



钜地半导体
Tudi Semiconductor

Product Specification

TUDI-ILN2003ADT/AN

HIGH-VOLTAGE HIGH-CURRENT
DARLINGTON TRANSISTOR ARRAYS

网址 www.sztdbdt.com 🔍

用芯智造 · 卓越品质

**semiconductor device
manufacturer**

- Design
- research and development
- production
- and sales



Features

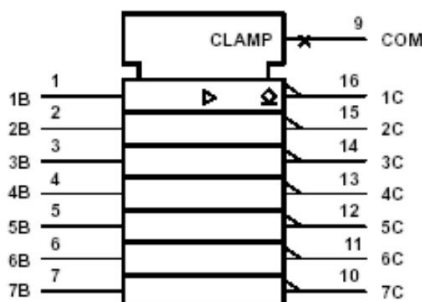
- 500-mA Rated Collector Current (Single Output)
- High-Voltage Outputs . . . 50 V
- Output Clamp Diodes
- Inputs Compatible With Various Types of Logic
- Relay Driver Applications

Description

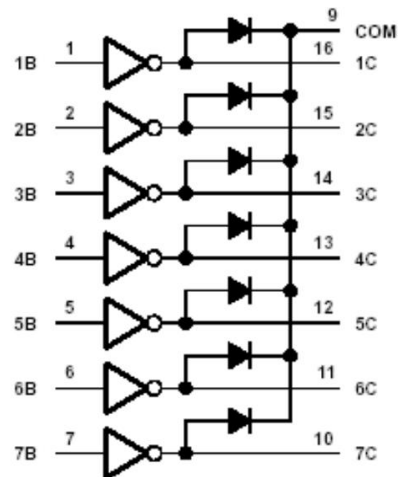
The ILN2003A are monolithic high-voltage, high-current Darlington transistor arrays. Each consists of seven n-p-n Darlington pairs that feature high-voltage outputs with common-cathode clamp diodes for switching inductive loads. The collector-current rating of a single Darlington pair is 500 mA. The Darlington pairs may 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 ILN2003A has a 2.7-k Ω series base resistor for each Darlington pair for operation directly with TTL or 5-V CMOS devices.

LOGIC SYMBOL



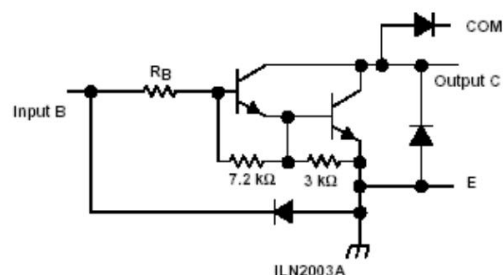
LOGIC DIAGRAM



SCHEMATICS (each Darlington Pair)

All resistor values shown are nominal.

ILN2003A: $R_B = 2.7 \text{ k}\Omega$





Absolute Maximum Ratings (Ta =25°C)

Parameter		Symbol	Limit Values		Unit
			min.	max.	
Output Sustaining Voltage		V _{CE(SUS)}	−0.5	50	V
Output Current		I _{OUT}	500		mA/ch
Input Voltage		V _{IN}	− 0.5	30	V
Clamp Diode Reverse Voltage		V _R	50		V
Clamp Diode Forward Current		I _F	500		mA
Power Dissipation	DIP	P _D	1.15		W
	SOP		0.95		
Operating Temperature		T _{opr}	−40	85	°C
Storage Temperature		T _{sta}	−55	150	°C

* Stresses beyond those listed under “absolute maximum ratings” may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated under “recommended operating conditions” is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

Recommended Operating Conditions (Ta=-40~85°C)

Parameter		Symbol	Test Condition	Limit Value			Unit
				Min	Typ	Max	
Output Sustaining Voltage		V _{CE(SUS)}		0	-	50	V
Output Current	DIP	I _{OUT}	T _{pw} =25ms,Duty=10%, 7 Circuits	0	-	370	mA/ch
			T _{pw} =25ms,Duty=30%, 7 Circuits	0	-	200	
	SOP		T _{pw} =25ms,Duty=10%, 7 Circuits	0	-	290	
			T _{pw} =25ms,Duty=30%, 7 Circuits	0	-	150	
Input Voltage		V _{IN}		0	-	30	V
Clamp Diode Reverse Voltage		V _R		-	-	50	V
Clamp Diode Forward Current		I _F		-	-	400	mA
Power Dissipation	DIP	P _D		-	-	0.52	W
	SOP			-	-	0.4	



Electrical characteristics, $T_A = 25^\circ\text{C}$ (unless otherwise noted)

Parameter	Test Fig.	Test Conditions		Min	Typ	Max	Unit
$V_{I(on)}$ On-state Input Voltage	6	$V_{CE}=2V$	$I_C=125mA$				V
			$I_C=200mA$			2.4	
			$I_C=250mA$			2.7	
			$I_C=275mA$				
			$I_C=300mA$			3	
			$I_C=350mA$				
$V_{CE(sat)}$ Collector-emitter saturation voltage	5	$I_I=250\mu A$	$I_C=100mA$		0.9	1.1	V
		$I_I=350\mu A$	$I_C=200mA$		1	1.3	
		$I_I=500\mu A$	$I_C=350mA$		1.2	1.6	
I_{CEX} Collector outoff current	1	$V_{CE}=50V$	$I_I=0$			50	uA
	2	$V_{CE}=50V$, $T_A=85^\circ\text{C}$	$I_I=0$ $V_I=1V$			100	
h_{FE} DC Current Transfer Ratio	5	$V_{CE}=2V$, $I_{OUT}=350mA$		1000	-	-	
V_F Clamp forward voltage	8	$I_F=350mA$			1.7	2	V
$I_{I(off)}$ Off-state input current	3	$V_{CE}=50V$ $T_A=85^\circ\text{C}$	$I_C=500\mu A$	50	65		uA
I_I Input current	4	$V_I=2.4V$			0.4	0.7	mA
		$V_I=5V$					
		$V_I=12V$					
I_R Clamp reverse current	7	$V_R=50V$				50	uA
		$V_R=50V$	$T_A=85^\circ\text{C}$			100	
C_I Input capacitance		$V_I=0$	$f=1MHz$		15	25	pF

Switching Characteristics, $T_A=25^\circ\text{C}$

Parameter	Test Conditions	Min	Typ	Max	Unit
t_{PLH} Propagation delay time, low-to-high-level output	See Figure 9		0.25	1	us
t_{PHL} Propagation delay time, high -to- low -level output			0.25	1	us
V_{OH} High-level output voltage after switching	$V_S=50V$, $I_O=300mA$, See Figure 10	V_S-20			mV



PARAMETER MEASUREMENT INFORMATION

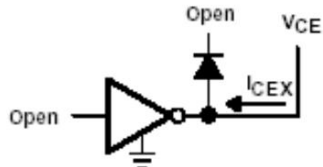


Figure 1. I_{CEX} Test Circuit

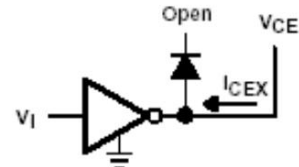


Figure 2. I_{CEX} Test Circuit

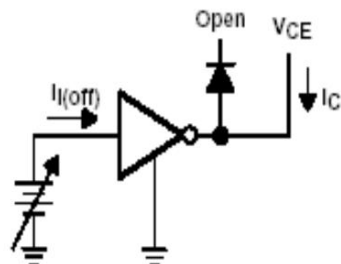


Figure 3. $I_{I(off)}$ Test Circuit

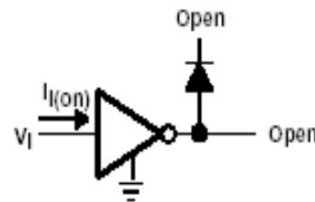
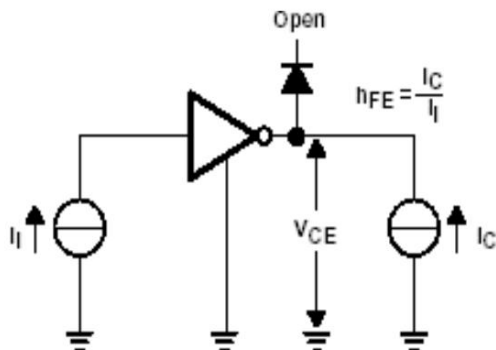


Figure 4. I_I Test Circuit



NOTE: I_I is fixed for measuring $V_{CE(sat)}$, variable for measuring h_{FE} .

Figure 5. h_{FE} , $V_{CE(sat)}$ Test Circuit

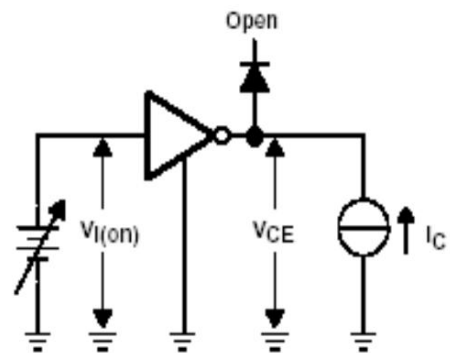


Figure 6. $V_{I(on)}$ Test Circuit

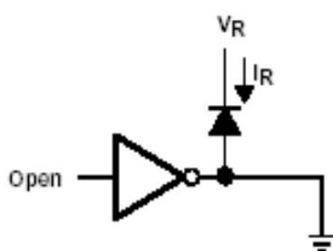


Figure 7. I_R Test Circuit

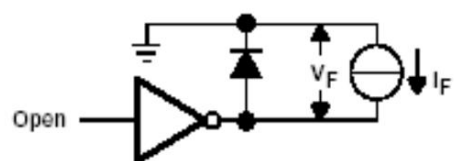


Figure 8. V_F Test Circuit

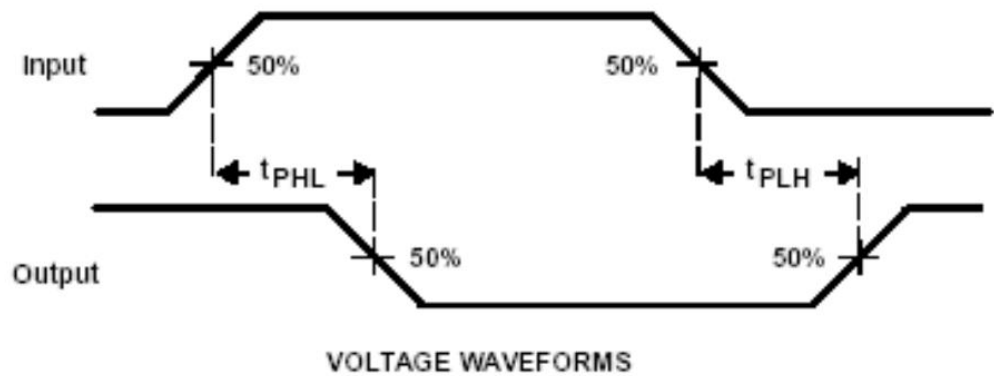
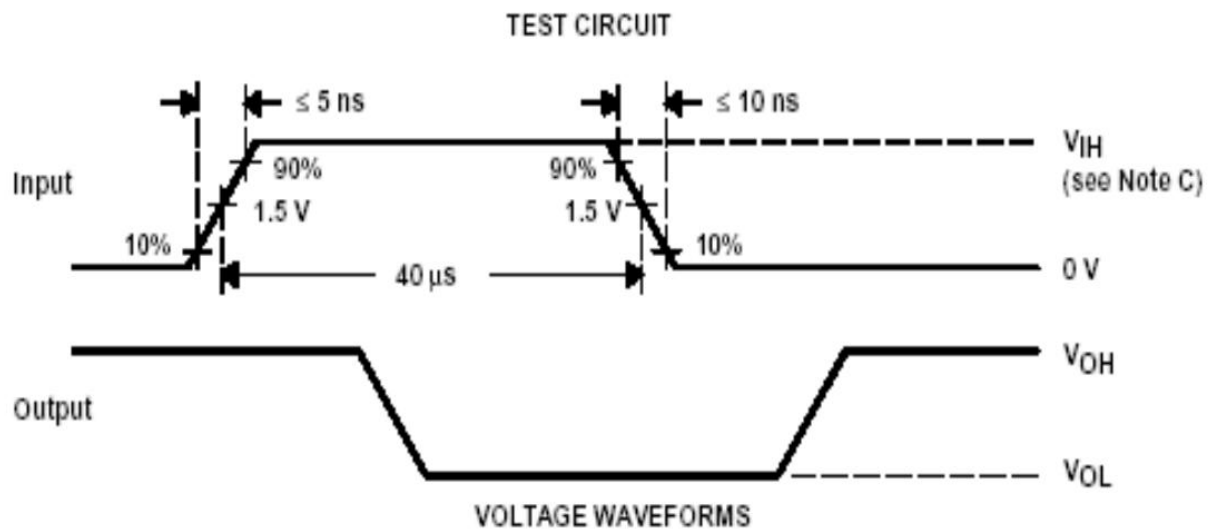


Figure 9. Propagation Delay-Time Waveforms



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. $V_{IH} = 3 \text{ V}$;

Figure 10. Latch-Up Test Circuit and Voltage Waveforms



APPLICATION INFORMATION

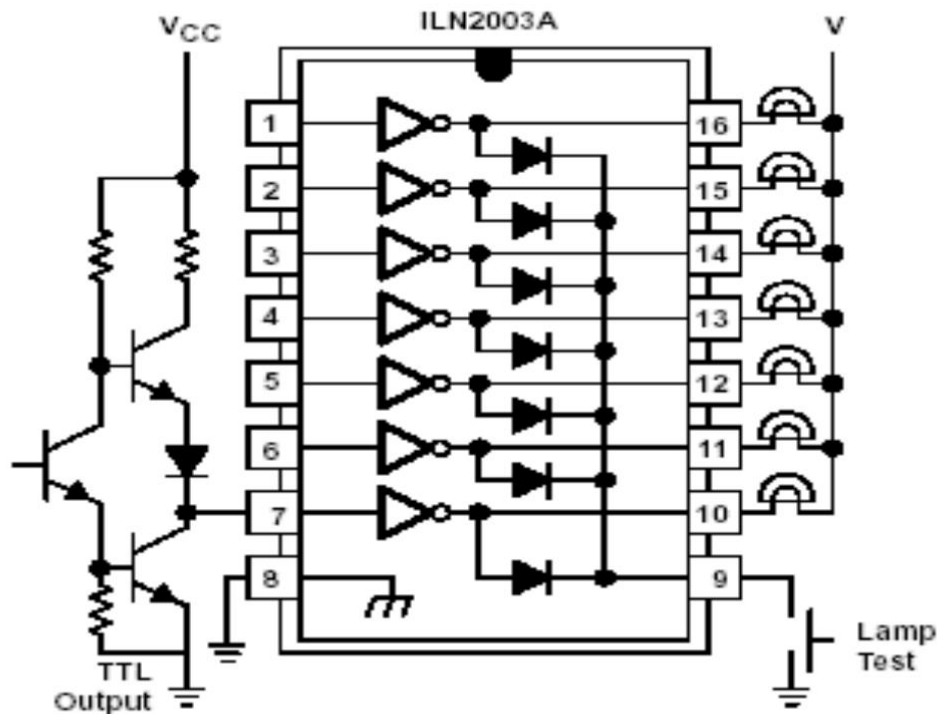


Figure 16. TTL to Load

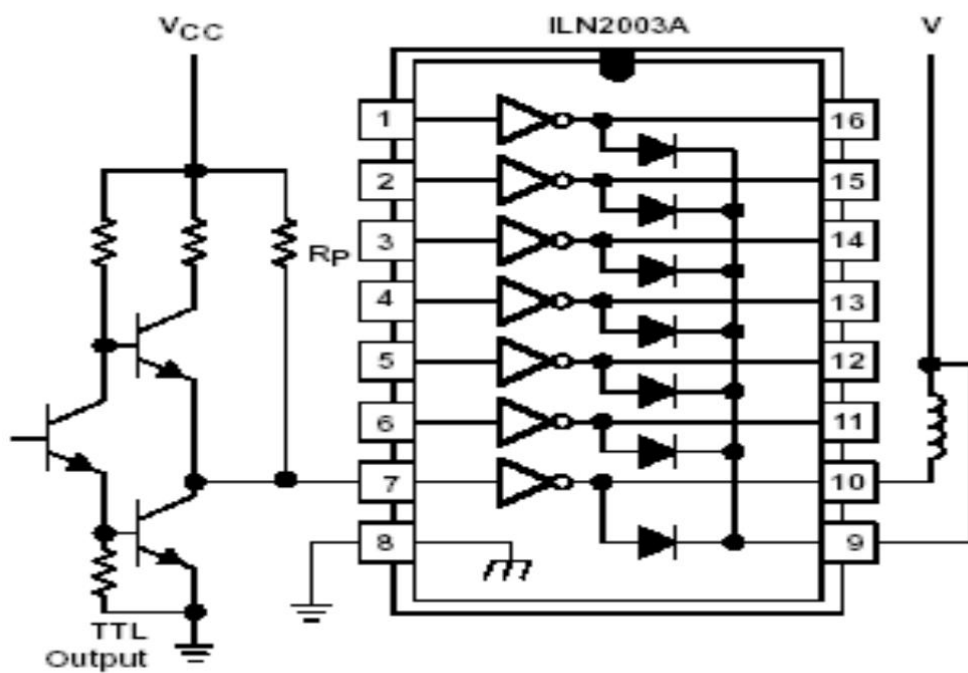


Figure 17. Use of Pullup Resistors to Increase Drive Current

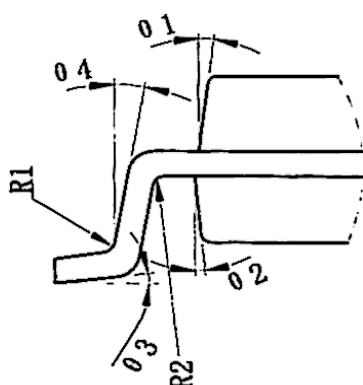
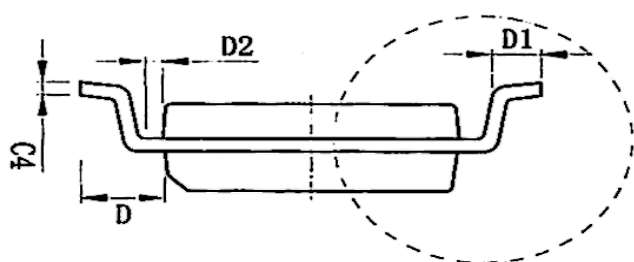
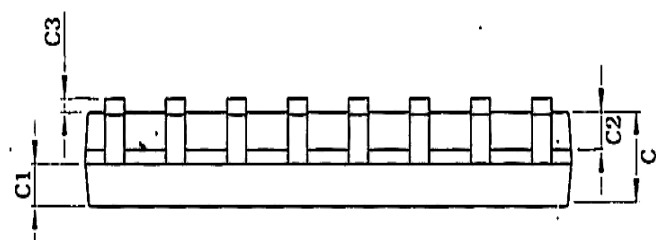
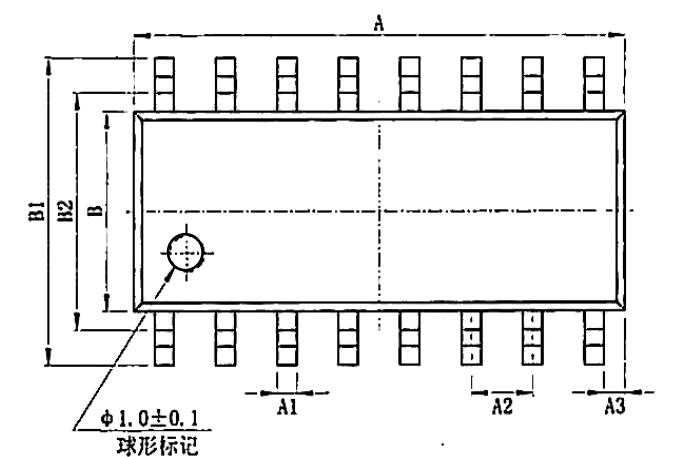


Order information

Order Number	Package	Package Quantity	Marking On The park
ILN2003ADT-TUDI	SOP16	Tape,Reel,2500	ILN2003ADT
ILN2003AN-TUDI	DIP16	Tube,25,A box of 1000	ILN2003AN



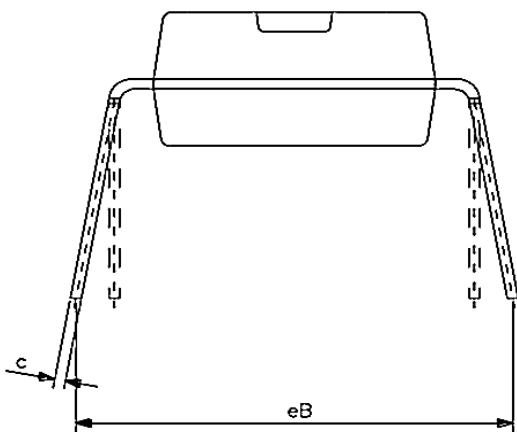
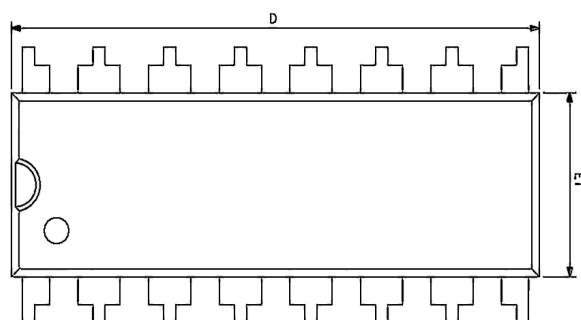
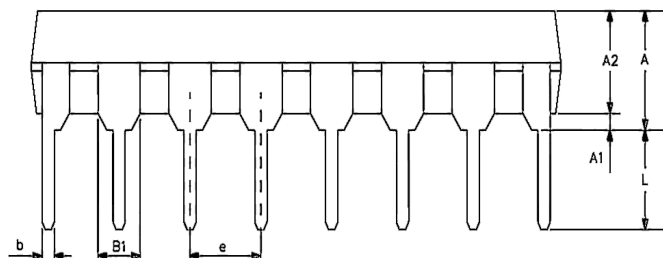
Package SOP16



SIZE SYMBOL	MIN./mm	MAX./mm
A	9.80	10.00
A1	0.356	0.456
A2	1.27TYP	
A3	0.302TYP	
B	3.85	3.95
B1	5.84	6.24
B2	5.00 TYP	
C	1.40	1.60
C1	0.61	0.71
C2	0.54	0.64
C3	0.05	0.25
C4	0.203	0.233
D	1.05 TYP	
D1	0.40	0.70
D2	0.15	0.25
R1	0.20TYP	
R2	0.20TYP	
01	8°~12°TYP4	
02	8°~12°TYP4	
03	0°~8°	
04	4°~12°	



Package DIP16



SIZE SYMBOL	MIN./mm	MAX./mm
A2	3.20	3.60
A1	0.51	—
A	3.60	5.33
L	3.00	3.60
b	0.36	0.56
B1	1.52	
D	18.80	19.94
E1	6.20	6.60
e	2.54	
C	0.20	0.36
eB	7.62	9.30
R	0.20TYP	
R1	0.30TYP	
θ	0°	8°
$\theta 1$	45°TYP	
02	12°TYP	
03	0°	8°
04	0°	10°