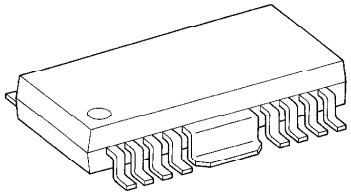
TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

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.



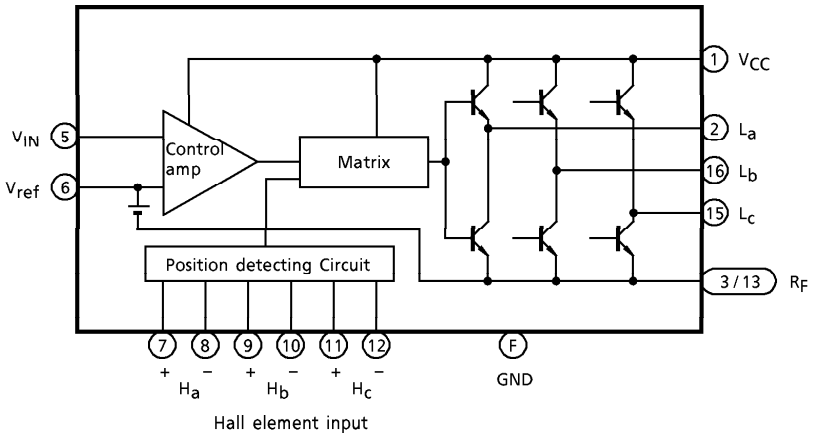
HSOP16-P-300-1.00

Weight : 0.50g (Typ.)

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

BLOCK DIAGRAM



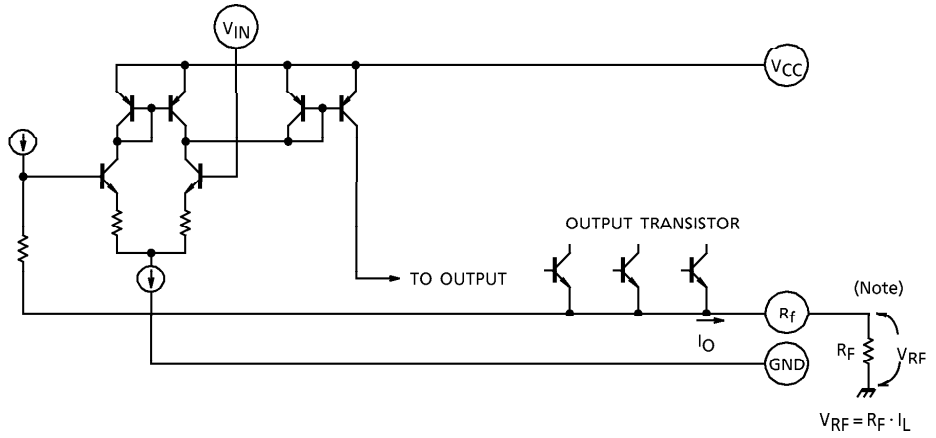
Pins ④ and ⑭ are NC.

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)

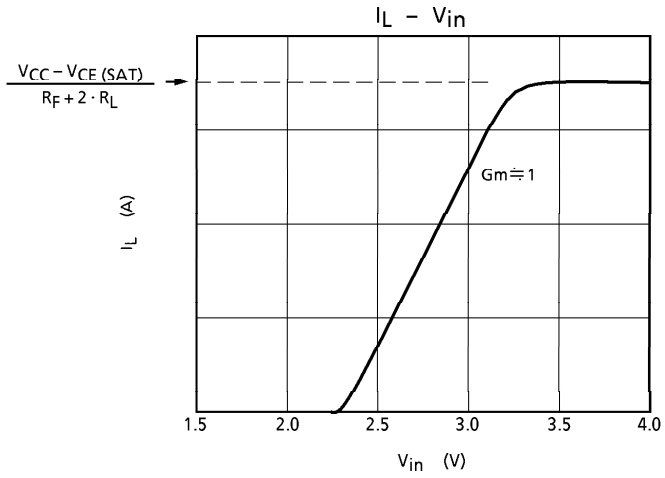
1. Control input circuit



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)

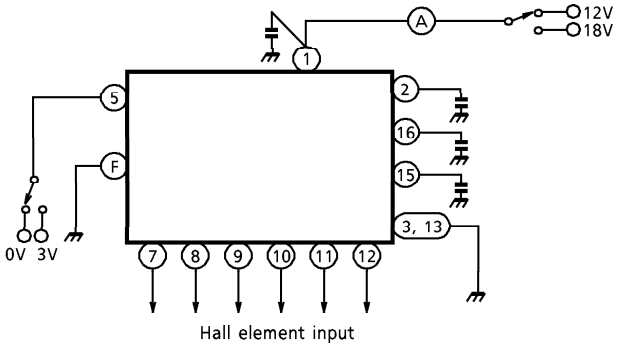
CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	V_{CC}	18	V
Output Current	$I_{O\ (MAX.)}$	0.7	A
Power Dissipation	P_D	(Note 1) 0.9	W
		(Note 2) 8.3	
Operating Temperature	T_{opr}	−30~75	°C
Storage Temperature	T_{stg}	−55~150	°C

(Note 1) Single body
(Note 2) Infinite heat sink mounting

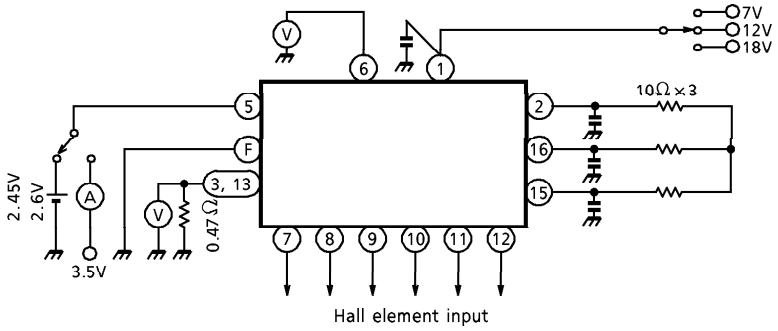
ELECTRICAL CHARACTERISTICS (V_{CC} = 12V, Ta = 25°C)

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

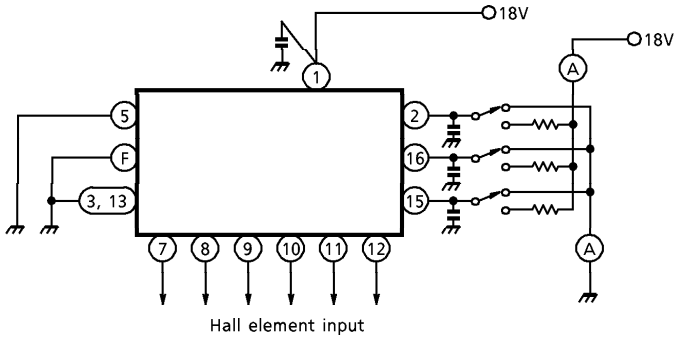
TEST CIRCUIT 1 I_{CC1}, I_{CC2}, I_{CC3}



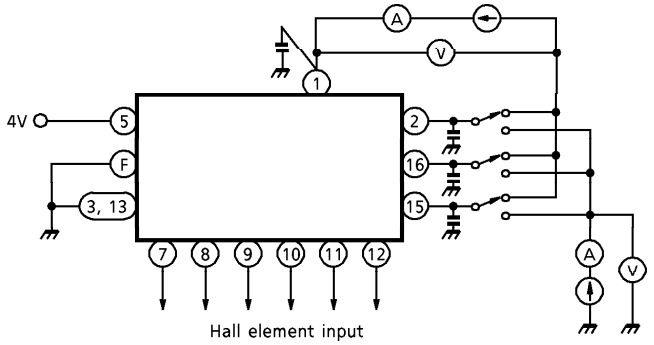
TEST CIRCUIT 2 V_{ref}, G_V, I_{in}, R_r, Vor



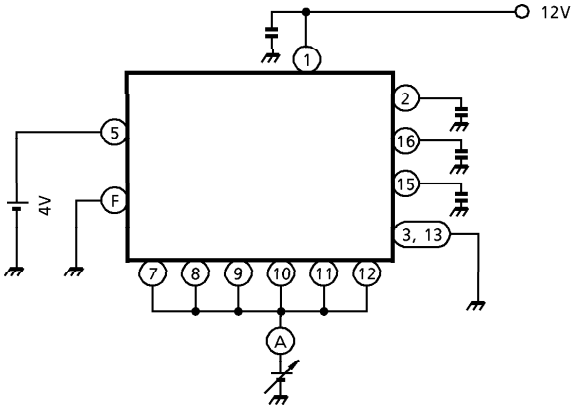
TEST CIRCUIT 3 $I_{OL\,(U)}$, $I_{OL\,(L)}$



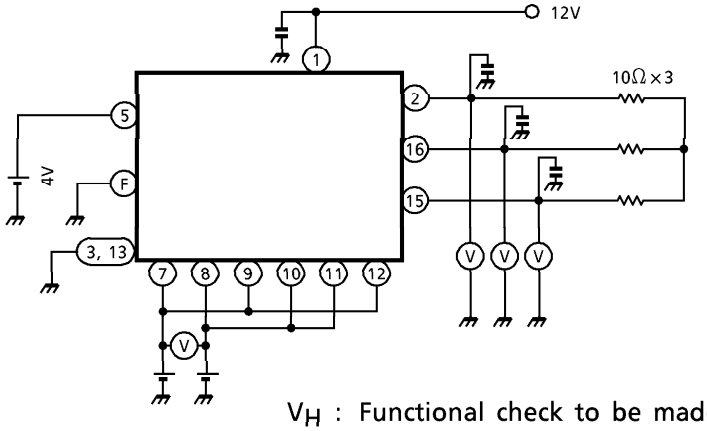
TEST CIRCUIT 4 $V_{sat\,(U)}$, $V_{sat\,(L)}$



TEST CIRCUIT 5 V_{CMRH}

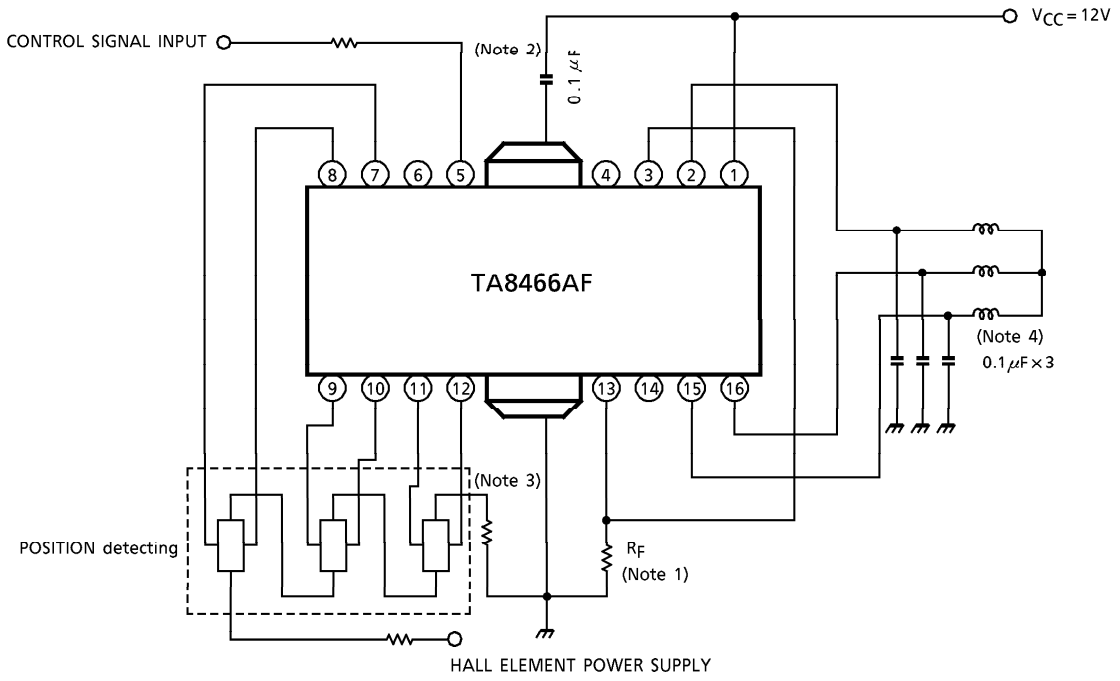


TEST CIRCUIT 6 V_H



V_H : Functional check to be made at $30mV_{p-p}$ / $200mV_{p-p}$.

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 0.3~5Ω.

(Note 2) Connect this condenser directly to IC fin (GND). Still larger capacity may be necessary depending upon common impedance among supply lines.

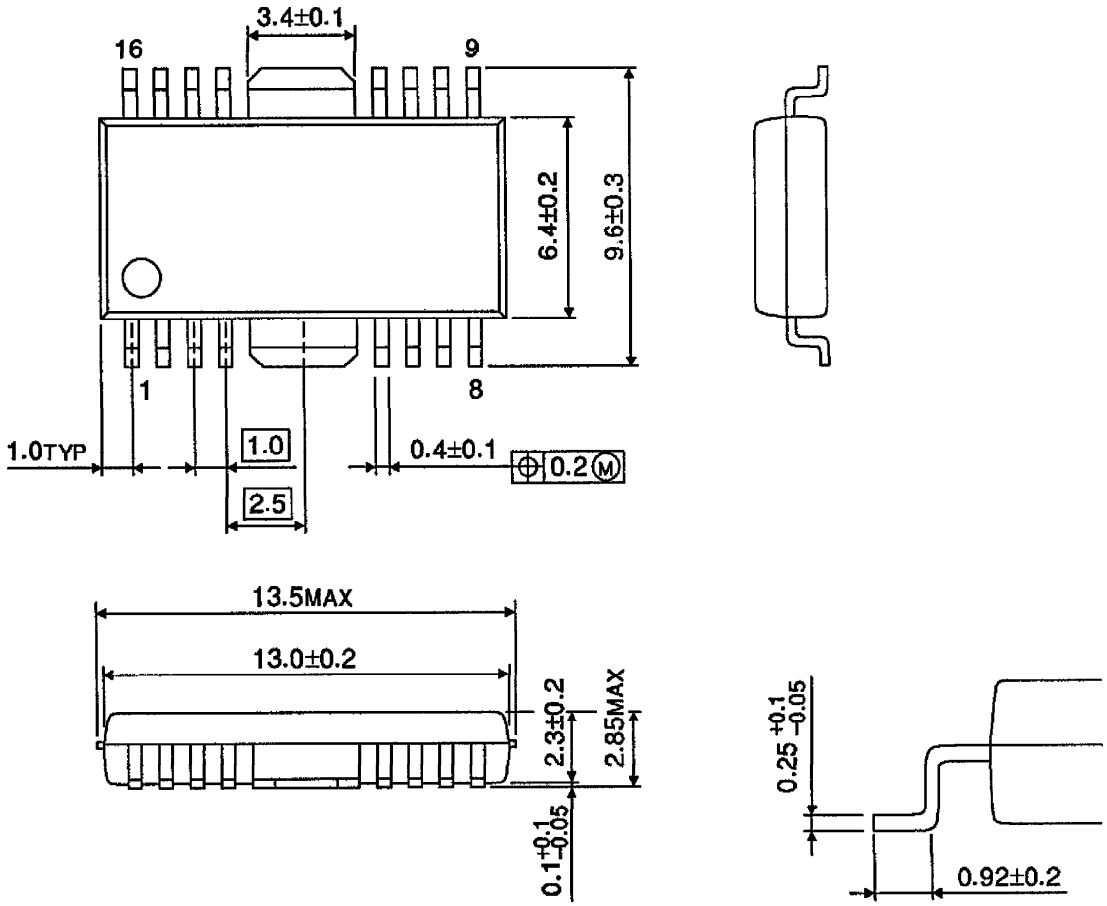
(Note 3) Write Hall sensor GND line and coil current R_F line without common impedance.

(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



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