

MN673794

Digital Conversion IC

■ Overview

The MN673794 accepts an analog video signal in the NTSC or PAL format and converts it to an ITU-R BT.656 signal, the standard signal for digital video signal transmission.

■ Features

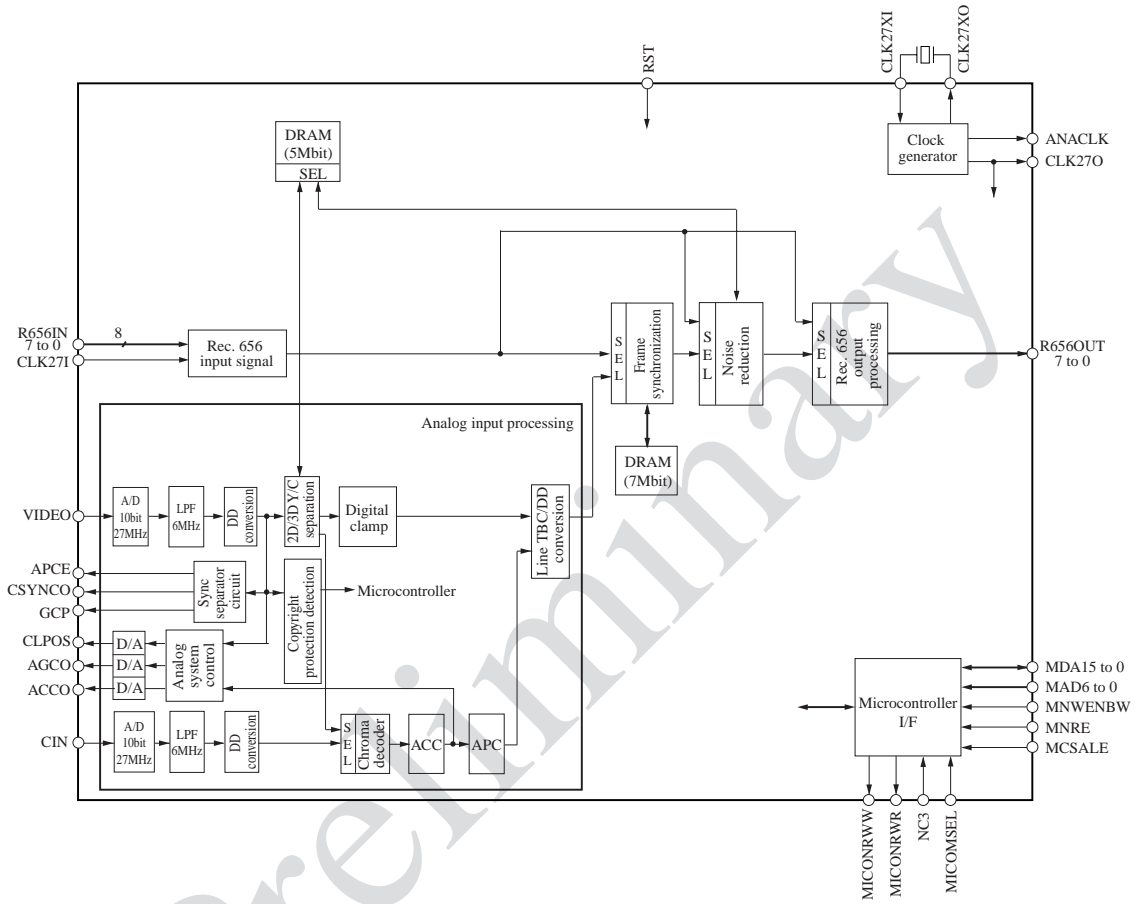
- Increased calculation precision for Y/C separation (both 2D and 3D): 9 bits.
- Processing from A/D conversion through Rec. 656 output can be performed with a single fixed 27 MHz clock.
- Velocity error correction has been introduced in the TBC (Time Base Corrector), to create a correct time axis across the whole screen.
- Supports signal standardization using a frame synchronizer.
- Use of embedded DRAM allows all the above functions to be implemented on a single chip.

Item	MN673794
Functions	Motion adaptive 3D Y/C separation, TBC processing, 3D noise reduction processing, DD conversion processing, frame synchronization processing
Analog inputs	Two systems: composite video signal and separate Y and C signals
Digital I/O	One ITU-R BT.656 system
Operating frequency	Operates at up to 27 MHz
Supply voltage	3.3 V \pm 0.3 V (analog input block) 1.8 V \pm 0.15 V (internal digital blocks) 2.5 V \pm 0.2 V (internal DRAM block)
Package	208 pin LQFP (28 mm \square , 0.5 mm lead pitch)

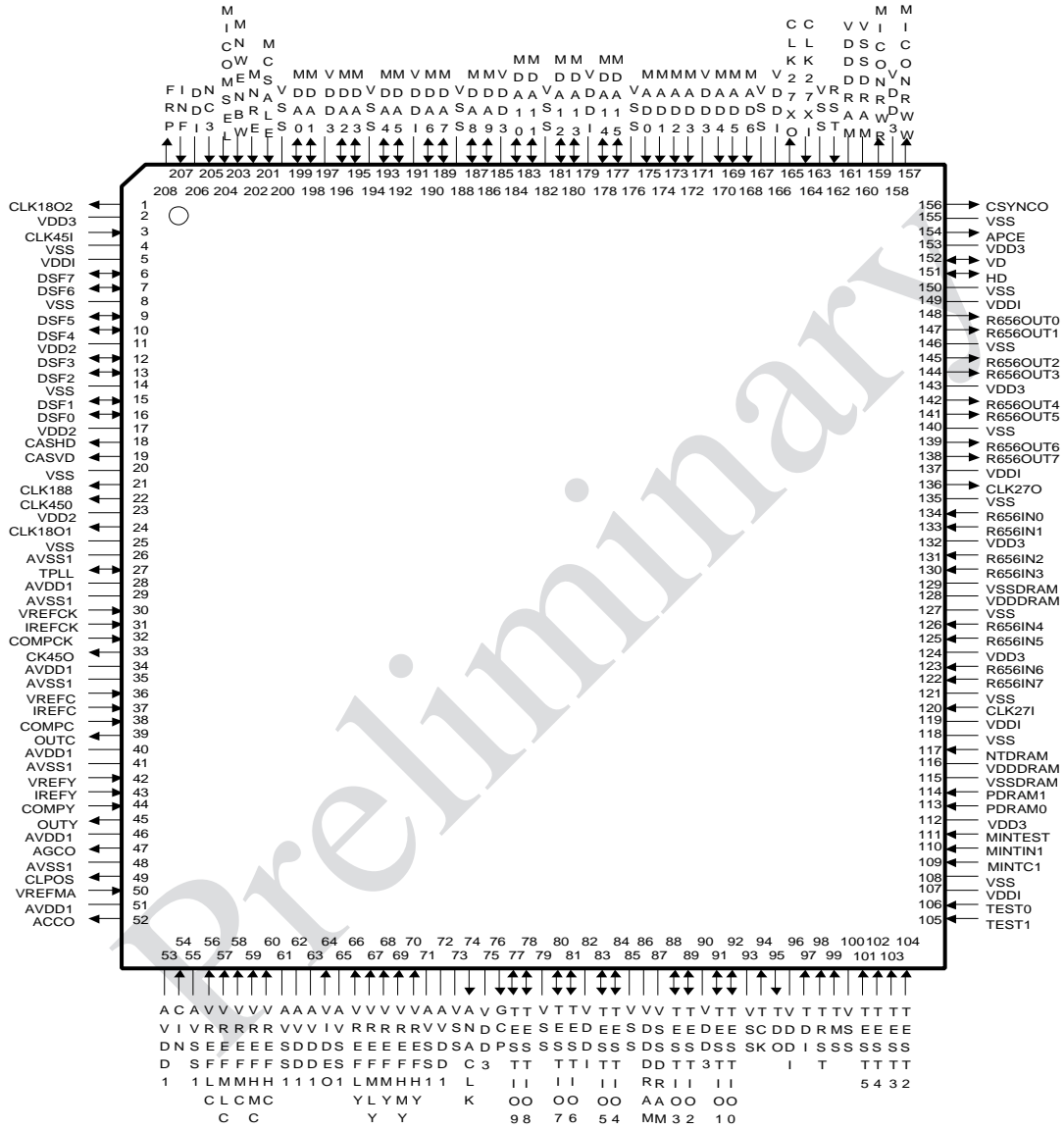
■ Applications

- DVD recorders, hard disk application products, multimedia PCs, and display equipment such as TVs and PDPs.

■ Block Diagram



■ Pin Assignment



■ Pin Descriptions

Pin No.	Pin Name	I/O	Voltage	Description
1	CLK1802	O	3.3V	Clock: 18 MHz, 2 outputs
2	VDD3	Power supply	3.3V	Digital I/O system (3.3 V)
3	CLK45I	I	-	Clock: 4.5 MHz input (Connect to V _{SS} if unused.)
4	VSS	GND	-	Digital system ground
5	VDD1	Power supply	1.8V	Internal digital system power supply
6	DSF7	I/O	2.2V	Shuffle data I/O (MSB) (Leave open or connect to V _{SS} if unused.)
7	DSF6	I/O	2.2V	Shuffle data I/O (Leave open or connect to V _{SS} if unused.)
8	VSS	GND	-	Digital system ground
9	DSF5	I/O	2.2V	Shuffle data I/O (Leave open or connect to V _{SS} if unused.)
10	DSF4	I/O	2.2V	Shuffle data I/O (Leave open or connect to V _{SS} if unused.)
11	VDD2	Power supply	2.2V	Digital I/O system (2.2 V) (Connect to V _{DD3} if DV is unused.)
12	DSF3	I/O	2.2V	Shuffle data I/O (Leave open or connect to V _{SS} if unused.)
13	DSF2	I/O	2.2V	Shuffle data I/O (Leave open or connect to V _{SS} if unused.)
14	VSS	GND	-	Digital system ground
15	DSF1	I/O	2.2V	Shuffle data I/O (Leave open or connect to V _{SS} if unused.)
16	DSF0	I/O	2.2V	Shuffle data I/O (MSB) (Leave open or connect to V _{SS} if unused.)
17	VDD2	Power supply	2.2V	Digital I/O system (2.2 V) (Connect to V _{DD3} if DV is unused.)
18	CASHD	O	2.2V	CAS HD output
19	CASVH	O	2.2V	CAS VD output
20	VSS	GND	-	Digital system ground
21	CLK188	O	2.2V	Clock output
22	CLK45O	O	2.2V	Clock output
23	VDD2	Power supply	2.2V	Digital I/O system (2.2 V) (Connect to V _{DD3} if DV is unused.)
24	CLK1801	O	2.2V	Clock: 18 MHz, 1 output
25	VSS	GND	-	Digital system ground
26	AVSS1	GND	-	PLL (18 MHz) system ground
27	TPLL	I/O	-	PLL (18 MHz) system test
28	AVDD1	Power supply	3.3V	PLL (18 MHz) system power supply
29	AVSS2	GND	-	D/A converter (CLK) ground
30	VREFCK	I	-	D/A converter (CLK) reference voltage input (Connect to AV _{SS} if unused.)
31	IREFCK	I	-	D/A converter (CLK) bias current setting (Connect to AV _{SS} if unused.)
32	COMPCK	I	-	D/A converter (CLK) stabilization (Connect to AV _{DD} if unused.)
33	CK45O	O	-	4.5 MHz clock output
34	AVDD2	Power supply	3.3V	D/A converter (CLK) power supply
35	AVSS3	GND	-	D/A converter (COUT) ground
36	VREFC	I	-	D/A converter (COUT) reference voltage input (Connect to AV _{SS} if unused.)
37	IREFC	I	-	D/A converter (COUT) bias current setting (Connect to AV _{SS} if unused.)
38	COMP C	I	-	D/A converter (COUT) stabilization (Connect to AV _{DD} if unused.)
39	OUTC	O	-	C output (analog)
40	AVDD3	Power supply	3.3V	D/A converter (COUT) power supply
41	AVSS4	GND	-	D/A converter (YOUT) ground
42	VREFY	I	-	D/A converter (YOUT) reference voltage input (Connect to AV _{SS} if unused.)
43	IREFY	I	-	D/A converter (YOUT) bias current setting (Connect to AV _{SS} if unused.)
44	COMPY	I	-	D/A converter (YOUT) stabilization (Connect to AV _{DD} if unused.)

■ Pin Descriptions (continued)

Pin No.	Pin Name	I/O	Voltage	Description
45	OUTY	O	-	Y output (analog)
46	AVDD4	Power supply	3.3V	D/A converter (YOUT) power supply
47	AGCO	O	-	AGC control output
48	AVSS5	GND	-	Resistor divider D/A converter (ACC, CLAMP, AGC) ground
49	CLPOS	O	-	Clamp control output (sync tip)
50	VREFMA	I	-	Resistor divider D/A converter reference voltage input (Connect to AV _{SS} through a capacitor.)
51	AVDD5	Power supply	3.3V	Resistor divider D/A converter (ACC, CLAMP, AGC) power supply
52	ACCO	O	-	ACC control output
53	AVDD6	Power supply	3.3V	A/D converter (C) power supply
54	CIN	I	-	C input (analog)
55	AVSS6	GND	-	A/D converter (C) ground
56	VREFLC	I	-	A/D converter (C) reference voltage low level input
57	VREFMLC	I	-	A/D converter (C) intermediate reference potential input (Connect to AV _{SS} through a capacitor.)
58	VREFMC	I	-	A/D converter (C) intermediate reference potential input (Connect to AV _{SS} through a capacitor.)
59	VREFHMC	I	-	A/D converter (C) intermediate reference potential input (Connect to AV _{SS} through a capacitor.)
60	VREFHC	I	-	A/D converter (C) reference voltage high level input
61	AVSS7	GND	-	A/D converter (C) ground
62	AVDD7	Power supply	3.3V	A/D converter (C) power supply
63	AVDD8	Power supply	3.3V	A/D converter (Y and composite) power supply
64	VIDEO	I	-	Composite video signal input (analog)
65	AVSS8	GND	-	A/D converter (Y and composite) ground
66	VREFLY	I	-	A/D converter (Y and composite) reference voltage low level input
67	VREFMLY	I	-	A/D converter (Y and composite) intermediate reference potential input (Connect to AV _{SS} through a capacitor.)
68	VREFMY	I	-	A/D converter (Y and composite) intermediate reference potential input (Connect to AV _{SS} through a capacitor.)
69	VREFHMY	I	-	A/D converter (Y and composite) intermediate reference potential input (Connect to AV _{SS} through a capacitor.)
70	VREFHY	I	-	A/D converter (Y and composite) reference voltage high level input
71	AVSS9	GND	-	A/D converter (Y and composite) ground
72	AVDD9	Power supply	3.3V	A/D converter (Y and composite) power supply
73	VSS	GND	-	Digital system ground
74	ANACLK	O	3.3V	6.75 MHz output
75	VDD3	Power supply	3.3V	Digital I/O system (3.3 V) power supply
76	GCP	O	3.3V	Clamp pulse (sync tip) output
77	TESTIO9	I/O	3.3V	Test I/O (MSB) (Leave open or connect to V _{SS} .)
78	TESTIO8	I/O	3.3V	Test I/O (Leave open or connect to V _{SS} .)
79	VSS	GND	-	Digital system ground
80	TESTIO7	I/O	3.3V	Test I/O (Leave open or connect to V _{SS} .)
81	TESTIO6	I/O	3.3V	Test I/O (Leave open or connect to V _{SS} .)
82	VDDI	Power supply	1.8V	Internal digital system power supply
83	TESTIO5	I/O	3.3V	Test I/O (Leave open or connect to V _{SS} .)
84	TESTIO4	I/O	3.3V	Test I/O (Leave open or connect to V _{SS} .)
85	VSS	GND	-	Digital system ground
86	VDDDRAM0	Power supply	2.5V	DRAM (5 Mbit) power supply
87	VSSDRAM0	GND	-	Digital system ground
88	TESTIO3	I/O	3.3V	Test I/O (Leave open or connect to V _{SS} .)

Note) If the boundary scan function is not used, connect these pins to the TRST (pin 98) reset input or V_{SS}.

■ Pin Descriptions (continued)

Pin No.	Pin Name	I/O	Voltage	Description
89	TESTIO2	I/O	3.3V	Test I/O (Leave open or connect to V _{SS} .)
90	VDD3	Power supply	3.3V	Digital I/O system (3.3 V) power supply
91	TESTIO1	I/O	3.3V	Test I/O (Leave open or connect to V _{SS} .)
92	TESTIO0	I/O	3.3V	Test I/O (LSB) (Leave open or connect to V _{SS} .)
93	VSS	GND	-	Digital system ground
94	TCK	I	3.3V	Boundary scan clock input
95	TDO	O	3.3V	Boundary scan data output
96	VDDI	Power supply	1.8V	Internal digital system power supply
97	TDI	I	3.3V	Boundary scan data input
98	TRST	I	3.3V	Boundary scan reset input (Connect to either V _{SS} or RST if unused.)
99	TMS	I	3.3V	Boundary scan mode input
100	VSS	GND	-	Digital system ground
101	TEST5	I	3.3V	Test mode (MSB) (Leave open or connect to V _{SS} .)
102	TEST4	I	3.3V	Test mode (Leave open or connect to V _{SS} .)
103	TEST3	I	3.3V	Test mode (Leave open or connect to V _{SS} .)
104	TEST2	I	3.3V	Test mode (Leave open or connect to V _{SS} .)
105	TEST1	I	3.3V	Test mode (Leave open or connect to V _{SS} .)
106	TEST0	I	3.3V	Test mode (LSB) (Leave open or connect to V _{SS} .)
107	VDDI	Power supply	1.8V	Internal digital system power supply
108	VSS	GND	-	Digital system ground
109	MINTC1	I	3.3V	Test input (Connect to V _{SS} .)
110	MINTIN1	I	3.3V	Test input (Connect to V _{SS} .)
111	MINTEST	I	3.3V	Test input (Leave open or connect to V _{SS} .)
112	VDD3	Power supply	3.3V	Digital I/O system (3.3 V) power supply
113	PDRAM0	I	3.3V	DRAM test input (Leave open or connect to V _{SS} .)
114	PDRAM1	I	3.3V	DRAM test input (Leave open or connect to V _{SS} .)
115	VSSDRAM1	GND	-	Digital system ground
116	VDDDRAM1	Power supply	2.5V	DRAM (5 Mbit) power supply
117	NTDRAM	I	3.3V	DRAM test input (Leave open or connect to V _{SS} .)
118	VSS	GND	-	Digital system ground
119	VDDI	Power supply	1.8V	Internal digital system power supply
120	CLK27I	I	3.3V	Rec. 656 27 MHz clock input (Connect to V _{SS} if unused.)
121	VSS	GND	-	Digital system ground
122	R656IN7	I	3.3V	Digital video (Rec. 656) input (MSB) (Leave open or connect to V _{SS} if unused.)
123	R656IN6	I	3.3V	Digital video (Rec. 656) input (Leave open or connect to V _{SS} if unused.)
124	VDD3	Power supply	3.3V	Digital I/O system (3.3 V) power supply
125	R656IN5	I	3.3V	Digital video (Rec. 656) input (Leave open or connect to V _{SS} if unused.)
126	R656IN4	I	3.3V	Digital video (Rec. 656) input (Leave open or connect to V _{SS} if unused.)
127	VSS	GND	-	Digital system ground
128	VDDDRAM2	Power supply	2.5V	DRAM (7 Mbit) power supply
129	VSSDRAM2	GND	-	Digital system ground
130	R656IN3	I	3.3V	Digital video (Rec. 656) input (Leave open or connect to V _{SS} if unused.)
131	R656IN2	I	3.3V	Digital video (Rec. 656) input (Leave open or connect to V _{SS} if unused.)
132	VDD3	Power supply	3.3V	Digital I/O system (3.3 V) power supply

■ Pin Descriptions (continued)

Pin No.	Pin Name	I/O	Voltage	Description
133	R656IN1	I	3.3V	Digital video (Rec. 656) input (Leave open or connect to V _{SS} if unused.)
134	R656IN0	I	3.3V	Digital video (Rec. 656) input (LSB) (Leave open or connect to V _{SS} if unused.)
135	VSS	GND	-	Digital system ground
136	CLK27O	O	3.3V	27 MHz clock output
137	VDDI	Power supply	1.8V	Internal digital system power supply
138	R656OUT7	O	3.3V	Digital video (Rec. 656) output (MSB)
139	R656OUT6	O	3.3V	Digital video (Rec. 656) output
140	VSS	GND	-	Digital system ground
141	R656OUT5	O	3.3V	Digital video (Rec. 656) output
142	R656OUT4	O	3.3V	Digital video (Rec. 656) output
143	VDD3	Power supply	3.3V	Digital I/O system (3.3 V) power supply
144	R656OUT3	O	3.3V	Digital video (Rec. 656) output
145	R656OUT2	O	3.3V	Digital video (Rec. 656) output
146	VSS	GND	-	Digital system ground
147	R656OUT1	O	3.3V	Digital video (Rec. 656) output
148	R656OUT0	O	3.3V	Digital video (Rec. 656) output (LSB)
149	VDDI	Power supply	1.8V	Internal digital system power supply
150	VSS	GND	-	Digital system ground
151	HD	I/O	3.3V	Test I/O (Leave open or connect to V _{SS} .)
152	VD	I/O	3.3V	Test I/O (Leave open or connect to V _{SS} .)
153	VDD3	Power supply	3.3V	Digital I/O system (3.3 V) power supply
154	APCE	O	3.3V	Phase error output
155	VSS	GND	-	Digital system ground
156	CSYNCO	O	3.3V	Composite video signal sync detection output
157	MICONRWW	O	3.3V	Microcontroller interrupt (write) sync signal output
158	VDD3	Power supply	3.3V	Digital I/O system (3.3 V) power supply
159	MICONRWR	O	3.3V	Microcontroller interrupt (read) sync signal output
160	VSSDRAM3	GND	-	Digital system ground
161	VDDDRAM3	Power supply	2.5V	DRAM (7 Mbit) power supply
162	RST	I	3.3V	Reset input
163	VSS	GND	-	Digital system ground
164	CLK27XI	I	-	27 MHz crystal oscillator clock input
165	CLK27XO	O	-	27 MHz crystal oscillator clock output
166	VDDI	Power supply	1.8V	Internal digital system power supply
167	VSS	GND	-	Digital system ground
168	MAD6	I/O	3.3V	Microcontroller interface data/address input (MSB)
169	MAD5	I/O	3.3V	Microcontroller interface data/address input
170	MAD4	I/O	3.3V	Microcontroller interface data/address input
171	VDD3	Power supply	3.3V	Digital I/O system (3.3 V) power supply
172	MAD3	I/O	3.3V	Microcontroller interface data/address input
173	MAD2	I/O	3.3V	Microcontroller interface data/address input
174	MAD1	I/O	3.3V	Microcontroller interface data/address input
175	MAD0	I/O	3.3V	Microcontroller interface data/address input (LSB)
176	VSS	GND	-	Digital system ground

■ Pin Descriptions (continued)

Pin No.	Pin Name	I/O	Voltage	Description
177	MDA15	I/O	3.3V	Microcontroller interface data/address input (MSB)
178	MDA14	I/O	3.3V	Microcontroller interface data/address input
179	VDDI	Power supply	1.8V	Internal digital system power supply
180	MDA13	I/O	3.3V	Microcontroller interface data/address input
181	MDA12	I/O	3.3V	Microcontroller interface data/address input
182	VSS	GND	-	Digital system ground
183	MDA11	I/O	3.3V	Microcontroller interface data/address input
184	MDA10	I/O	3.3V	Microcontroller interface data/address input
185	VDD	Power supply	3.3V	Digital I/O system (3.3 V) power supply
186	MDA9	I/O	3.3V	Microcontroller interface data/address input
187	MDA8	I/O	3.3V	Microcontroller interface data/address input
188	VSS	GND	-	Digital system ground
189	MDA7	I/O	3.3V	Microcontroller interface data/address input
190	MDA6	I/O	3.3V	Microcontroller interface data/address input
191	VDDI	Power supply	1.8V	Internal digital system power supply
192	MDA5	I/O	3.3V	Microcontroller interface data/address input
193	MDA4	I/O	3.3V	Microcontroller interface data/address input
194	VSS	GND	-	Digital system ground
195	MDA3	I/O	3.3V	Microcontroller interface data/address input
196	MDA2	I/O	3.3V	Microcontroller interface data/address input
197	VDD3	Power supply	3.3V	Digital I/O system (3.3 V) power supply
198	MDA1	I/O	3.3V	Microcontroller interface data/address input
199	MDA0	I/O	3.3V	Microcontroller interface data/address input (LSB)
200	VSS	GND	-	Digital system ground
201	MCSALE	I/O	3.3V	Microcontroller interface chip select input
202	MNRE	I/O	3.3V	Microcontroller interface read input
203	MNWENBW	I/O	3.3V	Microcontroller interface write input
204	MICOMSEL	I/O	3.3V	Microcontroller interface switching input
205	NC3	I/O	3.3V	Microcontroller interface mode switching input (Set to V _{SS} for normal mode.)
206	VDDI	Power supply	1.8V	Internal digital system power supply
207	INF	I	3.3V	DV interface frame signal input (Leave open or connect to V _{SS} if unused.)
208	FRP	O	3.3V	FRP output

■ Package Dimensions (Unit: mm)

- LQFP208-P-2828

