



## NTE832 & NTE832SM Integrated Circuit Tone Decoder

### **Description:**

The NTE832 and NTE832SM are general purpose tone decoders designed to provide a saturated transistor switch to GND when an input signal is present within the passband. The circuit consists of an I and Q detector driven by a voltage controlled oscillator which determines the center frequency of the decoder. External components are used to independently set center frequency, bandwidth, and output delay.

### **Features:**

- Logic Compatible Output with 100mA Current Sinking Capability
- Bandwidth Adjustment from 0 to 14%
- Inherent Immunity to False Signals
- High Stable Center Frequency
- High Rejection of Out-Of-Band Signals and Noise
- Center Frequency Adjustable from 0.01Hz to 500kHz
- Frequency Range Adjustable over 20:1 range by an External Resistor
- Available in Standard 8-Lead DIP (NTE832) and Surface Mount SOIC-8 (NTE832SM)

### **Applications:**

- Touch Tone Decoder
- Precision Oscillator
- Frequency Monitoring and Control
- Wide Band FSK Demodulation
- Communications Paging Decoders
- Carrier Current Remote Controls
- Ultrasonic Controls (Remote TV, etc.)

### **Absolute Maximum Ratings:**

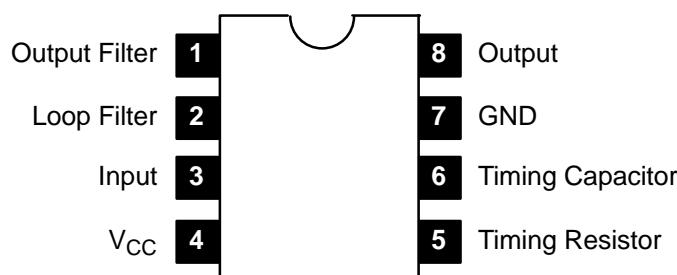
Operating Voltage, $V_{CC}$ .....	10V
Input Voltage, $V_{IN}$ .....	-10V to $V_{CC} + 0.5V$
Output Voltage, $V_O$ .....	15V
Power Dissipation (Note 1), $P_D$ .....	300mW
Operating Temperature Range, $T_{opr}$ .....	0° to +70°C
Storage Temperature Range, $T_{stg}$ .....	-65° to +150°C

Note 1. The maximum junction temperature of these devices is +100°C. For operating at elevated temperatures, devices must be derated on a thermal resistance of +187°C/W, junction-to-ambient.

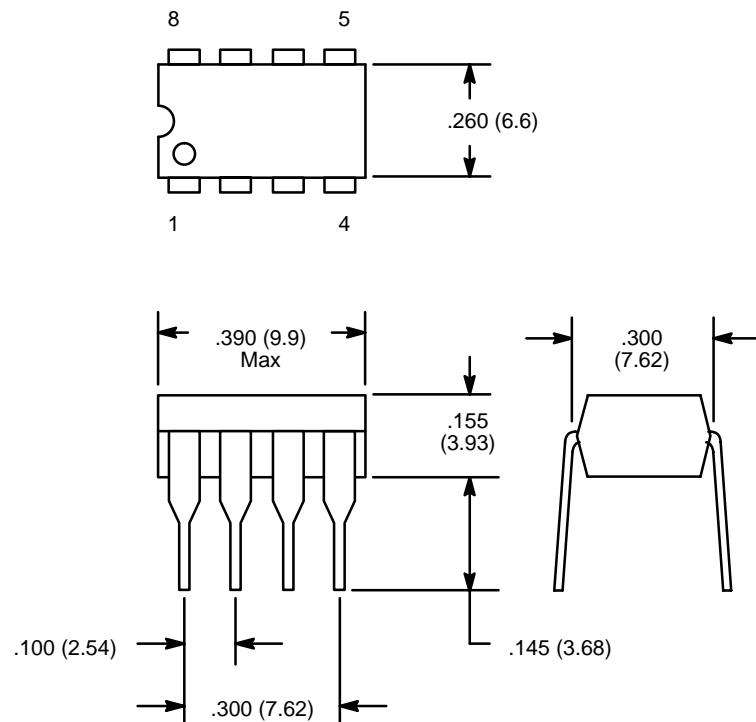
**Electrical Characteristics:** ( $V_{CC} = 5V$ ,  $T_A = +25^\circ C$ , unless otherwise specified)

Parameter	Test Conditions	Min	Typ	Max	Unit
Power Supply Voltage		4.75	5.00	9.00	V
Power Supply Current, Quiescent	$R_L = 20k\Omega$	—	7	10	mA
Power Supply Current, Activated		—	12	15	mA
Quiescent Power Dissipation		—	35	—	mW
Input Resistance		15	20	25	k $\Omega$
Smallest Detectable Input Voltage	$I_L = 100mA$ , $f_i = f_o$	—	20	25	mV <sub>rms</sub>
Largest No Output Input Voltage	$I_C = 100mA$ , $f_i = f_o$	10	15	—	mV <sub>rms</sub>
Largest Simultaneous Outband Signal to Inband Signal Ratio	$R_L = 20k\Omega$	—	+6	—	dB
Minimum Input Signal to Widband Noise Ratio	$B_n = 140kHz$	—	—6	—	dB
Largest Detection Bandwidth		10	14	18	% of $f_o$
Largest Detection Bandwidth Skew		—	2	3	% of $f_o$
Largest Detection Bandwidth with Variation with Temperature		—	$\pm 0.1$	$\pm 0.5$	%/ $^\circ C$
Largest Detection bandwidth with Variation with Supply Voltage	4.75V to 6.75V	—	$\pm 1$	$\pm 5$	%/V
Highest Center Frequency	$R_L = 20k\Omega$	100	500	—	kHz
Center Frequency Stability	$0^\circ < T_A , +70^\circ C$	—	$35 \pm 60$	—	ppm/ $^\circ C$
	$-55^\circ < T_A < +125^\circ C$	—	$35 \pm 140$	—	ppm/ $^\circ C$
Center Frequency Shift with Supply Voltage	4.75V to 6.75V	—	0.4	2.0	%/V
Fastest ON-OFF Cycling Rate		—	$f_o/20$	—	
Output Leakage Current	$V_8 = 15V$	—	0.01	25.0	$\mu A$
Output Saturation Voltage	$e_i = 25mV$ , $I_8 = 30mA$	—	0.2	0.4	V
	$e_i = 25mV$ , $I_8 = 100mA$	—	0.6	1.0	V
Output Fall Time		—	30	—	ns
Output Rise Time		—	150	—	ns

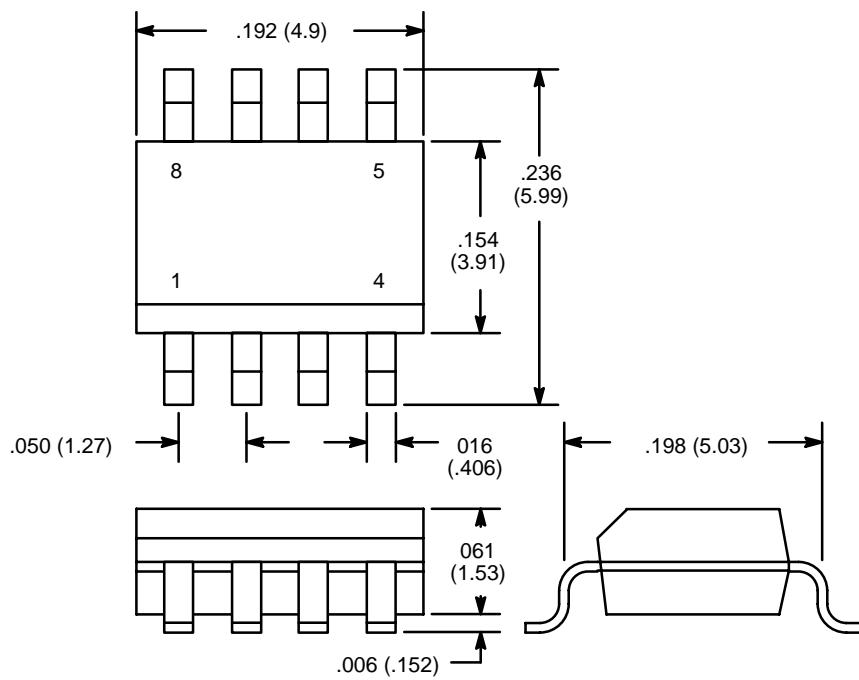
Pin Connection Diagram



### NTE832 (8-Lead DIP)



### NTE832SM (SOIC-8)



NOTE: Pin1 on Beveled Edge