Specifications Ver. 0.99

Driver LSI for a color TFT LCD Panel

MC2PA8201

Checked by : Keiji Hayashi

Prepared by : Jun Takasu

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This document is subject to change without notice.

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1.Product overview

The MC2PA8201 is a one-chip driver LSI for TFT liquid crystal display with built-in Gate driver I/F.

The MC2PA8201 incorporates 240 TFT Data line drive outputs, built-in Gate driver I/F signals generate circuit, and incorporates 1,843,200bit (240 x 24 x 320) display RAM and can display 1677K Colors.

2.Features

- The MC2PA8201 is a one-chip driver LSI for TFT liquid crystal display with built-in Gate driver I/F.
- Incorporates 8/16bit Parallel I/F, Serial I/F for external EEPROM.
- I/O Circuit power supply（VCCI）: 1.65~1.95V, Power supply（VCC,VCCA）: 2.60~2.95V
- Incorporates display RAM: 240x24x320bits.
- LCD drive I/F

  Source output(S1~S240) : V0~V255 Gray Scale.

  Gate output (VGH,VGL) : CGS-Panel control output are 10 outputs.

  Incorporate VCOM generate circuit.
- Max 1677K Colors
- Incorporate OSC circuit.

4. Pin Assignment

4.1. Pin Description

4.1.1. Power supply pins - 1

Bump No.	Signal	No of pins	I/O	Connected to	Function	Unused pins
101-108, 309-318	VCC	18	I	Power supply and bypass capacitor	Power supply for step-up circuit, power circuit to drive LCD panel and EEPROM interface circuit such as SCS, SCL and SDO. Connect to external 2.60V to 2.95V power supply.	-
117	VPP	1	I	Power supply	Power supply for inside EEPROM. Connect to VCC pin.	VCC
183-198	VCCA	16	I	Power supply and bypass capacitor	Power supply for analog reference voltage generator. Connect to VCC on FPC not on Glass.	-
241-248	VCCI	8	I	Power supply and bypass capacitor	Power supply for interface circuit such as CSX, RDX, WRX, D15-0, D/CX, RESEX, 16/8x, TE) and for built-in RAM and logic circuit. Connect to external 1.65V to 1.95V power supply.	-
172-182	GND_REF	11	-	GND	GND for analog reference voltage generator. Connect to GND on FPC, not on TFT panel.	-
142-154, 161, 233-240, 307-308, 323-325	GND	27	-	GND	GND pins. Connect to 0V.	-

4.1.2. Power supply pins - 2

Bump No.	Signal	No of pins	I/O	Connected to	Function	Unused pins	未使用時処理
92-100	VOUT1	9	O	Bypass capacitor	Step-upped voltage from step-up circuit 1.	VCC	-
109-115	VR1	7	O	Bypass capacitor	Regulator output for step-up circuit 2.	GND	-
199-208	VR2	10	O	Bypass capacitor	Regulator output for step-up circuit 2.	GND	-
45-51,	VGH	7	O	Bypass capacitor	TFT LCD drive power supply from step-up circuit 2.	GND	-
329	VGHO	1	O	TFT LCD panel	TFT LCD drive power supply from step-up circuit 2. By switch control, it output a VGH level by the same timing to VGL.	GND	-
54-63, 330	VGL	10+1	O	Bypass capacitor TFT LCD panel	TFT LCD drive power supply from step-up circuit 2. It output the Gate off level.	GND	-
65-69	VCL	5	O	Bypass capacitor	Power supply for VCOML circuit from step-up circuit 3. It become power supply to VCOML circuit.	GND	-

4.1.3. Step up Capacitor pins

Bump No.	Signal	No. of Pins	I/O	Connected to	Function	After reset	Unused pins
71-75	C11+	5	I/O	C11- through step-up capacitor	Step-up capacitor connection for step-up 1.	VCC	-
76-80	C11-	5	I/O	C11+ through step-up capacitor	Step-up capacitor connection for step-up 1.	GND	-
81-85	C12+	5	I/O	C12- through step-up capacitor	Step-up capacitor connection for step-up 1.	VCC	
86-90	C12-	5	I/O	C12+ through step-up capacitor	Step-up capacitor connection for step-up 1.	GND	
37-39	C13+	3	I/O	C13- through step-up capacitor	Step-up capacitor connection for step-up 3.	GND	
41-43	C13-	3	I/O	C13+ through step-up capacitor	Step-up capacitor connection for step-up 3.	GND	
30-32	C21+	3	I/O	C21- through step-up capacitor	Step-up capacitor connection for step-up 2.	GND	
33-35	C21-	3	I/O	C21+ through step-up capacitor	Step-up capacitor connection for step-up 2.	GND	
24-26	C22+	3	I/O	C22- through Step-up capacitor	Step-up capacitor connection for step-up 2.	GND	
27-29	C22-	3	I/O	C22+ through step-up capacitor	Step-up capacitor connection for step-up 2.	GND	

4.1.4. Interface pins

Bump No.	Signal	No. of Pins	I/O	Connected to	Function	After reset	Unused pins
257	CSX	1	I	MPU	Chip select signal. (Amplitude: VCCI – GND) “Low”: Selection (Possible to access trough parallel interface) “High” Non-selection (Impossible to access through parallel interface)	-	-
256	D/CX	1	I	MPU	Command/Data select signal. (Amplitude: VCCI – GND) “Low”: Command “High” Data	-	-
281	RESX	1	I	MPU or external CR circuit	Reset signal. (Amplitude: VCCI – GND) Initialization at “Low”. Power on reset shall be done after power supply.	-	-
255	WRX	1	I	MPU	Write strobe signal. (Amplitude: VCCI – GND) Data is written at rising edge.	-	-
254	RDX	1	I	MPU	Read strobe signal. (Amplitude: VCCI – GND) Data is read at “Low” level .	-	-
258-263, 267-276	D0 D5 D6-D15	16	I/O	MPU	16-bit bidirectional data bath. (Amplitude: VCCI – GND) 8-bit interface: D7 to D0 are used. (D15 to D8 are connected to GND or VCCI) 16-bit interface: D15 to D0 are used.	-	GND or VCCI
277	16/8X	1	I	MPU	Data bath width selection. (Amplitude: VCCI – GND) “Low”: 8-bit interface “High”: 16-bit interface	-	-
253	TE	1	O	MPU	Tearing effect output signal. (Amplitude: VCCI – GND)	GND	-
225	SCS	1	O	EEPROM	EEPROM select signal. (Amplitude: VCC – GND) “Low”: Non-selection (Impossible to access) “High”: Selection (Possible to access)	GND	Open
226	SCL	1	O	EEPROM	Serial clock signal. (Amplitude: VCC– GND)	GND	Open
227	SDI	1	I	EEPROM	EEPROM data input signal. (Amplitude: VCC – GND) Serial data input.	-	-
228	SDO	1	O	EEPROM	EEPROM data output signal. (Amplitude: VCC– GND) Start-bit, Operand, Address and serial data output.	GND	Open

4.1.6. TEST pins

Bump No.	Signal	No. of Pins	I/O	Connected to	Function	Unused pins
1,91,116, 118-120, 158-160, 162-171, 209-215, 217, 219-224, 229-232, 249-252, 264-266, 278-280, 282-294, 303-306, 326 453-470, 593-596	TEST_OPEN	87	-	Open	Test pin Leave it open. They have no ESD elements.	Open
327,328	TEST_ESD	2	-	Open	Test pin with ESD protect circuits whose high voltage is VGH and Low voltage is VGL.	Open
216, 218, 295-302, 319-322	TEST_GND	14	-	GND	Test pin Connect to GND on panel	GND
2, 23, 36, 40, 44, 52, 53, 64, 70, , 331, 452, 471, 592	TEST_OG	13	-	GND or Open	Test pin Connect to GND on panel or leave it open	GND or Open

5. Bump Coordinate

Pad No	Pad Name	X	Y
1	TEST_OPEN	-11375	-691.5
2	TEST_OG	-11305	-691.5
3	GSPB	-11235	-691.5
4	GSPB	-11165	-691.5
5	GCK	-11095	-691.5
6	GCK	-11025	-691.5
7	UD	-10955	-691.5
8	UD	-10885	-691.5
9	GEN	-10815	-691.5
10	GEN	-10745	-691.5
11	SMPB_R	-10675	-691.5
12	SMPB_R	-10605	-691.5
13	SMPB_G	-10535	-691.5
14	SMPB_G	-10465	-691.5
15	SMPB_B	-10395	-691.5
16	SMPB_B	-10325	-691.5
17	SMP_R	-10255	-691.5
18	SMP_R	-10185	-691.5
19	SMP_G	-10115	-691.5
20	SMP_G	-10045	-691.5
21	SMP_B	-9975	-691.5
22	SMP_B	-9905	-691.5
23	TEST_OG	-9835	-691.5
24	C22P	-9765	-691.5
25	C22P	-9695	-691.5
26	C22P	-9625	-691.5
27	C22M	-9555	-691.5
28	C22M	-9485	-691.5
29	C22M	-9415	-691.5
30	C21P	-9345	-691.5
31	C21P	-9275	-691.5
32	C21P	-9205	-691.5
33	C21M	-9135	-691.5
34	C21M	-9065	-691.5
35	C21M	-8995	-691.5
36	TEST_OG	-8925	-691.5
37	C13P	-8855	-691.5
38	C13P	-8785	-691.5
39	C13P	-8715	-691.5
40	TEST_OG	-8645	-691.5
41	C13M	-8575	-691.5
42	C13M	-8505	-691.5
43	C13M	-8435	-691.5
44	TEST_OG	-8365	-691.5
45	VGH	-8295	-691.5
46	VGH	-8225	-691.5
47	VGH	-8155	-691.5
48	VGH	-8085	-691.5
49	VGH	-8015	-691.5
50	VGH	-7945	-691.5

Pad No	Pad Name	X	Y
51	VGH	-7875	-691.5
52	TEST_OG	-7805	-691.5
53	TEST_OG	-7735	-691.5
54	VGL	-7665	-691.5
55	VGL	-7595	-691.5
56	VGL	-7525	-691.5
57	VGL	-7455	-691.5
58	VGL	-7385	-691.5
59	VGL	-7315	-691.5
60	VGL	-7245	-691.5
61	VGL	-7175	-691.5
62	VGL	-7105	-691.5
63	VGL	-7035	-691.5
64	TEST_OG	-6965	-691.5
65	VCL	-6895	-691.5
66	VCL	-6825	-691.5
67	VCL	-6755	-691.5
68	VCL	-6685	-691.5
69	VCL	-6615	-691.5
70	TEST_OG	-6545	-691.5
71	C11P	-6475	-691.5
72	C11P	-6405	-691.5
73	C11P	-6335	-691.5
74	C11P	-6265	-691.5
75	C11P	-6195	-691.5
76	C11M	-6125	-691.5
77	C11M	-6055	-691.5
78	C11M	-5985	-691.5
79	C11M	-5915	-691.5
80	C11M	-5845	-691.5
81	C12P	-5775	-691.5
82	C12P	-5705	-691.5
83	C12P	-5635	-691.5
84	C12P	-5565	-691.5
85	C12P	-5495	-691.5
86	C12M	-5425	-691.5
87	C12M	-5355	-691.5
88	C12M	-5285	-691.5
89	C12M	-5215	-691.5
90	C12M	-5145	-691.5
91	TEST_OPEN	-5075	-691.5
92	VOUT1	-5005	-691.5
93	VOUT1	-4935	-691.5
94	VOUT1	-4865	-691.5
95	VOUT1	-4795	-691.5
96	VOUT1	-4725	-691.5
97	VOUT1	-4655	-691.5
98	VOUT1	-4585	-691.5
99	VOUT1	-4515	-691.5
100	VOUT1	-4445	-691.5

Pad No	Pad Name	X	Y
101	VCC	-4375	-691.5
102	VCC	-4305	-691.5
103	VCC	-4235	-691.5
104	VCC	-4165	-691.5
105	VCC	-4095	-691.5
106	VCC	-4025	-691.5
107	VCC	-3955	-691.5
108	VCC	-3885	-691.5
109	VR1	-3815	-691.5
110	VR1	-3745	-691.5
111	VR1	-3675	-691.5
112	VR1	-3605	-691.5
113	VR1	-3535	-691.5
114	VR1	-3465	-691.5
115	VR1	-3395	-691.5
116	TEST_OPEN	-3325	-691.5
117	VPP	-3255	-691.5
118	TEST_OPEN	-3185	-691.5
119	TEST_OPEN	-3115	-691.5
120	TEST_OPEN	-3045	-691.5
121	VCS	-2975	-691.5
122	VCS	-2905	-691.5
123	VCS	-2835	-691.5
124	VCS	-2765	-691.5
125	VCOM	-2695	-691.5
126	VCOM	-2625	-691.5
127	VCOM	-2555	-691.5
128	VCOM	-2485	-691.5
129	VCOM	-2415	-691.5
130	VCOML	-2345	-691.5
131	VCOML	-2275	-691.5
132	VCOML	-2205	-691.5
133	VCOML	-2135	-691.5
134	VCOML	-2065	-691.5
135	VCOML	-1995	-691.5
136	VCOMH	-1925	-691.5
137	VCOMH	-1855	-691.5
138	VCOMH	-1785	-691.5
139	VCOMH	-1715	-691.5
140	VCOMH	-1645	-691.5
141	VCOMH	-1575	-691.5
142	GND	-1505	-691.5
143	GND	-1435	-691.5
144	GND	-1365	-691.5
145	GND	-1295	-691.5
146	GND	-1225	-691.5
147	GND	-1155	-691.5
148	GND	-1085	-691.5
149	GND	-1015	-691.5
150	GND	-945	-691.5

Pad No	Pad Name	X	Y
151	GND	-875	-691.5
152	GND	-805	-691.5
153	GND	-735	-691.5
154	GND	-665	-691.5
155	VREG	-595	-691.5
156	VREG	-525	-691.5
157	VREG	-455	-691.5
158	TEST_OPEN	-385	-691.5
159	TEST_OPEN	-315	-691.5
160	TEST_OPEN	-245	-691.5
161	GND	-175	-691.5
162	TEST_OPEN	-105	-691.5
163	TEST_OPEN	-35	-691.5
164	TEST_OPEN	35	-691.5
165	TEST_OPEN	105	-691.5
166	TEST_OPEN	175	-691.5
167	TEST_OPEN	245	-691.5
168	TEST_OPEN	315	-691.5
169	TEST_OPEN	385	-691.5
170	TEST_OPEN	455	-691.5
171	TEST_OPEN	525	-691.5
172	GND_REF	595	-691.5
173	GND_REF	665	-691.5
174	GND_REF	735	-691.5
175	GND_REF	805	-691.5
176	GND_REF	875	-691.5
177	GND_REF	945	-691.5
178	GND_REF	1015	-691.5
179	GND_REF	1085	-691.5
180	GND_REF	1155	-691.5
181	GND_REF	1225	-691.5
182	GND_REF	1295	-691.5
183	VCCA	1365	-691.5
184	VCCA	1435	-691.5
185	VCCA	1505	-691.5
186	VCCA	1575	-691.5
187	VCCA	1645	-691.5
188	VCCA	1715	-691.5
189	VCCA	1785	-691.5
190	VCCA	1855	-691.5
191	VCCA	1925	-691.5
192	VCCA	1995	-691.5
193	VCCA	2065	-691.5
194	VCCA	2135	-691.5
195	VCCA	2205	-691.5
196	VCCA	2275	-691.5
197	VCCA	2345	-691.5
198	VCCA	2415	-691.5
199	VR2	2485	-691.5
200	VR2	2555	-691.5