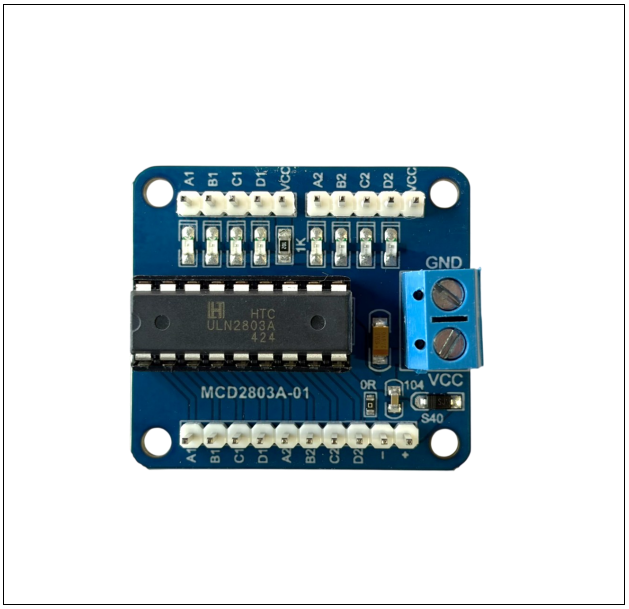
ULN2803A Stepper Motor Driver Module

FEATURES

- ULN2803A Stepper Motor Driver Module
- Recommended Input Voltage: DC 5.0V
- Output breakdown voltage: 50V
- Output current: 500mA



APPLICATIONS

- Relay Drivers
- Stepper and DC Brushed Motor Drivers
- Lamp Drivers
- Line Drivers

ORDERING INFORMATION

Part Number	MCD2803A-01
Device	ULN2803A Stepper Motor Driver Module
Package	Assembled Module (37mm X 33mm)

DESCRIPTION

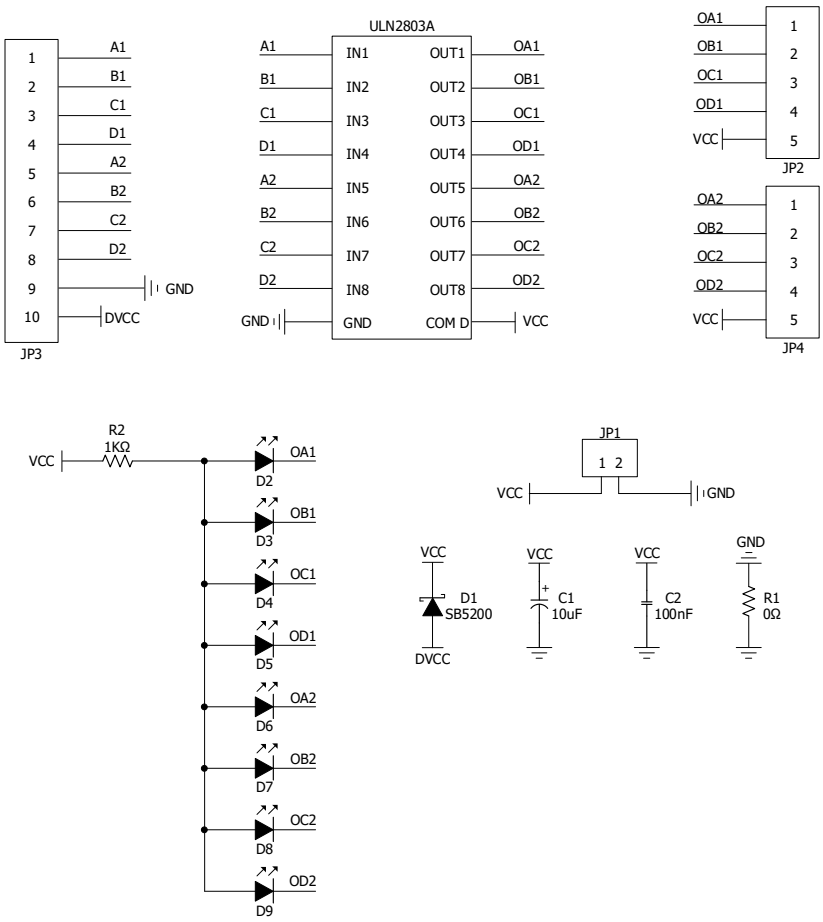
The ULN2803A Module is monolithic high-voltage, high-current Darlington transistor arrays.

APPLICATION GUIDE

Each consists of eight NPN 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

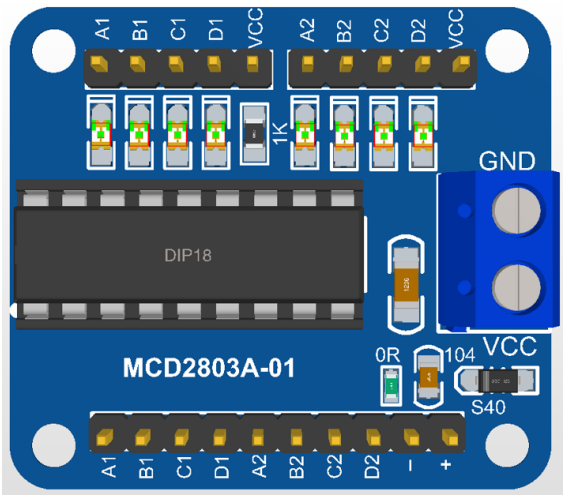
ULN2803A Stepper Motor Driver Module

SCHEMATICS

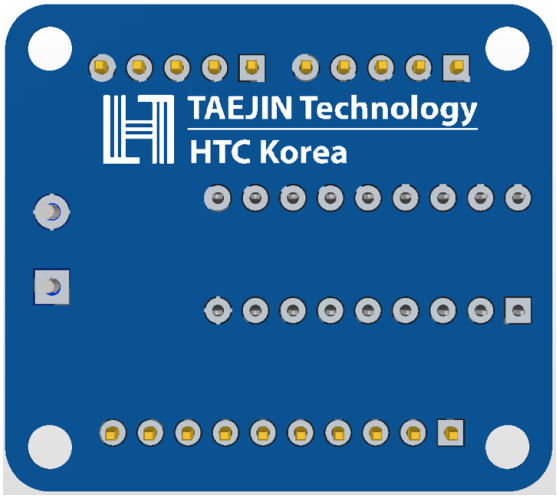


LAYOUT

Top

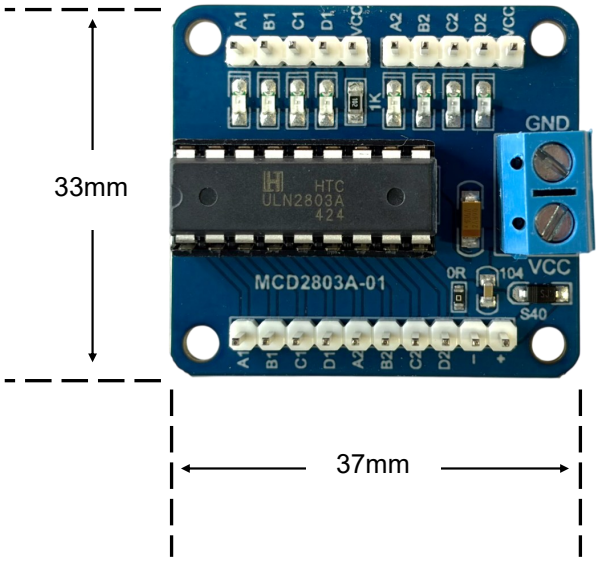


Bottom

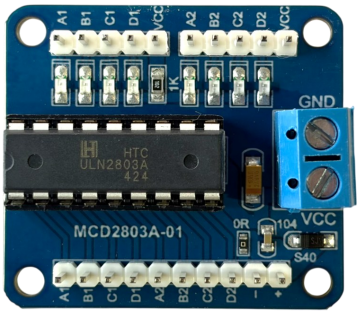


ULN2803A Stepper Motor Driver Module

SIZE INFORMATION

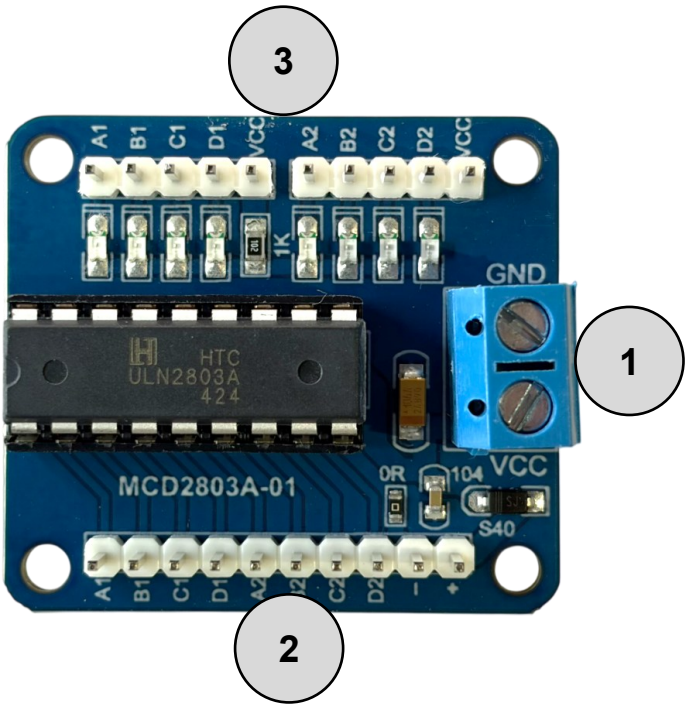


PRODUCT IMAGE



ULN2803A Stepper Motor Driver Module

I/O PORT CONFIGURATION AND DESCRIPTION



Designator	Port Name	Port Description
1	VCC Connector	Input DC 5V
2	Driver Input Pin	Channel 1 through 8 Darlington base Input
3	Driver Output Pin	Channel 1 through 8 Darlington collector Output

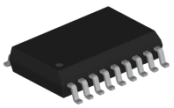
REVISION NOTICE

The description in this datasheet is subject to change without any notice to describe its electrical characteristics properly.

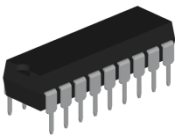
8-Digit Darlington Current Driver ULN2803A

FEATURES

- 8 Darlington Arrays per Package
- 500 mA Rated Collector Current (Single Output)
- Output voltage 50V
- Output Clamp Diodes
- Input Compatible with Various Types of Logic
- Relay-Driver Applications
- Input pins placed opposite to output pins to simplify layout



SOP-18



DIP-18

APPLICATION

- Relay Drivers
- Stepper and DC Brushed Motor Drivers
- Lamp Drivers
- Display Drivers
- Line Drivers
- Logic Buffers

DESCRIPTION

The ULN2803A is monolithic high-voltage, high-current Darlington transistor arrays. Each consists of eight NPN 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.

ORDERING INFORMATION

Device	Package
ULN2803AD	SOP-18
ULN2803AN	DIP-18

ABSOLUTE MAXIMUM RATINGS (Note 1)

CHARACTERISTIC	SYMBOL	MIN.	MAX.	UNIT
Output Voltage	V_O	-	50	V
Input Voltage (Note 2)	V_I	-	30	V
Peak Collector Current	I_C	-	500	mA
Output Clamp Current	I_{OK}	-	500	mA
Total Emitter-Terminal Current	I_E	-	2.5	A
Maximum Junction Temperature	T_J	-	150	°C

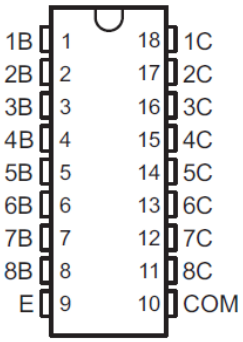
RECOMMENDED OPERATIONG CONDITIONS

CHARACTERISTIC	SYMBOL	MIN.	MAX.	UNIT
Output Voltage	V_O	-	50	V
Junction Temperature	T_J	-40	125	°C
Operating Free-Air Temperature Range	T_A	-40	85	°C

ORDERING INFORMATION

Package	Order No.	Description	Package Marking	Status
SOP-18	ULN2803AD	8-Digit Darlington Current Driver	ULN2803A	Active
DIP-18	ULN2803AN	8-Digit Darlington Current Driver	ULN2803A	Active

PIN CONFIGURATION

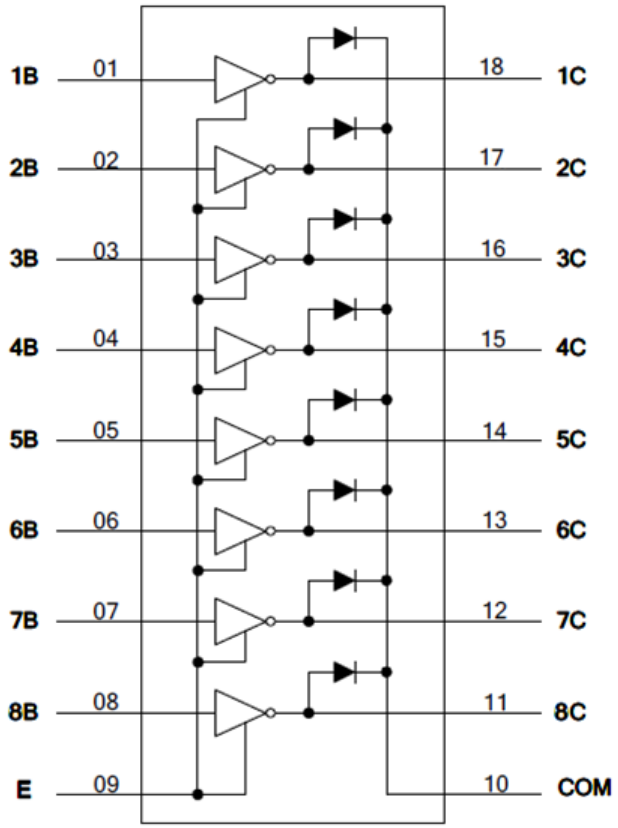


SOP-18 / DIP-18

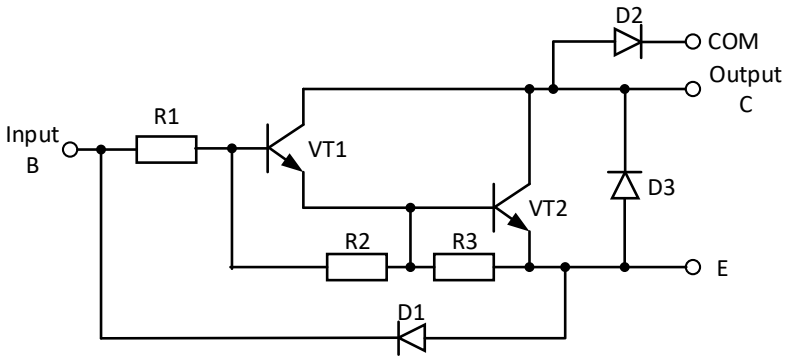
PIN DESCRIPTION

Pin No.		Pin Name	Pin Function
SOP-18	DIP-18		
1	1	1B	Channel 1 through 8 Darlington Base Input
2	2	2B	
3	3	3B	
4	4	4B	
5	5	5B	
6	6	6B	
7	7	7B	
8	8	8B	
9	9	E	Common Emitter shared by All Channels
10	10	COM	Common Cathode Node for Flyback Diodes
11	11	8C	Channel 1 through 8 Darlington Collector Output
12	12	7C	
13	13	6C	
14	14	5C	
15	15	4C	
16	16	3C	
17	17	2C	
18	18	1C	

PIN CONNECTION DIAGRAM



BLOCK DIAGRAM



R1 : Resistor
2.7kΩ
R2 : Resistor
7.2 kΩ
R3 : Resistor
3.0 kΩ

ELECTRICAL CHARACTERISTICS (Note 3)

Limits in standard typeface are for T_J=25°C, unless otherwise specified.

PARAMETER	SYMBOL	TEST FIGURE	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
ON-State Input Voltage	$V_{I(ON)}$	Fig.1.	V_{CE}=2V	I_C=200mA	-	-	2.4	V
				I_C=250mA	-	-	2.7	
				I_C=300mA	-	-	3.0	
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$	Fig. 2.	I_I=250μA, I_C=100mA		-	0.9	1.1	V
			I_I=350μA, I_C=200mA		-	1.0	1.3	
			I_I=500μA, I_C=350mA		-	1.2	1.6	
Output Leakage Current	I_{CEX}	Fig. 3. Fig. 4.	V_{CE}=50V,	I_I=0mA	-	-	50	μA
			V_{CE}=50V, T_A=85°C	I_I=0mA	-	-	100	
				V_I=1V	-	-	500	
Clamp Forward Voltage	VF	Fig. 5.	I_F=350mA		-	1.7	2	V
Off-State Input Current	$I_{I(OFF)}$	Fig. 6.	V_{CE}=50V, I_C=500μA, T_A=85°C		50	65	-	μA
Input Current	$I_{I(ON)}$	Fig. 7.	V_I=3.85V		-	-	1.35	mA
Clamp Diode Leakage Current	I_R	Fig. 8.	V_R=50V		-	-	50	μA
			V_R=50V, T_A=85°C		-	-	100	
Turn-On Propagation Delay Time	t_{PLH}	-	V_{OUT}=50V, R_L=125Ω, C_L=15pF		-	0.1		μs
Turn-Off Propagation Delay Time	t_{PHL}	-	V_{OUT}=50V, R_L=125Ω, C_L=15pF		-	0.2		

Note 1. 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.

Note 2. All voltage values are with respect to the emitter/substrate terminal E, unless otherwise noted.

Note 3. The device is not guaranteed to function outside its operating ratings.

PARAMETER MEASUREMENT INFORMATION

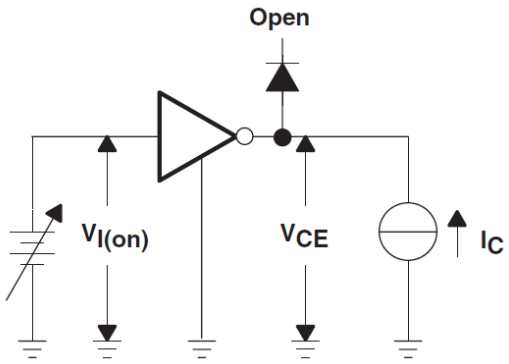


Fig. 1. ON-State Input Voltage Test Circuit

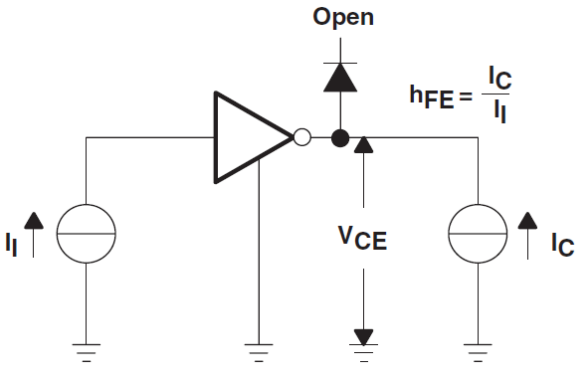


Fig. 2. Collector-Emitter Saturation Voltage Test Circuit

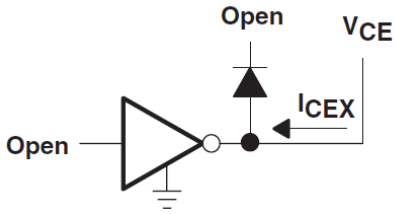


Fig. 3. Output Leakage Current Test Circuit

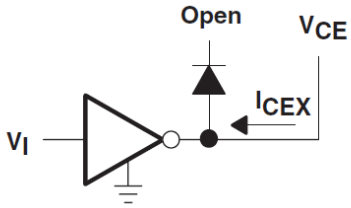


Fig. 4. Output Leakage Current Test Circuit

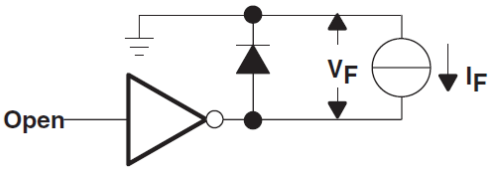


Fig. 5. Clamp Forward Voltage Test Circuit

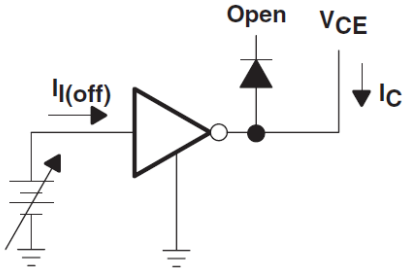


Fig. 6. Off-State Input Current Test Circuit

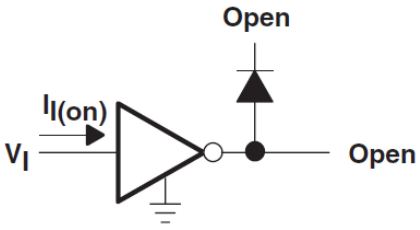


Fig. 7. Input Current Test Circuit

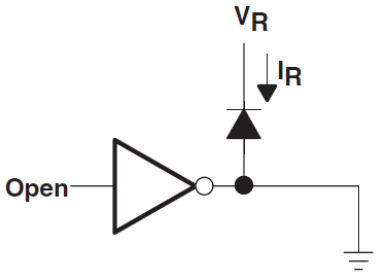


Fig. 8. Clamp Diode Leakage Current Test Circuit

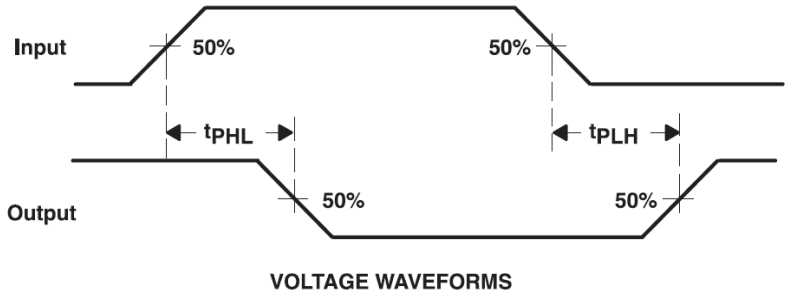


Fig. 9. Propagation Delay Time Waveform

APPLICATION INFORMATION

T.B.D.

TYPICAL OPERATING CHARACTERISTICS

T.B.D.

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