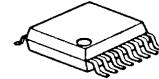


RF Modulator for VHF Band

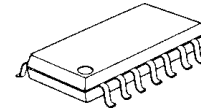
DESCRIPTION

The NJM2536A is a RF modulator IC especially designed for VHF band RF modulator and consists of video clamp circuit, white clip circuit, video AM modulator and audio FM modulator, built into one chip.

PACKAGE OUTLINE



NJM2536AV

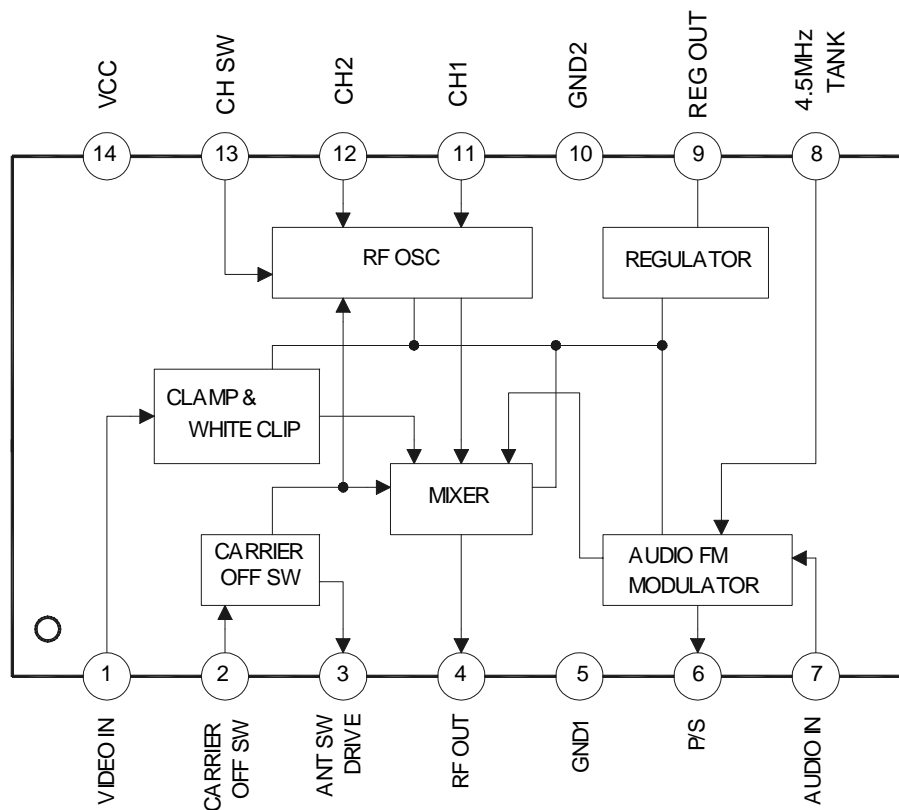


NJM2536AM

FEATURES

- Operating Voltage 5V
- Picture-to-sound ratio is adjustable
- VHF Oscillator on chip
- Carrier-off switch function on chip
- Regulator on chip
- Bipolar Technology
- Package Outline:DMP/SSOP14

BLOCK DIAGRAM



NJM2536A

■ ABSOLUTE MAXIMUM RATINGS

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

| Parameter | Symbol | Ratings | Unit |
|-----------------------------|-----------|------------------|------------------|
| Supply Voltage | V_{CC} | 7 | V |
| Power Dissipation | P_D | 300 | mW |
| Input Voltage | V_I | -0.3 to V_{CC} | V |
| Operating Temperature Range | T_{opr} | -20 to +75 | $^\circ\text{C}$ |
| Storage Temperature Range | T_{stg} | -40 to +125 | $^\circ\text{C}$ |

■ 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

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

| Parameter | Condition | Symbol | Min. | Typ. | Max. | Unit |
|--|--|------------|------|---------|------|--------|
| Operating Current | No video/audio input signal, CARRIER OFF SW(Pin2)=5V | I_{CC} | 13.5 | 16.0 | 22.5 | mA |
| ANT SW DRIVE Output Voltage -1 | CARRIER OFF SW(Pin2)=5V $I_D=26\text{mA}$ | V_{ANT1} | 3.7 | 4.0 | 4.3 | V |
| ANT SW DRIVE Output Voltage -2 | CARRIER OFF SW(Pin2)=Open $V_{CC}=2\text{V}$ | V_{ANT2} | 0 | 0.065 | 0.1 | V |
| Video Output Level (Note 1) | Video input signal(Pin1)= $0.5V_{PP}$ | V_O | (83) | 86 | (89) | dBu |
| Video Modulation Depth (Note 1) | Video input signal(Pin1)= $0.5V_{PP}$ | mp | (70) | 76 | (82) | % |
| Video Limiter Modulation Depth (Note 1) | Video input signal(Pin1)= $1.0V_{PP}$ | mpmax | (85) | 94 | (98) | % |
| Differential Gain | Video input signal(Pin1)= $0.5V_{PP}$ Staircase | DG | - | ± 3 | - | % |
| Differential Phase | Video input signal(Pin1)= $0.5V_{PP}$ Staircase | DP | - | ± 3 | - | deg |
| Picture-to-sound Ratio (Note 1) | Video input signal(Pin1)= $0.5V_{PP}$ | PS | (11) | 13 | (15) | dB |
| Sound FM Modulation Sensitivity | Deviation of fs per 100mV | β_b | - | 0.51 | - | KHz/mV |
| Audio Distortion | Audio input signal(Pin7)= $0.05V_{PP}$ 1kHz sine wave | THD | - | 0.3 | - | % |
| Audio Signal-to-noise Ratio | Sound Modulation 60% 1kHz sine wave | ASN | - | 60 | - | dB |
| Maximum Sound FM Modulation | Audio input signal(Pin7)= $1.0V_{PP}$ 1kHz sine wave | msmax | - | 700 | - | % |

(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** ($V_{CC}=5V, Pin2=2.5V, T_A=25^{\circ}C$, otherwise noted. All measurements performed in the DC test circuit are shown in next page)

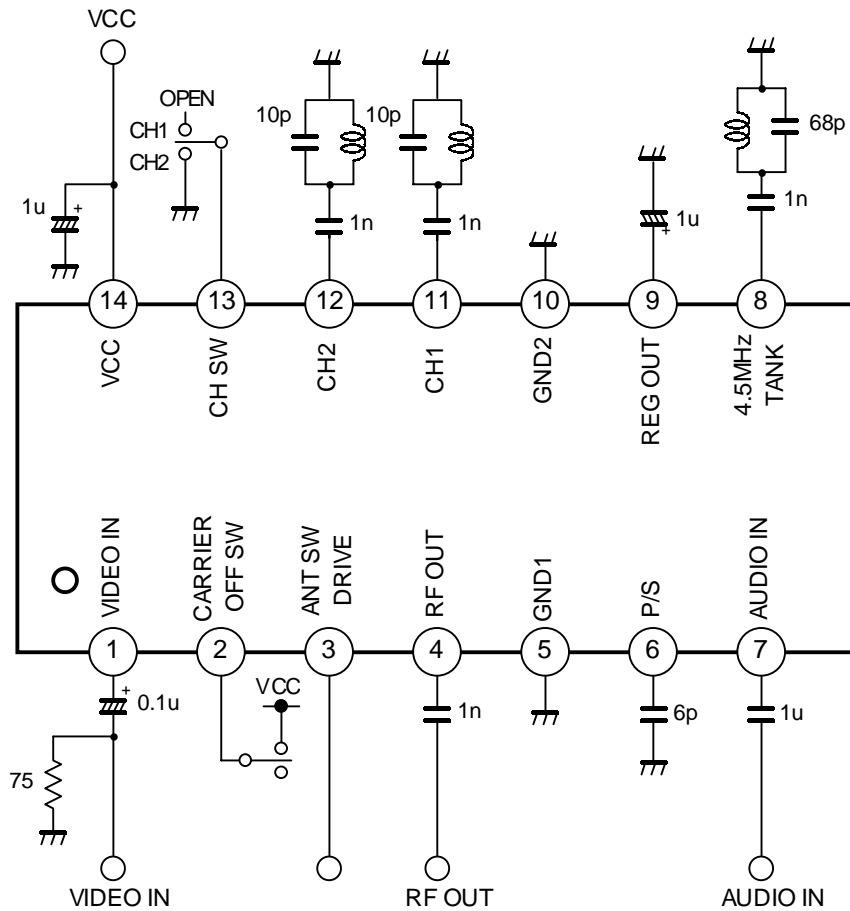
| Parameter | Condition (Note 2) | Symbol | Min. | Typ. | Max. | Unit |
|---|---|--------|------|------|-------|------|
| Video Output Signal Amplitude 1 | $Gw1=Gwh1-Gwl1$ | Gw1 | 62.4 | 85 | 124.5 | mV |
| Video Output Signal Amplitude 2 | $Gw2=Gwh2-Gwl2$ | Gw2 | 62.4 | 85 | 124.5 | mV |
| Video Modulation Depth | $Mp=((Gw1-Mw)/Gw1) \times 100$ where $Mw=Mwh-Mwl$ | Mp | 70 | 76 | 82 | % |
| Video Limiter Modulation Depth (Note 2) | $Mpmax=((Gw1-Wc)/Gw1) \times 100$ where $Wc=Wch-Wcl$ | Mpmax | 85 | 94 | 98 | % |
| Picture-to-sound Ratio | $Ps=Psh-Psl$ | Ps | -70 | -45 | -35.1 | mV |

(Note 2) Explanation of symbols

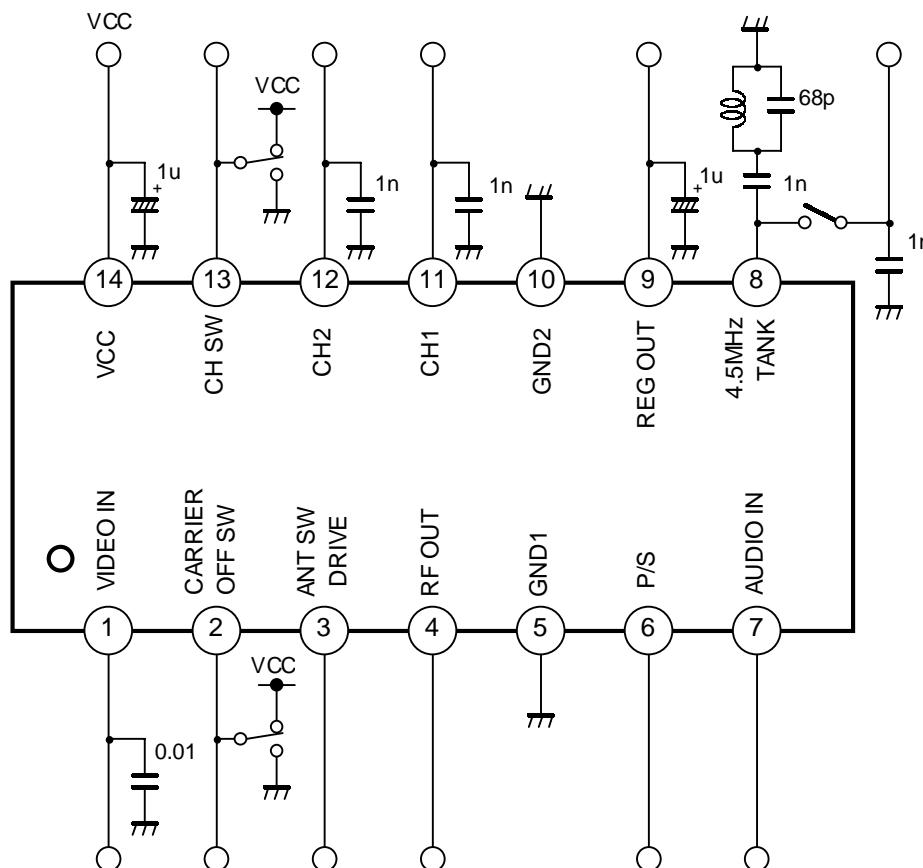
- V_v : VIDEO IN output voltage at Pin1
- V_{11h} : CH1 output voltage at Pin11
CH SW (Pin13) input = 2.5V
- V_{12h} : CH1 output voltage at pin12
CH SW (Pin13) input = 0.5V
- $Gwh1$: RF OUT output voltage at Pin4
VIDEO IN (Pin 1) input = V_v , CH1 (Pin11) = $V_{11h} + 0.15V$, CH SW (Pin13) input = 2.5V
- $Gwl1$: RF OUT output voltage at Pin4
VIDEO IN (Pin 1) input = V_v , CH1 (Pin11) = $V_{11h} - 0.15V$, CH SW (Pin13) input = 2.5V
- $Gwh2$: RF OUT output voltage at Pin4
VIDEO IN (Pin 1) input = V_v , CH2 (Pin12) = $V_{12h} + 0.15V$, CH SW (Pin13) input = 0.5V
- $Gwl2$: RF OUT output voltage at Pin4
VIDEO IN (Pin 1) input = V_v , CH2 (Pin12) = $V_{12h} - 0.15V$, CH SW (Pin13) input = 0.5V
- Mwh : RF OUT output voltage at Pin4
VIDEO IN (Pin 1) input = $V_v + 0.43V$, CH1 (Pin11) = $V_{11h} + 0.15V$, CH SW (Pin13) input = 2.5V
- Mwl : RF OUT output voltage at Pin4
VIDEO IN (Pin 1) input = $V_v + 0.43V$, CH1 (Pin11) = $V_{11h} - 0.15V$, CH SW (Pin13) input = 2.5V
- Wch : RF OUT output voltage at Pin4
VIDEO IN (Pin 1) input = $V_v + 0.8V$, CH1 (Pin11) = $V_{11h} + 0.15V$, CH SW (Pin13) input = 2.5V
- Wcl : RF OUT output voltage at Pin4
VIDEO IN (Pin 1) input = $V_v + 0.8V$, CH1 (Pin11) = $V_{11h} - 0.15V$, CH SW (Pin13) input = 2.5V
- VPs : P/S output voltage at Pin6
CARRIER OFF SW (Pin 2) input = 2.5V
- Psh : RF OUT output voltage at Pin4
P/S (Pin 6) input = $VPs + 0.2V$, CH1 (Pin11) = 2.4V, CH SW (Pin13) input = 2.5V
- Psl : RF OUT output voltage at Pin4
P/S (Pin 6) input = $VPs - 0.2V$, CH1 (Pin11) = 2.4V, CH SW (Pin13) input = 2.5V

NJM2536A

AC TEST CIRCUIT



DC TEST CIRCUIT



■ TERMINAL CHARACTERISTICS

| No. | Symbol | Typ. DC Voltage (V) | Equivalent Circuit | Function |
|-----|----------------|-------------------------------------|--------------------|--|
| 1 | VIDEO IN | 1.9 | | Video Signal Input |
| 2 | CARRIER OFF SW | - | | Picture Carrier-Off Switch |
| 3 | ANT SW DRIVE | 4 (Pin2=High) 0 (Pin2=Low) | | ANT Switch Drive Voltage Output |
| 4 | RF OUT | 4 | | RF Signal Output |
| 5 | GND1 | 0 | | GND terminal except for oscillator circuit |
| 6 | P/S | 2.8 | | Picture-to-sound Ratio Adjust |

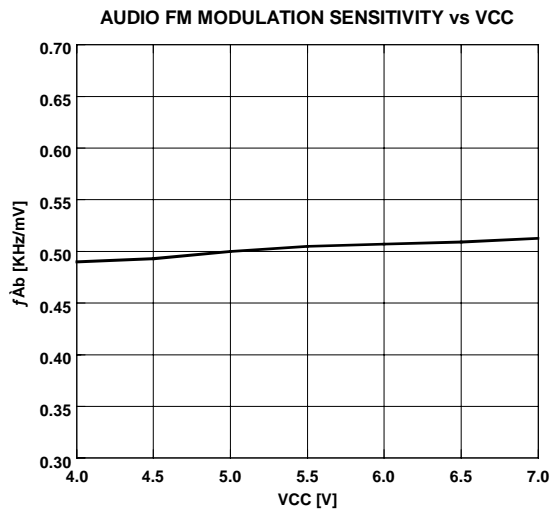
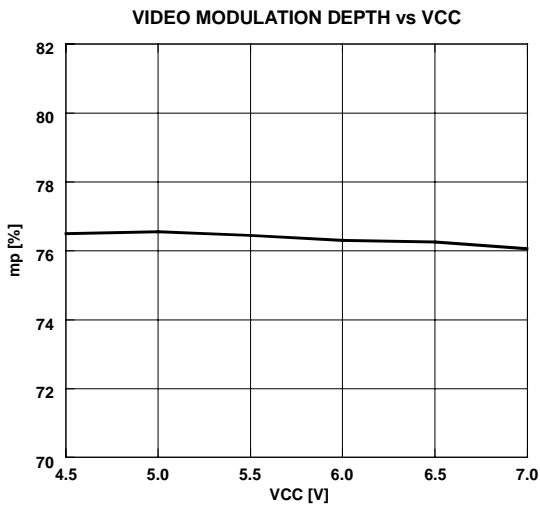
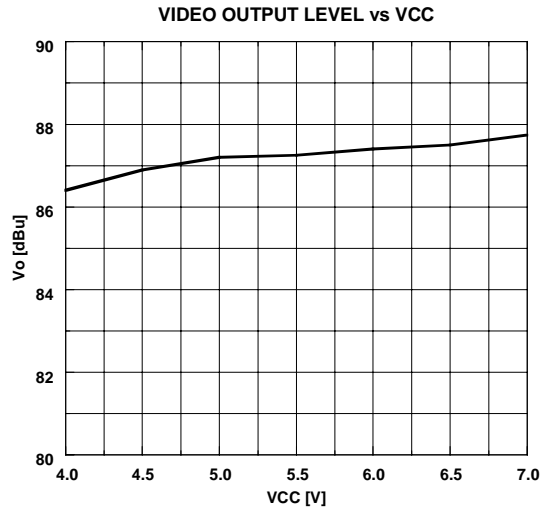
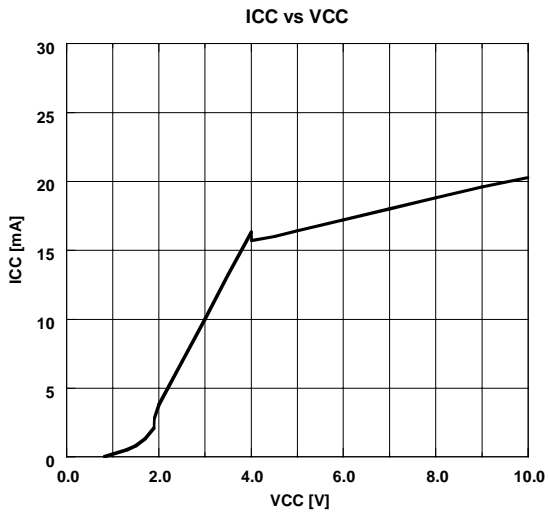
NJM2536A

| No. | Symbol | Typ. DC Voltage (V) | Equivalent Circuit | Function |
|-----|-------------|---------------------------------|--------------------|--|
| 7 | AUDIO IN | 0.035 | | Audio Signal Input |
| 8 | 4.5MHz TANK | 2.9 | | 4.5MHz Tank Coil for Sound FM Modulation Circuit |
| 9 | REG OUT | 4 | | Regulator Output |
| 10 | GND2 | 0 | | GND for Oscillator Circuit |
| 11 | CH1 | 2.24 (OSC:ON) 2.30 (OSC:OFF) | | RF Oscillator Pin (Base) |
| 12 | CH2 | 2.24 (OSC:ON) 2.30 (OSC:OFF) | | RF Oscillator Pin (Base) |

| No. | Symbol | Typ. DC Voltage (V) | Equivalent Circuit | Function |
|-----|--------|---------------------|--------------------|------------------------------|
| 13 | CH SW | 2.38 | | Output channel Select Switch |
| 14 | VCC | 5 | | Power Supply |

■ TYPICAL CHARACTERISTICS

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



MEMO

[CAUTION]

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