

Features

- Optimal for 2 phase excitation drive for 2-phase stepping motors
- “Soft off” function that reduces power supply line noise when switching from drive to standby modes. (Requires the use of one external capacitor.)
- No limitations on the magnitude relationship between the power supply voltage (V_{CC}) and the input voltage (V_{IN})
- Low saturation voltage. $V_{O(sat)} = 0.55\text{ V}$ typical at $I_O = 300\text{ mA}$
- Standby current: zero
- Thermal shutdown circuit
- Through-current prevention circuit
- SOP14 Package

Applications

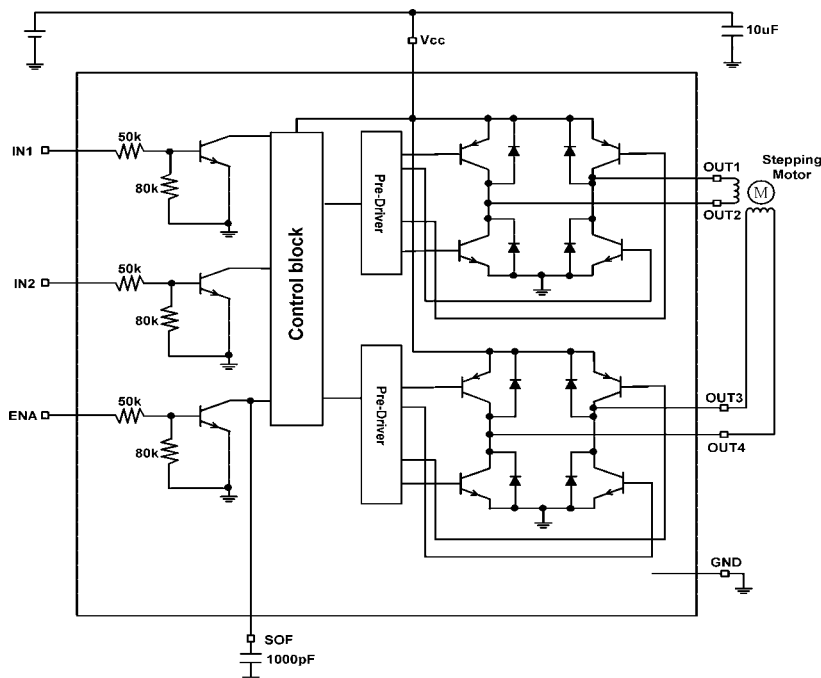
- Camera
- Printer
- Other portable equipment

General Description

The AT5548 is 2-channel low-voltage/low saturation voltage type bidirectional motor driver IC that are optimal for use as 2-phase stepping motor drivers in cameras, printers, and other portable equipment. The output circuits are of the bipolar type, with PNP transistors in the upper side and NPN transistors in the lower side, and they achieve low saturation output and low power characteristics despite being provided in a miniature package.

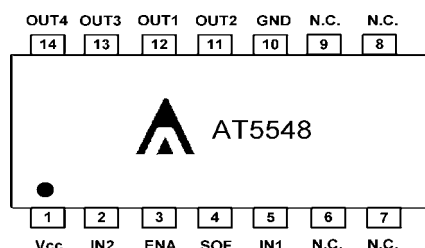
The IC product can directly control a motor from signals from a microcontroller. The AT5548 is optimal for 2-phase excitation drive for 2-phase stepping motors using 3-input logic (ENA, IN1, IN2).

Block Diagram



Aimtron reserves the right without notice to change this circuitry and specifications.

Pin Configuration



Ordering Information

Part number	Package	Remarks
AT5548	SOP14	AT5548S

Absolute Maximum Rating

$T_a = +25^{\circ}\text{C}$

Parameter	Symbol	Condition	Ratings	Units
Maximum Supply Voltage	V _{CC}		-0.3 to +8.0	V
Output Voltage	V _{OUT}		V _{CC} + V _{SF}	V
Input Voltage	V _{IN}		-0.3 to +8.0	V
Ground pin Outflow Current	I _{GND}	Per Channel	800	mA
Power Dissipation	P _{D1}	Independent IC	500	mW
	P _{D2}	Mounted PCB*Note	870	mW
Operating Temperature	T _a		-20 to +75	°C
Storage Temperature	T _{stg}		-40 to +150	°C

Note: On the 114.3x76.2x1.5-mm glass-epoxy printed circuit board

Recommand Operating Rating

$T_a = +25^{\circ}\text{C}$

Parameter	Symbol	Condition	Ratings	Units
Supply Voltage	V _{CC}		2.5 to 7.5	V
Input High-Level Voltage	V _{IH}		2.0 to 7.5	V
Input Low-Level Voltage	V _{IL}		-0.3 to 0.7	V

Electrical Characteristics

(V_{CC} = 5V, T_a = +25°C)

Parameter	Symbol	Condition	Rating			Unit
			Min.	Typ.	Max.	
Current Drain	ICC0	ENA=0V, V _{IN} = 3V or 0V	-	0.1	10	μA
	ICC1	ENA=3V, V _{IN} = 3V or 0V	-	25	35	mA
Output Saturation Voltage	V _{OUT1}	ENA=3V, V _{IN} = 3V or 0V V _{CC} = 3 to 7.5V, I _{OUT} = 200mA	-	0.3	0.4	V
	V _{OUT2}	ENA=3V, V _{IN} = 3V or 0V V _{CC} = 4 to 7.5V, I _{OUT} = 300mA	-	0.55	0.8	V
Input Current 1	I _{IN1}	V _{IN} = 5V	-	75	100	μA
Input Current 2	I _{INA}	ENA = 5V	-	85	110	μA
Spark Killer Diode						
Reverse Current	I _S	V _{IN} = 5V	-	-	30	μA
Forward Voltage	V _{SF}	I _{OUT} = 300mA	-	-	1.7	V

Truth Tables

ENA	IN1	IN2	OUT1	OUT2	OUT3	OUT4	Notes
L	×	×	OFF	OFF	OFF	OFF	Standby
H	L	L	H	L	H	L	2-phase excitation
	L	H	H	L	L	H	
	H	H	L	H	L	H	
	H	L	L	H	H	L	

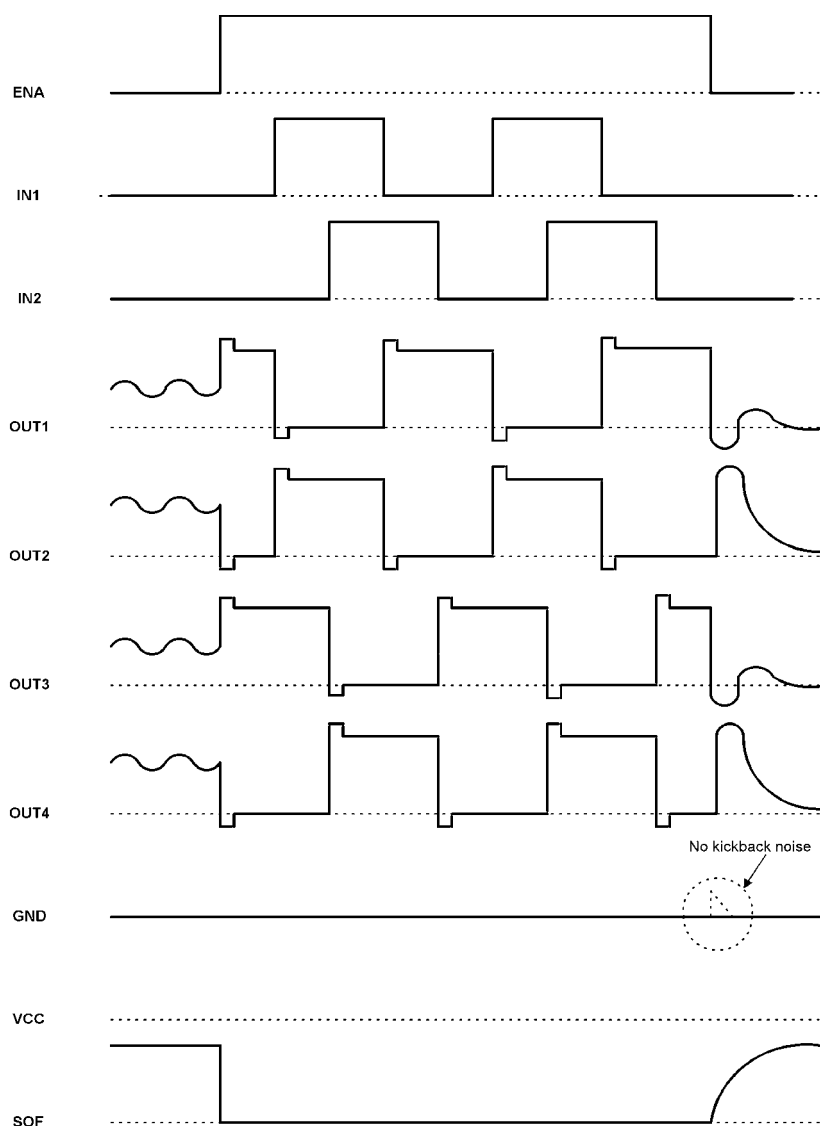
× indicates “don’t care”

Pin Description

Pin No.	Symbol	I/O	Description
1	VCC	P	Power Supply
2	IN2	I	Control for CH2
3	ENA	I	Enable input
4	SOF	I	Soft-Off input terminal
5	IN1	I	Control for CH1
6,7,8,9			NC
10	GND	P	Ground
11,12	OUT1,OUT2	O	CH1 Output
13,14	OUT3,OUT4	O	CH2 Output

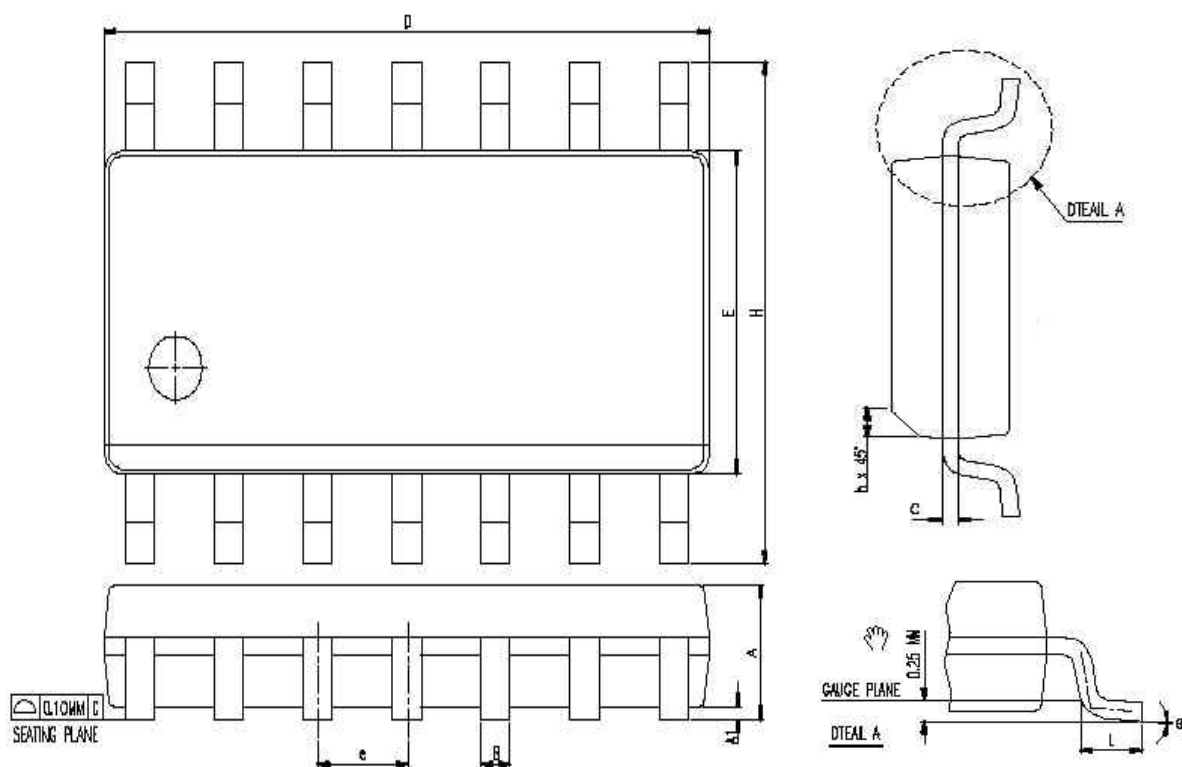
SOF Pin (“Soft Off” Function) Operation

The soft off function reduces power supply line noise due to the kickback current generated when the stepping motor drive mode is switched from drive to standby. The “Soft Off” function provided by this IC operates when a capacitor (0.001 to 0.01 μ F) is connected between SOF pin and Ground. Leave the SOF pin open to disable the soft off function.



Timing Chart Stepping Motor 2-Phase Excitation

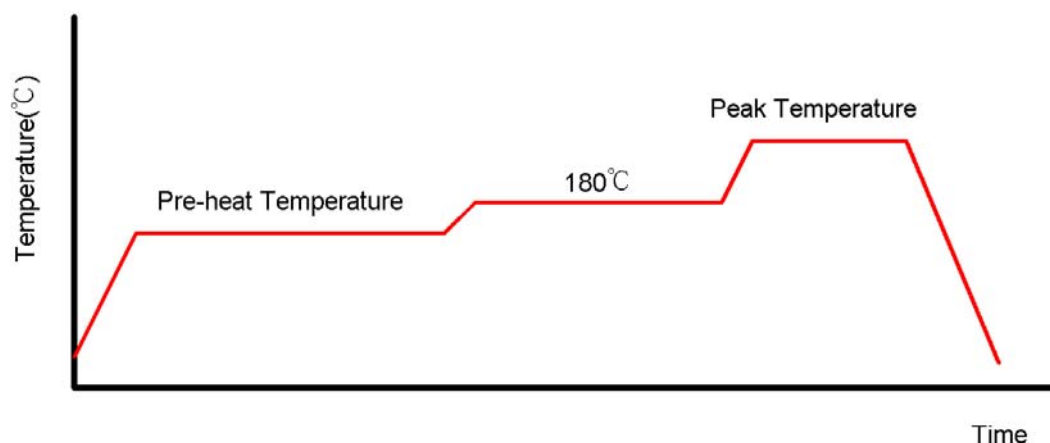
Package Outline:SOP14



SYMBOL	INCHES		MILLIMETERS		NOTES
	MIN	MAX	MIN	MAX	
A	0.0532	0.0688	1.35	1.75	-
A1	0.0040	0.0098	0.10	0.25	-
B	0.013	0.020	0.33	0.51	-
C	0.0075	0.0098	0.19	0.25	-
D	0.3367	0.3444	8.55	8.75	-
H	0.2284	0.2440	5.80	6.20	-
E	0.1497	0.1574	3.80	4.00	-
L	0.016	0.050	0.40	1.27	
h	0.0099	0.0196	0.25	0.50	
e	0.050 BSC		1.27 BSC		
θ	0°	8°	0°	8°	-

Reflow Condition (IR/Convection or VPR Reflow)

Reference JEDEC Standard J-STD-020A



Classification Reflow Profiles

	Convection or IR/Convection	VPR
Average Heating Rate(180°C to peak)	5°C/second max.	10°C/second max.
Preheat Temperature(125±20°C)	120 seconds max.	
Temperature maintained above 180°C	10~150 seconds	
Time within 5°C of actual Peak Temperature	10~20 seconds	60 seconds
Peak Temperature Range(Note 1)	219~225°C or 235~240°C	219~225°C or 235~240°C
Cooling Rate	6°C /second max.	10°C/second max.
Time 25°C to Peak Temperature	6 minutes max.	

*1 The maximum peak temperatures for IR and VP reflow are depending on package dimensions.

Package Reflow Conditions

Pkg. Thickness ≥2.5mm and all bags	Pkg. Thickness <2.5mm and Pkg. Volume ≥350 mm ³	Pkg. Thickness <2.5mm and Pkg. Volume <350 mm ³
Convection 219~225°C		Convection 235~240°C
VPR 219~225°C		VPR 235~240°C
IR/Convection 219~225°C		IR/Convection 235~240°C