Specification of LCD Module

Product No: ZX12864SYHDA6577D

北京中显电子有限公司
地址:海淀区中关村大街32号和盛大厦811室
电话:010-82626833 52926620
传真:010-52926621

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1.GENERAL DESCRIPTION

The 12864SYHDA-6577D is a 128X64 DOTS MATRIX LCD module which is fabricated by low power COMS technology. It has an STN panel composed of 128 segments and 64 commons. The LCM can be easily accessed by microcontroller via 8bit parallel interface.

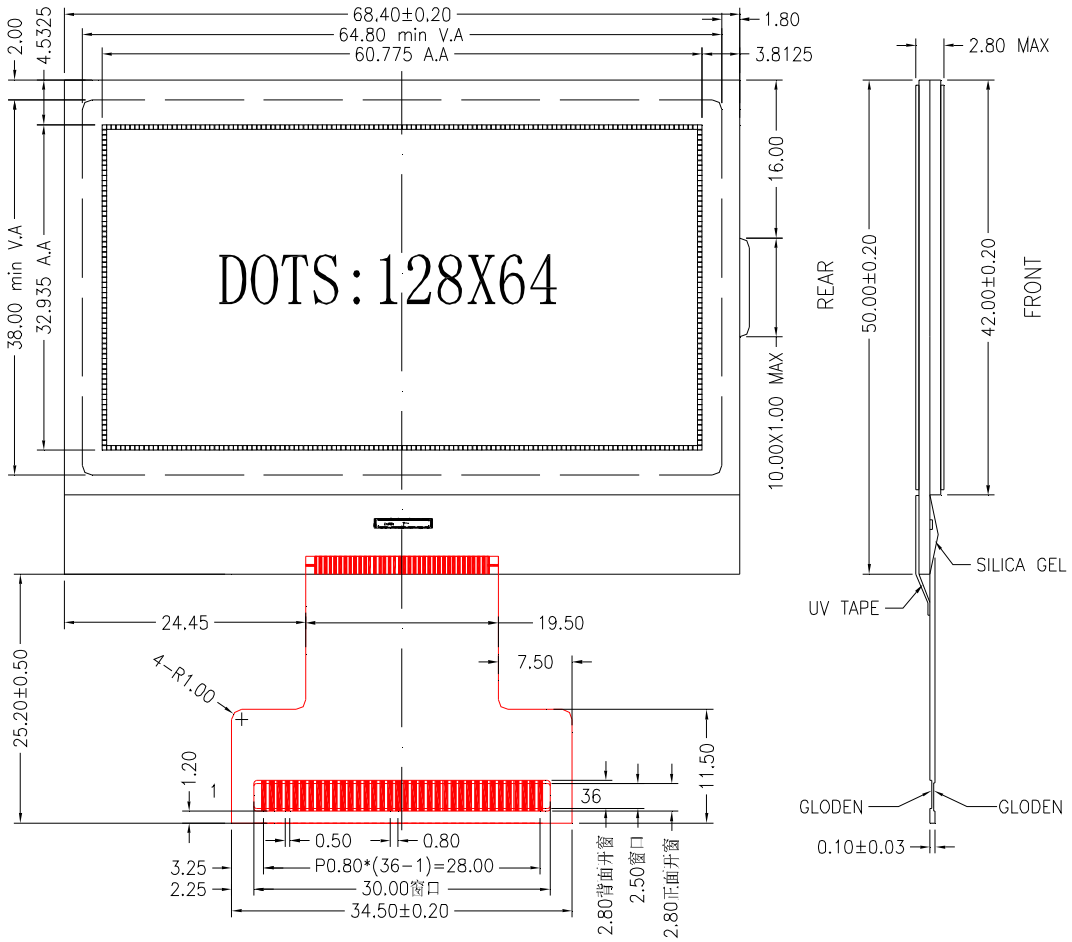
2.FEATURES

Display Mode	Transmissive and positive type
	LCD STN Y-G
Display Format	128X64 DOTS MATRIX
Input Data	Parallel data input from MPU
Multiplexing Ration	1/65 Duty , 1/9Bias
Viewing Direction	6 O'clock
Driver	ST7565R

3.MECHANICAL SPECIFICATION

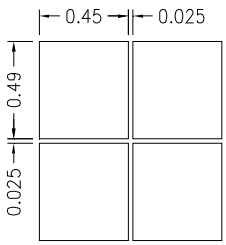
Item	Specifications	Unit
Module Size(W*H*T)	68.4X（50+25.2）X2.8MAX	mm
Viewing Area (W*H)	64.8X38	mm
Dot Pitch (W*H)	0.475X0.515	mm
Dot Size (W*H)	0.45X0.49	mm
Active Area (W*H)	60.775X32.935	mm
Number of Dots	128x64	---

4.MECHANICAL DIMENSION



NO	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
PIN	NC	IRS	NC	P/S	C86	NC	VR	V0	V1	V2	V3	V4	NC	CAP2N	CAP2P	CAP1P	CAP1N	CAP3P
NO	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
PIN	VOUT	VSS	VDD	D7/ SID	D6/ SCLK	D5	D4	D3	D2	D1	D0	/RD(E)	/WR R/W	A0 RS/	/RES	/CS1	NC	NC

DISPLAY TYPE: STN/Y-G
POLARIZER: TRANSMISSIVE
VIEWING DIRECTION: 6:00-CLOCK
DRIVE METHOD: 1/65DUTY,1/9BIAS
LCD OPERATING VOLTAGE: 9.4v
LCM OPERATING VOLTAGE: 3.0v
OPERATING TEMP: -10 TO 50 Deg.C
STORAGE TEMP: -20 TO 60 Deg.C
CONNECTOR: COG



5. PIN DESCRIPTIONS

No.	Symbol	Function
1	NC	No Connection
2	IRS	This terminal selects the resistors for the V0 voltage level adjustment.
3	NC	No Connection
4	P/S	This pin configures the interface to be parallel mode or serial mode.
5	C86	This is the MPU interface selection pin. 6800 or 8080
6	NC	No Connection
7	VR	No Connection
8	V0	power supply liquid crystal drive.
9	V1	power supply liquid crystal drive.
10	V2	power supply liquid crystal drive.
11	V3	power supply liquid crystal drive.
12	V4	power supply liquid crystal drive.
13	NC	No Connection
14	C2-	DC/DC voltage converter.
15	C2+	DC/DC voltage converter.
16	C1+	DC/DC voltage converter.
17	C1-	DC/DC voltage converter.

18	C3+	DC/DC voltage converter.
19	Vout	DC/DC voltage converter.
20	VSS	Power supply (ground)
21	VDD	Power supply
22	D7	Input data signal
23	D6	Input data signal
24	D5	Input data signal
25	D4	Input data signal
26	D3	Input data signal
27	D3	Input data signal
28	D1	Input data signal
29	D0	Input data signal
30	/RD/E	Read signal input pin, active “H” 6800 MPU and is HIGH-active.
31	WR/RW	Write signal input pin, active “H” / “L” Read / Write.
32	A0	Select control data or display for read /write operation
33	/RES	Reset
34	/CS	Chip select signal
35	NC	No Connection
36	NC	No Connection

6. MAXIMUM RATINGS

Item	Symbol	Min	Max	Unit
Supply Voltage	VDD	-0.3	3.6	V
	Vout	-0.3	13.5	V
Input Voltage	Vin	VSS-0.3	VDD+0.3	V
Operating temperature	Topr	-20	70	℃
Storage temperature	Tstr	-30	80	℃

7. ELECTRICAL CHARACTERISTICS

(1).

Item		Symbol	Condition	Min	Typ.	Max.	Unit
Supply Voltage		Logic	V_{DD}-GND	-	3.0	-	V
Input cotage	H level	V_{DD}	-	$0.8V_{DD}$	-	V_{DD}	V
	L level	V_{IH}		V_{SS}	-	$0.2V_{DD}$	
LCD Driving Voltage		V_{LCD}		-	9.4	-	V

Note1. The value is measure at following condition; follow same condition to test sample and mass product.

(a)VDD=3.0V

(b)1/65Duty ,1/9 Bias

8. MODULE FUNCTION DESCRIPTION

1、Timing Characteristics

System Bus Read/Write Characteristics 1 (For the 8080 Series MPU)

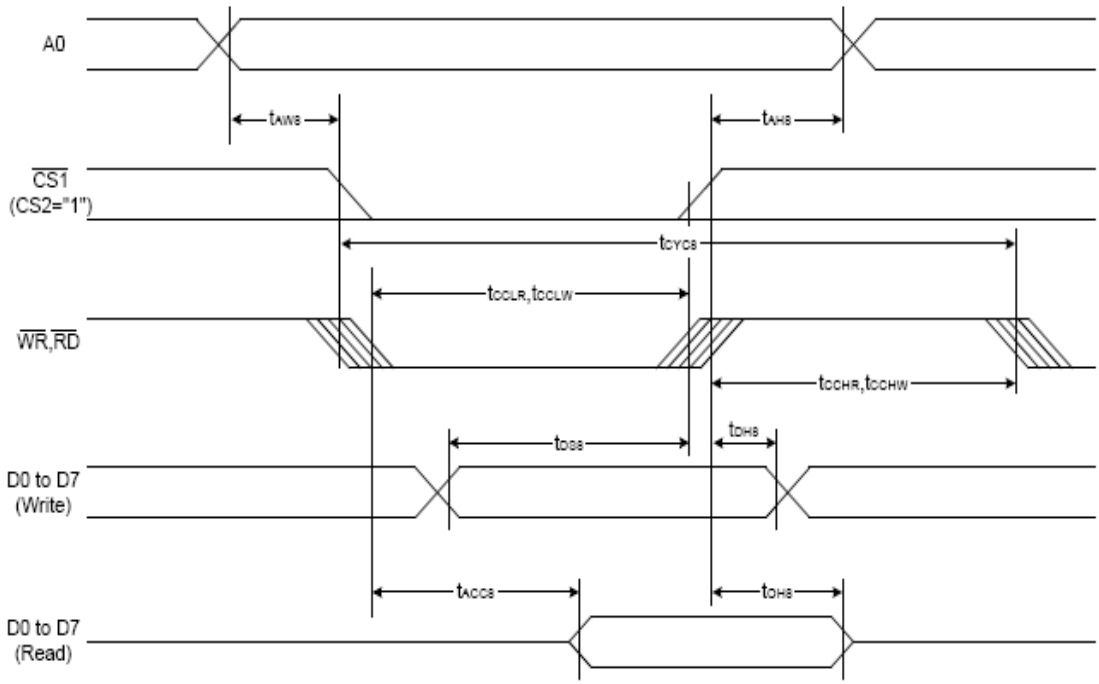


Figure 37

Table 24

(V_{DD} = 3.3V, Ta = –30 to 85°C)

Item	Signal	Symbol	Condition	Rating		Units
				Min.	Max.	
Address hold time	A0	t_{AH8}		0	—	Ns
Address setup time		t_{AW8}		0	—	
System cycle time		t_{CYC8}		240	—	
Enable L pulse width (WRITE)	WR	t_{CCLW}		80	—	
Enable H pulse width (WRITE)		t_{CCHW}		80	—	
Enable L pulse width (READ)	RD	t_{CCLR}		140	—	
Enable H pulse width (READ)		t_{CCHR}		80		
WRITE Data setup time	D0 to D7	t_{DS8}		40	—	
WRITE Address hold time		t_{DH8}		0	—	
READ access time		t_{ACC8}	C_L = 100 pF	—	70	
READ Output disable time		t_{OH8}	C_L = 100 pF	5	50	

System Bus Read/Write Characteristics 2 (For the 6800 Series MPU)

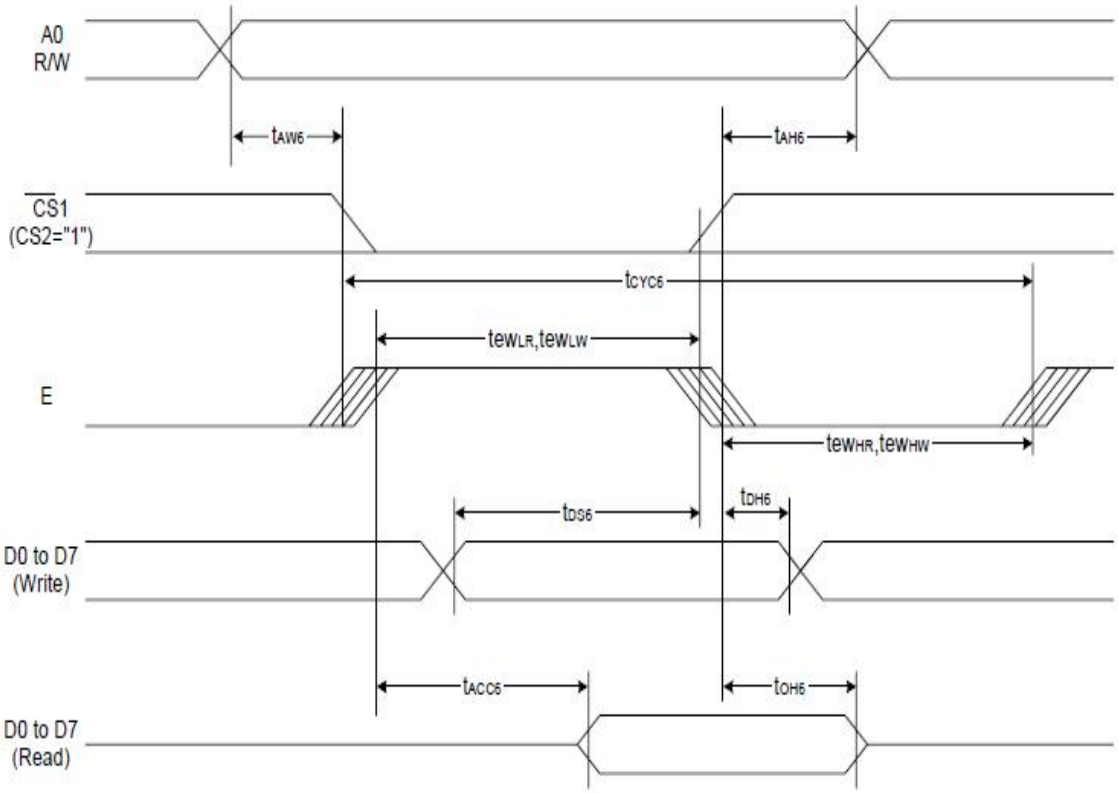


Figure 38

Table 26

(V_{DD} = 3.3V, Ta = –30 to 85°C)

Item	Signal	Symbol	Condition	Rating		Units
				Min.	Max.	
Address hold time	A0	t_{AH6}		0	—	ns
Address setup time		t_{AW6}		0	—	
System cycle time		t_{CYC6}		240	—	
Enable L pulse width (WRITE)	WR	t_{EWLW}		80	—	
Enable H pulse width (WRITE)		t_{EWHW}		80	—	
Enable L pulse width (READ)	RD	t_{EWLR}		80	—	
Enable H pulse width (READ)		t_{EWHR}		140		
WRITE Data setup time	D0 to D7	t_{DS6}		40	—	
WRITE Address hold time		t_{DH6}		0	—	
READ access time		t_{ACC6}	C_L = 100 pF	—	70	
READ Output disable time		t_{OH6}	C_L = 100 pF	5	50	

2. APPLICATION OF LCM

The Step-up Voltage Circuits

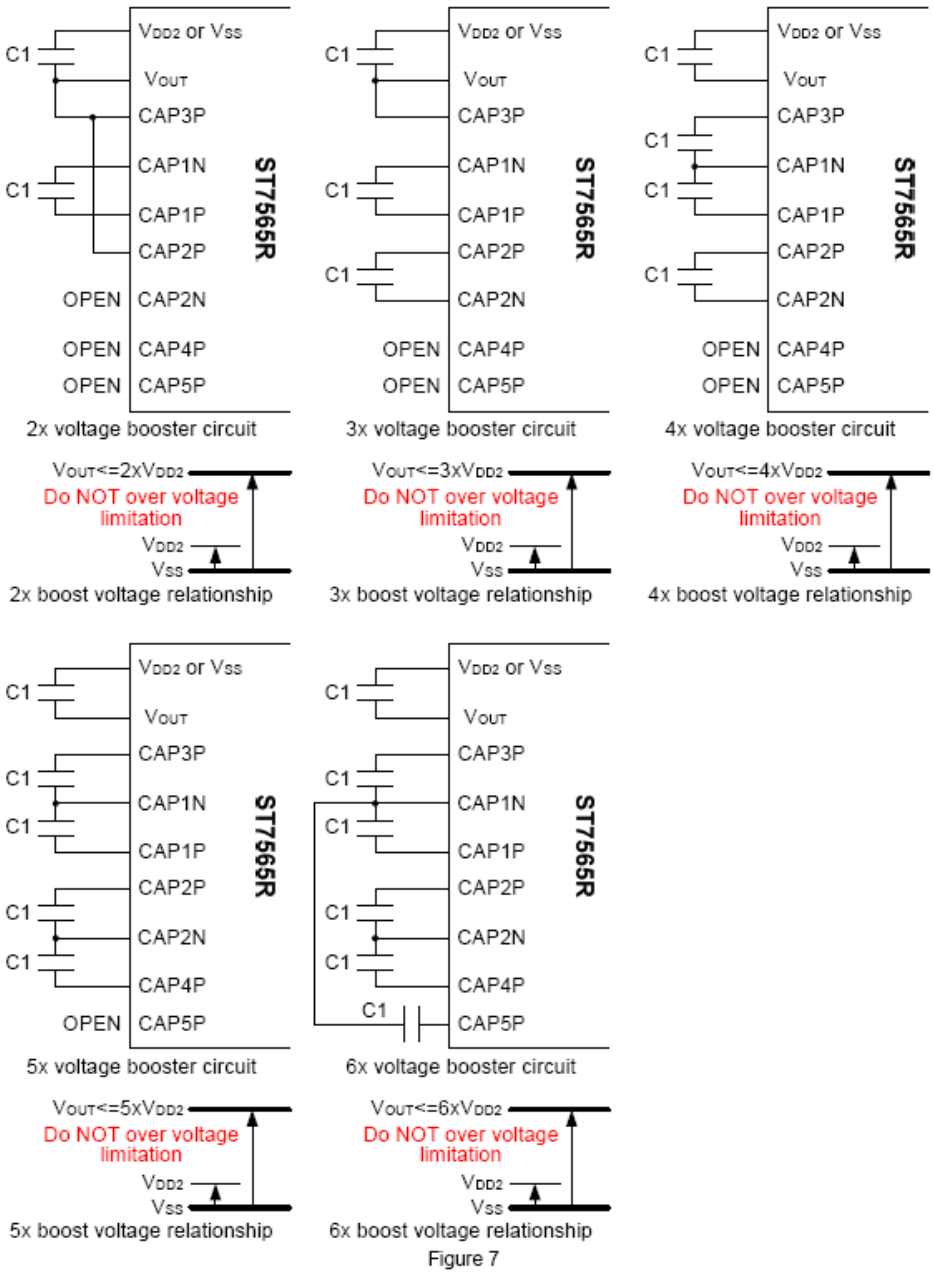


Figure 7

* The V_{DD2} voltage range must be set so that the V_{OUT} terminal voltage does not exceed the absolute maximum rated value.
* The maximum voltage of the booster capacitor terminals are :
  V_{MAX}: CAP5P > CAP4P > CAP3P > CAP2P > CAP1P > CAP2N = CAP1N.

3、 COMMAND TABLE

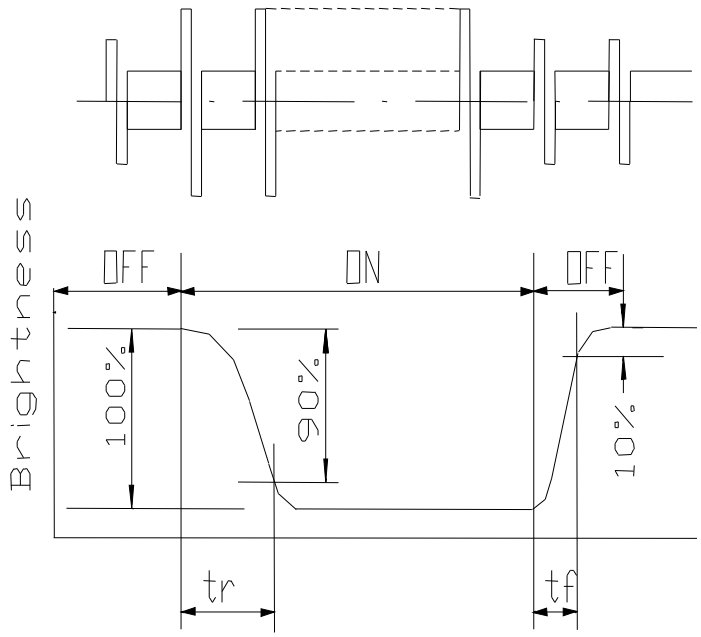
Command	Command Code										Function
	A0	/RD	/WR	D7	D6	D5	D4	D3	D2	D1	D0	
(1) Display ON/OFF	0	1	0	1	0	1	0	1	1	1	0 1	LCD display ON/OFF 0: OFF, 1: ON
(2) Display start line set	0	1	0	0	1	Display start address						Sets the display RAM display start line address
(3) Page address set	0	1	0	1	0	1	1	Page address				Sets the display RAM page address
(4) Column address set upper bit Column address set lower bit	0	1	0	0	0	0	1	Most significant column address				Sets the most significant 4 bits of the display RAM column address. Sets the least significant 4 bits of the display RAM column address.
				0	0	0	0	Least significant column address				
(5) Status read	0	0	1	Status				0	0	0	0	Reads the status data
(6) Display data write	1	1	0	Write data								Writes to the display RAM
(7) Display data read	1	0	1	Read data								Reads from the display RAM
(8) ADC select	0	1	0	1	0	1	0	0	0	0	0 1	Sets the display RAM address SEG output correspondence 0: normal, 1: reverse
(9) Display normal/ reverse	0	1	0	1	0	1	0	0	1	1	0 1	Sets the LCD display normal/ reverse 0: normal, 1: reverse
(10) Display all points ON/OFF	0	1	0	1	0	1	0	0	1	0	0 1	Display all points 0: normal display 1: all points ON
(11) LCD bias set	0	1	0	1	0	1	0	0	0	1	0 1	Sets the LCD drive voltage bias ratio 0: 1/9 bias, 1: 1/7 bias (ST7565R)
(12) Read-modify-write	0	1	0	1	1	1	0	0	0	0	0	Column address increment At write: +1 At read: 0
(13) End	0	1	0	1	1	1	0	1	1	1	0	Clear read/modify/write
(14) Reset	0	1	0	1	1	1	0	0	0	1	0	Internal reset
(15) Common output mode select	0	1	0	1	1	0	0	0 1	*	*	*	Select COM output scan direction 0: normal direction 1: reverse direction
(16) Power control set	0	1	0	0	0	1	0	1	Operating mode			Select internal power supply operating mode
(17) V_0 voltage regulator internal resistor ratio set	0	1	0	0	0	1	0	0	Resistor ratio			Select internal resistor ratio(Rb/Ra) mode
(18) Electronic volume mode set Electronic volume register set	0	1	0	1	0	0	0	0	0	0	1	Set the V_0 output voltage electronic volume register
				0	0	Electronic volume value						
(19) Static indicator ON/OFF Static indicator register set	0	1	0	1	0	1	0	1	1	0	0 1	0: OFF, 1: ON Set the flashing mode
				0	0	0	0	0	0	0	Mode	
(20) Booster ratio set	0	1	0	1	1	1	1	1	0	0	0	select booster ratio 00: 2x,3x,4x 01: 5x 11: 6x
				0	0	0	0	0	0	step-up value		
(21) Power save	0	1	0									Display OFF and display all points ON compound command
(22) NOP	0	1	0	1	1	1	0	0	0	1	1	Command for non-operation
(23) Test	0	1	0	1	1	1	1	*	*	*	*	Command for IC test. Do not use this command

9. Electro-Optical Characteristics

(1).FSTN Type

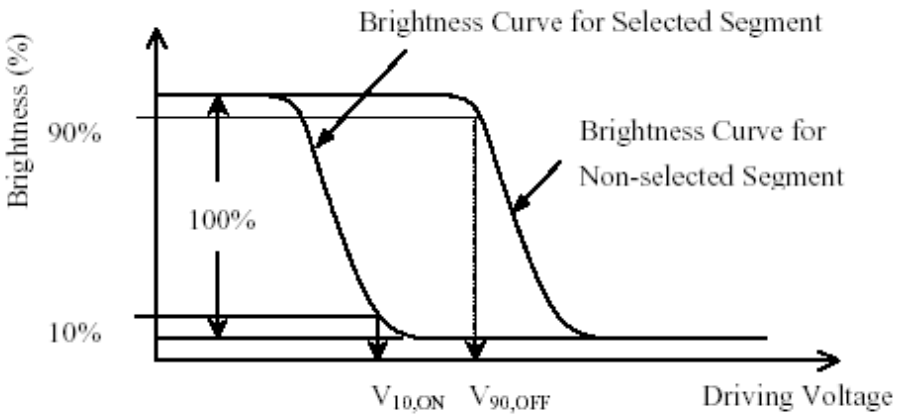
Item	Symbol	Condition	Min	Typ	Max	Units
Contrast	K	u=0° F=0°	5 ： 1	—	—	deg.
Viewing Angle	u	K=5 F=0°	u_2 2 u_1=30	—	—	deg.
		K=5 u=10°	F= 6 30	—	—	deg.
Response time	T_{on}	258C	—	—	250	ms
	T_{off}	258C	—	—	250	ms

(2). Definition of Optical Response Time



(3). Definition of Driving Voltage (Vlcd)

$$Vlcd=(V_{10,ON}+V_{90,OFF})/2$$



(4). Definition of Viewing Angle θ and Φ