钍地半导体
Tudi Semiconductor

Product Specification

TUDI-ULQ2003/2004

7ch Darlington Sink Driver

网址 www.sztdbdt.com

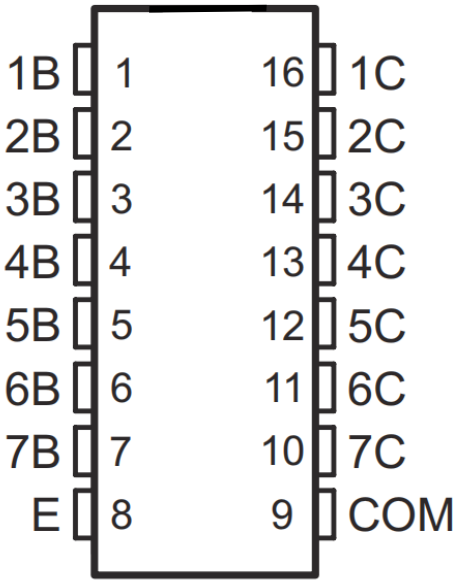
用芯智造·卓越品质

semiconductor device manufacturer

- Design
- research and development
- production
- and sales

Features

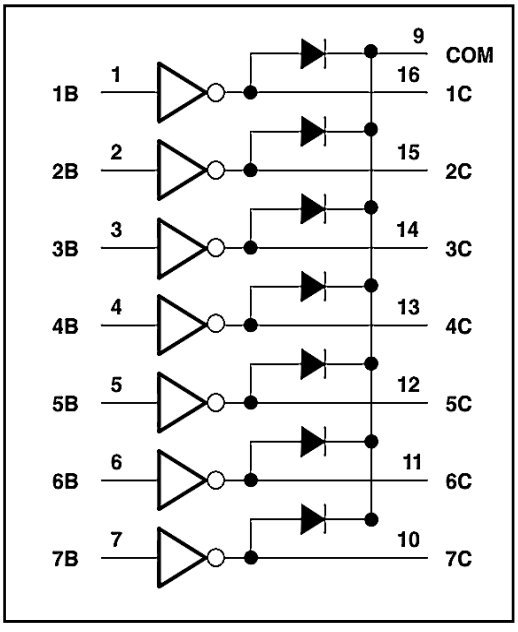
- ESD protection exceeds 200V (using Machine Discharge Model , C = 200pF,R = 0)
- 500mA rated collector current (single output)
- High voltage output: 50V
- Output clamp diodes
- Logic input compatible
- Relay driver



Pin Diagram

Description

The ULQ200xA-Q1 devices are high-voltage, high-current Darlington transistor arrays, each consisting of seven NPN Darlington pairs. These Darlington pfeature high-voltage outputs with common-cathode clamp diodes for switching inductive loads. The collector current rating for a single Darlington pair is 500l connection of Darlington pairs allows for higher currents. Each Darlington pair in the ULQ2003A-Q1 features a 2.7kΩ series base resistbling direct operation with TTL or 5V CMOS devices. The ULQ2004A-Q1 features a 10.5kΩ series base resistor, allct operation from CMOS devices using supply voltages from 6V to 15V. The ULQ2004A-Q1 requires less input current han the ULQ2003A-Q1.



Simplified block diagram

Applications

- Relay drivers
- Stepper motor drivers and brushed DC motor drivers
- Lamp drivers
- Display drivers (LED and gas discharge elements)
- Livers
- Logic buffers

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.)

Parameter	Test Figure	Test Condition		2003			2004			Unit
				Min	Typ	Max	Min	Typ	Max	
VI(on) On-state input voltage	VcE=2V		Ic=125mA						5	V
			Ic=200mA			2.4			6	
			Ic=250mA			2.7				
			Ic=275mA						7	
			Ic=300mA			3				
			Ic=350mA						8	
VoH) On-state inpward voltage	Figure10	Vs=50V,Io=300mA		VS - 20			VS - 20			mit
VCE(sat)Collector-emitter saturation voltage	Figure5	I=250μA,Ic=300mA			0.9	1.1		0.9	1.1	V
		I=250μA,Ic=200mA			1	1.3		1	1.3	
		I=500μA,Ic=350mA			1.2	1.6		1.2	1.6	
Collamping neucitrater	Figure 1	VCE=50V,I=0				50			50	μA
	Figure2	VCE=50V, TA=70℃	I=0			100			100	
			Vi=6V						500	
VF Input current	Figure8	IF=350mA			1.7	2		1.7	2	V
lkof) Off-state input	Figure3	VCE=50V,	Ic=300μA	50	65		50	65		μA
I Input current	Figure4	V=3.85V			0.93	1.36				mA
		V=5V						0.35	0.5	
		V=-5V						1	1.45	
R Clamp-diode reverse current	Figure7	VR=50V				50			50	pA
		VR=50V TA=70℃				100			100	
Ci Input Capacitance		Vi=0,f=1MHz			15	25		15	25	pF

limit Parameter

limit parameter	
Storage temperature:	65℃~150℃
Operating temperature range:	-40℃~125℃
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	2003/2004		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

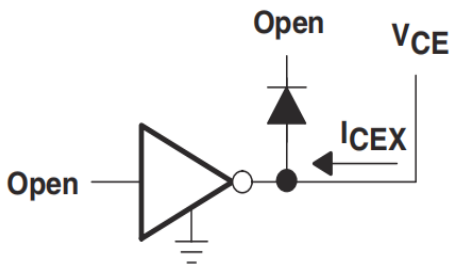


Figure 1

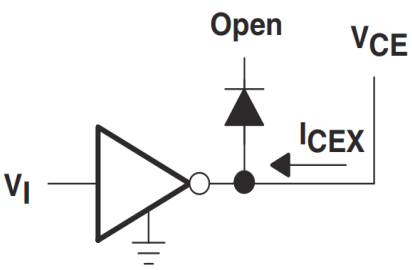


Figure 2

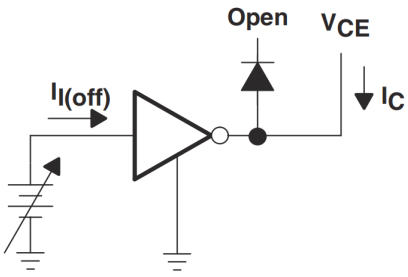


Figure 3

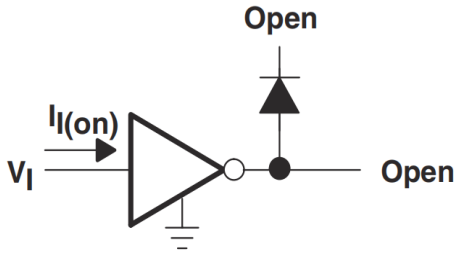


Figure 4

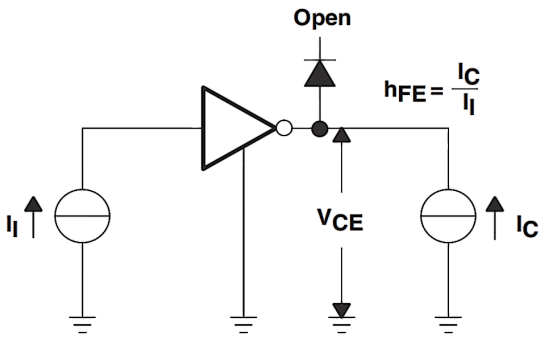


Figure 5

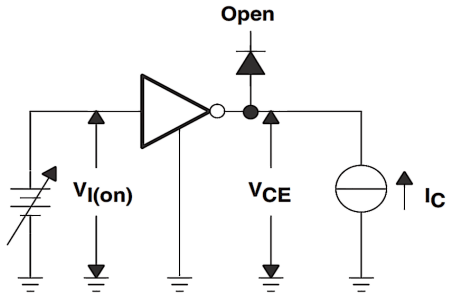


Figure 6

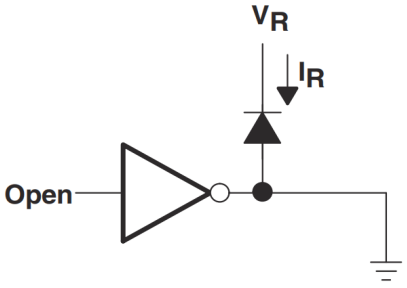


Figure 7

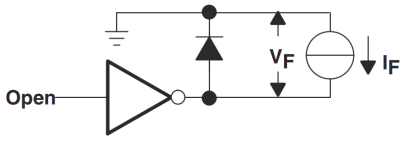


Figure 8

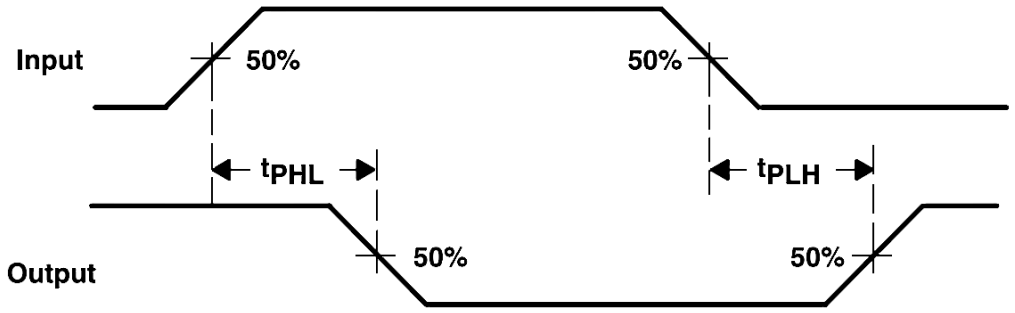
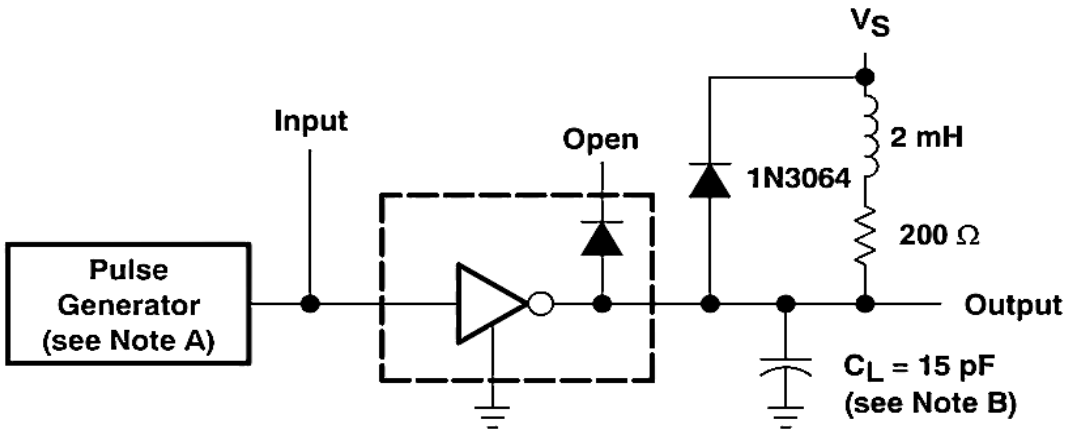


Figure 9



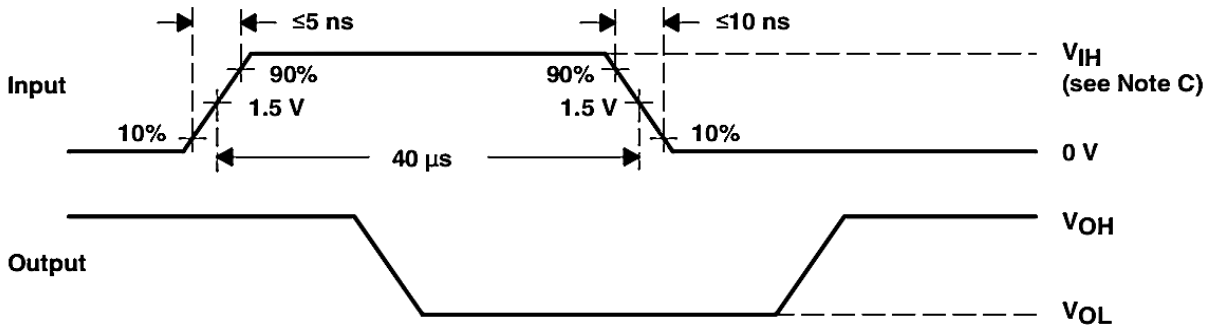
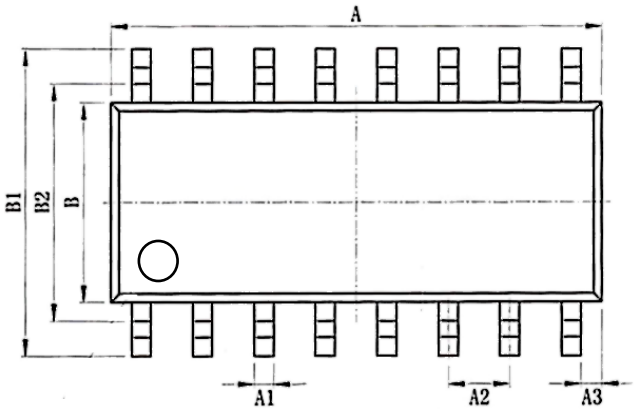


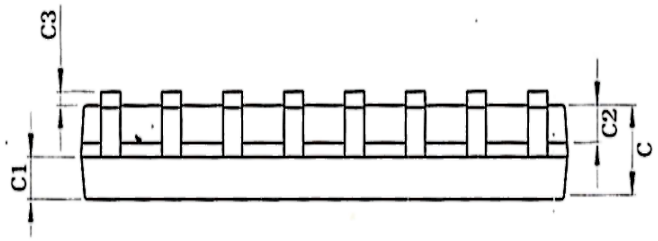
Figure 10

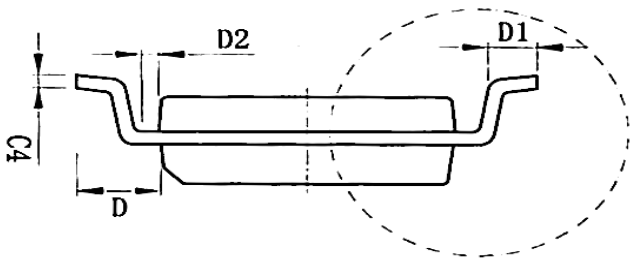
Note:

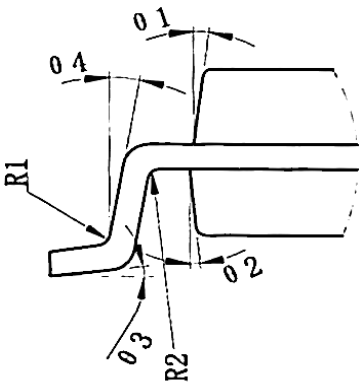
1. The absolute maximum ratings indicate limits beyond which the device may be damaged; they are not normal operating conditions. The electrical characteristics table provides the device's operatingconditions;
2. Unless otherwise specified, all conditions apply to the Darlington array;
3. Under typical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

Package SOP16



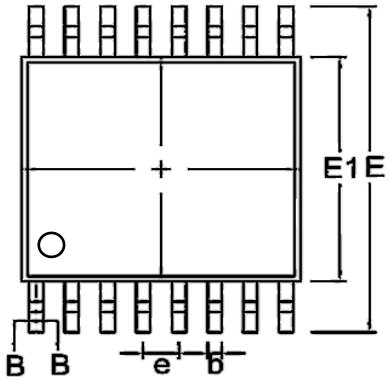


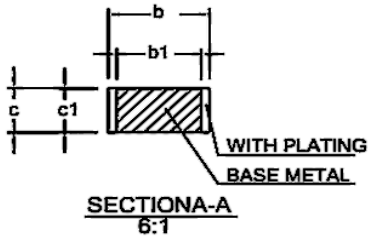


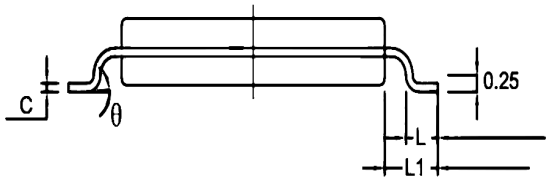


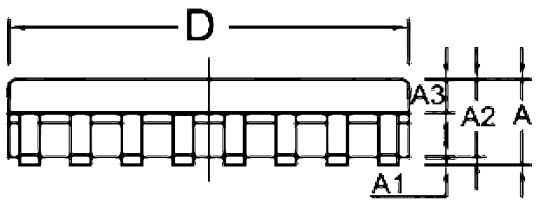
SIZE / SYMBOL	MIN./mm	MAX./mm
A	9.80	10.00
A1	0.356	0.456
A2	1.27TYP	
A3	0.302TYP	
B	3.85	3.95
B1	5.84	6.24
B2	5.00 TYP	
C	1.40	1.60
C1	0.61	0.71
C2	0.54	0.64
C3	0.05	0.25
C4	0.203	0.233
D	1.05 TYP	
D1	0.40	0.70
D2	0.15	0.25
R1	0.20TYP	
R2	0.20TYP	
01	8°~12°TYP4	
02	8°~12°TYP4	
03	0°~8°	
04	4°~12°	

Package TSSOP16









SIZE / SYMBOL	MIN./mm	TYP./mm	MAX./mm
A	--	--	1.20
A1	0.05		0.15
A2	0.90	1.00	1.05
b	0.20	--	0.30
b1	0.19	0.22	0.25
C	0.110	0.127	0.145
cl	0.12	0.13	0.14
D	4.86	4.96	5.06
E	6.20	6.40	6.60
E1	4.30	4.40	4.50
e	0.65BSC		
L	0.45	0.60	0.75
L1	1.00BSC		
	0°	--	8°

Order information

Order Number	Package	Package Quantity	Marking On The park	Temperature
ULQ2003AQDRQ1-TUDI	SOP16	Tape,Reel,2500	ULQ2003AQ	-40℃ to 125℃
ULQ2003ATDRQ1-TUDI	SOP16	Tape,Reel,2500	ULQ2003AT	-40℃ to 105℃
ULQ2003ATPWRQ1-TUDI	TSSOP16	Tape,Reel,2500	U2003AT	
ULQ2004ATDRQ1-TUDI	SOP16	Tape,Reel,2500	ULQ2004AT	

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