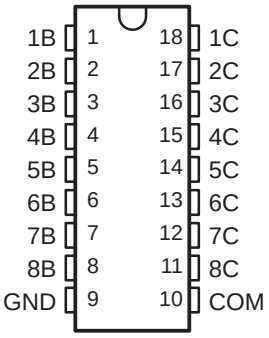
- **500-mA Rated Collector Current (Single Output)**
- **High-Voltage Outputs . . . 100 V**
- **Output Clamp Diodes**
- **Inputs Compatible With Various Types of Logic**
- **Relay Driver Applications**
- **Compatible With ULN2800A Series**
- **Packaged in Plastic (N) DIPs**

N PACKAGE
(TOP VIEW)



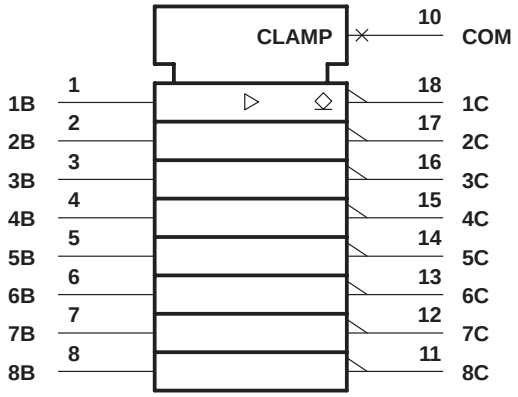
description

The SN75423 and SN75424 are monolithic high-voltage, high-current Darlington transistor arrays. Each consists of eight npn Darlington pairs that feature high-voltage outputs with common-cathode clamp diodes for switching inductive loads. The collector-current rating of each Darlington pair is 500 mA. The Darlington pairs can be paralleled for higher current capability. Applications include relay drivers, hammer drivers, lamp drivers, display drivers (LED and gas discharge), line drivers, and logic buffers.

The SN75423 has a 2700-Ω series base resistor for each Darlington pair for operation directly with TTL or 5-V CMOS. The SN75424 has a 10.5-kΩ series base resistor to allow operation directly with CMOS or PMOS that use supply voltages of 6 to 15 V.

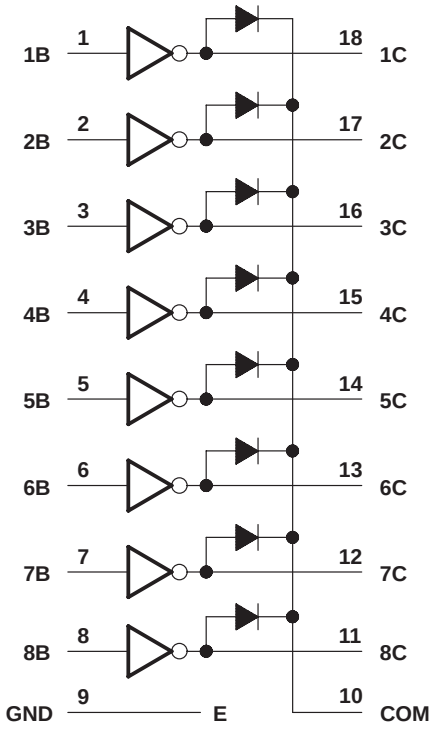
The SN75423 and SN75424 are designed for operation from 0°C to 85°C.

logic symbol†



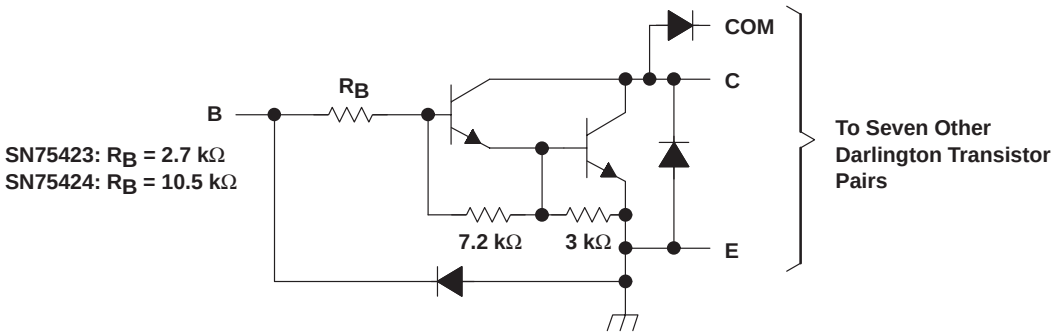
† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

logic diagram (positive logic)



Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.

schematic (each Darlington pair)



All resistor values shown are nominal.

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

Collector-emitter voltage, V_{CE}	100 V
Input voltage, V_I (see Note 1)	30 V
Continuous collector current	500 mA
Output clamp diode current, I_{OK}	500 mA
Total substrate-terminal current	–2.5 A
Continuous total power dissipation at or below 25°C free air temperature	1150 mW
Operating free-air temperature range, T_A	0°C to 85°C
Storage temperature range, T_{stg}	–65°C to 150°C
Lead temperature 1,6 mm (1/16 inch) from case for 10 seconds	260°C

NOTE 1: All voltage values are with respect to the emitter/substrate, terminal 9.

electrical characteristics, T_A = 25°C (unless otherwise noted)

PARAMETER		TEST FIGURE	TEST CONDITIONS		SN75423			SN75424			UNIT
					MIN	TYP	MAX	MIN	TYP	MAX	
$V_{I(on)}$	On-state input voltage	5	V_{CE} = 2 V	I_C = 125 mA						5	V
				I_C = 200 mA			2.4			6	
				I_C = 250 mA			2.7				
				I_C = 275 mA						7	
				I_C = 300 mA			3				
				I_C = 350 mA						8	
$V_{CE(sat)}$	Collector-emitter saturation voltage	6	I_I = 250 μA,	I_C = 100 mA		0.9	1.1		0.9	1.1	V
			I_I = 350 μA,	I_C = 200 mA		1	1.3		1	1.3	
			I_I = 500 μA,	I_C = 350 mA		1.2	1.6		1.2	1.6	
V_F	Clamp-diode forward voltage	8	I_F = 350 mA			1.7	2		1.7	2	V
I_{CEX}	Collector cutoff current	1	V_{CE} = 100 V,	I_I = 0			100			100	μA
		2	V_{CE} = 100 V, T_A = 70°C	V_I = 1 V,						500	
$I_{I(off)}$	Off-state input current	3	V_{CE} = 100 V, T_A = 70°C	I_C = 500 μA,	50	65		50	65		μA
$I_{I(on)}$	Input current	4	V_I = 3.85 V			0.93	1.35				mA
			V_I = 5 V						0.35	0.5	
			V_I = 12 V						1	1.45	
I_R	Clamp-diode reverse current	7	V_R = 100 V				50			50	μA
C_i	Input capacitance		V_I = 0,	f = 1 MHz		15	30		15	30	pF

switching characteristics, T_A = 25°C free-air temperature

PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
t_{PLH}	Propagation delay time, low-to-high-level output	V_S = 50 V, R_L = 163 Ω, C_L = 15 pF, See Figure 9		130		ns
t_{PHL}	Propagation delay time, high-to-low-level output	V_S = 50 V, R_L = 163 Ω, C_L = 15 pF, See Figure 9		20		ns
V_{OH}	High-level output voltage after switching	V_S = 60 V, I_O ≈ 300 mA, See Figure 10	V_S – 20			mV

PARAMETER MEASUREMENT INFORMATION

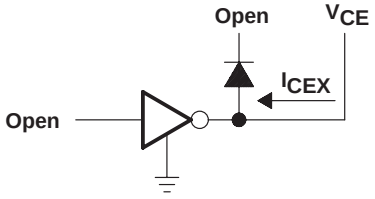


Figure 1. I_{CEX}

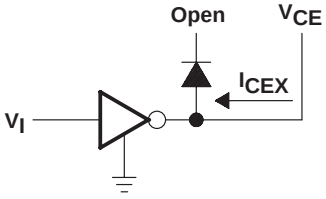


Figure 2. I_{CEX}

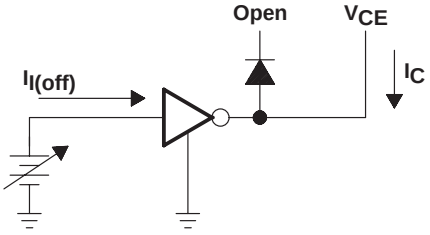


Figure 3. $I_{I(off)}$

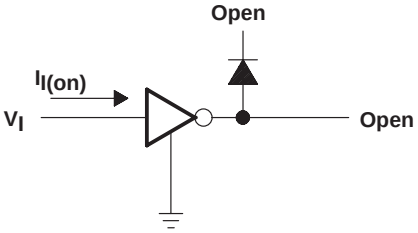


Figure 4. $I_{I(on)}$

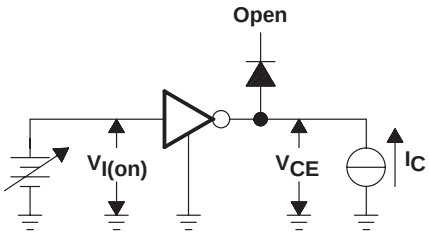


Figure 5. $V_{I(on)}$

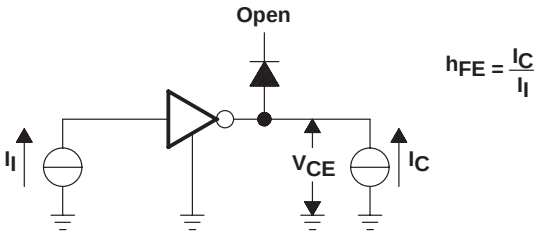


Figure 6. h_{FE}, $V_{CE(sat)}$

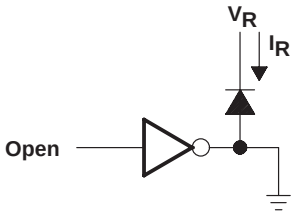


Figure 7. I_R

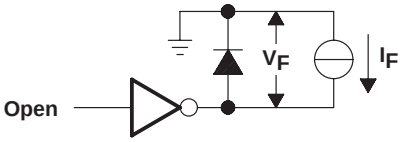
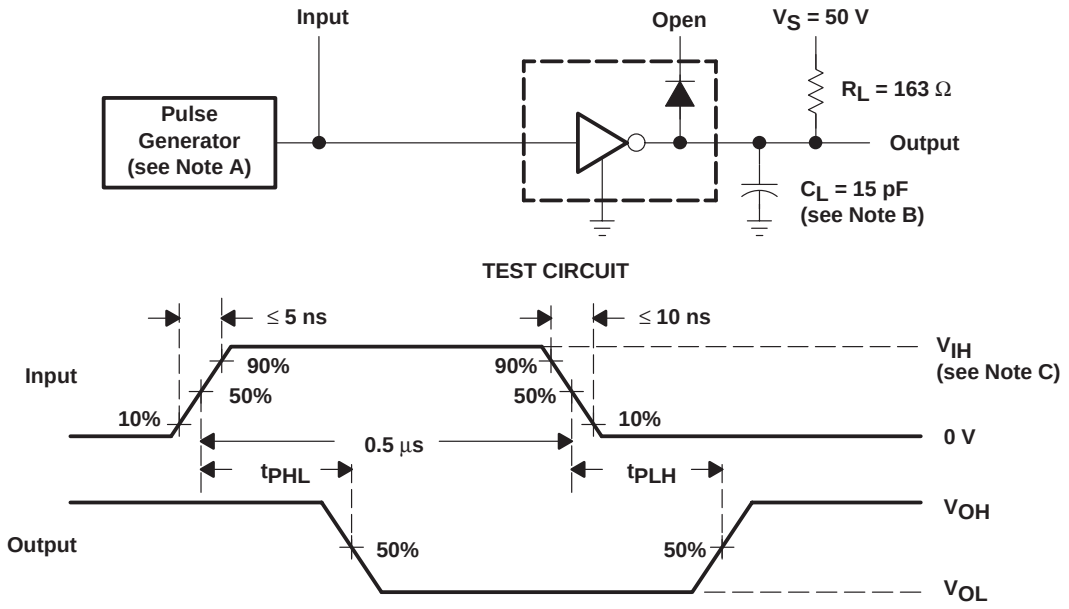


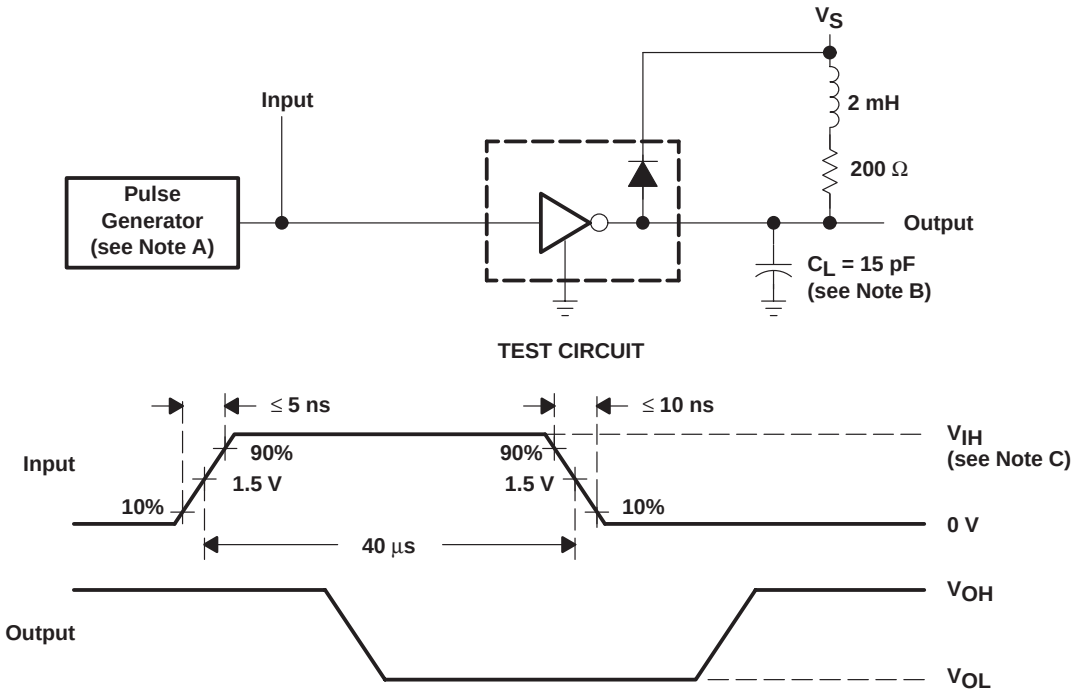
Figure 8. V_F

PARAMETER MEASUREMENT INFORMATION



NOTES: A. The pulse generator has the following characteristics: PRR = 12.5 kHz, Z_O = 50 Ω.
B. C_L includes probe and jig capacitance.
C. For testing the SN75423, V_{IH} = 3 V; for the SN75424, V_{IH} = 8 V.

Figure 9. Propogation Delay Test Circuit and Voltage Waveforms



NOTES: A. The pulse generator has the following characteristics: PRR = 12.5 kHz, Z_O = 50 Ω.
B. C_L includes probe and jig capacitance.
C. For testing the SN75423, V_{IH} = 3 V; for the SN75424, V_{IH} = 8 V.

Figure 10. Latch-Up Test Circuit and Voltage Waveforms

PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish	MSL Peak Temp (3)
SN75423N	OBSOLETE	PDIP	N	18		None	Call TI	Call TI
SN75423N-90	OBSOLETE	PDIP	N	18		None	Call TI	Call TI

(1) The marketing status values are defined as follows:
ACTIVE: Product device recommended for new designs.
LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.
NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.
PREVIEW: Device has been announced but is not in production. Samples may or may not be available.
OBSOLETE: TI has discontinued the production of the device.

(2) Eco Plan - May not be currently available - please check http://www.ti.com/productcontent for the latest availability information and additional product content details.
None: Not yet available Lead (Pb-Free).
Pb-Free (RoHS): TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.
Green (RoHS & no Sb/Br): TI defines "Green" to mean "Pb-Free" and in addition, uses package materials that do not contain halogens, including bromine (Br) or antimony (Sb) above 0.1% of total product weight.

(3) MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDECindustry standard classifications, and peak solder temperature.

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