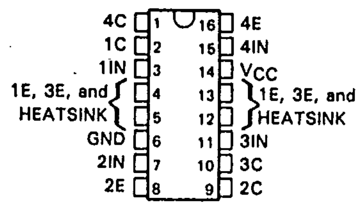
UDN2841, UDN2845
QUADRUPLE HIGH-CURRENT DARLINGTON DRIVERS

D2507, DECEMBER 1980—REVISED AUGUST 1986

T-52-13-25

- For Use with Negative Supplies
- Current Sink . . . UDN2841
- Sink or Source Combination . . . UDN2845
- Output Current Capability . . . 1.5 A
- High Output-Voltage Capability . . . 50 V
- Preamplifier for High Current Gain
- Inputs Compatible with TTL and 5-V CMOS
- Reliable Monolithic Construction
- Designed to be Interchangeable with Sprague UDN2841 and UDN2845

NE DUAL-IN-LINE PACKAGE
(TOP VIEW)



description

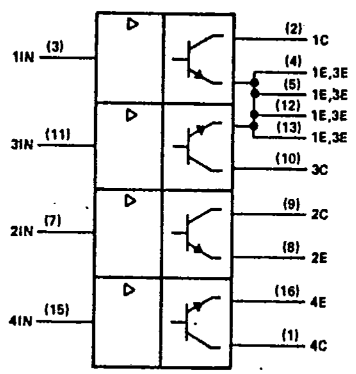
These quadruple Darlington switches are monolithic bipolar devices especially designed for high-current, high-voltage peripheral driver applications. The devices are designed to offer solutions to interface problems involving electronic-discharge printers, bipolar and unipolar dc motor drivers, telephone relays, LEDs, PIN diodes, and other high-current loads operating from negative power supplies.

The UDN2841 is intended for current-sink applications with the load connected to ground and the device switching the negative supply. The UDN2845 is a sink and source combination for use in bipolar switching applications where both ends of the load are floating. The UDN2841 and UDN2845 each feature inputs that are compatible with standard TTL and 5-volt CMOS signals. The p-n-p input transistor serves as a level translator and the first n-p-n transistor stage is designed to provide sufficient current gain to drive the output Darlington-connected pair.

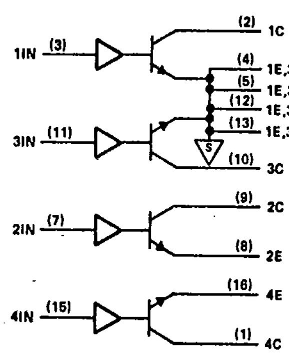
Driver channels 2 and 4 have uncommitted collectors and emitters while 1 and 3 have emitters internally connected to the substrate. For proper operation, the substrate must be connected to the most-negative supply voltage.

The UDN2841 and UDN2845 are characterized for operation from −20°C to 85°C.

logic symbol†



logic diagram



S = SUBSTRATE

†This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

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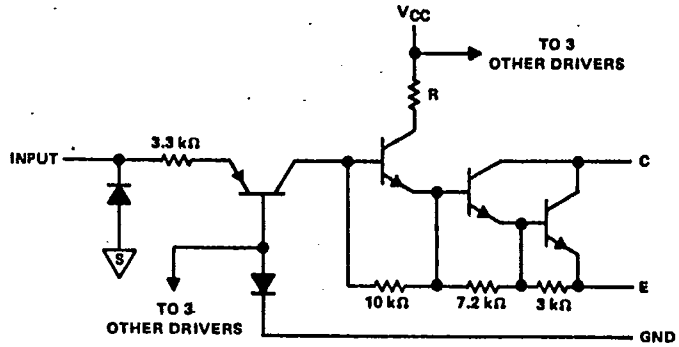
schematic diagram (each driver)



S = Substrate
UDN2841: R = 15 kΩ each channel
UDN2845: R = 15 kΩ channels 1 and 3, R = 1 kΩ, channels 2 and 4.
Resistor values shown are nominal.

absolute maximum ratings at 25°C free-air temperature (unless otherwise noted)

Collector-emitter voltage	50 V
Supply voltage, V_{CC} (see Note 1)	10 V
Input voltage	10 V
Substrate voltage	−50 V
Peak output current	1.75 A
Total power dissipation at (or below) 25°C free-air temperature (see Note 2)	2075 mW
Operating free-air temperature range	−20°C to 85°C
Storage temperature range	−55°C to 150°C
Lead temperature 1,6 mm (1/16 inch) from case for 10 seconds	260°C

NOTES: 1. All voltage values, except collector-emitter voltage, are with respect to the network ground terminal.
2. For operation above 25°C free-air temperature, derate total power linearly to 1079 mW at 85°C at the rate of 16.6 mW/°C.

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electrical characteristics at 25°C free-air temperature (unless otherwise noted), V_{CC} = 5 V, see Figures 1 and 2

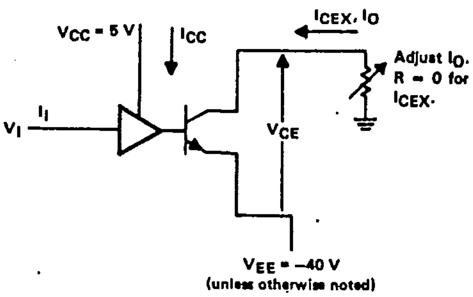
PARAMETER		TEST CONDITIONS		UDN2841 MIN	UDN2841 TYP	UDN2841 MAX	UDN2845 MIN	UDN2845 TYP	UDN2845 MAX	UNIT
$V_{CEX(sus)}$	Collector sustaining voltage	V_{EE} = −50 V, V_I = 0.4 V, I_O = 100 mA		35	50		35	50		V
I_{CEX}	Collector output cutoff current	V_{EE} = −50 V, V_I = 0.4 V				100			100	μA
		V_{EE} = −50 V, V_I = 0.4 V, T_A = 70°C				500			500	
$I_{I(on)}$	On-state input current	I_O = 0.5 A	Drivers 1 and 3		300	500		300	500	μA
			Drivers 2 and 4		300	500		350	500	
$V_{I(on)}$	On-state input voltage	I_O = 1.5 A, See Note 3				2.4			2.4	V
$V_{CE(sat)}$	Collector-emitter saturation voltage	V_I = 2.4 V, See Note 3	I_O = 0.5 A			1.1			1.1	V
			I_O = 1 A			1.4			1.4	
			I_O = 1.5 A			1.6			1.6	
I_{CC}	Supply current (each driver)	I_O = 0.5 A, See Note 3	Drivers 1 and 3		2.5	3.75		2.5	3.75	mA
			Drivers 2 and 4		2.5	3.75		3.75	7.5	

NOTE 3: These parameters must be measured on one output at a time using pulse techniques, t_w = 10 ms, duty cycle ≤10%.

switching characteristics at V_{EE} = −40 V, R_L = 39 Ω, C_L = 15 pF, T_A = 25°C

PARAMETER		TEST CONDITIONS	UDN2841 MIN	UDN2841 TYP	UDN2841 MAX	UDN2845 MIN	UDN2845 TYP	UDN2845 MAX	UNIT
t_{on}	Turn-on time	See Figure 3			2			2	μs
t_{off}	Turn-off time	See Figure 3			5			5	μs

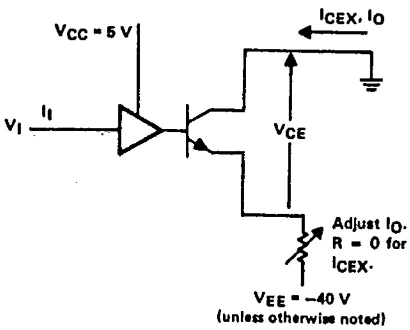
PARAMETER MEASUREMENT INFORMATION



NOTE: UDN2841 driver channels 1 through 4 and UDN2845 driver channels 1 and 3 only.

TEST CIRCUIT

FIGURE 1. SINK-CURRENT DRIVER



NOTE: UDN2845 driver channels 2 and 4 only.

TEST CIRCUIT

FIGURE 2. SOURCE-CURRENT DRIVER

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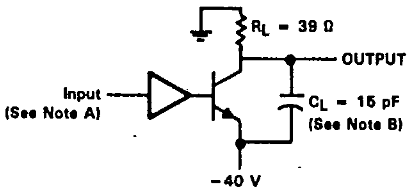
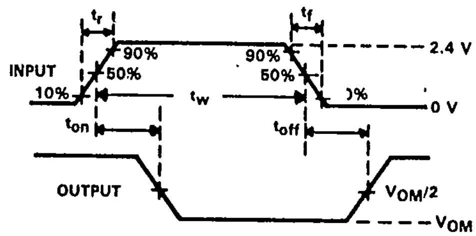
PARAMETER MEASUREMENT INFORMATION



TEST CIRCUIT



VOLTAGE WAVEFORMS

NOTES: A. The input pulse is supplied by a generator with the following characteristics: PRR = 50 kHz, t_w = 10 μs, $t_r \leq$ 5 ns, $t_f \leq$ 5 ns, Z_O = 50 Ω.
B. C_L includes probe and jig capacitance.

FIGURE 3. SWITCHING CHARACTERISTICS

THERMAL INFORMATION

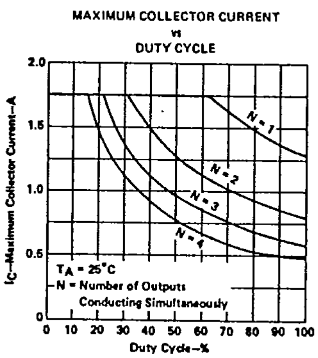


FIGURE 4

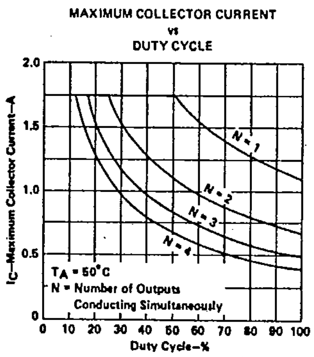


FIGURE 5

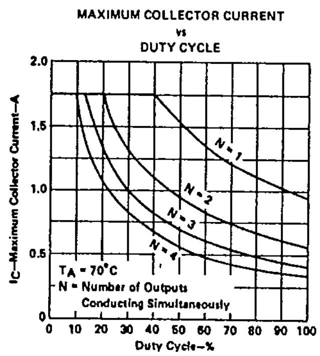


FIGURE 6

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