

TB6501P

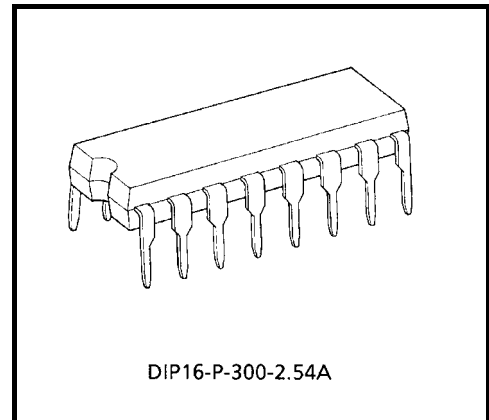
Bridge Driver with Rotation Detector

The TB6501P is Bridge Driver.

Forward Rotation, Reverse Rotation, Stop and Breaking Operations are available.

FEATURES

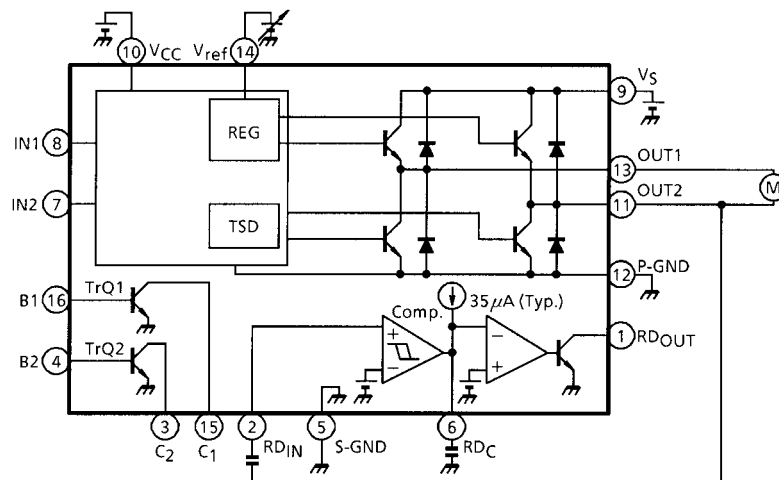
- TB6501P has RD (Rotation Detector).
- Output current up to 0.4A (AVE.) to 1.0A (PEAK).
- Wide Range of Operating Supply Voltage
 $V_{CC} \text{ (opr.)} = 4.5 \sim 20 \text{ V}$ (6.0 to 20 V when RD is used.)
 $V_S \text{ (opr.)} = 0 \sim 20 \text{ V}$
 $V_{ref} \text{ (opr.)} = 0 \sim 20 \text{ V}$ ($V_{ref} \leq V_S$)
 Can be operated with any combination of V_{CC} and V_S voltages within the range
- Thermal shutdown, Over current protector, and Standby circuit built in.



DIP16-P-300-2.54A

Weight: 1.11g (Typ.)

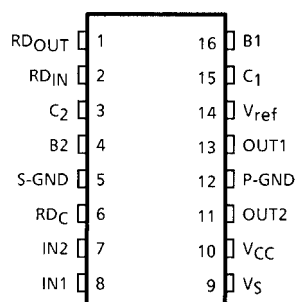
BLOCK DIAGRAM



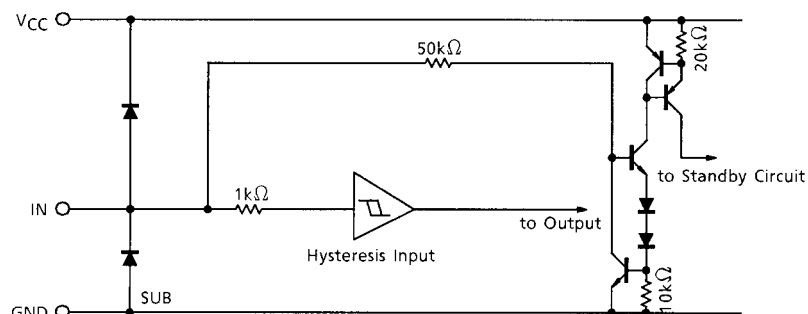
PIN FUNCTION

PIN No.	SYMBOL	FUNCTIONAL DESCRIPTION
1	RD _{OUT}	Rotation detector output terminal
2	RD _{IN}	Rotation detector input terminal
3	C ₂	NPN transistor collector terminal
4	B2	NPN transistor base terminal
5	S-GND	Signal GND terminal
6	RD _C	Rotation detector capacitor connection terminal
7	IN2	Input 2 terminal
8	IN1	Input 1 terminal
9	V _S	Power voltage supply terminal for motor driver
10	V _{CC}	Power voltage supply terminal for logic
11	OUT2	Output 2 terminal
12	P-GND	Power GND terminal
13	OUT1	Output 1 terminal
14	V _{ref}	Power voltage supply terminal for controller
15	C ₁	NPN transistor collector terminal
16	B1	NPN transistor base terminal

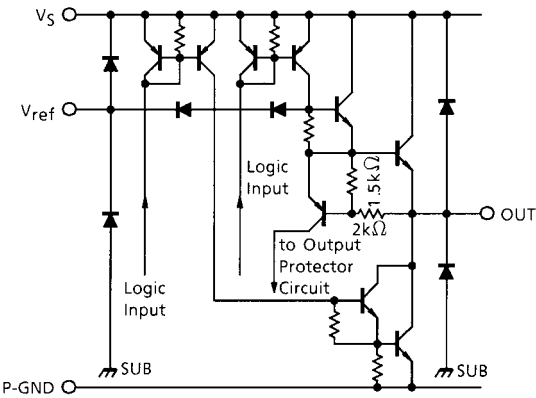
PIN CONNECTION



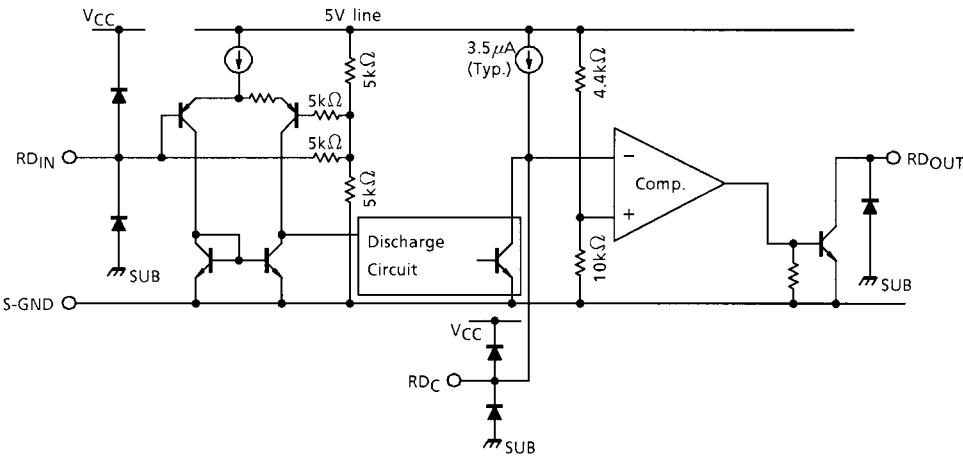
INPUT CIRCUIT



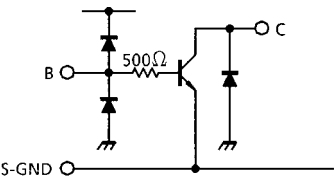
OUTPUT CIRCUIT



ROTATION DETECTOR CIRCUIT



TrQ1, TrQ2 CIRCUIT



FUNCTION

INPUT		OUTPUT		MODE
IN1	IN2	OUT1	OUT2	MOTOR
0	0	∞	∞	STOP
1	0	H	L	CW / CCW
0	1	L	H	CCW / CW
1	1	L	L	BRAKE

∞ : High Impedance

Note: Inputs are all high active type.

MAXIMUM RATINGS (Ta = 25°C)

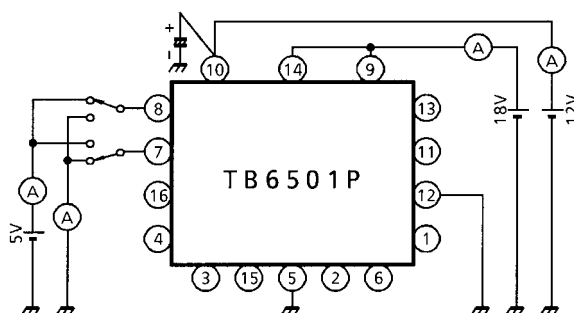
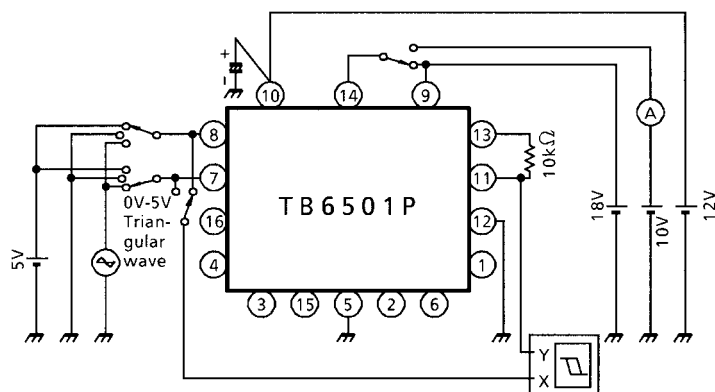
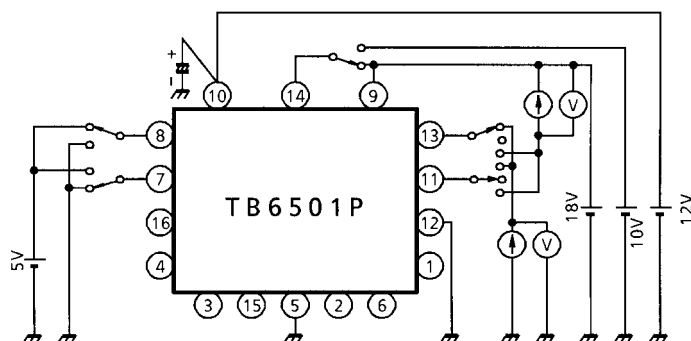
CHARACTERISTICS		SYMBOL	RATING	UNIT
Supply Voltage		V _{CC}	25	V
Motor Drive Voltage		V _S	25	V
Reference Voltage		V _{ref}	25	V
Output Current	PEAK	I _O (PEAK)	1.0 (Note)	A
	AVE.	I _O (AVE.)	0.4	
	RD	I _{RD} (PEAK)	20 (Note)	mA
	TR	I _{TR} (PEAK)	50 (Note)	
Power Dissipation		P _D	1.2	W
Operating Temperature		T _{opr}	-30~75	°C
Storage Temperature		T _{stg}	-55~150	°C

Note: t = 0.1s

ELECTRICAL CHARACTERISTICS (Ta = 25°C, VCC = 12V, VS = 18V)

CHARACTERISTIC		SYMBOL	TEST CIR- CUIT	TEST CONDITION	MIN	TYP.	MAX	UNIT
Supply Current		I _{CC1}	—	Output open CW / CCW mode	—	8.2	12	mA
		I _{CC2}	—	Output open STOP mode	—	400	750	μA
		I _{CC3}	—	Output open BREAK mode	—	8.2	12	mA
		I _{S1}	—	Output open CW / CCW mode V _{ref} = V _S	—	5.2	11	mA
		I _{S2}	—	Output open STOP mode V _{ref} = V _S	—	0	50	μA
		I _{S3}	—	Output open BREAK mode V _{ref} = V _S	—	6.8	13	mA
Input Operating Voltage	1 (High)	V _{IN1}	—	T _j = 25°C	3.5	—	5.5	V
	2 (Low)	V _{IN2}	—	T _j = 25°C	GND	—	0.8	
Input Current		I _{IN}	—	Sink V _{IN} = 5V	—	37	80	μA
Input Hysteresis Voltage		ΔV _T	—	—	—	0.55	—	V
Saturation Voltage		V _{SAT U-1}	—	V _{ref} = V _S I _O = 0.2 A Output V _S CW / CCW mode	—	1.6	—	V
		V _{SAT L-1}	—	V _{ref} = V _S I _O = 0.2 A Output GND CW / CCW mode	—	0.8	—	V
		V _{SAT U-2}	—	V _{ref} = V _S I _O = 0.4 A Output V _S CW / CCW mode	—	1.75	2.3	V
		V _{SAT L-2}	—	V _{ref} = V _S I _O = 0.4 A Output GND CW / CCW mode	—	0.9	1.3	V
		V _{SAT U-3}	—	V _{ref} = V _S I _O = 1.0 A Output V _S CW / CCW mode	—	2.25	2.6	V
		V _{SAT L-3}	—	V _{ref} = V _S I _O = 1.0 A Output GND CW / CCW mode	—	1.2	1.6	V
Output Voltage		V _{SAT U-1'}	—	V _{ref} = 10 V I _O = 0.2 A Output GND CW / CW mode	9.3	10	10.7	V
		V _{SAT U-2'}	—	V _{ref} = 10 V I _O = 0.4 A Output GND CW / CCW mode	9.3	10	10.7	V
Leaking Current		I _{LU}	—	V _L = 25 V	—	0	50	μA
		I _{LL}	—	V _L = 25 V	—	0	50	
Diode Forward Voltage	Upper	V _{F U-1}	—	I _F = 0.4 A	—	1.5	—	V
		V _{F U-2}	—	I _F = 1 A	—	2.5	—	
	Lower	V _{F L-1}	—	I _F = 0.4 A	—	1.0	—	
		V _{F L-2}	—	I _F = 1 A	—	1.3	—	
Reference Current		I _{ref}	—	V _{ref} = 10 V Source Typ.	—	1	—	mA
RD Output Saturation Voltage		V _{SAT RD}	—	I _{RD} = 5 mA	—	0.18	0.35	V
TR Output Saturation Voltage		V _{SAT TR}	—	I _{TR} = 10 mA	—	4	0.65	V
RDC Charge Current		I _{RDC}	—	—	21	35	55	μA
RD Detective Sensitivity	Detective Level	R _D (ON)	—	AC coupling sine wave input RDC = 10 μF	14	—	—	mV
	Undetective Level	R _D (OFF)	—		—	—	7	
Thermal Shutdown Operating Temperature		T _{TSD}	—	T _j	160	—	—	°C

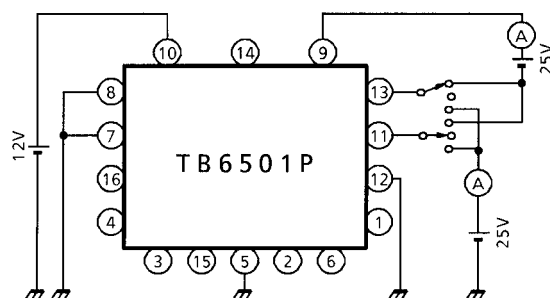
lcc1, lcc2, lcc3, lln, ls1, ls2, ls3

 $V_{IN1}, V_{IN2}, \Delta V_T$ 
$$V_{SAT\ U-1, 2, 3} \quad V_{SAT\ L-1, 2, 3} \quad V_{SAT\ U-1', 2'}$$


Note: Calibrate I_O to 0.2 / 0.4 / 1.0 A by R_L .

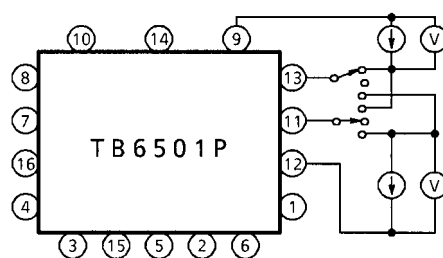
TEST CIRCUIT 4

I_{LU} , I_{LL}



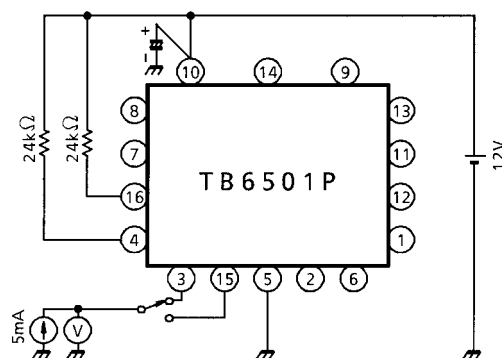
TEST CIRCUIT 5

$V_{FU-1,2}$ $V_{FL-1,2}$



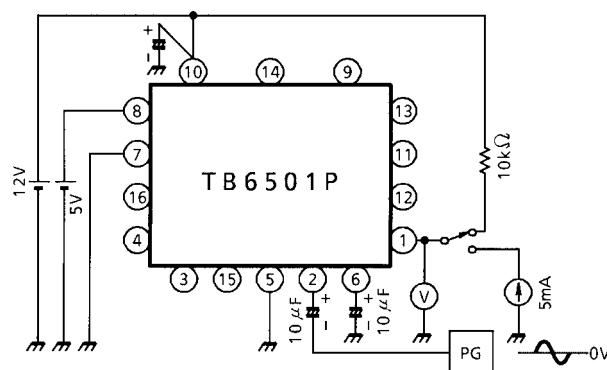
TEST CIRCUIT 6

$V_{SAT TR.}$



TEST CIRCUIT 7

$V_{SAT RD}$ RD Sensitivity

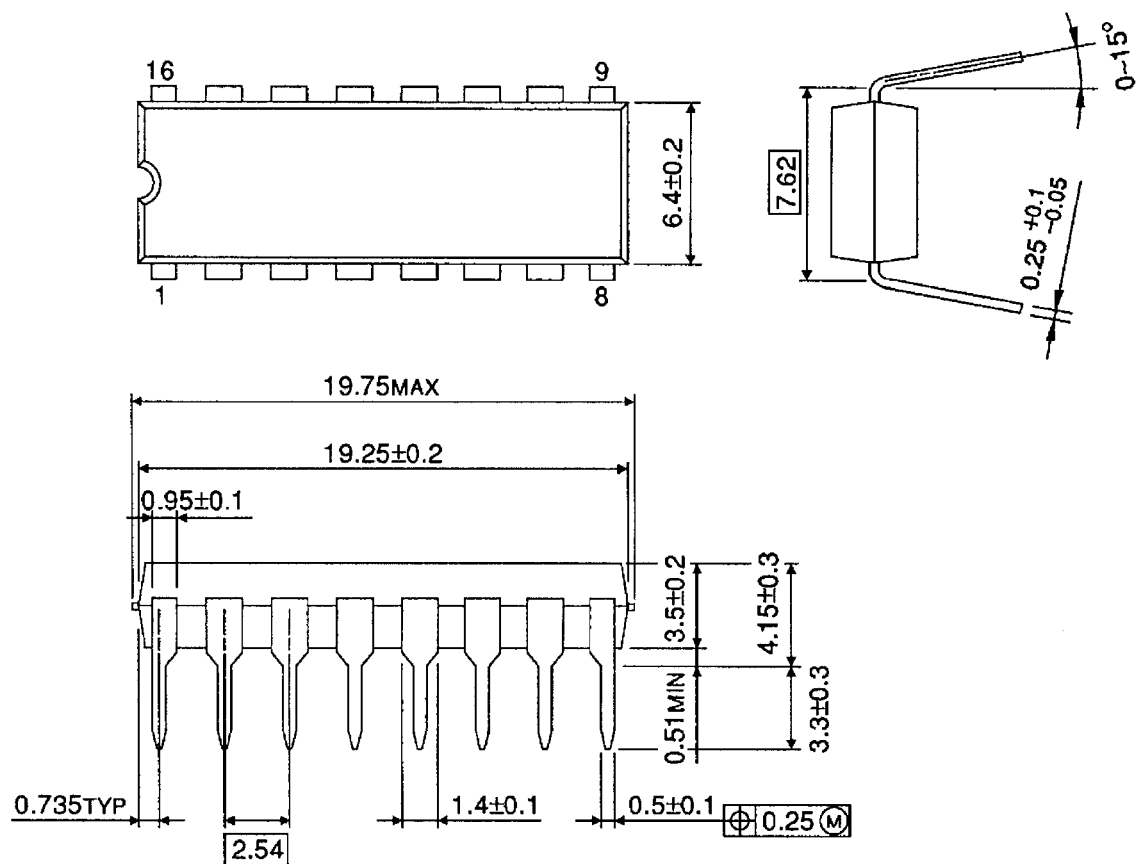


Note: Utmost care is necessary in the design of the output line, V_S , V_{CC} and GND line since IC may be destroyed due to short-circuit between outputs, air contamination fault, or fault by improper grounding.

PACKAGE DIMENSIONS

DIP16-P-300-2.54A

Unit: mm



Weight: 1.11 g (Typ.)

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030619EBA

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