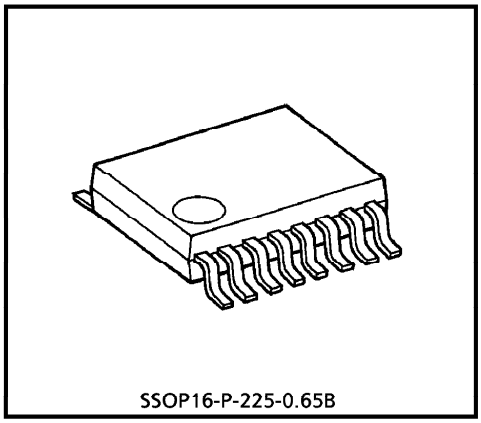
TOSHIBA Bi-CMOS INTEGRATED CIRCUIT SILICON MONOLITHIC

TB6524FN

DC MOTOR DUAL FULL BRIDGE DRIVER (H-SWITCH)

The TB6524FN is a bridge driver most suitable for switching between normal rotation and reverse rotation and can control three modes, normal rotation, reverse rotation, and stop.
The driver is capable of handling output current of 100mA.
Fixed current operation is also available as the control method.



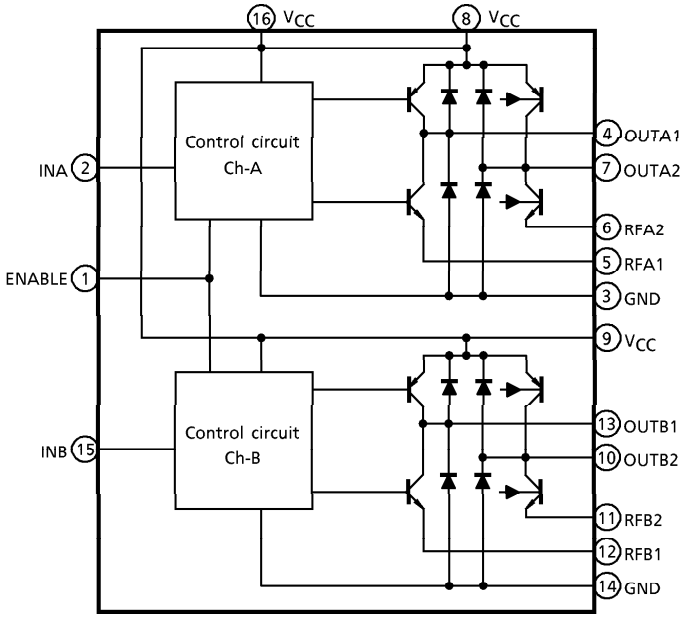
SSOP16-P-225-0.65B

Weight : 0.07g (Typ.)

FEATURES

- Operating voltage range : V_{CC} = 1.5~7.0V (normal operation)
  V_{CC} = 2.0~7.0V (fixed current operation)
- Output current : I_{OUT} = 100mA
- Built-in diode for absorbing counter electromotive force
- Built-in enable terminal

BLOCK DIAGRAM



961001EBA2

PIN FUNCTION

PIN No.	SYMBOL	DESCRIPTION
1	ENABLE	Enable signal input, Hi : Enabled, Low : All output OFF
2	INA	Channel A input signal terminal
3	GND	Ground terminal
4	OUTA1	Channel A output terminal
5	RFA1	Channel A : Output current is set by external resistance.
6	RFA2	Channel A : Output current is set by external resistance.
7	OUTA2	Channel A output terminal
8	V_{CC}	Power supply
9	V_{CC}	Power supply
10	OUTB2	Channel B output terminal
11	RFB2	Channel B : Output current is set by external resistance.
12	RFB1	Channel B : Output current is set by external resistance.
13	OUTB1	Channel B output terminal
14	GND	Ground terminal
15	INB	Channel B input signal terminal
16	V_{CC}	Logic power supply

⑧ V_{CC}, ⑨ V_{CC}, ⑯ V_{CC}, ③ GND and ⑭ GND must be connected to V_{CC} or GND.

FUNCTION

INPUT			OUTPUT			
INA	INB	ENABLE	OUTA1	OUTA2	OUTB1	OUTB2
H	H	H	H	L	H	L
L	L	H	L	H	L	H
H	L	H	H	L	L	H
L	H	H	L	H	H	L
H / L	H / L	L	∞	∞	∞	∞

∞ : High impedance

(Note) Before you change "Enable" to Low from High on the operating, change to Low both "INA" and "INB".

MAXIMUM RATING (Ta = 25°C)

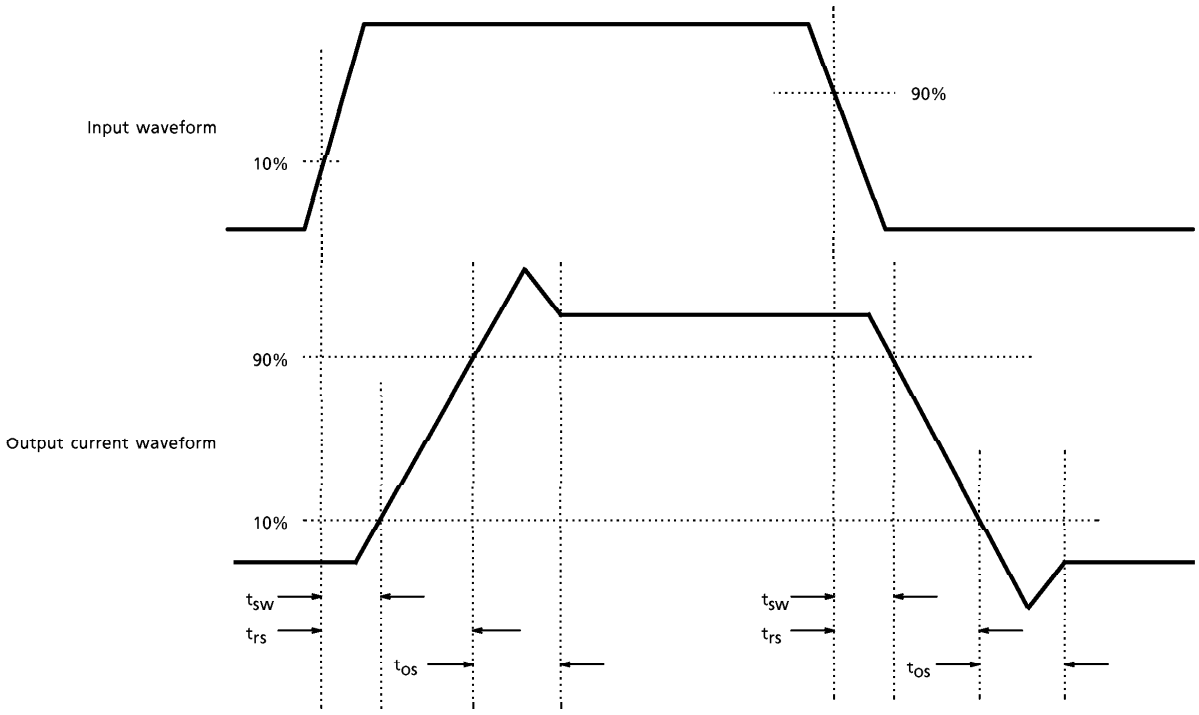
CHARACTERISTIC	SYMBOL	RATING	UNIT
Power Supply Voltage	V_{CC} (Max)	8	V
Output Current	I_{OUT}	0.1	A
Power Dissipation (Tc = 25°C)	P_D	0.5 (Note)	W
Operating Temperature	T_{opr}	− 30~75	°C
Storage Temperature	T_{stg}	− 55~150	°C

(Note) IC single unit

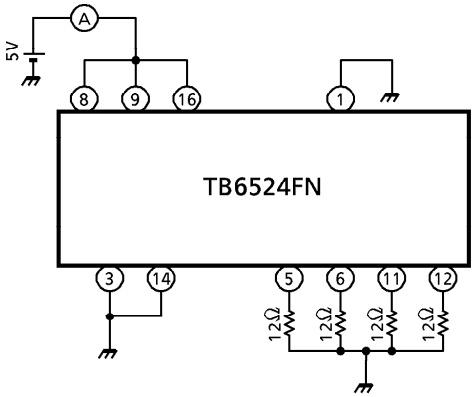
ELECTRICAL CHARACTERISTICS (Ta = 25°C, V_{CC} = 5V)

CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Power Supply Current	I_{CC1}	1	Standby (ENABLE OFF)	—	0.1	1.0	μA
	I_{CC2}	2	Normal / reverse (for 2 channels), output OPEN	—	32	45	mA
Output Saturation Voltage	Upper $V_{SAT\ U-1}$	3	I_{OUT} = 100mA at normal / reverse	—	0.2	0.3	V
	Lower $V_{SAT\ L-1}$		I_{OUT} = 100mA at normal / reverse	—	0.2	0.3	
	Upper $V_{SAT\ U-2}$		I_{OUT} = 50mA at normal / reverse	—	0.1	0.25	
	Lower $V_{SAT\ L-2}$		I_{OUT} = 50mA at normal / reverse	—	0.1	0.25	
Setting Output Current	$I_{OUT\ C}$	4	12Ω between RFA1, 2 / RFB1, and 2-GND Load 7.5Ω	55	65	75	mA
Output Current V_{CC} Dependency	$\frac{\Delta I_{OUTC}}{\Delta V_{CC}}$	5	$I_{OUT\ C}$ = 10~100mA (R_f : 8Ω, 80Ω) V_{CC} = 2.0~7.0V Load 5Ω	−8		5	%
Output Current Switching Duration	t_{sw}	—	560μH (7.5Ω) R_f = 16Ω	—	1.0	—	μs
	t_{rs}			—	6.0	—	
Overshoot Duration	t_{os}			—	2.0	—	
Input Voltage	V_{IH}	6	INA, INB, ENABLE	1.5	—	V_{CC}	V
	V_{IL}			0	—	0.3	
Input Current	I_{in}	7	Sync V_{IN} = 5.0V Input terminal 4.7kΩ	—	430	550	μA
Output Transistor Leak Current	Upper I_{LU}	8	V_L = 7V	—	—	30	μA
	Lower I_{LL}			—	—	30	

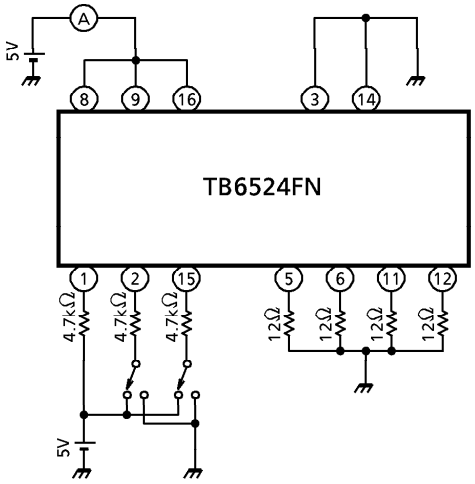
t_{sw}, t_{rs}, t_{os}


Input waveform
90%
10%
90%
Output current waveform
10%
tsw
trs
tos
tsw
trs
tos

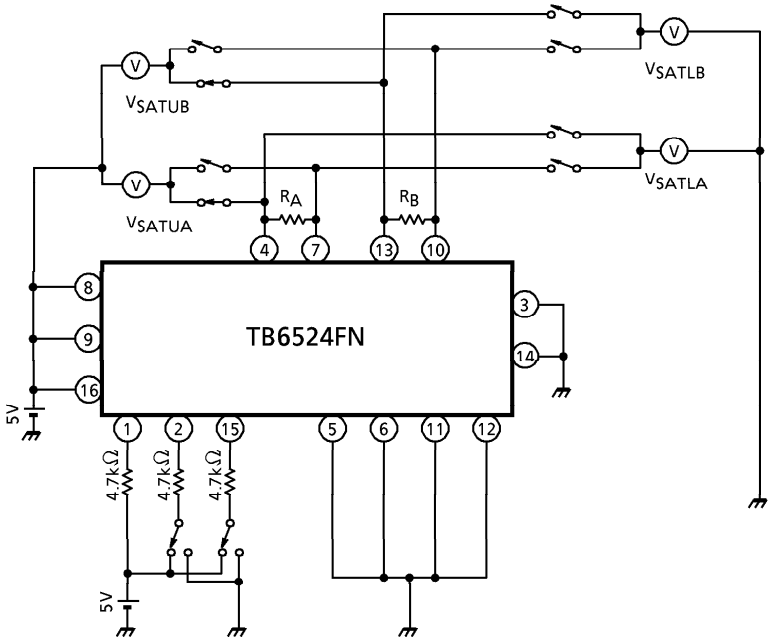
TEST CIRCUIT 1 I_{CC1}



TEST CIRCUIT 2 I_{CC2}

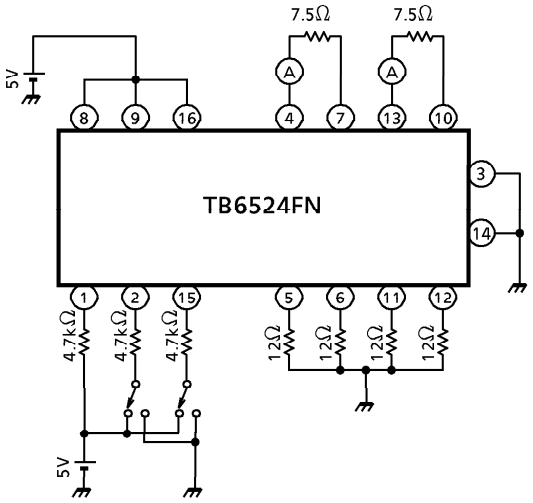


TEST CIRCUIT 3 $V_{SATU-1, 2}$ / $V_{SATL1, 2}$

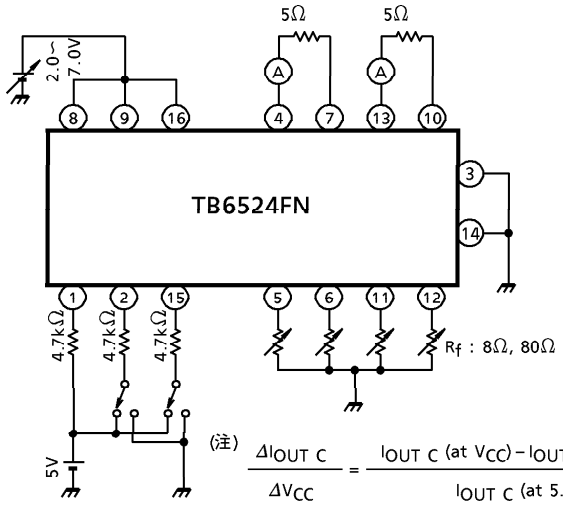


(Note) Set R_A and R_B so that I_{OUT} = 50mA and 100mA is satisfied.

TEST CIRCUIT 4 $I_{OUT\ C}$

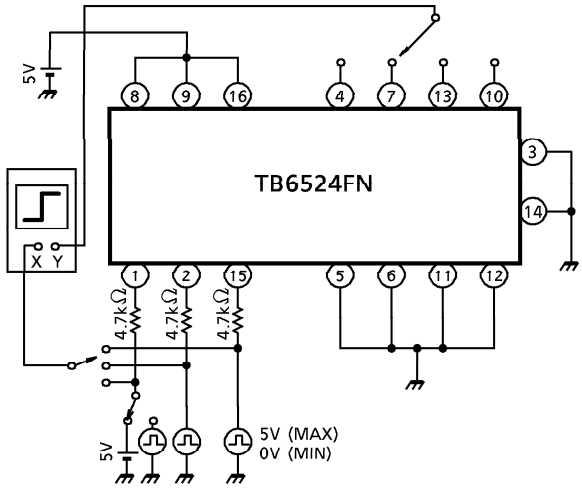


TEST CIRCUIT 5 $\Delta I_{OUT\ C}$

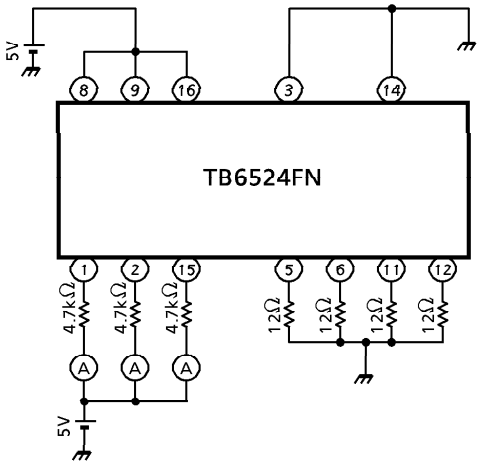


(注) $\dfrac{\Delta I_{OUT\ C}}{\Delta V_{CC}} = \dfrac{I_{OUT\ C}\ (\text{at } V_{CC}) - I_{OUT\ C}\ (\text{at } 5.0V)}{I_{OUT\ C}\ (\text{at } 5.0V)}$

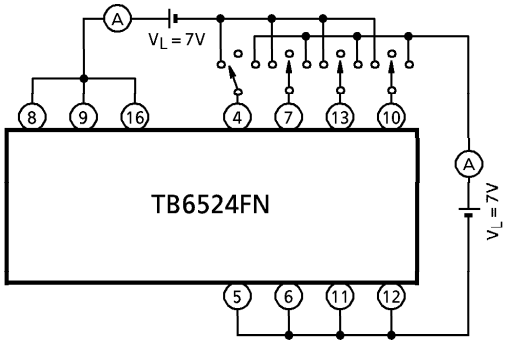
TEST CIRCUIT 6 V_{IH} / V_{IL}

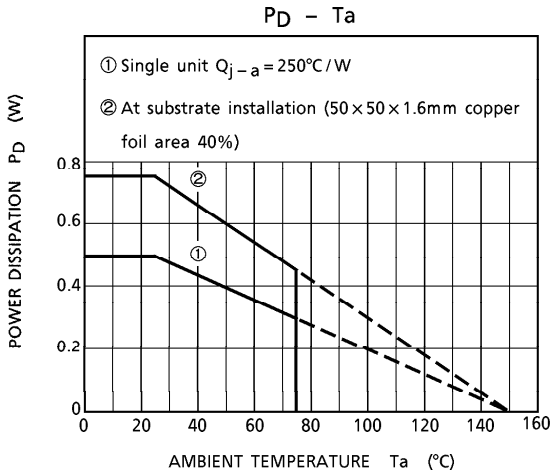


TEST CIRCUIT 7 I_{in}

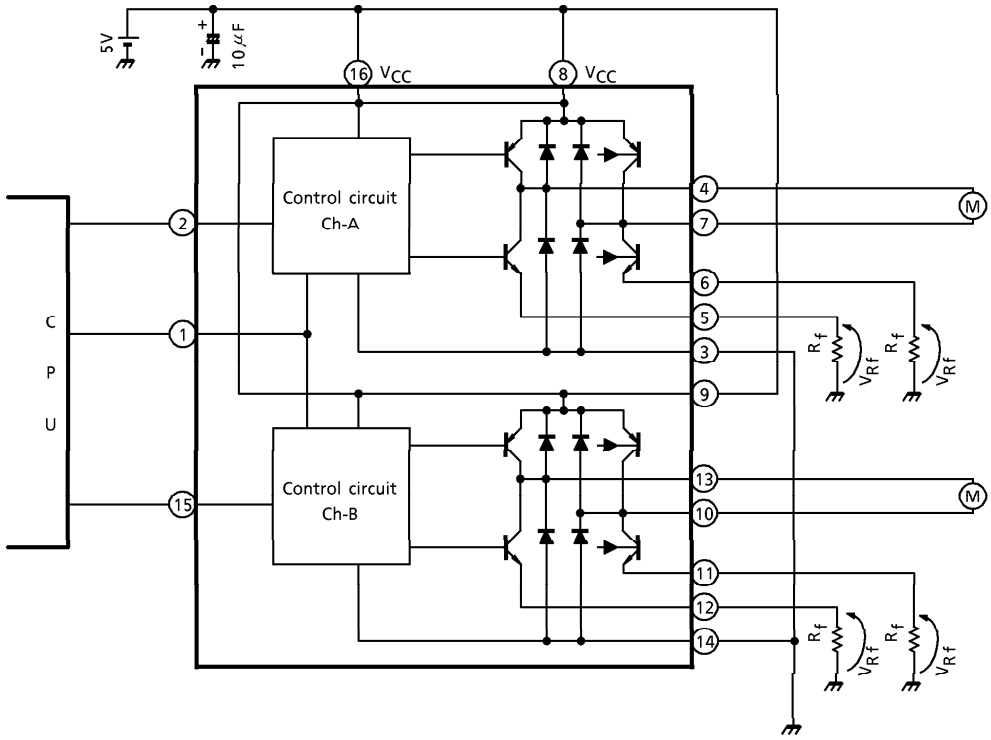


TEST CIRCUIT 8 I_{LU} / I_{LL}




P_D – Ta
① Single unit Q_{j-a} = 250°C / W
② At substrate installation (50 × 50 × 1.6mm copper foil area 40%)
POWER DISSIPATION P_D (W)
0.8
0.6
0.4
0.2
0
0
20
40
60
80
100
120
140
160
AMBIENT TEMPERATURE Ta (°C)

APPLICATION CIRCUIT



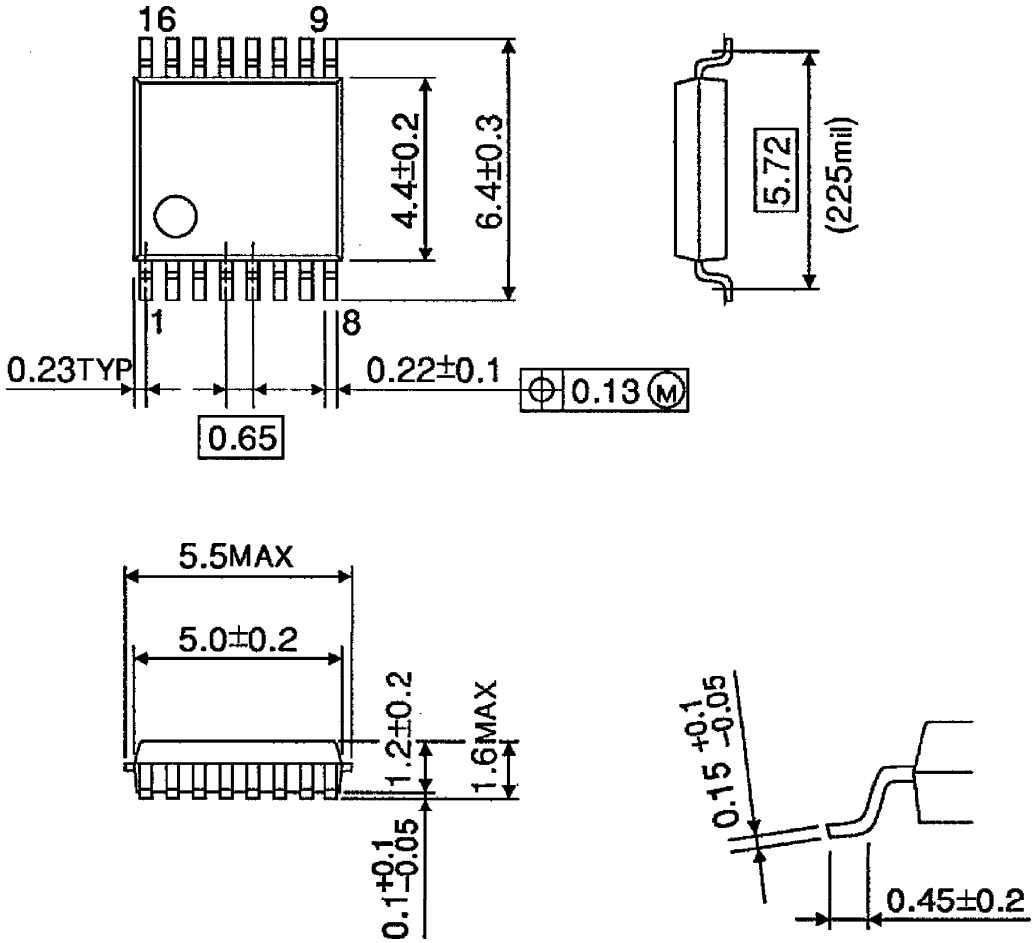
V_{Rf} : 0.78V (TYP.)
R_f : Set resistance

(Note) Utmost care is necessary in the design of the output line, V_{CC} and GND line since IC may be destroyed due to short-circuit between outputs, air contamination fault, or fault by improper grounding.

OUTLINE DRAWING

SSOP16-P-225-0.65B

Unit : mm



Weight : 0.07g (Typ.)