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NTE1604 Integrated Circuit FM IF System for Car Radio

Description:

The NTE1604 is an integrated circuit in a 16-Lead SIP type package designed for use in FM car stereo receivers. This device features versatile muting characteristics and allows receiver designers to realize the muting performance according to their design concept.

Functions:

- IF Amplification/Limiter
- AFC Output
- Muting Bandwidth
- Quadrature Detector
- Signal Meter Output
- Muting Under Weak Signal Strength
- AF Preamplifier
- AGC Output

Features:

- Versatile Mutings
 - a. When Muting Operation is Performed under a Weak Signal Strength, an Attenuation Slope of the Audio Output Against the Input Signal Strength Variations can be Set at any Given value
 - b. Maximum Muting Attenuation can be Selected Between about 6dB to 40dB
 - c. Input Signal Strength level which Actuates the Muting Circuit can be Set Freely
- High Limiting Sensitivity (25db μ Typ. with Muting OFF) Provides a Fine Quieting Characteristic
- High Signal-to-Noise Ratio: 78dB Typ
- Low Distortion (0.05% Typ) Available, if used with Double-Tuned Circuits
- Good AM Rejection Ratio (63dB with 6 Stages of Differential IF Amplifiers)
- Signal Merter Drive Output Proportional to the Input Signal Strength in dB
- Clamped ($\pm V_{BE}$) AFC Output, Bandwidth Adjustable
- Delayed AGC Output for Front End Circuit

Absolute Maximum Ratings: ($T_A = +25^\circ\text{C}$ unless otherwise specified)

Maximum Supply Voltage (Pin12), V_{CCmax}	16V
Maximum Supply Current (Pin12), I_{CCmax}	40mA
Allowable Power Dissipation, P_{Dmax}	
$T_A = +25^\circ\text{C}$	640mW
$T_A = +70^\circ\text{C}$	460mW
Input Voltage (Pin1 to Pin2), v_i	$\pm 1V_{P-P}$
Flow-In Current (Pin2, Pin3), I_2, I_3	$\pm 0.2\text{mA}$
Flow-In Current (Pin6), I_6	2mA
Flow-Out Current (Pin5, Pin15, Pin16), I_5, I_{15}, I_{16}	1mA
Flow-Out Current (Pin13, Pin14), I_{13}, I_{14}	2mA
Operating Temperature Range, T_{opr}	-20° to $+70^\circ\text{C}$
Storage Temperature Range, T_{stg}	-40° to $+125^\circ\text{C}$

Recommended Operating Conditions: ($T_A = +25^\circ\text{C}$ unless otherwise specified)

Recommended Supply Voltage, V_{CC} 8V

V_{CC} Range on Operation, V_{CC} 7.5V to 16V

Electrical Characteristics: ($T_A = +25^\circ\text{C}$, $V_{CC} = 8\text{V}$, $f = 10.7\text{MHz}$ unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Quiescent Current	I_{CCO}	Quiescent	15	21	27	mA
Current Dissipation	I_{CC}	$v_{in} = 100\text{dB}\mu$	20	25	30	mA
Demodulated Output	v_o	$v_{in} = 100\text{dB}\mu$, 400Hz, 100% MOD	200	260	320	mV_{rms}
Total Harmonic Distortion	THD	$v_{in} = 100\text{dB}\mu$, 400Hz, 100% MOD	–	0.05	0.2	%
Signal-to-Noise Ratio	S/N	$v_{in} = 100\text{dB}\mu$, 400Hz, 100% MOD	72	78	–	dB
Input Limiting Voltage	$v_{i(\text{lim})}$	v_o : 3dB Down, 400Hz, 100% MOD	–	25	29	$\text{dB}\mu$
Muting Sensitivity	$v_{i(\text{mute})}$	$V_{14} = 2.0\text{V}$	22	26	32	$\text{dB}\mu$
Muting Attenuation	Mute (A_{CC})	$V_6 = 2\text{V}$ (22k Ω)	10	15	20	dB
		$V_6 = 5\text{V}$ (22k Ω)				
Muting Bandwidth	BW (mute)	$v_i = 100\text{dB}\mu$, $V_{14} = 2\text{V}$	140	210	370	kHz
AM Rejection Ratio	AMR	$v_i = 100\text{dB}\mu$, FM: 400Hz, 100% MOD, AM: 1kHz, 30% MOD	50	63	–	dB
Muting Drive Output	V_{14-0}	Quiescent	3.5	4.2	5.0	V
	V_{14-100}	$v_i = 100\text{dB}\mu$	0.0	0.0	0.3	V
Signal Meter Output	V_{15-0}	Quiescent	0.0	0.1	0.3	V
	V_{15-50}	$v_i = 50\text{dB}\mu$	0.8	1.4	2.0	V
	V_{15-70}	$v_i = 70\text{dB}\mu$	1.6	2.4	3.2	V
	V_{15-100}	$v_i = 100\text{dB}\mu$	4.5	5.3	6.0	V
AGC Output	V_{16-0}	Quiescent	3.5	4.1	4.5	V
	V_{16-100}	$v_i = 100\text{dB}\mu$	0.0	0.02	0.3	V
Offset Voltage	V_{7-13}	Quiescent, Pin7 to Pin13	–0.25	0.0	+0.25	V
	V_{8-13}	Quiescent, Pin8 to Pin13	–0.5	0.0	+0.5	V

Pin Connection Diagram
(Front View)



