

Mixer and Oscillator for TV Tuner

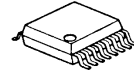
DESCRIPTION

The NJM2540/43 are mixer/oscillator especially designed for TV tuners and consists of mixers, oscillators, IF amplifier and OSC buffer for VHF, UHF and CATV band, built into one chip.

The NJM2540/43 packaging in SSOP16 are suitable for small-sized tuners.

The NJM2543 is the reverse pin assignment type of the NJM2540.

PACKAGE OUTLINE

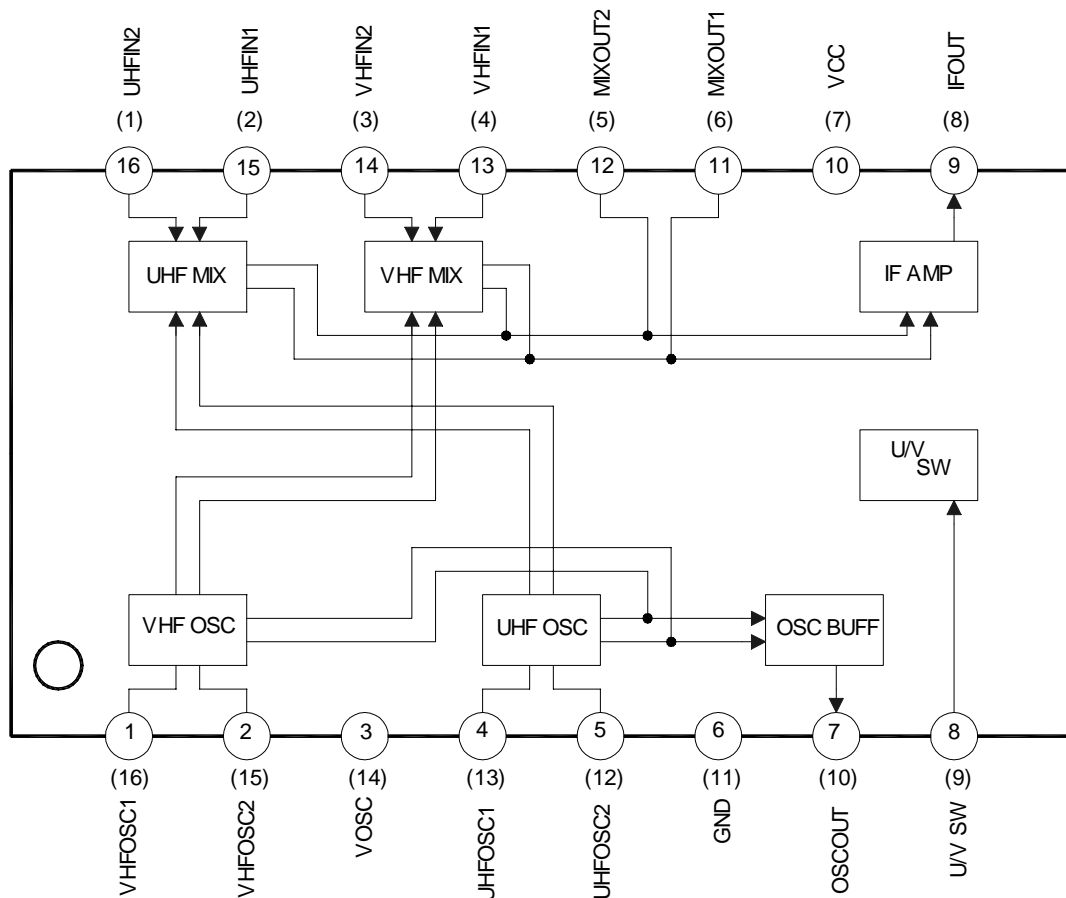


NJM2540V/NJM2543V

FEATURES

- Operating Voltage 5V
- Mixers, Oscillators, IF AMP and OSC buffer on chip
- Bipolar Technology
- Package Outline: SSOP16

BLOCK DIAGRAM



(Note)

Pin numbers in circle are for NJM2540

Pin numbers in parenthesis are for NJM2543

NJM2540/2543

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■ ABSOLUTE MAXIMUM RATINGS

($T_A=25^\circ\text{C}$)

Parameter	Symbol	Ratings	Unit
Supply Voltage	V_{CC}	7	V
Power Dissipation	P_D	*550	mW
Operating Temperature Range	T_{opr}	-20 to +75	$^\circ\text{C}$
Storage Temperature Range	T_{stg}	-40 to +150	$^\circ\text{C}$

* Test IC soldered on PC board

■ RECOMMENDED OPERATING VOLTAGE RANGE

($T_A=25^\circ\text{C}$)

Parameter	Condition	Symbol	Min.	Typ.	Max.	Unit
Operating Voltage		V_{CC}	4.5	5.0	5.5	V

■ ELECTRICAL CHARACTERISTICS (Note 1)

($V_{CC}=5\text{V}$, $T_A=25^\circ\text{C}$, $I_F=45.75\text{MHz}$)

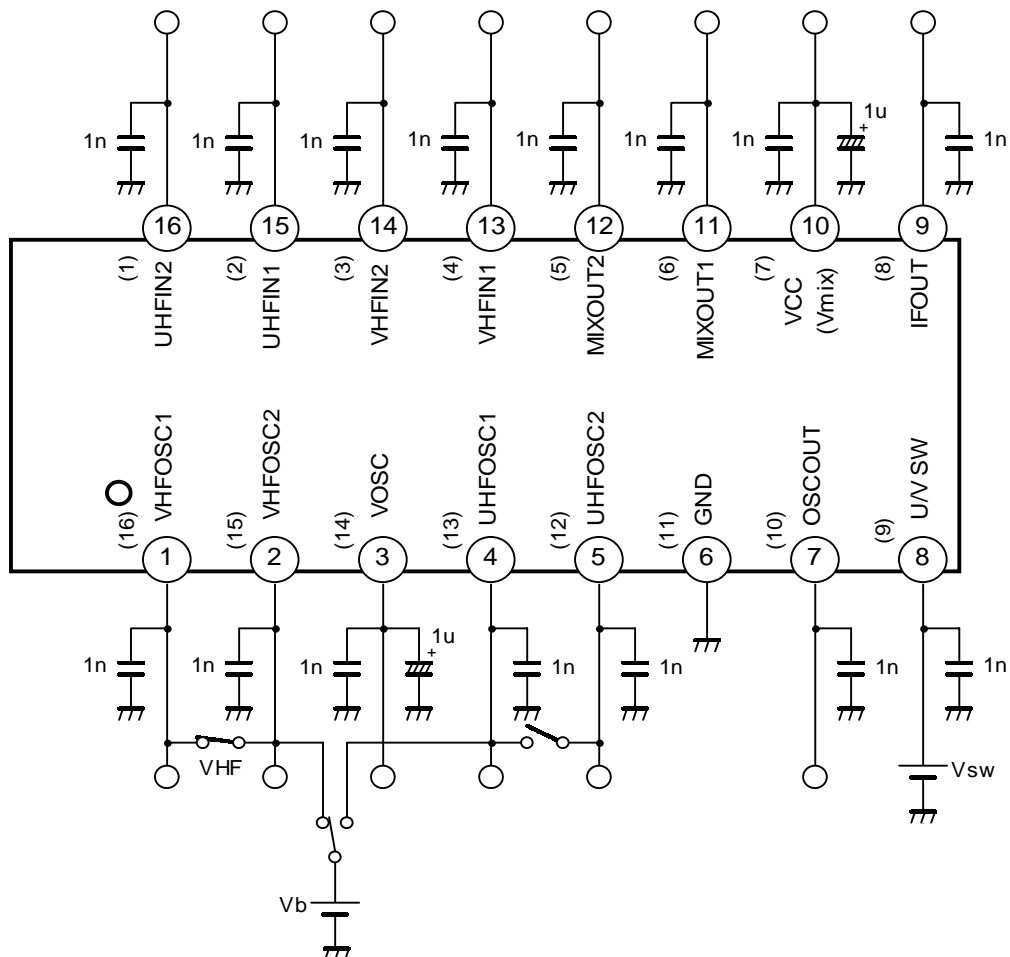
Parameter	Condition	Symbol	Min.	Typ.	Max.	Unit
Operating Current	VHF OSC only, No RF input	I_{CC1}	24	41	56	mA
Operating Current	UHF OSC only, No RF input	I_{CC2}	25	42	57	mA
Conversion Gain	VHF OSC only $f_{RF}=55.25$ to 361.25MHz , -50dBm	Ga1	-	26	-	dB
Conversion Gain	VHF OSC only $f_{RF}=55.25$ to 361.25MHz , -50dBm	Ga2	-	30	-	dB
PCS Beat 1	VHF OSC only Input Level: $F_p=F_c=F_s$ IF Output level: -10dBm	PCS1	-	51	-	dB
PCS Beat 2	UHF OSC only Input Level: $F_p=F_c=F_s$ IF Output level: -10dBm	PCS2	-	50	-	dB
Noise Figure 1	VHF OSC only $F_{RF}=55.25$ to 361.25MHz	NF1	-	13	-	dB
Noise Figure 2	VHF OSC only $F_{RF}=55.25$ to 361.25MHz	NF2	-	11	-	dB
OSC Output Level	$F_{local}=101$ to 847MHz	OUTosc	-	-12	-	dBm
Maximum IF Output Level	$F_{local}=55.25$ to 801.25MHz	OUTif	-	10	-	dBm

(Note 1) Because AC characteristics largely depends on application circuit, these parameters are specified by the DC characteristics as shown in next page.

■ DC ELECTRICAL CHARACTERISTICS ($V_{CC}=V_{osc}=V_{mix}=5V, T_A=25^{\circ}C, V_b=2.92V$)

Parameter	Condition	Symbol	Min.	Typ.	Max.	Unit
Pin3 Current 1:UHF	$V_{sw}=2v$	I_{osc1}	9	-	17.6	mA
Pin3 Current 2:VHF	$V_{sw}=0.5v$	I_{osc2}	8.7	-	16.8	mA
Pin7 Voltage 1:UHF	$V_{sw}=2v$	$V_{oscout1}$	3.45	-	3.95	V
Pin7 Voltage 2:VHF	$V_{sw}=0.5v$	$V_{oscout2}$	3.45	-	3.95	V
Pin9 Voltage	$V_{sw}=2v$	V_{ifout}	2	-	2.5	V
Pin10 Current	$V_{sw}=2v$	I_{cc}	18.5	-	37.5	mA
Pin11 Voltage 1:UHF	$V_{sw}=2v$	$V_{mixouta1}$	3.6	-	4.15	V
Pin11 Voltage 2:VHF	$V_{sw}=0.5v$	$V_{mixouta2}$	3.6	-	4.15	V
Pin12 Voltage 1:UHF	$V_{sw}=2v$	$V_{mixoutb1}$	3.6	-	4.15	V
Pin12 Voltage 2:VHF	$V_{sw}=0.5v$	$V_{mixoutb2}$	3.6	-	4.15	V
Pin1 Voltage	$V_{sw}=0.5v$	V_{vosc1}	2.65	-	3.2	V
Pin2 Voltage	$V_{sw}=0.5v$	V_{vosc2}	1.95	-	2.5	V
Pin4 Voltage	$V_{sw}=2v$	V_{uosc1}	1.95	-	2.45	V
Pin5 Voltage	$V_{sw}=2v$	V_{uosc2}	2.6	-	3.2	V
Pin2 Current	$V_{sw}=0.5v, 2Pin=V_{vosc1}, 1-2Pin Short$	I_{vosc}	2.4	-	4.6	mA
Pin4 Current	$V_{sw}=2v, 4Pin=V_{uosc1}, 4-5Pin Short$	I_{uosc}	2.9	-	5.7	mA
Pin13 Voltage	$V_{sw}=0.5v$	V_{vmixa}	1.8	-	2.25	V
Pin14 Voltage	$V_{sw}=0.5v$	V_{vmixb}	1.8	-	2.25	V
Pin15 Voltage	$V_{sw}=2v$	V_{umixa}	1.8	-	2.25	V
Pin16 Voltage	$V_{sw}=2v$	V_{umixb}	1.8	-	2.25	V

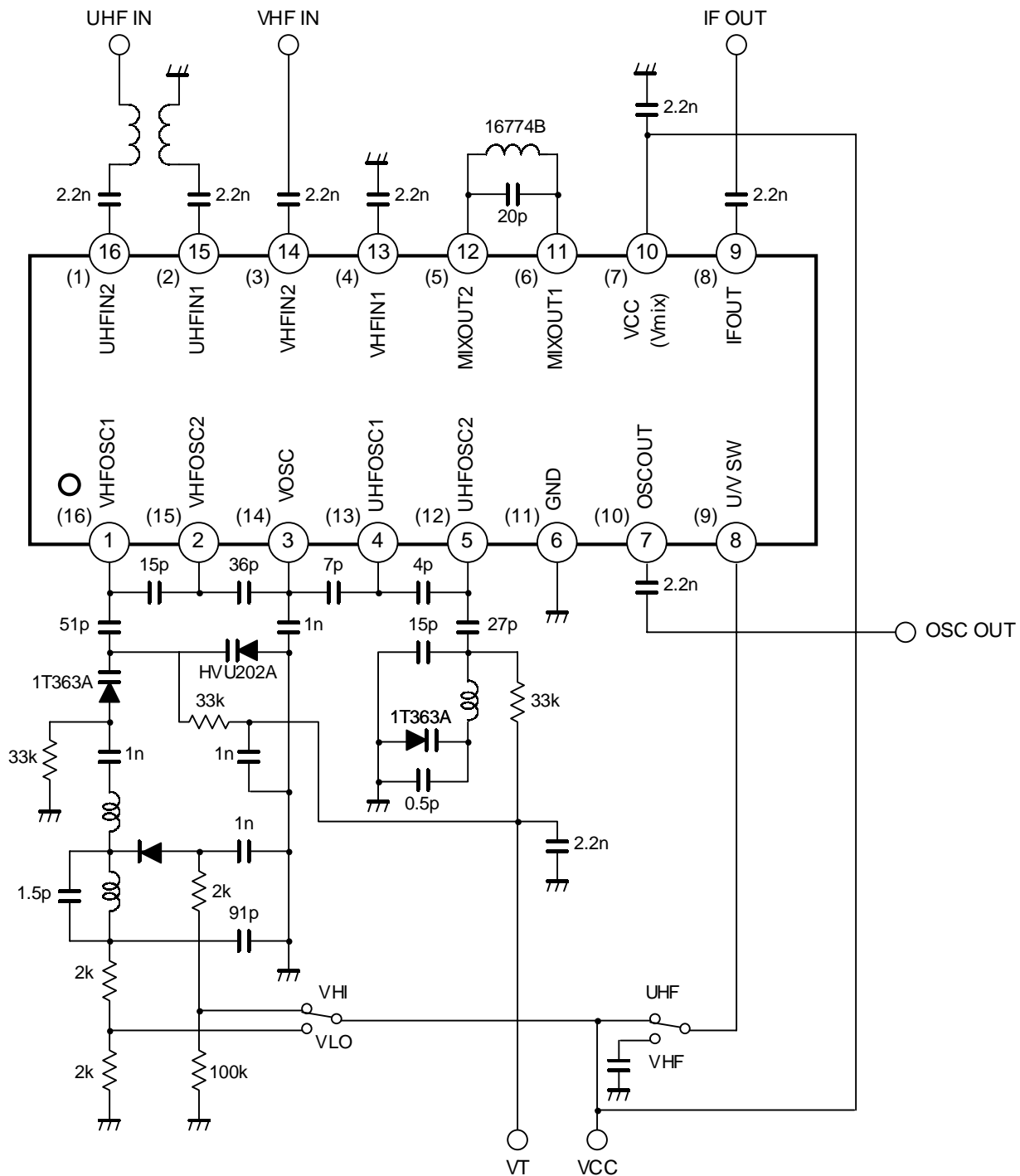
■ DC TEST CIRCUIT



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■ AC TEST CIRCUIT



■ TERMINAL CHARACTERISTICS

No.	Symbol	Typ.DC Voltage (V)	Equivalent Circuit	Function
1 (16)	VHFOSC1	VHF 2.9		VHF Oscillator
2 (15)	VHFOSC2	VHF 2.2		
3 (14)	VOSC	-		Oscillator Power Supply
4 (13)	UHFOSC1	UHF 2.1		UHF Oscillator
5 (12)	UHFOSC2	UHF 2.9		
6 (11)	GND	-		GND
7 (10)	OSCOUT	3.7		OSC Output
8 (9)	U/V SW	-		UHF/MHF Select Switch UHF at Vcc VHF at GND
9 (8)	IFOUT	2.2		IF Output

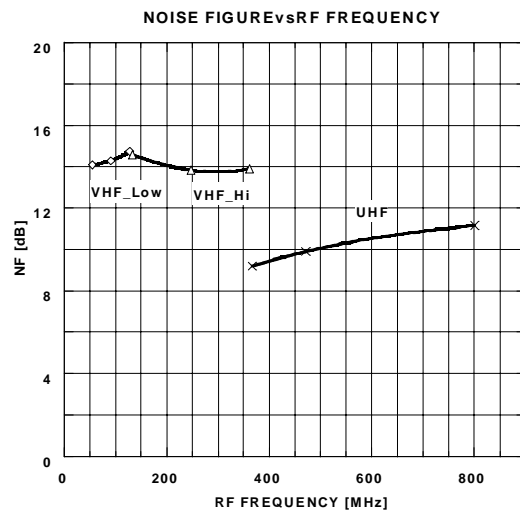
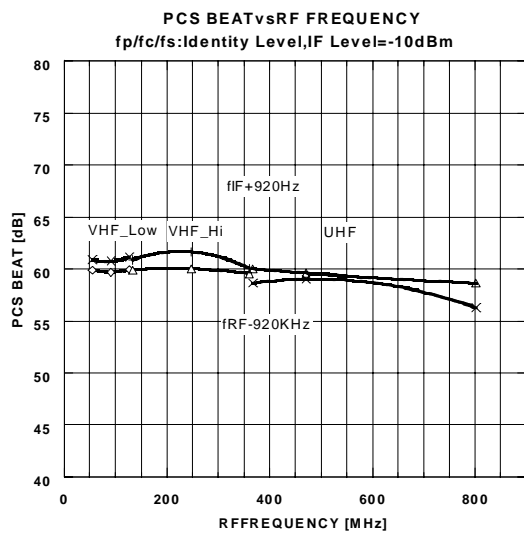
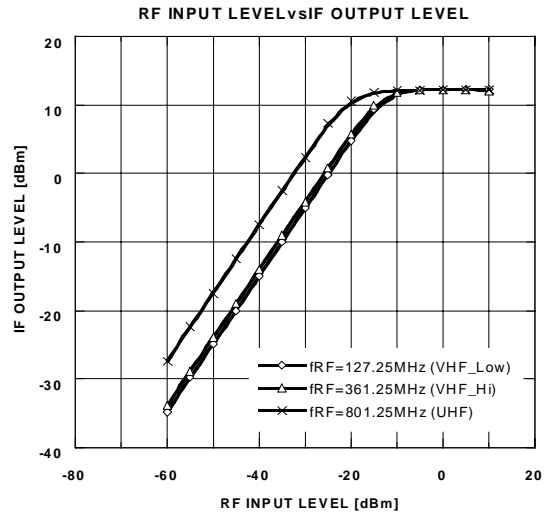
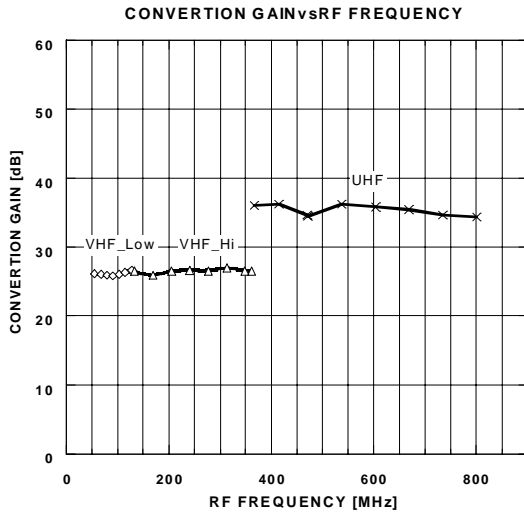
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No.	Symbol	Typ.DC Voltage (V)	Equivalent Circuit	Function
10 (7)	VCC	-		Power Supply Except for Oscillator
11 (6)	MIXOUT1	3.9		Mixer Output
12 (5)	MIXOUT2	3.9		
13 (4)	VHFIN1	VHF 2.0		RF Input for VHF band
14 (3)	VHFIN2	VHF 2.0		
15 (2)	UHFIN1	UHF 2.0		RF Input for UHF band
16 (1)	UHFIN2	UHF 2.0		

TYPICAL CHARACTERISTICS

$V_{CC}=5V, f_{IF}=45.75MHz, T_A=25^{\circ}C$



MEMO

[CAUTION]

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