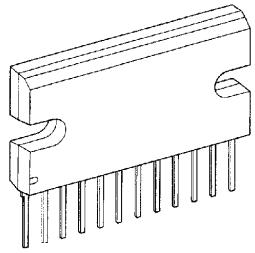
TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

TA8068L

INTELLIGENT STEPPING MOTOR DRIVER

The TA8068L is a stepping motor driver with a current capacity of 1.5A. Inputs INA and INB are combined to control the four outputs.
Since the inputs are TTL-compatible, this IC can be controlled directly from a CPU or other control system. The IC also incorporates various protective functions as well as a self-diagnostic function for diagnostic function for diagnostic output.



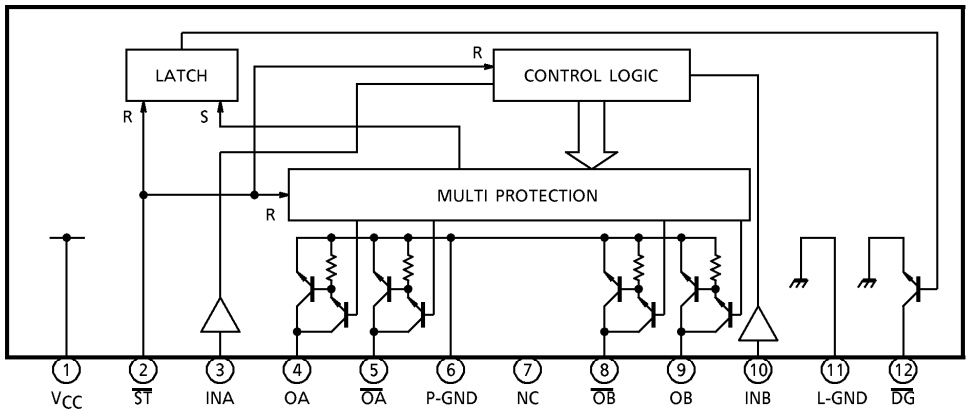
HSIP12-P-2.54

Weight : 7.95g (Typ.)

FEATURES

- Output current capacity : 1.5A (Max.)
- Low standby current : 100μA (Max.)
- Built-in Protective Functions : Over-Voltage Protection / Short-Circuit Protection (latch) / Thermal-Shutdown
- Self-diagnostic Output : On Short-Circuit Detection
- Separate GND for output and logic control sections
- Plastic package HSIP-12pin

BLOCK DIAGRAM AND PIN LAYOUT

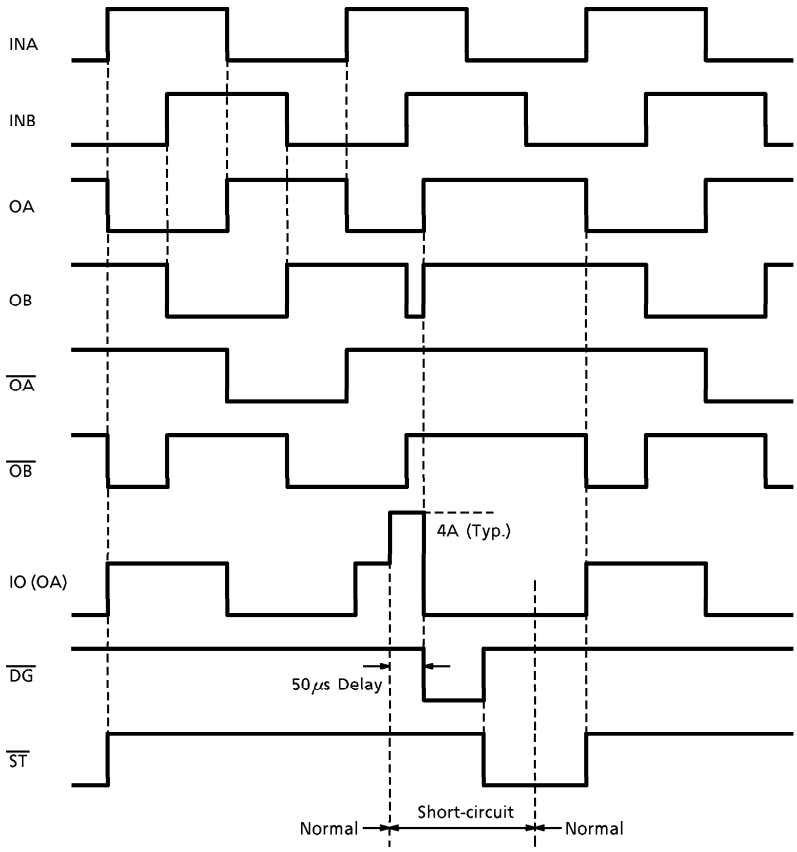


961001EBA2

PIN DESCRIPTION

PIN No.	SYMBOL	DESCRIPTION
1	V_{CC}	Power supply pin. This pin has a function to turn off the output when the applied voltage exceeds 30V (Typ.), thus protecting the IC and the motor load.
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	INA	This is input terminal which controls output condition of pin 4 and pin 5. PNP-type voltage comparator is built in.
4	OA	PNP-type complementary output pin with a current capacity of 1.5A. This pin is controlled by the input from pin 3. When the output is supplied with a current exceeding the detection current (4A Typ.) because of load short-circuit, the output is latched to the OFF state after a 50μs (Typ.) delay in order to protect the IC.
5	$\overline{OA}$	Output pin of the inversion of pin 4. This terminal has the same function as pin 4 and is controlled by pin 3.
6	P-GND	Ground terminal of output section which is usually connected with pin 11.
7	(NC)	Not connected.
8	$\overline{OB}$	Output pin of the inversion of pin 9. This terminal has the same function as pin 4 and is controlled by pin 10.
9	OB	This terminal has the same function as pin 4 and is controlled by pin 10.
10	INB	This is input terminal which controls output condition of pin 8 and pin 9. PNP-type voltage comparator is built in.
11	L-GND	Ground terminal of logic control section which is usually connected with pin 6.
12	$\overline{DG}$	Self-diagnostic output pin. This signal goes low when the output is short-circuited while the input is on (high). The output will be latched after a 50μs (Typ.) delay when the load is short-circuited. This pin supplies an NPN open-collector output.

TIMING CHART



TRUTH TABLE INPUT / OUTPUT

INPUT			OUTPUT				
INA	INB	$\overline{ST}$	OA	$\overline{OA}$	OB	$\overline{OB}$	$\overline{DG}$
L	L	H	OFF	ON	OFF	ON	OFF
L	H	H	OFF	ON	ON	OFF	OFF
H	L	H	ON	OFF	OFF	ON	OFF
H	H	H	ON	OFF	ON	OFF	OFF
—	—	L	OFF	OFF	OFF	OFF	OFF
—	—	OPEN	OFF	OFF	OFF	OFF	OFF

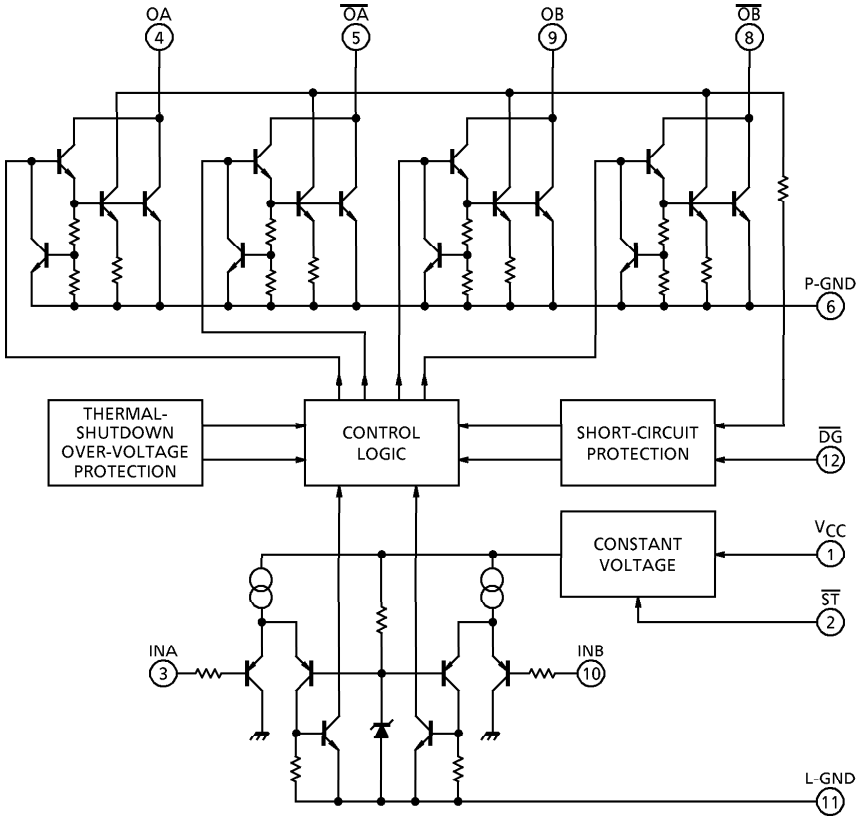
MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	V_{CC}	30	V
	V_{CC}	60 (1s)	
Input Voltage	V_{IN}	−0.3~7	V
Output Voltage	V_{CC}	−0.3~V_{CC}	V
Output Current	I_O·AVE	1.5	A
Power Dissipation	P_D	25	W
Operating Temperature	T_{opr}	−40~110	°C
Storage Temperature	T_{stg}	−55~150	°C
Lead Temperature·time	T_{sol}	260 (10s)	°C

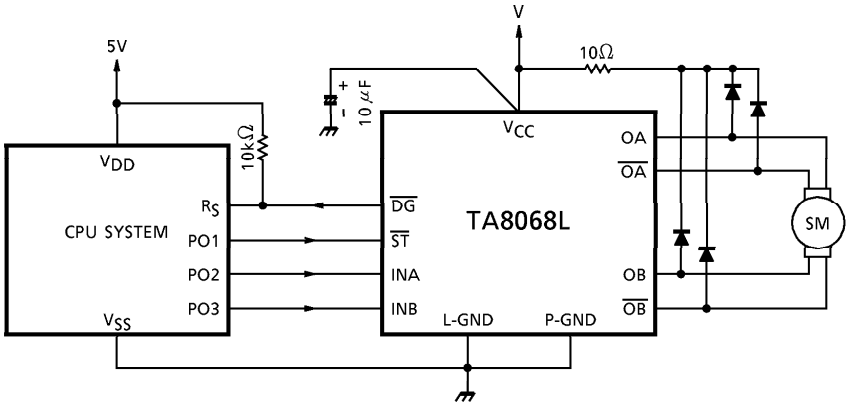
ELECTRICAL CHARACTERISTICS (V_{CC} = 8~16V, Ta = −40~85°C)

CHARACTERISTIC	SYMBOL	PIN	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Current Consumption	I_{CC}	V_{CC}	—	—	12	25	40	mA
Input Voltage	V_{IL}	INA / INB	—	—	—	—	0.8	V
	V_{IH}		—	—	2.4	—	—	
Input Current	I_{IL}	INA / INB	—	V_{IN} = 0.4V	−50	—	—	μA
	I_{IH}		—	V_{IN} = 5V	—	—	10	
Input Voltage	V_{IL}	$\overline{ST}$	—	—	—	—	0.8	V
	V_{IH}		—	—	3.0	—	—	
Output Saturation Voltage	V_{SAT}	OA, $\overline{OA}$ OB, $\overline{OB}$	—	I_O = 1.5A / Ta = 25°C	—	1.25	1.5	V
Output Leakage Current	I_{LEAK}	OA, $\overline{OA}$ OB, $\overline{OB}$	—	V_O = V_{CC}	—	—	10	μA
Output Voltage	V_{OL}	$\overline{DG}$	—	I_{OL} = 3mA	—	—	0.3	V
Output Leakage Current	I_{LEAK}		—	V_O = V_{CC}	—	—	10	μA
Over-current Detection	ISD	—	—	—	1.8	4	6	A
Shutdown Temperature	TSD-H	—	—	OUT = ON→OFF	—	160	—	°C
	TSD-L		—	OUT = OFF→ON	—	130	—	
Over-voltage Detection	VSD	—	—	—	27.5	30	33	V
Standby Current	IST	V_{CC}	—	$\overline{ST}$ = GND	—	—	100	μA
Thermal Resistance	$R\theta_{j-c}$	—	—	—	—	3	—	°C / W
Transfer Delay Time	t_{pLH}	—	—	—	—	1	10	μs
	t_{pHL}	—	—	—	—	1	10	

EQUIVALENT CIRCUIT



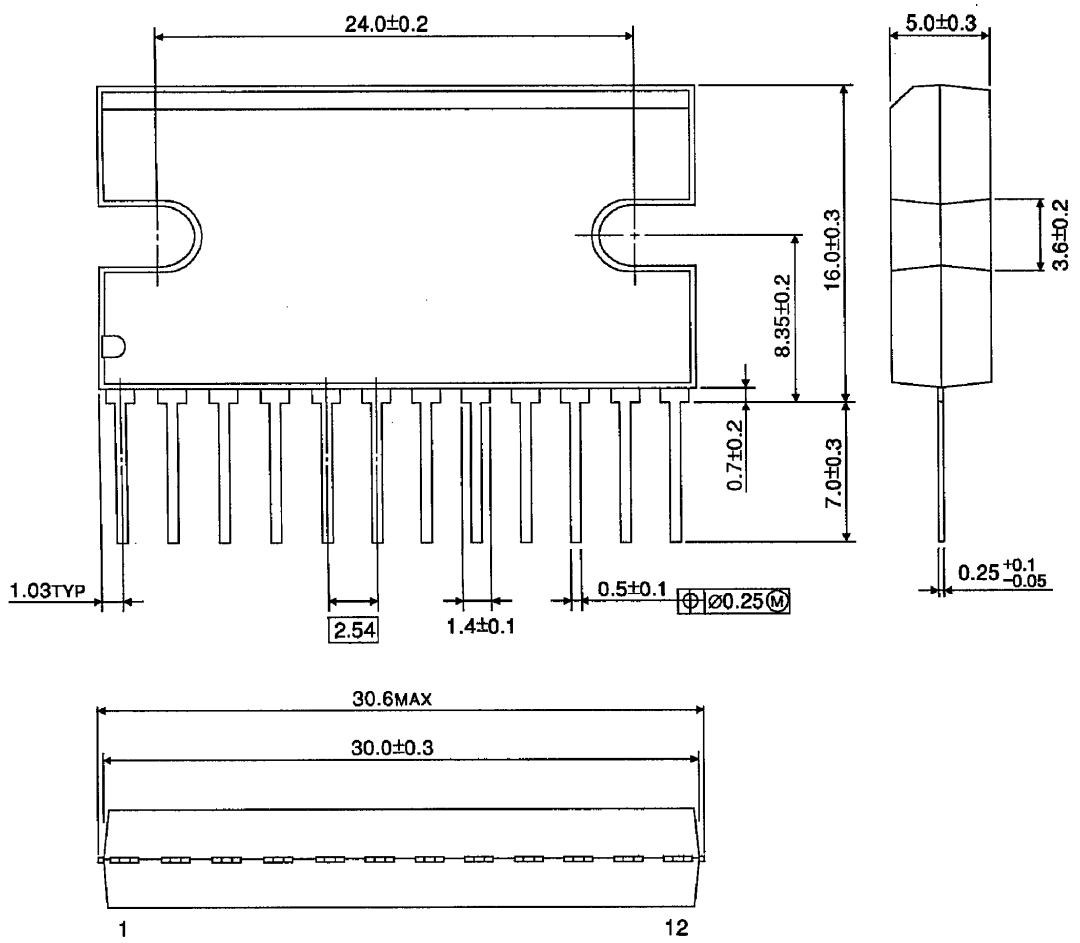
APPLICATION CIRCUIT



OUTLINE DRAWING

HSIP12-P-2.54

Unit : mm



Weight : 7.95g (Typ.)