

## SYNCHRONOUS SEPARATION WITH AFC

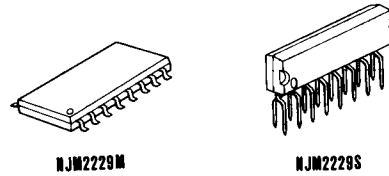
### ■ GENERAL DESCRIPTION

The NJM2229 has functions of getting the horizontal and vertical synchronous signal from the composite video signal by the synchronous separation circuit. Also the NJM2229 has a detective terminal of the input signal through the synchronous circuit.

### ■ FEATURES

- Operating Voltage (+4.7V~+5.3V)
- Internal AFC circuit (Horizontal sync. signal)
- No adjustment of free run frequency.
- Internal detective circuit of sync. signal.
- Package Outline DIP16, ZIP16
- Bipolar Technology

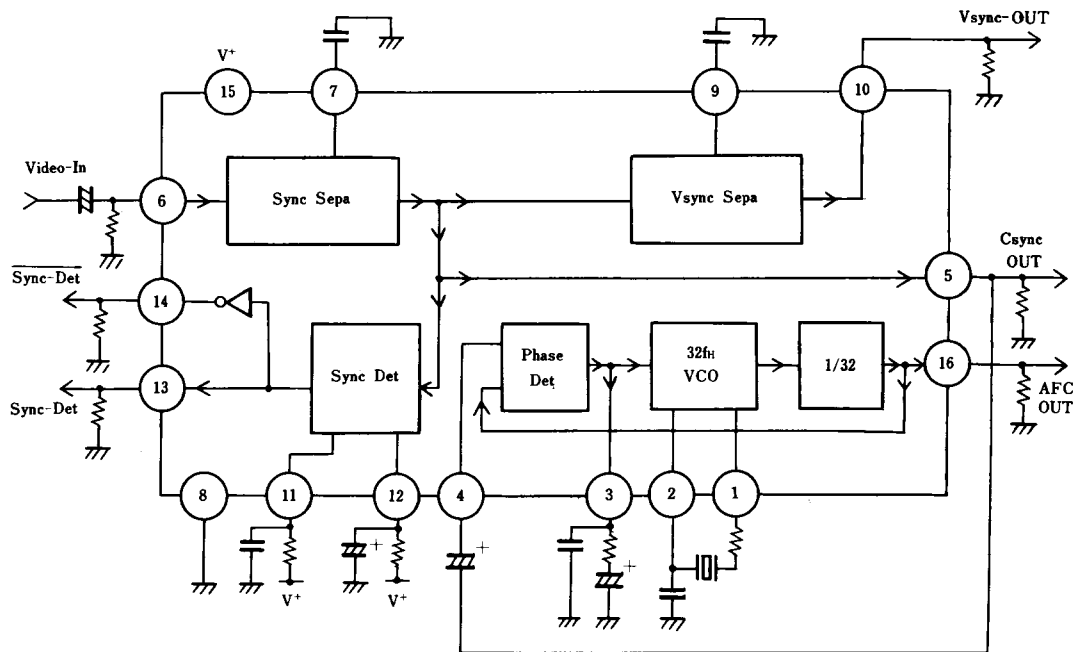
### ■ PACKAGE OUTLINE



### ■ RECOMMENDED OPERATING CONDITION

- Operating Voltage 4.7~5.3V

### ■ BLOCK DIAGRAM



## ■ ABSOLUTE MAXIMUM RATINGS

(Ta=25°C)

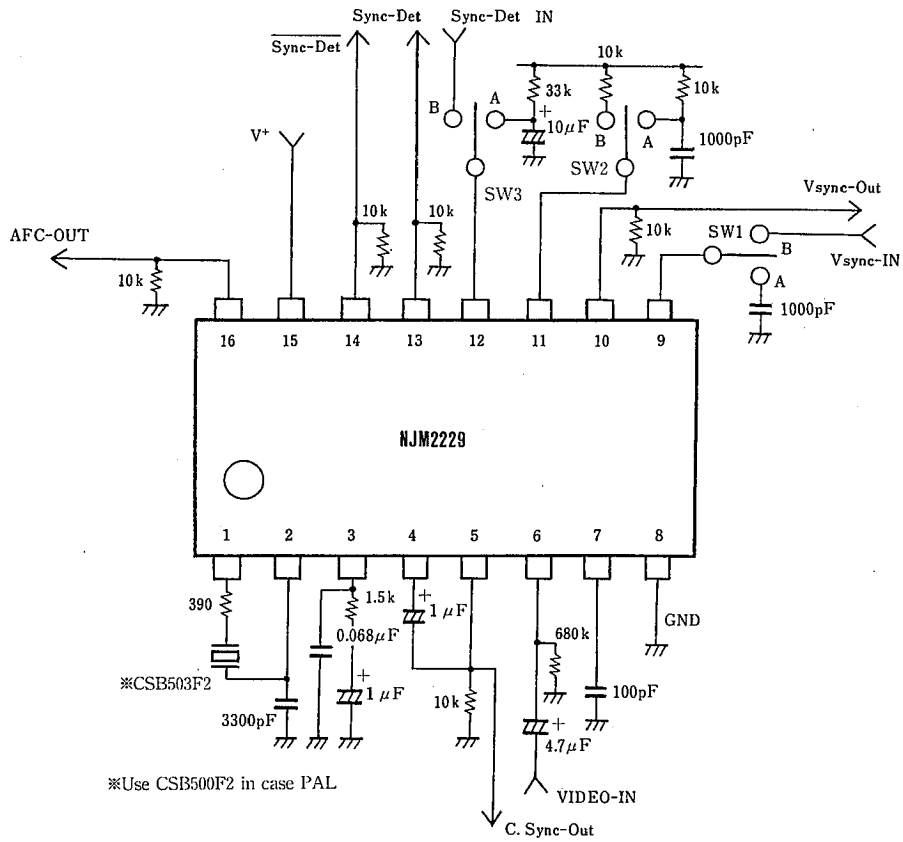
PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V <sup>+</sup>	7	V
Power Dissipation	P <sub>D</sub>	500	mW
Operating Temperature Range	T <sub>opr</sub>	-20~+75	°C
Storage Temperature Range	T <sub>stg</sub>	-40~+125	°C

## ■ ELECTRICAL CHARACTERISTICS

(Ta=25°C, V<sup>+</sup>=5V)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Operating Current	I <sub>CC</sub>	—	20	26	mA
AFC Free-run Frequency	f <sub>OH</sub>	15.534	15.734	15.934	kHz
AFC Pulse Width	T <sub>HD</sub>	3.7	3.9	4.1	μs
AFC Delay	T <sub>HA</sub>	0.7	1.7	2.7	μs
AFC Lock Range	Δf <sub>HL</sub>	+600 -900	+700 -1000	—	Hz
AFC Capture Range	Δf <sub>HP</sub>	+400 -700	+600 -900	—	Hz
AFC Output Voltage High	V <sub>H<sub>AH</sub></sub>	4.0	4.2	—	V
AFC Output Voltage Low	V <sub>H<sub>AL</sub></sub>	—	0	0.1	V
Sync. Signal Detection Level	V <sub>H<sub>DS</sub></sub>	0.11	0.14	0.17	V
Sync. Signal Detection Delay Time	T <sub>H<sub>DC</sub></sub>	0	0.57	1.5	μs
Sync. Signal Detection Output Voltage High	V <sub>H<sub>DH</sub></sub>	4.0	4.2	—	V
Sync. Signal Detection Output Voltage Low	V <sub>H<sub>DL</sub></sub>	—	0	0.1	V
V <sub>SYNC</sub> Threshold Voltage High	V <sub>D<sub>SH</sub></sub>	2.4	2.5	2.6	V
V <sub>SYNC</sub> Threshold Voltage Low	V <sub>D<sub>SL</sub></sub>	1.4	1.5	1.6	V
V <sub>SYNC</sub> Output Voltage High	V <sub>D<sub>H</sub></sub>	4.0	4.2	—	V
V <sub>SYNC</sub> Output Voltage Low	V <sub>D<sub>L</sub></sub>	—	0	0.1	V
V <sub>SYNC</sub> Pulse Width	T <sub>V<sub>D</sub></sub>	212	272	332	μs
V <sub>SYNC</sub> Delay Time	T <sub>V<sub>DT</sub></sub>	9.6	12.3	15	μs
Sync. Detection Lock Voltage High	V <sub>L<sub>H</sub></sub>	2.53	2.68	2.83	V
Sync. Detection Lock Voltage Low	V <sub>L<sub>L</sub></sub>	1.25	1.40	1.55	V
Sync. Detection Capture High	V <sub>C<sub>H</sub></sub>	2.07	2.22	2.37	V
Sync. Detection Capture Low	V <sub>C<sub>L</sub></sub>	1.57	1.72	1.87	V
Sync. Detection Output Voltage High	V <sub>D<sub>EH</sub></sub>	4.0	4.2	—	V
Sync. Detection Output Voltage Low	V <sub>D<sub>EL</sub></sub>	—	0	0.1	V
Sync. Detection Output Voltage High	V <sub>D<sub>EH</sub></sub>	4.0	4.2	—	V
Sync. Detection Output Voltage Low	V <sub>D<sub>EL</sub></sub>	—	0	0.1	V

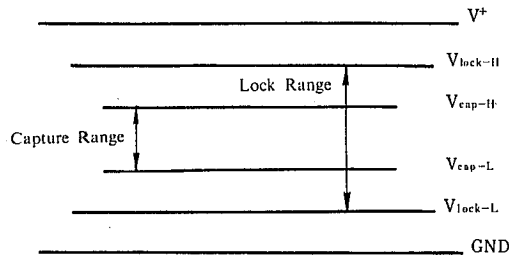
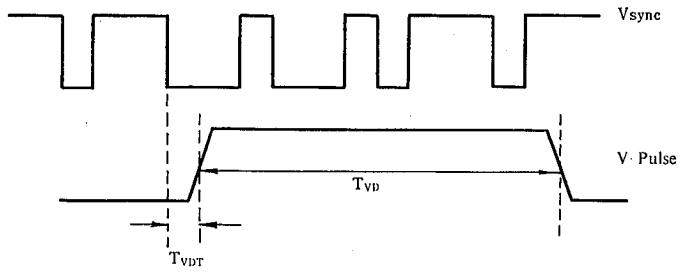
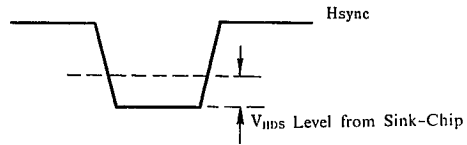
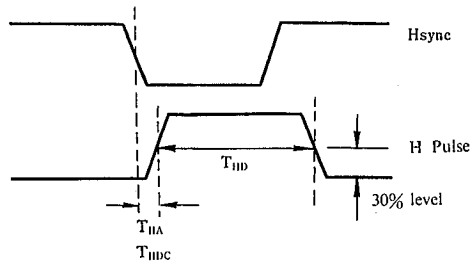
■ TEST CIRCUIT



## ■ ELECTRICAL PARAMETER TEST METHOD

Test Circuit:

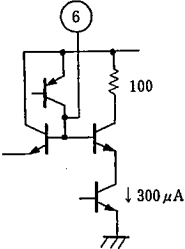
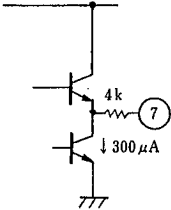
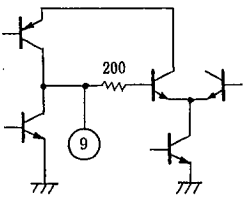
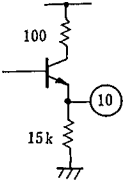
PARAMETERS	SW-1	SW-2	SW-3	TEST CONDITION
Operating Current	A	A	A	No input signal. DC current at Pin15.
AFC Free-run Frequency	A	A	A	No input signal. Video-IN terminal to GND. Frequency at Pin16.
AFC Pulse Width	A	A	A	No input signal. Output Pulse width at pin16. (Note 1)
AFC Output Delay Time	A	A	A	Input 2V <sub>P-P</sub> video signal on Video-IN terminal. Delay time between input and AFC output signal. (Note 1)
AFC Lock Range	A	A	A	Operating frequency range of AFC output when the input pulse signal frequency with 5 μsec pulse width at Video-IN terminal changes.
AFC Capture Range	A	A	A	Frequency range when signal changes from AFC unlock condition to lock.
AFC Output Voltage	A	A	A	Output voltage at Pin16 in condition of load resistance R <sub>L</sub> = 10kΩ.
Sync. Signal Detection Level	A	A	A	Putting 2V <sub>P-P</sub> video signal on Video-IN terminal and reducing it to the level that pin5 output waveform is beginning to change. V <sub>HDS</sub> is the sink-chip level at that point. (Note 2)
Sync. Signal Detection Output Voltage	A	A	A	Output voltage at Pin5 with load resistance R <sub>L</sub> = 10kΩ.
Sync. Signal Detection Delay Time	A	A	A	2V <sub>P-P</sub> video signal at Video-IN terminal. Time difference between input(Pin5) and output(Pin6) waveform.
V <sub>SYNC</sub> Threshold Voltage High	B	A	A	Gradually increase DC voltage from 2V to 3V at V <sub>SYNC</sub> -IN terminal. DC input voltage when output voltage at Pin10 changes from LOW to HIGH state.
V <sub>SYNC</sub> Threshold Voltage Low	B	A	A	Gradually decrease DC voltage from 3V to 1V at V <sub>SYNC</sub> -IN terminal. DC input voltage when output voltage at Pin10 changes from HIGH to LOW state.
V <sub>SYNC</sub> Output Voltage	B	A	A	Output voltage at Pin10 with load resistance R <sub>L</sub> = 10kΩ.
V <sub>SYNC</sub> Pulse Width	A	A	A	Putting 2V <sub>P-P</sub> video signal on Video-IN terminal and measuring output pulse width at Pin10. (Note 3)
V <sub>SYNC</sub> Delay Time	A	A	A	Putting 2V <sub>P-P</sub> video signal on Video-IN terminal. Delay time between output at Pin10 and V <sub>SYNC</sub> at Pin6. (Note 3)
Sync. Detection Lock Voltage High	A	B	B	Increase DC voltage from 2V to 4V put on Sync-Det-IN terminal and measure its DC voltage when output voltage at Pin13 changes from HIGH to LOW. (Note 4)
Sync. Detection Lock Voltage Low	A	B	B	Decrease DC voltage from 2V to 1V put on Sync-Det-IN terminal and measure its DC voltage when output voltage at Pin13 changes from HIGH to LOW. (Note 4)
Sync. Detection Capture High	A	B	B	Decrease DC voltage from 3V to 1V put on Sync-Det-IN terminal and measure its DC voltage when output voltage at Pin13 changes from LOW to HIGH. (Note 4)
Sync. Detection Capture Low	A	B	B	Increase DC voltage from 1V to 2V put on Sync-Det-IN terminal and measure its DC voltage when output voltage at Pin13 changes from LOW to HIGH. (Note 4)
Sync. Detection Output Voltage	A	B	B	Output voltage at Pin13 with load resistance R <sub>L</sub> = 10kΩ.
Sync. Detection Output Voltage	A	B	B	Output voltage at Pin14 with load resistance R <sub>L</sub> = 10kΩ.



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## ■ PIN FUNCTION

PIN NO.	SYMBOL	FUNCTION	INSIDE EQUIVALENT CIRCUIT
1	VCO-OUT	Putting VCO output on ceramic resonator.	
2	VCO-FILTER	Deciding phase of ceramic resonator.	
3	AFC-FILTER	Low pass filter of AFC.	
4	AFC-IN	Input terminal of AFC. Putting composite synchronous signal on it.	
5	C. SYNC-OUT	Sync. signal Detection output	

PIN NO.	SYMBOL	FUNCTION	INSIDE EQUIVALENT CIRCUIT
6	VIDEO-IN	Input composite video signal.	
7	L. P. F	Low pass filter for chroma signal.	
8	GND	Ground.	
9	SYNC-INTEGR	Integrating composite synchronous signal and putting vertical synchronous reproducing circuit.	
10	VSYNC-OUT	Vertical synchronous output.	

PIN NO.	SYMBOL	FUNCTION	INSIDE EQUIVALENT CIRCUIT
11	M. M-TC	Deciding time constant of M. M. V. (monomulti vibrator)	
12	M. M-INTER	Smoothing M. M. V. output.	
13	SYNCDDET-OUT	Signal detective output.	
14	$\overline{\text{SYNCDDET-OUT}}$	Inversed output of Pin 13.	
15	V <sup>+</sup>	Power supply.	
16	AFC-OUT	AFC output.	

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## MEMO

[CAUTION]

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