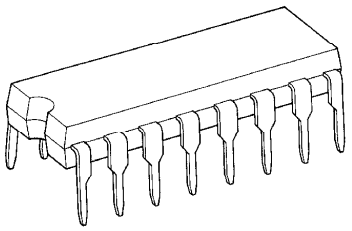
TENTATIVE TOSHIBA BIPOLAR DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

TA8081P

0.7A MOTOR DRIVER WITH DIAGNOSIS

The TA8081P is a 0.7A motor driver which directly drivers a bidirectional DC motor. Inputs DI1 and DI2 are combined to select one of forward, reverse, stop, and brake modes. Since the inputs are TTL-compatible, this IC can be controlled directly from a CPU or other control system. The IC also has various protective, self-diagnostic, and standby functions.



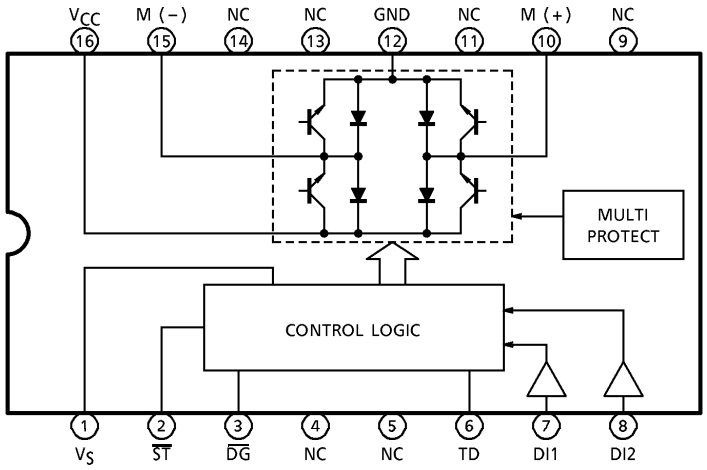
DIP16-P-300-2.54A

Weight : 1.0g (Typ.)

FEATURES

- Bidirectional DC motor driver.
- Current capacity : 0.7A (Max.)
- Low standby current : 100μA (Max.)
- Four operation modes : Forward, reverse, stop, and brake.
- Protective functions : Thermal shutdown, short-circuit protection, and over-voltage shutdown.
- Built-in counter electromotive force absorption diodes.
- Self-diagnostic output : On short-circuit detection.
- Plastic DIP-16pin.

BLOCK DIAGRAM AND PIN LAYOUT



961001EBA2

PIN DESCRIPTION

PIN No.	SYMBOL	DESCRIPTION
1	V_S	Control power supply pin. This pin is completely isolated from V_{CC}.
2	$\overline{ST}$	When this pin is opened or grounded, the output turns off, thus reducing the current consumption to 100μA or less. If standby mode is not needed, the pin is connected to V_{CC}.
3	$\overline{DG}$	Self-diagnostic output pin. When the output current becomes 1.5A or more, this pin outputs a protection switching waveform similar to the waveform which would be supplied from M (+) / M (−) pin. If a capacitor is connected to the TD pin, the signal from this pin will become low after a specific delay. The output from the pin is an open-collector output. The delay time is calculated approximately by the following : $TD = 50 \times C_T$ (ms) C_T (μF)···The permissible range of C_T is from 0.01μF to 2μF.
4	NC	Not connected.
5	NC	Not connected.
6	TD	Provides a delay for the $\overline{DG}$ output. A capacitor is connected between this pin and GND. When the pin is opened, the $\overline{DG}$ pin supplies a switching output.
7 8	DI1 DI2	Output status control pin. Connects to a PNP-type voltage comparator.
9	NC	Not connected.
10	M (+)	Connects to the DC motor. Both the sink and the source have a current capacity of 0.7A. Diodes for absorbing counter electromotive force are contained on the V_{CC} and GND sides.
11	NC	Not connected.
12	GND	Grounded
13	NC	Not connected.
14	NC	Not connected.
15	M (−)	Connects to the DC motor together with pin 10 and has the same function as pin 10. This pin is controlled by the inputs from pins 7 and 8.
16	V_{CC}	Output section power supply pin. This pin has a function to turn off the output when the applied voltage exceeds 30.0V, thus protecting the IC and the load.

TRUTH TABLE

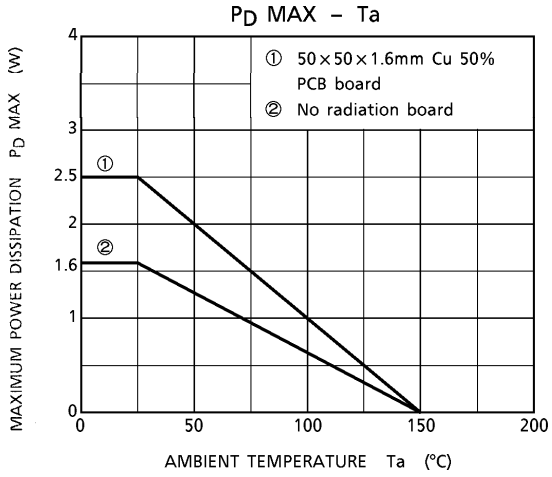
INPUT			OUTPUT		OUTPUT MODE
DI1	DI2	$\overline{ST}$	M (+)	M (−)	
H	H	H	L	L	Brake
L	H	H	L	H	Reverse (CCW)
H	L	H	H	L	Forward (CW)
L	L	H	OFF (high impedance)		Stop
H / L	H / L	L	OFF (high impedance)		Standby (stop)

MAXIMUM RATINGS (Ta = 25°C)

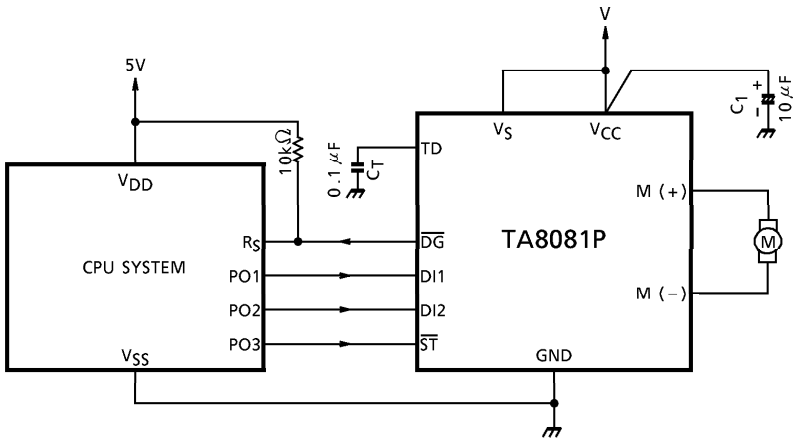
CHARACTERISTIC	SYMBOL	RATING	UNIT
Power Supply Voltage	V_{CC}	33	V
	V_{CC}	60 (1s)	
Input Voltage	V_{IN}	−0.3~V_{CC}	V
Output Current	$I_{O\ AVE}$	0.7	A
Power Dissipation	P_D	1.6	W
Operating Temperature	T_{opr}	−40~110	°C
Storage Temperature	T_{stg}	−55~150	°C
Lead Temperature-time	T_{sol}	260 (10s)	°C

ELECTRICAL CHARACTERISTICS (V_{CC} = 6~16V, Ta = −40~110°C)

CHARACTERISTIC	SYMBOL	PIN	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Current Consumption 1	I_{S1}	V_S	—	Stop	—	5	10	mA
	I_{S2}		—	Forward / Reverse	—	10	20	
	I_{S3}		—	Brake	—	10	20	
Current Consumption 2	I_{CC1}	V_{CC}	—	Stop	—	1.0	2.0	mA
	I_{CC2}		—	Forward / Reverse	—	15	30	
	I_{CC3}		—	Brake	—	1.0	2.0	
Input Voltage	V_{IL}	DI1 / DI2	—	—	—	—	0.8	V
	V_{IH}		—	—	2.0	—	—	
	V_{IL}	$\overline{ST}$	—	—	—	—	0.5	
	V_{IH}		—	—	2.0	—	—	
Input Current	I_{IL}	DI1 / DI2	—	V_{IN} = 0.4V	− 10	—	10	μA
	I_{IH}		—	V_{IN} = V_{CC}	− 10	—	10	
	I_{IL}	$\overline{ST}$	—	V_{IN} = 0.4V	—	—	20	
	I_{IH}		—	V_{IN} = V_{CC}	—	—	2.0	mA
Output Saturation Voltage	V_{sat} (total)	M (+) / M (−)	—	I_O = 0.5A, Tc = 25°C	—	1.7	2.4	V
			—	I_O = 0.5A, Tc = 110°C	—	1.6	2.3	
Output Leakage Current	$I_{LEAK·U}$	M (+) / M (−)	—	V_{OUT} = 0V	—	—	− 10	μA
	$I_{LEAK·L}$		—	V_{OUT} = V_{CC}	—	—	10	
Output Voltage	V_{OL}	$\overline{DG}$	—	I_{OL} = 3mA	—	—	0.5	V
Output Leakage Current	I_{LEAK}		—	V_{OUT} = V_{CC}	—	—	10	μA
Diode Forward Voltage	$V_{F·U}$	M (+) / M (−)	—	I_F = 0.5A	—	1.5	—	V
	$V_{F·L}$				—	1.5	—	
Over-current Detection	I_{SD}	—	—	—	1.0	1.5	2.0	A
Shutdown Temperature	T_{SD}	—	—	—	—	150	—	°C
Over-voltage Detection	V_{SD}	—	—	—	27	30	33	V
Standby Current	I_S	V_{CC} + V_S	—	$\overline{ST}$ = 0V	—	—	100	μA
Transfer Delay Time	t_{pLH}	—	—	—	—	1	10	μs
	t_{pHL}	—	—	—	—	1	10	



EXAMPLE OF APPLICATION CIRCUIT

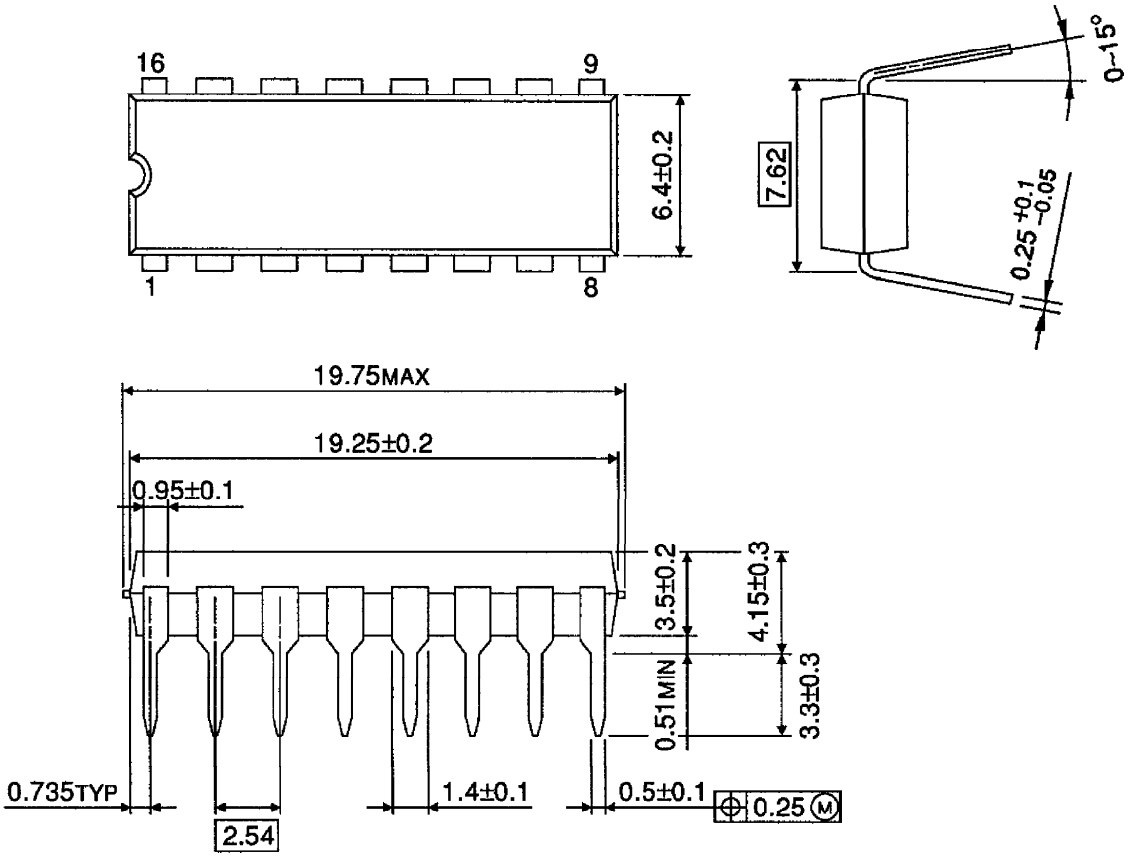


Cautions for Wiring : C_1 is for absorbing disturbance, noise, etc. Connect is as close to the IC as possible.

OUTLINE DRAWING

DIP16-P-300-2.54A

Unit : mm



Weight : 1.0g (Typ.)