.	Set V _{LCD} Resistor Ratio	0	0	0	0	1	0	0	#	#	#	Set PC[5:3]	100b
9.	Set Electronic Volume (double-byte command)	0	0	1	0	0	0	0	0	0	1	Set PM[5:0]	20H
				0	0	#	#	#	#	#	#		
10.	Set All-Pixel-ON	0	0	1	0	1	0	0	1	0	#	Set DC[1]	0b
11.	Set Inverse Display	0	0	1	0	1	0	0	1	1	#	Set DC[0]	0b
12.	Set Display Enable	0	0	1	0	1	0	1	1	1	#	Set DC[2]	0b
13.	Set SEG Direction	0	0	1	0	1	0	0	0	0	#	Set LC[0]	0b
14.	Set COM Direction	0	0	1	1	0	0	#	-	-	-	Set LC[1]	0b
15.	System Reset	0	0	1	1	1	0	0	0	1	0	Software Reset	N/A
16.	NOP	0	0	1	1	1	0	0	0	1	1	No operation	N/A
17.	Set LCD Bias Ratio	0	0	1	0	1	0	0	0	1	#	Set BR	0b
18.	Set Cursor Update Mode	0	0	1	1	1	0	0	0	0	0	AC3=1, CR=CA	N/A
19.	Reset Cursor Update Mode	0	0	1	1	1	0	1	1	1	0	AC3=0, CA=CR.	N/A
20.	Set Static Indicator OFF	0	0	1	0	1	0	1	1	0	0	NOP	N/A
21.	Set Static Indicator ON	0	0	1	0	1	0	1	1	0	1	NOP	N/A
	Set Static Indicator			-	-	-	-	-	-	-	-		
22.	Set Booster Ratio (double-byte command)	0	0	1	1	1	1	1	0	0	0	NOP	00b
				0	0	0	0	0	0	#	#		
23.	Set Power Save (compound command)	0	0	#	#	#	#	#	#	#	#	Display OFF & All Pixel ON	N/A
24.	Set Test Control (double-byte command)	0	0	1	1	1	1	1	1	TT		For UCI only Do NOT use	N/A
				-	#	#	#	#	#	#	#		
25.	Set Adv. Program Control 0 (double-byte command)	0	0	1	1	1	1	1	0	1	0	Set TC, WA[1:0]	90H
				#	0	0	1	0	0	#	#		
26.	Set Adv. Program Control 1 (double-byte command)	0	0	1	1	1	1	1	0	1	1	For UCI only Set APC1	N/A
				#	#	#	#	#	#	#	#		

* Other than commands listed above, all other bit patterns result in NOP (No Operation).

10. DDRAM 映射表

PA[3:0]	0	Line AddCsa																	Panel Location	MY=0		MY=1		SL=0		SL=16		SL=25		SL=25	
0000	D0	00H	0	1															COM1	C1	C49	C64	C48	C25	C9						
	D1	01H	0	1															COM2	C2	C50	C63	C47	C24	C8						
	D2	02H	0	0															COM3	C3	C51	C62	C46	C23	C7						
	D3	03H	0	0															COM4	C4	C52	C61	C45	C22	C6						
	D4	04H	0	1															COM5	C5	C53	C60	C44	C21	C5						
	D5	05H	1	1															COM6	C6	C54	C59	C43	C20	C4						
	D6	06H	1	0															COM7	C7	C55	C58	C42	C19	C3						
	D7	07H	1	0															COM8	C8	C56	C57	C41	C18	C2						
0001	D0	08H																	COM9	C9	C57	C56	C40	C17	C1						
	D1	09H																	COM10	C10	C58	C55	C39	C16	--						
	D2	0AH																	COM11	C11	C59	C54	C38	C15	--						
	D3	0BH																	COM12	C12	C60	C53	C37	C14	--						
	D4	0CH																	COM13	C13	C61	C52	C36	C13	--						
	D5	0DH																	COM14	C14	C62	C51	C35	C12	--						
	D6	0EH																	COM15	C15	C63	C50	C34	C11	--						
	D7	0FH																	COM16	C16	C64	C49	C33	C10	--						
0010	D0	10H																	COM17	C17	C1	C48	C32	C9	--						
	D1	11H																	COM18	C18	C2	C47	C31	C8	--						
	D2	12H																	COM19	C19	C3	C46	C30	C7	--						
	D3	13H																	COM20	C20	C4	C45	C29	C6	--						
	D4	14H																	COM21	C21	C5	C44	C28	C5	--						
	D5	15H																	COM22	C22	C6	C43	C27	C4	--						
	D6	16H																	COM23	C23	C7	C42	C26	C3	--						
	D7	17H																	COM24	C24	C8	C41	C25	C2	--						
0011	D0	18H																	COM25	C25	C9	C40	C24	C1	--						
	D1	19H																	COM26	C26	C10	C39	C23	C64	C48*						
	D2	1AH																	COM27	C27	C11	C38	C22	C83	C47						
	D3	1BH																	COM28	C28	C12	C37	C21	C62	C46						
	D4	1CH																	COM29	C29	C13	C36	C20	C61	C45						
	D5	1DH																	COM30	C30	C14	C35	C19	C60	C44						
	D6	1EH																	COM31	C31	C15	C34	C18	C59	C43						
	D7	1FH																	COM32	C32	C16	C33	C17	C58	C42						
0100	D0	20H																	COM33	C33	C17	C32	C16	C57	C41						
	D1	21H																	COM34	C34	C18	C31	C15	C56	C40						
	D2	22H																	COM35	C35	C19	C30	C14	C55	C39						
	D3	23H																	COM36	C36	C20	C29	C13	C54	C38						
	D4	24H																	COM37	C37	C21	C28	C12	C53	C37						
	D5	25H																	COM38	C38	C22	C27	C11	C52	C36						
	D6	26H																	COM39	C39	C23	C26	C10	C51	C35						
	D7	27H																	COM40	C40	C24	C25	C9	C50	C34						
0101	D0	28H																	COM41	C41	C25	C24	C8	C49	C33						
	D1	29H																	COM42	C42	C26	C23	C7	C48	C32						
	D2	2AH																	COM43	C43	C27	C22	C6	C47	C31						
	D3	2BH																	COM44	C44	C28	C21	C5	C46	C30						
	D4	2CH																	COM45	C45	C29	C20	C4	C45	C29						
	D5	2DH																	COM46	C46	C30	C19	C3	C44	C28						
	D6	2EH																	COM47	C47	C31	C18	C2	C43	C27						
	D7	2FH																	COM48	C48	C32	C17	C1	C42	C26						
0110	D0	30H																	COM49	C49	C33	C16	--	C41	C25						
	D1	31H																	COM50	C50	C34	C15	--	C40	C24						
	D2	32H																	COM51	C51	C35	C14	--	C39	C23						
	D3	33H																	COM52	C52	C36	C13	--	C38	C22						
	D4	34H																	COM53	C53	C37	C12	--	C37	C21						
	D5	35H																	COM54	C54	C38	C11	--	C36	C20						
	D6	36H																	COM55	C55	C39	C10	--	C35	C19						
	D7	37H																	COM56	C56	C40	C9	--	C34	C18						
0111	D0	38H																	COM57	C57	C41	C8	--	C33	C17						
	D1	39H																	COM58	C58	C42	C7	--	C32	C16						
	D2	3AH																	COM59	C59	C43	C6	--	C31	C15						
	D3	3BH																	COM60	C60	C44	C5	--	C30	C14						
	D4	3CH																	COM61	C61	C45	C4	--	C29	C13						
	D5	3DH																	COM62	C62	C46	C3	--	C28	C12						
	D6	3EH																	COM63	C63	C47	C2	--	C27	C11						
	D7	3FH																	COM64	C64	C48	C1	--	C26	C10						
1000	D0	40H																	CIC	CIC	CIC	CIC	CIC	CIC	CIC						

MX=0		SEG1	SEG2	SEG3	SEG4	SEG5	SEG6	SEG7	SEG8		SEG128	SEG129	SEG130	SEG131	SEG132
MX=1		SEG132	SEG131	SEG130	SEG129	SEG128	SEG127	SEG126	SEG125		SEG5	SEG4	SEG3	SEG2	SEG1

65	49	65	49
MUX			

Example for memory mapping: let MX = 0, MY = 0, SL = 0, according to the data shown in the above table:

- Page 0 SEG 1 (D7-D0) : 11100000b
- Page 0 SEG 2 (D7-D0) : 00110011b