

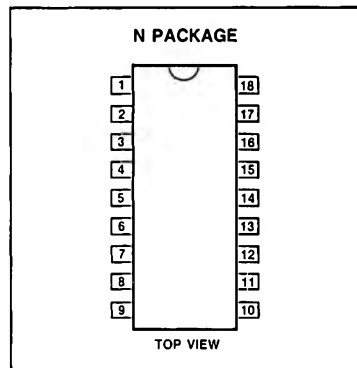
**FM RADIO CIRCUIT****TDA7000****Preliminary****DESCRIPTION**

The TDA7000 is a monolithic integrated circuit for mono FM portable radios where a minimum of peripheral components is important (small dimensions and low costs).

The IC has an FLL (Frequency-Locked-Loop) system with an intermediate frequency of 70 kHz. The I.F. selectivity is obtained by active RC filters. The only function which needs alignment is the resonant circuit for the oscillator, thus selecting the reception frequency. Spurious reception is avoided by means of a mute circuit, which also eliminates too-noisy input signals. Special precautions are taken to meet the radiation requirements.

**FEATURES**

- R.F. input stage
- Mixer
- Local oscillator
- I.F. amplifier/limiter
- Phase demodulator
- Mute detector
- Mute switch

**PIN CONFIGURATION****ABSOLUTE MAXIMUM RATINGS**

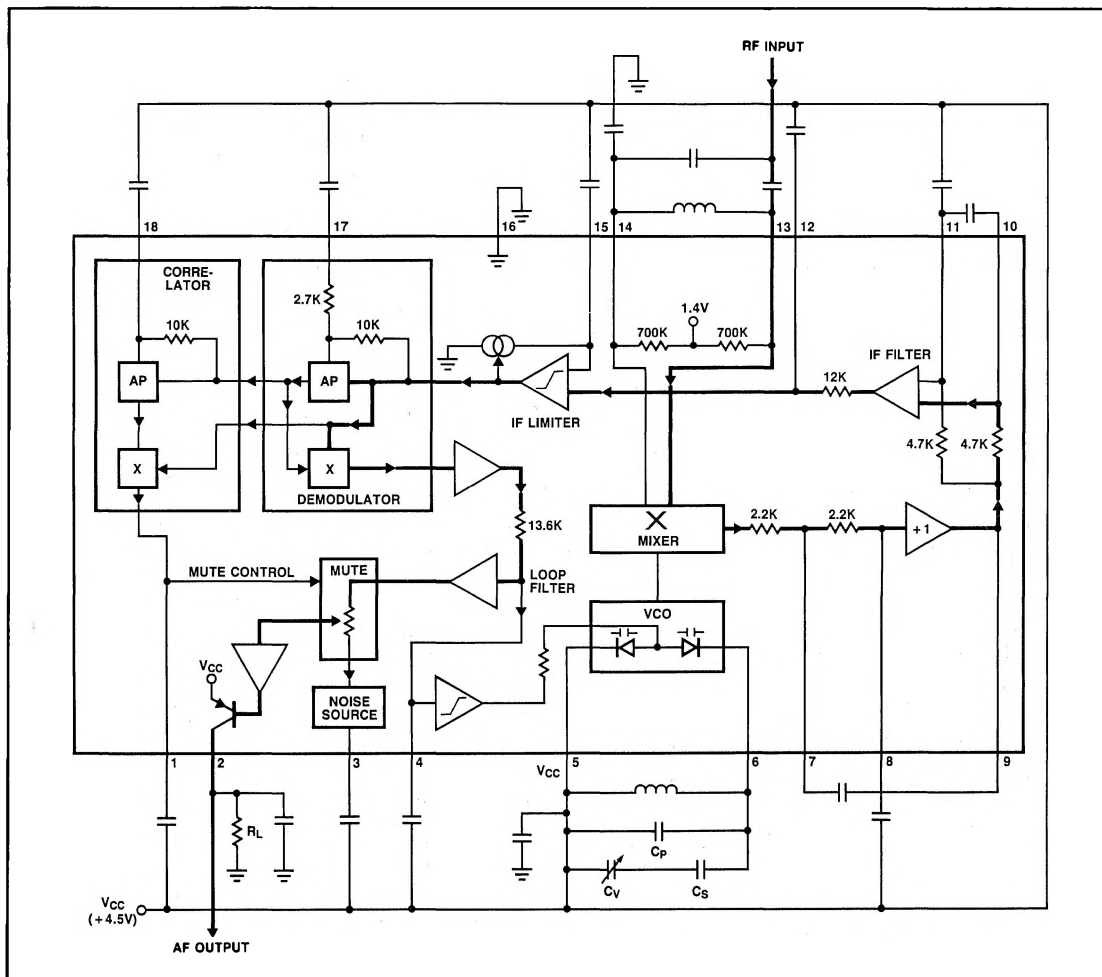
SYMBOL AND PARAMETER	RATING	UNIT
$V_{CC}$ Supply voltage (pin 5)	12	V
$V_{6.5}$ Oscillator voltage (pin 6)	$V_{CC}-0.5$ to $V_{CC}+0.5$	V
Total power dissipation	See derating curve Figure 2	
$T_{STG}$ Storage temperature range	-55 to +150	°C
$T_A$ Operating ambient temperature range	0 to +60	°C

**FUNCTIONAL PIN DESCRIPTION**

PIN NO	NAME AND FUNCTION
1	Muting capacitor
2	Audio frequency output
3	Noise source
4	Loop filter capacitor
5	Supply voltage
6	VCO
7	1st integrator capacitor (to pin 9)
8	2nd integrator capacitor
9	1st integrator capacitor (to pin 7)
10	IF filter capacitor (to pin 11)
11	IF filter capacitor
12	IF limiter capacitor
13	RF input
14	Mixer
15	Current source capacitor
16	Ground
17	Demodulator capacitor
18	Correlator capacitor

## FM RADIO CIRCUIT

TDA7000

**Preliminary****BLOCK DIAGRAM**

## FM RADIO CIRCUIT

TDA7000

## Preliminary

DC ELECTRICAL CHARACTERISTICS  $V_{CC} = 4.5V$ ;  $T_A = 25^\circ C$ ; measured in Figure 3; unless otherwise specified

SYMBOL AND PARAMETER	TEST CONDITION	TDA7000			UNIT
		Min	Typ	Max	
$V_{CC}$ Supply voltage	(Pin 5)	2.7	4.5	10	V
$I_{CC}$ Supply current	$V_{CC} = 4.5V$		8		mA
$I_b$ Oscillator current	(Pin 6)		280		$\mu A$
$V_{14-16}$ Voltage	(Pin 14)		1.35		V
$I_2$ Output current	(Pin 2)		60		$\mu A$
$V_{2-16}$ Output voltage	(Pin 2) $R_L = 22\text{ k}\Omega$		1.3		V

AC ELECTRICAL CHARACTERISTICS  $V_{CC} = 4.5\text{ V}$ ;  $T_A = 25^\circ C$ ; measured in Figure 3 (mute switch open, enabled);  $f_{rf} = 96\text{ MHz}$  (tuned to max. signal at  $5\text{ }\mu V$  e.m.f.) modulated with  $\Delta f = \pm 22.5\text{ kHz}$ ;  $f_m = 1\text{ kHz}$ ; EMF =  $0.2\text{ mV}$  (e.m.f. voltage at a source impedance of  $75\text{ }\Omega$ ); r.m.s. noise voltage measured unweighted ( $f = 300\text{ Hz}$  to  $20\text{ kHz}$ ); unless otherwise specified.

SYMBOL AND PARAMETER	TEST CONDITION	TDA7000			UNIT
		Min	Typ	Max	
EMF Sensitivity (see Figure 2) (e.m.f. voltage)	-3 dB limiting; muting disabled		1.5		$\mu V$
	-3 dB muting		6		
	S/N = 26 dB		5.5		
EMF Signal handling (e.m.f. voltage)	THD < 10%; $\Delta f = \pm 75\text{ kHz}$		200		mV
S/N Signal-to-noise ratio			60		dB
THD Total harmonic distortion	$\Delta f = \pm 22.5\text{ kHz}$		0.7		%
	$\Delta f = \pm 75\text{ kHz}$		2.3		
AMS AM suppression of output voltage	(ratio of the AM output signal referred to the FM output signal) FM signal: $f_m = 1\text{ kHz}$ ; $\Delta f = \pm 75\text{ kHz}$ AM signal: $f_m = 1\text{ kHz}$ ; $m = 80\%$		50		dB
RR Ripple rejection	( $\Delta V_{CC} = 100\text{ mV}$ ; $f = 1\text{ kHz}$ )		10		dB
$V_{6-5(rms)}$ Oscillator voltage (r.m.s. value)	(Pin 6)		250		mV
$\Delta f_{osc}$ Variation of oscillator frequency	Supply voltage ( $\Delta V_{CC} = 1V$ )		60		kHz/V
$S_{+300}$ Selectivity $S_{-300}$			45		dB
			35		
$\Delta f_{rf}$ A.F.C. range			$\pm 300$		kHz
B Audio bandwidth	$\Delta V_O = 3\text{ dB}$ measured with pre-emphasis ( $t = 50\text{ }\mu s$ )		10		kHz
$V_{O(rms)}$ A.F. output voltage (r.m.s. value)	$R_L = 22\text{ k}\Omega$		75		mV
$R_L$ Load resistance	$V_{CC} = 4.5V$			22	k $\Omega$
	$V_{CC} = 9.0V$			47	

## NOTES:

1. The muting system can be disabled by feeding a current of about  $20\text{ }\mu A$  into pin 1.
2. The interstation noise level can be decreased by choosing a low-value capacitor at pin 3. Silent tuning can be achieved by omitting this capacitor.

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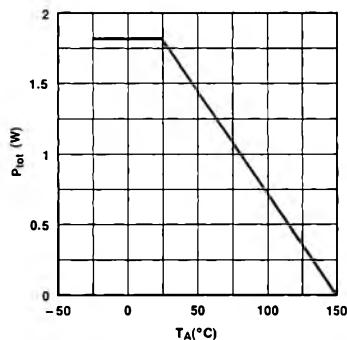


Figure 1. Power Derating Curve.

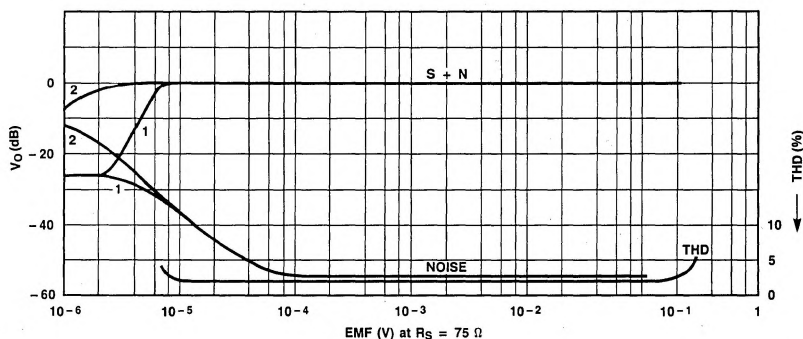


Figure 2. AF output voltage ( $V_O$ ) and total harmonic distortion (THD) as a function of the e.m.f. input voltage (EMF) with a source impedance ( $R_S$ ) of 75  $\Omega$ : (1) muting system enabled; (2) muting system disabled.

Conditions: 0dB = 75mV;  $f_{IF}$  = 96 MHz  
 for S + N curve:  $\Delta f$  =  $\pm$  22.5 kHz  $f_m$  = 1 kHz  
 for THD curve:  $\Delta f$  =  $\pm$  75 kHz  $f_m$  = 1 kHz

## NOTES:

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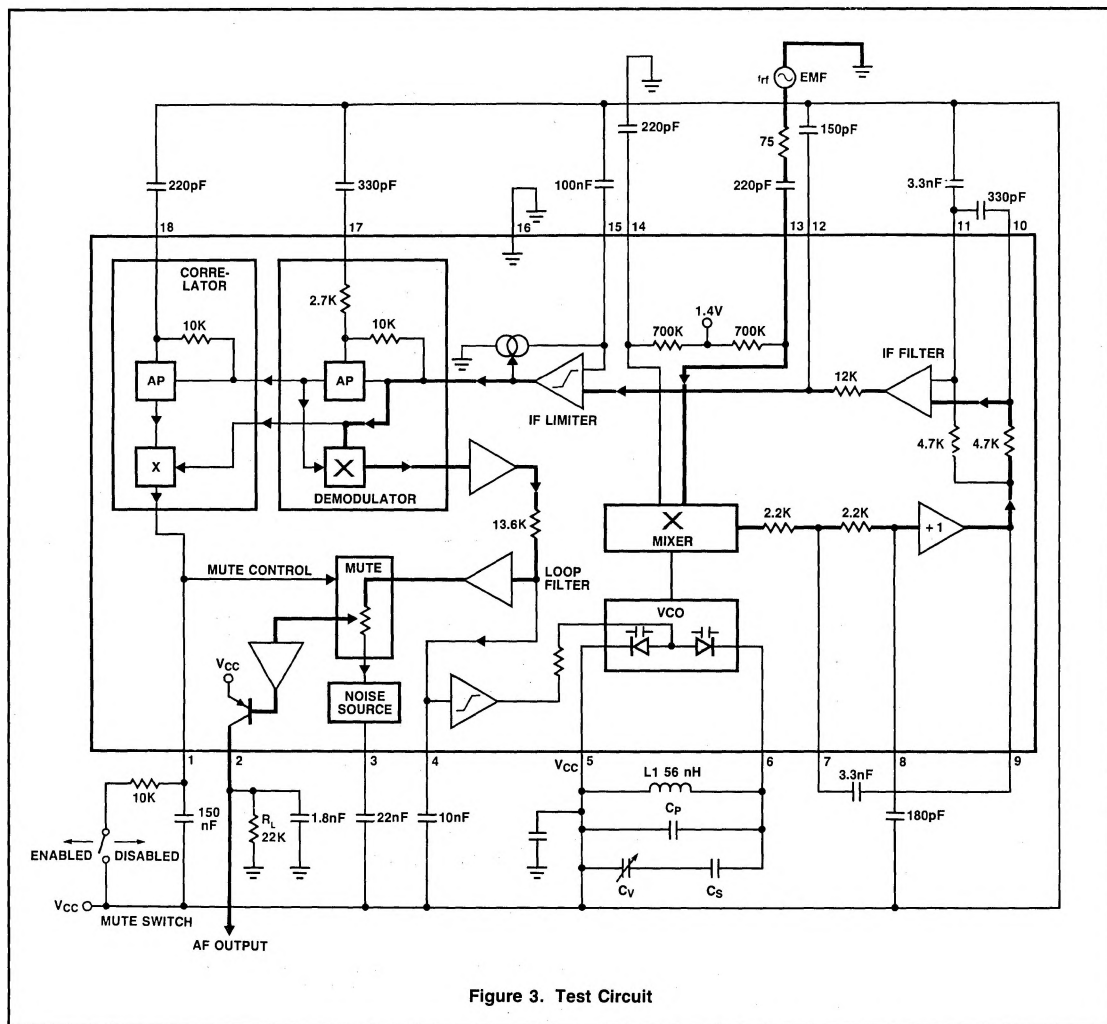


Figure 3. Test Circuit