

## FM FRONT-END

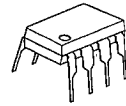
### ■ GENERAL DESCRIPTION

The NJM2236 is designed for FM front end application, which is suitable to portable radio, radio cassette, clock radio and TV with FM radio. Comparing with conventional types, supply voltage dependence, overload characteristics and spurious radiation characteristics are improved.

### ■ FEATURES

- Wide Operating Voltage (1.6~6.0V)
- Excellent Supply Voltage Dependence of Local Oscillator
- Improved Intermodulation Characteristics by Duple Balanced Mixer Circuit
- Low Spurious Radiation
- Build-In Clamping Diode for the Mixer Output
- Local Oscillator Voltage : NJM2236A (Typ.80mV)  
: NJM2236 (Typ.110mV)
- Package Outline DIP8, DMP8, SIP8
- Bipolar Technology

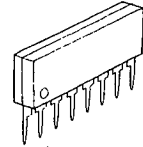
### ■ PACKAGE OUTLINE



NJM 2236 D/AD

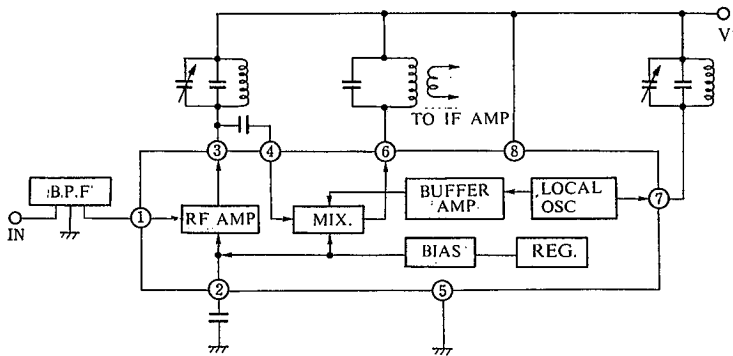


NJM 2236 M/AM



NJM 2236 AL

### ■ BLOCK DIAGRAM



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# NJM2236/2236A

## ■ ABSOLUTE MAXIMUM RATINGS

(Ta=25°C)

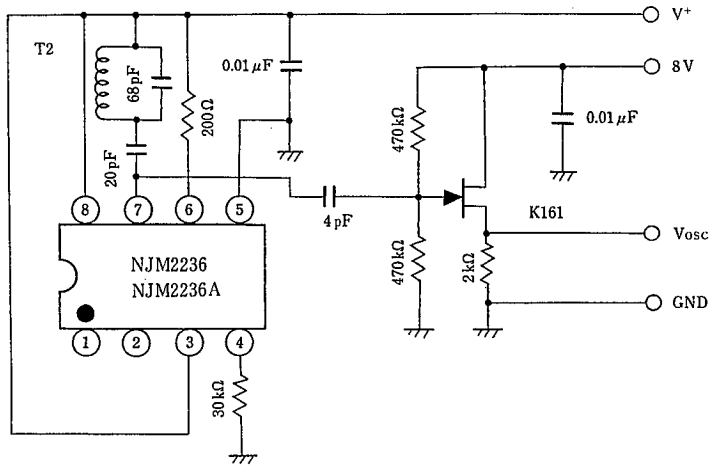
PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V <sup>+</sup>	8	V
Power Dissipation	P <sub>D</sub>	(DIP8) 500	mW
		(DMP8) 300	mW
		(DIP8) 800	mW
Operating Temperature Range	T <sub>opr</sub>	-20~75	°C
Storage Temperature Range	T <sub>stg</sub>	-40~125	°C

## ■ ELECTRICAL CHARACTERISTICS

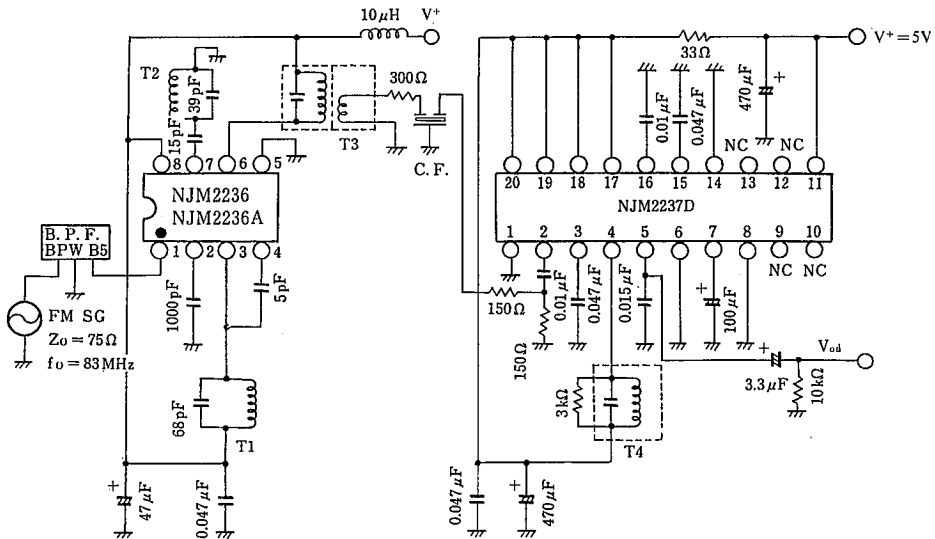
(V<sup>+</sup>=5V, [M-Type V<sup>+</sup>=3V], f=83MHz, f<sub>m</sub>=1kHz, Δf=22.5kHz dev., Ta=25°C)

CHARACTERISTICS	SYMBOLS	CIRCUIT	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT		
Operating Current	I <sub>CC</sub>	2	V <sub>IN</sub> =0	—	5.2	8.0	mA		
-3dB Limiting Sensitivity	V <sub>IN(lim)</sub>	2		—	3.0	7.0	dBμ		
Quiescent Sensitivity	Q <sub>S</sub>	2		—	11.0	—	dBμ		
Conversion Gain	G <sub>C</sub>	—		—	31	—	dB		
Local OSC Voltage	NJM2236A	V <sub>OSC</sub>	1	f <sub>osc</sub> =60MHz	40	80	120	mVrms	
	NJM2236				70	110	180	mVrms	
1 Pin Parallel Input Impedance	Resistance	r <sub>ip1</sub>	3	f=83MHz	—	57	—	Ω	
	3 Pin Parallel Output Impedance	Resistance			r <sub>op3</sub>	3	—	25	—
Capacitance		c <sub>op3</sub>	—		2.0		—	pF	
4 Pin Parallel Input Impedance	Resistance	r <sub>ip4</sub>	3		—	2.7	—	kΩ	
	Capacitance	c <sub>ip4</sub>			—	3.3	—	pF	
6 Pin Parallel Output Impedance	Resistance	r <sub>op6</sub>	3		f=10.7MHz	—	100	—	kΩ
	Capacitance	c <sub>op6</sub>				—	4.8	—	pF
Local OSC Stop Voltage		V <sub>stop</sub>	1			—	0.9	1.3	V

■ TEST CIRCUIT 1



■ TEST CIRCUIT 2



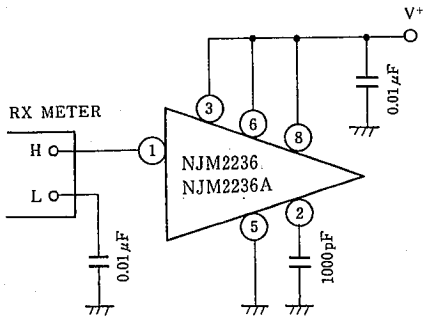
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# NJM2236/2236A

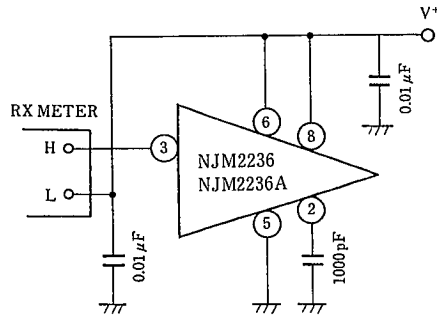
## TEST CIRCUIT 3

Input, Output Impedance

(1) rip 1

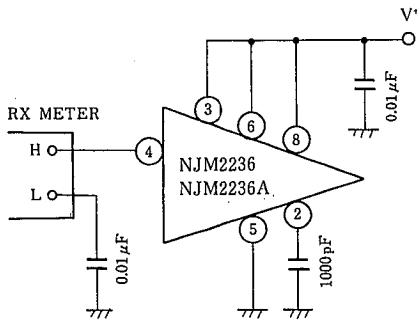


(2) rop 3, cop 3

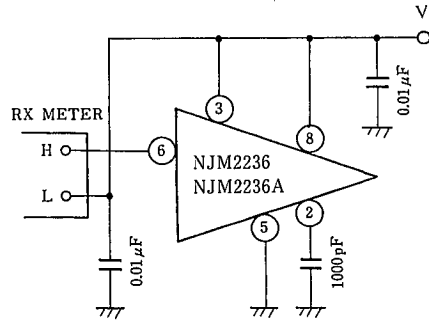


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(3) rip 4, cip 4

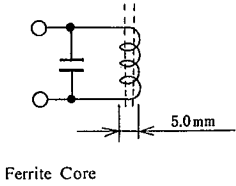
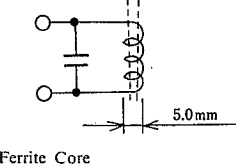
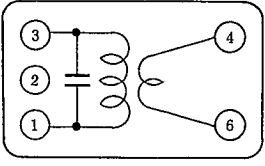
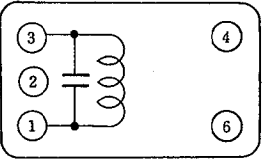


(4) rop 6, cop 6



■ TEST CIRCUIT COIL DATA:

(Japan Band for 76.0MHz to 108.0MHz)

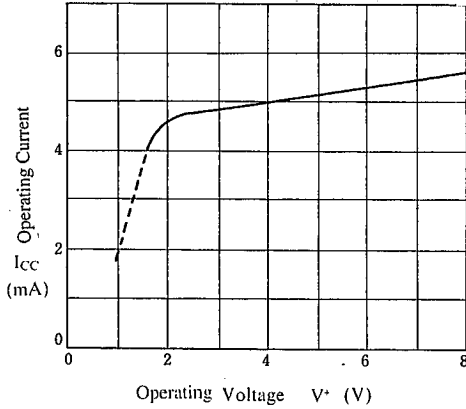
COIL	fo	Qo	TURNS	Co	
T 1 RF Coil	100MHz	100	0.7mmφ 2 $\frac{1}{4}$ (Japan Band)  SUMIDA 0295-057	22pF  (ext.)	 Ferrite Core
T 2 osc Coil	100MHz	100	0.7mmφ 2 $\frac{1}{2}$ (Japan Band)  SUMIDA 0295-056	30pF  (ext.)	 Ferrite Core
T 3 FM IFT Coil	10.7MHz	①-③ 90	①-③ 11T ④-⑥ 2T Wire : 0.12mmφ UEW SUMIDA 2153-414-041	①-③ 82pF	 Bottom View
T 4 FM DET Coil	10.7MHz	①-③ 100	①-③ 10T Wire : 0.12mmφ UEW SUMIDA 2153-4095-331	①-③ 150pF	 Bottom View

- Band Pass Filter (B. P. F.) : SOSHIN ELECTRIC Co., LTD. ...BPWB5
- Tuning Capacitor : ALPS ELECTRIC Co., LTD. ...VCB41E10I

## TYPICAL CHARACTERISTICS

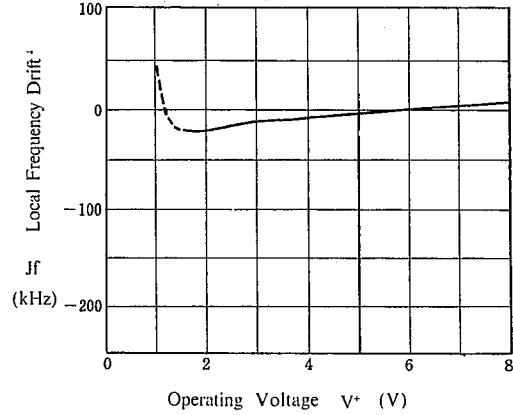
### Operating Current vs. Operating Voltage

( $V_{IN}=0, T_a=25^\circ\text{C}$ )



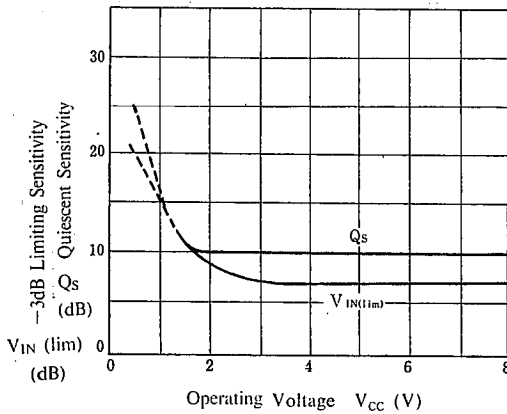
### Local Frequency Drift vs. Operating Voltage

( $V_{IN}=0, T_a=25^\circ\text{C}$ )



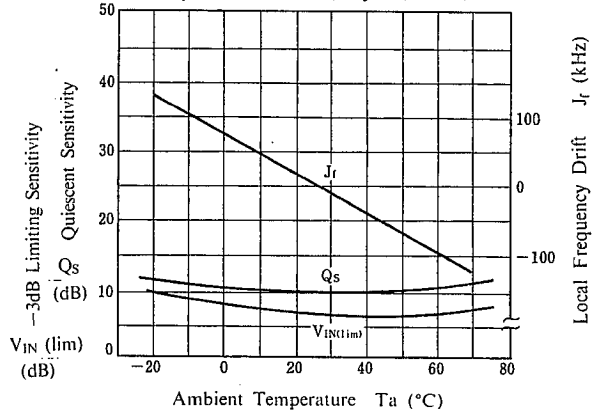
### $V_{IN}(\text{lim}), Q_s$ vs. $V_{CC}$

( $f=63\text{MHz}, f_m=1\text{kHz}, J_f=22.5\text{kHzdev.}, T_a=25^\circ\text{C}$ )



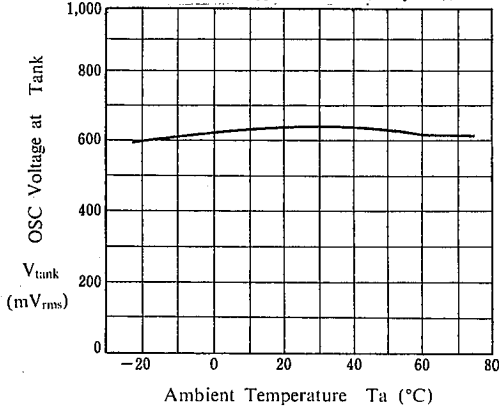
### $V_{IN}(\text{lim}), Q_s, J_f$ vs. $T_a$

( $V^*=5\text{V}, f=83\text{MHz}, f_m=1\text{kHz}, J_f=22.5\text{kHzdev. (only IC)}$ )



### $V_{\text{tank}}$ vs. $T_a$

( $V^*=5\text{V}, f_{\text{osc}}=72.3\text{MHz (Only IC)}$ )



## MEMO

[CAUTION]

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