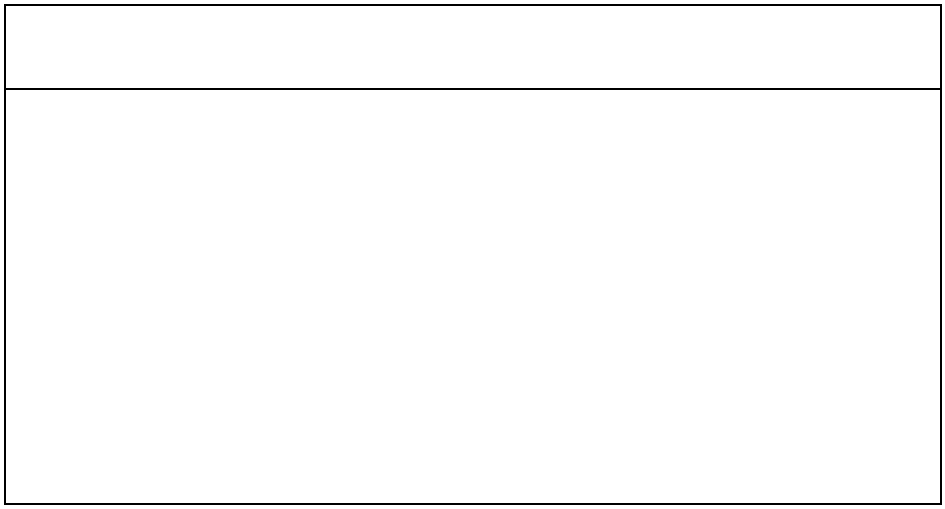
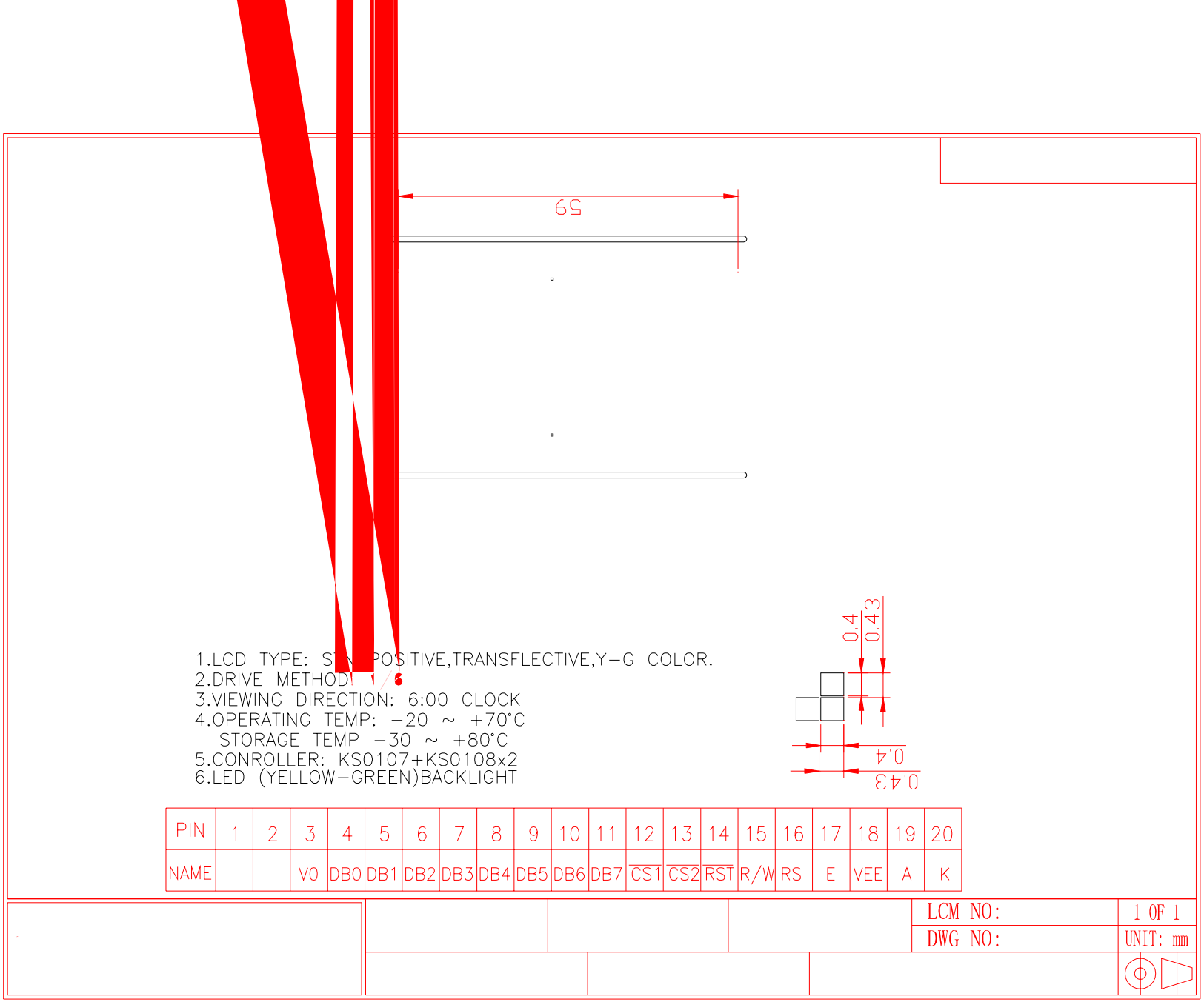
S P E C I F I C A T I O N

P a s s i v e M a t r i x L C D M o d u l e

(1 2 8 x 6 4 D o t s)

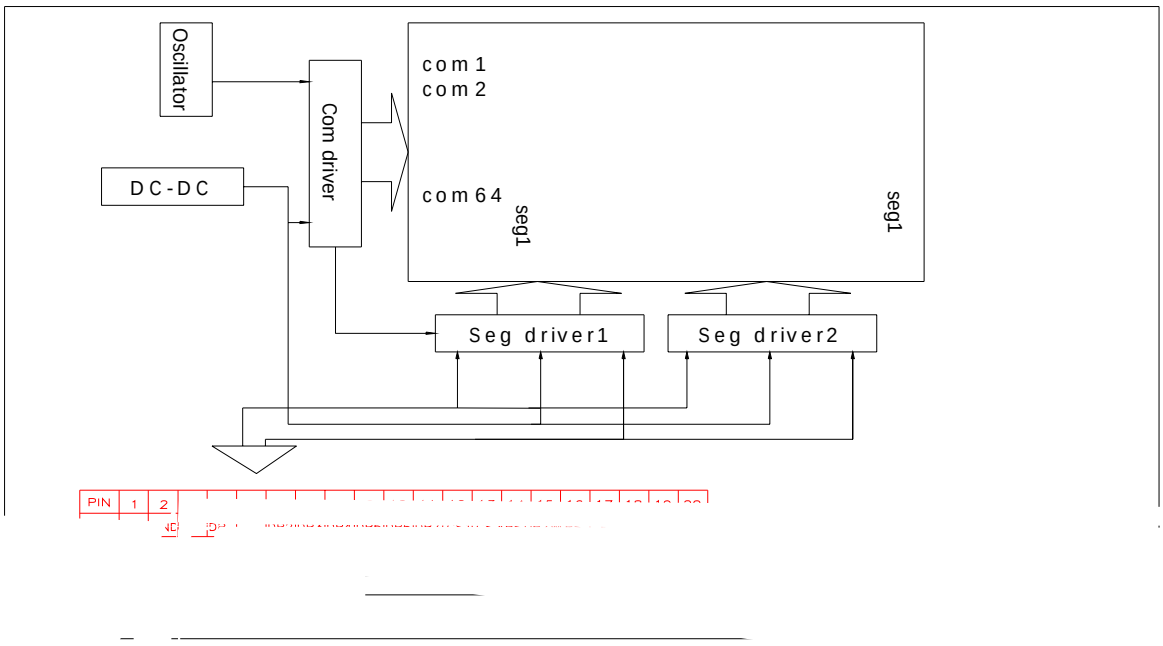




1.LCD TYPE: STN POSITIVE,TRANSFLECTIVE,Y-G COLOR.
2.DRIVE METHOD: 1/16
3.VIEWING DIRECTION: 6:00 CLOCK
4.OPERATING TEMP: -20 ~ +70°C
STORAGE TEMP -30 ~ +80°C
5.CONROLLER: KS0107+KS0108x2
6.LED (YELLOW-GREEN)BACKLIGHT

PIN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
NAME			V0	DB0	DB1	DB2	DB3	DB4	DB5	DB6	DB7	$\overline{CS1}$	$\overline{CS2}$	$\overline{RST}$	R/W	RS	E	VEE	A	K

				LCM NO:	1 OF 1
				DWG NO:	UNIT: mm

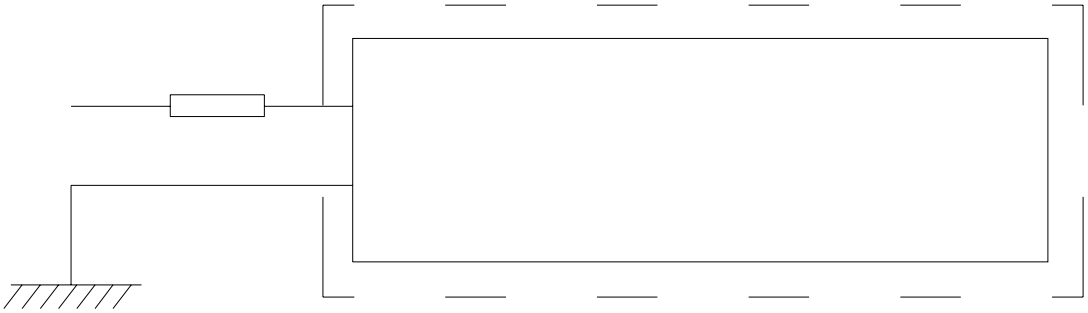

Oscillator
Com driver
DC-DC
com1
com2
com64
seg1
seg1
Seg driver1
Seg driver2

± % o o

							o = 0
							o = 0
							o = 0
							± %
							o
“ ”							
“ ”							
“ ”							
“ ”							

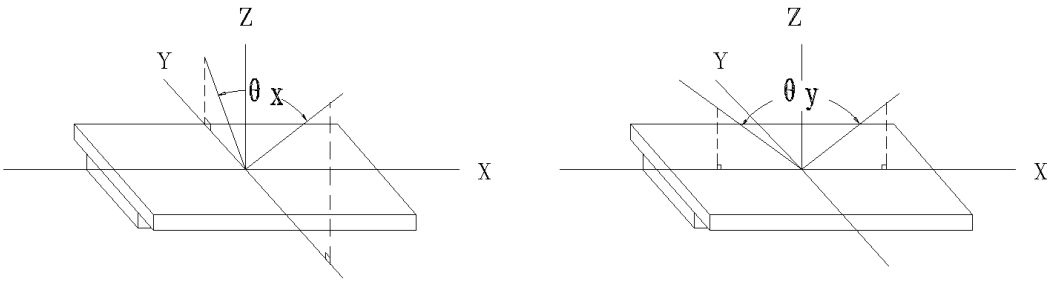
		o			
		o			
		o			

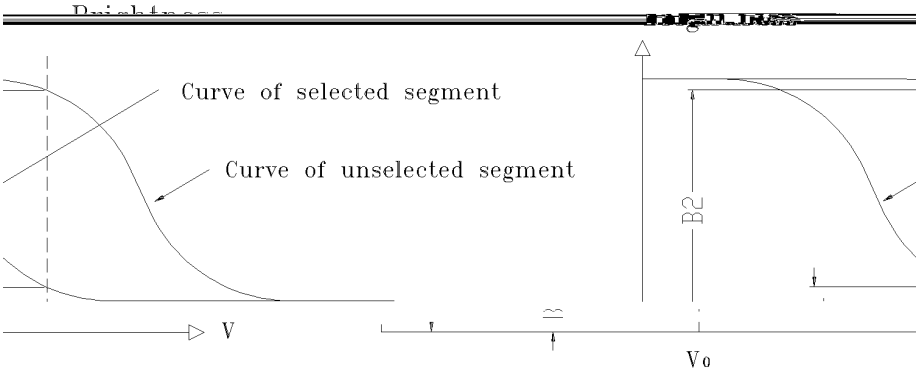
		o				



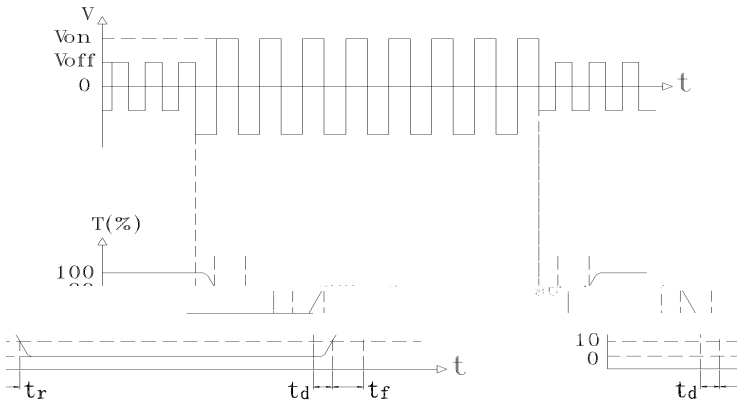
!

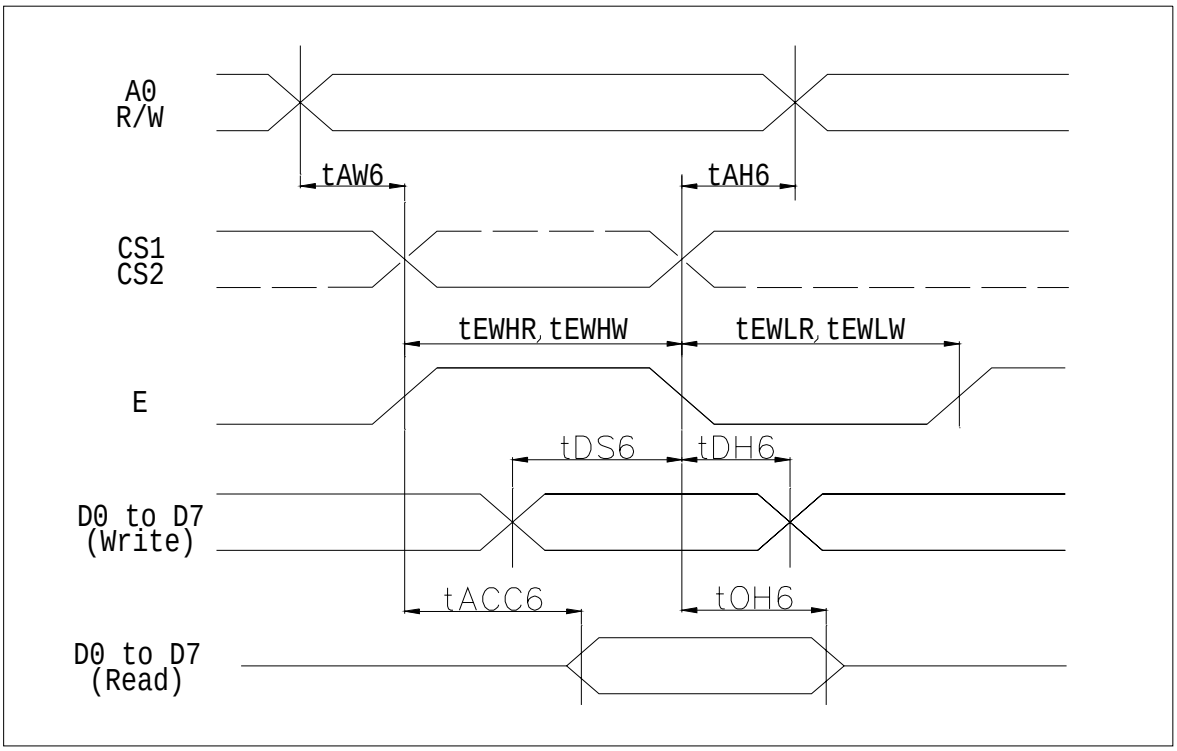
	"		" #			
	"		" #			
		" #				
		" #				
			" #			
			" #			





$$\text{Contrast Ratio} = B2/B1 = \frac{\text{unselected state brightness}}{\text{selected state brightness}}$$




A0
R/W
tAW6
tAH6
CS1
CS2
tEWHR, tEWHW
tEWLR, tEWLW
E
tDS6
tDH6
D0 to D7
(Write)
tACC6
tOH6
D0 to D7
(Read)

– !°

					—	
					—	
					—	
					—	
				—		
					—	
					—	
					—	
					—	

The KS0108 chip identify the data bus signals by a combination of D/I, R/W, E signals. Command interpretation and execution does not depend on the external clock, but rather is performed through internal timing only.

The interface is placed in a read mode when an “H” signal is input to the R/W terminal and placed in a write mode when a “L” signal is input to the R/W terminal and then the command is launched by inputting a high pulse to the E terminal. (See Timing Characteristics” regarding the timing.)

(1). Display ON/OFF

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.

R/W	D/I	D7	D6	D5	D4	D3	D2	D1	D0	Setting
0	0	0	0	1	1	1	1	1	0	**Display OFF**
									1	**Display ON**

(2) Display Start Line

Z address D5 - D0 (binary) of the display data RAM is set in the display start line register and is displayed at the top of the screen.

		D7	D6	D5	D4	D3	D2	D1	D0	Line address
0	0	1	1	0	0	0	0	0	0	0
				0	0	0	0	0	1	1
				0	0	0	0	1	0	2
								↓		↓
				1	1	1	1	1	0	62
				1	1	1	1	1	1	63

(3) Set Page (X Address)

X address D2 –D0 (binary) of the display data RAM is set in the X address register. After that, writing or reading to or from MPU is executed in this specified page until the next page is set.

R/W	D/I	D7	D6	D5	D4	D3	D2	D1	D0	Page address
0	0	1	0	1	1	1	0	0	0	0
							0	0	1	1
								↓		↓
							1	1	0	6
							1	1	1	7

(4) Set Y Address

Y address D5 - D0 (binary) of the display data RAM is set in the Y address counter. After that, Y address counter is increased by 1 every time the data is written or read to or from MPU.

R/W	D/I	D7 D6 D5 D4 D3 D2 D1 D0	Y address
0	0	0 1 0 0 0 0 0 0	0
		0 0 0 0 0 1	1
		0 0 0 0 1 0	2
		↓	↓
		1 1 1 1 1 0	62
		1 1 1 1 1 1	63

(5) Status Read

R/W	D/I	D7	D6	D5	D4	D3	D2	D1	D0
1	0	BUSY	0	ON/OFF	RESET	0	0	0	0

BUSY	When busy is 1, the LSI is executing internal operations. No instructions are accepted while busy is 1, so you should make sure that busy is 0 before writing the next instruction.
ON/OFF	Shows the liquid crystal display conditions: on condition or off condition. When on/off is 1, the display is in off condition. When on/off is 0, the display is in on condition.
RESET	RESET = 1 shows that the system is being initialized. In this condition, no instructions except status read can be accepted. RESET = 0 shows that initializing has finished and the system is in the usual operation condition.

(6) Write Display Data

Writes 8-bit data D7 – D0 (binary) into the display data RAM. Then Y address is increased by 1 automatically.

R/W	D/I	D7	D6	D5	D4	D3	D2	D1	D0
1	0	Write data							

(7) Read Display Data

Reads out 8-bit data D7 – D0 (binary) from the display data RAM. Then Y address is increased by 1 automatically.

R/W	D/I	D7	D6	D5	D4	D3	D2	D1	D0
1	0	Read data							

Instructions	Command Code		Functions
	R/W D/I	D7 D6 D5 D4 D3 D2 D1 D0	
(1) Display ON/OFF	0 0	0 0 1 1 1 1 1 0 1	LCD display ON/OFF 1: ON, 0: OFF
(2) Display start line	0 0	1 1 Display start line (0-63)	Specifies the RAM line displayed at the top of the screen.
(3) Set page (X address	0 0	1 0 1 1 1 Page (0-7)	Sets the page (X address) of RAM at the page (X address) register.
(4) Set Y address	0 0	0 1 Y address (0-63)	Sets the Y address in the Y address counter.
(5) Status read	1 0	busy 0 on/off res 0 0 0 0	Reads the status. RESET 1: Reset 0: Normal ON/ OFF 1: Display off 0: Display on Busy 1: Internal operation 0: Ready
(6) Write Display data	0 1	Write data	Writes data DB0 (LSB) to DB7 (MSB) on the data bus into display RAM
(7) Read Display data	1 1	Read data	Reads data DB0 (LSB) to DB7 (MSB) from the display RAM to the data bus.

Note: Busy time varies with the frequency (f CLK) of ø1, and ø2. (1/ f CLK <= T busy <= 3/ f CLK)