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NTE4028B NTE4028BT Integrated Circuit CMOS, BCD-to-Decimal Decoder

Description:

The NTE4028B and NTE4028BT are BDC-to-decimal or binary-to-octal decoders in a 16-Lead DIP type package consisting of buffering on all 4 inputs, decoding-logic gates, and 10 output buffers. A BCD code applied to the four inputs, A to D, results in a high level at the selected one of 10 decimal decoded outputs. Similarly, a 3-bit binary code applied to inputs A through C is decoded in octal code at output 0 to 7 if D = "0". High drive capability is provided at all outputs to enhance DC and dynamic performance in high fan-out applications.

Features:

- Available in 16-Lead DIP (NTE4028B) and SOIC-16 Surface Mount (NTE4028BT) Packages
- BCD-to-Decimal Decoding or Binary-to-Octal Decoding
- High Decoded Output Drive Capability
- "Positive Logic" Inputs and Outputs.....Decoded Outputs Go High on Selection
- Medium-Speed Operation: t_{PHL} , t_{PLH} = 80ns (Typ) at V_{DD} = 10V
- Standardized, Symmetrical Output Characteristics
- 100% Tested for Quiescent Current at 20V
- Maximum Input Current of 1mA at 18V Over Full Package Temperature Range: 100nA at 18V and +25°C
- Noise Margin (Over Full Package Temperature Range:
 - 1V at V_{DD} = 5V
 - 2V at V_{DD} = 10V
 - 2.5V at V_{DD} = 15V
- 5V, 10V, and 15V Parametric Ratings

Applications:

- Code Conversion
- Indicator Tube Decoder
- Address Decoding – Memory Selection Control

Absolute Maximum Ratings:

DC Supply Voltage Range (Voltages Referenced to V_{SS} Pin), V_{DD} -0.5V to +20V
Input Voltage Range, All Inputs -0.5V to V_{DD} to +0.5V
DC Input Current, Any One Input $\pm 10\text{mA}$
Power Dissipation (Per Package), P_D

- T_A = -55° to +100°C 500mW
- T_A = +100° to +125°C Derate Linearly at 12mW/°C to 200mW

Device Dissipation Per Output Transistor (T_A = Full Package Temperature Range) 100mW
Operating Temperature Range, T_A -55° to +125°C
Storage Temperature Range, T_{stg} -65° to +150°C
Lead Temperature (During Soldering, 1/16" for Case for 10sec Max), T_L +265°C

Recommended Operating Conditions: (Note 1)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Supply Voltage Range	V_{DD}	T_A = Full Package Temperature Range	3	–	18	V

Note 1. For maximum reliability, nominal operating conditions should be selected so that operation is always within the Recommended Operating Conditions.

Static Electrical Characteristics: ($T_A = +25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Quiescent Device Current	I_{DD}	$V_{DD} = 5\text{V}$, $V_{IN} = 0$ to 5V	–	0.04	5.0	μA
		$V_{DD} = 10\text{V}$, $V_{IN} = 0$ to 10V	–	0.04	10.0	μA
		$V_{DD} = 15\text{V}$, $V_{IN} = 0$ to 15V	–	0.04	20.0	μA
		$V_{DD} = 20\text{V}$, $V_{IN} = 0$ to 20V	–	0.08	100.0	μA
Output Low (Sink) Current	I_{OL}	$V_{DD} = 5\text{V}$, $V_{IN} = 0$ to 5V , $V_O = 0.4\text{V}$	0.51	1.0	–	mA
		$V_{DD} = 10\text{V}$, $V_{IN} = 0$ to 10V , $V_O = 0.5\text{V}$	1.3	2.6	–	mA
		$V_{DD} = 15\text{V}$, $V_{IN} = 0$ to 15V , $V_O = 1.5\text{V}$	3.4	6.8	–	mA
Output High (Source) Current	I_{OH}	$V_{DD} = 5\text{V}$, $V_{IN} = 0$ to 5V , $V_O = 4.6\text{V}$	–0.51	1.0	–	mA
		$V_{DD} = 5\text{V}$, $V_{IN} = 0$ to 5V , $V_O = 2.5\text{V}$	–1.6	–3.2	–	mA
		$V_{DD} = 10\text{V}$, $V_O = 9.5\text{V}$	–1.3	–2.6	–	mA
		$V_{DD} = 15\text{V}$, $V_O = 13.5\text{V}$	–3.4	–6.8	–	mA
Output Voltage, Low Level	V_{OL}	$V_{DD} = 5\text{V}$, $V_{IN} = 0$ to 5V	–	0	0.05	V
		$V_{DD} = 10\text{V}$, $V_{IN} = 0$ to 10V	–	0	0.05	V
		$V_{DD} = 15\text{V}$, $V_{IN} = 0$ to 15V	–	0	0.05	V
Output Voltage, High Level	V_{OH}	$V_{DD} = 5\text{V}$, $V_{IN} = 0$ to 5V	4.95	5.0	–	V
		$V_{DD} = 10\text{V}$, $V_{IN} = 0$ to 10V	9.95	10.0	–	V
		$V_{DD} = 15\text{V}$, $V_{IN} = 0$ to 15V	14.95	15.0	–	V
Input Low Voltage	V_{IL}	$V_{DD} = 5\text{V}$, $V_O = 0.5$ to 4.5V	–	–	1.5	V
		$V_{DD} = 10\text{V}$, $V_O = 1$ to 9V	–	–	3.0	V
		$V_{DD} = 15\text{V}$, $V_O = 1.5$ to 13.5V	–	–	4.0	V
Input High Voltage	V_{IH}	$V_{DD} = 5\text{V}$, $V_O = 0.5$ to 4.5V	3.5	–	–	V
		$V_{DD} = 10\text{V}$, $V_O = 1$ to 9V	7.0	–	–	V
		$V_{DD} = 15\text{V}$, $V_O = 1.5$ to 13.5V	11.0	–	–	V
Input Current	I_{IN}	$V_{DD} = 18\text{V}$, $V_{IN} = 0$ to 18V	–	$\pm 10^{-5}$	± 0.1	μA

Dynamic Electrical Characteristics: ($T_A = +25^\circ\text{C}$, $C_L = 50\text{pF}$, Input t_r , $t_f = 20\text{ns}$, $R_L = 200\text{k}\Omega$ unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Propagation Delay Time	t_{PHL} , t_{PLH}	$V_{DD} = 5\text{V}$	–	175	350	ns
		$V_{DD} = 10\text{V}$	–	80	160	ns
		$V_{DD} = 15\text{V}$	–	60	120	ns
Transition Time	t_{THL} , t_{TLH}	$V_{DD} = 5\text{V}$	–	100	200	ns
		$V_{DD} = 10\text{V}$	–	50	100	ns
		$V_{DD} = 15\text{V}$	–	40	80	ns
Input Capacitance	C_{IN}		–	5.0	7.5	pF

Truth Table

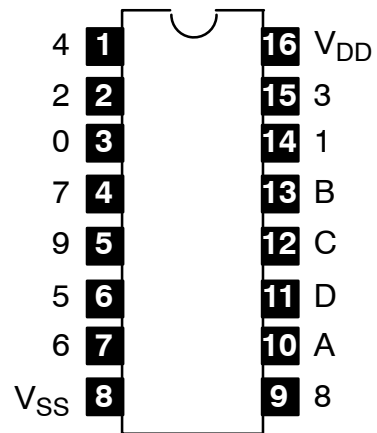
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1 = HIGH LEVEL; 0 = LOW LEVEL

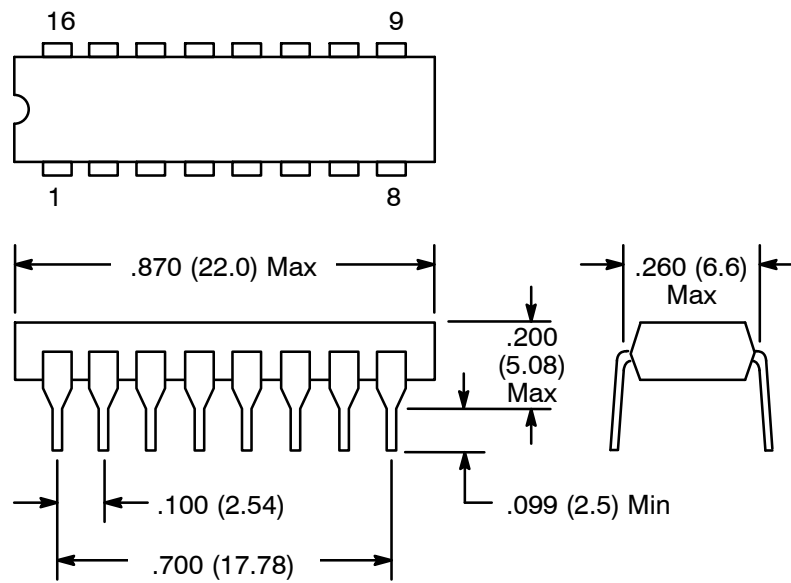
Code Conversion Chart

[illegible]

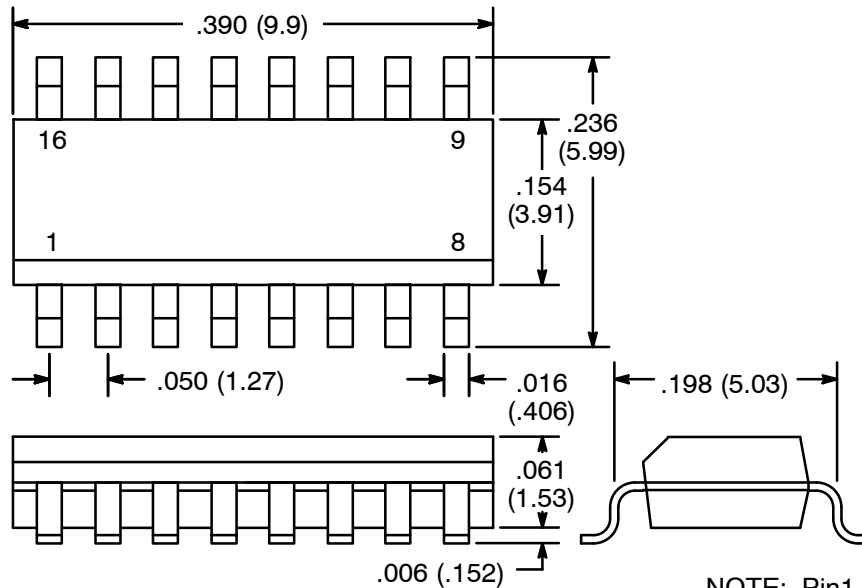
Pin Connection Diagram



NTE4028B



NTE4028BT



NOTE: Pin1 on Beveled Edge