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## NTE74141 Integrated Circuit TTL – BCD-to-Decimal Decoder/Driver 16-Lead DIP Type Package

**Description:**

The NTE74141 is a second-generation BCD-to-decimal decoder in a 16-lead DIP type package designed specifically to drive cold-cathode indicator tubes. This decoder demonstrates an improved capability to minimize switching transients in order to maintain a stable display.

Full decoding is provided for all possible input states. For binary inputs 10 through 15, all the outputs are off. Therefore the NTE74141, combined with a minimum of external circuitry, can use these invalid codes in blanking leading- and/or trailing-edge zeros in a display. The ten high-performance NPN output transistors have a maximum reverse current of 150 microamperes at 55 volts.

Low forward-impedance diodes are also provided for each input to clamp negative-voltage transients in order to minimize transmission-line effects. Power dissipation is typically 80 milliwatts. The NTE74141 is characterized for operation over the temperature range of 0° to +70°C.

**Features:**

- Drives Gas-Filled Cold-Cathode Indicator Tubes Directly
- Fully Decoded Inputs Ensures all Outputs are Off for Invalid Codes
- Input Clamping Diodes Minimize Transmission-Line Effects

**Absolute Maximum Ratings:** ( $T_A = 0^\circ$  to  $+70^\circ\text{C}$  unless otherwise specified)

Supply Voltage (Note 1), $V_{CC}$ .....	7V
Input Voltage .....	5.5V
Current Into Any Output (Off-State) .....	2mA
Operating Free-Air Temperature Range, $T_A$ .....	$0^\circ$ to $+70^\circ\text{C}$
Storage Temperature Range, $T_{stg}$ .....	$-65^\circ$ to $+150^\circ\text{C}$

Note 1. Voltage values are with respect to network ground terminal.

**Recommended Operating Characteristics:**

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Supply Voltage	$V_{CC}$		4.75	5.0	5.25	V
Off-State Output Voltage			-	-	60	V
Operating Free-Air Temperature	$T_A$		0	-	70	$^\circ\text{C}$

**Electrical Characteristics:** ( $T_A = 0^\circ$  to  $+70^\circ\text{C}$ , Note 2, Note 3 unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit	
High-Level Input Voltage	$V_{IH}$		2	-	-	V	
Low-Level Input Voltage	$V_{IL}$		-	-	0.8	V	
Input Clamp Voltage	$V_{IK}$	$V_{CC} = \text{MIN}, I_I = -5\text{mA}$	-	-	-1.5	V	
On-State Output Voltage	$V_{O(on)}$	$V_{CC} = \text{MIN}, I_O = 7\text{mA}$	-	-	2.5	V	
Off-State Output Voltage for Input Counts 0 Thru 9	$V_{O(off)}$	$V_{CC} = \text{MAX}, I_O = 0.5\text{mA}$	60	-	-	V	
Off-State Reverse Current	$I_{O(off)}$	$V_{CC} = \text{MAX}, V_O = 55\text{V}$	-	-	50	$\mu\text{A}$	
Off-State Reverse Current for Input Counts 10 Thru 15	$I_{O(off)}$	$V_{CC} = \text{MAX}, V_O = 30\text{V}$	$T_A = +55^\circ\text{C}$	-	-	5	$\mu\text{A}$
			$T_A = +70^\circ\text{C}$	-	-	15	$\mu\text{A}$
Input Current at Maximum Input Voltage	$I_I$	$V_{CC} = \text{MAX}, V_I = 5.5\text{V}$	-	-	1	mA	
High-Level Input Current A Input	$I_{IH}$	$V_{CC} = \text{MAX}, V_I = 2.4\text{V}$	-	-	40	$\mu\text{A}$	
B, C, or D Input			-	-	80	$\mu\text{A}$	
Low-Level Input Current A Input	$I_{IL}$	$V_{CC} = \text{MAX}, V_I = 0.4\text{V}$	-	-	-1.6	mA	
B, C, or D Input			-	-	-3.2	mA	
Supply Current	$I_{CC}$	$V_{CC} = \text{MAX}, \text{Note 4}$	-	16	25	mA	

Note 2. For conditions shown as MIN or MAX, use the appropriate value specified under "Recommended Operating Conditions".

Note 3. Typical value is at  $V_{CC} = 5\text{V}$ ,  $T_A = +25^\circ\text{C}$ .

Note 4.  $I_{CC}$  is measured with all inputs grounded and outputs open.

**Function Table:**

Input				Output ON †
A	B	C	D	
L	L	L	L	0
L	L	L	H	1
L	L	H	L	2
L	L	H	H	3
L	H	L	L	4
L	H	L	H	5
L	H	H	L	6
L	H	H	H	7
H	L	L	L	8
H	L	L	H	9
H	L	H	L	NONE
H	L	H	H	NONE
H	H	L	L	NONE
H	H	L	H	NONE
H	H	H	L	NONE
H	H	H	H	NONE

H = HIGH Level, L = LOW Level

† All other outputs are OFF

### Pin Connection Diagram

