



钰地半导体
Tudi Semiconductor

Product Specification

TUDI-ULN2003/2004

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

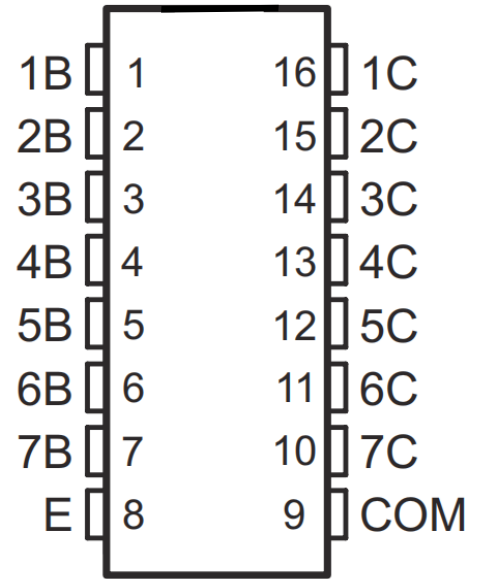


Features

- Output current (single output):500 mA max
- High sustaining voltage output: 50 V min
- Output clamp diodes
- Inputs compatible with various types of logic

Description

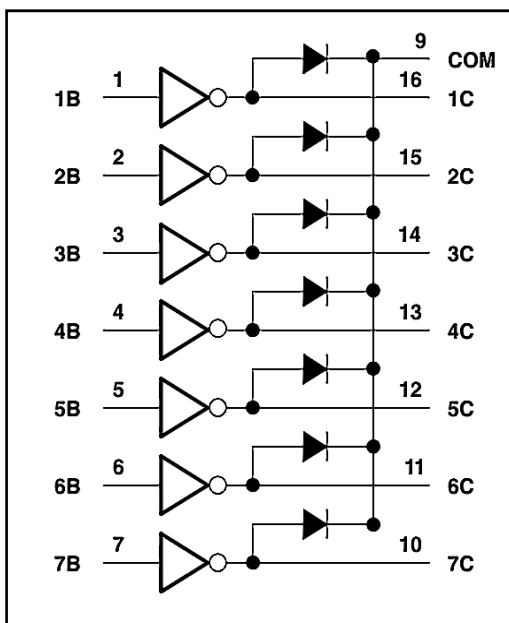
The ULN2003/2004 Series are high-voltage,high-current darlington drivers comprised of seven NPN darlington pairs. All units feature integral clamp diodes for switching inductive loads.



Pin Diagram

Applications

- Include relay
- hammer
- lamp
- display (LED) drivers



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	O	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 inward 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°C, I=0, Vi=6V			100			100	
VF Input current	Figure8	IF=350mA		1.7	2		1.7	2	V
Ikof) 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°C			100			100	
Ci Input Capacitance		Vi=0,f=1MHz		15	25		15	25	pF

limit Parameter

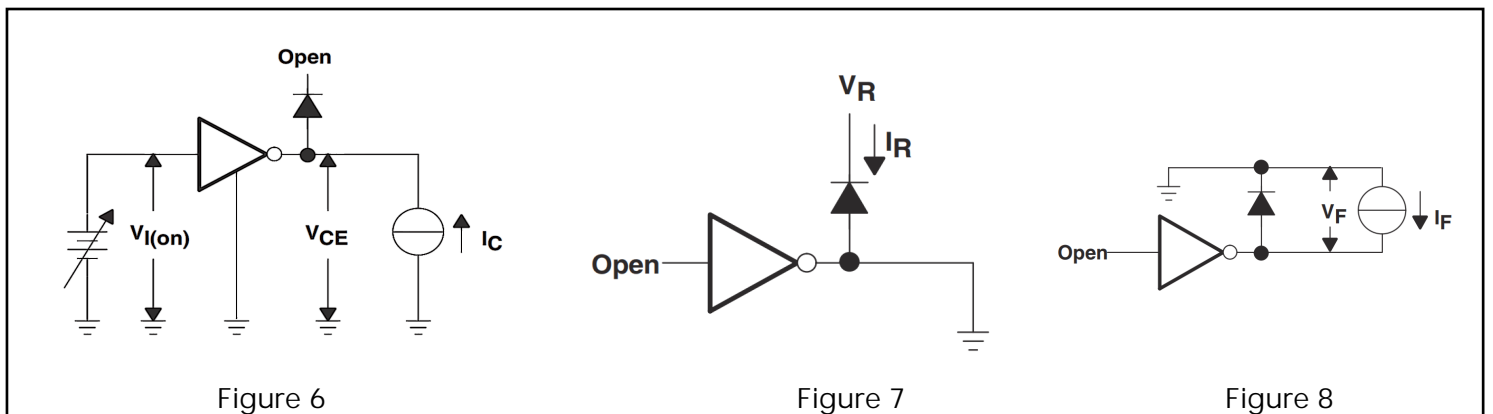
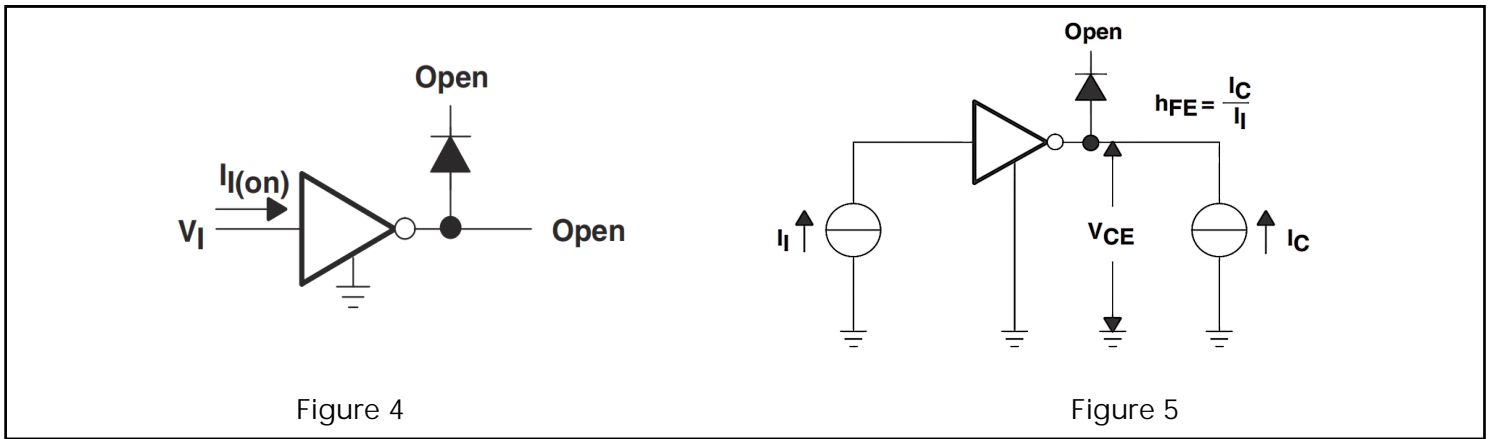
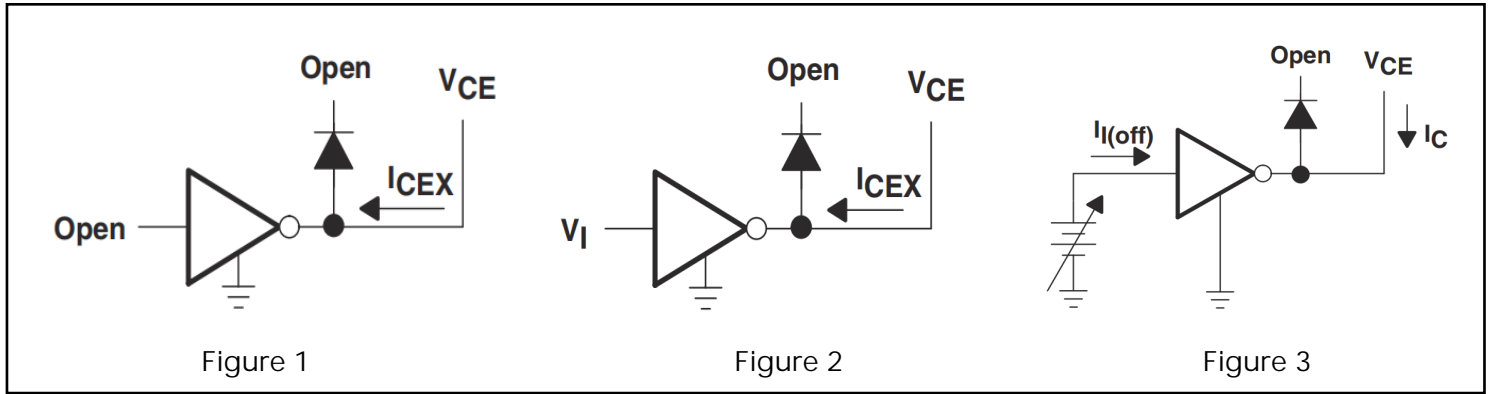
limit parameter	
Storage temperature:	65°C~150°C
Operating temperature range:	40°C~85°C
Junction temperature range:	40°C~150°C
Input Voltage:	0.3V~30V
Output Voltage:	55V
Maximum Emitter-to-Base Voltage:	6.0V
Collector continuous current:	500mA
Continuous Base Current	25mA

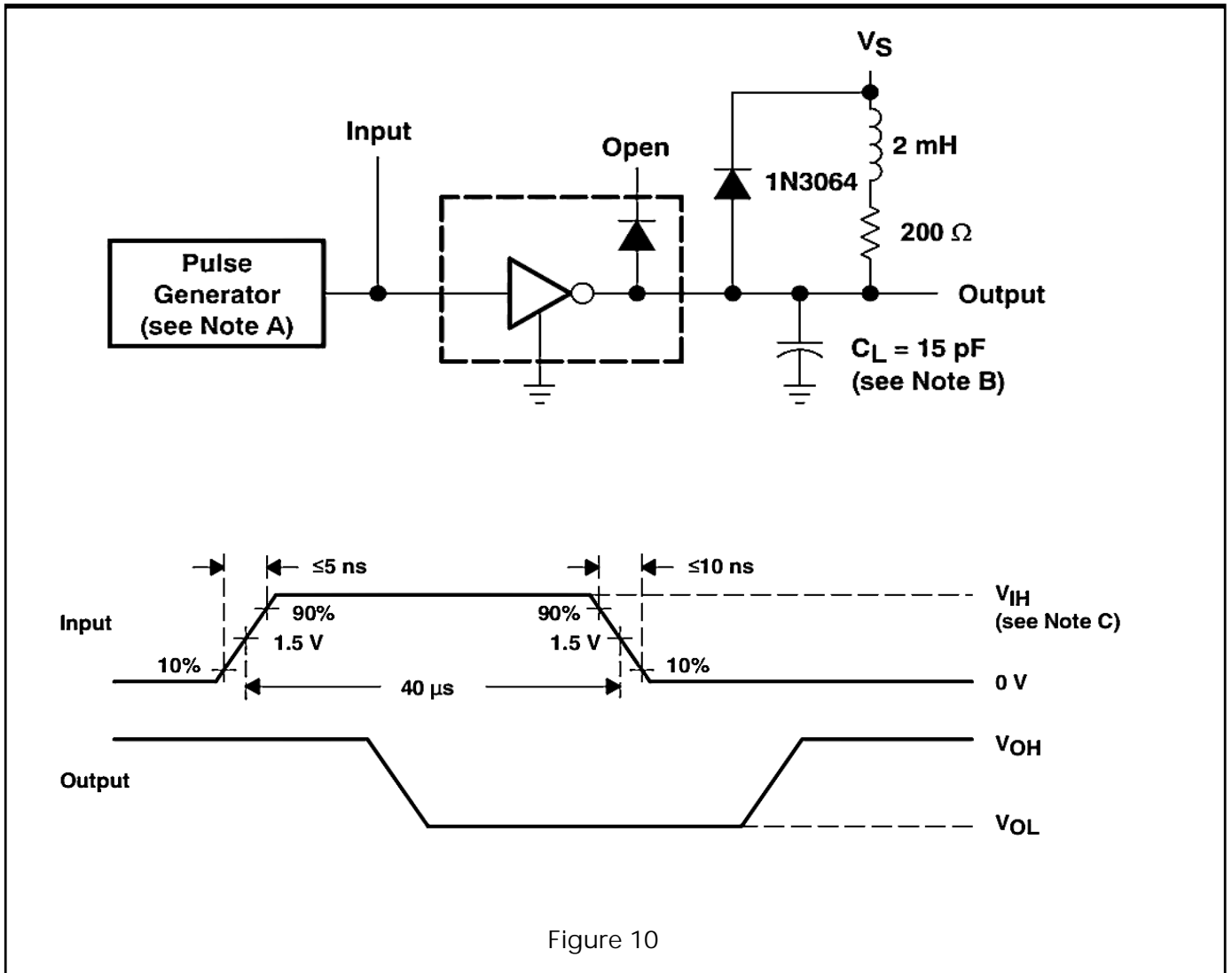
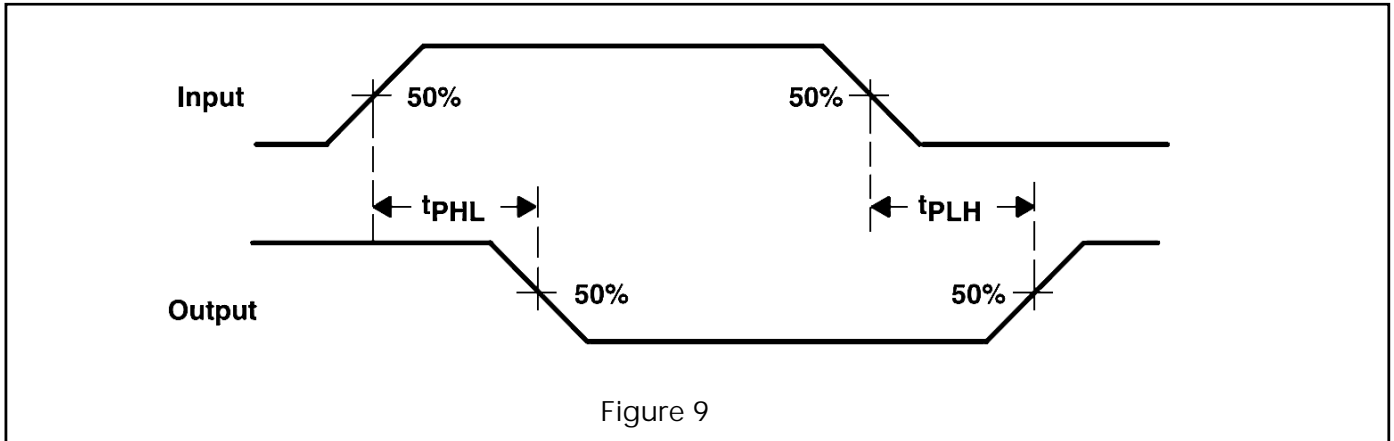


Switching Characteristics

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



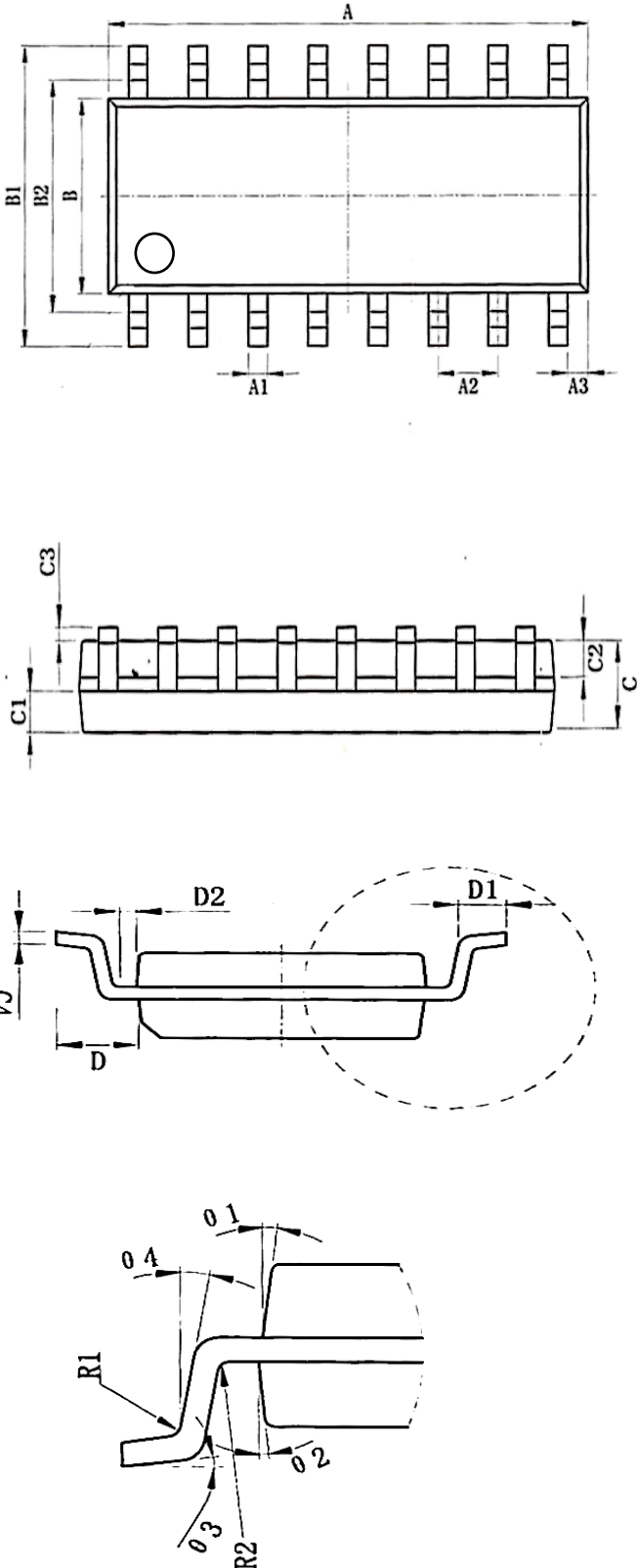


Note:

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 operating conditions;
2. Unless otherwise specified, all conditions apply to the Darlington array;
3. Under typical conditions, continuous operation of each output at $^{\circ}\text{C}$, $V^{CE(sat)} = 1.6\text{ V}$, and a pulse width of 20ms



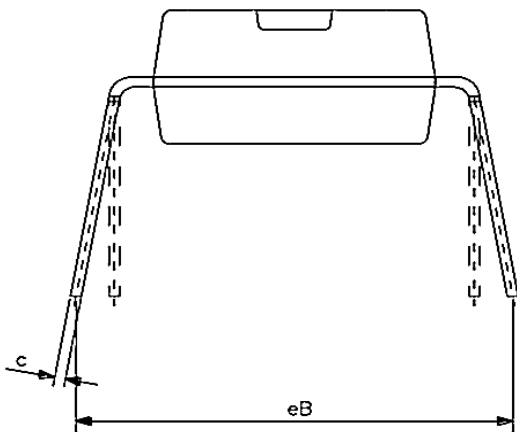
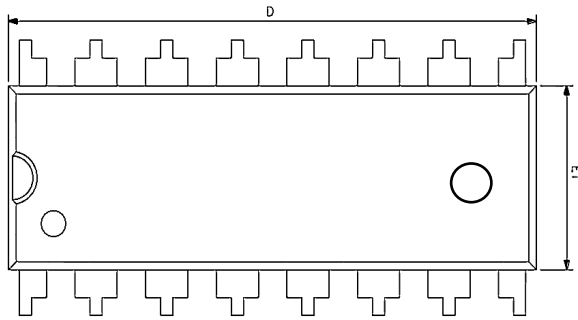
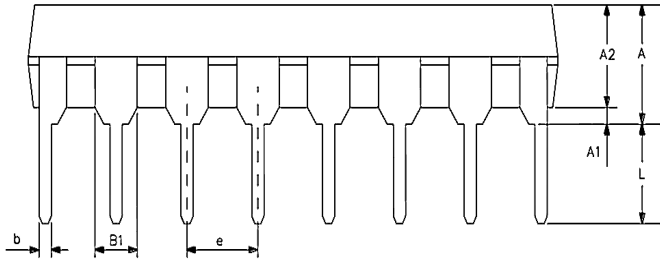
Package SOP16



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 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°
θ_1	45°TYP	
θ_2	12°TYP	
θ_3	0°	8°
θ_4	0°	10°



Order information

Order Number	Package	Package Quantity	Marking On The park	Temperature
ULN2003APG-TUDI	DIP16	Tube,25,A box of 1000	ULN2003APG	-40°C to 85°C
ULN2003AFWG-TUDI	SOP16	Tape,Reel,2500	ULN2003AFWG	
ULN2004APG-TUDI	DIP16	Tube,25,A box of 1000	ULN2004APG	
ULN2004AFWG-TUDI	SOP16	Tape,Reel,2500	ULN2004AFWG	



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