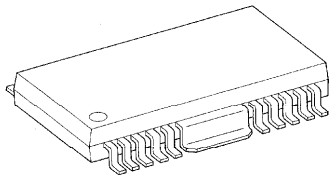
TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT MULTI-CHIP PACKAGE

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.



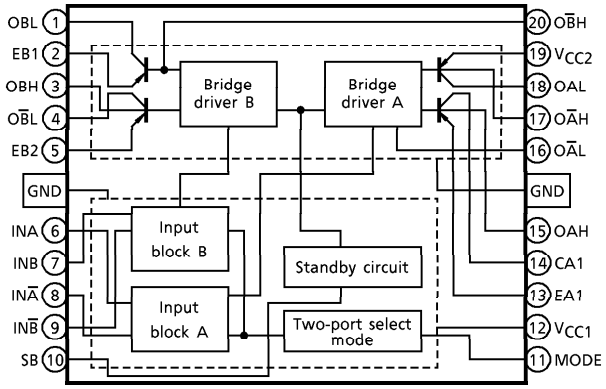
HSOP20-P-450-1.00

Weight : 0.79g (Typ.)

FEATURES

- Two low-saturation-voltage bridge drivers: saturation voltage < 0.95V (I_O = 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

PIN FUNCTION

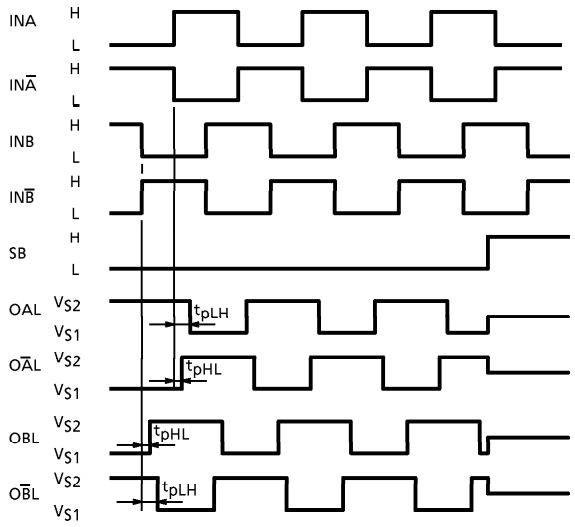
PIN No.	PIN NAME	FUNCTION	I/O
1	OBL	Bridge driver B output pin	O
2	EB1	PNP transistor emitter pin	—
3	OBH	PNP transistor base pin	—
4	$O\overline{B}L$	Bridge driver B output pin	O
5	EB2	PNP transistor emitter pin	—
6	INA	Channel A excitation input pin	I
7	INB	Channel B excitation input pin	I
8	$IN\overline{A}$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

LOGIC CHART

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

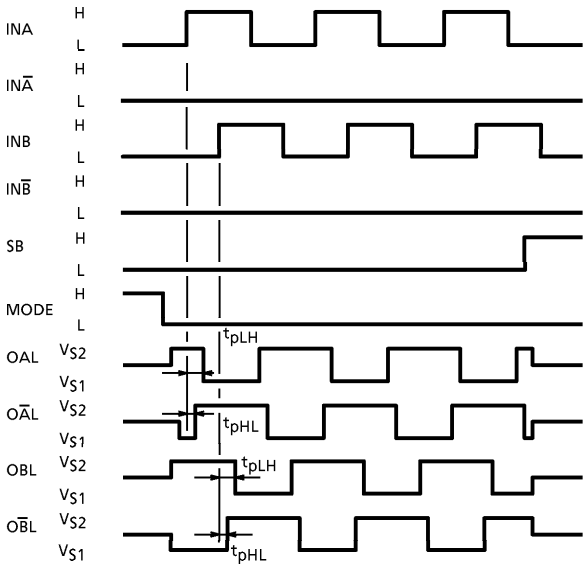
X : Don't Care
∞ : High impedance

TIMING CHART 1



$V_{S2} = V_{CC2} - V_{satH}$
$V_{S1} = V_{satL}$
t_{pLH} : 40μs
t_{pHL} : 5μs

TIMING CHART 2



MAXIMUM RATINGS (Ta = 25C°)

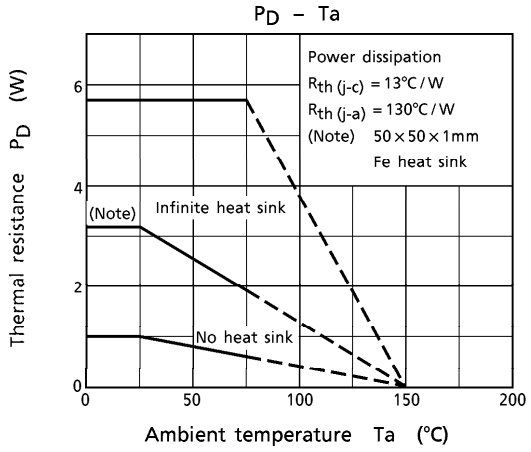
CHARACTERISTICTS	SYMBOL	RATING	UNIT
Power supply voltage	V_{CC1}	7.0	V
	V_{CC2}	17.0	
Output current	$I_{O\ (MAX)}$	± 500	mA
Input voltage	V_{IN}	~V_{CC1}	V
Power dissipation	P_D	1.0	W
Operating temperature	T_{opr}	(Note) – 30~75	°C
Storage temperature	T_{stg}	– 55~150	°C

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

RECOMMENDED OPERATING CONDITION

CHARACTERISTICS	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Power supply voltage	V_{CC1}	—	—	4.5	—	5.5	V
	V_{CC2}	—	—	4.5	—	13.2	

Package PFP-20 characteristics

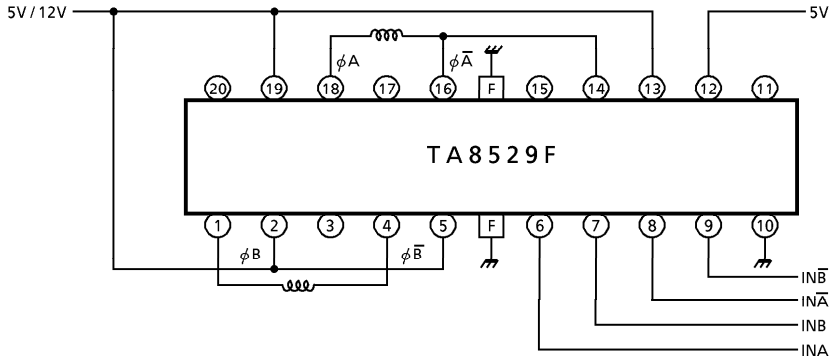


ELECTRICAL CHARACTERISTICS (Ta = 25°C, V_{CC1} = 5V, V_{CC2} = 12V)

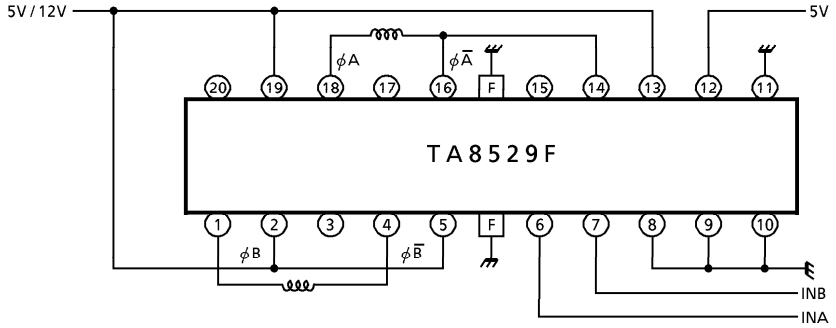
CHARACTERISTICS	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Supply Current	I_{CC1}	—	V_{SB} = 5V, output open	—	—	5	μA
	I_{CC2}			—	—	10	
	I_{CC1}	—	V_{SB} = 5V, output open 1 input = 5V、3 inputs = 0V	—	—	5	μA
	I_{CC2}			—	—	10	
	I_{CC1}	—	V_{SB} = 5V, output open A : 1 input = 5V, B : 1 input = 5V	—	—	5	μA
	I_{CC2}		A : 1 input = 0V, B : 1 input = 0V	—	—	10	
	I_{CC1}	—	Output open, V_{SB} = 0V 1 input = 5V, 3 inputs = 0V	—	25	30	mA
	I_{CC2}			—	20	25	
	I_{CC1}	—	Output open, V_{SB} = 0V A : 1 input = 5V, B : 1 input = 5V	—	35	44	mA
	I_{CC2}		A : 1 input = 0V, B : 1 input = 0V	—	35	47	
	I_{CC1}	—	Output open, V_{SB} = 0V V_{MODE} = 0V, input = 0V	—	35	44	mA
	I_{CC2}			—	35	47	
Input Voltage	V_{INH}	—	Pins 6, 7, 8, and 9	2.0	—	V_{CC1}	V
	V_{INL}			GND	—	0.8	
	V_{SBH}	—	Pin 10	3.5	—	V_{CC1}	V
	V_{SBL}			GND	—	2.0	
	V_{MODEH}	—	Pin 11	3.5	—	V_{CC1}	V
	V_{MODEL}			GND	—	2.0	
Input Current	I_{INH}	—	V_{IN} = 3.5V, Pins 6, 7, 8, and 9	—	– 2	– 10	μA
	I_{INL}	—	V_{IN} = 0.4V, Pins 6, 7, 8, and 9	—	– 200	– 300	
	I_{SBH}	—	V_{SB} = 3.5V, Pin 10	—	– 30	– 45	μA
	I_{SBL}	—	V_{SB} = 0.4V, Pin 10	—	– 150	– 220	
Saturation voltage (Note) $V_{sat1} = V_{satH1} + V_{satL1}$ $V_{sat2} = V_{satH2} + V_{satL2}$	V_{satH1}	—	I_O = 100mA	—	0.1	—	V
	V_{satH2}	—	I_O = 400mA	—	0.15	—	
	V_{satL1}	—	I_O = 100mA	—	0.1	—	V
	V_{satL2}	—	I_O = 400mA	—	0.45	—	
	V_{sat1}	—	I_O = 100mA	—	0.2	0.4	V
	V_{sat2}	—	I_O = 400mA	—	0.6	0.95	
Diode Forward Voltage	V_F	—	I_F = 400mA	—	1.4	1.6	V
Delay time During	t_{pLH}	—	IN-ϕ	—	40	—	μs
	t_{pHL}			—	5	—	

APPLICATION CIRCUIT

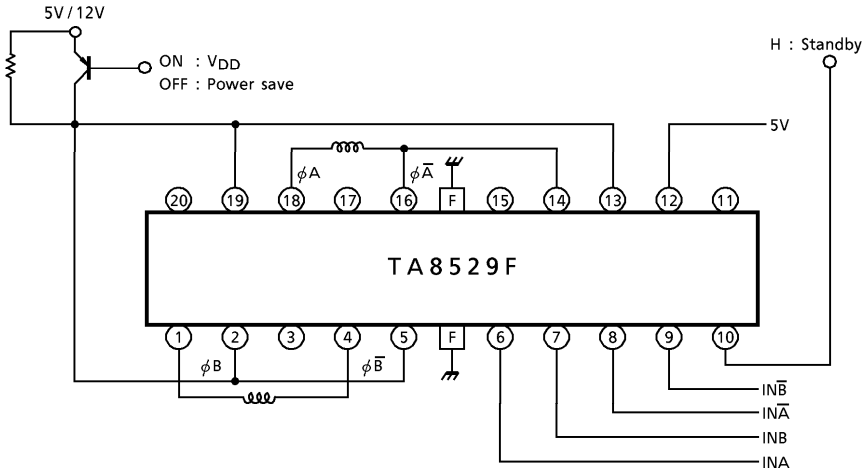
1. Four-input method



2. Two-input method



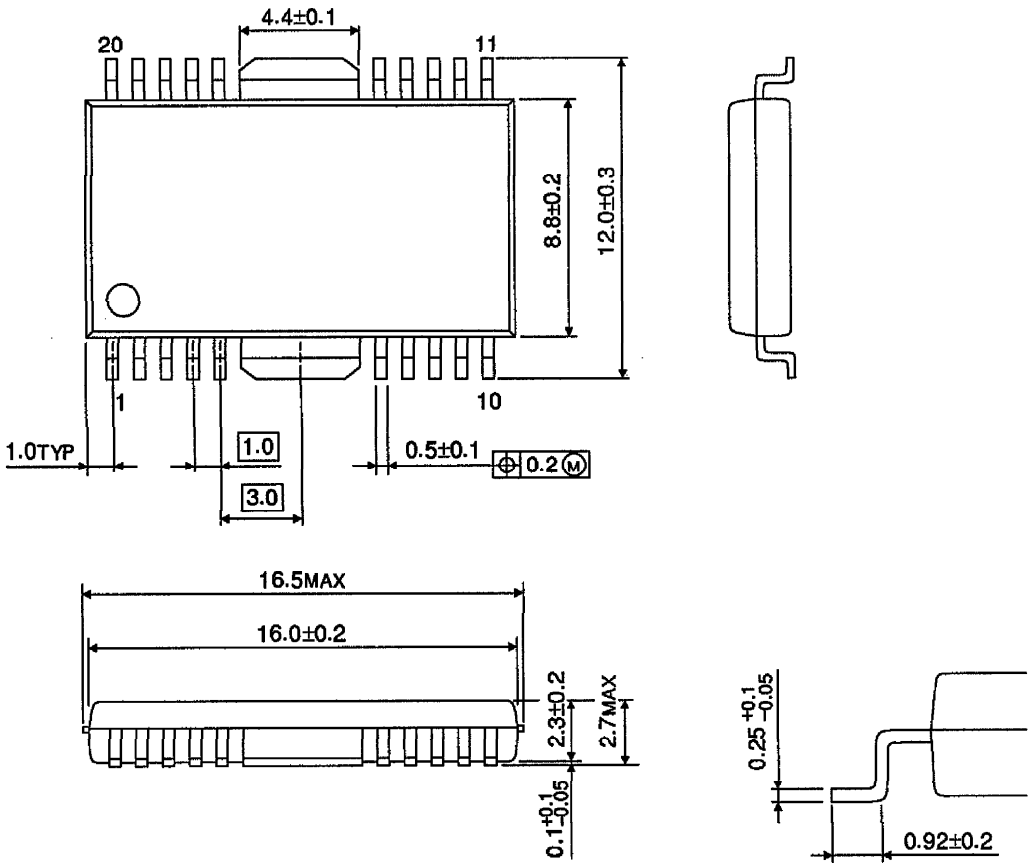
3. Power save application circuit



PACKAGE DRAWING

HSOP20-P-450-1.00

Unit : mm



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