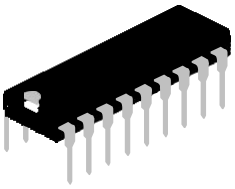
DARLINGTON ARRAY DRIVER IC

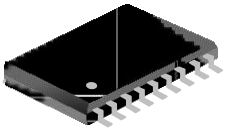
DESCRIPTION

The ULN2803 is high-voltage, high-current darlington driver IC composed of 8 NPN darlington pairs. All units share the emitter in common, and each unit adopts open-collector output. A 2.7KΩ resistor is connected to each darlington pair in serial, which is compatible with TTL and 5V CMOS for data processing without logic buffer.

Sink current of ULN2803 is up to 500mA, when it is off state, the withstand voltage is 50V and the output can runs with high load current, which provides solutions for various interface.



DIP-18-300-2.54



SOP-18-375-1.27

FEATURES

- Wide operating voltage range
- 8-ch high-gain darlington array
- High output voltage (up to 50V)
- High output current (up to 500mA)
- Able to connect to TTL, CMOS, PMOS directly
- Clamp diodes for switching inductive loads

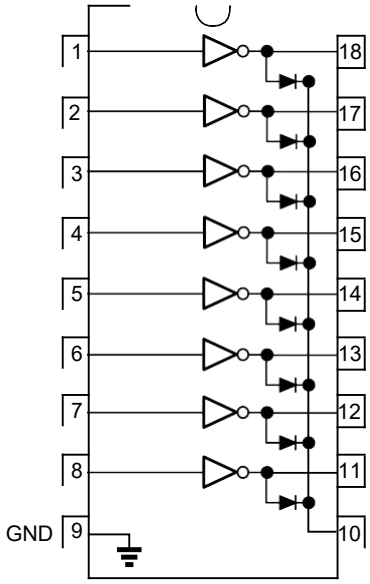
APPLICATIONS

- Relay driver
- DC lamp driver
- Step motor driver
- Magnet valve
- DC brushless motor driver

ORDERING INFORMATION

Part No.	Package	Marking	Hazardous Substance Control	Packing Type
UMW ULN2803AN	DIP-18-300-2.54	ULN2803AN	Halogen free	Tube
UMW ULN2803A	SOP-18-375-1.27	ULN2803A	Halogen free	Tape&Reel

BOLBK DIAGRAM



Pin		I/O	Description
Pin name	Pin		
<1:8>	1-8	Input	Channel 1~8 darlington input
<11:18>	18-11	Output	Channel 1~8 darlington output
(GND)	9	GND	Ground
COM	10	Input/ Output	Positive of clamp diode (used with inductive load)

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Ratings	Units
Input Voltage	V_{IN}	-0.5~30	V
Output Voltage	V_{OUT}	-0.5~50	V
Clamp Diode Reverse Voltage	V_R	55	V
Output Current	I_{OUT}	500	mA
Clamp Diode Forward Current	IF	500	mA
Storage Temperature	T_{STG}	-55~150	°C
Operating Temperature	T_{OPR}	-40~85	°C
Operating Junction Temperature	T_J	-40~150	°C

ELECTRICAL CHARACTERISTICS (Ta = 25 °C UNLESS OTHERWISE NOTED)

Parameter	Symbol	Test conditions	Min.	Typ.	Max.	Units
Output Leakage Current	I_{CEX}	T_A=25°C, V_{CE}=50V(Figure 1)	--	--	20	uA
		T_A=85°C, V_{CE}=50V(Figure 1)	--	--	100	
CE Saturation Voltage	VCE(sat)	I_{OUT}=350mA, I_{IN}=500 uA(Figure 3)	--	1.3	1.6	V
		I_{OUT}=250mA, I_{IN}=350 uA(Figure 3)	--	1.1	1.3	
		I_{OUT}=100mA, I_{IN}=250 uA(Figure 3)	--	0.9	1.1	
Input Current (Output On)	$I_{I(ON)}$	V_I=3.85V(Figure 4)	--	0.93	1.35	mA
Input Current (Output Off)	$I_{I(OFF)}$					uA
		T_A=+25°C, I_C=500uA(Figure 5)	50	100	--	
		T_A=+85°C, I_C=500uA(Figure 5)	25	50	--	
Input Voltage (Output On)	$V_{I(ON)}$	V_{CE}=2.0V,I_C=200mA(Figure 6)	--	--	2.4	V
		V_{CE}=2.0V,I_C=250mA(Figure 6)	--	--	2.7	
		V_{CE}=2.0V,I_C=300mA(Figure 6)	--	--	3.0	
Input Capacitance	C_I		--	15	30	pF
Turn-on Delay	t_{MH}	0.5V_I to 0.5 V_0	--	--	1.0	μS
Turn-off Delay	t_{ML}	0.5V_I to 0.5 V_0	--	--	1.0	
Clamp Diode Reverse Current	I_R		--	--	--	μA
		T_A=+25°C, V_R=50V(Figure 7)	--	--	10	
		T_A=+85°C, V_R=50V(Figure 7)	--	--	50	
Clamp Diode Forward Voltage	V_F	I_F=350mA(Figure 8)	--	1.7	2.0	V

Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged.
Absolute maximum ratings are stress ratings only and functional device operation is not implied. Electrical Characteristics are for normal operating range;

2. All the conditions are suitable for darlington pairs unless otherwise noted;

3. In general, with 70°C, VCE (Sat)= 1.6V, pulse width=20ms, the continuous operating current of each channel is 350mA.

TYPICAL CHARACTERISTIC CURVES

Figure 1. Collector Current vs. Saturation Voltage Drop

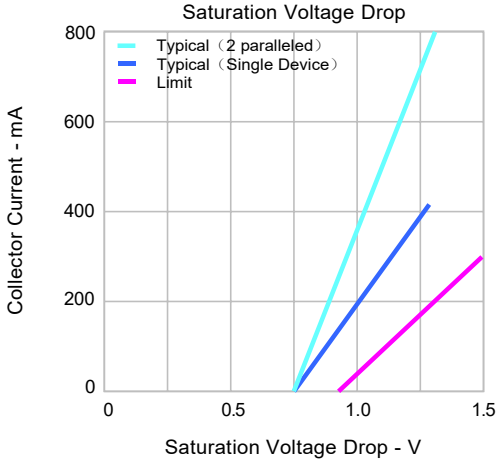


Figure 2. Collector Current vs. Input Current

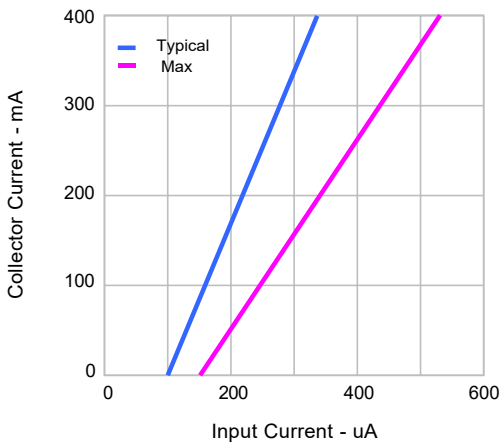


Figure 3. Input Current vs. Input Voltage

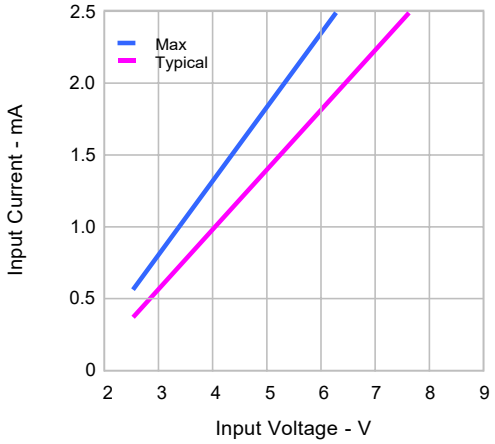
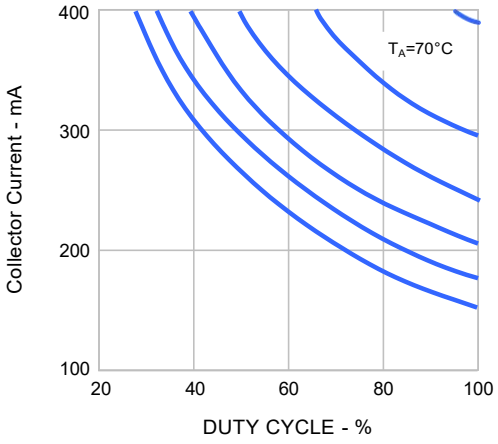
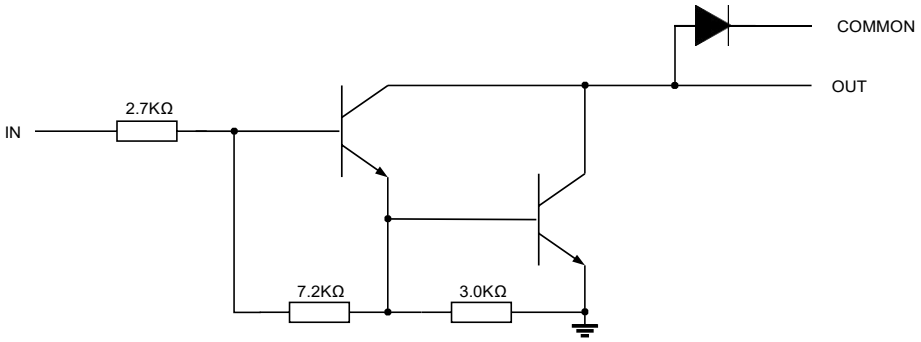


Figure 4. Collector Current vs. Duty Cycle



INTERNAL EQUIVALENT CIRCUIT



TEST CIRCUITS

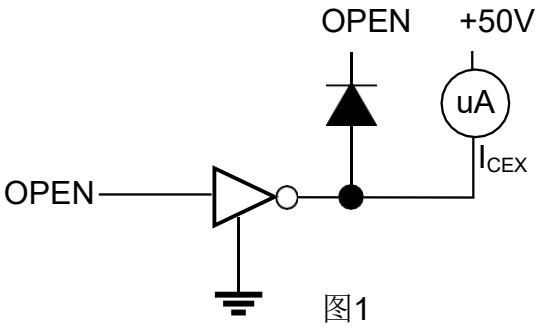


图1

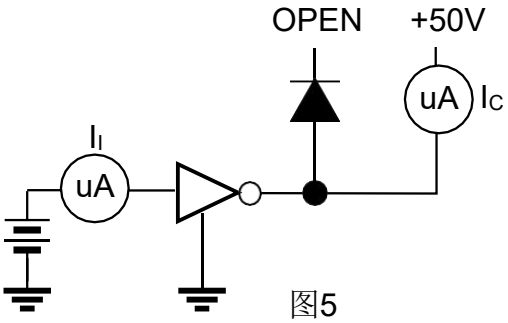


图5

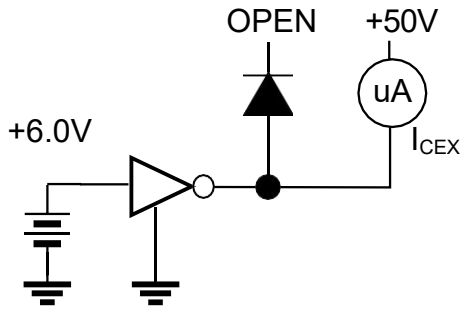


图2

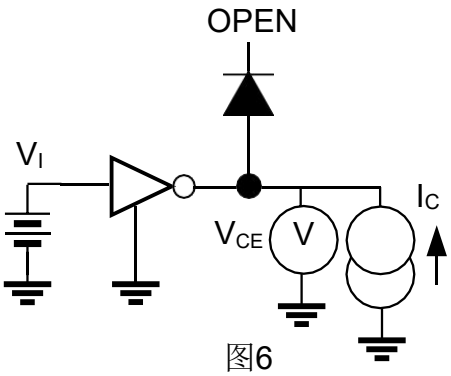


图6

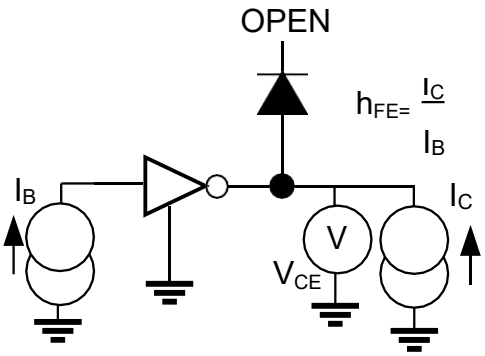


图3

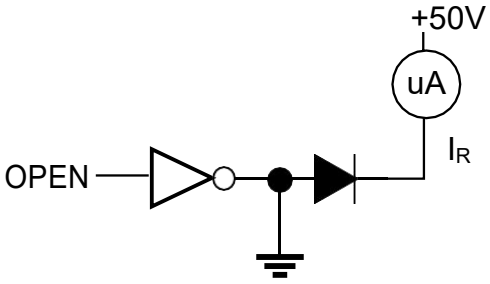


图7

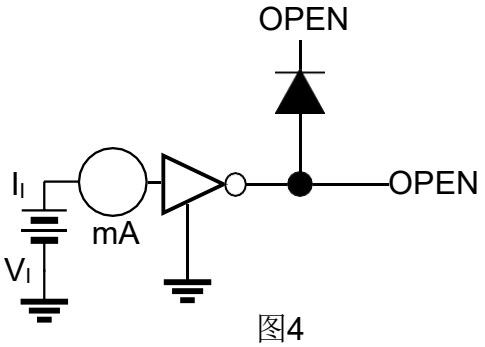


图4

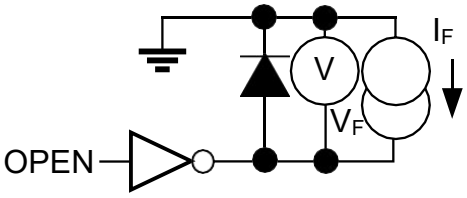
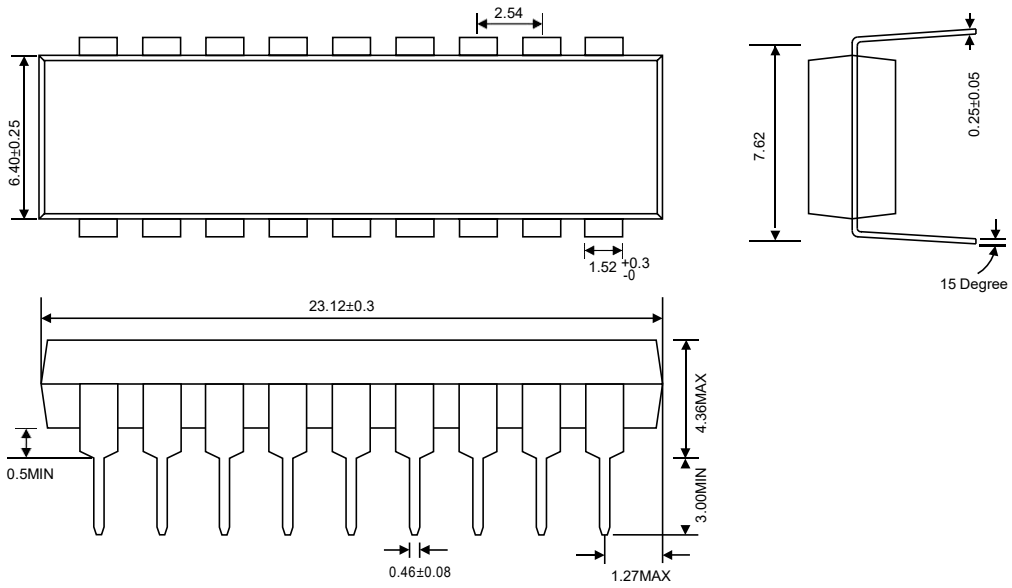


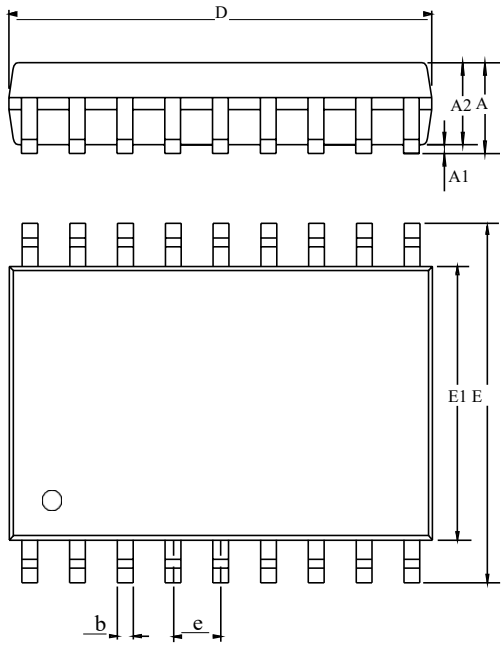
图8

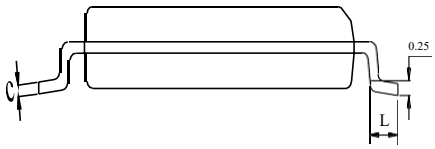
PACKAGE OUTLINE

DIP-18-300-2.54 UNIT: mm



SOP-18-375-1.27 UNIT: mm





SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	—	—	2.65
A1	0.10	—	0.30
A2	2.20	2.30	2.40
b	0.35	—	0.43
c	0.25	—	0.29
D	11.35	11.45	11.55
E	10.10	10.30	10.50
E1	7.40	7.50	7.60
e	1.27BSC		
L	0.70	—	1.00