TOSHIBA Bipolar Linear Integrated Circuit Silicon Monolithic

TD62915F

Intelligent Stepping Motor Driver

The TD62915F is a stepping motor driver with a current capacity of 1.5 A. 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: 1.5 A (max)
- Low standby current: 0.1 mA (max)
- Built-in protective functions: Short-circuit protection (latch) / Thermal shutdown
- Self-diagnostic output: On short-circuit detection
- Separate GND for output and logic control sections
- Package: 20-pin HSOP

Block Diagram and Pin Assignment



Weight: 0.79 g (typ.)



Pin Description

Pin No.	Symbol	Description
1	V _{CC}	Power supply pin.
4	ST	When this pin is opened or grounded, the output turns off, thus reducing the current consumption to 100 μA or less. If standby mode is not needed, the pin is connected to V _{CC} .
5	INA	This is input terminal which controls output condition of pin 6 and pin 7. PNP-type voltage comparator is built in.
6	OA	PNP-type complementary output pin with a current capacity of 1.5 A. This pin is controlled by the input from pin 5. When the output is supplied with a current exceeding the detection current (4 A typ.) because of load shortcircuit, the output is latched to the OFF state after a 50 μ s (typ.) delay in order to protect the IC.
7	ŌĀ	Output pin of the inversion of pin 6. This terminal has the same function as pin 6 and is controlled by pin 5.
10	P-GND	Ground terminal of output section which is usually connected with pin 17.
2, 3, 8, 9, 11, 12, 13, 18, 19	NC	Not connected. (electrically, this pin is completely open.)
14	OB	Output pin of the inversion of pin 15. This terminal has the same function as pin 6 and is controlled by pin 16.
15	OB	This terminal has the same function as pin 6 and is controlled by pin 16.
16	INB	This is input terminal which controls output condition of pin 14 and pin 15. PNP-type voltage comparator is built in.
17	L-GND	Ground terminal of logic control section which is usually connected with pin 10.
20	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	ST	OA	ŌĀ	OB	OB	DG
L	L	Н	OFF	ON	OFF	ON	OFF
L	Н	Н	OFF	ON	ON	OFF	OFF
Н	L	Н	ON	OFF	OFF	ON	OFF
Н	Н	Н	ON	OFF	ON	OFF	OFF
_	_	L	OFF	OFF	OFF	OFF	OFF
-	_	OPEN	OFF	OFF	OFF	OFF	OFF

Maximum Ratings (Ta = 25°C)

Characteristics	Symbol	Rating	Unit
Supply voltage	V _{CC}	7~30	V
Input voltage	V _{IN}	-0.3~7	V
Output voltage	V _{CC}	-0.3~V _{CC}	V
Output current	Ι _Ο	1.5 (Note 1)	А
Power dissipation	PD	2.0 (Note 2)	W
Operation temperature	T _{opr}	-40~85	°C
Storage temperature	T _{stg}	-55~150	°C
Lead temperature mounted on PCB	T _{sol}	260 (10 s)	°C

Note 1: Maximum current value when using infinite heatsink

Note 2: When mounted on PCB (50 mm × 50 mm × 1.6 mm, copper foil area: 50%)

HSOP20-P-450 Thermal Resistance Data (Ta = 25°C)

Characteristics	Test Condition	Rating	Unit
R _{θj-a}	—	125	°C/W
R _{θj-c}	—	13	°C/W
P _{D1}	When using infinite heatsink	9.6	W
P _{D2}	When mounted on iron sheet (50 mm × 50 mm × 1.6 mm)	3.2	W
P _{D3}	When mounted on PCB (50 mm × 50 mm × 1.6 mm, copper foil area: 50%)	2.0	W
P _{D4}	Without a board	1.0	W

Electrical Characteristics (V_{CC} = 24 V, Ta = 25°C)

Characteristics	Symbol	Pin	Test Circuit	Test Condition	Min	Тур.	Max	Unit
Current consumption	ICC	V _{CC}	-	—	12	25	40	mA
	V _{IL}	INA/INB —	—	_	_	0.8	V	
input voitage	VIH		_	_	2.4	_	_	v
	١ _{IL}			V _{IN} = 0.4 V	-50	_	—	μA
	Ι _{ΙΗ}	INA/IND	_	V _{IN} = 5 V	—	_	10	
Input voltago	V _{IL}	ST —		—	—	_	0.8	V
input voltage	VIH		—	3.0	_	—	v	
Output saturation voltage	V _{SAT}	OA, <u>OA</u> OB, OB	_	I _O = 1.5 A, Tc = 25°C	_	1.25	1.5	V
Output leakage current	ILEAK	OA, <u>OA</u> OB, OB	_	V _O = V _{CC}	_	_	±10	μA
Output voltage	V _{OL}	DG	_	I _{OL} = 3 mA	_	_	0.3	V
Output leakage current	I _{LEAK}	DG	_	$V_{O} = V_{CC}$	_	_	10	μA
Overcurrent detection	I _{SD}	_	_	—	1.8	4	6	А
Shutdown tomporaturo	T _{SD-H}	—		$OUT=ON\toOFF$	_	160	_	°C
Shuldown lemperature	T _{SD-L}	—		$OUT \textbf{=} OFF \to ON$	_	130	_	
Standby current	I _{ST}	$V_{CC} + V_S$	_	ST = GND	_	_	100	μA
Propagation dalay time	t _{pLH}	—		—	_	1	10	
riopagation delay time	t _{pHL}	—	1 —	—	_	1	10	μs

TOSHIBA





<u>TOSHIBA</u>

Equivalent Circuit



Application Circuit



Precautions when Using the Device in Application

The IC may degrade or break down due to overvoltage or overcurrent.

Also the IC may break down due to short circuit between output pins, an output pin and the $V_{\rm CC}$ pin, or an output pin and the GND pin.

Design an output line, $V_{\mbox{CC}}$ line and GND line with great care.

TOSHIBA

Package Dimensions



Weight: 0.79 g (typ.)

RESTRICTIONS ON PRODUCT USE

000707EBA

- 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 TOSHIBA products listed in this document are intended for usage in general electronics applications (computer, personal equipment, office equipment, measuring equipment, industrial robotics, domestic appliances, etc.). These TOSHIBA products are neither intended nor warranted for usage in equipment that requires extraordinarily high quality and/or reliability or a malfunction or failure of which may cause loss of human life or bodily injury ("Unintended Usage"). Unintended Usage include atomic energy control instruments, airplane or spaceship instruments, transportation instruments, traffic signal instruments, combustion control instruments, medical instruments, all types of safety devices, etc.. Unintended Usage of TOSHIBA products listed in this document shall be made at the customer's own risk.
- The products described in this document are subject to the foreign exchange and foreign trade laws.
- 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.