

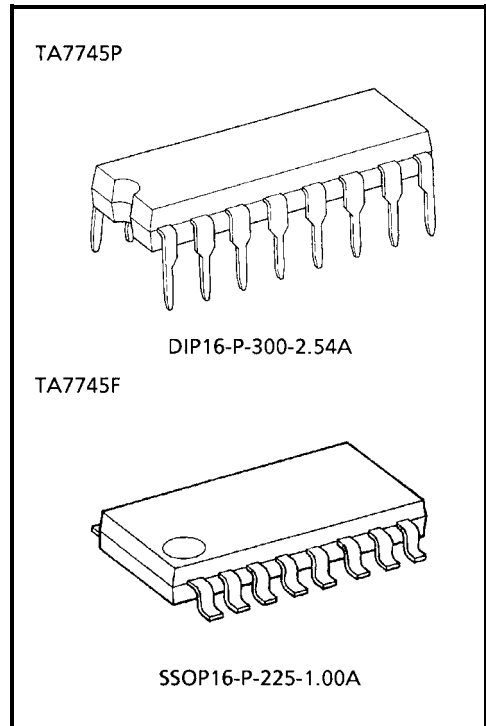
TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

# TA7745P, TA7745F

## DC MOTOR DRIVER

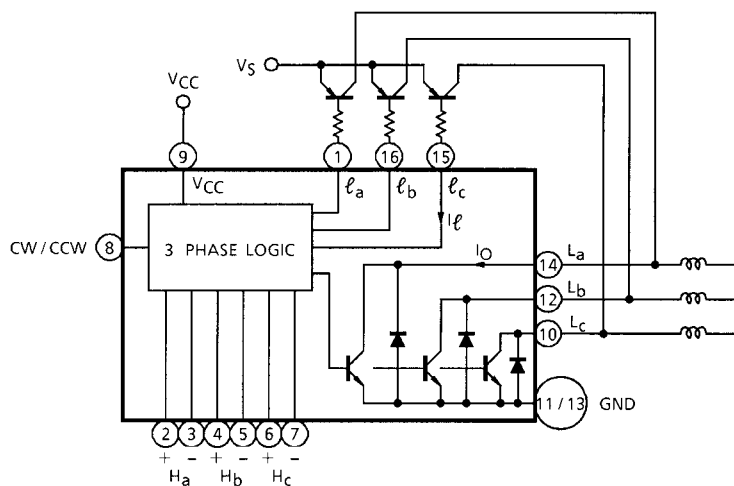
### FEATURES

- 3 Phase Power Driver.
- Voltage Control System.
- High Efficiency is Obtained.
- Capsealed in Flat Package 16Pin.
- Operating Voltage Range :  $V_{CC} = 4.0\sim 15\text{ V}$   
 $V_S = 2\sim 15\text{ V}$
- High Sensitivity of Position Sensing Inputs and Have a Hysteresis :  $V_H = 20\text{ mV}_{p-p}$  (Typ.)
- Output Current :  $I_O$  (MAX.) = 1.0 A
- Build in Thermal Shut Down Circuit.
- Forward and Reverse Rotation and Stop Modes are Available by Means of Rotation Control Terminal.



Weight  
 DIP16-P-300-2.54A : 1.11g (Typ.)  
 SSOP16-P-225-1.00A: 0.14g (Typ.)

### BLOCK DIAGRAM



## PIN FUNCTION

PIN No.	SYMBOL	FUNCTIONAL DESCRIPTION
1	$\text{I}_a$	a-phase Pre-drive stage output terminal
2	$H_{a+}$	a-phase Hall Amp. positive input terminal
3	$H_{a-}$	a-phase Hall Amp. negative input terminal
4	$H_{b+}$	b-phase Hall Amp. positive input terminal
5	$H_{b-}$	b-phase Hall Amp. negative input terminal
6	$H_{c+}$	c-phase Hall Amp. positive input terminal
7	$H_{c-}$	c-phase Hall Amp. negative input terminal
8	CW / CCW	Forward rotation / reverse rotation switch terminal
9	$V_{CC}$	Power Supply input terminal
10	$L_c$	c-phase drive output terminal
11	GND	GND terminal
12	$L_b$	b-phase drive output terminal
13	GND	GND terminal
14	$L_a$	a-phase drive output terminal
15	$\text{I}_c$	c-phase Pre-drive stage output terminal
16	$\text{I}_b$	b-phase Pre-drive stage output terminal

## FUNCTION

FRS (8) PIN)	POSITION SENSING INPUT			COIL OUTPUT		
	$H_a$	$H_b$	$H_c$	$L_a$	$L_b$	$L_c$
$V_{RVS}$	1	0	1	H	L	M
	1	0	0	H	M	L
	1	1	0	M	H	L
	0	1	0	L	H	M
	0	1	1	L	M	H
	0	0	1	M	L	H
$V_{FWD}$	1	0	1	L	H	M
	1	0	0	L	M	H
	1	1	0	M	L	H
	0	1	0	H	L	M
	0	1	1	H	M	L
	0	0	1	M	H	L
$V_{STOP}$	1	0	1	High Impedance		
	1	0	0			
	1	1	0			
	0	1	0			
	0	1	1			
	0	0	1			

## MAXIMUM RATINGS (Ta = 25°C)

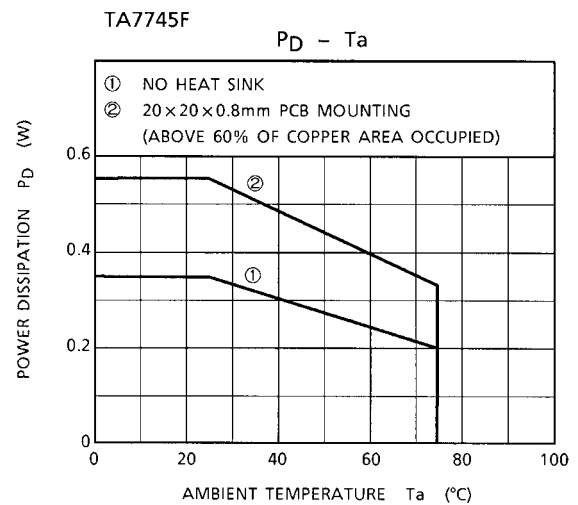
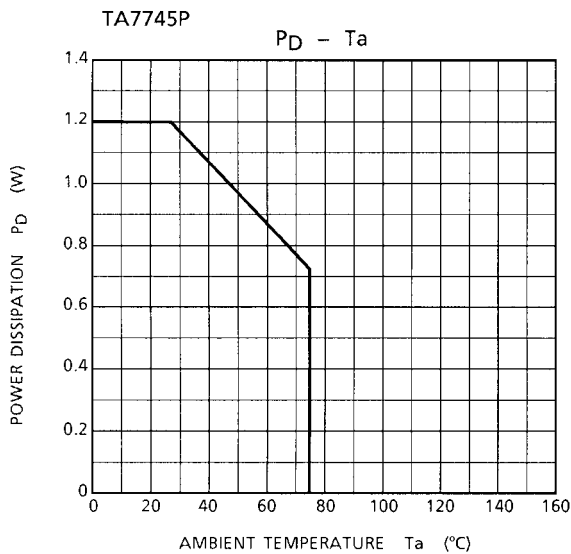
CHARACTERISTIC		SYMBOL	RATING	UNIT
Supply Voltage		V <sub>CC</sub>	18	V
		V <sub>S</sub>	18	V
Output Current		I <sub>O</sub>	1.0	A
		I <sub>t</sub>	20.0	mA
Power Dissipation	TA7745P	P <sub>D</sub>	350	mW
			550 (Note)	
	TA7745F		1200	
Operating Temperature		T <sub>opr</sub>	-30~75	°C
Storage Temperature		T <sub>stg</sub>	-55~150	°C

Note: This rating is obtained by mounting on 20 × 20 × 0.8 mm PCB that occupied above 60% of copper area.

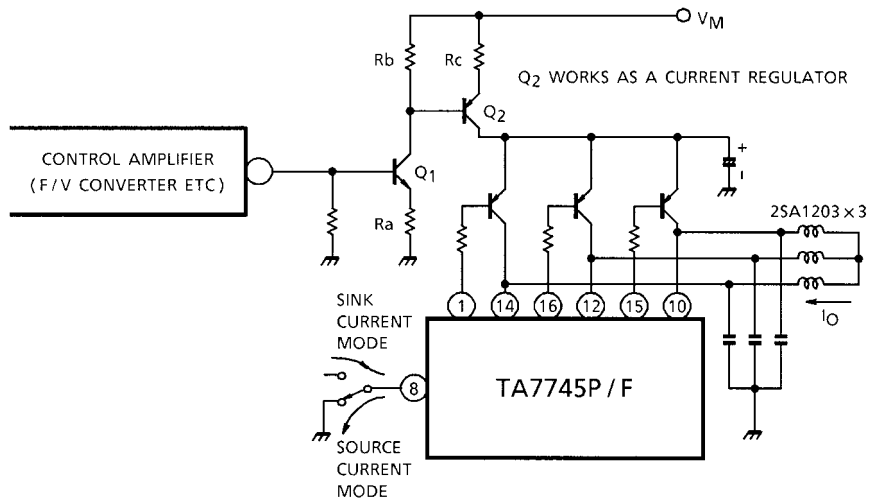
## ELECTRICAL CHARACTERISTICS (Unless otherwise specified, Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN	TYP.	MAX	UNIT
Supply Current		I <sub>CC1</sub>		V <sub>CC</sub> = 5 V, Output "OPEN"	0.5	1	3.0	mA
		I <sub>CC2</sub>		V <sub>CC</sub> = 9 V, Output "OPEN"	0.6	1.3	3.5	
		I <sub>CC3</sub>		V <sub>CC</sub> = 12 V, Output "OPEN"	0.7	1.5	5.0	
Saturation Voltage	L <sub>a</sub> , L <sub>b</sub> , L <sub>c</sub> Side	V <sub>SL-1</sub>		I <sub>O</sub> = 0.1 A	—	0.12	0.3	V
		V <sub>SL-2</sub>		I <sub>O</sub> = 0.5 A	—	0.5	1.0	
	ℓ <sub>a</sub> , ℓ <sub>b</sub> , ℓ <sub>c</sub> Side	V <sub>SU</sub>		I <sub>ℓ</sub> = 1.0 mA	—	—	0.2	
Position Sensing Input	Sensitivity	V <sub>H</sub>			—	20	—	mV
	Operating DC Level	CMR-H			1	—	V <sub>CC</sub> -1.5	V
Diode Forward Voltage		V <sub>F</sub>		I <sub>F</sub> = 1 A	—	2.0	—	V
Rotation Control Input Voltage	Forward	V <sub>FWD</sub>		Source current mode	3.9	—	V <sub>CC</sub>	V
	Stop	V <sub>STOP</sub>		No current flow (Note)	1.8	—	2.6	
	Reverse	V <sub>RVS</sub>		Sink current mode	0	—	0.9	
Saturation Voltage Differential (L <sub>a</sub> , L <sub>b</sub> , L <sub>c</sub> Side)		ΔV <sub>S</sub>		I <sub>O</sub> = 200 mA	—	—	50	mV
Leakage Current		I <sub>L</sub>		V = 18 V	—	—	50	μA

Note: IC is stop mode when (8) pin supplied 1.8 V~2.6 V or open.



## APPLICATION CIRCUIT 1 (3 phase Bi-Pola drive)

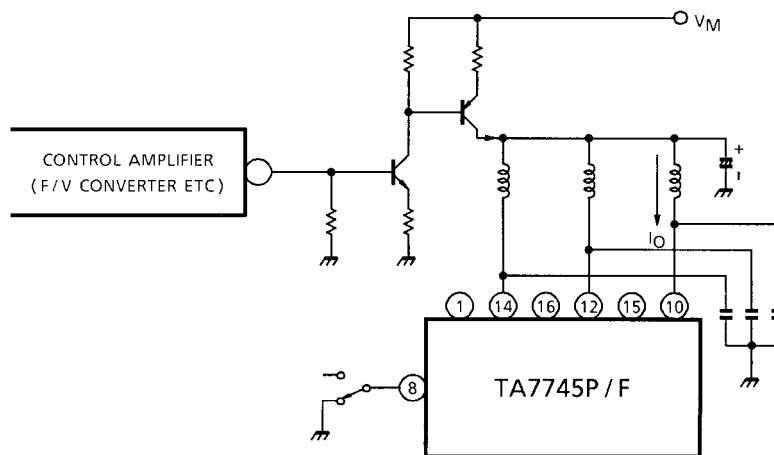


$$I_o \approx \frac{R_b}{R_a R_c} V_{IN} - \frac{1}{R_c} \left( \frac{R_b}{R_c} V_{BE1} + V_{BE2} \right)$$

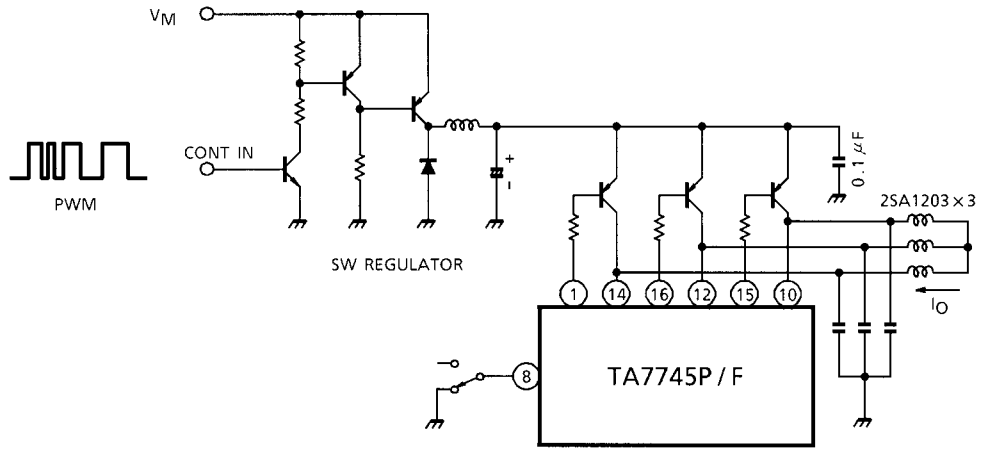
$$\approx (K_1 \cdot V_{IN}) + K_2$$

(K<sub>1</sub>, K<sub>2</sub> = CONSTANT)

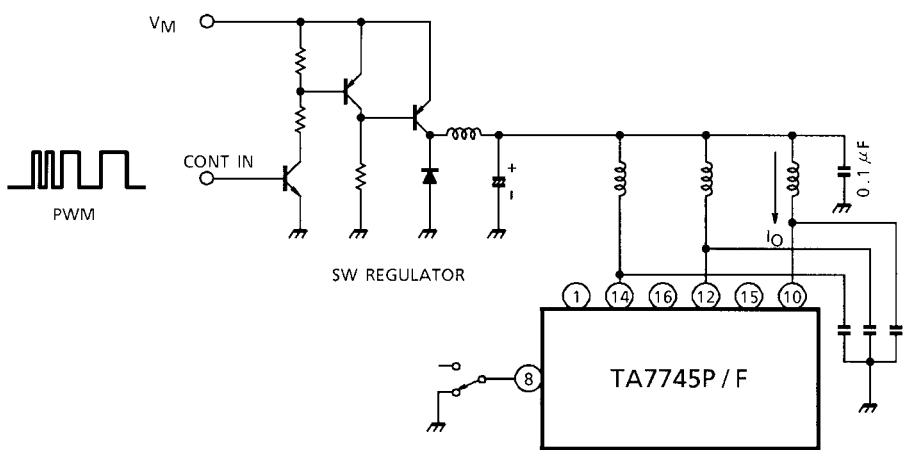
## APPLICATION CIRCUIT 2 (3 phase UNI-Pola drive)



**APPLICATION CIRCUIT 3**  
(High efficiency drive (UNI-Pola))



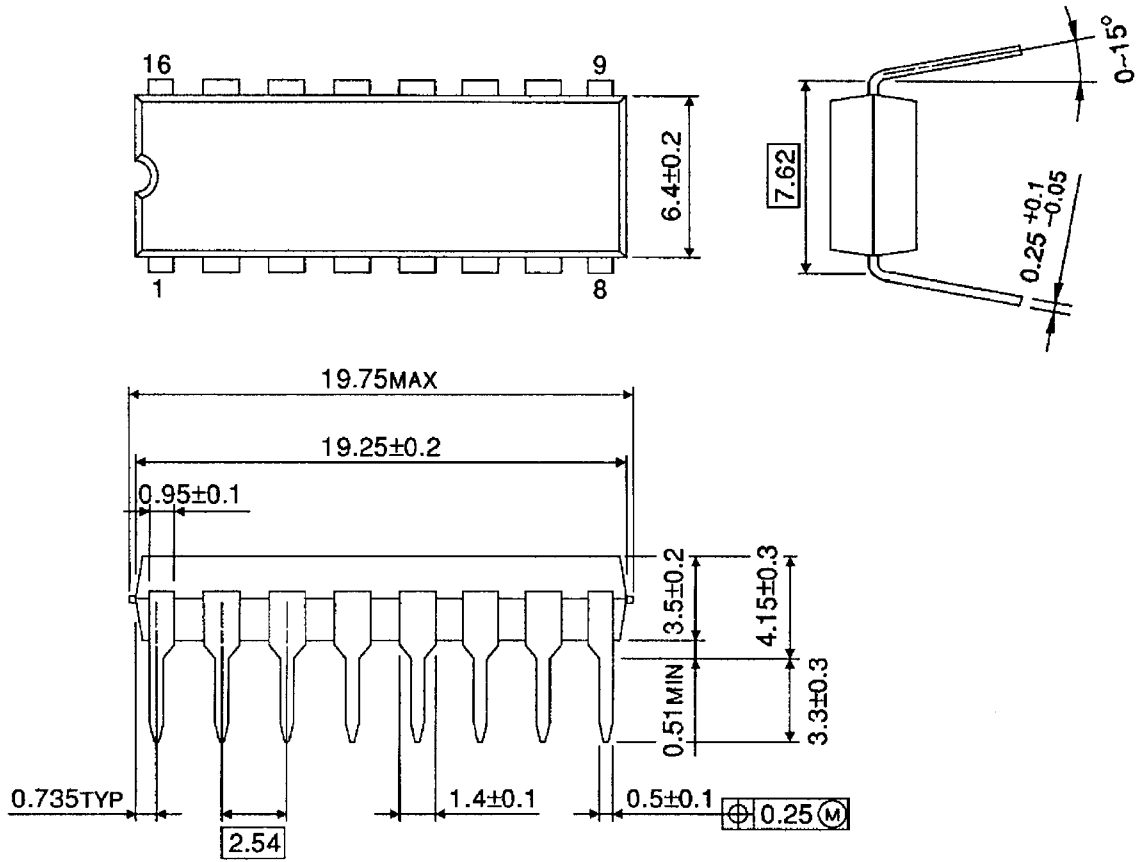
**APPLICATION CIRCUIT 4**  
(High efficiency drive (Bi-Pola))



## PACKAGE DIMENSIONS

DIP16-P-300-2.54A

Unit: mm

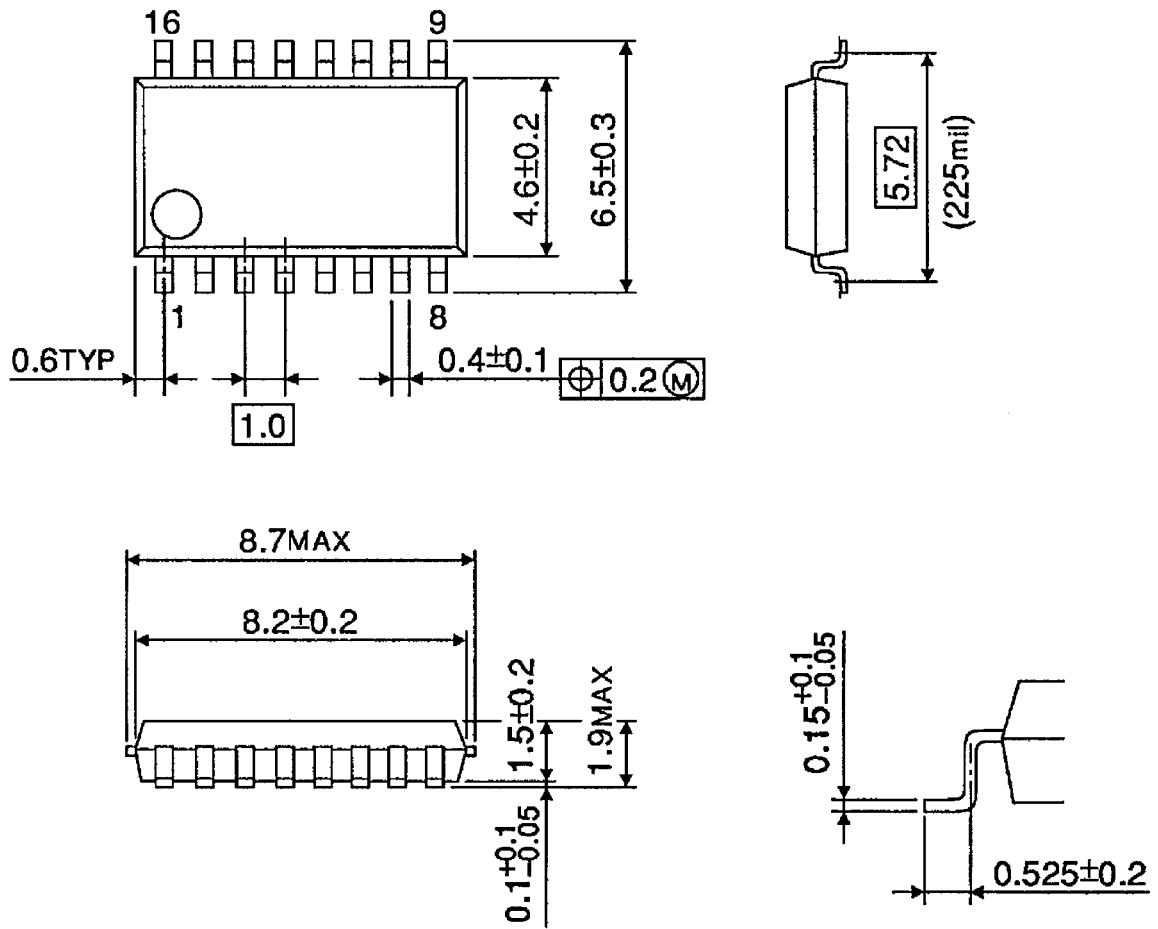


Weight: 1.11 g (Typ.)

## PACKAGE DIMENSIONS

SSOP16-P-225-1.00A

Unit: mm



Weight: 0.14 g (Typ.)



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