

- 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

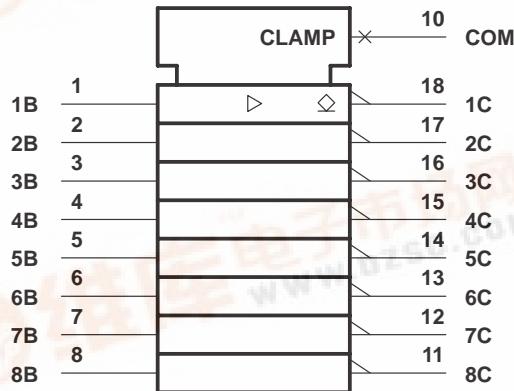
description

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-k Ω series base resistor to allow operation directly with CMOS or PMOS that use supply voltages of 6 to 15 V.

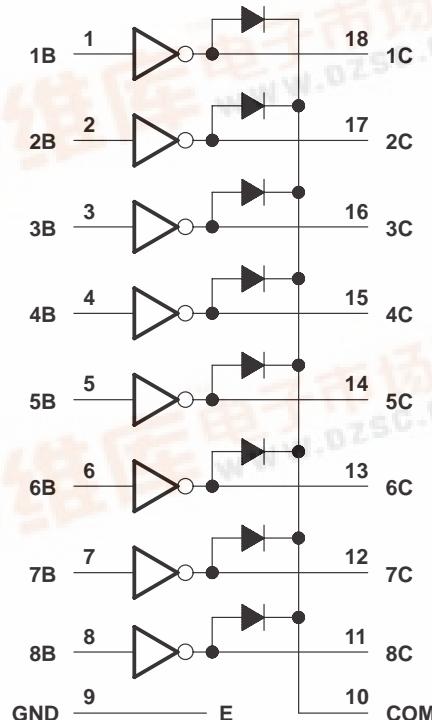
The SN75423 and SN75424 are designed for operation from 0°C to 85°C.

logic symbol†



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

logic diagram (positive logic)

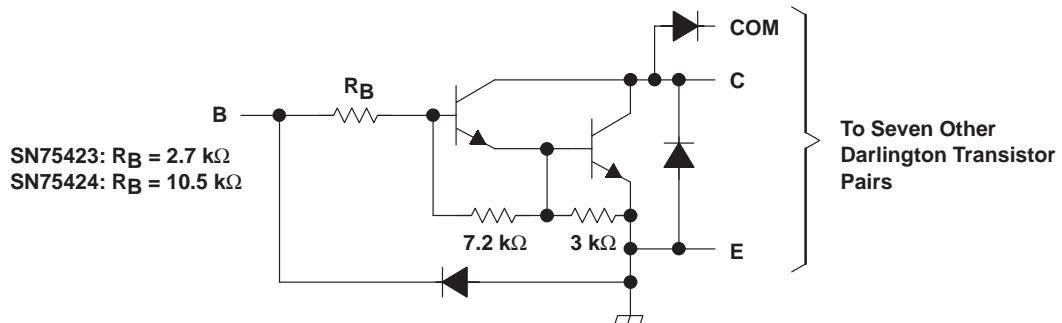


Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.

SN75423, SN75424 HIGH-VOLTAGE HIGH-CURRENT DARLINGTON TRANSISTOR ARRAYS

SLDS115 – FEBRUARY 1998

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.

SN75423, SN75424
**HIGH-VOLTAGE HIGH-CURRENT
DARLINGTON TRANSISTOR ARRAYS**
SLDS115 – FEBRUARY 1998

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	
$V_{I(\text{on})}$ 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	
$V_{CE(\text{sat})}$ 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	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	
$I_{I(\text{off})}$	3	$V_{CE} = 100\text{ V}, I_C = 500\text{ }\mu\text{A}, T_A = 70^\circ\text{C}$	50	65		50	65		μA
$I_{I(\text{on})}$ 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	7	$V_R = 100\text{ V}$		50			50		μA
C_I		$V_I = 0, f = 1\text{ MHz}$	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

SN75423, SN75424
HIGH-VOLTAGE HIGH-CURRENT
DARLINGTON TRANSISTOR ARRAYS
 SLDS115 – FEBRUARY 1998

PARAMETER MEASUREMENT INFORMATION

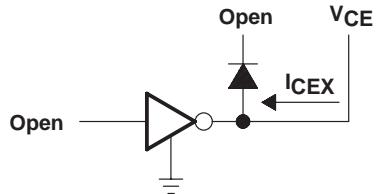


Figure 1. I_{CEX}

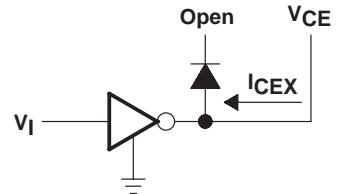


Figure 2. I_{CEX}

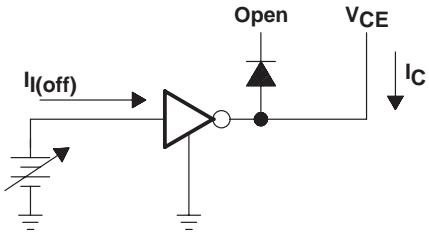


Figure 3. $I_{I(off)}$

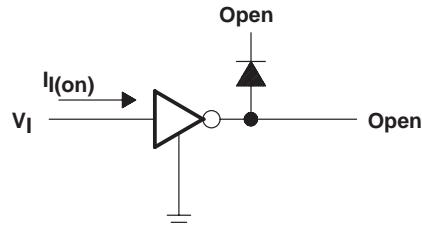


Figure 4. $I_{I(on)}$

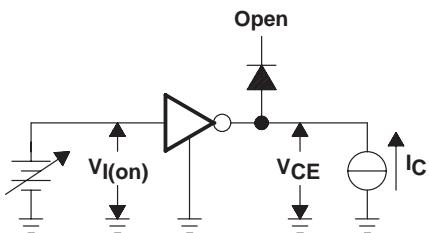


Figure 5. $V_{I(on)}$

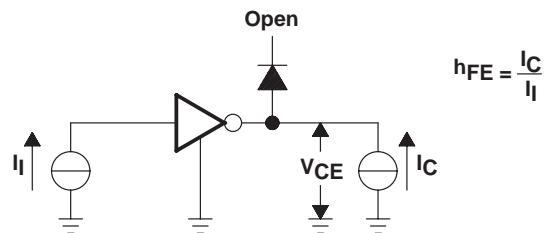


Figure 6. h_{FE} , $V_{CE(sat)}$

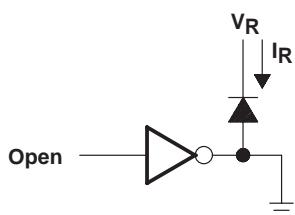


Figure 7. I_R

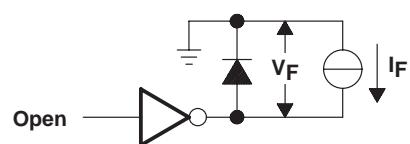


Figure 8. V_F

PARAMETER MEASUREMENT INFORMATION

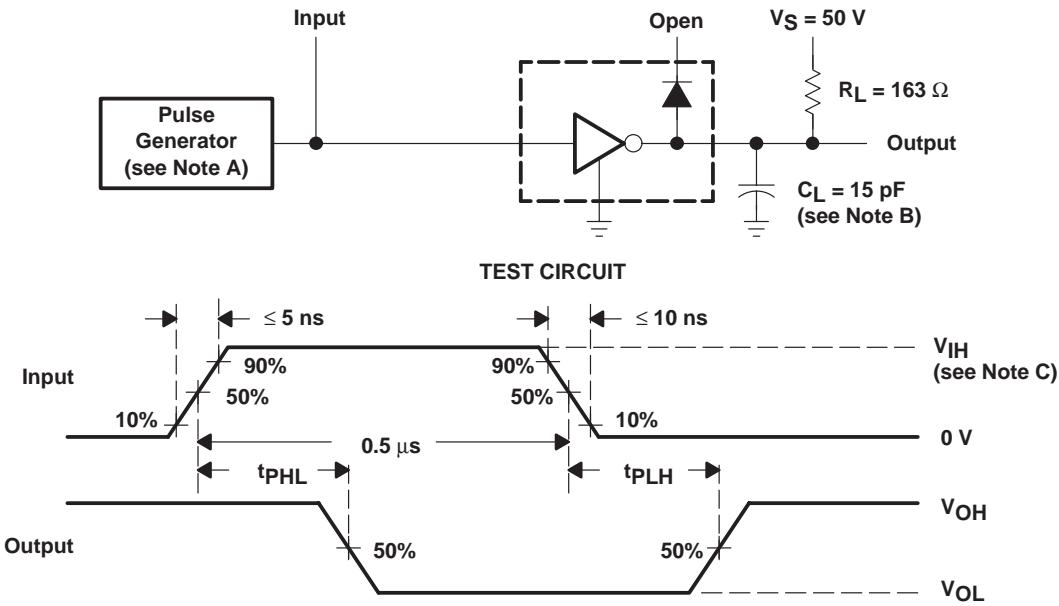


Figure 9. Propagation Delay Test Circuit and Voltage Waveforms

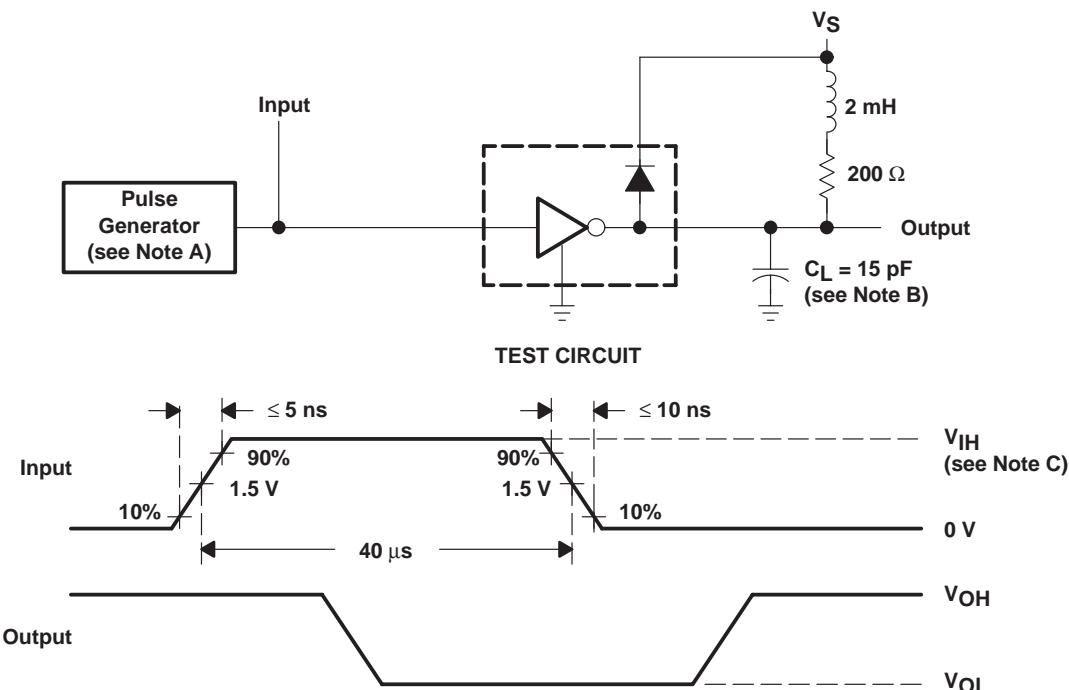


Figure 10. Latch-Up Test Circuit and Voltage Waveforms

IMPORTANT NOTICE

Texas Instruments and its subsidiaries (TI) reserve the right to make changes to their products or to discontinue any product or service without notice, and advise customers to obtain the latest version of relevant information to verify, before placing orders, that information being relied on is current and complete. All products are sold subject to the terms and conditions of sale supplied at the time of order acknowledgement, including those pertaining to warranty, patent infringement, and limitation of liability.

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

CERTAIN APPLICATIONS USING SEMICONDUCTOR PRODUCTS MAY INVOLVE POTENTIAL RISKS OF DEATH, PERSONAL INJURY, OR SEVERE PROPERTY OR ENVIRONMENTAL DAMAGE ("CRITICAL APPLICATIONS"). TI SEMICONDUCTOR PRODUCTS ARE NOT DESIGNED, AUTHORIZED, OR WARRANTED TO BE SUITABLE FOR USE IN LIFE-SUPPORT DEVICES OR SYSTEMS OR OTHER CRITICAL APPLICATIONS. INCLUSION OF TI PRODUCTS IN SUCH APPLICATIONS IS UNDERSTOOD TO BE FULLY AT THE CUSTOMER'S RISK.

In order to minimize risks associated with the customer's applications, adequate design and operating safeguards must be provided by the customer to minimize inherent or procedural hazards.

TI assumes no liability for applications assistance or customer product design. TI does not warrant or represent that any license, either express or implied, is granted under any patent right, copyright, mask work right, or other intellectual property right of TI covering or relating to any combination, machine, or process in which such semiconductor products or services might be or are used. TI's publication of information regarding any third party's products or services does not constitute TI's approval, warranty or endorsement thereof.