

SYNCHRONOUS SEPARATION WITH AFC

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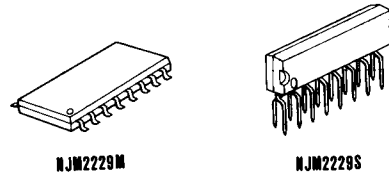
■ GENERAL DESCRIPTION

The NJM2229 has functions of getting the horizontal and vertical synchronous signal from the composit 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

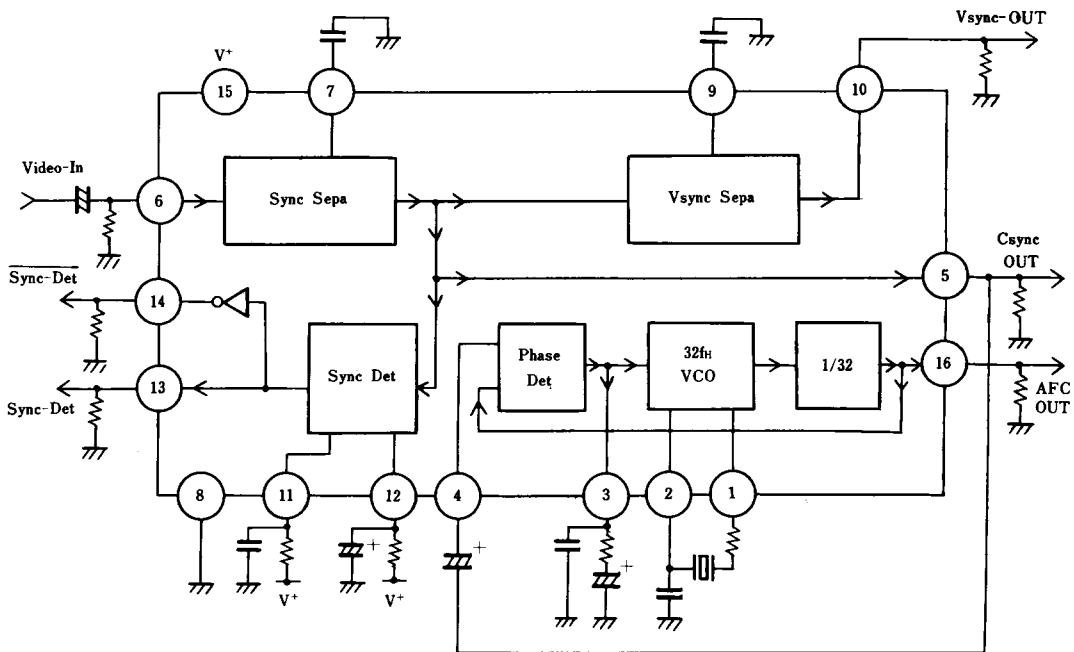
■ PACKAGE OUTLINE



■ RECOMMENDED OPERATING CONDITION

- Operating Voltage 4.7~5.3V

■ BLOCK DIAGRAM



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■ ABSOLUTE MAXIMUM RATINGS

(Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V ⁺	7	V
Power Dissipation	P _D	500	mW
Operating Temperature Range	T _{opr}	-20~+75	°C
Storage Temperature Range	T _{stg}	-40~+125	°C

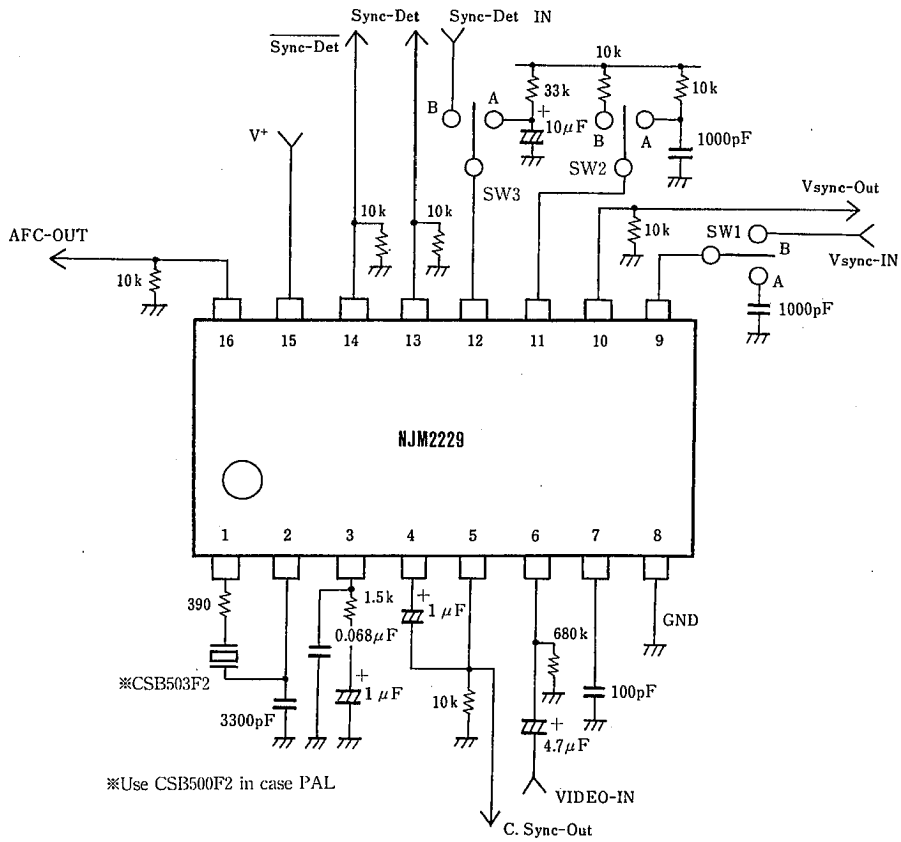
■ ELECTRICAL CHARACTERISTICS

(Ta=25°C, V⁺=5V)

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

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■ TEST CIRCUIT



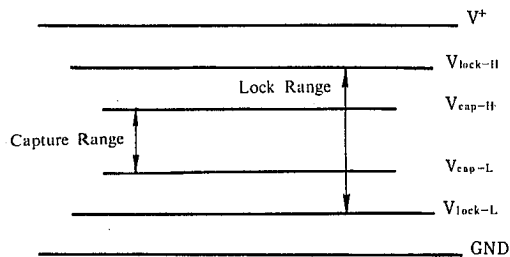
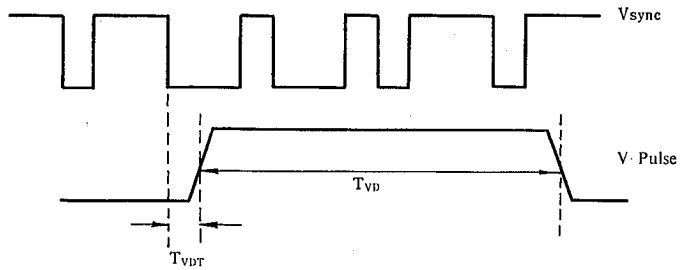
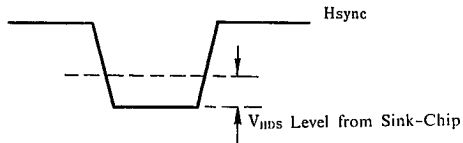
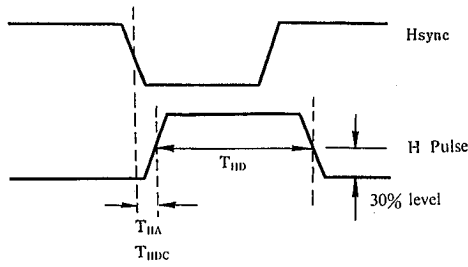
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■ ELECTRICAL PARAMETER TEST METHOD

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 _{P-P} 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 _L = 10kΩ.
Sync. Signal Detection Level	A	A	A	Putting 2V _{P-P} video signal on Video-IN terminal and reducing it to the level that pin5 output waveform is beginning to change. V _{HDS} 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 _L = 10kΩ.
Sync. Signal Detection Delay Time	A	A	A	2V _{P-P} video signal at Video-IN terminal. Time difference between input(Pin5) and output(Pin6) waveform.
V _{SYNC} Threshold Voltage High	B	A	A	Gradually increase DC voltage from 2V to 3V at V _{SYNC-IN} terminal. DC input voltage when output voltage at Pin10 changes from LOW to HIGH state.
V _{SYNC} Threshold Voltage Low	B	A	A	Gradually decrease DC voltage from 3V to 1V at V _{SYNC-IN} terminal. DC input voltage when output voltage at Pin10 changes from HIGH to LOW state.
V _{SYNC} Output Voltage	B	A	A	Output voltage at Pin10 with load resistance R _L = 10kΩ.
V _{SYNC} Pulse Width	A	A	A	Putting 2V _{P-P} video signal on Video-IN terminal and measuring output pulse width at Pin10. (Note 3)
V _{SYNC} Delay Time	A	A	A	Putting 2V _{P-P} video signal on Video-IN terminal. Delay time between output at Pin10 and V _{SYNC} 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 _L = 10kΩ.
Sync. Detection Output Voltage	A	B	B	Output voltage at Pin14 with load resistance R _L = 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	

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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.	

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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 ⁺	Power supply.	
16	AFC-OUT	AFC output.	

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MEMO

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