



AIP31065

40 CH SEGMENT/COMMON DRIVER FOR DOT MATRIX LCD

1、GENERAL DESCRIPTION

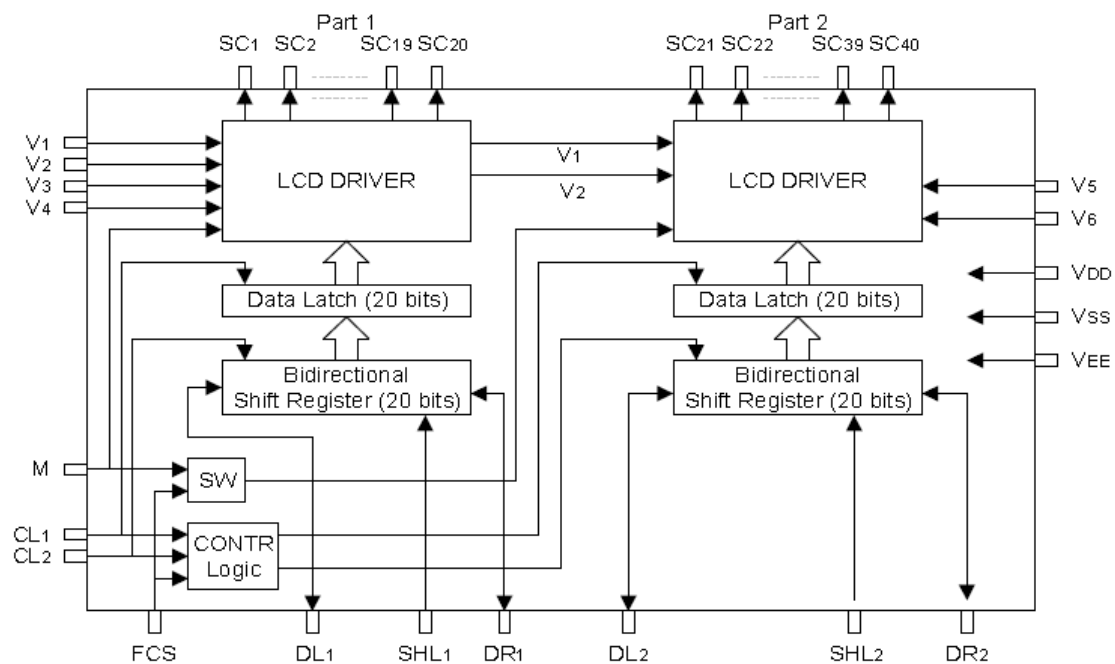
The AIP31065 is a LCD driver IC which is fabricated by low power CMOS technology. Basically this IC consists of 20 x 2 bit bi-directional shift register, 20 x 2 bit data latch and 20 x 2 bit driver. (refer to Fig 1) This IC can be used as common or segment driver.

Features

- Dot matrix LCD driver with 40 channel output.
- Selects function to use common/segment drivers simultaneously.
- Input / Output signal
- Output: 20 x 2 channel waveform for LCD driving
- Input: Serial display data and control signal from the controller LSI. Bias voltage (V1-V6)
- Display driving bias: static - 1/5
- Power supply voltage: 2.7- 5.5V
- Supply voltage for display: 3.0 - 13.0V (VLCD = VDD - VEE)
- CMOS Process
- Chip size: 2360×1895 (μm×μm) .
- The IC substrate should be connected to VDD or float in the PCB layout artwork.
- 64-QFP or bare chip available

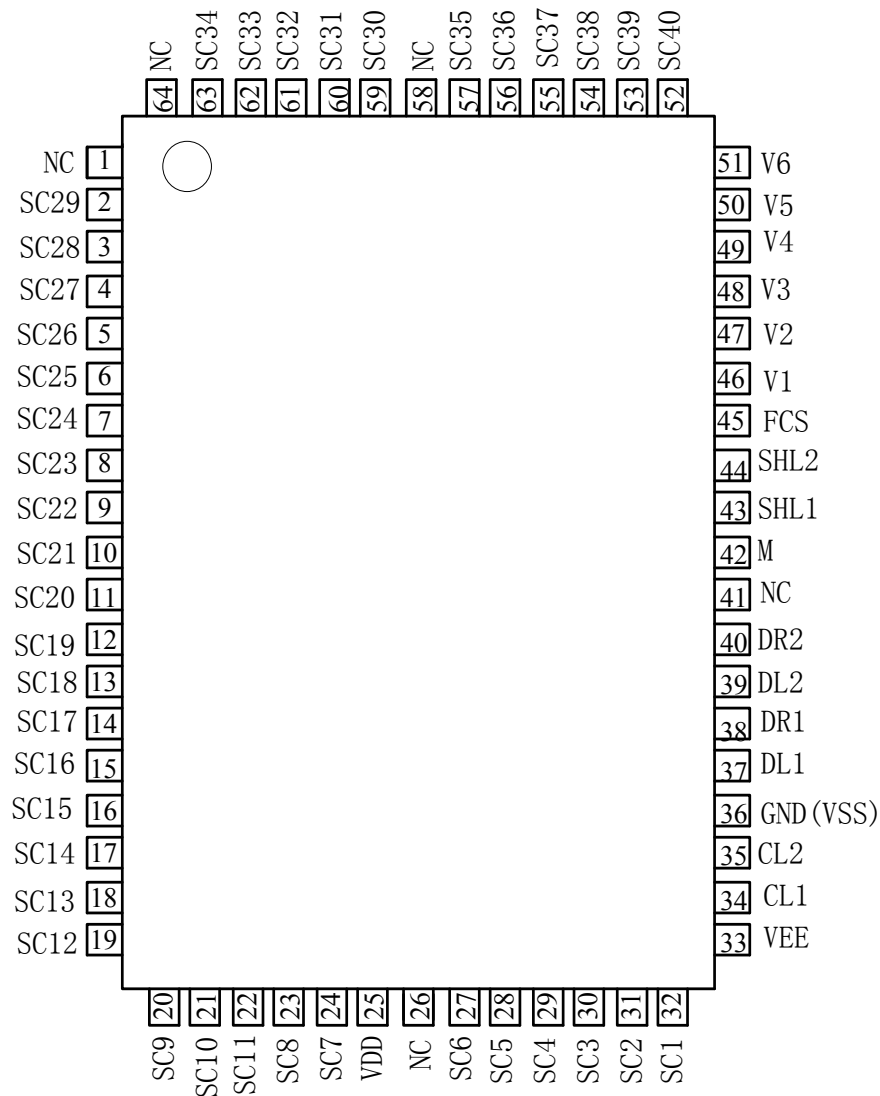
2、BLOCK DIAGRAM AND PIN DESCRIPTION

2.1、BLOCK DIAGRAM





2.2、PIN CONFIGURATIONS





2.3、PIN DESCRIPTION

Pin No.	Pin Name		I/O	Description			Interface																	
25	VDD	Supply Voltage	Power	Supply Voltage for logical circuit			Power Supply																	
36	GND			Ground (0V)																				
33	V _{EE}			For LCD driving voltage																				
46,47	V1、V2	Bias voltage	I	Bias voltage level for LCD drive(select level)			Power																	
11~24 27~32	SC1~ SC20	Part1	LCD driver	O	LCD driver output			LCD																
48,49	V3,V4		Bias voltage	I	Bias voltage level for LCD drive(non-select level)			Power																
43	SHL1		Data interface	I	Selection of the shift direction of Part1 shift register			VDD or GND																
					SHL1	DL1	DR1																	
		VDD			Out	In																		
			GND	in	out																			
37,38	DL1,DR1		I/O	Data input/output of Part1 shift register			Controller or AIP31065																	
2~10, 52~57, 59~63	SC21~ SC40	Part2	LCD driver	O	LCD driver output			LCD																
50,51	V5,V6		Bias voltage	I	Bias voltage level for LCD drive(non-select level)			Power																
42	SHL2		Data interface	I	Selection of the shift direction of Part2 shift register			VDD or GND																
					SHL2	DL2	DR2																	
		VDD			Out	In																		
			GND	in	out																			
39,40	DL2,DR2		I/O	Data input/output of Part2 shift register			Controller or AIP31065																	
42	M	Alternated signal for LCD driver output		I	<table><tr><td>PAR T</td><td>FCS</td><td>CL1</td><td>CL2</td><td>M polarity</td></tr><tr><td rowspan="2">1</td><td>GND</td><td rowspan="2">Latch clock ↓</td><td rowspan="2">Shift clock ↓</td><td rowspan="2">M</td></tr><tr><td>VDD</td></tr><tr><td rowspan="2">2</td><td>GND</td><td rowspan="2">Latch clock ↑</td><td rowspan="2">Shift clock ↑</td><td rowspan="2">$\overline{M}$</td></tr><tr><td>VDD</td></tr></table>			PAR T	FCS	CL1	CL2	M polarity	1	GND	Latch clock ↓	Shift clock ↓	M	VDD	2	GND	Latch clock ↑	Shift clock ↑	$\overline{M}$	VDD
PAR T	FCS	CL1	CL2	M polarity																				
1	GND	Latch clock ↓	Shift clock ↓	M																				
	VDD																							
2	GND	Latch clock ↑	Shift clock ↑	$\overline{M}$																				
	VDD																							
34,35	CL1,CL2	Data shift/latch clock		I																				
45	FCS	Mode selection		I	Shift/latch clock of display data and polarity of M signal are changed by FCS signal By setting FCS to VDD level,user can select the function that use Part1 as segment driver and Part2 as common driver simultaneously																			
1,26,41, 58,64	NC				No connection pin			NC																



3、ELECTRICAL PARAMETER

3.1、ABSOLUTE MAXIMUM RATINGS

(Tamb=25 °C, All voltage referenced to GND, unless otherwise specified)

Characteristic	Symbol	MIN.	MAX.	Unit
Operating Voltage	VDD	- 0.3	+7.0	V
Driver Supply Voltage	VLCD	VDD - 15.0	VDD+ 0.3	V
Input Voltage 1	VIN1	- 0.3	VDD+ 0.3	V
Input Voltage 2 (V1 - V6)	VIN2	VEE - 0.3	VDD+ 0.3	V
Operating Temperature	TOPR	- 30	+85	°C
Storage Temperature	TSRG	- 55	+125	°C
Soldering Temperature	T _L	245(10s)		°C

3.2、ELECTRICAL CHARACTERISTICS

DC Characteristics (Ta=-30~+85°C, VDD =2.7V~5.5V, VDD-V_{EE} = 3V~13V, GND =0V)

Characteristic	Symbol	Test condition	Min	Max	Unit	Applicable pin
Operating Current *	I _{DD}	fCL2= 400kHz	-	1	mA	-
Supply Current *	I _{EE}	fCL1= 1kHz	-	10	A	
Input High Voltage	V _{IH}	-	0.7VDD	VDD	V	CL1, CL2, DL1, DL2, DR1, DR2, SHL1, SHL2 M, FCS
Input Low Voltage	V _{IL}		0	0.3VDD		
Input Leakage Current	I _{LKG}	VIN= 0-VDD	-5	5	A	
Output High Voltage	V _{OH}	IOH= -0.4mA	VDD-0.4	-	V	DL1, DL2, DR1, DR2
Output Low Voltage	V _{OL}	IOL= +0.4mA	-	0.4		
Voltage Descending	V _{D1}	I _{ON} = 0.1mA for one of SC1-SC40	-	1.1		V(V1-V6)-SC(SC1-SC40)
	V _{D2}	I _{ON} = 0.05mA for each SC1-SC40	-	1.5		
Leakage Current	I _V	VIN= VDD ~VEE (OutputSC1-SC40 :floating)	-10	10	A	V1-V6



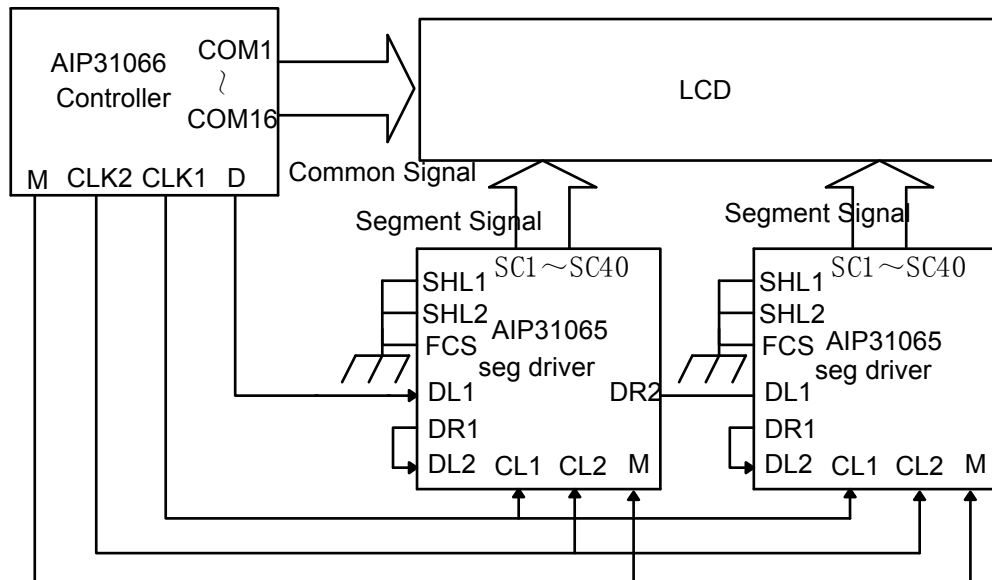
AC Characteristics ($T_a = -30 \sim +85^\circ\text{C}$, $V_{DD} = 2.7\text{V} \sim 5.5\text{V}$, $V_{DD} - V_{EE} = 3\text{V} \sim 13\text{V}$, $GND = 0\text{V}$)

Characteristic	Symbol	Test condition	Min	Max	Unit	Applicable pin
Data Shift Frequency	f_{CL}	—	—	400	KHz	CL2
Clock High Level Width	t_{WCKH}	—	800	—	ns	CL1, CL2
Clock Low Level Width	t_{WCKL}	—	800	—	ns	CL2
Clock Set-up Time	t_{SL}	From CL2 to CL1	500	—	ns	CL1, CL2
	t_{LS}	From CL1 to CL2	500	—	ns	
Clock Rise/Fall Time	$T_{R/F}$	—	—	200	ns	
Data Set-up Time	t_{SU}	—	300	—	ns	DL1, DL2, DR1
Data Hold Time	t_{DH}	—	300	—	ns	DR2, FLM
Data Delay Time	t_D	CL=15pF	—	500	ns	DL1, DL2 DR1, DR2

4、TYPICAL APPLICATION CIRCUIT AND FUNCTION DESCRIPTION

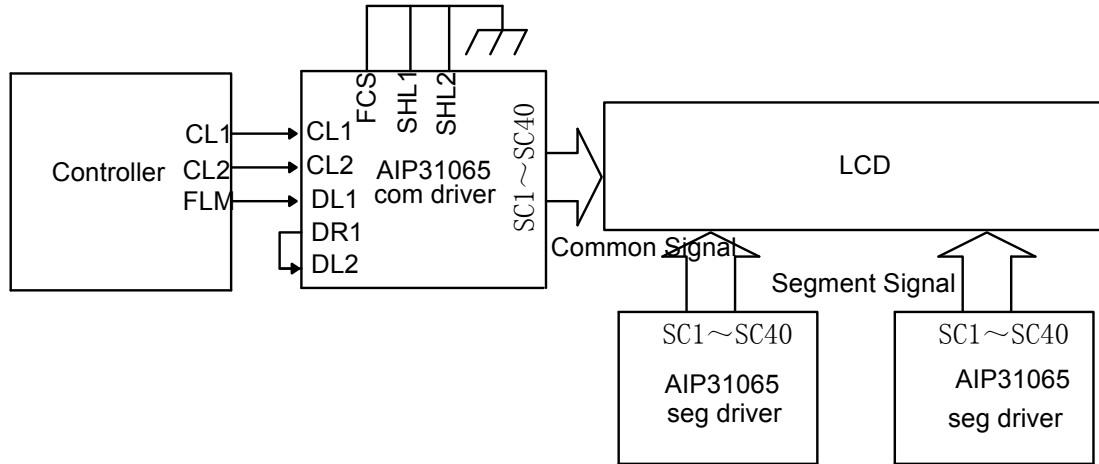
4.1、APPLICATION CIRCUIT

• Segment Driver

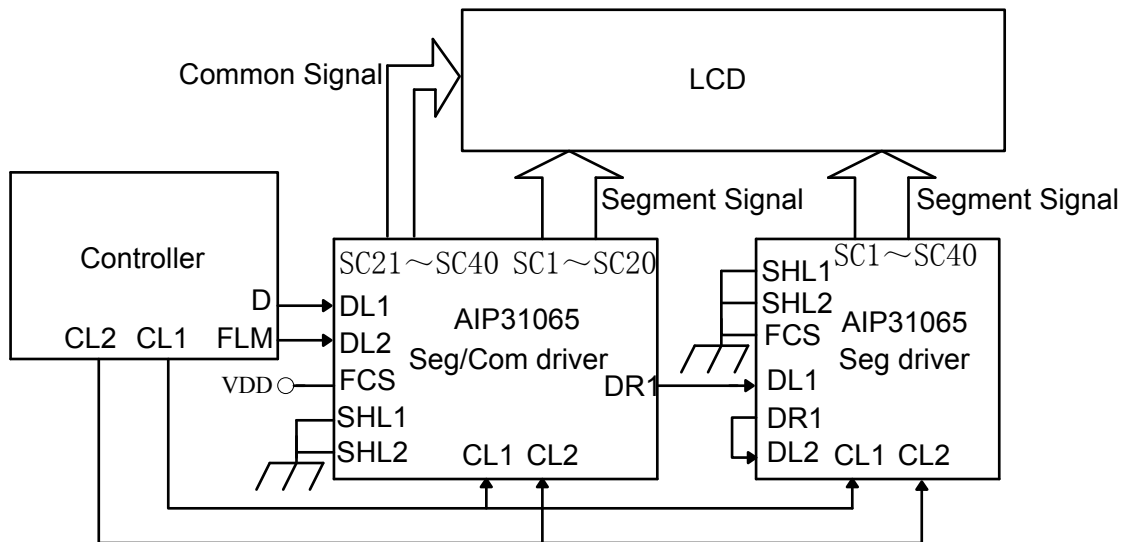




•Common Driver



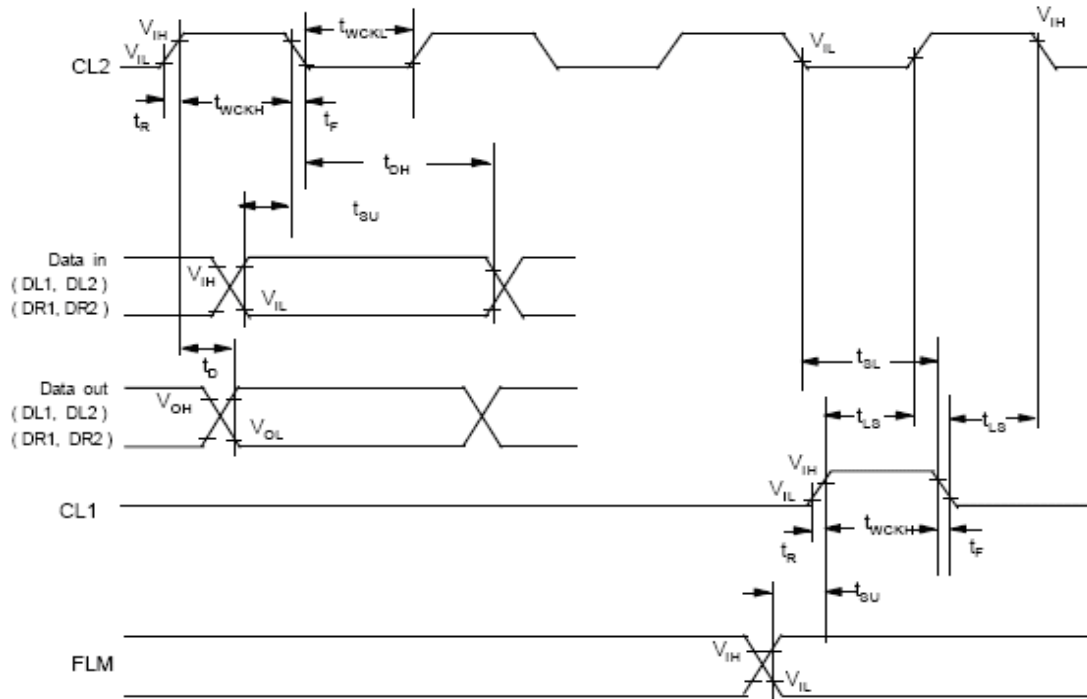
•Segment / Common Driver





4. 2、APPLICATION NOTE

4.2.1、Time Characteristics

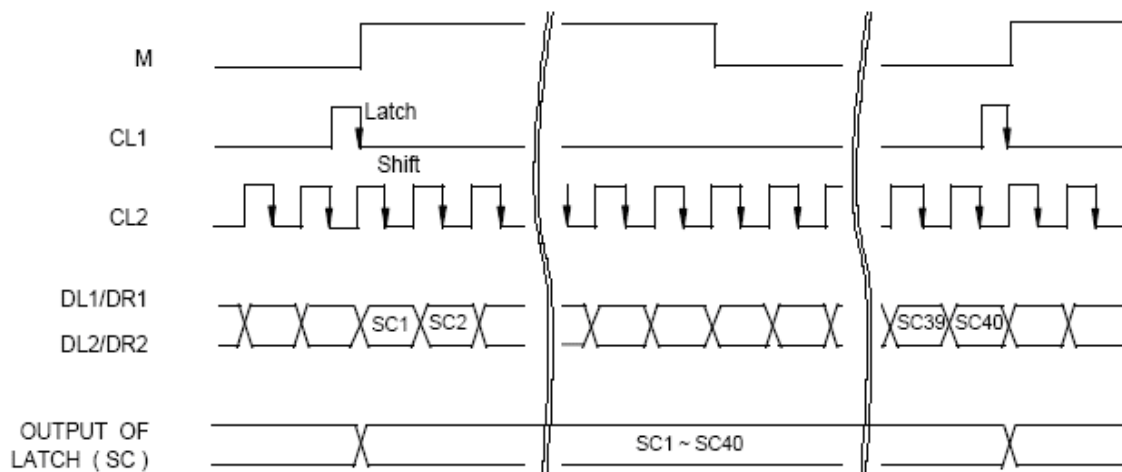


AC characteristics

4.2.2、Functional Description

1) To drive segment type

When the FCS is connected to Vss, AIP31065(SC1~SC40) is operated as segment driver.

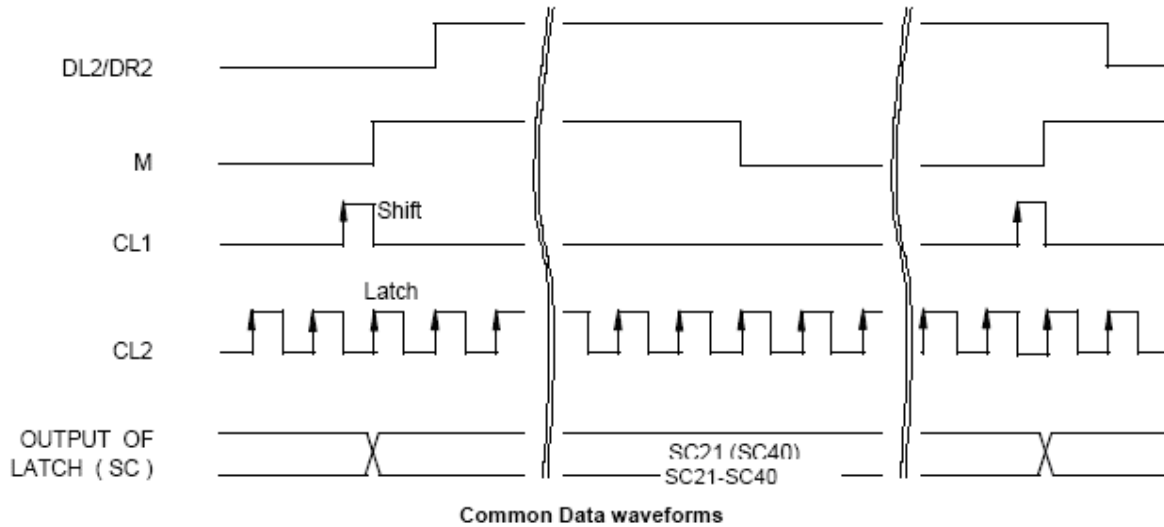


Segment Data Waveforms

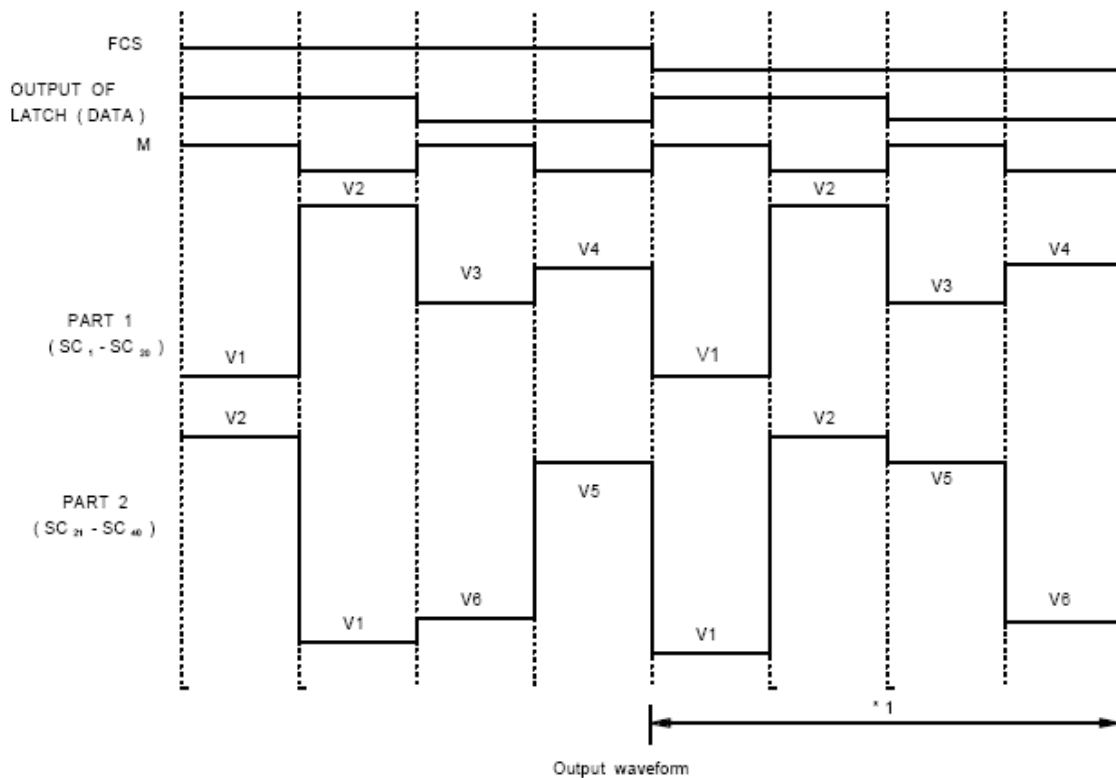


2) To drive common type

When the FCS is connected to VDD, only part2 (SC21~SC40) of AIP31065 is operated as common driver.



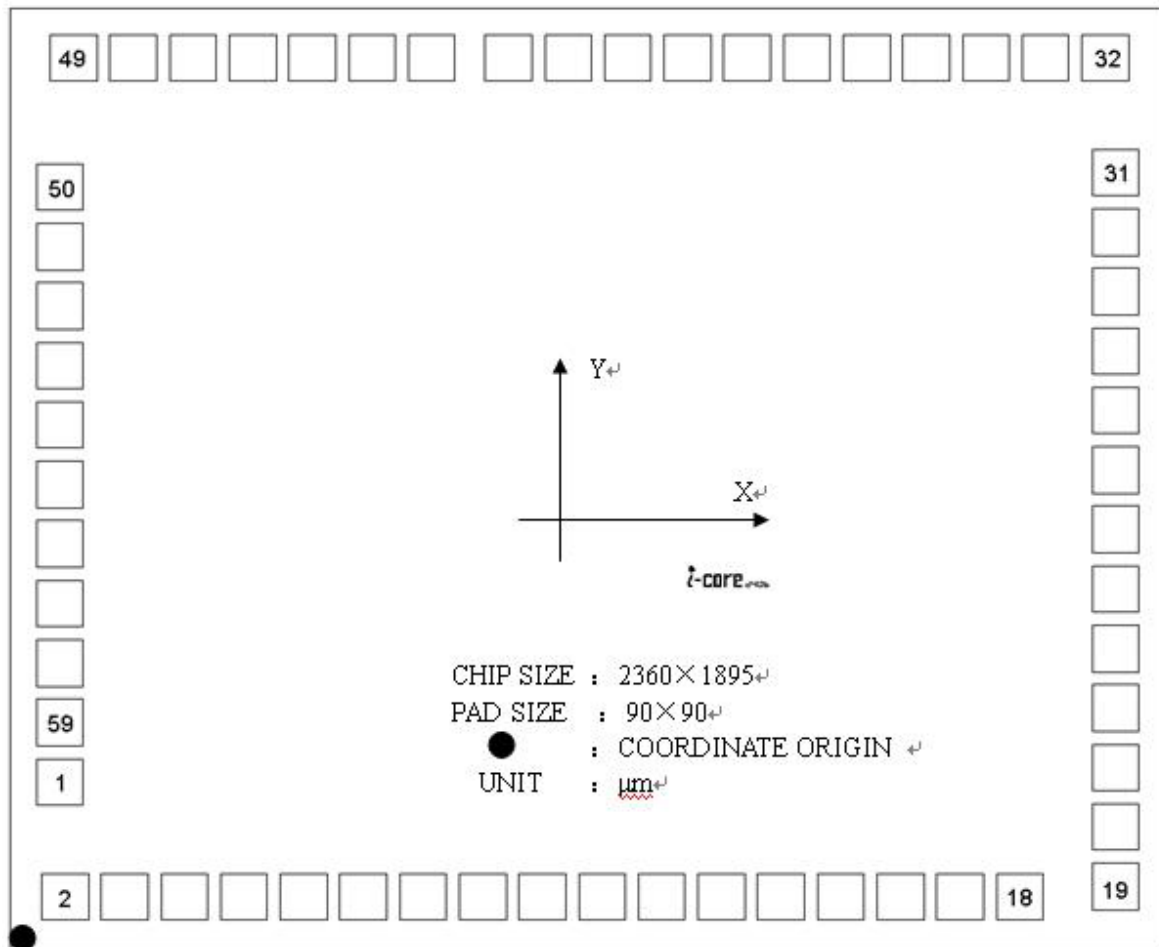
4.2.3、LCD Output Waveforms





5、PAD DIAGRAM AND PAD LOCATION

5.1、PAD DIAGRAM





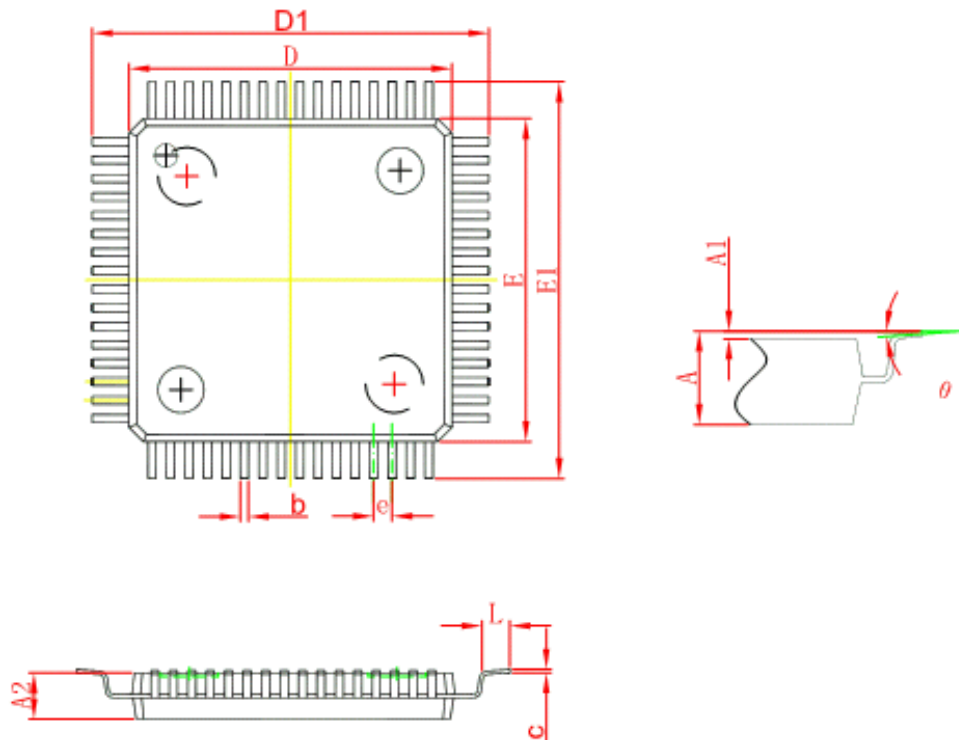
5.2、PAD Location (UNIT:μm)

PAD No.	Pin Name	X	Y	PAD No.	Pin Name	X	Y
1	SC29	99.6	316.5	31	VEE	2124.2	1494.6
2	SC28	99.6	99.6	32	CL1	2109.2	1721
3	SC27	214.6	99.6	33	CL2	1994.2	1721
4	SC26	329.6	99.6	34	GND	1879.2	1721
5	SC25	444.6	99.6	35	DL1	1764.2	1721
6	SC24	559.6	99.6	36	DR1	1649.2	1721
7	SC23	674.6	99.6	37	DL2	1534.2	1721
8	SC22	789.6	99.6	38	DR2	1419.2	1721
9	SC21	904.6	99.6	39	M	1304.2	1721
10	SC20	1019.6	99.6	40	SHL1	1189.2	1721
11	SC19	1240.6	99.6	41	SHL2	1074.2	1721
12	SC18	1364.6	99.6	42	FCS	959.2	1721
13	SC17	1479.6	99.6	43	V1	811.2	1721
14	SC16	1594.6	99.6	44	V2	696.2	1721
15	SC15	1700.6	99.6	45	V3	581.2	1721
16	SC14	1824.6	99.6	46	V4	466.2	1721
17	SC13	1930.6	99.6	47	V5	351.2	1721
18	SC12	2124.2	114.6	48	V6	236.2	1721
19	SC9	2124.2	229.6	49	SC40	121.2	1721
20	SC10	2124.2	344.6	50	SC39	99.6	1466.5
21	SC11	2124.2	459.6	51	SC38	99.6	1351.5
22	SC8	2124.2	689.6	52	SC37	99.6	1236.5
23	SC7	2124.2	804.6	53	SC36	99.6	1121.5
24	VDD	2124.2	919.6	54	SC35	99.6	1006.5
25	SC6	2124.2	1034.6	55	SC30	99.6	891.5
26	SC5	2124.2	1149.6	56	SSC31	99.6	776.5
27	SC4	2124.2	1264.6	57	SC32	99.6	661.5
28	SC3	2124.2	1379.6	58	SC33	99.6	546.5
29	SC2	2124.2	1404.6	59	SC34	99.6	431.5
30	SC1	2124.2	1379.6				



6、PACKAGE INFORMATION

6.1、QFP64



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A		2.450		0.096
A1	0.050	0.250	0.002	0.010
A2	1.800	2.200	0.071	0.087
b	0.300	0.450	0.012	0.018
c	0.110	0.230	0.004	0.009
D	13.900	14.100	0.547	0.555
D1	17.050	17.350	0.671	0.683
E	13.900	14.100	0.547	0.555
E1	17.050	17.350	0.671	0.683
e	0.800 (BSC)		0.031 (BSC)	
L	0.730	1.030	0.029	0.041
θ	0°	7°	0°	7°



7、STATEMENTS AND NOTES:

7.1、The name and content of Hazardous substances or Elements in the product

Part name	Hazardous substances or Elements					
	Lead and lead compounds	Mercury and mercury compounds	Cadmium and cadmium compounds	Hexavalent chromium compounds	Polybrominated biphenyls	Polybrominated biphenyl ethers
Lead frame	○	○	○	○	○	○
Plastic resin	○	○	○	○	○	○
Chip	○	○	○	○	○	○
The lead	○	○	○	○	○	○
Plastic sheet installed	○	○	○	○	○	○
explanation	○: Indicates that the content of hazardous substances or elements in the detection limit of the following the SJ/T11363-2006 standard. ×: Indicates that the content of hazardous substances or elements exceeding the SJ/T11363-2006 Standard limit requirements.					

7.2 NOTION:

Recommended carefully reading this information before the use of this product;

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The company is not responsible for the any infringement of the third party patents or other rights of the responsibility.

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