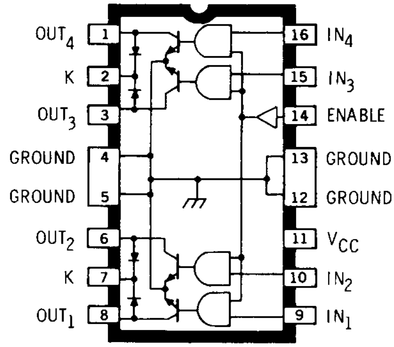
UDN-2540B
QUAD-NAND GATE POWER DRIVER

FEATURES

- 1.5 A Output Current
- Output Voltage to 60 V
- Integral Transient-Suppression Diodes
- Efficient Input/Output Pin Structure
- TTL, CMOS, PMOS, NMOS Compatible



Dwg. No. A-11,561

Combining NAND logic gates and high-current bipolar outputs, the UDN-2540B power and relay driver provides interface between low-level signal-processing circuits and power loads to 350 W. Each of the four independent outputs of this device can sink up to 1.5 A in the ON state. In the OFF state the drivers will withstand at least 60 V. Transient-suppression clamp diodes and a minimum 35 V output sustaining voltage allow their use with many inductive loads.

Typical applications include relays, solenoids, and dc stepping motors. It can also be used to drive high-current incandescent lamps, LEDs, and heaters. In display applications, the diodes can be used to perform the "lamp test" function.

Inputs are compatible with most TTL, DTL, LSTTL, and 5 V or 12 V CMOS and PMOS logic.

Each of the four outputs is recommended for continuous load currents to 1.25 A. Outputs can be paralleled for higher load currents.

The UDN-2540B is supplied in a 16-pin dual-in-line package with heat-sink contact tabs. This configuration allows attachment of an inexpensive heat sink and fits a standard integrated circuit socket or printed wiring board layout.

ABSOLUTE MAXIMUM RATINGS
at +25°C Free-Air Temperature

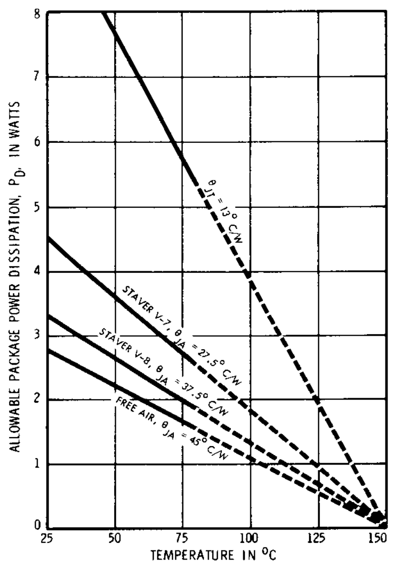
Output Voltage, V_{CE}	60 V
Output Current, I_{OUT}	1.5 A
Supply Voltage, V_{CC}	18 V
Input Voltage, V_{IN}	18 V
Power Dissipation, P_D (Each Driver)	2.5 W
(Total Package)	See Graph
Operating Temperature Range, T_A	−20°C to +85°C
Storage Temperature Range, T_S	−55°C to +150°C

ELECTRICAL CHARACTERISTICS at T_A = +25°C, T_{TAB} = +70°C, V_{CC} = 4.75 V to 12.6 V (unless otherwise noted)

Characteristic	Symbol	Test Conditions	Limits Min.	Limits Max.	Units
Output Leakage Current	I_{CEX}	V_{OUT} = 60 V, V_{IN} = 0.7 V, V_{ENABLE} = 2.0 V	—	100	μA
		V_{OUT} = 60 V, V_{IN} = 2.0 V, V_{ENABLE} = 0.7 V	—	100	μA
Output Sustaining Voltage	$V_{CE(SUS)}$	I_{OUT} = 100 mA, V_{IN} = V_{ENABLE} = 0.7 V	35	—	V
Output Saturation Voltage	$V_{CE(SAT)}$	I_{OUT} = 250 mA, V_{IN} = V_{ENABLE} = 2.0 V	—	1.0	V
		I_{OUT} = 500 mA, V_{IN} = V_{ENABLE} = 2.0 V	—	1.1	V
		I_{OUT} = 750 mA, V_{IN} = V_{ENABLE} = 2.0 V	—	1.25	V
		I_{OUT} = 1.0 A, V_{IN} = V_{ENABLE} = 2.0 V	—	1.4	V
		I_{OUT} = 1.25 A, V_{IN} = V_{ENABLE} = 2.0 V	—	1.6	V
Input Voltage	Logic 1	$V_{IN(1)}$ or $V_{ENABLE(1)}$	2.0	—	V
	Logic 0	$V_{IN(0)}$ or $V_{ENABLE(0)}$	—	0.7	V
Input Current	Logic 1	$V_{IN(1)}$ or $V_{ENABLE(1)}$ = 2.0 V	—	20	μA
	Logic 0	$V_{IN(0)}$ or $V_{ENABLE(0)}$ = 0.4 V	—	−200	μA
Input Clamp Voltage	V_{IK}	I_{IN} or I_{ENABLE} = −10 mA	—	−1.5	V
Total Supply Current	I_{CC}	V_{IN}* = V_{ENABLE} = 2.0 V, V_{CC} = 5.0 V, Outputs Open	—	8.0	mA
		V_{IN}* = V_{ENABLE} = 2.0 V, V_{CC} = 15 V, Outputs Open	—	33	mA
		V_{IN}* = V_{ENABLE} = 0.7 V, V_{CC} = 5.0 V	—	2.0	mA
		V_{IN}* = V_{ENABLE} = 0.7 V, V_{CC} = 15 V	—	7.0	mA
Clamp Diode Forward Voltage	V_F	I_F = 1.0 A	—	2.1	V
		I_F = 1.25 A	—	2.5	V
Clamp Diode Leakage Current	I_R	V_R = 60 V, V_{IN} = V_{ENABLE} = 2.0 V, $D_1 + D_2$ or $D_3 + D_4$	—	100	μA

*All inputs simultaneously, all other tests are performed with each input tested separately.

ALLOWABLE AVERAGE PACKAGE POWER DISSIPATION AS A FUNCTION OF TEMPERATURE



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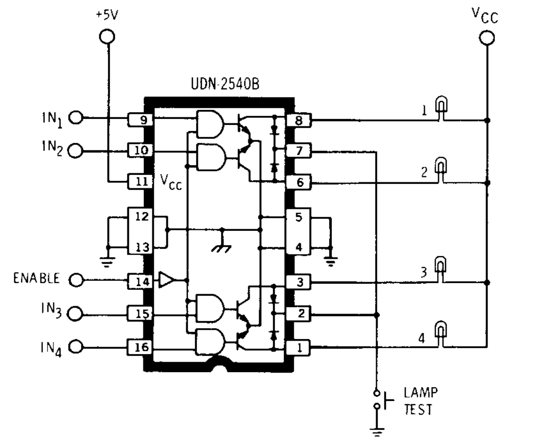
APPLICATIONS

Typical applications for this device include driving incandescent lamps and dc stepper motors. Lamps with steady-state current ratings up to 150 mA can be driven without current limiting or warming resistors (assumes 1.5 A peak in-rush). The internal diodes can be used to perform the "lamp test" function as shown. Bifilar (unipolar) stepper motors can be driven directly. The internal transient-suppression diodes prevent damage to the output transistor from positive high-voltage inductive spikes as the output switches OFF.

INCANDESCENT LAMP DRIVER



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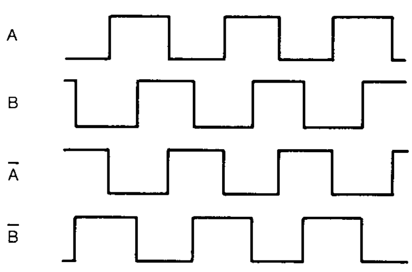
STEPPER-MOTOR DRIVER

INPUT WAVEFORMS



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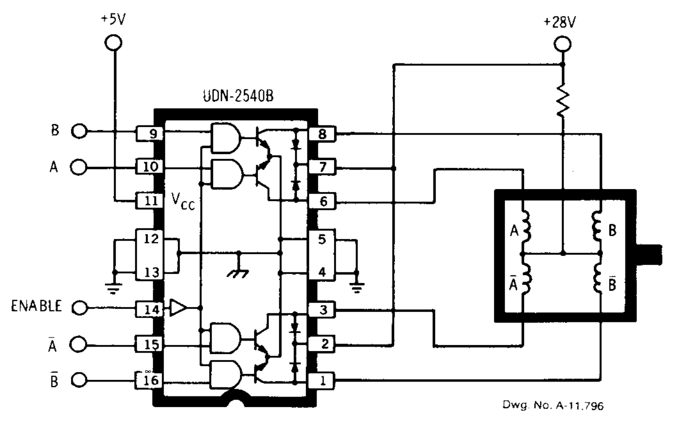

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