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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 Varaitions 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 (25dbμ 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°C unless otherwise specified)

Maximum Supply Voltage (Pin12), V_{CC}max 16V
Maximum Supply Current (Pin12), I_{CC}max 40mA
Allowable Power Dissipation, $P_D$max
  T_A = +25°C 640mW
  T_A = +70°C 460mW
Input Voltage (Pin1 to Pin2), v_i . . . . . $\pm 1V_{P-P}$
Flow–In Current (Pin2, Pin3), I_2, I_3 . . . . . ±0.2mA
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°C
Storage Temperature Range, T_{stg} . . . . . –40° to +125°C

Recommended Operating Conditions: (T_A = +25°C unless otherwise specified)

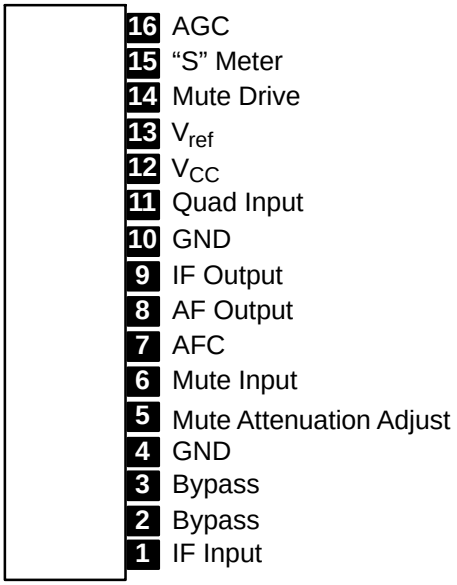
Recommended Supply Voltage, V_{CC} 8V

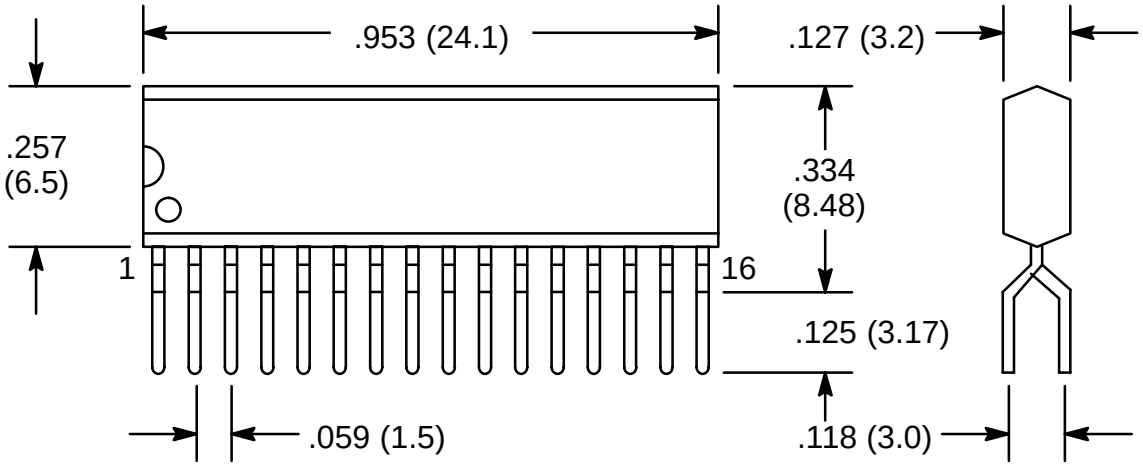
V_{CC} Range on Operation, V_{CC} . . . . . 7.5V to 16V

Electrical Characteristics: (T_A = +25°C, V_{CC} = 8V, f = 10.7MHz 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} = 100dBμ		20	25	30	mA
Demodulated Output	v_o	v_{in} = 100dBμ, 400Hz, 100% MOD		200	260	320	mV_{rms}
Total Harmonic Distortion	THD	v_{in} = 100dBμ, 400Hz, 100% MOD		–	0.05	0.2	%
Signal–to–Noise Ratio	S/N	v_{in} = 100dBμ, 400Hz, 100% MOD		72	78	–	dB
Input Limiting Voltage	$v_{i(lim)}$	v_o: 3dB Down, 400Hz, 100% MOD		–	25	29	dBμ
Muting Sensitivity	$v_{i(mute)}$	V_{14} = 2.0V		22	26	32	dBμ
Muting Attenuation	Mute (A_{CC})	V_6 = 2V (22kΩ)	v_i = 100dBμ, 400Hz, 100% MOD	10	15	20	dB
		V_6 = 5V (22kΩ)		24	28	32	dB
Muting Bandwidth	BW (mute)	v_i = 100dBμ, V_{14} = 2V		140	210	370	kHz
AM Rejection Ratio	AMR	v_i = 100dBμ, 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 = 100dBμ		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 = 50dBμ		0.8	1.4	2.0	V
	$V_{15–70}$	v_i = 70dBμ		1.6	2.4	3.2	V
	$V_{15–100}$	v_i = 100dBμ		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 = 100dBμ		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)

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16
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