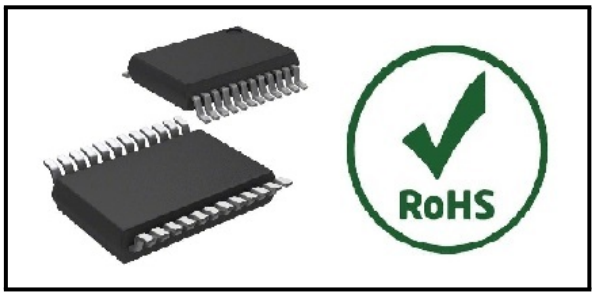
BE2803LVP

High-voltage High-current Darlington Transistor Arrays

Features

- Support 1.8V low voltage input
- 500mA collector output current per channel
- Input compatible with TTL/CMOS logic signals
- Small package

Package



Application

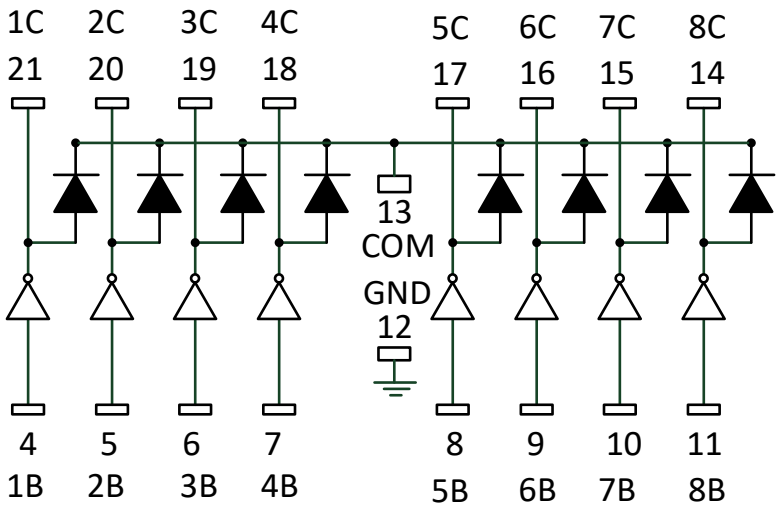
- Stepper motor drive
- Relay drive
- Display driver
- Indicator drive

General Description

BE2803LVP is a high-current Darlington tube array specially designed for low-voltage systems. The circuit consists of eight independent Darlington tubes, each with a freewheeling diode, which can drive inductive loads such as relays and stepper motors. Each single Darlington tube supports 200mA output when the input voltage is as low as 1.8V. The parallel connection of Darlington tubes can get a larger output current capability. This circuit is widely used in lighting. Drivers, Display Drivers, Stepper Motor Drivers, and Logic Buffers.

Each Darlington tube of BE2803LVP is connected in series with a base resistor, which can be directly connected to TTL/CMOS circuits under 5V operating voltage and can omit the logical buffer and process the data directly. Each Darlington tube input pin of BE2803LVP is internally connected with a 4.7K ohm pull-down resistor to the ground, to prevent the Darlington tube from entering an abnormal working state due to an unstable state when the IO port of the MCU is powered on.

Connection Diagram



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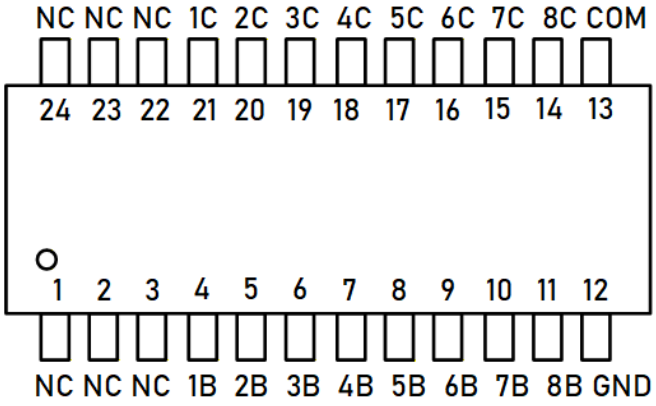
Marking

BORN :LOGO
YY :Year Code
WW :Week Code
BE2803LV-24 :Type Specification

Pin Description



SSOP24 Pinout

Pin Number	Pin Name	Function	Pin Number	Pin Name	Function
1	NC	NC	13	COM	CC Diodes
2	NC	NC	14	8C	Output pair8
3	NC	NC	15	7C	Output pair7
4	1B	Input pair1	16	6C	Output pair6
5	2B	Input pair2	17	5C	Output pair5
6	3B	Input pair3	18	4C	Output pair4
7	4B	Input pair4	19	3C	Output pair3
8	5B	Input pair5	20	2C	Output pair2
9	6B	Input pair6	21	1C	Output pair1
10	7B	Input pair7	22	NC	NC
11	8B	Input pair8	23	NC	NC
12	E	CE(ground)	24	NC	NC

NOTE: CE(ground)= Common Emitter (ground); CC Diodes = Common Clamp Diodes

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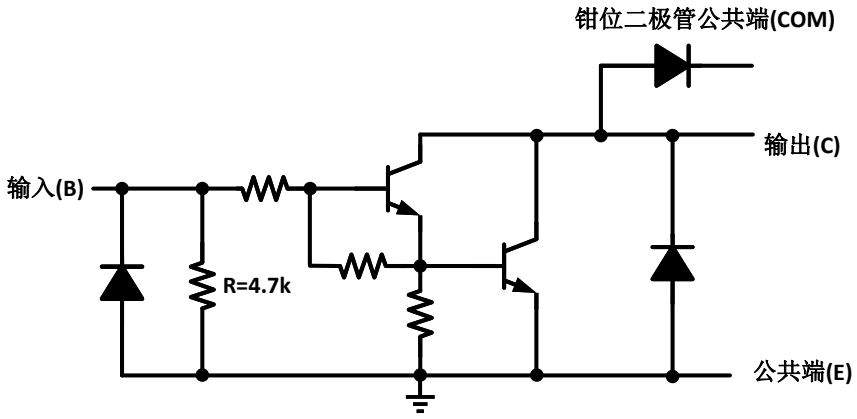
Functional Block Diagram



Note: All resistor values shown are nominal.

The collentor-emitter diode is a parasitic structure and should not be used to conduct current.If the collector(s) go below ground an external Schoottky diode should be added to clamp negative undershoots.

Absolute Maximum Ratings (At 25°C free-air temperature unless otherwise noted)(1)

Symbol	Parameter	Min.	Max.	Units
V_{CC}	Collector to emitter voltage	-0.5	15	V
V_{COM}	voltage of Pin COM	–	15	V
V_I	Input voltage	-0.5	7	V
I_{CP}	Peak collector current (See typical characteristics)	–	500	mA/ch
I_{OK}	Output clamp current	–	500	mA
I_{TE}	Total emitter-terminal current	–	-2	A
T_A	Operating free-air temperature range	–20	70	°C
T_J	Operating virtual junction temperature	–	150	°C
T_{STG}	Storage temperature range	-65	150	°C

(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.

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

(3) Maximum power dissipation is a function of $T_J(max)$, θ_{JA}, and T_A. The maximum allowable power dissipation at any allow able ambient temperature is $PD = (T_J(max)–T_A)/\theta_{JA}$. Operating at the absolute maximum T_J of 150°C can affect reliability.

(4) Maximum pow er dissipation is a function of $T_J(max)$, θ_{JC}, and T_A. The maximum allow able pow er dissipation at any allow able ambient temperature is $PD = (T_J(max)–T_A)/\theta_{JC}$. Operating at the absolute maximum T_J of 150°C can affect reliability.

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Typical Characteristics

Symbol	Parameter	Min.	Max.	Units
V_{CE}	Collector to emitter voltage	–	12	V
T_A	Operating Ambient Temperature	-40	+85	°C

Electrical Characteristics (T_A=+25°C, unless otherwise specified)

Parameter		Test Figure	Test Conditions		BN2003 MIN	BN2003 TYP	BN2003 MAX	Unit
$V_{I(on)}$	Input current-on condition	Figure 4	V_{CE} = 1.5V	I_C = 100 mA	–	2.0	2.1	V
				I_C = 200 mA	–	2.2	2.3	
$V_{CE(sat)}$	Collector-emitter saturation voltage	Figure 5	V_I = 1.8V	I_C = 100 mA	–	2.0	2.1	V
				I_C = 200 mA	–	3.2	3.3	
			V_I =3.3V	I_C = 300 mA	–	1.5	1.6	
				I_C = 500 mA	–	1.8	1.9	
V_F	Clamp forw ard voltage	Figure 8	I_F=350mA	–	–	0.1	1.6	V
I_{CEX}	Collector cutoff current	Figure 2	V_{CE}=12,I_I=0		–	–	50	uA
			V_{CE}=12,V_I=0,Ta=85°C		–	–	100	
I_i	Input current	Figure 4	V_{IN}=1.8V	I_C=250mA	–	–	1.25	mA
			V_{IN}=2.4V		–	–	3.05	
			V_{IN}=3.3V		–	–	4.55	
I_R	Clamp reverse current	Figure 7	V_R=12V	–	–	–	100	uA
C_i	Input capacitance	–	V_I = 0, f = 1 MHz		–	15	–	pF

Switching Characteristics (T_A = +25°C, unless otherwise specified)

Parameter		Test Conditions	BE2803LVP MIN.	BE2803LVP TYP.	BE2803LVP MAX.	Unit
t_{PLH}	Propagation delay time, low - to high-level output	Figure 9	–	0.15	1	μs
t_{PHL}	Propagation delay time, high- to low -level output	Figure 9	–	0.15	1	μs

 Revision: 2026-Apr-22-B

Parameter Measurement Information

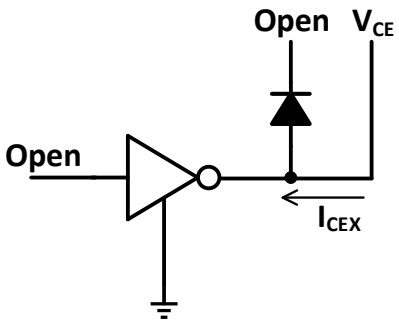


Fig.1 I_{CEX} Test Circuit

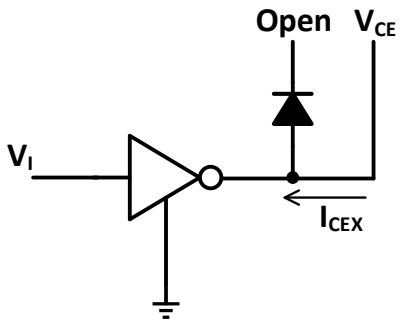


Fig.2 I_{CEX} Test Circuit

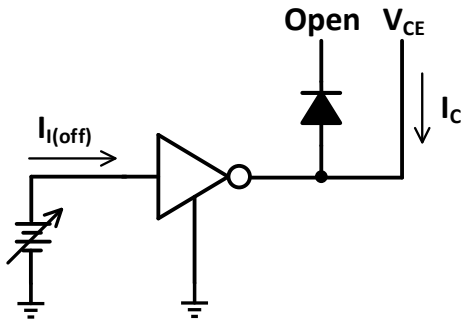


Fig.3 $I_{I(off)}$ Test Circuit

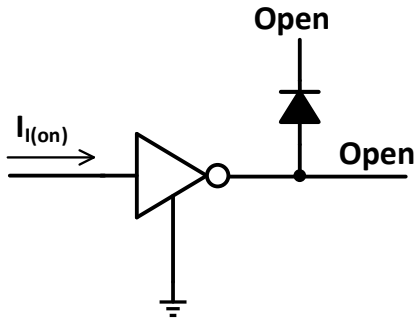


Fig.4 I_I Test Circuit

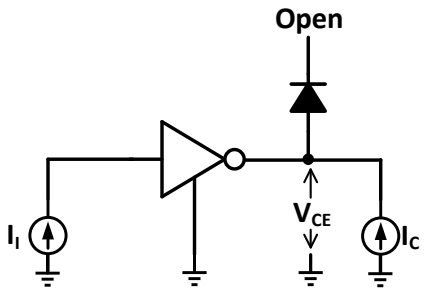


Fig.5 h_{fe}, $V_{CE(sat)}$ Test Circuit

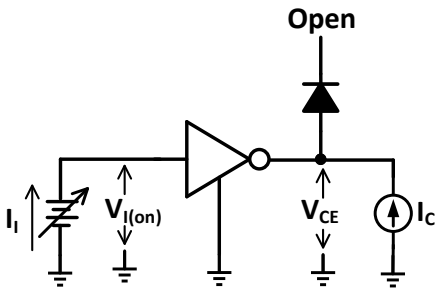


Fig.6 $V_{I(on)}$ Test Circuit

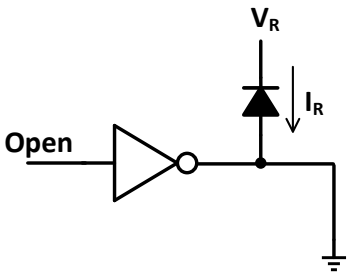


Fig.7 I_R Test Circuit

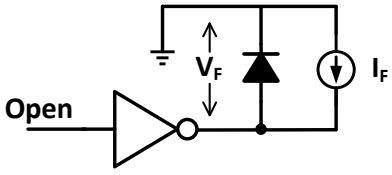
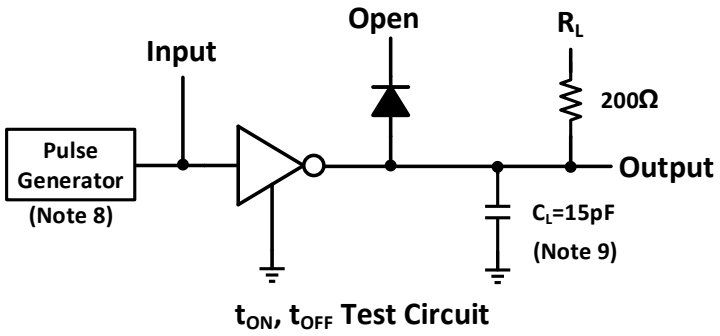
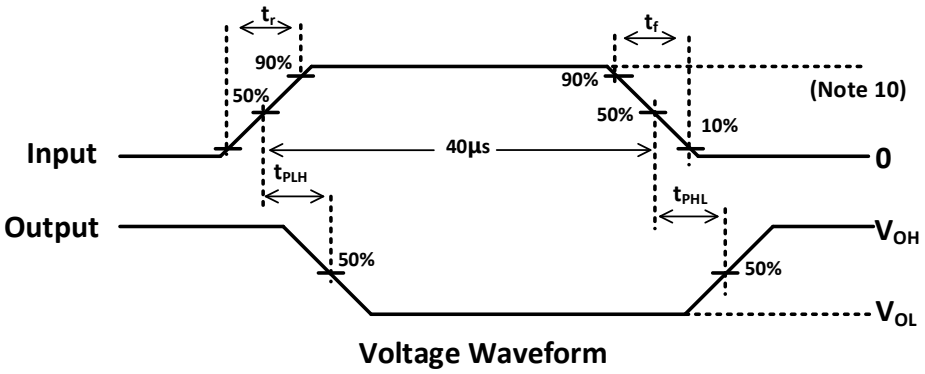


Fig.8 V_F Test Circuit

Parameter Measurement Information



t_{ON}, t_{OFF} Test Circuit



Voltage Waveform

Fig.9 Latch-Up Test Circuit and Voltage Waveform

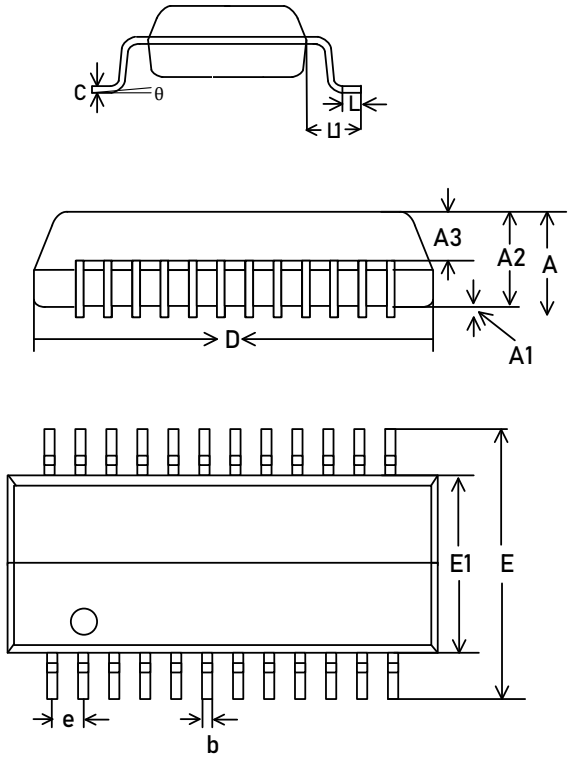
Notes:

8. The pulse generator has the follow ing characteristics: Pulse Width=12.5Hz, output impedance 50Ω, t_f≤5ns, t_f≤10ns.

9. C_L includes prove and jig capacitance.

10 V_{IH}=3V

SSOP24 Package Specifications



SYMBOL	MIN.	TYP.	MAX.
A	1.50	1.60	1.70
A1	0.10	0.15	0.25
A2	1.40	1.45	1.50
A3	0.60	0.65	0.70
b	0.20	0.25	0.30
c	0.15	0.20	0.25
D	8.50	8.60	8.70
E	5.80	6.00	6.20
E1	3.85	3.90	3.95
e		0.635BSC	
L	0.50	0.60	0.70
L1		1.05REF	
θ	0°	4°	8°

Note: All dimensions shown are in millimeters (mm) and refer to JEDEC STANDARD MO-220 WHHD-4

 Revision: 2026-Apr-22-B