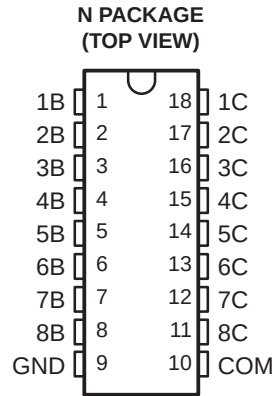


- 500-mA Rated Collector Current (Single Output)
- High-Voltage Outputs . . . 100 V
- Output Clamp Diodes
- Inputs Compatible With Various Types of Logic
- Relay Driver Applications
- Compatible With ULN2800A Series
- Packaged in Plastic (N) DIPs



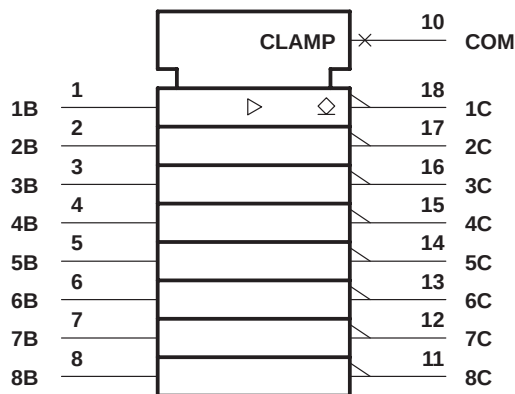
description

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.

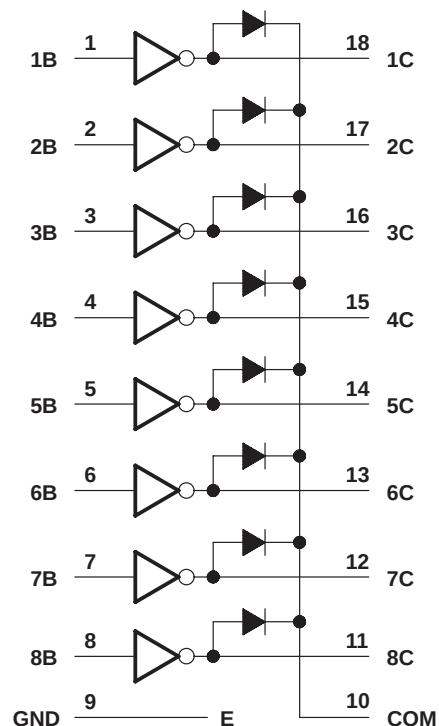
The SN75423 and SN75424 are designed for operation from 0°C to 85°C.

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.

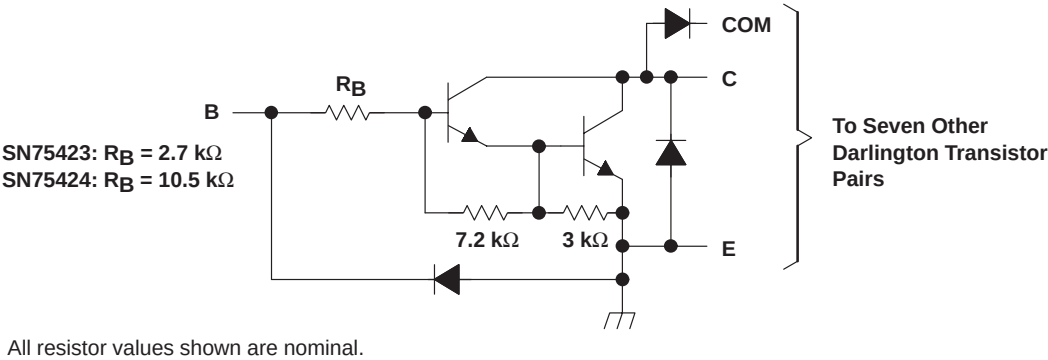
PRODUCTION DATA information is current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

**TEXAS
INSTRUMENTS**

POST OFFICE BOX 655303 • DALLAS, TEXAS 75265

Copyright © 1998, Texas Instruments Incorporated

schematic (each Darlington pair)



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, $T_A = 25^\circ\text{C}$ (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	$V_{CE} = 2\text{ V}$	$I_C = 125\text{ mA}$						5	V
			$I_C = 200\text{ mA}$			2.4			6	
			$I_C = 250\text{ mA}$			2.7				
			$I_C = 275\text{ mA}$						7	
			$I_C = 300\text{ mA}$			3				
			$I_C = 350\text{ mA}$						8	
$V_{CE(sat)}$ Collector-emitter saturation voltage	6	$I_I = 250\text{ }\mu\text{A}$, $I_C = 100\text{ mA}$		0.9	1.1		0.9	1.1		V
		$I_I = 350\text{ }\mu\text{A}$, $I_C = 200\text{ mA}$		1	1.3		1	1.3		
		$I_I = 500\text{ }\mu\text{A}$, $I_C = 350\text{ mA}$		1.2	1.6		1.2	1.6		
V_F Clamp-diode forward voltage	8	$I_F = 350\text{ mA}$		1.7	2		1.7	2		V
I_{CEX} Collector cutoff current	1	$V_{CE} = 100\text{ V}$, $I_I = 0$			100			100		μA
	2	$V_{CE} = 100\text{ V}$, $V_I = 1\text{ V}$, $T_A = 70^\circ\text{C}$						500		
$I_{I(off)}$ Off-state input current	3	$V_{CE} = 100\text{ V}$, $I_C = 500\text{ }\mu\text{A}$, $T_A = 70^\circ\text{C}$		50	65		50	65		μA
$I_{I(on)}$ Input current	4	$V_I = 3.85\text{ V}$		0.93	1.35					mA
		$V_I = 5\text{ V}$					0.35	0.5		
		$V_I = 12\text{ V}$					1	1.45		
I_R Clamp-diode reverse current	7	$V_R = 100\text{ V}$			50			50		μA
C_i Input capacitance		$V_I = 0$, $f = 1\text{ MHz}$		15	30		15	30		pF

switching characteristics, $T_A = 25^\circ\text{C}$ free-air temperature

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

PARAMETER MEASUREMENT INFORMATION

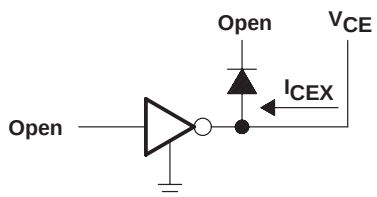


Figure 1. I_{CEX}

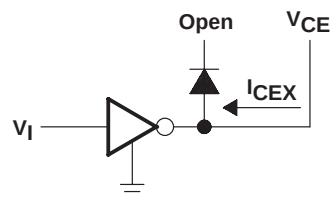


Figure 2. I_{CEX}

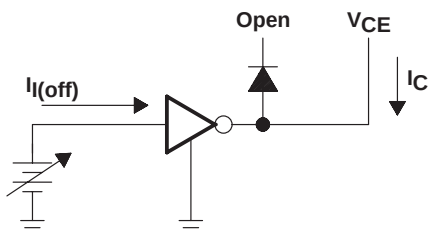


Figure 3. $I_{I(off)}$

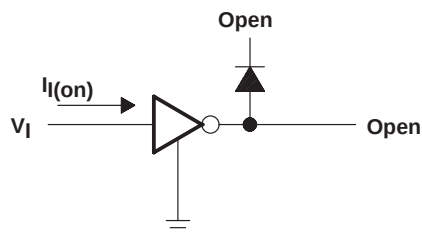


Figure 4. $I_{I(on)}$

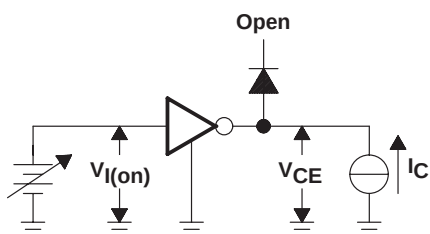


Figure 5. $V_{I(on)}$

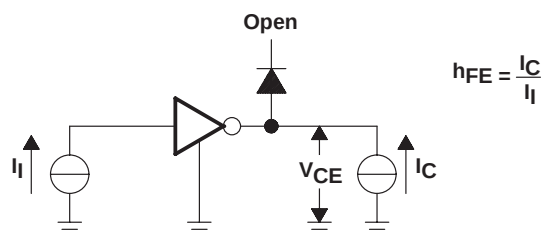


Figure 6. h_{FE} , $V_{CE(sat)}$

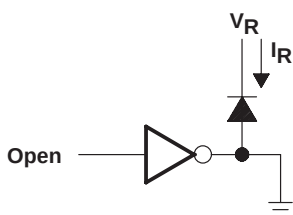


Figure 7. I_R

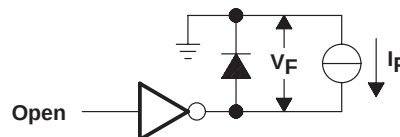
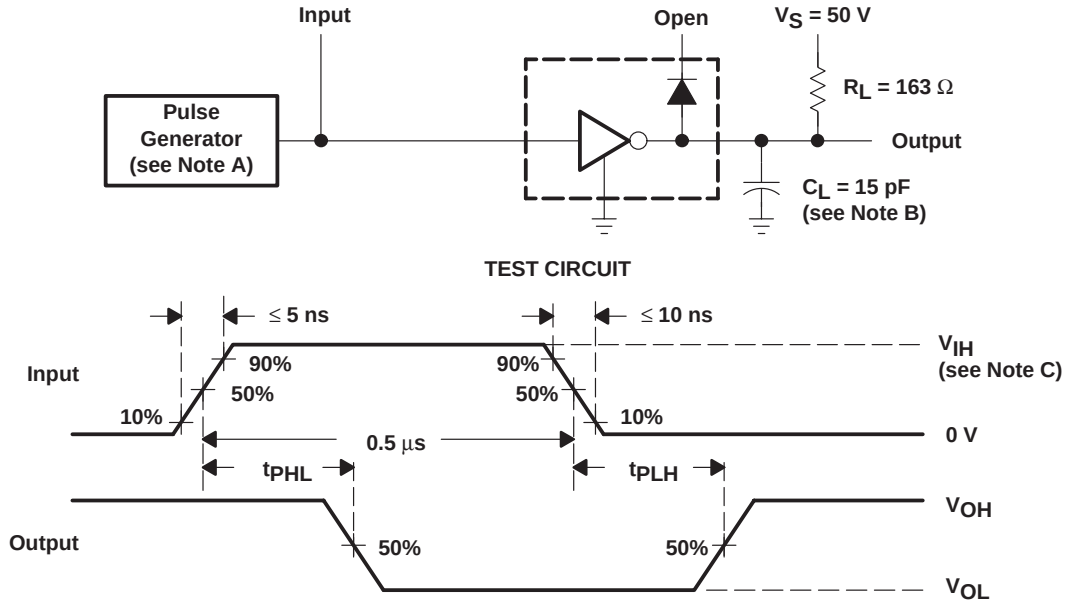


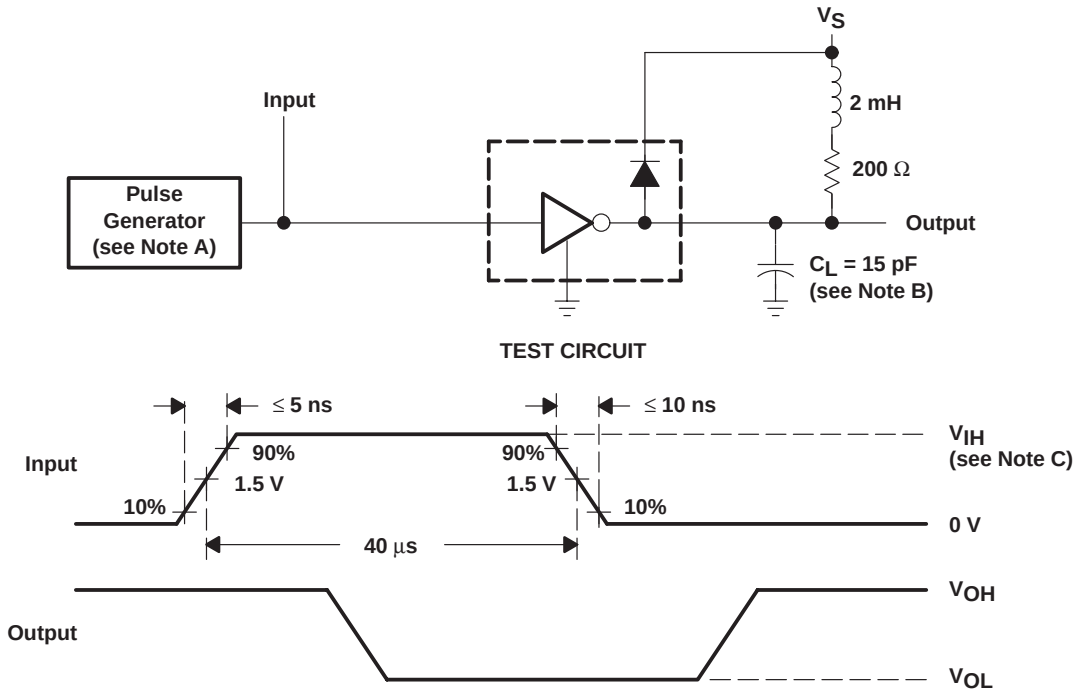
Figure 8. V_F

PARAMETER MEASUREMENT INFORMATION



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

Figure 9. Propagation Delay Test Circuit and Voltage Waveforms



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

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		TBD	Call TI	Call TI
SN75423N-90	OBSOLETE	PDIP	N	18		TBD	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 - The planned eco-friendly classification: Pb-Free (RoHS) or Green (RoHS & no Sb/Br) - please check <http://www.ti.com/productcontent> for the latest availability information and additional product content details.

TBD: The Pb-Free/Green conversion plan has not been defined.

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 (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

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

Important Information and Disclaimer: The information provided on this page represents TI's knowledge and belief as of the date that it is provided. TI bases its knowledge and belief on information provided by third parties, and makes no representation or warranty as to the accuracy of such information. Efforts are underway to better integrate information from third parties. TI has taken and continues to take reasonable steps to provide representative and accurate information but may not have conducted destructive testing or chemical analysis on incoming materials and chemicals. TI and TI suppliers consider certain information to be proprietary, and thus CAS numbers and other limited information may not be available for release.

In no event shall TI's liability arising out of such information exceed the total purchase price of the TI part(s) at issue in this document sold by TI to Customer on an annual basis.

IMPORTANT NOTICE

Texas Instruments Incorporated and its subsidiaries (TI) reserve the right to make corrections, modifications, enhancements, improvements, and other changes to its products and services at any time and to discontinue any product or service without notice. Customers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All products are sold subject to TI's terms and conditions of sale supplied at the time of order acknowledgment.

TI warrants performance of its hardware products to the specifications applicable at the time of sale in accordance with TI's standard warranty. Testing and other quality control techniques are used to the extent TI deems necessary to support this warranty. Except where mandated by government requirements, testing of all parameters of each product is not necessarily performed.

TI assumes no liability for applications assistance or customer product design. Customers are responsible for their products and applications using TI components. To minimize the risks associated with customer products and applications, customers should provide adequate design and operating safeguards.

TI does not warrant or represent that any license, either express or implied, is granted under any TI patent right, copyright, mask work right, or other TI intellectual property right relating to any combination, machine, or process in which TI products or services are used. Information published by TI regarding third-party products or services does not constitute a license from TI to use such products or services or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property of the third party, or a license from TI under the patents or other intellectual property of TI.

Reproduction of information in TI data books or data sheets is permissible only if reproduction is without alteration and is accompanied by all associated warranties, conditions, limitations, and notices. Reproduction of this information with alteration is an unfair and deceptive business practice. TI is not responsible or liable for such altered documentation.

Resale of TI products or services with statements different from or beyond the parameters stated by TI for that product or service voids all express and any implied warranties for the associated TI product or service and is an unfair and deceptive business practice. TI is not responsible or liable for any such statements.

Following are URLs where you can obtain information on other Texas Instruments products and application solutions:

Products		Applications	
Amplifiers	amplifier.ti.com	Audio	www.ti.com/audio
Data Converters	dataconverter.ti.com	Automotive	www.ti.com/automotive
DSP	dsp.ti.com	Broadband	www.ti.com/broadband
Interface	interface.ti.com	Digital Control	www.ti.com/digitalcontrol
Logic	logic.ti.com	Military	www.ti.com/military
Power Mgmt	power.ti.com	Optical Networking	www.ti.com/opticalnetwork
Microcontrollers	microcontroller.ti.com	Security	www.ti.com/security
		Telephony	www.ti.com/telephony
		Video & Imaging	www.ti.com/video
		Wireless	www.ti.com/wireless

Mailing Address: Texas Instruments
Post Office Box 655303 Dallas, Texas 75265

Copyright © 2005, Texas Instruments Incorporated