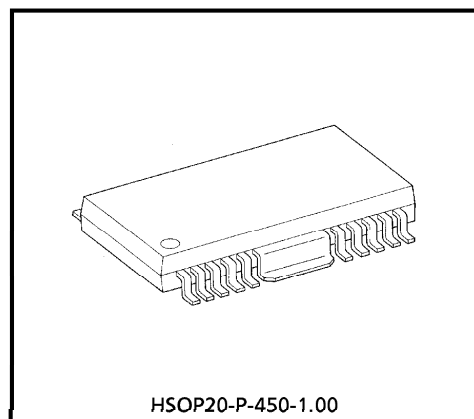


# TA8529F

## Stepping Motor Driver IC (TA8528 + 2SA950 × 4 MCP)

TA8529F is a stepping motor driver IC which operates based on bipolar transistors. The device incorporates stepping motor driver IC TA8528 and four PNP transistors 2SA950 configuring a multi-chip package. It also incorporates a standby function and two bridge drivers which enable an inductive load to be driven by the bipolar transistors. Four-port inputs allow driving by 1-phase excitation, 2-phase excitation, or 1/2-phase excitation. Selecting the mode enables two-port inputs which allows driving by 2-phase excitation. The device can be used as a low-saturation-voltage bridge driver.

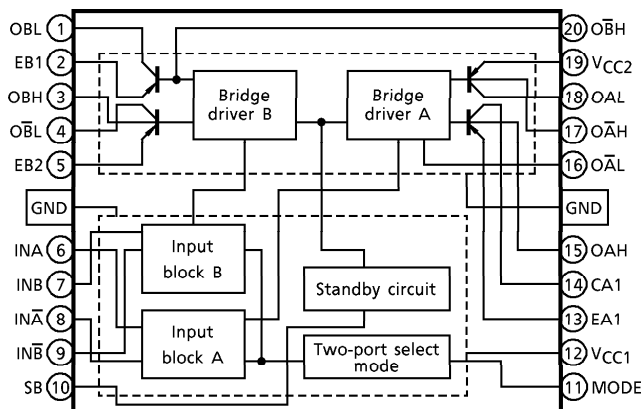


Weight : 0.79g (Typ.)

### FEATURES

- Two low-saturation-voltage bridge drivers: saturation voltage < 0.95V (I<sub>O</sub> = 400mA)
- 1-phase excitation, 2-phase excitation, 1/2-phase excitation enabled by four-port inputs (pin 11 open)
- 2-phase excitation enabled by two-port inputs (pins 8, 9, 11 grounded)
- Built-in standby function
- Built-in rush-current protector circuit for when switching excitation current
- Standard 20-pin PFP
- GND pin = heat sink

### BLOCK DIAGRAM



961001EBA2

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## PIN FUNCTION

PIN No.	PIN NAME	FUNCTION	I/O
1	OBL	Bridge driver B output pin	O
2	EB1	PNP transistor emitter pin	—
3	OBH	PNP transistor base pin	—
4	OBL	Bridge driver B output pin	O
5	EB2	PNP transistor emitter pin	—
6	INA	Channel A excitation input pin	I
7	INB	Channel B excitation input pin	I
8	INA	Channel A excitation input pin	I
9	INB	Channel B excitation input pin	I
10	SB	Standby function input pin	I
11	MODE	Two-port input select mode pin	I
12	V <sub>CC1</sub>	5V supply pin	—
13	EA1	PNP transistor emitter pin	—
14	CA1	PNP transistor collector pin	—
15	OAH	PNP transistor base pin	—
16	OAL	Bridge driver A output pin	O
17	OAH	PNP transistor base pin	—
18	OAL	Bridge driver A output pin	O
19	V <sub>CC2</sub>	5V / 12V supply pin	—
20	OBH	PNP transistor base pin	—
F	S.GND P.GND	Small signal ground pin Power ground pin	—

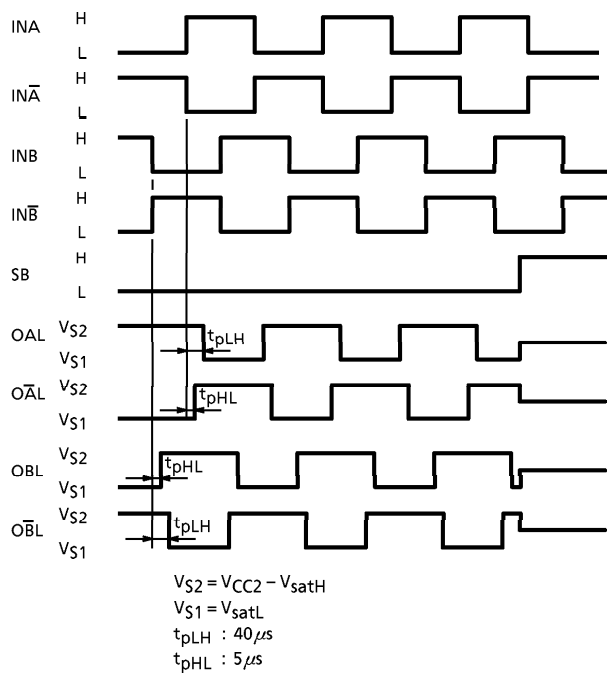
## LOGIC CHART

INPUT				OUTPUT		
SB	MODE	INA (B)	IN $\bar{A}$ ( $\bar{B}$ )	OA (B) L	O $\bar{A}$ ( $\bar{B}$ ) L	
L	H	L	L	$\infty$	$\infty$	OPERATION
L	H	H	H	$\infty$	$\infty$	OPERATION
L	H	H	L	L	H	OPERATION
L	H	L	H	H	L	OPERATION
L	L	L	L	H	L	OPERATION
L	L	H	L	L	H	OPERATION
H	X	X	X	$\infty$	$\infty$	STAND-BY

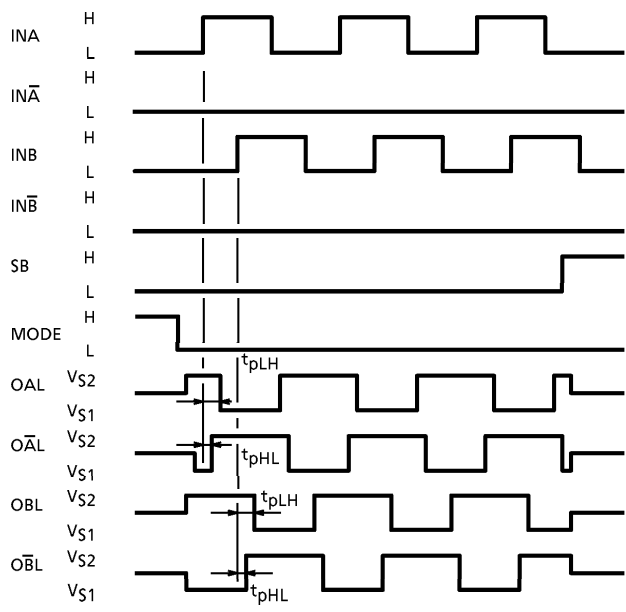
X : Don't Care

 $\infty$  : High impedance

**TIMING CHART 1**



**TIMING CHART 2**



**MAXIMUM RATINGS (Ta = 25°C)**

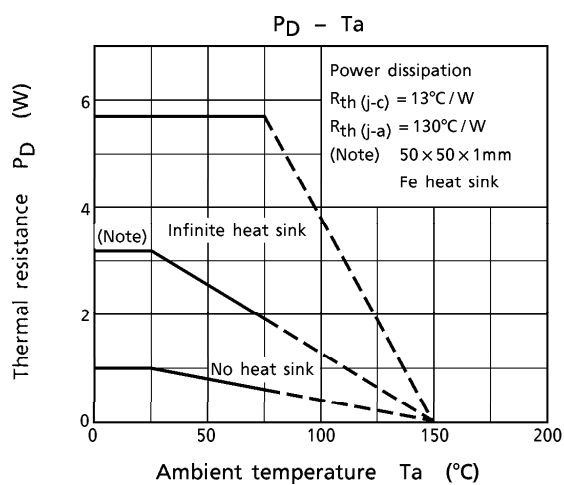
CHARACTERISTICS	SYMBOL	RATING	UNIT
Power supply voltage	V <sub>CC1</sub>	7.0	V
	V <sub>CC2</sub>	17.0	
Output current	I <sub>O</sub> (MAX)	± 500	mA
Input voltage	V <sub>IN</sub>	~V <sub>CC1</sub>	V
Power dissipation	P <sub>D</sub>	1.0	W
Operating temperature	T <sub>opr</sub>	(Note) - 30~75	°C
Storage temperature	T <sub>stg</sub>	- 55~150	°C

(Note) Depending on the operating temperature, output current may be restricted. (See Pd-Ta characteristics graph.)

**RECOMMENDED OPERATING CONDITION**

CHARACTERISTICS	SYMBOL	TEST CIRCUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Power supply voltage	V <sub>CC1</sub>	—	—	4.5	—	5.5	V
	V <sub>CC2</sub>	—	—	4.5	—	13.2	

Package PFP-20 characteristics

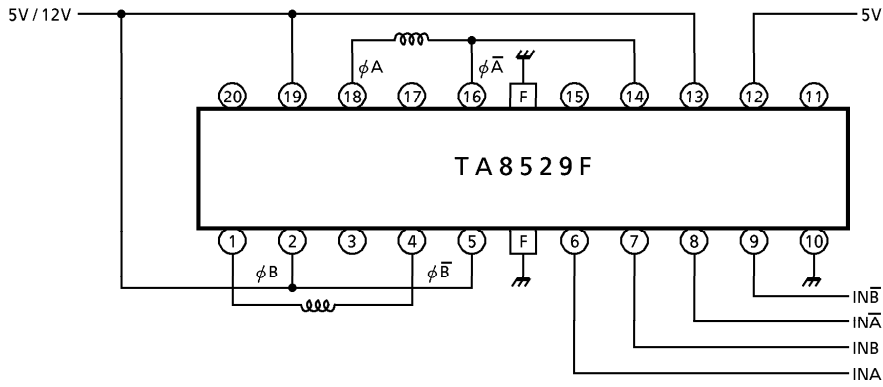


**ELECTRICAL CHARACTERISTICS (Ta = 25°C, VCC1 = 5V, VCC2 = 12V)**

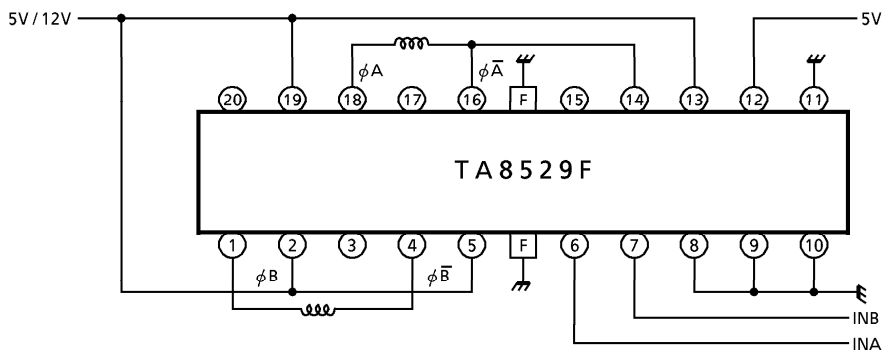
CHARACTERISTICS	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT	
Supply Current	I <sub>CC1</sub>	—	V <sub>SB</sub> = 5V, output open	—	—	5	μA	
	I <sub>CC2</sub>	—		—	—	10		
	I <sub>CC1</sub>	—	V <sub>SB</sub> = 5V, output open 1 input = 5V, 3 inputs = 0V	—	—	5	μA	
	I <sub>CC2</sub>	—		—	—	10		
	I <sub>CC1</sub>	—	V <sub>SB</sub> = 5V, output open A : 1 input = 5V, B : 1 input = 5V A : 1 input = 0V, B : 1 input = 0V	—	—	5	μA	
	I <sub>CC2</sub>	—		—	—	10		
	I <sub>CC1</sub>	—	Output open, V <sub>SB</sub> = 0V 1 input = 5V, 3 inputs = 0V	—	25	30	mA	
	I <sub>CC2</sub>	—		—	20	25		
	I <sub>CC1</sub>	—	Output open, V <sub>SB</sub> = 0V A : 1 input = 5V, B : 1 input = 5V A : 1 input = 0V, B : 1 input = 0V	—	35	44	mA	
	I <sub>CC2</sub>	—		—	35	47		
	I <sub>CC1</sub>	—	Output open, V <sub>SB</sub> = 0V V <sub>MODE</sub> = 0V, input = 0V	—	35	44	mA	
	I <sub>CC2</sub>	—		—	35	47		
Input Voltage	V <sub>INH</sub>	—	Pins 6, 7, 8, and 9	2.0	—	V <sub>CC1</sub>	V	
	V <sub>INL</sub>			GND	—	0.8		
	V <sub>SBH</sub>	—	Pin 10	3.5	—	V <sub>CC1</sub>	V	
	V <sub>SBL</sub>			GND	—	2.0		
	V <sub>MODEH</sub>	—	Pin 11	3.5	—	V <sub>CC1</sub>	V	
	V <sub>MODEL</sub>			GND	—	2.0		
Input Current	I <sub>INH</sub>	—	V <sub>IN</sub> = 3.5V	Pins 6, 7, 8, and 9	—	-2	-10	μA
	I <sub>INL</sub>	—			V <sub>IN</sub> = 0.4V	—	-200	
	I <sub>SBH</sub>	—	V <sub>SB</sub> = 3.5V	Pin 10	—	-30	-45	μA
	I <sub>SBL</sub>	—			V <sub>SB</sub> = 0.4V	—	-150	
Saturation voltage (Note) V <sub>sat1</sub> = V <sub>satH1</sub> + V <sub>satL1</sub> V <sub>sat2</sub> = V <sub>satH2</sub> + V <sub>satL2</sub>	V <sub>satH1</sub>	—	I <sub>O</sub> = 100mA		—	0.1	—	V
	V <sub>satH2</sub>	—	I <sub>O</sub> = 400mA		—	0.15	—	
	V <sub>satL1</sub>	—	I <sub>O</sub> = 100mA		—	0.1	—	V
	V <sub>satL2</sub>	—	I <sub>O</sub> = 400mA		—	0.45	—	
	V <sub>sat1</sub>	—	I <sub>O</sub> = 100mA		—	0.2	0.4	V
	V <sub>sat2</sub>	—	I <sub>O</sub> = 400mA		—	0.6	0.95	
Diode Forward Voltage	V <sub>F</sub>	—	I <sub>F</sub> = 400mA		—	1.4	1.6	V
Delay time During	t <sub>pLH</sub>	—	IN-φ		—	40	—	μs
	t <sub>pHL</sub>				—	5	—	

APPLICATION CIRCUIT

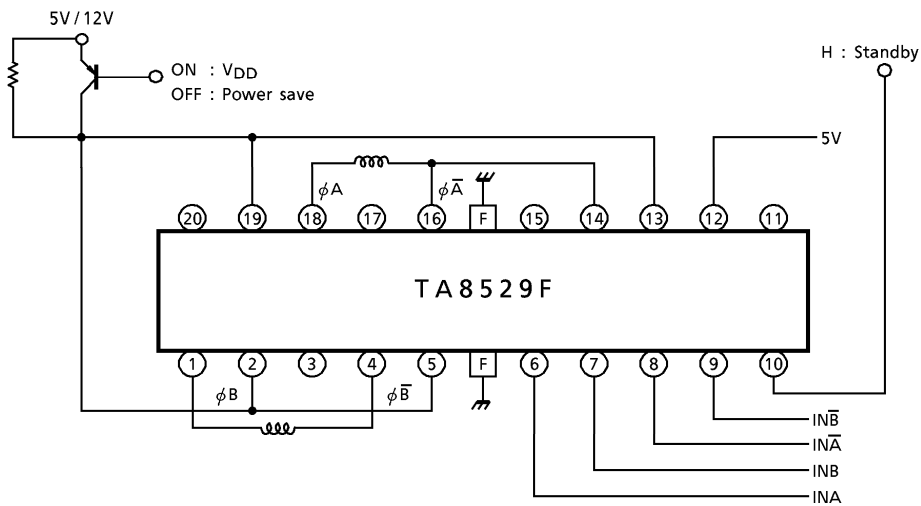
1. Four-input method



2. Two-input method

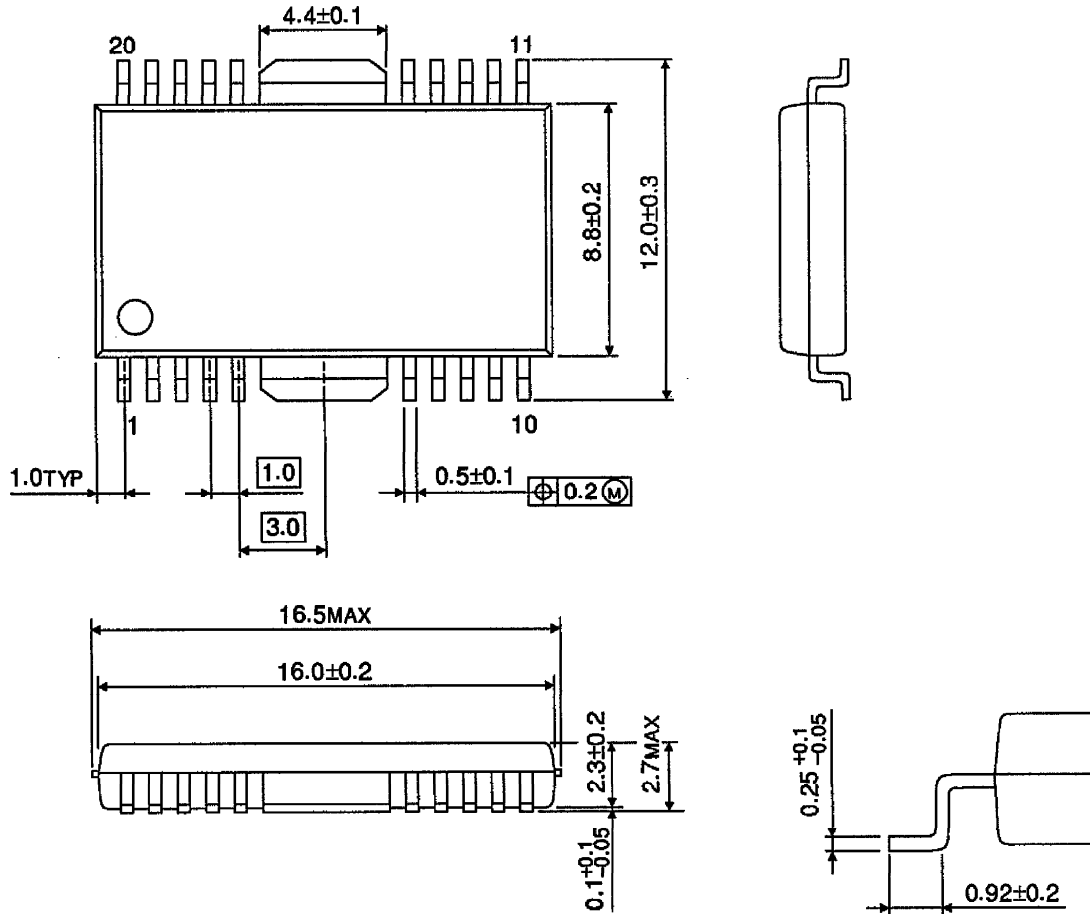


3. Power save application circuit



PACKAGE DRAWING  
HSOP20-P-450-1.00

Unit : mm



Weight : 0.79g (Typ.)