AZ DISPLAYS,INC.

COMPLETE LCD SOLUTIONS

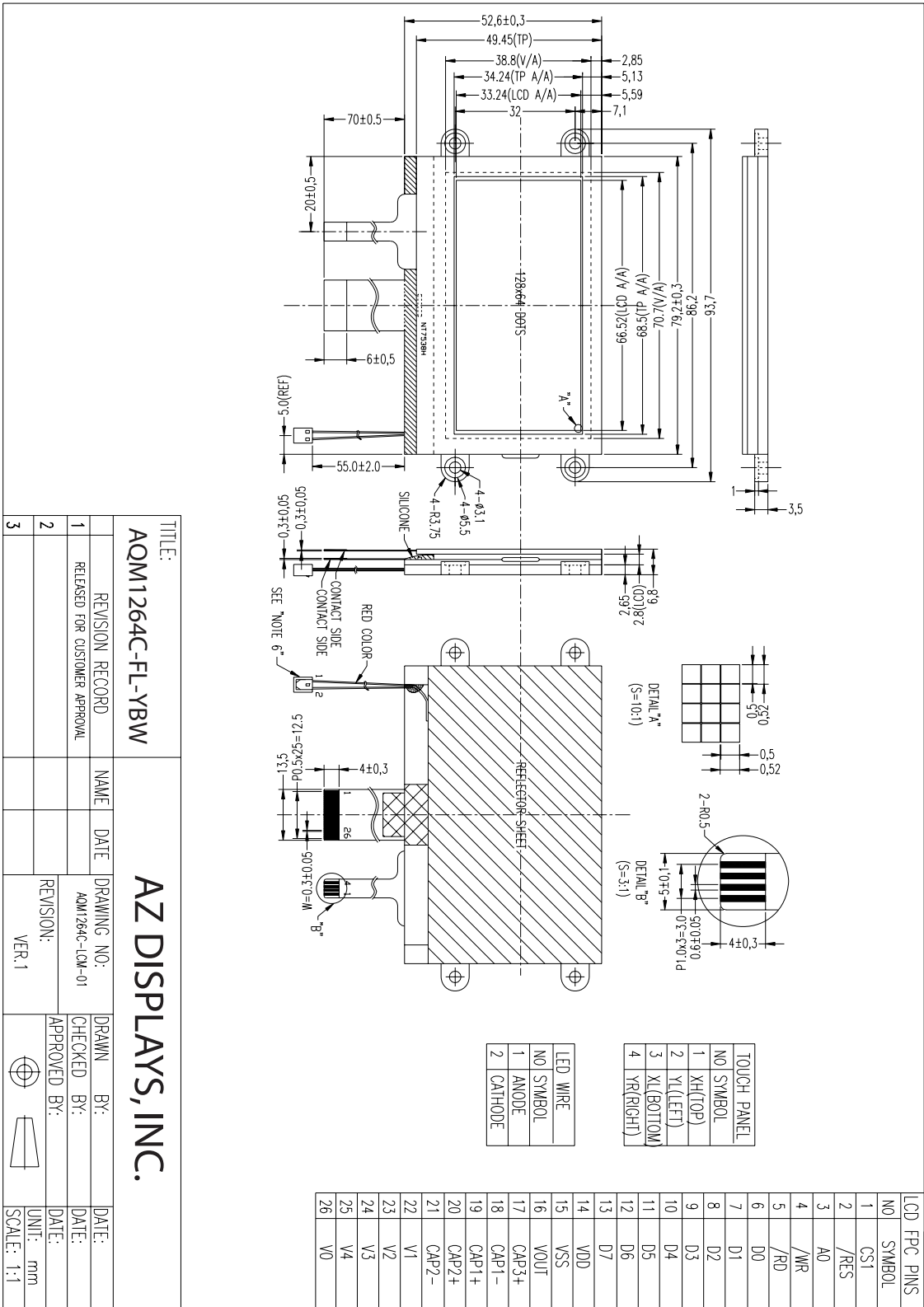# SPECIFICATIONS FOR
LIQUID CRYSTAL DISPLAY

PART NUMBER: AQM1264C-FL-YBW-T

DATE: AUGUST 21, 2007

1.0   MECHANICAL DRAWING

TITLE: AQM1264C-FL-YBW

DRAWING NO: AQM1264C-LCM-01

REVISION: VER.1

AZ DISPLAYS, INC.

LCD FPC PINS	
NO	SYMBOL
1	CS1
2	/RES
3	A0
4	/WR
5	/RD
6	D0
7	D1
8	D2
9	D3
10	D4
11	D5
12	D6
13	D7
14	VDD
15	VSS
16	VOUT
17	CAP3+
18	CAP1-
19	CAP1+
20	CAP2+
21	CAP2-
22	V1
23	V2
24	V3
25	V4
26	V0

TOUCH PANEL	
NO	SYMBOL
1	XH(TOP)
2	YL(LEFT)
3	XL(BOTTOM)
4	YR(RIGHT)

LED WIRE	
NO	SYMBOL
1	ANODE
2	CATHODE

REVISION RECORD

	NAME	DATE
1 RELEASED FOR CUSTOMER APPROVAL		
2		
3		

DRAWN BY: DATE:
CHECKED BY: DATE:
APPROVED BY: DATE:
UNIT: mm
SCALE: 1:1

NOTE1: ULESS OTHERWISE SPECIFIED STANDARD TOLERANCE ±0.2MM

2.0 MECHANICAL SPECIFICATION

1.	Number of dots	128x64
2.	Module dimension	93.7mm(L) x 52.6mm(W) x 6.8mm(T)
3.	Active display area (A/A)	66.52mm(L) x 33.24mm(W)
4.	View area (V/A)	70.7mm(L) x 38.8mm(W)
5.	Dot Size	0.5mm(W) x 0.5mm(H)
6.	Dot Pitch	0.52mm(W) x 0.52mm(H)
7.	Driver method	1/65 duty,1/9 bias, Vop=8.3V, boosting 4X
8.	Display mode	Positive STN Transflective Yellow-Green
9.	LCD type	STN/ YELLOW-GREEN
10.	Driver IC	NT7538H COG
11.	Backlight Options	Yellow-Green

3.0 ABSOLUTE MAXIMUM RATINGS

Item Min		Typ	Max	Unit
DC Supply Voltage(VDD)	-0.3		4.0	V
DC Supply Voltage(Vout)	-0.3		15	V
DC Supply Voltage(V0)	-0.3		15	V
Input Voltage	-0.3		VDD+0.3	V
Operating Temperature	-20		70	ºC
Storage Temperature	-30		80	ºC

4.0 ELECTRICAL CHARACTERISTICS

Item Sy	mbol	Condition	Min	Typ	Max	Unit
Power Supply	V_{DD}-V_{SS}		1.8	3.0	3.3	V
Input voltage (high)	Vih	H level	$0.8 V_{DD}$	-	V_{DD}	V
Input voltage (low)	Vil	L level	Vss	-	$0.2 V_{DD}$	V
Output voltage (high)	Voh	H level	$0.8 V_{DD}$		V_{DD}	V
Output voltage (low)	Vol	L level	$0.2 V_{DD}$		V_{DD}	V
Power Supply Current	Idd	Vdd=3.3V		1.3	1.8	mA
LED Power Supply Voltage	A-K		4.0	4.2	4.5	V
LED Power Supply Current	I_{BL}	-		120	-	mA
Luminance Lv		Covered by LCD and Touch panel	3.5	5.5	-	cd/m2
Luminance evenness	-	Same part(Min/Max)	70%			-

5.0 TOUCH PANEL CHARACTERISTICS

Item	Min		Typ	Max	Unit
Type		Resistor analog,4-wire FPC interface Film/Glass			
Power supply	-		5.0	-	V(DC)
Operating force	30		-	70	g
Life time	1KK		-	-	times
Light transmission	75%				-
Chattering time				10	ms

6.0 BLOCK DIAGRAM
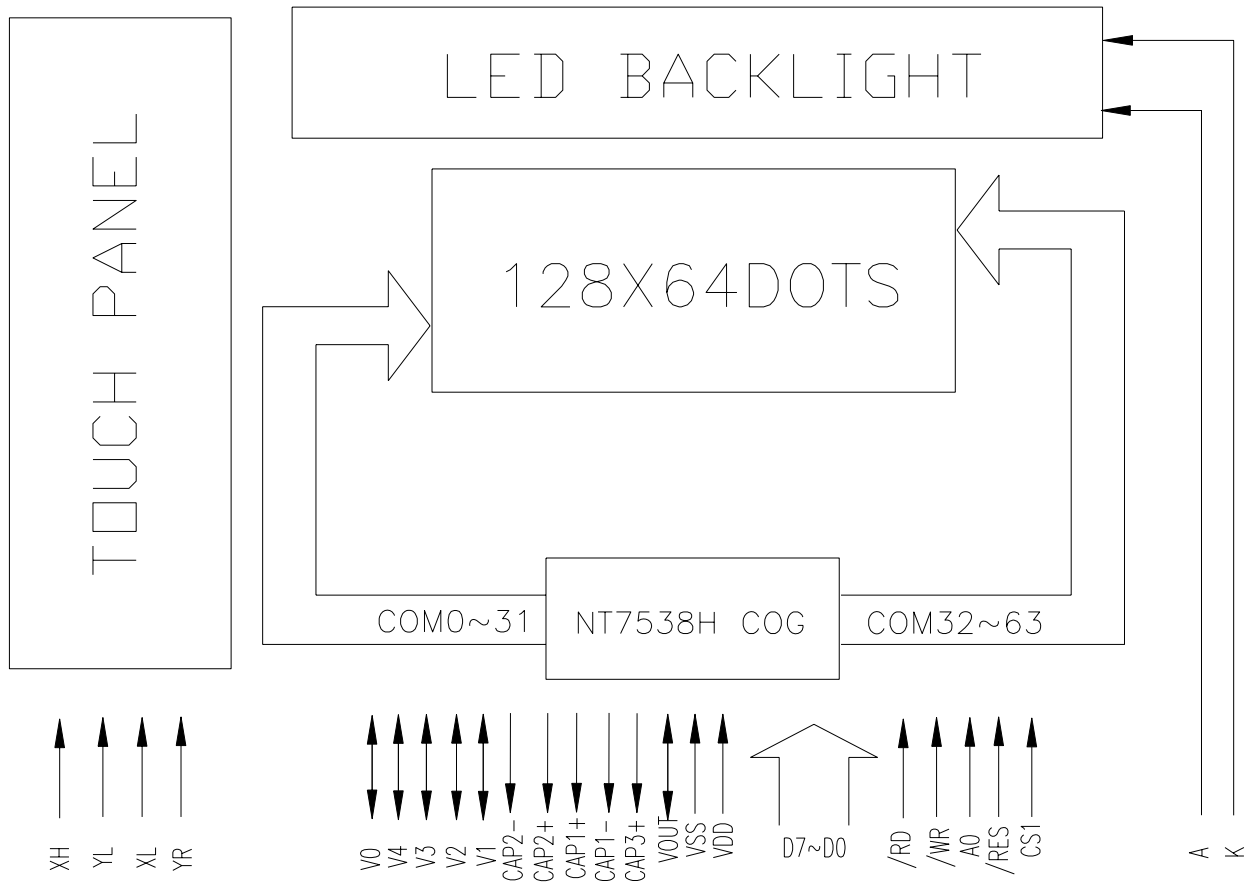
7.0 PIN ASSIGNMENT

Pin No	I/O	Name	Description
1	I	CS1	Chip select signal. Active when low
2	I	/RES	Chip reset signal. Active when low
3	I	A0	It decide whether the data bits are data or a command. "L" is for command and "H" is for data.
4	I	/WR	Write signal. Active when low
5	I	/RD	Read signal. Active when low
6~13	I/O	D0~D7	8-bit directional data bus
14	I	VDD	Power supply
15	I	VSS	Power supply
16	I/O	VOUT	DC/DC voltage converter output
17	O	CAP3+	
18	O	CAP1-	
19	O	CAP1+	Pins for DC/DC voltage converter
20	O	CAP2+	
21	O	CAP2-	
22~26	I/O	V1~V0	LCD driver supplies voltages

8.0 LCD OPTICAL CHARACTERISTICS

Item	Symbol	Test condition	Min.	Typ.	Max.	Unit	Note
Viewing angle	1- 2		-	65	-	Degree	Note2
	1	35 T=25℃,CR=2		45	-		
	2	-25		-20	-		
			-	±35	-		
Contrast ratio	K1	=0°, =0°	6	-	-	-	Note3
Rise time	tr1	- =0°, =0°		150	250	ms	Note4
Fall time	td1	Transflective mode	-	150	250	ms	Note4

Note 2: Definition of angle   and   .
   : Angle measured from normal to direction of observation.
   : Azimuth angle measured counter-clockwise from X-axis.
Note 3 : Definition of Contrast ratio
   The contrast ratio is defined to be the ratio of transmission or reflection of a symbol at its "on" and "off" state.

$$\text{Contrast ratio}(K) = \frac{\text{Transmission/Reflectance at "OFF" state}}{\text{Transmission/Reflectance at "ON" state}}$$

Note 4 : Definition of response time

At specific operating voltage and temperature, the times measured by observing contrast or transmission ratio.
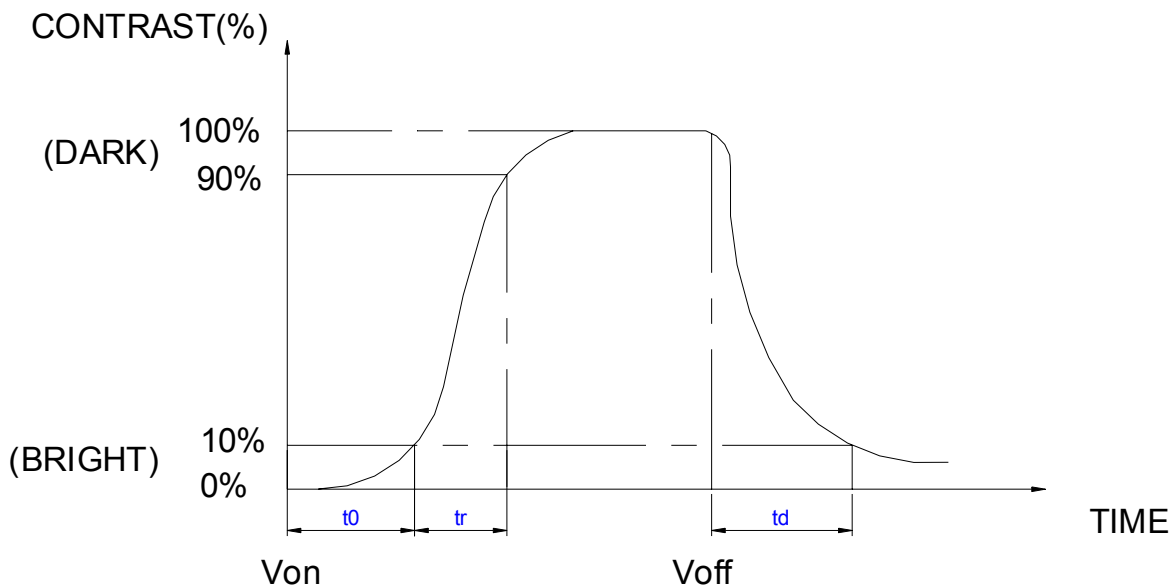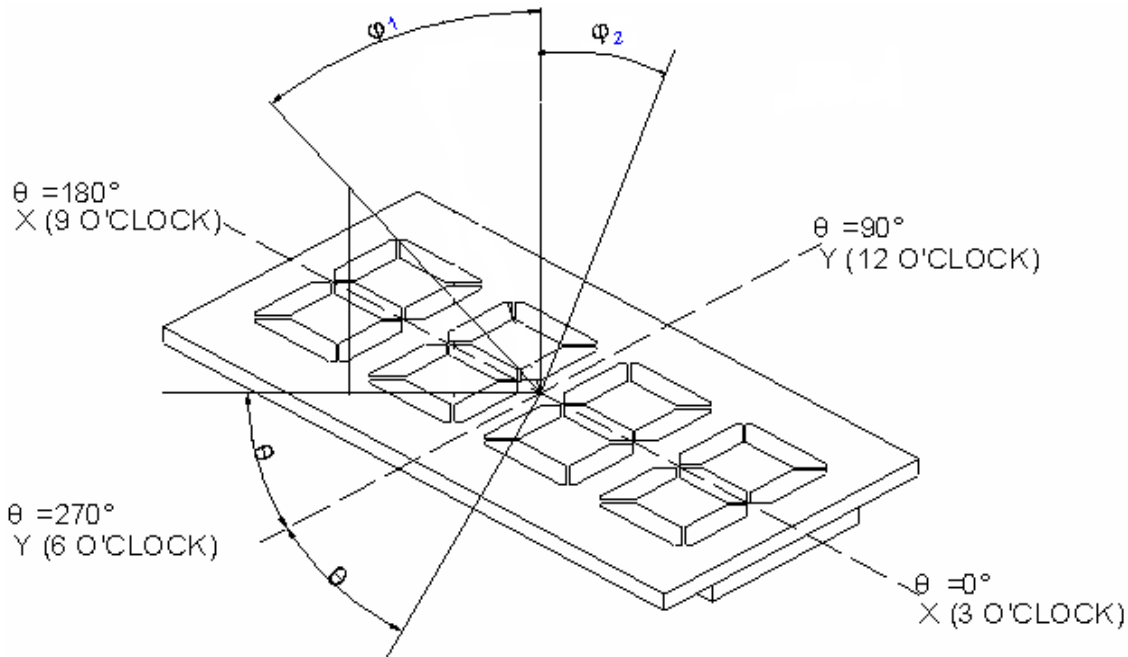
Delay time to : Measured between zero and 10% with Von.
Rise time tr   : Measured between 10% and 90% of LCD segment maximum response with Von
Decay time td : With voltage switches to zero and the instant LCD segment reaches 10% of its maximum
      response
Ton : Time measured between the instant operating voltage is applied to display and the distant the
      display reaches 90% of its maximum response.
Toff : Time measured between the instant operating voltage switches to zero and the instant the display
      reaches 10% of its maximum response.

LIQUID CRYSTAL PANEL LIFE TIME

50000 hours minimum at 25℃±10℃ and 65% RH maximum.
Note: Definition of life time : the time up to occurrence of any of the following:
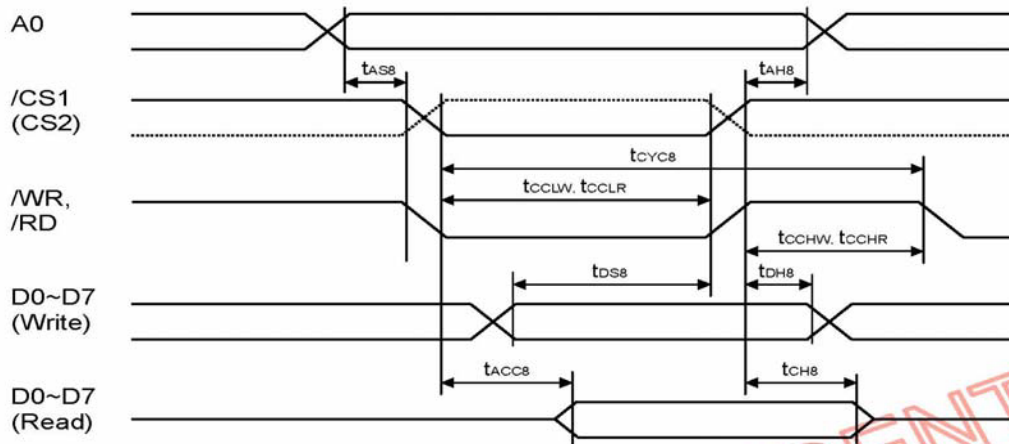   Contrast reduces to 30% of the initial value.
         Current consumption becomes three times the initial value.

   Orientation deteriorates significantly.

9.0 TIMING CHARACTERISTICS

AC Characteristics

1. System Buses Read/Write Characteristics (for 8080 Series MPU)

(VDD = 2.7 ~ 3.6V, Ta = -40 ~ +85°C)

Symbol	Parameter	Min.	Typ.	Max.	Unit	Condition
T_{AH8}	Address hold time	0	-	-	ns	A0
T_{AS8}	Address setup time	0	-	-	ns	A0
t_{CYC8}	System cycle time	240	-	-	ns	
t_{CCLW}	Control low pulse width (write)	90	-	-	ns	/WR
t_{CCLR}	Control low pulse width (read)	120	-	-	ns	/RD
t_{CCHW}	Control high pulse width (write)	100	-	-	ns	/WR
t_{CCHR}	Control high pulse width (read)	60	-	-	ns	/RD
T_{DS8}	Data setup time	40	-	-	ns	D0~D7
T_{DH8}	Data hold time	0	-	-	ns	D0~D7
t_{ACC8}	/RD access time	-	-	140	ns	D0~D7, CL = 100pF
T_{CH8}	Output disable time	5	-	50	ns	D0~D7, CL = 100pF

System Buses Read/Write Characteristics (for 8080 Series MPU) (continued)

(VDD = 1.8 ~ 2.7V, Ta = -40 ~ +85°C)

Symbol	Parameter	Min.	Typ.	Max.	Unit	Condition
t_{AH8}	Address hold time	0	-	-	ns	A0
t_{AS8}	Address setup time	0	-	-	ns	A0
t_{CYC8}	System cycle time	400	-	-	ns	
t_{CCLW}	Control low pulse width (write)	150	-	-	ns	/WR
t_{CCLR}	Control low pulse width (read)	150	-	-	ns	/RD
t_{CCHW}	Control high pulse width (write)	120	-	-	ns	/WR
t_{CCHR}	Control high pulse width (read)	120	-	-	ns	/RD
t_{DS8}	Data setup time	80	-	-	ns	D0~D7
t_{DH8}	Data hold time	0	-	-	ns	D0~D7
t_{ACC8}	/RD access time	-	-	240	ns	D0~D7, CL = 100pF
t_{CH8}	Output disable time	10	-	100	ns	D0~D7, CL = 100pF

*1. The input signal rise time and fall time (t_r, t_f) is specified at 15ns or less.
   ($t_r + t_f$) < (t_{CYC8} - t_{CCLW} - t_{CCHW}) for write, ($t_r + t_f$) < (t_{CYC8} - t_{CCLR} - t_{CCHR}) for read.
*2. All timing is specified using 20% and 80% of VDD as the reference.
*3. t_{CCLW} and t_{CCLR} are specified as the overlap interval when /CS1 is low (CS2 is high) and /WR or /RD is low.
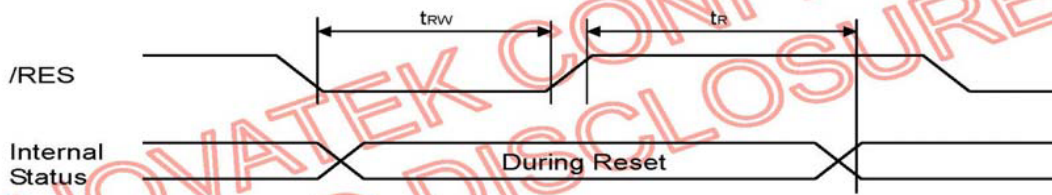
. Reset Timing

(VDD = 2.7 ~ 3.6V, Ta = -40 ~ +85°C)

Symbol	Parameter	Min.	Typ.	Max.	Unit	Condition
t_R	Reset Time	-	-	1.0	µs	
t_{RW}	Reset low pulse width	10	-	-	µs	/RES

(VDD = 1.8 ~ 2.7V, Ta = -40 ~ +85°C)

Symbol	Parameter	Min.	Typ.	Max.	Unit	Condition
t_R	Reset Time	-	-	2.0	µs	
t_{RW}	Reset low pulse width	20	-	-	µs	/RES

10.0 COMMAND SETTING DESCRIPTION

Command	A0	/RD	/WR	D7	D6	D5	D4	D3	D2	D1	D0	Hex	Function
(1) Display OFF	0	1	0	1	0	1	0	1	1	1	0 / 1	AEh / AFh	Turn on LCD panel when high, and turn off when low
(2) Display Start Line Set	0	1	0	0	1	Display Start Address						40h to 7Fh	Specifies RAM display line for COM0
(3) Page Address Set	0	1	0	1	0	1	1	Page Address				B0h to B8h	Set the display data RAM page in Page Address register
(4) Column Address Set	0	1	0	0	0	0	1	Higher Column Address				00h to 18h	Set 4 higher bits and 4 lower bits of column address of display data RAM in register
	0	1	0	0	0	0	0	Lower Column Address					
(5) Read Status	0	0	1	Status				0	0	0	0	XX	Reads the status information
(6) Write Display Data	1	1	0	Write Data								XX	Write data in display data RAM
(7) Read Display Data	1	0	1	Read Data								XX	Read data from display data RAM
(8) ADC Select	0	1	0	1	0	1	0	0	0	0	0 / 1	A0h / A1h	Set the display data RAM address SEG output correspondence
(9) Normal/Reverse Display	0	1	0	1	0	1	0	0	1	1	0 / 1	A6h / A7h	Normal indication when low, but full indication when high
(10) Entire Display ON/OFF	0	1	0	1	0	1	0	0	1	0	0 / 1	A4h / A5h	Select normal display (0) or entire display on
(11) LCD Bias Set	0	1	0	1	0	1	0	0	0	1	0 / 1	A2h / A3h	Sets LCD driving voltage bias ratio
(12) Read-Modify-Write	0	1	0	1	1	1	0	0	0	0	0	E0h	Increments column address counter during each write
(13) End	0	1	0	1	1	1	0	1	1	1	0	EEh	Releases the Read-Modify-Write
(14) Reset	0	1	0	1	1	1	0	0	0	1	0	E2h	Resets internal functions
(15) Common Output Mode Select	0	1	0	1	1	0	0	0 / 1	*	*	*	C0h to CFh	Select COM output scan direction *: invalid data
(16) Power Control Set	0	1	0	0	0	1	0	1	Operation Status			28h to 2Fh	Select the power circuit operation mode
(17) V0 Voltage Regulator Internal Resistor ratio Set	0	1	0	0	0	1	0	0	Resistor Ratio			20h to 27h	Select internal resistor ratio Rb/Ra mode
(18) Electronic Volume mode Set	0	1	0	1	0	0	0	0	0	0	1	81h	
Electronic Volume Register Set	0	1	0	*	*	Electronic Control Value						XX	Sets the V0 output voltage electronic volume register
(19) Set Static indicator ON/OFF	0	1	0	1	0	1	0	1	1	0	0 / 1	ACh / ADh	Sets static indicator ON/OFF 0: OFF, 1: ON
Set Static Indicator Register	0	1	0	*	*	*	*	*	*	Mode		XX	Sets the flash mode
(20) Power Save	0	1	0	-	-	-	-	-	-	-	-	-	Compound command of Display OFF and Entire Display ON
(21) NOP	0	1	0	1	1	1	0	0	0	1	1	E3h	Command for non-operation

Command	A0	/RD	/WR	D7	D6	D5	D4	D3	D2	D1	D0	Hex	Function
(22)Oscillation Frequency Select	O	1	O	1	1	1	O	O	1	O	0 / 1	E4h E5h	Select the oscillation frequency
(23)Partial Display mode Set	O	1	O	1	O	O	O	O	O	1	0 / 1	82h 83h	Enter/Release the partial display mode
(24)Partial Display Duty Set	O	1	O	O	O	1	1	O	Duty Ratio			30h 37h	Sets the LCD duty ratio for partial display mode
(25)Partial Display Bias Set	O	1	O	O	O	1	1	1	Bias Ratio			38h 3Fh	Sets the LCD bias ratio for partial display mode
(26)Partial Start Line Set	O	1	O	1	1	O	1	O	O	1	1	D3h	Enter Partial Start Line Set
Partial Start Line Set	O	1	O	1	1	Partial Start Line						XX	Sets the LCD Number of partial display start line
(27)N-Line Inversion Set	O	1	O	1	O	O	O	O	1	O	1	85h	Enter N-Line inversion
Number of Line Set	O	1	O	*	*	*	Number of Line					XX	Sets the number of line used for N-Line inversion
(28)N-Line Inversion Release	O	1	O	1	O	O	O	O	1	O	O	84h	Exit N-Line Inversion
(29)DC/DC Clock Set	O	1	O	1	1	1	O	O	1	1	O	E6h	Set DC/DC Clock Frequency
DC/DC Clock Division Set	O	1	O	1	1	O	O	Clock Division				XX	Set the Division of DC/DC Clock Frequency
(30)Test Command	O	1	O	1	1	1	1	*	*	*	*	F1h to FFh	IC test command. Do not use!
(31)Test Mode Reset	O	1	O	1	1	1	1	O	O	O	O	F0h	Command of test mode reset

Note: Do not use any other command, or system malfunction may result.

11.0 RELIABILITY SPECIFICATION

ITEM	CONDCONDITIONS
High temperature operation	70℃ for 96 hours
Low temperature operation	-20℃ for 96 hours
High humidity, High temperature operation	40℃,90%RH for 96 hours
High temperature storage	80℃ for 96 hours
Low temperature storage	-30℃ for 96 hours
Temperature cycling(storage)	80℃ (30 min) ↓ ↑ 25℃ (5 min) ↓ ↑ -30℃ (30 min) CYCLES: 5
ESD (Electrostatic Discharge)	+/-8KV air discharge to LCD module. +/-2KV discharge is applied to VDD&VSS of LCD module. Test for functionality and No missing line after discharge.