TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

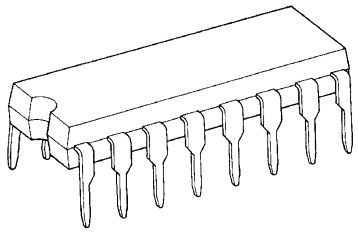
TA7745P,TA7745F

DC MOTOR DRIVER

FEATURES

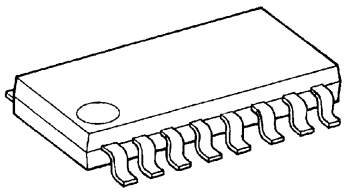
- 3 Phase Power Driver.
- Voltage Control System.
- High Efficiency is Obtained.
- Capsealded in Flat Package 16Pin.
- Operating Voltage Range : V_{CC} = 4.0~15 V
  V_S = 2~15 V
- High Sensitivity of Position Sensing Inputs and Have a Hysteresis : V_H = 20 mV_{p-p} (Typ.)
- Output Current : I_O (MAX.)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

TA7745P



DIP16-P-300-2.54A

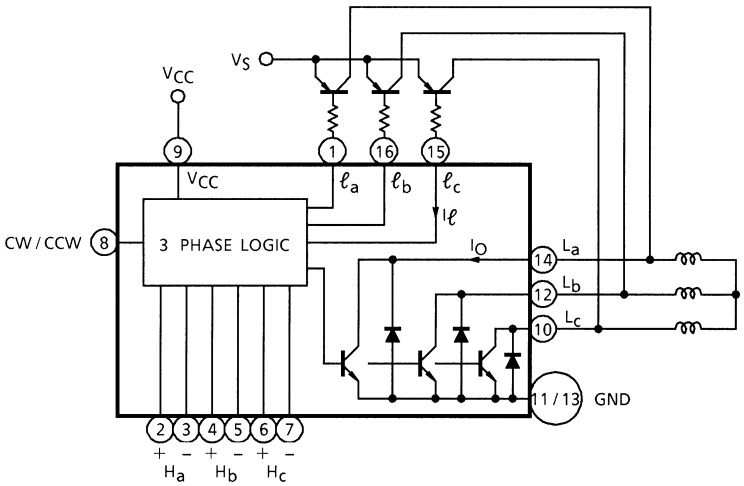
TA7745F



SSOP16-P-225-1.00A

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

BLOCK DIAGRAM



961001EBA2

PIN FUNCTION

PIN No.	SYMBOL	FUNCTIONAL DESCRIPTION
1	ℓ_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	ℓ_c	c−phase Pre−drive stage output terminal
16	ℓ_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			

961001EBA2'

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Supply Voltage		V_{CC}	18	V
		V_S	18	V
Output Current		I_O	1.0	A
		$I_ℓ$	20.0	mA
Power Dissipation	TA7745P	P_D	350	mW
			550 (Note)	
	TA7745F		1200	
Operating Temperature		T_{opr}	−30~75	°C
Storage Temperature		T_{stg}	−55~150	°C

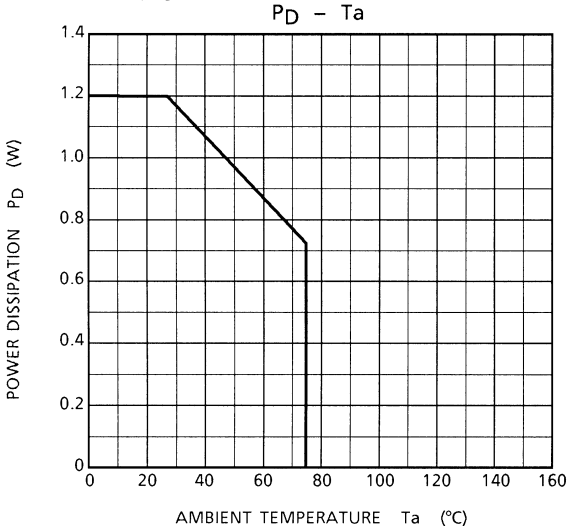
Note: This rating is obtained by mounting on 20 × 20 × 0.8 mm PCB that occupied above 60% of copper area.

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

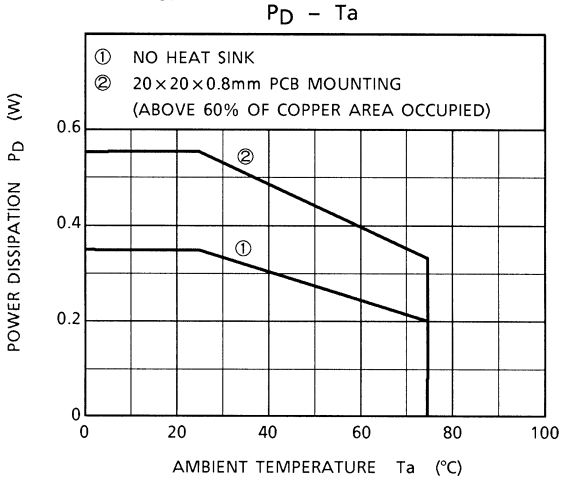
CHARACTERISTIC		SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN	TYP.	MAX	UNIT
Supply Current		I_{CC1}		V_{CC} = 5 V, Output "OPEN"	0.5	1	3.0	mA
		I_{CC2}		V_{CC} = 9 V, Output "OPEN"	0.6	1.3	3.5	
		I_{CC3}		V_{CC} = 12 V, Output "OPEN"	0.7	1.5	5.0	
Saturation Voltage	L_a, L_b, L_c Side	V_{SL-1}		I_O = 0.1 A	—	0.12	0.3	V
		V_{SL-2}		I_O = 0.5 A	—	0.5	1.0	
	ℓ_a, ℓ_b, ℓ_c Side	V_{SU}		I_ℓ = 1.0 mA	—	—	0.2	
Position Sensing Input	Sensitivity	V_H			—	20	—	mV
	Operating DC Level	CMR-H			1	—	$V_{CC-1.5}$	V
Diode Forward Voltage		V_F		I_F = 1 A	—	2.0	—	V
Rotation Control Input Voltage	Forward	V_{FWD}		Source current mode	3.9	—	V_{CC}	V
	Stop	V_{STOP}		No current flow (Note)	1.8	—	2.6	
	Reverse	V_{RVS}		Sink current mode	0	—	0.9	
Saturation Voltage Differential (L_a, L_b, L_c Side)		ΔV_S		I_O = 200 mA	—	—	50	mV
Leakage Current		I_L		V = 18 V	—	—	50	μA

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

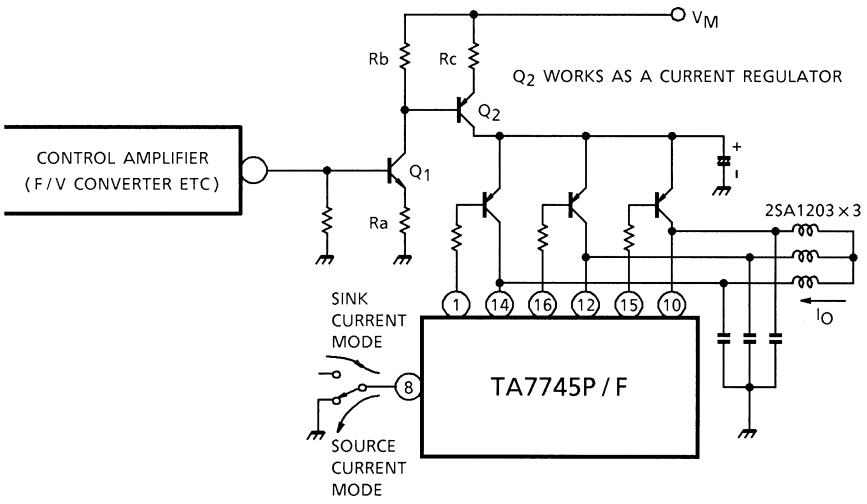
TA7745P



TA7745F



APPLICATION CIRCUIT 1
(3 phase Bi−Pola drive)

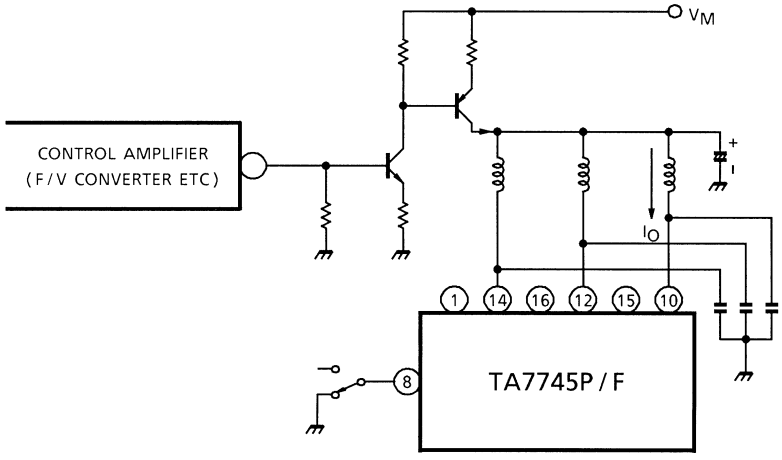


$$I_o \approx \frac{R_b}{R_a R_c} V_{IN} - \frac{1}{R_c}\left(\frac{R_b}{R_c} V_{BE1} + V_{BE2}\right)$$

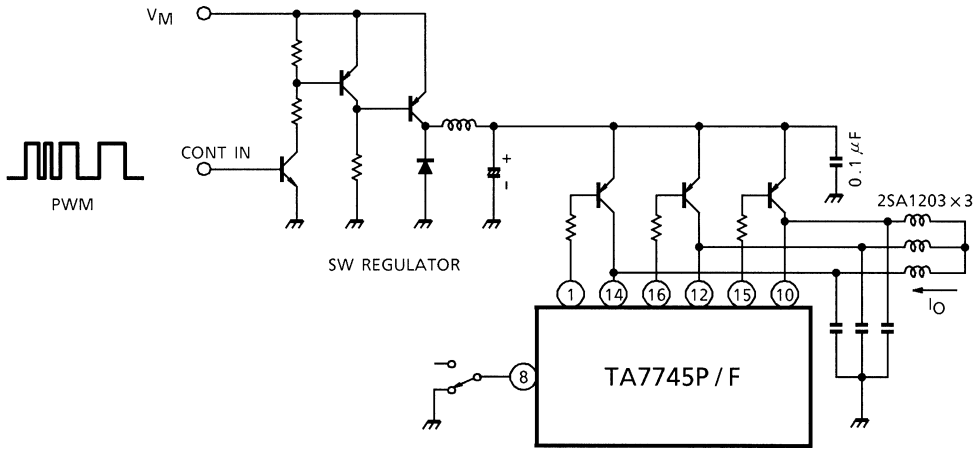
$$\approx (K_1 \cdot V_{IN}) + K_2$$

$(K_1, K_2 = \text{CONSTANT})$

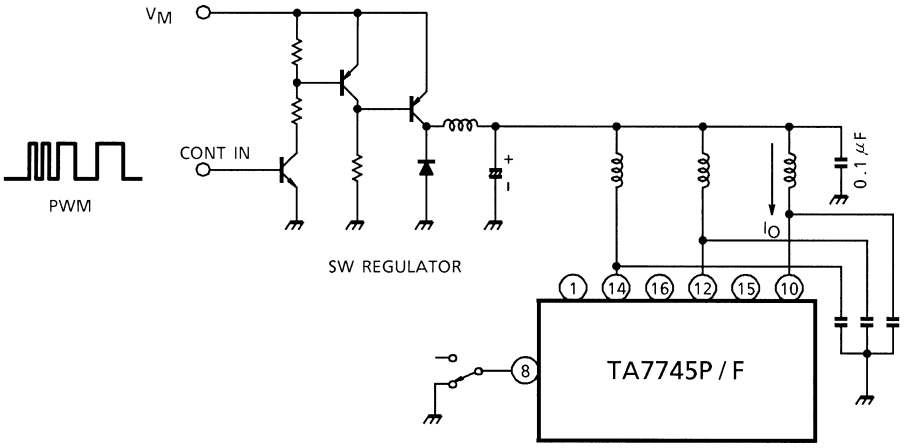
APPLICATION CIRCUIT 2
(3 phase UNI−Pola drive)



APPLICATION CIRCUIT 3
(High efficiency drive (UNI−Pola))

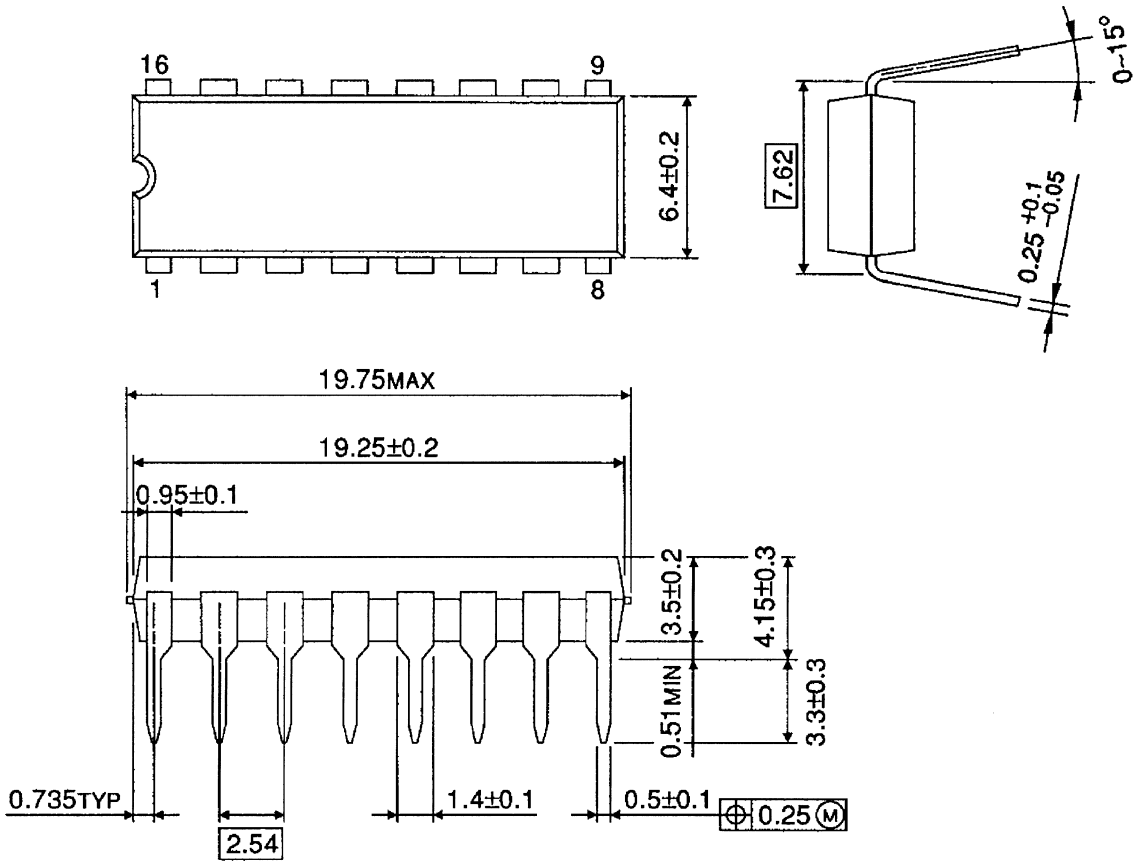


APPLICATION CIRCUIT 4
(High efficiency drive (Bi−Pola))



OUTLINE DRAWING

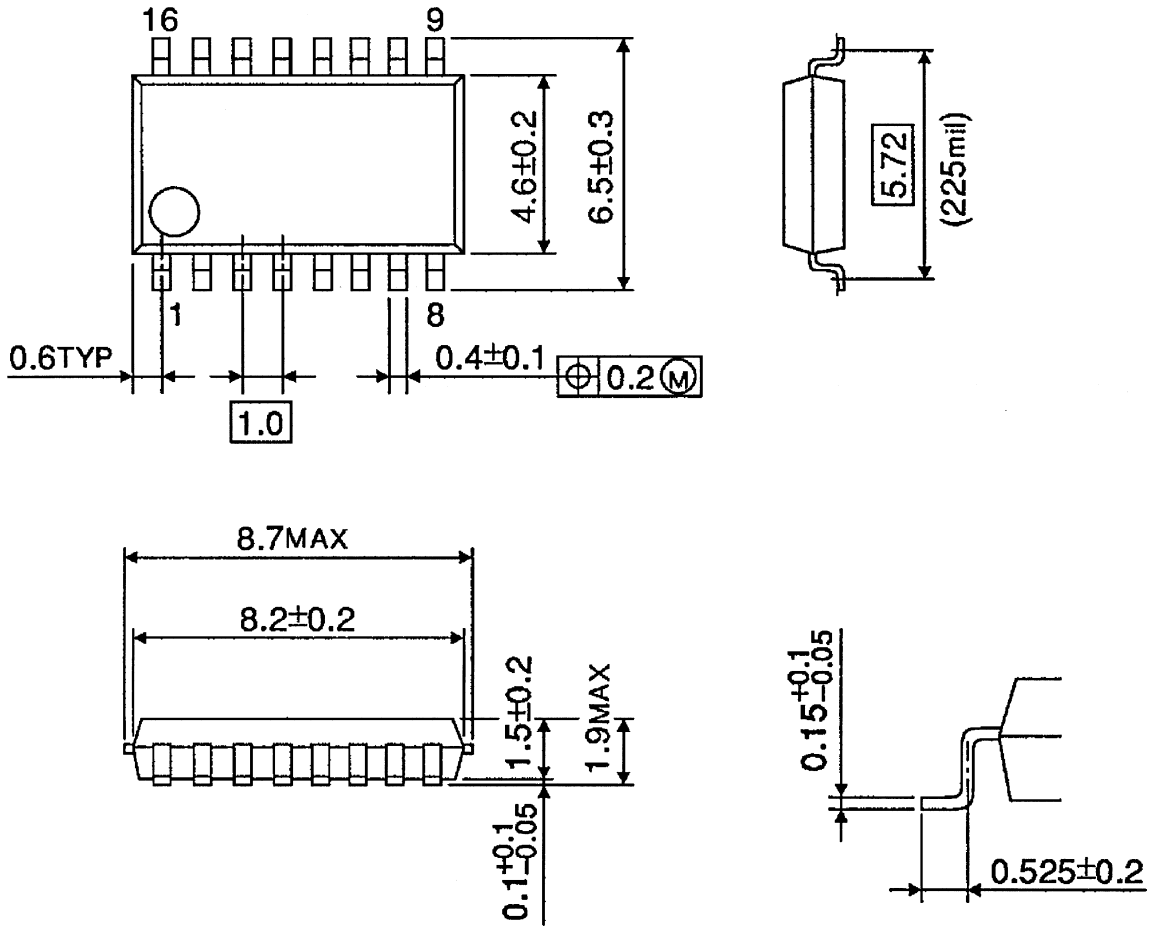
DIP16-P-300-2.54A Unit: mm



Weight: 1.11 g (Typ.)

OUTLINE DRAWING

SSOP16−P−225−1.00A Unit: mm



Weight: 0.14 g (Typ.)