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# NTE7013
# Integrated Circuit
# Remote Control Preamp with Active “Low”

**Description:**

The NTE7013 is a bipolar integrated circuit in an 8–Lead DIP type package intended for infrared remote control applications. This device has an active “Low” output polarity and contains a high–gain amplifier, a limiter amplifier, a band–pass filter, a detector, and a pulse shaper.

**Features:**

- On–Chip Band–Pass Filter: Frequenct Range 30 to 60kHz
- High Gain Pre–Amplifier: 86dB Typ
- Detector for PCM Demodulation
- Low Current Consumption
- Minimum External Components

**Absloute Maximum Ratings:** ($T_A$ = +25°C unless otherwise specified)

Supply Voltage ($R_g$ = 0Ω), $V_{CC}$ . . . . . 5.6V
Output Voltage, $V_{OUT}$ . . . . . 15V
Input Voltage, $V_{IN}$ . . . . . $5V_{P–P}$
Supply Current, $I_{CC}$ . . . . . 6mA
Power Dissipation, $P_D$ . . . . . 270mW
Operating Temperature Range, $T_{opr}$ . . . . . –20° to +75°C
Storage Temperature Range, $T_{stg}$ . . . . . –40° to +125°C

**Recommended Operating Conditions:**

| Parameter | Symbol | Test Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Power Supply Voltage | $V_{CC}$ | $R_g$ = 0Ω | 4.5 | 5.0 | 5.5 | V |
| Power Supply Voltage | $V_{CC'}$ | $R_g$ = 1.5kΩ | 11 | 12 | 13 | V |
| Operating Frequency | $f_O$ | | 30 | – | 60 | kHz |

**Electrical Characteristics:** ($T_A$ = +25°C, $V_{CC}$ = 5V unless otherwise specified)

| Parameter | Symbol | Test Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Power Supply Current | $I_{CC}$ | | – | 1.6 | 2.5 | mA |
| Input Pin Voltage 1 | $V_{IN1}$ | | 2.0 | 2.5 | 3.1 | V |
| Input Pin Voltage 2 | $V_{IN2}$ | $I_1$ = –100µA | 0.5 | 0.9 | 1.7 | V |
| Voltage Gain | $A_v$ | 38kHz CW, $v_i$ = 30µ$V_{P-P}$ | 74 | 86 | 89 | dB |
| Frequency Response | $A_{vQ}$ | 28, 35, 41, 48kHz CW, $v_i$ = 30µ$V_{P-P}$, Note 1 | 4 | 10 | – | dB |
| Input Impedance | $r_{in}$ | 38kHz CW, $v_i$ = 0.2$V_{P-P}$, Note 2 | 27 | 40 | 55 | kΩ |
| Output Pulse Width 1 | $t_{PW1}$ | 38kHz Burst, $v_i$ = 60µ$V_{P-P}$ | 440 | – | 770 | µs |
| Output Pulse Width 2 | $t_{PW2}$ | $V_{CC}$ = 4V, 38kHz Burst, $v_i$ = 50µ$V_{P-P}$ | 440 | – | 770 | µs |
| Output Voltage | $V_{OL}$ | $E_1$ = 1.0V | – | 0.2 | 0.4 | V |
| Output Leak Current | $I_{OH}$ | $E_1$ = 2.5V, $E_2$ = 15V | – | – | 2.0 | µA |

Note 1. Voltage gain difference $A_{vQ} = A_v$ (35kHz) – $A_v$ (28kHz)
$A_{vQ} = A_v$ (41kHz) – $A_v$ (48kHz)

Note 2. $r_{in} = \dfrac{47}{v_i/v_x - 1}$ (kΩ), $v_x$: Input voltage, $v_i$: SG output voltage

**Pin Connection Diagram**
(Front View)