

TA8068L

INTELLIGENT STEPPING MOTOR DRIVER

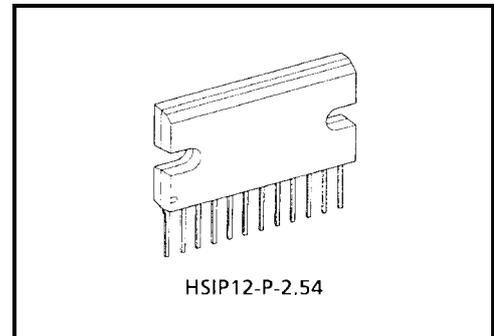
The TA8068L is a stepping motor driver with a current capacity of 1.5A. Inputs INA and INB are combined to control the four outputs.

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.

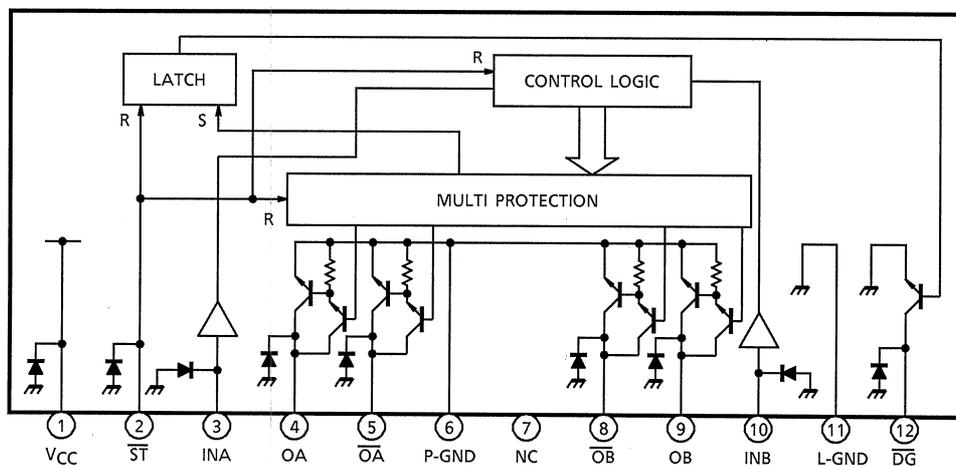
FEATURES

- Output current capacity : 1.5A (max.)
- Low standby current : 100 μ A (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



Weight: 7.95 g (typ.)

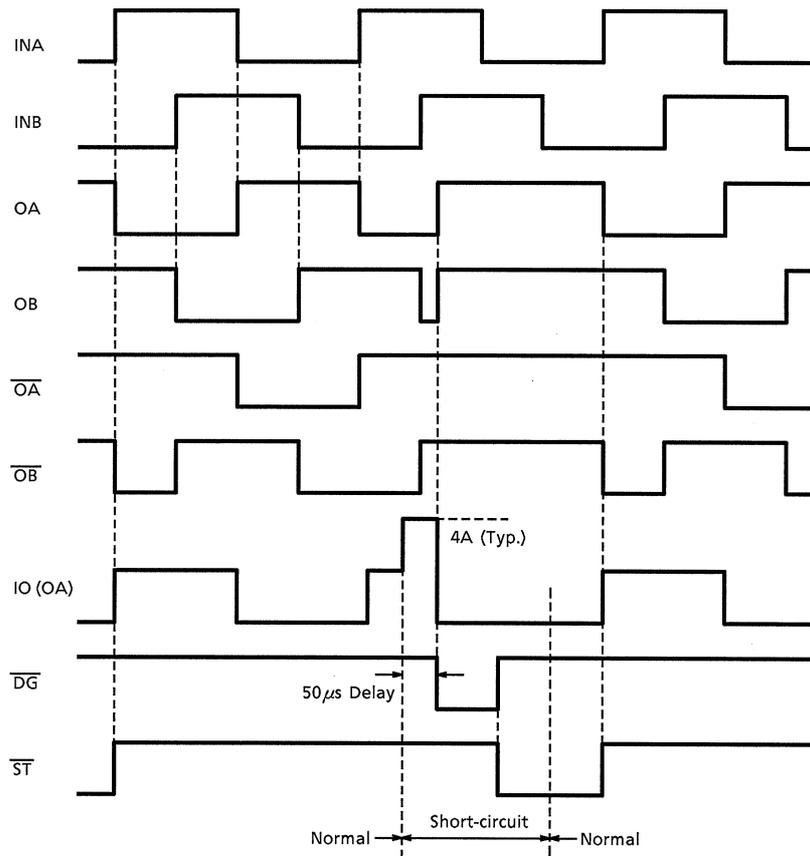
BLOCK DIAGRAM AND PIN LAYOUT



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 100 μ A 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 50 μ s (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. (Electrically, this pin is completely open.) |
| 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 50 μ s (Typ.) delay when the load is short-circuited. This pin supplies an NPN open-collector output. |

TIMING CHART



TRUTH TABLE INPUT / OUTPUT

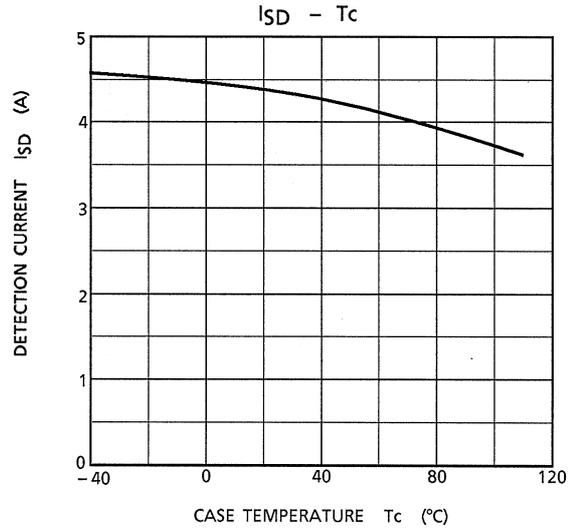
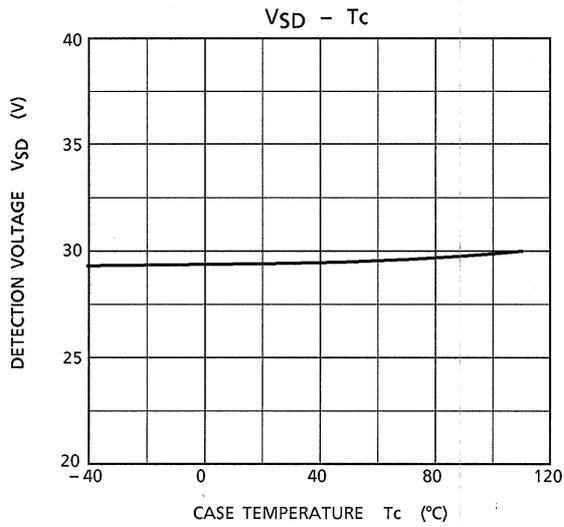
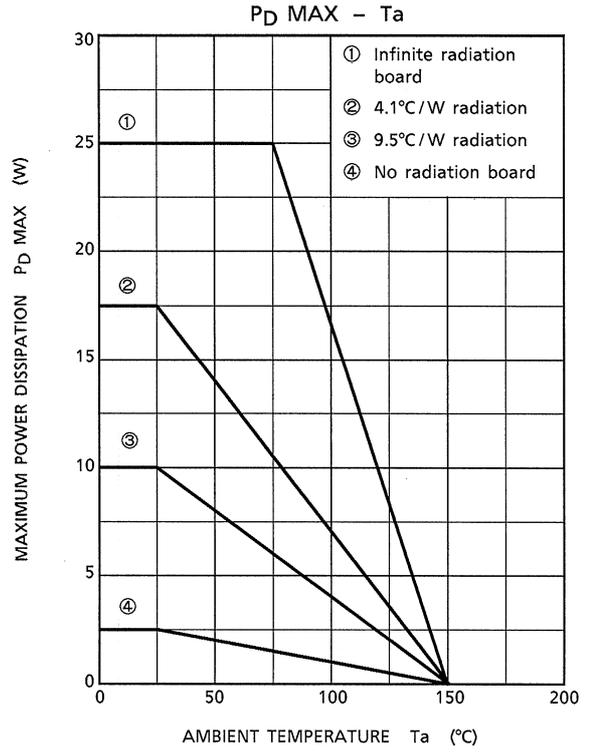
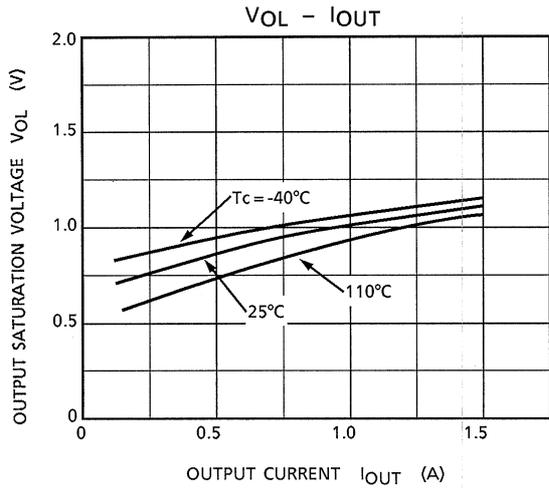
| INPUT | | | OUTPUT | | | | |
|-------|-----|-----------------|--------|-----------------|-----|-----------------|-----------------|
| INA | INB | \overline{ST} | OA | \overline{OA} | OB | \overline{OB} | \overline{DG} |
| L | L | H | OFF | ON | OFF | ON | OFF |
| L | H | H | OFF | ON | ON | OFF | OFF |
| 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)

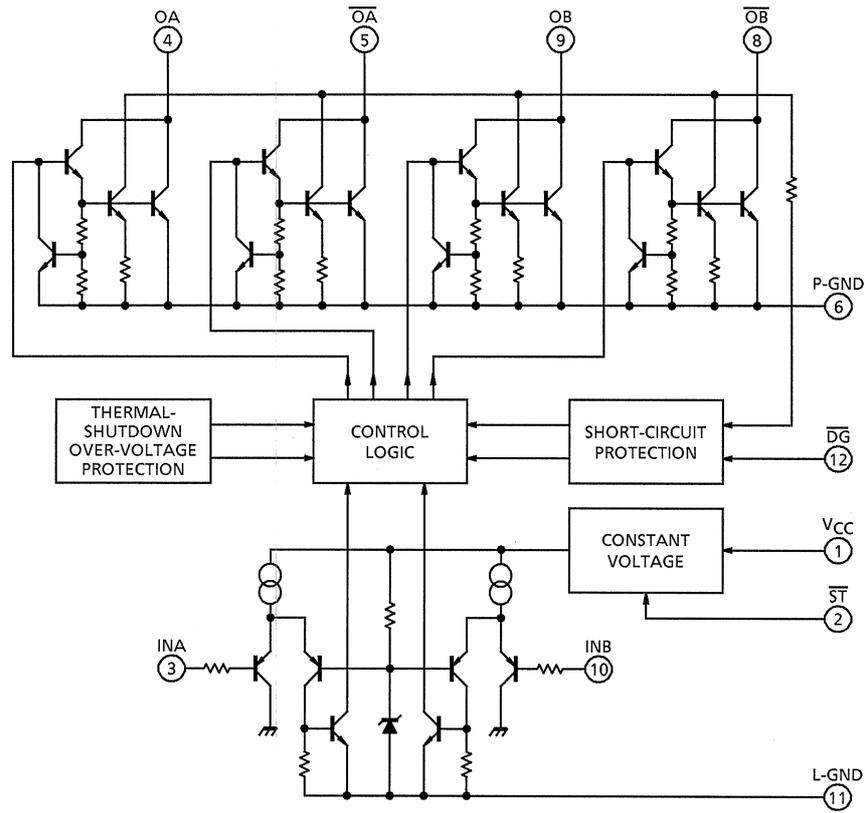
| CHARACTERISTIC | SYMBOL | RATING | UNIT |
|-----------------------|--------------------|----------------------|------|
| Supply Voltage | V _{CC} | 30 | V |
| | V _{CC} | 60 (1s) | |
| Input Voltage | V _{IN} | -0.3~7 | V |
| Output Voltage | V _{CC} | -0.3~V _{CC} | V |
| Output Current | I _{O AVE} | 1.5 | A |
| Power Dissipation | P _D | 25 | W |
| Operation 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 = -40~110°C)

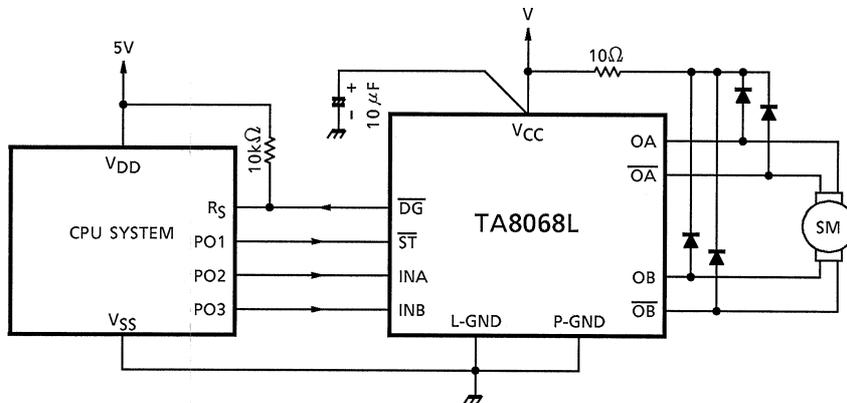
| CHARACTERISTIC | SYMBOL | PIN | TEST CIRCUIT | TEST CONDITION | MIN | TYP. | MAX | UNIT |
|---------------------------|-------------------|--|--------------|-----------------------------------|------|------|-----|--------|
| Current Consumption | I _{CC} | V _{CC} | — | | 12 | 25 | 40 | mA |
| Input 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} | 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} | 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} | — | ST = GND | — | — | 100 | μA |
| Thermal Resistance | R _{θj-c} | | — | | — | 3 | — | °C / W |
| Transfer Delay Time | t _{pLH} | | — | | — | 1 | 10 | μs |
| | t _{pHL} | | — | | — | 1 | 10 | |



EQUIVALENT CIRCUIT



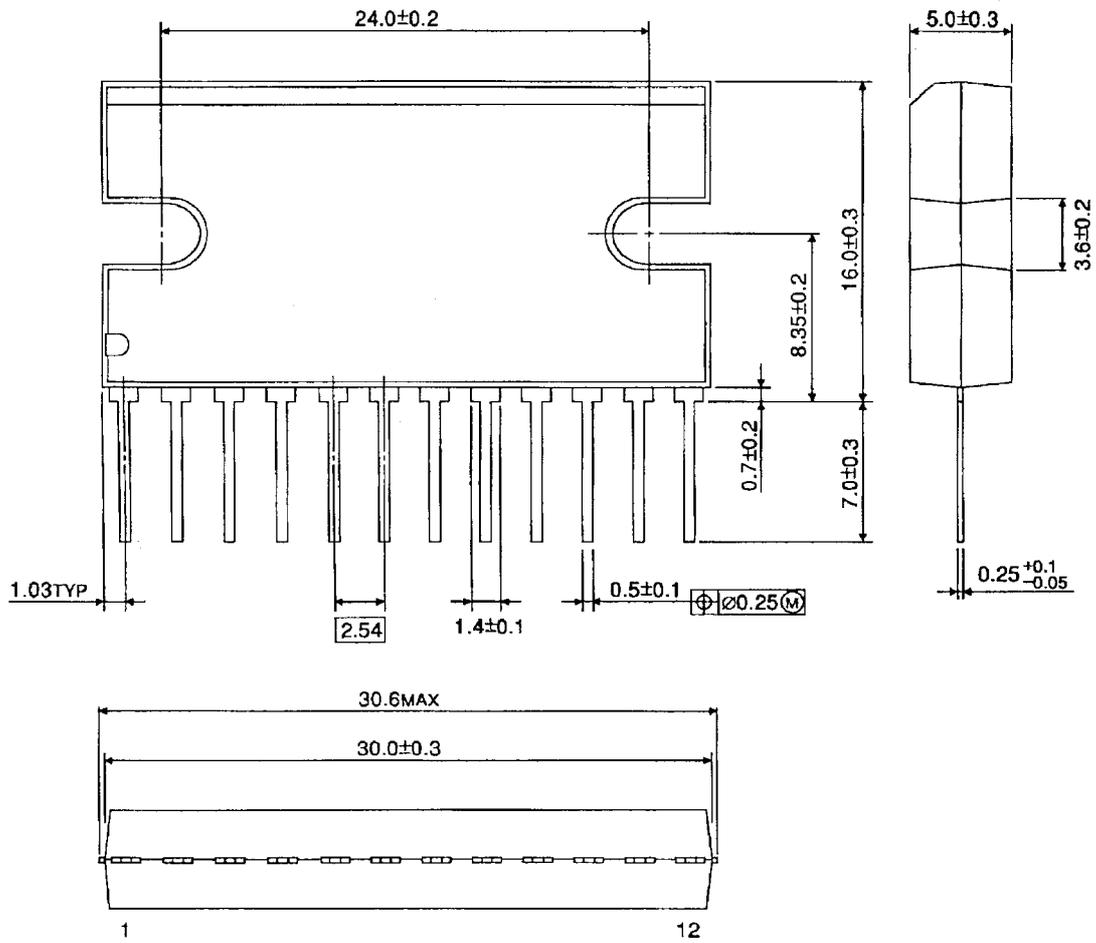
APPLICATION CIRCUIT



PACKAGE DIMENSIONS

HSIP12-P-2.54

Unit : mm



Weight: 7.95 g (Typ.)

RESTRICTIONS ON PRODUCT USE

000707EAA_S

- TOSHIBA is continually working to improve the quality and reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to comply with the standards of safety in making a safe design for the entire system, and to avoid situations in which a malfunction or failure of such TOSHIBA products could cause loss of human life, bodily injury or damage to property.
In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent TOSHIBA products specifications. Also, please keep in mind the precautions and conditions set forth in the "Handling Guide for Semiconductor Devices," or "TOSHIBA Semiconductor Reliability Handbook" etc..
- The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by TOSHIBA CORPORATION for any infringements of intellectual property or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any intellectual property or other rights of TOSHIBA CORPORATION or others.
- The information contained herein is subject to change without notice.