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NTE7016
Integrated Circuit
FM IF System

Description:

The NTE7016 is a monolithic integrated circuit that provides all the functions of a comprehensive FM–IF system. This device includes a three–stage FM–IF amplifier/limiter configuration with level detectors for each stage, a doubly–balanced quadrature FM detector, and an audio amplifier that features the optional use of a muting (squelch) circuit.

The advanced circuit design of the IF system includes desirable deluxe features such as programmable delayed AGC for the RF tuner, an AFC drive circuit, and an output signal to drive a tuning meter and/or provide stereo switching logic. In addition, internal power supply regulators maintain a nearly constant current drain over the voltage supply range of +8.5 to +16 volts.

The NTE7016 is ideal for high fidelity operation. Distortion in an NTE7016 FM–IF System is primarily a function of the phase linearity characteristic of the outboard detector coil.

The NTE7016 is available in a 16–Lead DIP type plastic package and can operate over the ambient temperature range of –40°C to +85°C.

Features:

- Exceptional Limiting Sensitivity: 12μV typ. at –3db Point
- Low Distortion: 0.1% typ. (With Double–Tuned Coil)
- Single–Coil Tuning Capability
- Improved S + N/N Ratio
- Externally Programmable Recovered Audio Level
- Provides Specific Signal for Control of Interchannel Muting (Squelch)
- Provides Specific Signal for Direct Drive of a Tuning Meter
- On Channel Step for Search Control
- Provides Programmable AGC Voltage for RF Amplifier
- Provides a Specific Circuit for Flexible Audio Output
- Internal Supply Voltage Regulators
- Externally Programmable “ON” Channel Step Width, and Deviation at Which Muting Occurs

Absolute Maximum Ratings: (T_A = +25°C unless otherwise specified)

DC Supply Voltage (Between Pin11 and Pin4) 16V
(Between Pin11 and Pin14) 16V
DC Current (Out of Pin15) 2mA
Device Dissipation, P_D
Up to T_A = +85°C 640mW
Derate linearly above T_A = +85°C . . . . . 9.9mW/°C
Operating Ambient Temperature Range, T_{opr} . . . . . –40° to +85°C
Storage Temperature Range, T_{stg} . . . . . –65° to +150°C
Lead Temperature (During Soldering), T_L
(At a distance not less than 1/32" (0.79mm) from case for 10sec max) . . . . . +265°C

Electrical Characteristics: (T_A = +25°C, V+ = 12V unless otherwise specified)

Parameter	Symbol	Test Conditions		Min	Typ	Max	Unit
Static (DC) Characteristics							
Quiescent Circuit Current	I_{11}	No Signal Input, Non Muted		20	31	40	mA
IF Input (Pin1)	V_1			1.2	1.9	2.4	V
AC Return to Input (Pin2)	V_2			1.2	1.9	2.4	V
DC Bias to Input (Pin3)	V_3			1.2	1.9	2.4	V
RF AGC (Pin15)	V_{15}			7.5	9.5	11.0	V
DC Reference (Pin10)	V_{10}			5.0	5.6	6.0	V
Dynamic Characteristics							
Input Limiting Voltage (–3dB Point)	V_I(lim)			–	12	25	µV
AM Rejection (Pin6)	AMR	V_{IN} = 0.1V, AM Mod. = 30%		45	55	–	dB
Recovered AF Voltage (Pin6)	V_O(AF)			325	500	650	mV
Total Harmonic Distortion: Single Tuned (Pin6) Note 1	THD	V_{IN} = 0.1V	f_O = 10.7MHz, f_{mod} = 400Hz, Deviation ±75kHz	–	0.5	1.0	%
Total Harmonic Distortion: Double Tuned (Pin6) Note 1				–	0.1	–	%
Signal Plus Noise to Noise Ratio (Pin6)	S + N/N			65	72	–	dB
Deviation Mute Frequency	f_{DEV}		f_{mod} = 0	–	±40	–	kHz
RF AGC Threshold	V_{16}			–	1.25	–	V
ON Channel Step	V_{12}	V_{IN} = 0.1V	f_{DEV} < ±40kHz	–	0	–	V
			f_{DEV} > ±40kHz	–	5.6	–	V

Note 1. THD characteristics are essentially a function of the phase characteristics of the network connected between Pin8, Pin9, and Pin10.

Pin Connection Diagram