钍地半导体
Tudi Semiconductor

Product Specification

TUDI-ULN/ULQ2003

High Voltage, High Current Darlington Transistor Arrays

网址 www.sztdbdt.com

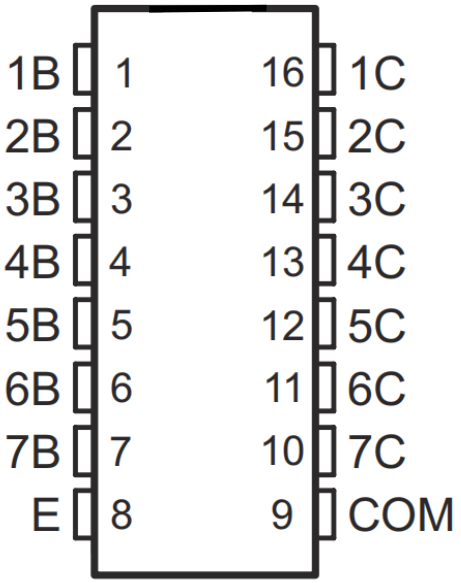
用芯智造·卓越品质

semiconductor device manufacturer

- Design
- research and development
- production
- and sales

Features

- Each package contains seven Darlington transistors
- 500mA output current per channel
- Output integrated freewheeling diosuitable for inductive loads
- Outputs can be paralleled for higher current
- Compatible with TTL/CMOS/PMOS/DTL inputs
- Input pins are located e the output pins for easy layout design



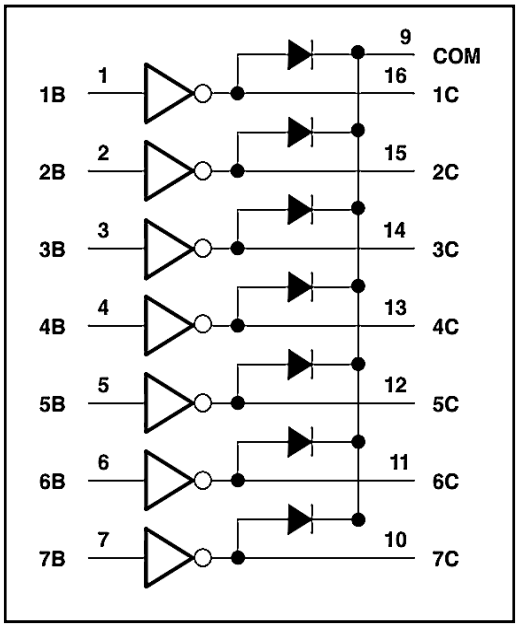
Pin Diagram

Description

The seven NPN Darlington connected transistors in these arrays are well suited for driving lamps,relays, or printer hammers in a variety of industrial and consumer applications. Their high breakdown voltage and internal suppression diodes insure reedom from problems associated with inductive loads.
Peak inrush currents to 500 mA permit them to drive incandescent lamps.
The ULx2003A with a 2.7 k series input resistor is well suited for systems utilizing a 5.0 V TTL or CMOS Logic.

Applications

- Relay Driver
- Lamp Driver
- Display Driver
- Line Driver
- Logic Buffer



Simplified block diagram

Pin description

Pin		I/O(1)	Description
Name	No.		
1B	1	I	Darlington base input
2B	2	I	Darlington base input
3B	3	I	Darlington base input
4B	4	I	Darlington base input
5B	5	I	Darlington base input
6B	6	I	Darlington base input
7B	7	I	Darlington base input
E	8	—	Common emitter shared by all channels (usually connected to ground)
COM	9	—	Flyback diode common cathode node (for inductive load)
7C	10	O	Darlington collector output
6C	11	O	Darlington collector output
5C	12	O	Darlington collector output
4C	13	O	Darlington collector output
3C	14	O	Darlington collector output
2C	15	0	Darlington collector output
1C	16	O	Darlington collector output

Maximum Ratings (TA= 25 ° C, and rating apply to any one device in the package, unless otherwise noted.)

Rating	Symbol	Value	Unit
Output Voltage	Vo	50	V
Input Voltage	V_1	30	V
Collector Current -Continuous	Ic	500	mA
Base Current -Continuous	IB	25	mA
Operating Ambient Temperature Range ULN2003A ULQ2003A	TA	 -20 to +85 -40 to +85	℃
Storage Temperature Range	Tstg	-55 to +150	℃
Junction Temperature	TJ	150	℃
Thermal Resistance,Junction-to-Ambient Case 751B,D Suffix	RoJA	100	℃/W
Thermal Resistance,Junction-to-Case Case 751B,D Suffix	RoJC	20	℃W
Electrostatic Discharge Sensitivity(ESD) Human Body Model (HBM) Machine Model (MM) Charged Device Model (CDM)	ESD	 2000 400 1500	V

limit Parameter

limit parameter	
Storage temperature:	65℃~150℃
Operating temperature range:	40℃~85℃
Junction temperature range:	40℃~150℃
Input Voltage:	0.3V~30V
Output Voltage:	55V
Maximum Emitter-to-Base Voltage:	6.0V
Collector continuous current:	500mA
Continuous Base Current	25mA

Switching Characteristics

Parameter	Test conditions	2003		unit
		Min	max	
tpLH propagation delay time, low to high output level	Please refer to Figure 9	0.25	1	μS
tPHL propagation delay time, high to low output level		0.25	1	μS

Circuit Test

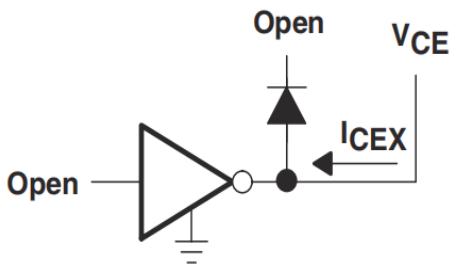


Figure 1

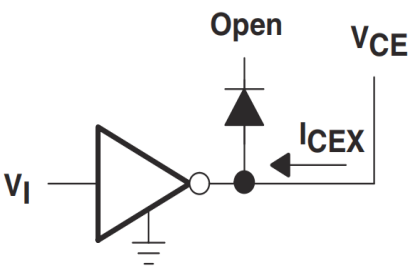


Figure 2

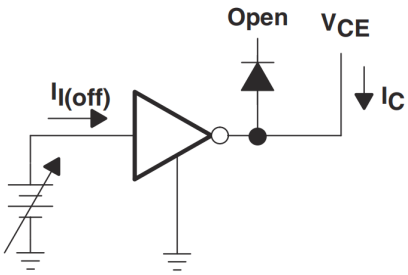


Figure 3

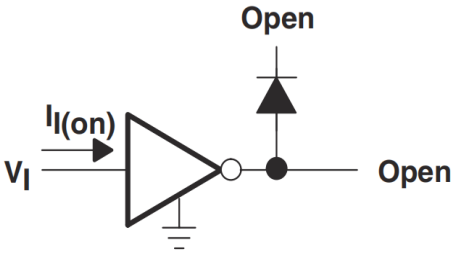


Figure 4

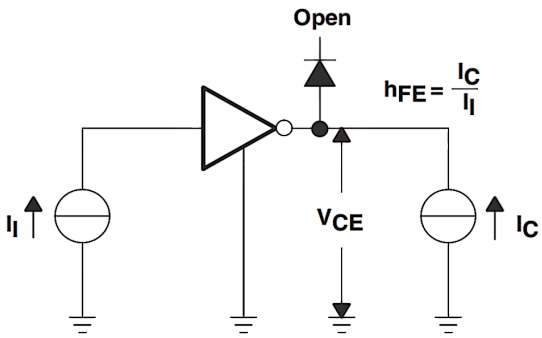


Figure 5

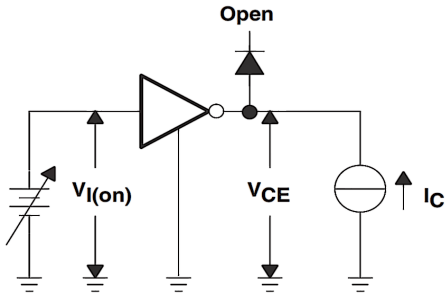


Figure 6

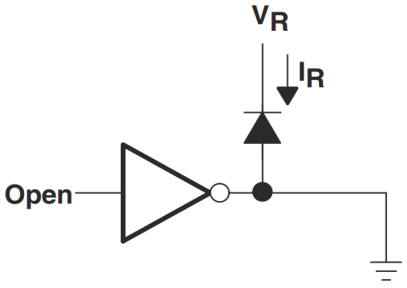


Figure 7

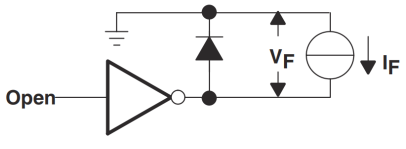


Figure 8

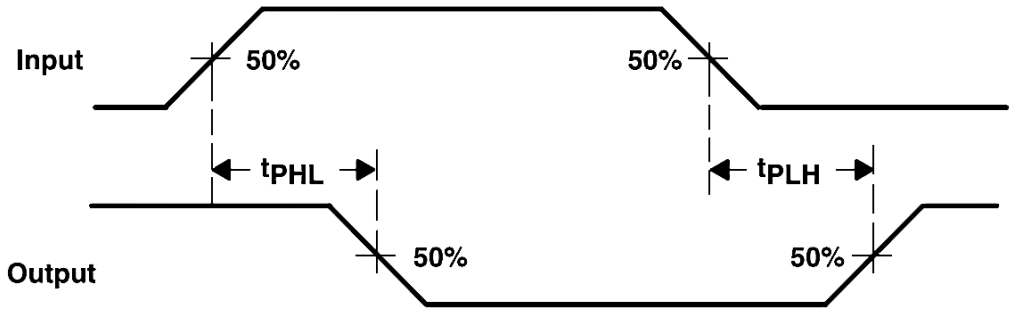


Figure 9

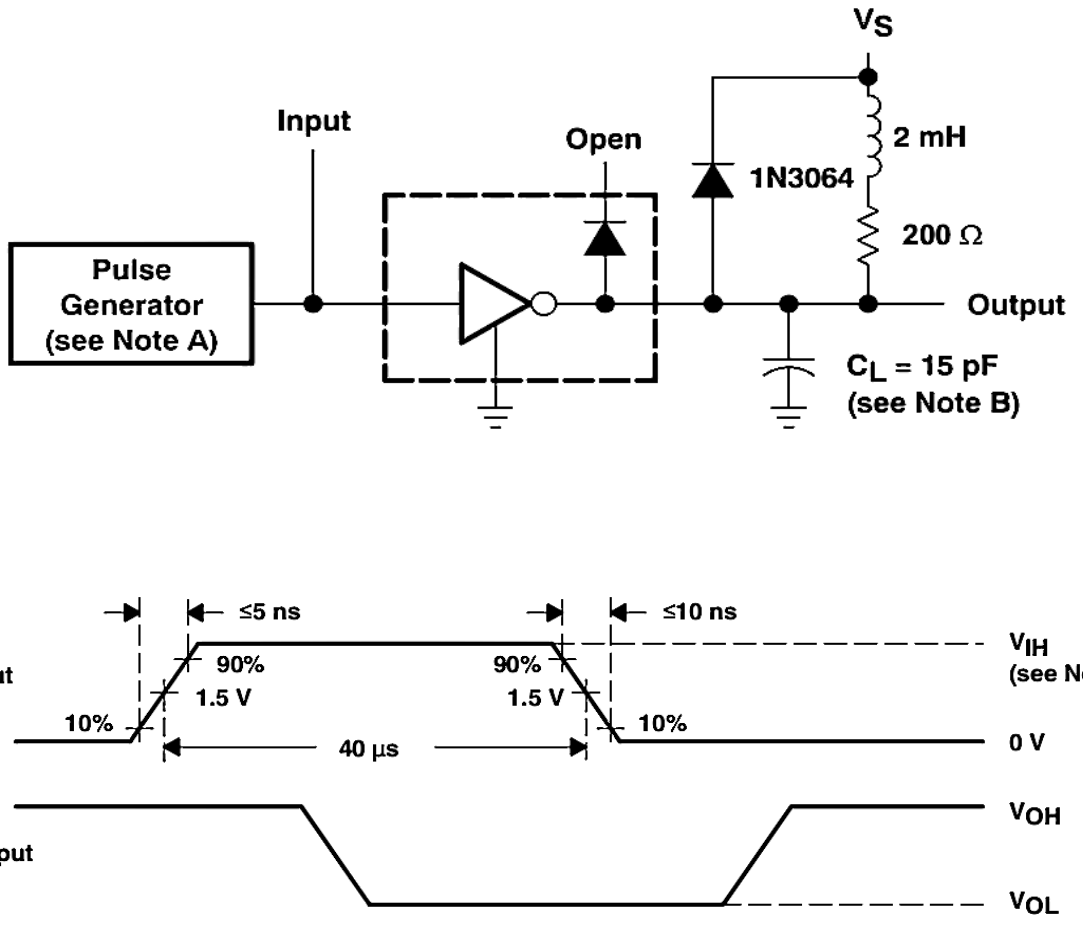
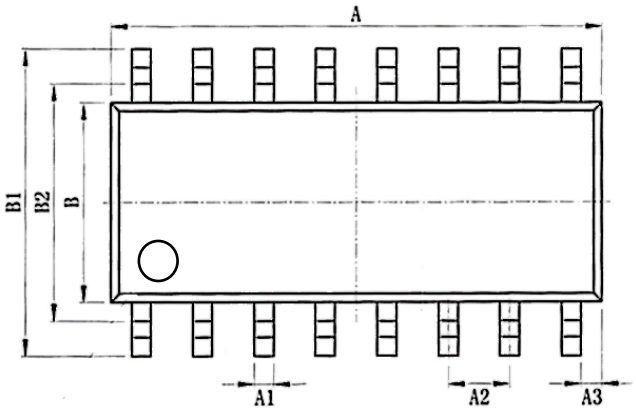


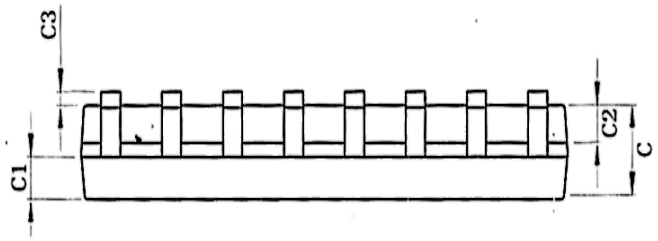
Figure 10

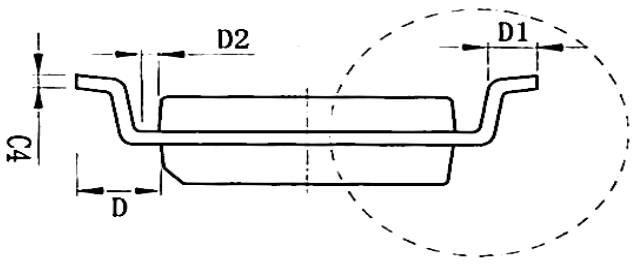
Note:

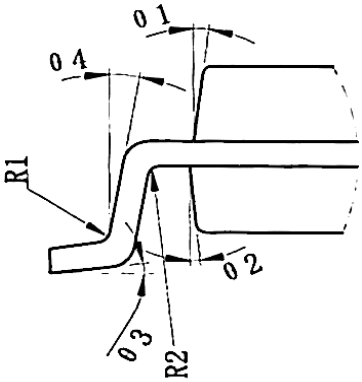
1. The absolute maximum ratings indicate limits beyond which the device may be damaged; they are not normal operating conditions. The electrical characteristics table provides the device's operatingconditions;
2. Unless otherwise specified, all conditions apply to the Darlington array;
3. Under typical conditions, continuous operation of each output at°C, $V^{CE\,(Sat)}$ = 1.6V , and a pulse width of 20ms

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°	

Order information

Order Number	Package	Package Quantity	Marking On The park	Temperature
ULN2003ADR2G-TUDI	SOP16	Tape,Reel,2500	ULN2003AG	-20℃ to 85℃
ULQ2003ADR2G-TUDI	SOP16	Tape,Reel,2500	ULQ2003AG	-40℃ to 85℃

Important statement:

●TUDI Semiconductor reserves the right to modify the product manual without prior notice! Before placing an order, customers need to confirm whether the obtained information is the latest version and verify the completeness of the relevant information.

●Any semi-guide product is subject to failure or malfunction under specified conditions. It is the buyer's responsibility to comply with safety standards when using TUDI Semiconductor products for system design and whole machine manufacturing.And take the appropriate safety measures to avoid the potential in the risk of loss of personal injury or loss of property situation!

●TUDI Semiconductor products have not been licensed for life support, military, and aerospace applications,and therefore TUDI Semiconductor is not responsible for any consequences arising from the use of this product in these areas.

●If any or all TUDI Semiconductor products (including technical data, services) described or contained in this document are subject to any applicable local export control laws and regulations, they may not be exported without an export license from the relevant authorities in accordance with such laws.

●The specifications of any and all TUDI Semiconductor products described or contained in this document specify the performance, characteristics, and functionality of said products in their standalone state, but do not guarantee the performance, characteristics, and functionality of said products installed in Customer's products or equipment. In order to verify symptoms and conditions that cannot be evaluated in a standalone device, the Customer should ultimately evaluate and test the device installed in the Customer's product device.

●TUDI Semiconductor documentation is only allowed to be copied without any alteration of the content and with the relevant authorization.TUDI Semiconductor assumes no responsibility or liability for altered documents.

●TUDI Semiconductor is committed to becoming the preferred semiconductor brand for customers, and TUDI Semiconductor will strive to provide customers with better performance and better quallity products.