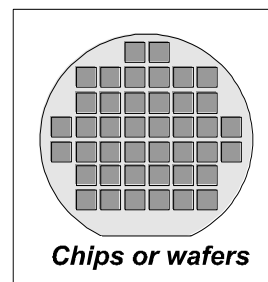


40-CHANNEL SEGMENT/Common DRIVER FOR DOT MATRIX LCD

The An6865B is a LCD driver LCI that is fabricated by low power CMOS technology. Basically this LCI consist of 20x2-bit bidirectional shift register, 20x2 bit data latch and 20x2 bit driver. This LSI can be used as common or segment driver.



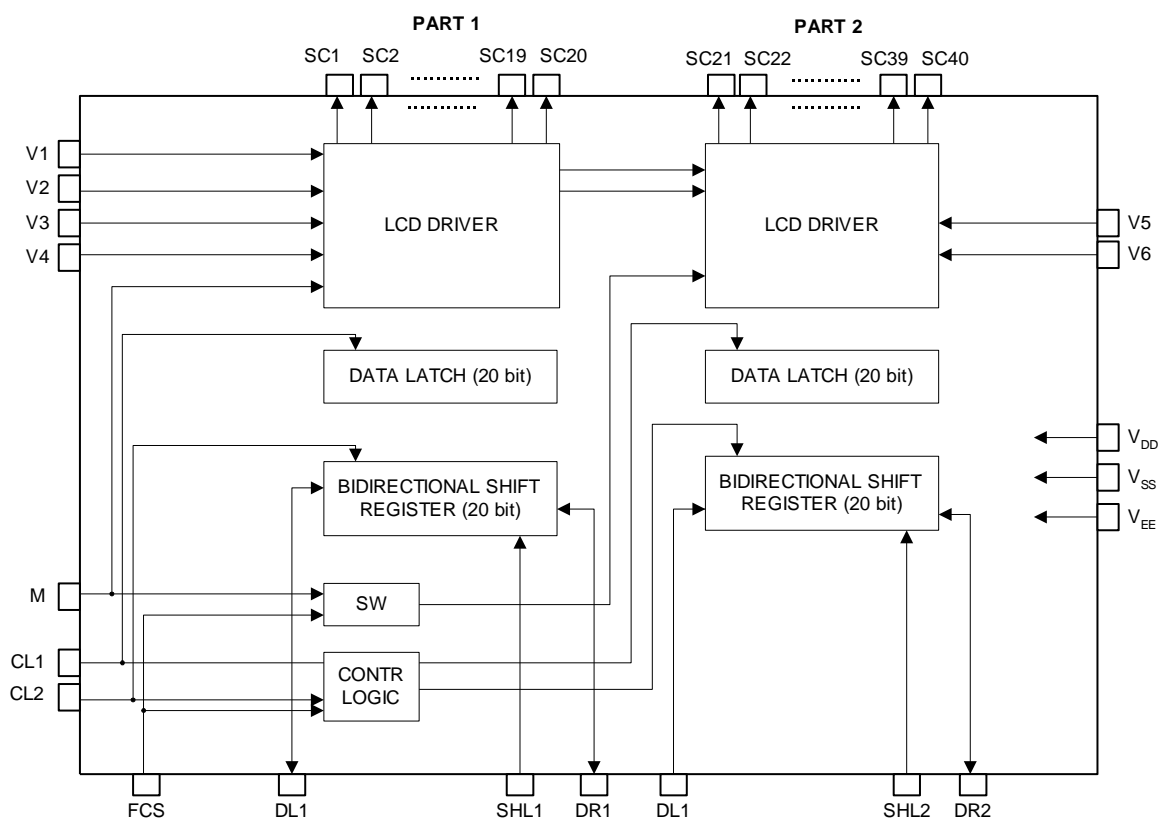
FUNCTION

- Dot matrix LCD driver with 40-channel output.
- Selectable function to use common/segment drivers simultaneously.
- Input/Output signal
 - input; *Serial display data and control pulse from the controller LSI
 - *Bias voltage (V1-V6)
 - output; 20x2 channel waveform for LCD driving

FEATURES

- Display driving bias; static-1/5
- Power supply voltage; +5V \pm 10%, +3V \pm 10%
- Supply voltage for display: 0 ~ -5V (V_{EE})
- Interface

BLOCK DIAGRAM



**MAXIMUM ABSOLUTE LIMIT**

(Ta = 25°C)

Characteristics	Symbol	Value	Unit
Power supply voltage	V _{DD}	-0.3 ~ +7.0	V
Driver supply voltage	V _{LCD}	V _{DD} - 13.5 ~ V _{DD} + 0.3	V
Input voltage 1	V _{IN1}	-0.3 ~ V _{DD} + 0.3	V
Input voltage 2 (V ₁ -V ₆)	V _{IN2}	V _{DD} + 0.3 ~ V _{EE} - 0.3	V
Operating temperature	T _{OPR}	-20 ~ + 75	°C
Storage temperature	T _{STG}	-55 ~ + 125	°C

* Voltage greater than above may damage to the circuit

* V_{EE}: connect a protection resistor (220Ω ± 5%)**ELECTRICAL CHARACTERISTICS****DC characteristics**(V_{DD} = + 5V ± 10%, V_{EE} = - 5V ± 10%, V_{SS} = 0V, Ta = 25°C)

Characteristic	Symbol	Test condition	Min	Max	Unit	Applicable pin
Supply current*	I _{DD}	f _{CL2} = 400 KHz	-	1	mA	-
	I _{EE}	f _{CL2} 1 KHz	-	10	μA	
Input voltage	V _{IH}	-	0.7V _{DD}	V _{DD}	V	CL1, CL2, DL1, DL2 DR1, DR2, SHL1, SHL2, M, FCS
	V _{IL}		0	0.3V _{DD}		
Input leakage current	I _{IL}	V _{IN} = 0 V _{DD}	-5	5	μA	
Output Voltage	V _{OH}	I _{OH} = - 0.4mA	V _{DD} -0.4	-	V	DL1, DL2 DR1, DR2
	V _{OL}	I _{OL} = + 0.4mA	-	0.4		
Voltage descending	V _{d1}	I _{ON} =0.1mA for one SC1-SC40	-	1.1		V(V ₁ -V ₆)-SC(SC1-SC40)
	V _{d2}	I _{ON} =0.05mA for one SC1-SC40	-	1.5		
Leakage current	I _{V1}	V _{IN} = V _{DD} ~ V _{EE} (Output SC1 - SC40: floating)	-10	10	μA	V ₁ - V ₆

AC CHARACTERISTICS(V_{DD} = + 5V ± 10%, V_{EE} = - 5V ± 10%, V_{SS} = 0V, Ta = 25°C)

Characteristic	Symbol	Test condition	Min	Max	Unit	Applicable pin
Data shift frequency	f _{CL}	-	-	400	KHz	CL2
Clock high level width	t _{CWH}	-	800	-	ns	CL1, CL2
Clock low level width	t _{CWL}	-	800	-		CL2
Clock set-up time	t _{SL}	from CL2 to CL1	500	-		CL1, CL2
	t _{LS}	from CL1 to CL2	500	-		
Clock rise/fall time	t _{CT}	-	-	200		
Data set-up time	t _{SU}	-	300	-		DL1, DL2, DR1, DR2, FLM
Data hold time	t _{DH}	-	300	-		
Data delay time	t _{PD}	CL=15pF	-	500		DL1, DL2, DR1, DR2

* Input/output current is excluded; When input is at the intermediate level with CMOS, excessive current flows through the input circuit to the power supply, To avoid this, input level must be fixed at "H" or 'L'.



TIMING CHARACTERISTICS

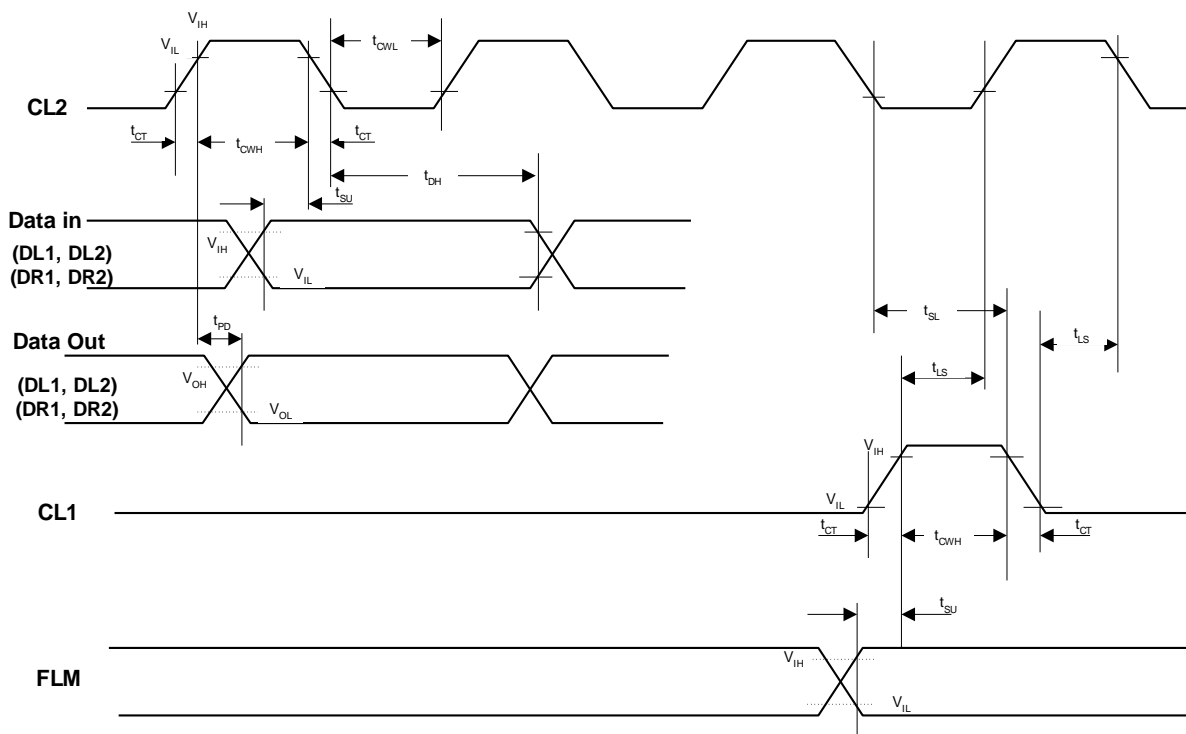


Fig.3. AC characteristics

FUNCTIONAL DESCRIPTION

1. To drive segment type.

When the FCS is connected to V_{SS} , An6865B (SC1 – SC40) is operated as segment driver. (refer to fig 4)

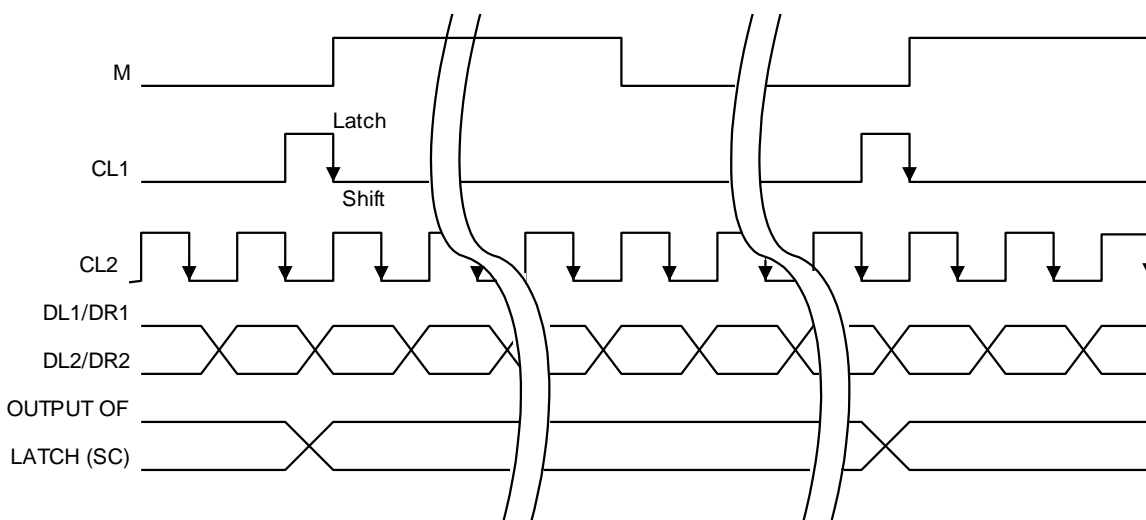


Fig.4. Segment Data Waveforms



2. To drive common type

When the FCS is connected to V_{DD}, only part 2 (SC21 –SC40) of An6865B is operated as common driver. (refer to fig 5)

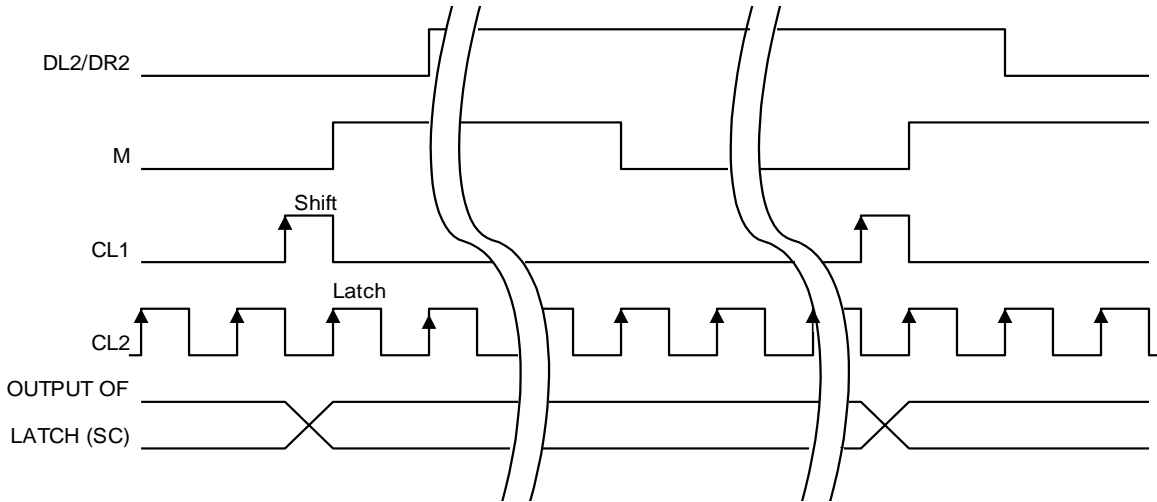


Fig.4. Common Data Waveforms

LCD OUTPUT WAVEFORMS

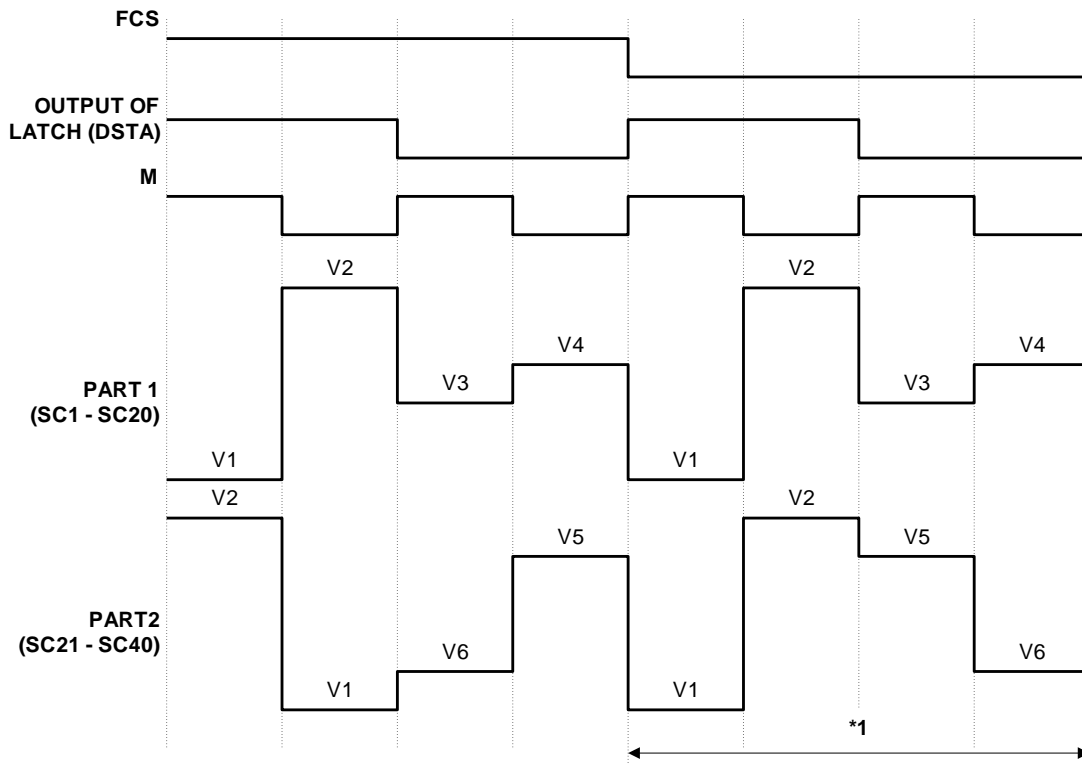
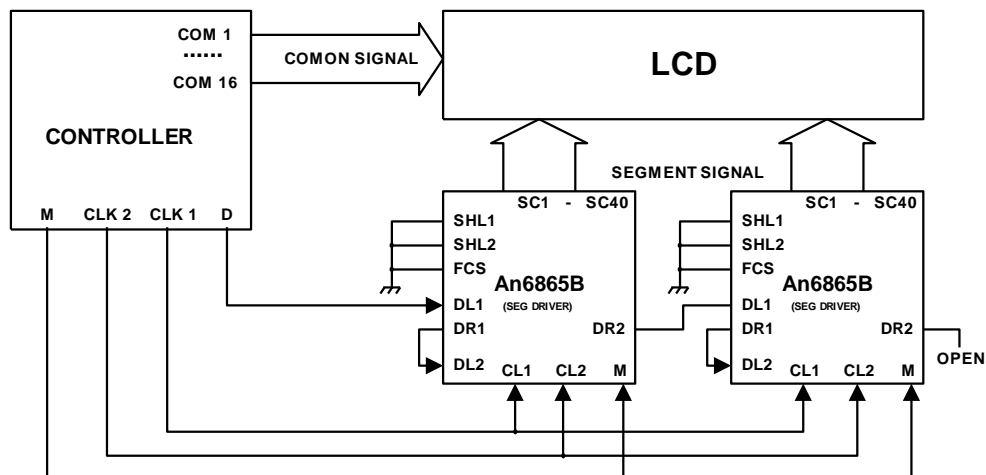


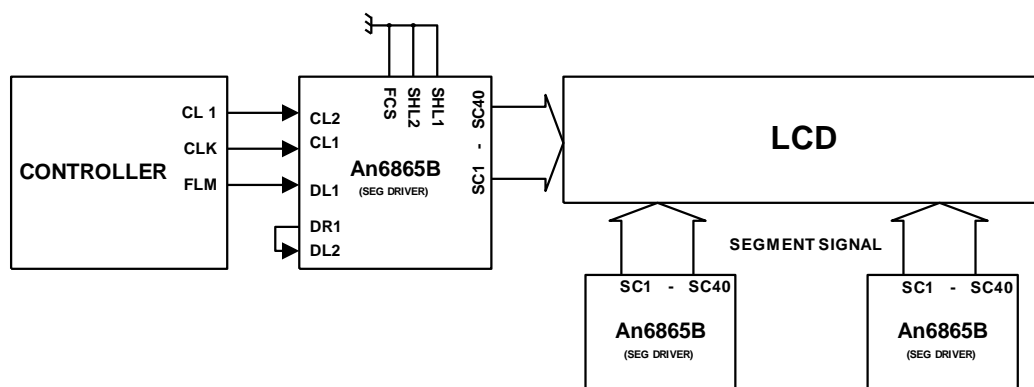
Fig.4. Output Waveforms

*1: To use for same function of part 1 and part 2, V3 and V5, V4 and V6 of power supply for LCD driver are short circuited respectively.

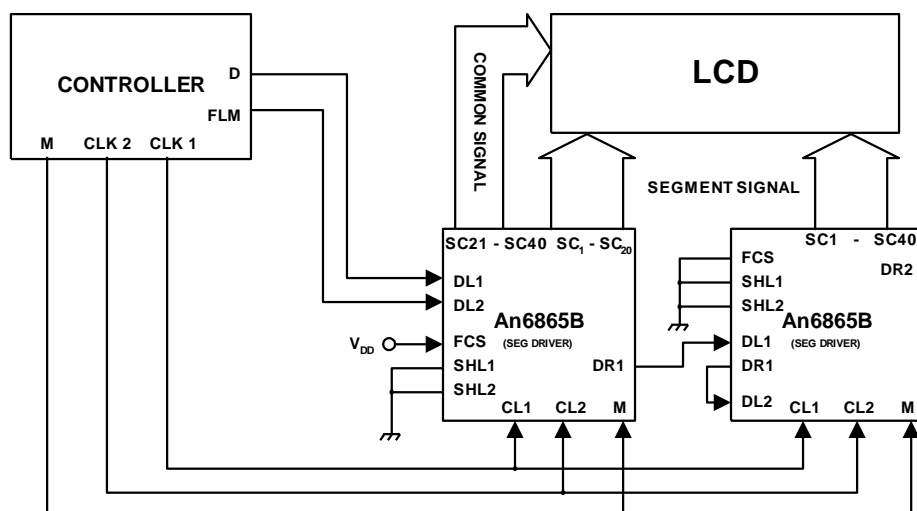
1. Segment driver



2. Common driver

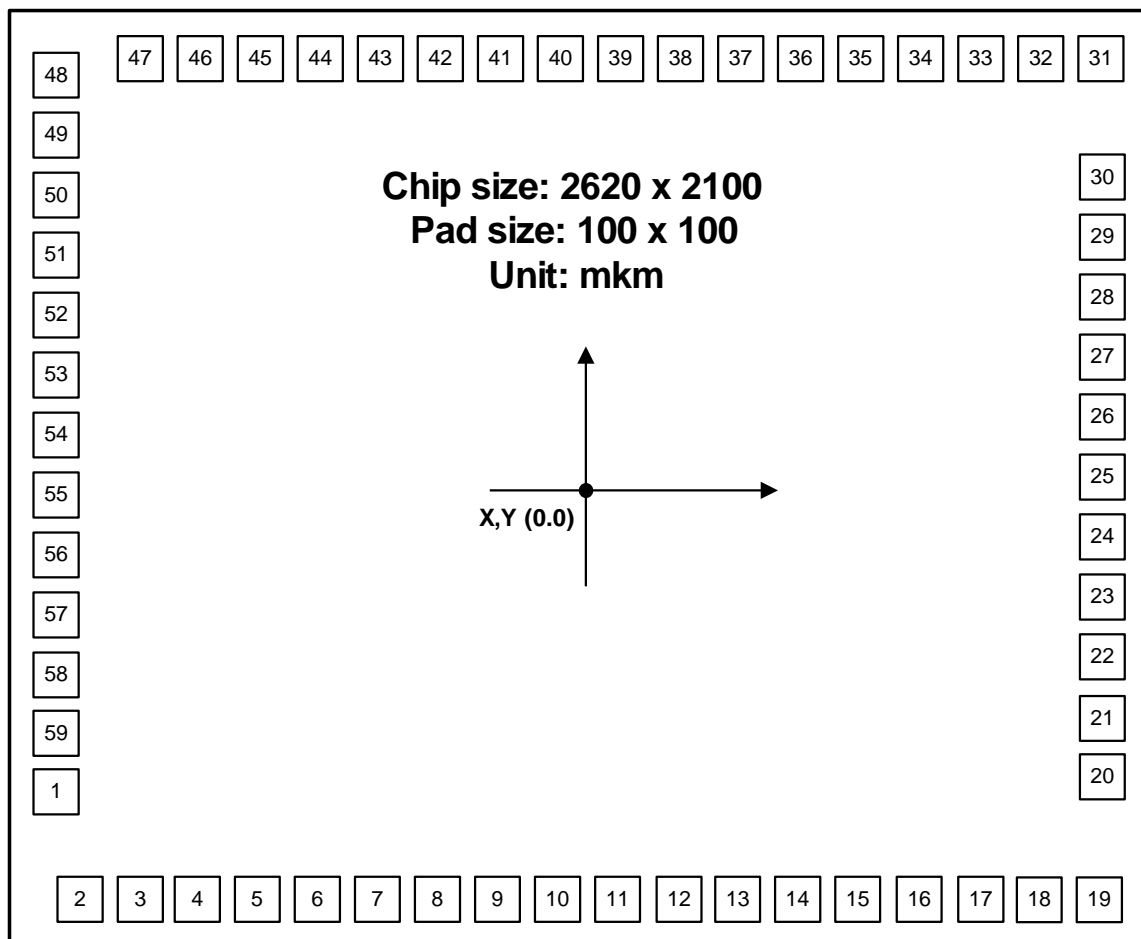


3. Segment/common driver





PAD DIAGRAM



**PAD LOCATION**

Pad number	Pad name	X	Y	Pad number	Pad name	X	Y
1	V _{EE}	- 1118.4	- 645.0	31	SC ₂₈	1113.9	864.3
2	CL ₁	- 1058.9	- 864.3	32	SC ₂₇	988.9	864.3
3	CL ₂	- 933.9	- 864.3	33	SC ₂₆	863.9	864.3
4	V _{SS}	- 809.0	- 864.3	34	SC ₂₅	738.9	864.3
5	DL ₁	- 683.8	- 864.3	35	SC ₂₄	613.9	864.3
6	DR ₁	- 558.8	- 864.3	36	SC ₂₃	488.9	864.3
7	DL ₂	- 433.8	- 864.3	37	SC ₂₂	363.9	864.3
8	DR ₂	-308.8	- 864.3	38	SC ₂₁	238.9	864.3
9	M	- 183.9	- 864.3	39	SC ₂₀	113.9	864.3
10	SHL ₁	- 58.9	- 864.3	40	SC ₁₉	- 11.1	864.3
11	SHL ₂	66.1	- 864.3	41	SC ₁₈	- 136.1	864.3
12	FCS	191.1	- 864.3	42	SC ₁₇	- 261.1	864.3
13	V ₁	336.1	- 864.3	43	SC ₁₆	- 386.1	864.3
14	V ₂	461.1	- 864.3	44	SC ₁₅	- 511.1	864.3
15	V ₃	586.1	- 864.3	45	SC ₁₄	- 636.1	864.3
16	V ₄	711.1	- 864.3	46	SC ₁₃	- 761.1	864.3
17	V ₅	836.1	- 864.3	47	SC ₁₂	- 886.1	864.3
18	V ₆	961.1	- 864.3	48	SC ₉	- 1118.4	854.6
19	SC ₄₀	1086.1	- 864.3	49	SC ₁₀	- 1118.4	729.8
20	SC ₃₉	1118.4	- 622.9	50	SC ₁₁	- 1118.4	604.8
21	SC ₃₈	1118.4	- 497.9	51	SC ₈	- 1118.4	479.8
22	SC ₃₇	1118.4	- 372.9	52	SC ₇	- 1118.4	354.8
23	SC ₃₆	1118.4	- 247.9	53	V _{DD}	- 1118.4	233.4
24	SC ₃₅	1118.4	- 122.9	54	SC ₆	- 1118.4	104.9
25	SC ₃₀	1118.4	2.1	55	SC ₅	- 1118.4	- 20.1
26	SC ₃₁	1118.4	127.1	56	SC ₄	- 1118.4	- 145.1
7	SC ₃₂	1118.4	252.1	57	SC ₃	- 1118.4	- 270.1
28	SC ₃₃	1118.4	377.1	58	SC ₂	- 1118.4	- 395.1
29	SC ₃₄	1118.4	502.1	59	SC ₁	- 1118.4	-520.1
30	SC ₂₉	1118.4	627.1				