

TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

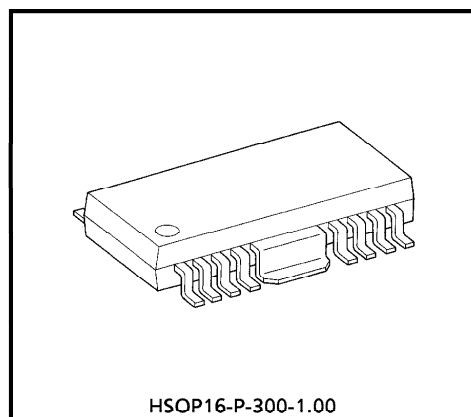
# TA8466AF

## 3 PHASE FULL WAVE BRUSHLESS DC MOTOR DRIVER IC

TA8466AF is a semi-linear type 3 Phase Full Wave Brushless DC Motor Driver IC, developed as a cylinder motor driver for stationary VTRs.

### FEATURES

- Low Noise Soft Switching Drive
- One direction Drive
- Small Outer Capacitance
- Operating Supply Voltage :  $V_{CC} = 7 \sim 17V$
- Hall Input Sensitivity :  $V_H = 30mV_{p-p}$
- Built-in Protective Diodes for All Input Pins
- Built-in Control Amp Reference Voltage (with Output Pins)
- Built-in Thermal Shutdown Circuit

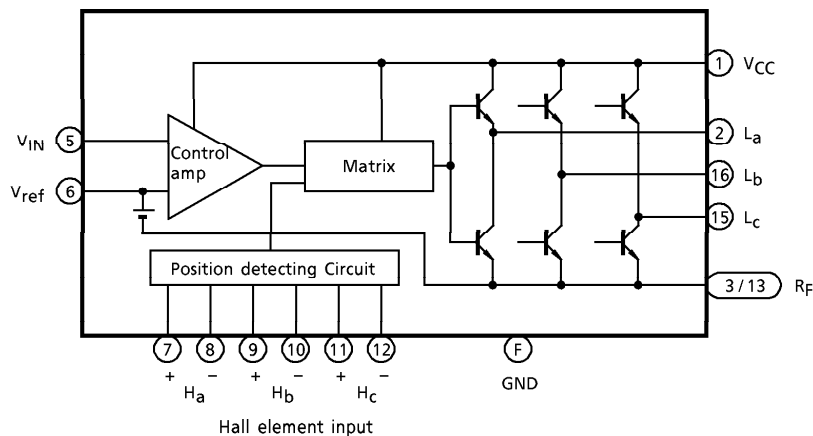


Weight : 0.50g (Typ.)

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## BLOCK DIAGRAM



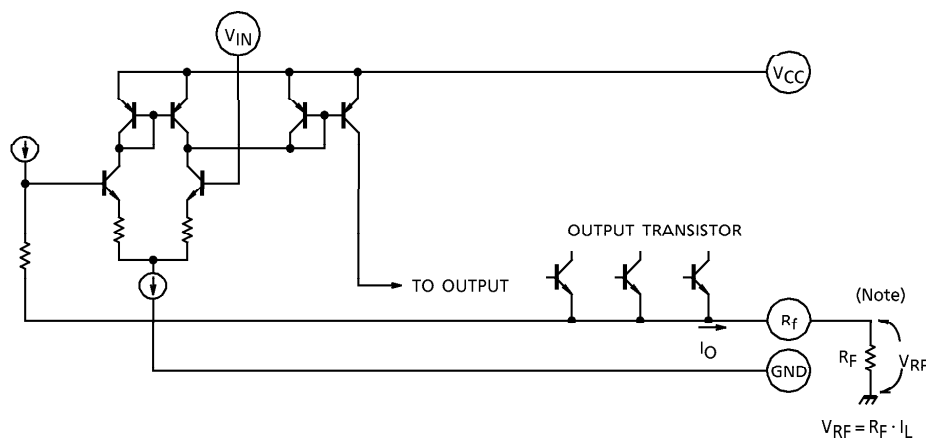
Pins ④ and ⑭ are NC.

Keep Pin ⑥ open.

## PIN FUNCTION

PIN No.	SYMBOL	FUNCTIONAL
1	$V_{CC}$	Supply voltage input pin
2	$L_a$	a-phase drive output pin
3	$R_F$	Output current detecting pin
4	N.C.	N.C. pin
5	$V_{IN}$	Control amp positive input pin
6	$V_{ref}$	Control amp reference voltage output pin
7	$H_a^+$	a-phase Hall amp positive input pin
8	$H_a^-$	a-phase Hall amp negative input pin
9	$H_b^+$	b-phase Hall amp positive input pin
10	$H_b^-$	b-phase Hall amp negative input pin
11	$H_c^+$	c-phase Hall amp positive input pin
12	$H_c^-$	c-phase Hall amp negative input pin
13	$R_F$	Output current detecting pin
14	N.C.	N.C. pin
15	$L_c$	c-phase drive output pin
16	$L_b$	b-phase drive output pin
F	FIN	(Connect to GND)

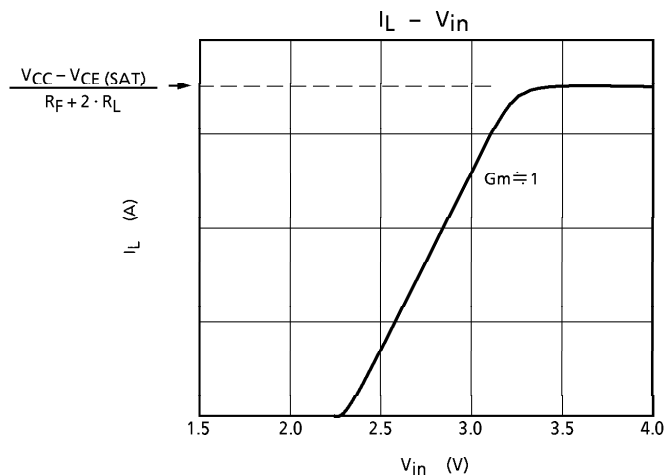
## 1. Control input circuit



Feedback circuit of output currents is built into IC, that is, the voltage feedback is proportional to the output current in  $R_F$ .

(Note) The common impedance inside IC is taken into consideration in providing two  $R_F$  terminals. Short two pins (③ and ⑬) in using them.

## INPUT / OUTPUT CHARACTERISTICS



$R_L$  : Output coil resistance  
 $V_{CE(SAT)}$  : Output transistor saturation voltage (upper / lower total)

## MAXIMUM RATINGS (Ta = 25°C)

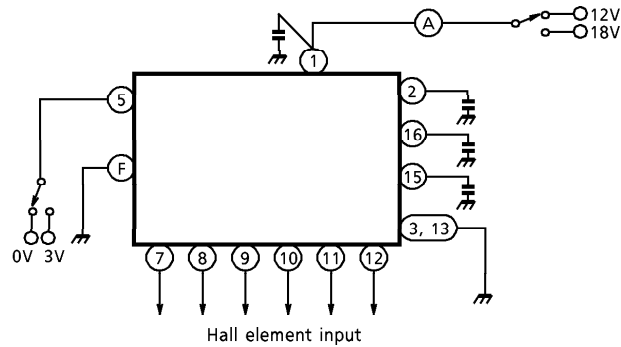
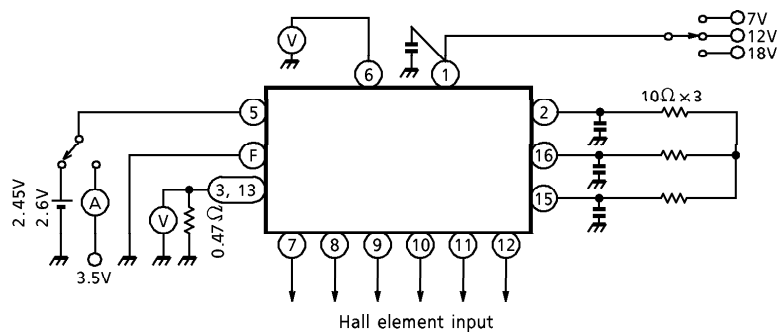
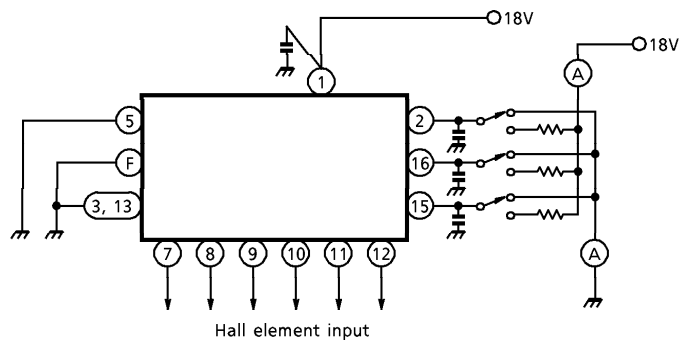
CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	V <sub>CC</sub>	18	V
Output Current	I <sub>O</sub> (MAX.)	0.7	A
Power Dissipation	P <sub>D</sub>	(Note 1) 0.9	W
		(Note 2) 8.3	
Operating Temperature	T <sub>opr</sub>	− 30~75	°C
Storage Temperature	T <sub>stg</sub>	− 55~150	°C

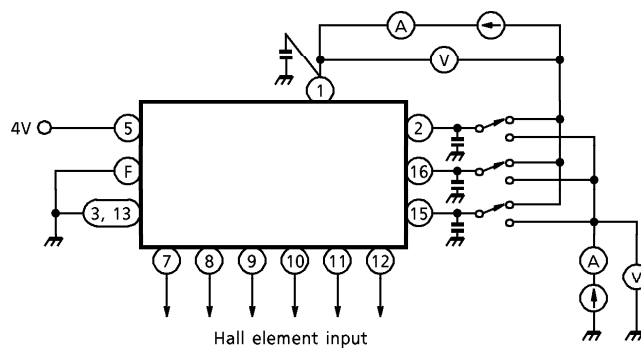
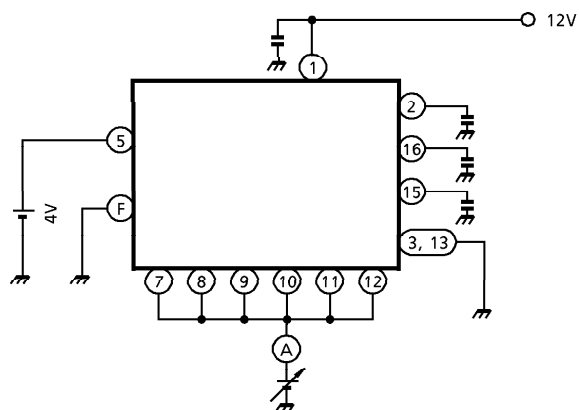
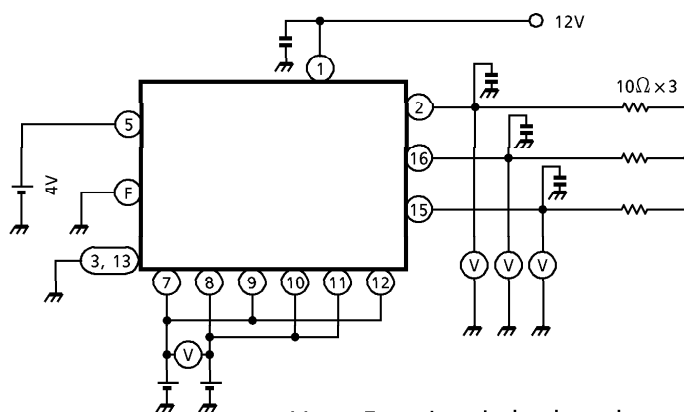
(Note 1) Single body

(Note 2) Infinite heat sink mounting

ELECTRICAL CHARACTERISTICS (V<sub>CC</sub> = 12V, Ta = 25°C)

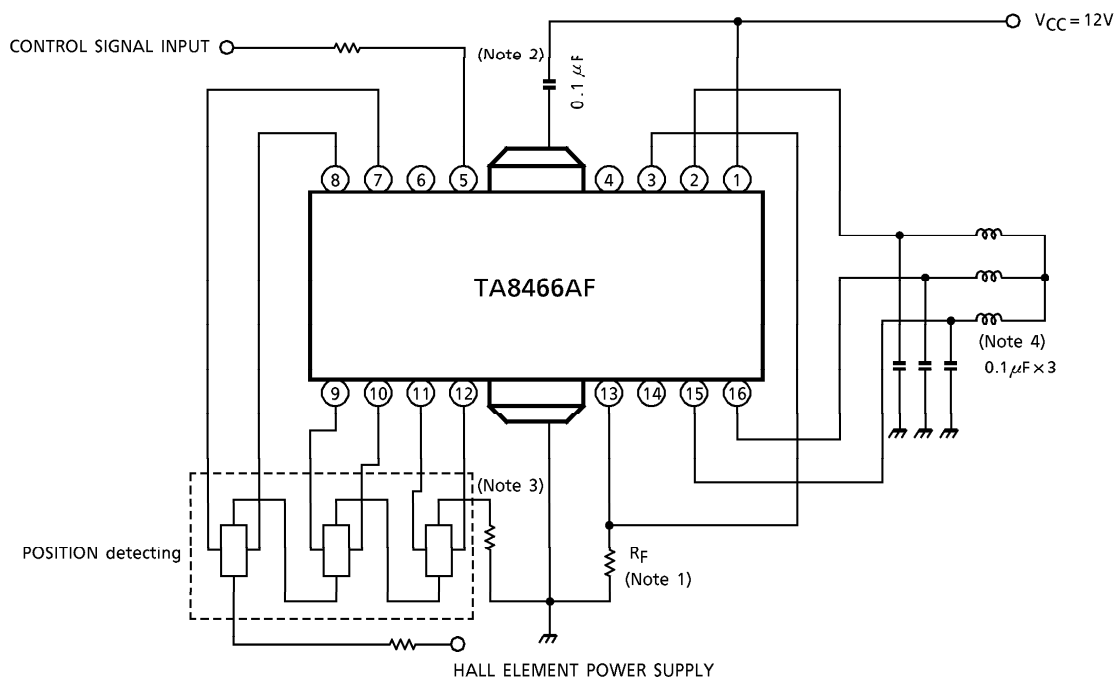
CHARACTERISTIC		SYMBOL	TEST CIR-CUIT	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Supply Current		I <sub>CC1</sub>	1	Output open, V <sub>IN</sub> = 0V	1.5	3.0	4.5	mA
		I <sub>CC2</sub>		Output open, V <sub>IN</sub> = 3V	18	50	95	
		I <sub>CC3</sub>		Output open, V <sub>CC</sub> = 18V, V <sub>IN</sub> = 3V	18	55	110	
Control Amp	Reference Voltage	V <sub>ref</sub>	2		2.25	2.35	2.45	V
	Control Gain	G <sub>m</sub>		R <sub>F</sub> = 0.47Ω, V <sub>IN</sub> = 2.45V / 2.6V	—	1.0	—	A / V
	Input Current	I <sub>in</sub>		V <sub>IN</sub> = 3.5V	—	2.5	10	μA
	Reference Voltage Ripple Compression Rate	R <sub>r</sub>		V <sub>CC</sub> = 7V / 18V	− 53	− 64	—	dB
Leak Current	Upper Side	I <sub>OL</sub> (U)	3	V <sub>CC</sub> = 18V	—	—	50	μA
	Lower Side	I <sub>OL</sub> (L)		V <sub>CC</sub> = 18V	—	—	50	
Saturation Voltage	Upper Side	V <sub>sat</sub> (U)	4	I <sub>L</sub> = 0.7A	—	1.2	1.6	V
	Lower Side	V <sub>sat</sub> (L)		I <sub>L</sub> = 0.7A	—	0.5	0.85	
Residual Output Voltage		V <sub>OR</sub>	2	V <sub>IN</sub> = 0V	—	0	12	mV
Hall Amp	Difference Input Voltage Range	V <sub>H</sub>	6		30	—	200	mV <sub>p-p</sub>
	Common-Mode Input Voltage Range	V <sub>CMRH</sub>	5		2.0	—	V <sub>CC</sub> − 3	V
Thermal Shutdown Operating Temperature		TSD	—		—	175	—	°C

TEST CIRCUIT 1  $I_{CC1}$ ,  $I_{CC2}$ ,  $I_{CC3}$ TEST CIRCUIT 2  $V_{ref}$ ,  $G_V$ ,  $I_{in}$ ,  $R_r$ ,  $V_{or}$ TEST CIRCUIT 3  $I_{OL(U)}$ ,  $I_{OL(L)}$ 

TEST CIRCUIT 4  $V_{\text{sat}}(\text{U})$ ,  $V_{\text{sat}}(\text{L})$ TEST CIRCUIT 5  $V_{\text{CMRH}}$ TEST CIRCUIT 6  $V_{\text{H}}$ 

$V_{\text{H}}$  : Functional check to be made at  $30\text{mV}_{\text{p-p}} / 200\text{mV}_{\text{p-p}}$ .

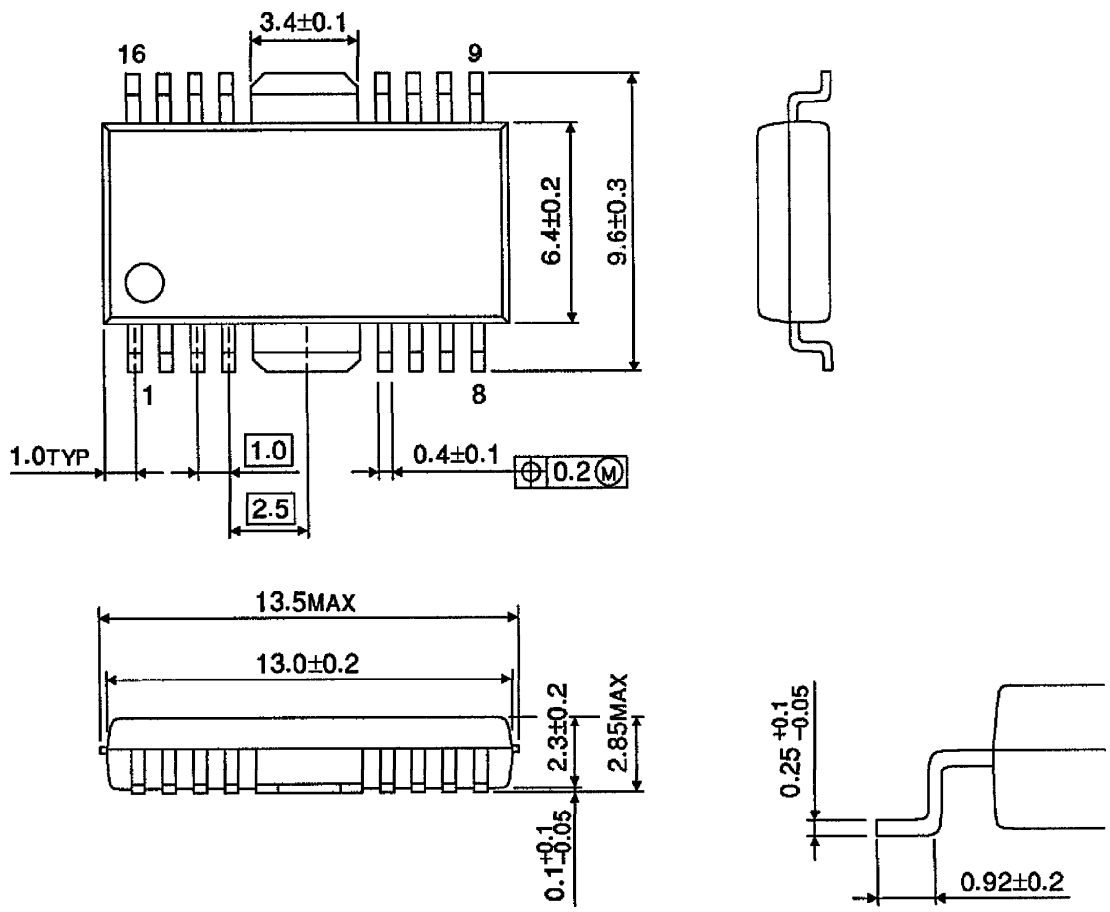
## APPLICATION CIRCUIT



- (Note 1)  $R_F$  value is determined by coil impedance, F/V conversion voltage (control input), and necessary activation torque. But determine it at about  $0.3 \sim 5\Omega$ .
- (Note 2) Connect this condenser directly to IC fin (GND). Still larger capacity may be necessary depending upon common impedance among supply lines.
- (Note 3) Write Hall sensor GND line and coil current  $R_F$  line without common impedance.
- (Note 4) It may be necessary to change condenser capacity depending upon motor type, to prevent noise and oscillation.
- (Note 5) 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  
HSOP16-P-300-1.00

Unit : mm



Weight : 0.50g (Typ.)