

GENERAL SPECIFICATION

ITEM	DESCRIPTION
LCD TYPE	STN GRAY POSITIVE
BACKLIGHT COLOR	YELLOW GREEN
VIEW DIRECTION	6 O'CLOCK
TEMPERATURE RANGE	GENERAL
MODULE SIZE	80.0mm*36.0mm*8.8/12.7mm MAX
VIEWING AREA	65.0mm*16.0mm
DOT SIZE	0.56mm*0.66mm
DOT PITCH	0.60mm*0.70mm
DISPLAY FORMAT	16 CHARACTERS (W) x 2 LINES (H)
DUTY RATIO	1/16 DUTY
CONTROLLER	ST7066U or Equivalent

ABSOLUTE MAXIMUM RATING

(1) ELECTRICAL ABSOLUTE RATINGS

ITEM	SYMBOL	MIN.	MAX.	UNIT
POWER SUPPLY FOR LOGIC	VDD-VSS	-0.3	7.0	VOLT
POWER SUPPLY FOR LCD	VDD-VO	-0.3	10.0	VOLT
INPUT VOLTAGE	VI	-0.3	VDD	VOLT
LED POWER DISSIPATION	PAD	-	897	mW
LED FORWARD CURRENT	IAF	-	390	mA
LED REVERSE VOLTAGE	VR	-	4	V

(2) ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS

ITEM	NORMAL TEMPERATURE			
	OPERATING		STORAGE	
	MIN.	MAX.	MIN.	MAX.
AMBIENT TEMPERATURE	0℃	+50℃	-20℃	+70℃
HUMIDITY (WITHOUT CONDENSATION)	Note 1,2		Note 1,3	

Note 1: Background color changes slightly depending on ambient temperature.
This phenomenon is reversible.

Note 2: Ta≤70℃: 75RH max
Ta>70℃: absolute humidity must be lower than the humidity of 75%RH at 70℃

Note 3: Ta at -30℃ will be <48hrs, at 80℃ will be <120hrs when humidity is higher than 70%.

*UNLESS OTHERWISE SPECIFIED TOLERANCES PER DECIMAL PRECISION ARE: X=±1 (±0.039), X.X=±0.5 (±0.020), X.XX=±0.25 (±0.010), X.XXX=±0.127 (±0.005). LEAD SIZE=±0.05 (±0.002), LEAD LENGTH=±0.75 (±0.030). MIN= ^{+DECIMAL PRECISION}_{-0.00} MAX.= ^{+0.00}_{-DECIMAL PRECISION}

INTERFACE PIN ASSIGNMENT

PIN NO.	PIN OUT	LEVEL	FUNCTION DESCRIPTION
1	Vss	0V	Power Supply Ground
2	VDD	3.3V	Power Supply Voltage
3	V0	--	Contrast Adjustment Voltage
4	RS	H/L	Register Select
5	R/W	H/L	Read / Write
6	E	H,H→L	Enable Signal
7	DB0	H/L	Data Bit 0
8	DB1	H/L	Data Bit 1
9	DB2	H/L	Data Bit 2
10	DB3	H/L	Data Bit 3
11	DB4	H/L	Data Bit 4
12	DB5	H/L	Data Bit 5
13	DB6	H/L	Data Bit 6
14	DB7	H/L	Data Bit 7
15	A	2.1V	LED Power Supply (+)
16	K	0V	LED Power Supply (-)

ELECTRICAL CHARACTERISTICS

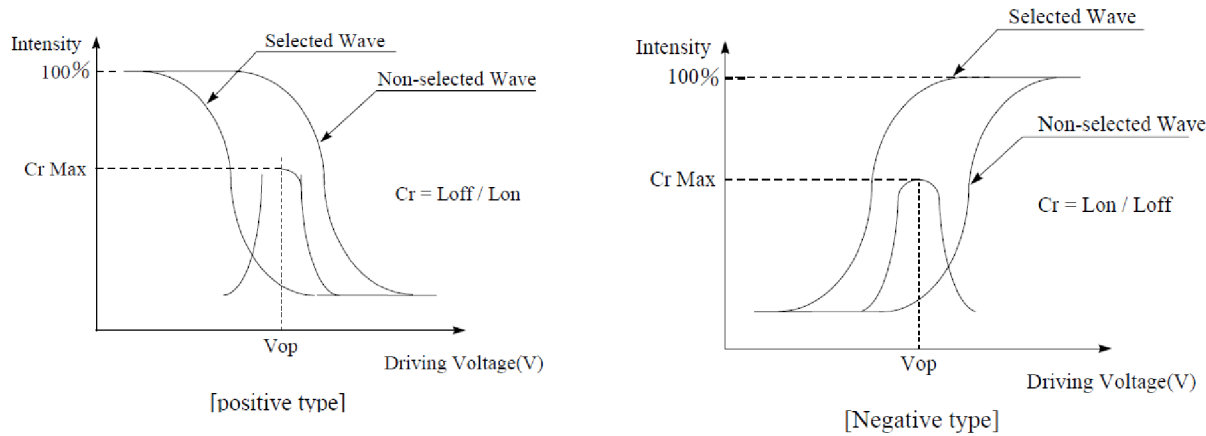
ITEM	SYMBOL	CONDITION	Min.	Typ	Max.	Unit	NOTE
POWER SUPPLY FOR LOGIC	VDD-VSS	-	2.7	3.3	4.5	VOLT	-
INPUT VOLTAGE	VIL	L LEVEL	-0.3	-	0.6	VOLT	-
	VIH	H LEVEL	0.7 VDD	-	VDD	VOLT	-
LCM RECOMMEND LCD MODULE DRIVING VOLTAGE	VDD-V0	Ta=0℃	-	-	-	VOLT	-
		Ta=25℃	2.7	3.3	4.5		-
		Ta=50℃	-	-	-		-
POWER SUPPLY CURRENT FOR LCM	IDD	VDD=3.3V VDD-V0=3.3V	-	2.0	3.0	mA	-
LED FORWARD VOLTAGE	VF	If=260mA	-	2.1	2.3	VOLT	-
LED FORWARD CURRENT	IF	-	-	260	-	mA	-
LED REVERSE CURRENT	IR	VR=4V	-	-	0.2	mA	-

OPTICAL CHARACTERISTICS

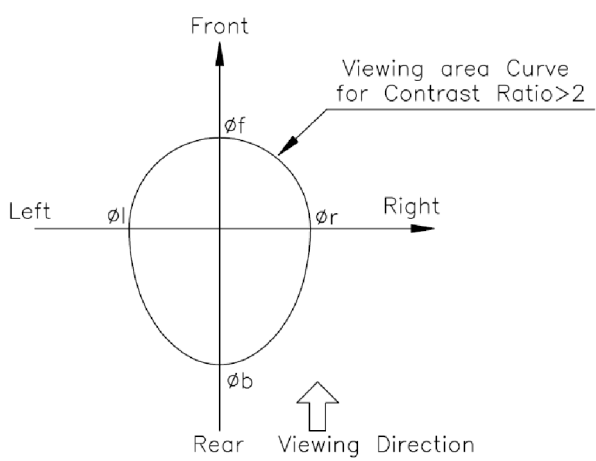
ITEM	SYMBOL	CONDITION	Min.	Typ	Max.	Unit	NOTE
VIEWING ANGLE RANGE	Φf (12 O'CLOCK)	WHEN Cr ≥1.4	-	20	-	DEGREE	9,10
	Φb (6 O'CLOCK)		-	40	-		
	Φl (9 O'CLOCK)		-	30	-		
	Φr (3 O'CLOCK)		-	30	-		
RISE TIME	Tr	VDD-V0=3.3V Ta=25℃	-	200	-	mS	-
FALL TIME	Tf		-	250	-		
FRAME FREQUENCY	Frm		-	64	-	Hz	8,10
CONTRAST	Cr		-	3.0	-	-	7
THE BRIGHTNESS OF BACKLIGHT	L	IF=260mA	120	180	-	cd/m ²	-
PEAK EMISSION WAVELENGTH	λP		567	570	577	nm	-

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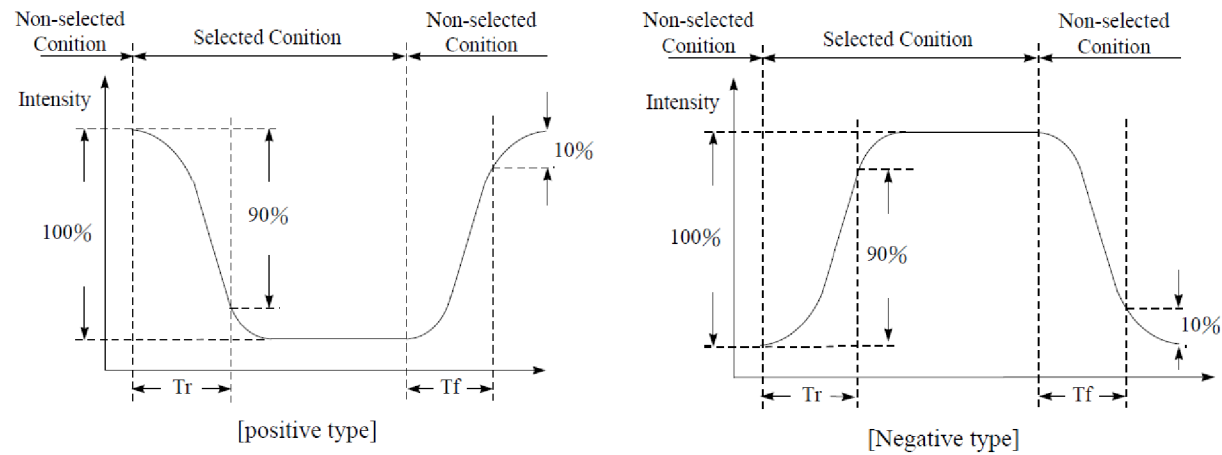
[Note 7] Definition of Operation Voltage (Vop)



[Note 9] Definition of Viewing Direction



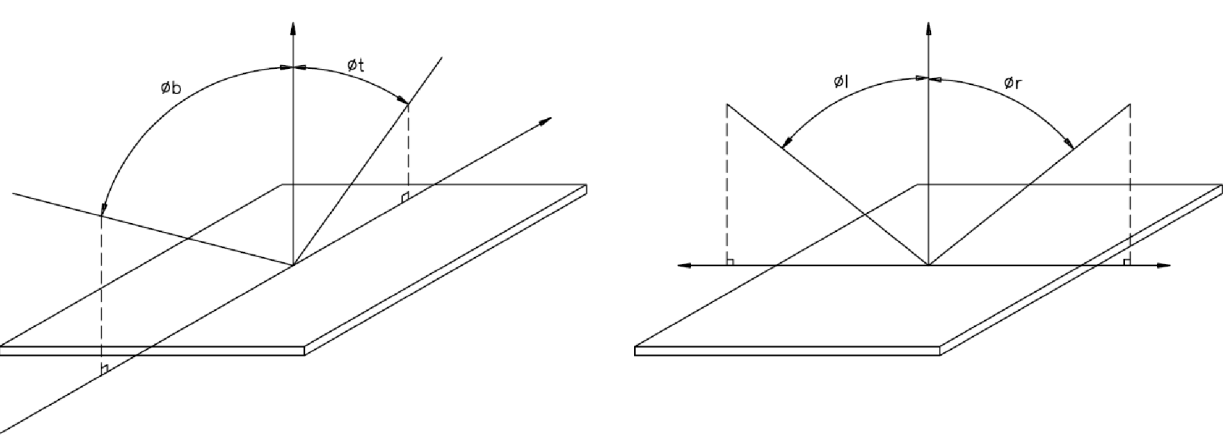
[Note 8] Definition of Response Time (Tr, Tf)



Conditions:
Operating Voltage : Vop
Frame Frequency : 64 Hz

Conditions:
Viewing Angle(θ , ϕ): 0° , 0°
Driving Wave form : 1/N duty, 1/a bias

[Note 10] Definition of viewing angle



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80.0(L)*36.0(W)*8.8/12.7(H)mm, 5.56mm CHARAXTER HEIGHT, 5*8 DOT MATRIX, 16x2 YELLOW GREEN BACKLIGHT, 3.3V, GENERAL TEMP.

THE SPECIFICATIONS MAY CHANGE AT ANY TIME WITHOUT NOTICE DUE TO NEW MATERIALS OR PRODUCT IMPROVEMENT.

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DATE : 2018.01.31	DRAWN BY : C.C.
PAGE : 4 OF 9	CHKD BY : E.C.
SCALE : NTF	APRVD BY : G.Y.
UNIT : mm [INCH]	Ⓢ

RESET FUNCTION

Initializing by Internal Reset Circuit

An internal reset circuit automatically initializes the IC when the power is turned on. The following instructions are executed during the initialization. The busy flag (BF) is kept in the busy state until the initialization ends (BF = 1). The busy state lasts for 40 ms after VCC rises to 4.5 V.

1. Display clear
2. Function set:

DL = 1; 8-bit interface data

N = 0; 1-line display

F = 0; 5x8 dot character font
3. Display on/off control:

D = 0; Display off

C = 0; Cursor off

B = 0; Blinking off
4. Entry mode set:

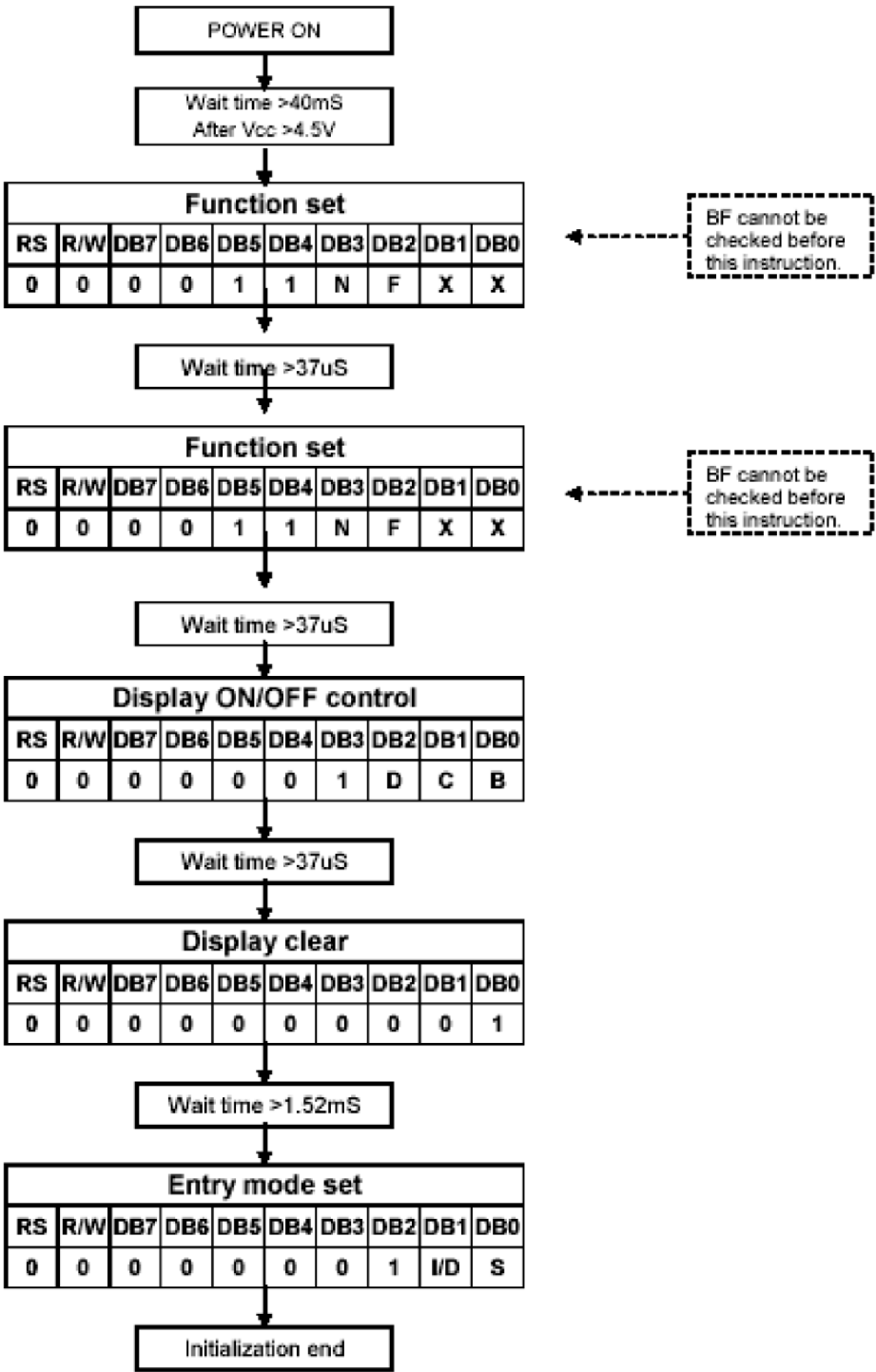
I/D = 1; Increment by 1

S = 0; No shift

Note:
If the electrical characteristics conditions listed in the table Power Supply Conditions are not met, the internal reset circuit will not operate normally and will fail to initialize the IC. For such a case, initialization must be performed by the MPU as explain by the following figures.

INITIALIZING BY INSTRUCTION

8 bit Interface(fosc =270KHZ)



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DD RAM ADDRESSING

For 10*4 Display

	1	2	3	4	5	6	7	8	9	10
Character	00	01	02	03	04	05	06	07	08	09
DD RAM	40	41	42	43	44	45	46	47	48	49
Address	0A	0B	0C	0D	0E	0F	10	11	12	13
	5A	5B	5C	5D	5E	5F	50	51	52	53

For 16*1 Display

Character	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
DD RAM	00	01	02	03	04	05	06	07	40	41	42	43	44	45	46	47
Address																

For 16*2 or 8*2 Display

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Character	00	01	02	03	04	05	06	07	8	9	0A	0B	0C	0D	0E	0F
DD RAM	40	41	42	43	44	45	46	47	48	49	4A	4B	4C	4D	4E	4F
Address																

For 16*4 Display

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Character	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
DD RAM	40	41	42	43	44	45	46	47	48	49	4A	4B	4C	4D	4E	4F
Address	10	11	12	13	14	15	16	17	18	19	1A	1B	1C	1D	1E	1F
	50	51	52	53	54	55	56	57	58	59	5A	5B	5C	5D	5E	5F

For 20*2 Display

	1	2	3	4	5	6	7	8	9	10	---	---	17	18	19	20
Character	00	01	02	03	04	05	06	07	08	09	---	---	10	11	12	13
DD RAM	40	41	42	43	44	45	46	47	48	49	---	---	50	51	52	53
Address																

For 20*4 Display

	1	2	3	4	5	6	7	8	9	10	---	---	17	18	19	20
Character	00	01	02	03	04	05	06	07	08	09	---	---	10	11	12	13
DD RAM	40	41	42	43	44	45	46	47	48	49	---	---	50	51	52	53
Address	14	15	16	17	18	19	1A	1B	1C	1D	---	---	24	25	26	27
	54	55	56	57	58	59	5A	5B	5C	5D	---	---	64	65	66	67

For 40*2 Display

	1	2	3	4	5	6	7	8	9	10	---	---	37	38	39	40
Character	00	01	02	03	04	05	06	07	08	09	---	---	24	25	26	27
DD RAM	40	41	42	43	44	45	46	47	48	49	---	---	64	65	66	67
Address																

For 40*4 Display

	E	1	2	3	4	5	6	7	8	9	10	---	---	37	38	39	40
Character	E1	00	01	02	03	04	05	06	07	08	09	---	---	24	25	26	27
DD RAM		40	41	42	43	44	45	46	47	48	49	---	---	64	65	66	67
Address	E2	00	01	02	03	04	05	06	07	08	09	---	---	24	25	26	27
		40	41	42	43	44	45	46	47	48	49	---	---	64	65	66	67

