DECEMBER 1972—REVISED DECEMBER 1983

- Drives Gas-filled Cold-cathode Indicator Tubes Directly
- Fully Decoded Inputs Ensure all Outputs are Off for Invalid Codes
- Input Clamping Diodes Minimize Transmission-line Effects

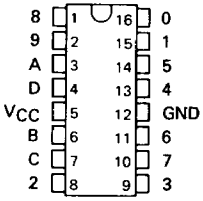
description

The SN74141 is a second-generation BCD-to-decimal decoder 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.

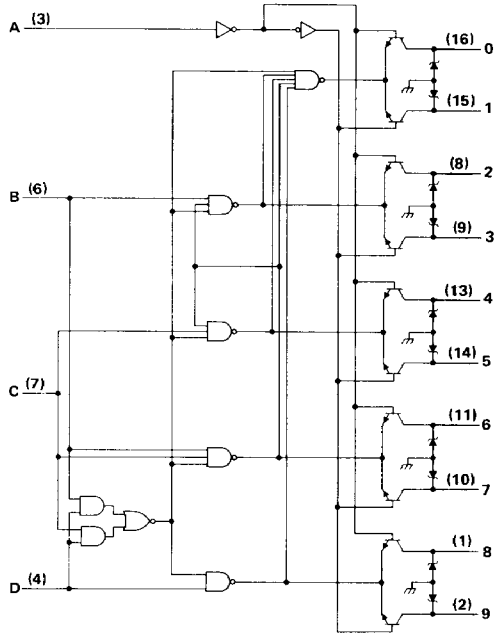
Full decoding is provided for all possible input states. For binary inputs 10 through 15, all the outputs are off. Therefore the SN74141, combined with a minimum of external circuitry, can use these invalid codes in blanking leading- and/or trailing-edge zeros in a display. The ten high-performance, n-p-n output transistors have a maximum reverse current of 50 microamperes at 55 volts.

Low-forward-impedance diodes are also provided for each input to clamp negative-voltage transitions in order to minimize transmission-line effects. Power dissipation is typically 80 milliwatts. The SN74141 is characterized for operation over the temperature range of 0°C to 70°C.

J OR N PACKAGE
(TOP VIEW)



logic diagram



FUNCTION TABLE

INPUT				OUTPUT
D	C	B	A	ON†
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

PRODUCTION DATA
This document contains information current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

absolute maximum ratings over operating free-air temperature range (unless otherwise noted)

Supply voltage, V_{CC} (see Note 1) . . . . . 7 V
Input voltage . . . . . 5.5 V
Current into any output (off-state) . . . . . 2 mA
Operating free-air temperature range . . . . . 0°C to 70°C
Storage temperature range . . . . . −65°C to 150°C

NOTE 1: Voltage values are with respect to network ground terminal.

recommended operating conditions

	MIN	NOM	MAX	UNIT
Supply voltage, V_{CC}	4.75	5	5.25	V
Off-state output voltage			60	V
Operating free-air temperature, T_A	0		70	°C

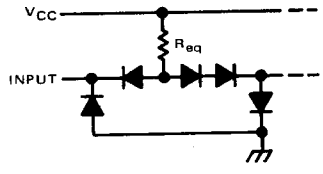
electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

PARAMETER			TEST CONDITIONS†		MIN	TYP‡	MAX	UNIT
V_{IH}	High-level input voltage				2			V
V_{IL}	Low-level input voltage						0.8	V
V_{IK}	Input clamp voltage		V_{CC} = MIN, I_I = −5 mA				−1.5	V
$V_{O(on)}$	On-state output voltage		V_{CC} = MIN, I_O = 7 mA				2.5	V
$V_{O(off)}$	Off-state output voltage for input counts 0 thru 9		V_{CC} = MAX, I_O = 0.5 mA		60			V
$I_{O(off)}$	Off-state reverse current		V_{CC} = MAX, V_O = 55 V				50	μA
$I_{O(off)}$	Off-state reverse current for input counts 10 thru 15		V_{CC} = MAX, V_O = 30 V	T_A = 55°C			5	μA
				T_A = 70°C			15	
I_I	Input current at maximum input voltage		V_{CC} = MAX, V_I = 5.5 V				1	mA
I_{IH}	High-level input current	A input	V_{CC} = MAX, V_I = 2.4 V				40	μA
		B, C, or D input					80	
I_{IL}	Low-level input current	A input	V_{CC} = MAX, V_I = 0.4 V				−1.6	mA
		B, C, or D input					−3.2	
I_{CC}	Supply current		V_{CC} = MAX, See Note 2			16	25	mA

†For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.
‡This typical value is at V_{CC} = 5 V, T_A = 25°C.
NOTE 2: I_{CC} is measured with all inputs grounded and outputs open.

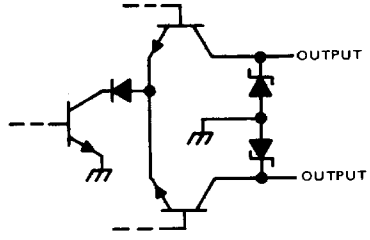
schematics of inputs and outputs

EQUIVALENT OF EACH INPUT



Input A: R_{eq} = 6 kΩ NOM
Inputs B, C, D: R_{eq} = 2 kΩ NOM

TYPICAL OF ALL OUTPUTS



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