

VIDEO SUB-CARRIER SIGNAL DOUBLER/TRIPLER

■ GENERAL DESCRIPTION

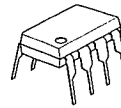
The NJM2228 is a doubler/triplex oscillator based on video sub-carrier frequency using PLL circuit technique.

The NJM2228 is suit to standard clock generator of CCD clock and onscreen display.

■ FEATURES

- Operating Voltage (+4V~+6V)
- Good input sensitivity  $V_{IN}=120mV$  MIN.
- Maximum oscillation frequency 20MHz.
- Switch function of doubler / tripler
- Package Outline DIP8, DMP8, SIP8
- Bipolar Technology

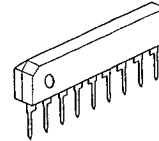
■ PACKAGE OUTLINE



NJM2228D



NJM2228M

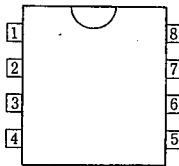


NJM2228S

■ APPLICATION

- VCR Video Camera AV-TV Video Disc Player

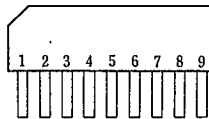
■ PIN CONFIGURATION



NJM2228D  
NJM2228M

PIN FUNCTION

1.  $f_{sc}$  Input
2. Detection Filter
3. GND
4. Oscillator Output
5. Oscillator C
6.  $V^+$
7. Oscillator R
8. 2/3 Switch

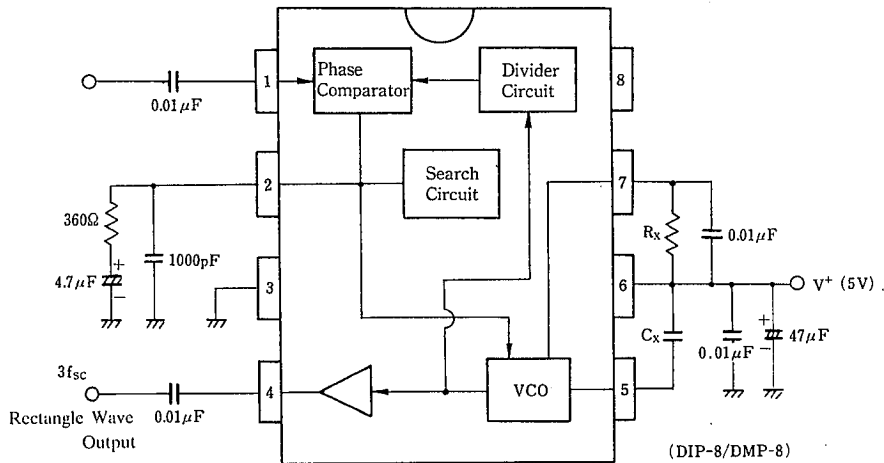


NJM2228S

PIN FUNCTION

1.  $f_{sc}$  Input
2. Detection Filter
3. GND 1
4. Oscillator Output
5. GND 2
6. Oscillator C
7.  $V^+$
8. Oscillator R
9. 2/3 Switch

■ BLOCK DIAGRAM & EXTERNAL COMPONENTS



There is stray capacity assembled on PC board, and so select  $R_x$ ,  $C_x$  to the value which pin 2 voltage (search voltage at VCO locked) becomes about 2V.  $C_x > 5pF$ ,  $5.6k > R_x > 3.3k\Omega$ .

	NTSC		PAL	
	3 multiplier	2 multiplier	3 multiplier	2 multiplier
$C_x$	10 p	22 p	8 p	15 p
$R_x$	4.7 k	4.6 k	3.9 k	4.6 k

## ■ ABSOLUTE MAXIMUM RATINGS

(Ta=25°C)

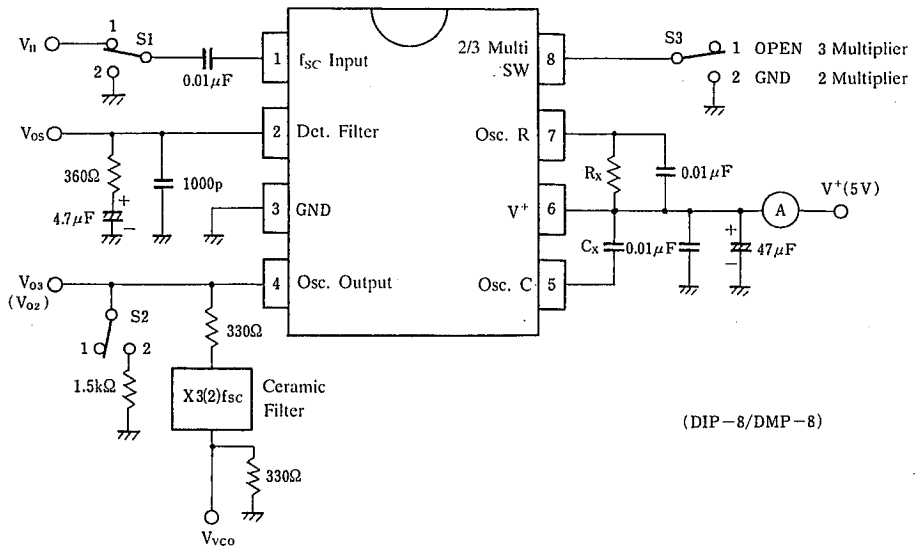
PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V*	8	V
Input Voltage	Io	GND-0.3~V*+0.3	V
Power Dissipation	Pd	(DIP8) 500	mW
		(DMP8) 300	mW
		(SIP8) 500	mW
Operating Temperature Range	ToPr	-20~+75	°C
Storage Temperature Range	Tstg	-40~+125	°C

## ■ ELECTRICAL CHARACTERISTICS

(V\*=5V, Ta=25°C)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Operating Voltage	V*		4.7	5.0	5.3	V
Operating Current	Icc	S1=1, S2=1, input Vi1 : 3.58MHz Count Current	7	10	13	mA
(3 Multiplier Oscillator)		(S3=1 apply below abbreviation)				
Input Voltage Swing Range	Vfsc3	S1=1, S2=1, input Vi1 : 3.58 or 4.43MHz (sine wave), guaranteed Vi1 voltage range.	0.12	1.0	2.0	Vp-p
Input Sensitivity	Vls3	S1=1, S2=1, input Vi1 : 3.58 or 4.43MHz (sine wave), actually tested minimum Vi1 voltage.	—	0.05	—	Vp-p
VCO Oscillation Swing	Vo3	S1=1, S2=2, input Vi1 : 3.58MHz, 1.0Vp-p. Vo3 Oscillation Swing	0.7	0.9	1.1	Vp-p
fsc Leakage	Lfsc3	S1=1, S2=2, input Vi1 : 3.58MHz, Vo3 (fsc level/3fsc level)	—	-50	—	dB
3fsc Output Duty	D3fsc	S1=1, S2=2, input Vi1 : 3.58MHz, 1.0Vp-p, Vos output signal duty.	45	50	55	%
(2 Multiplier Oscillator)		(S3=2 apply below)				
Input Voltage Swing Range	Vfsc2	S1=1, S2=1, input Vi1 : 3.58 or 4.43MHz (sine wave), guaranteed Vi1 voltage range.	0.12	1.0	2.0	Vp-p
Input Sensitivity	Vls2	S1=1, S2=1, input Vi1 : 3.58 or 4.43MHz (sine wave), actually tested minimum Vi1 voltage.	—	0.05	—	Vp-p
VCO Oscillation Swing	Vo2	S1=1, S2=2, input Vi1 : 3.58MHz, 1.0Vp-p, Vo2 Oscillation Swing	0.7	0.9	1.1	Vp-p
fsc Leakage	Lfsc2	S1=1, S2=2, input Vi1 : 3.58MHz, 1.0Vp-p, Vo2 (fsc level/2fsc level)	—	-50	—	dB
2fsc Output Duty	D2fsc	S1=1, S2=2, input Vi1 : 3.58MHz, 1.0Vp-p, Vo2 Output signal duty.	45	50	55	%

## ■ TEST CIRCUIT



(DIP-8/DMP-8)

(note 1):  $R_x$ ,  $C_x$  accuracy: less than  $\pm 1\%$ .

(note 2):  $C_x$  is not considered pin 5 stray capacitance. VCO free-run frequency is affected by stray capacitance of P.C board, socket and others.

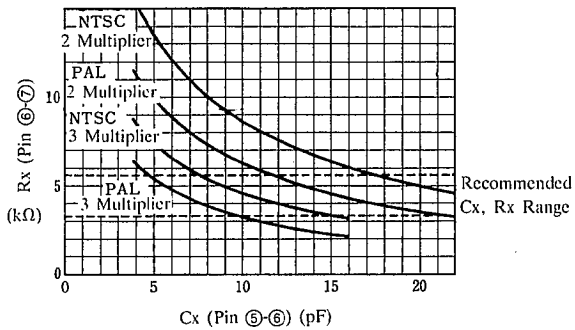
(note 3): The NJM2228 is produced by high frequency wafer process and some of pin may be weak against surge voltage.

(note 4): Pin 2 filter must be connected to ground.

■ TYPICAL CHARACTERISTICS

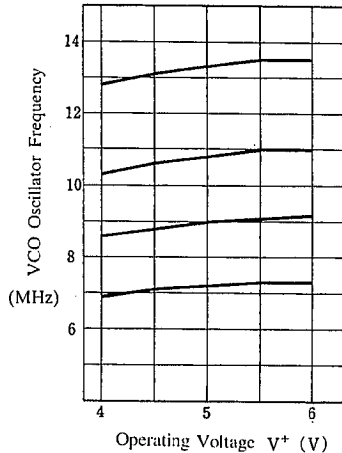
VCO Oscillator Frequency

( $V_{OS}=2V$ ,  $T_a=25^\circ C$ )



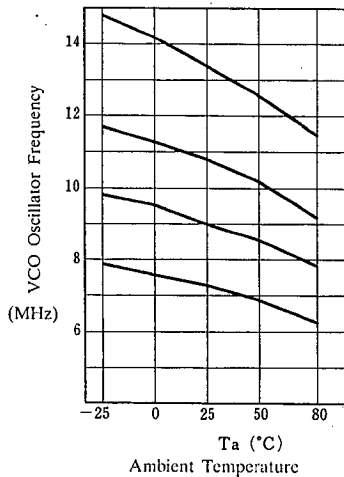
VCO Oscillator Frequency

(No input signal,  $V_{OS}=2.0V$ ,  $T_a=25^\circ C$ )



VCO Oscillator Frequency

(No input signal,  $V_{OS}=2.0V$ )



## MEMO

[CAUTION]

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