

7-Channel Darlington Drivers

FEATURES

- Improved Replacement for ULN2803.
- Fast Turn-on and Turn-off.
- TTL/CMOS Compatible.

APPLICATIONS

- Stepping Motor Driver.
- Relay Driver.
- LED Driver.
- Solenoid Driver.

DESCRIPTION

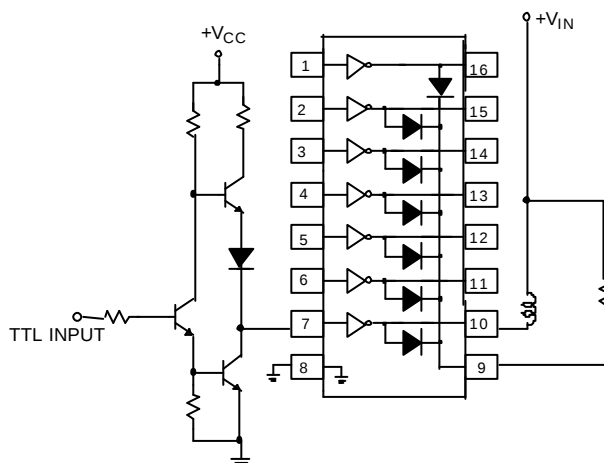
Manufactured with the standard bipolar process, the AIC2003 is a high-voltage, high-current 7-channel Darlington array, with each of the output transistors capable of sinking peak load current of 700mA and capable of withstanding at least 35V in the OFF state.

The AIC2003 has a 2.7K Ω series base resistor to each Darlington pair and thus allows operation directly with TTL or CMOS logic circuitry operating at a supply voltage of 5V. Outputs of the drivers can be paralleled for higher load current capability.

These make the AIC2003 ideally suited for numerous interfaces between low-level logic circuitry and high-power peripheral loads, particularly those beyond the capabilities of standard logic buffers. Typical loads include relays, solenoids, stepping motors, heaters, multiplexed LED, and incandescent displays.

The AIC2003 features open collector outputs and integral diodes for inductive load transient suppression.

TYPICAL APPLICATION CIRCUIT



Solenoid Driver

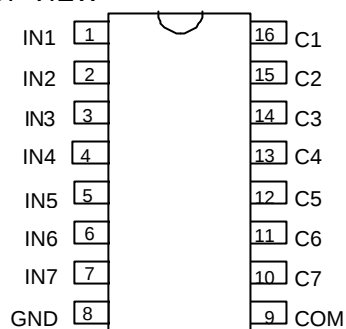
AIC2003CXXX

PACKAGE TYPE
N:PLASTIC DIP

Example: AIC2003CNTB

→ in DIP-16 Package & Tube
Packing Type

DIP-16
TOP VIEW



■ **ABSOLUTE MAXIMUM RATINGS** (at T_A=25°C)

Output Voltage, V_{CE} 35V

Input Voltage, V_{IN} 30V

Continuous Collector Current, I_C 500mA

Continuous Base Current, I_B25mA

Power Dissipation, PD (one Darlington pair).....1.0W

(total package).....2.25W

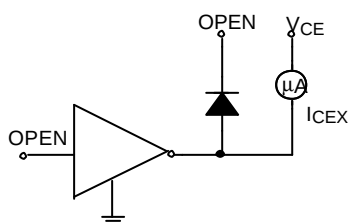
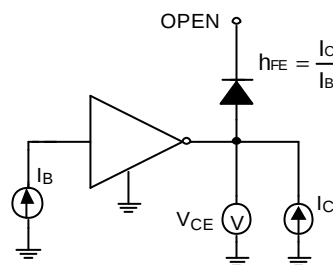
Operating Ambient Temperature Range, T_A-20°C to +85°C

Storage Temperature Range, T_s-55°C to +150°C

ELECTRICAL CHARACTERISTICS ($T_A=25^{\circ}\text{C}$, unless otherwise specified.)

PARAMETERS	SYMBOL	TEST FIG	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Leakage Current	I_{CEX}	1	$V_{CE}=35\text{V}, T_A=25^{\circ}\text{C}$ $V_{CE}=35\text{V}, T_A=70^{\circ}\text{C}$			3 50	μA
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$	2	$I_C=100\text{mA}, I_B=250\mu\text{A}$ $I_C=200\text{mA}, I_B=350\mu\text{A}$ $I_C=350\text{mA}, I_B=500\mu\text{A}$		0.8 0.9 1.0	1.1 1.3 1.5	V
Input Current	$I_{IN(ON)}$	3	$V_{IN}=3.85\text{V}$		0.93	1.35	mA
	$I_{IN(OFF)}$	4	$I_C=500\mu\text{A}, T_A=70^{\circ}\text{C}$	50	65		μA
Input voltage	$V_{IN(ON)}$	5	$V_{CE}=2.0\text{V}, I_C=200\text{mA}$ $V_{CE}=2.0\text{V}, I_C=250\text{mA}$ $V_{CE}=2.0\text{V}, I_C=300\text{mA}$			2.3 2.4 2.5	V
Input Capacitance	C_{IN}				15	25	pF
Turn-On Delay	t_{ON}		$0.5 E_{IN}$ to $0.5 E_{OUT}$		0.25	1.0	μS
Turn-off Delay	t_{OFF}		$0.5 E_{IN}$ to $0.5 E_{OUT}$		0.25	1.0	μS
Clamp Diode Leakage Current	I_R	6	$V_R=35\text{V}, T_A=25^{\circ}\text{C}$ $V_R=35\text{V}, T_A=70^{\circ}\text{C}$			3 50	μA
Clamp Diode Forward Voltage	V_F	7	$I_F=350\text{mA}$		1.4	1.8	V

TEST CIRCUITS


Fig. 1

Fig. 2

■ TEST CIRCUITS (Continued)

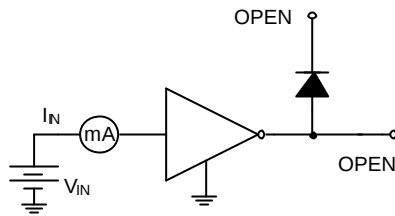


Fig. 3

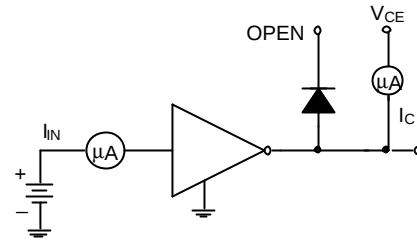


Fig. 4

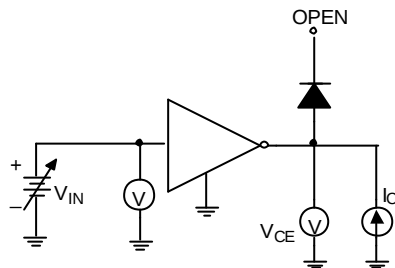


Fig. 5

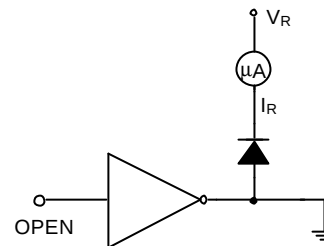


Fig. 6

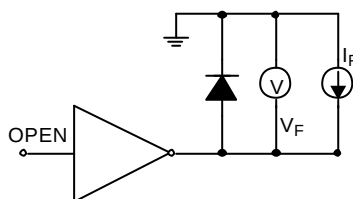


Fig. 7

■ PIN DESCRIPTIONS

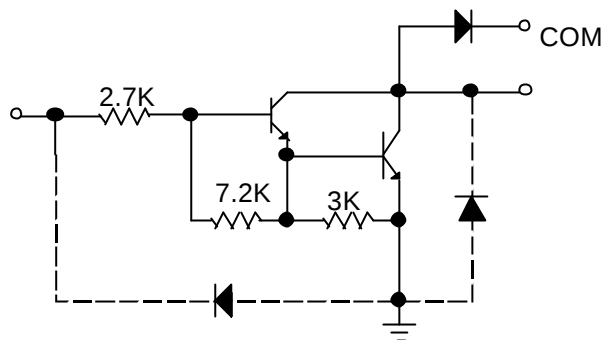
PIN 1~7: IN1~IN7 - Control signal input pin.

PIN 8: GND - Power ground.

PIN 9: COM - The output pin (Cathode) of freewheeling diode.

PIN 10~16: C1~C7 - Each of the pins may individually sink load current from some controlled circuits. The sunk current should be under 500mA in a continuous mode.

DRIVER CIRCUIT



ALLOWABLE AVERAGE POWER DISSIPATION

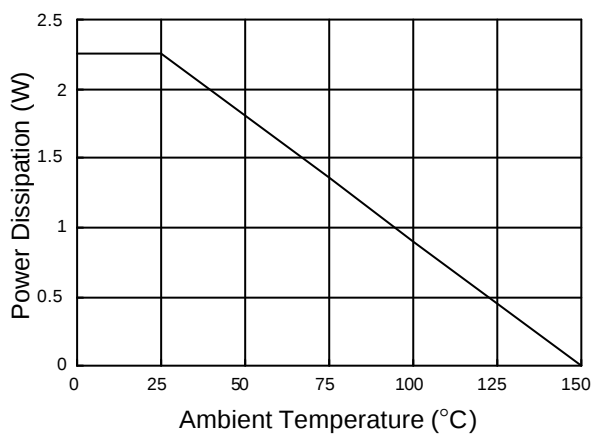
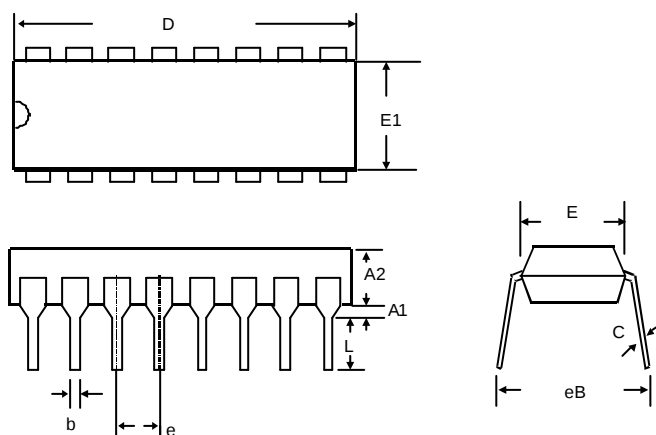


Fig. 8 Power Dissipation vs. Ambient Temperature

PHYSICAL DIMENSIONS

- 16 LEAD PLASTIC DIP (unit: mm)



SYMBOL	MIN	MAX
A1	0.381	—
A2	2.92	4.96
b	0.35	0.56
C	0.20	0.36
D	18.66	19.69
E	7.62	8.26
E1	6.09	7.12
e	2.54(TYP)	
eB	—	10.92
L	2.92	3.81