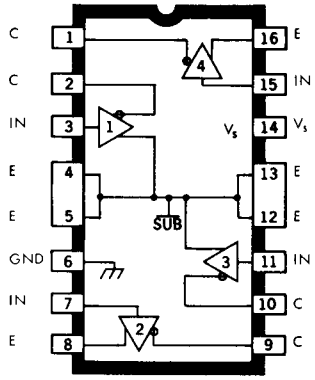
UDN-2841B AND UDN-2845B
QUAD DARLINGTON 1.5 A DRIVERS

FEATURES

- Inputs Compatible with DTL, TTL, LSTTL, CMOS
- – 50 V Darlington Outputs
- Current-Sink or Sink-and-Source Combination
- 16-Pin Dual In-Line Plastic Package



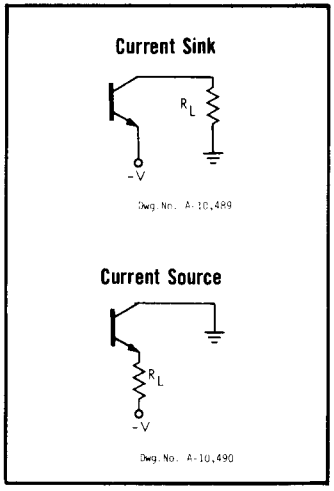
DWG. NO. A-10,323B

THIS PAIR OF QUAD DARLINGTON switches is designed for high-current, high-voltage peripheral driver applications. They provide solutions to interface problems involving electronic discharge printers, d-c motor drive (bipolar or unipolar), telephone relays, PIN diodes, LEDs, and other high-current loads operating with negative voltage supplies.

Type UDN-2841B is for current-sink applications in which the load is connected to ground. The outputs switch the negative supply. The input PNP transistor in each driver serves as a level translator. The first NPN stage provides current gain to drive the Darlington-pair outputs.

Type UDN-2845B is a current-sink, current-source combination in a single dual in-line plastic package. It can be used in bipolar switching applications in which neither end of the load is at ground potential.

Types UDN-2841 and UDN-2845B are intended for use with 5 V TTL, Schottky TTL, DTL, and CMOS logic. Both drivers reduce component count, lower system costs, and reduce circuit and board complexity.



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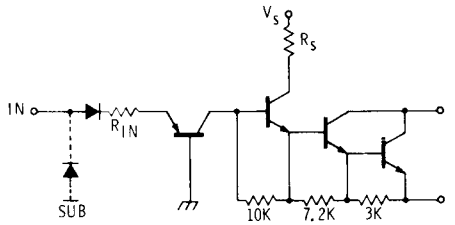
ABSOLUTE MAXIMUM RATINGS
at +25°C Free-Air Temperature
For Single Darlington Output
(Unless Otherwise Noted)

Output Voltage, $V_{CE(OFF)}$	50 V
Output Sustaining Voltage, $V_{CE(SUS)}$	35 V
Substrate Voltage, V_{SUB}	−50 V
Continuous Output Current, I_{OUT}	1.75 A
Supply Voltage, V_S	10 V
Input Voltage, V_{IN}	10 V
Power Dissipation, P_D (one output)	See Graph
Operating Temperature Range, T_A	−20°C to +85°C
Storage Temperature Range, T_S	−55°C to +150°C

SCHEMATIC
(Each Driver)

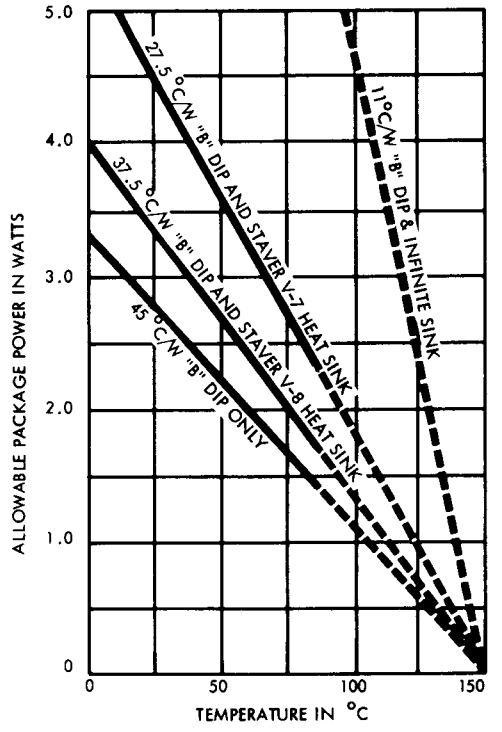


DWG. NO. A-10,483C

Type Number	Resistor Values in kΩ			
	Amplifier 1 & 3		Amplifier 2 & 4	
	R_{IN}	R_S	R_{IN}	R_S
UDN-2841B	3.3	15	3.3	15
UDN-2845B	3.3	15	3.3	1

NOTE: The substrate terminals must be tied to the most negative point in the external circuit to maintain isolation between transistors and to provide for normal device operation.

ALLOWABLE POWER DISSIPATION AS A FUNCTION OF TEMPERATURE



DWG. NO. A-10,488C

ELECTRICAL CHARACTERISTICS at T_A = +25°C (unless otherwise noted)

Characteristic	Symbol	Test Conditions	Limits			
			Min.	Typ.	Max.	Units
Output Leakage Current	I_{CEX}	V_{EE} = −50V, V_{IN} = 0.4V, T_A = 25°C	—	—	100	µA
		V_{EE} = −50V, V_{IN} = 0.4V, T_A = 70°C	—	—	500	µA
Output Sustaining Voltage	$V_{CE(SUS)}$	V_{EE} = −50V, V_{IN} = 0.4 V, I_{OUT} = 100 mA	35	50	—	V
Output Saturation Voltage	$V_{CE(SAT)}$	I_{OUT} = 500mA	—	—	1.1	V
		I_{OUT} = 1.0A (Note 1)	—	—	1.4	V
		I_{OUT} = 1.5A (Note 1)	—	—	1.6	V
Input Current	$I_{IN(ON)}$	I_{OUT} = 500mA, V_{IN} = 2.4V	—	300	500	µA
Input Voltage (Note 1)	$V_{IN(ON)}$	I_{OUT} = 1.5A	—	—	2.4	V
Supply Current (Note 1)	I_S	I_{OUT} = 500mA, UDN-2841B, UDN-2845B (Note 2)	—	2.5	3.75	mA
		I_{OUT} = 500mA, UDN-2845B (Note 3)	—	3.3	7.5	mA
Turn-On Delay	$t_{pd(ON)}$	R_L = 39Ω, 0.5 V_{IN} to 0.5 V_{OUT}	—	—	2.0	µs
Turn-Off Delay	$t_{pd(OFF)}$	R_L = 39Ω, 0.5V_{IN} to 0.5V_{OUT}	—	—	5.0	µs

NOTES:
1. Each driver tested separately.
2. Drivers 1 & 3 (sink drivers) only, V_S = 0V, V_{EE} = −40V.
3. Drivers 2 & 4 (source drivers) only, V_S = 5V, V_{EE} = −40V.

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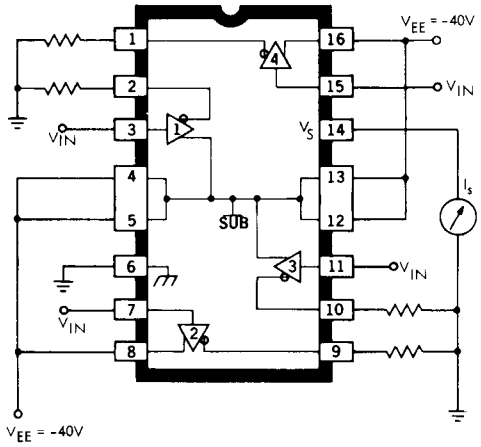
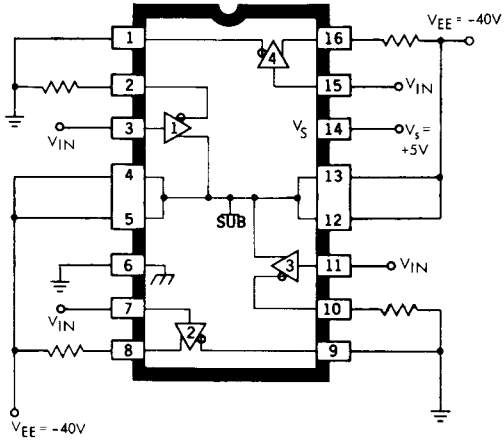
TEST CIRCUITS

UDN-2841B



DWG. NO. A-10,487A

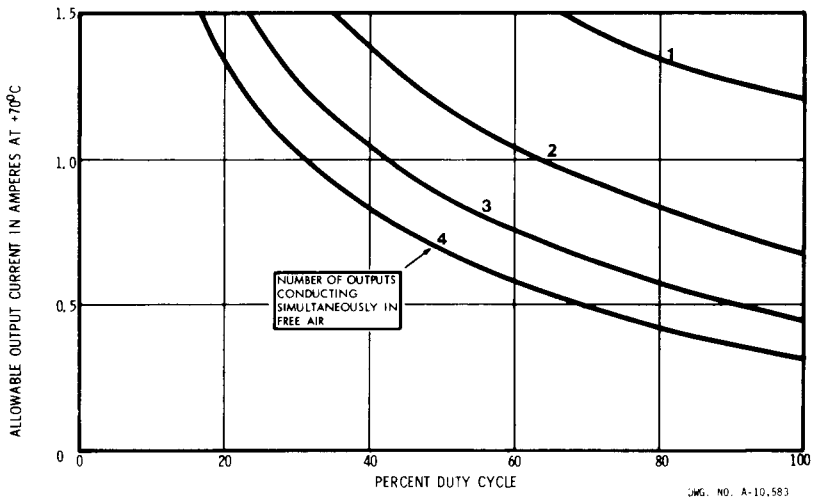
UDN-2845B



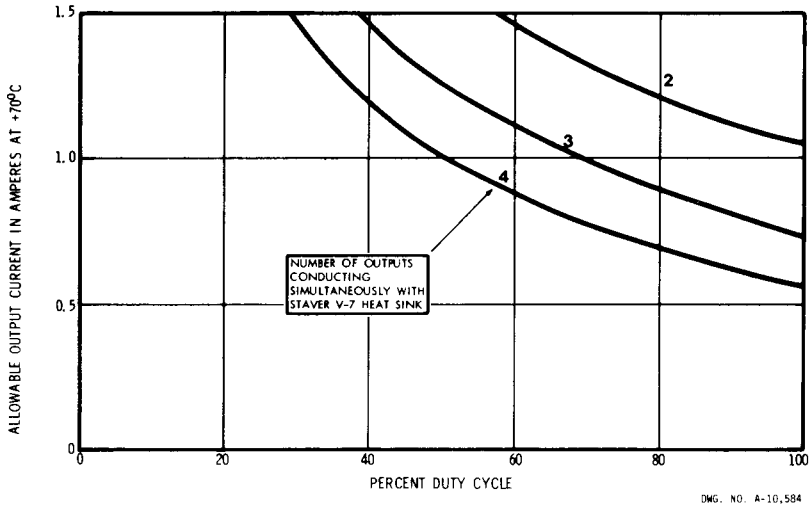
DWG. NO. A-10,484A

ALLOWABLE OUTPUT CURRENT AS A FUNCTION OF DUTY CYCLE

WITHOUT HEAT SINK



WITH STAVER V-7 HEAT SINK



OUTPUT-STAGE TRANSIENT PROTECTION

When switching inductive loads, the output transistors of UDN-2841B and UDN-2845B drivers should be protected by a suitable clamping technique. The simplest approach is to clamp each output with a discrete diode, as shown in Figures 1 and 2.

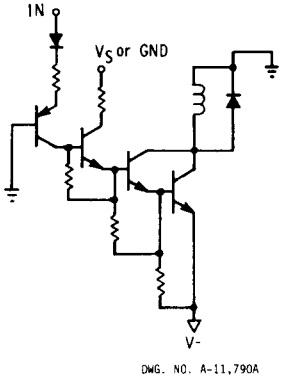


Figure 1
UDN-2841B

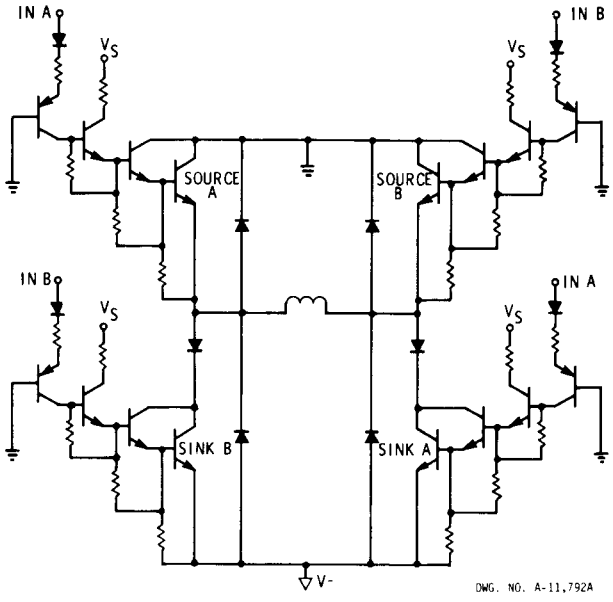


Figure 2
UDN-2845B

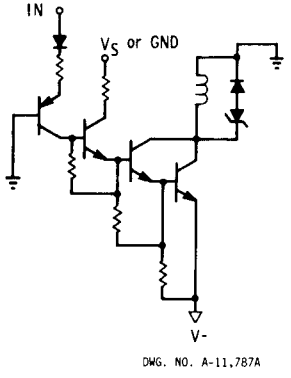
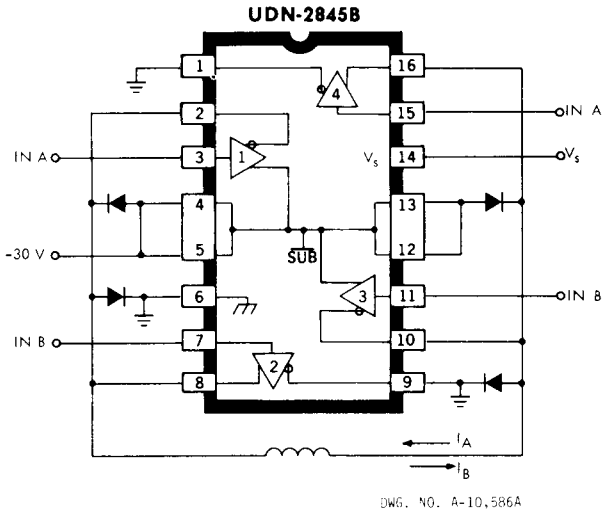


Figure 3
UDN-2841B

For improved turnoff, a combination diode/Zener diode scheme can be used. The Zener diode in the clamp circuit of Figure 3 allows the flyback voltage to rise above the supply voltage, speeding turnoff of the load. An appropriate resistor can be substituted for the Zener diode. With a 1A load, substitution of a 15Ω resistor results in operation similar to that of the Zener diode circuit.

TYPICAL APPLICATIONS

BIPOLAR MOTOR DRIVER



ELECTROSENSITIVE PRINTER INTERFACE