TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

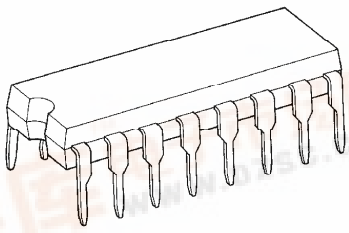
TA7745P, TA7745F

DC MOTOR DRIVER

FEATURES

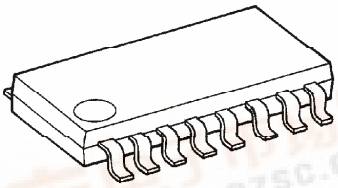
- 3 Phase Power Driver.
- Voltage Control System.
- High Efficiency is Obtained.
- Capsealded in Flat Package 16Pin.
- Operating Voltage Range : $V_{CC} = 4.0 \sim 15V$
  $V_S = 2 \sim 15V$
- High Sensitivity of Position Sensing Inputs and Have a Hysteresis : $V_H = 20mV_{p-p}$ (Typ.)
- Output Current : I_O (MAX.) = 1.0A
- 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

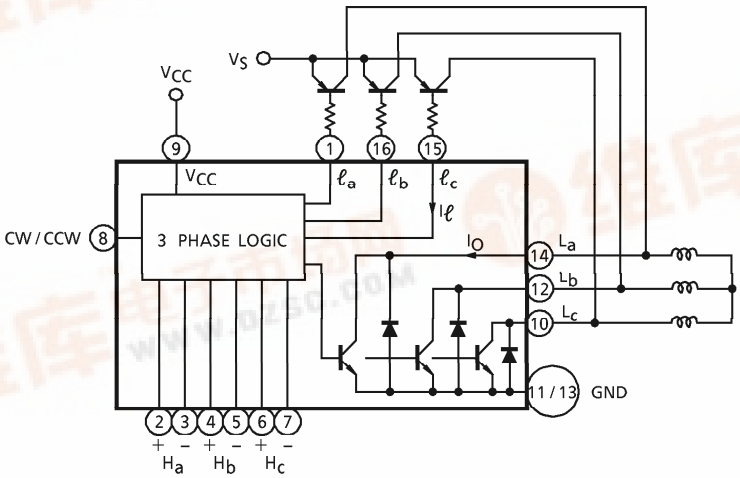
TA7745F



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	ℓa	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 (⑧PIN)	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_{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

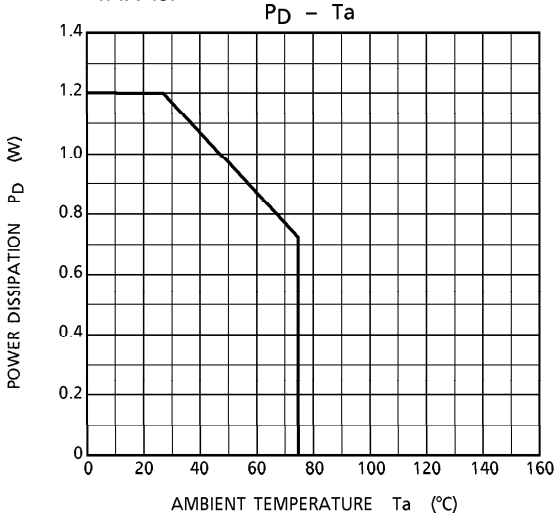
(Note) This rating is obtained by mounting on 20 × 20 × 0.8mm PCB that occupied above 60% of copper area.

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

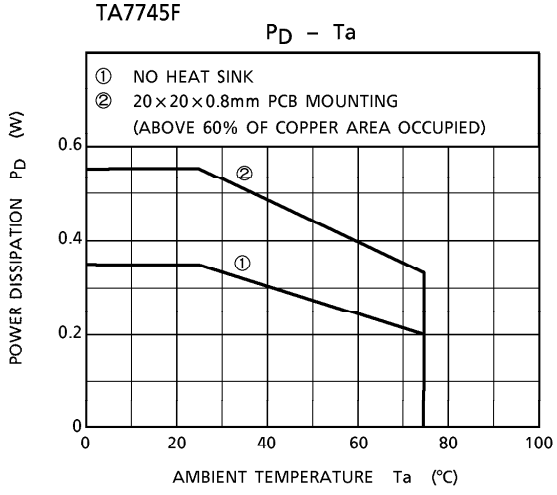
CHARACTERISTIC		SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Supply Current		I_{CC1}		V_{CC} = 5V, Output "OPEN"	0.5	1	3.0	mA
		I_{CC2}		V_{CC} = 9V, Output "OPEN"	0.6	1.3	3.5	
		I_{CC3}		V_{CC} = 12V, Output "OPEN"	0.7	1.5	5.0	
Saturation Voltage	L_a, L_b, L_c Side	V_{SL-1}		I_O = 0.1A	—	0.12	0.3	V
		V_{SL-2}		I_O = 0.5A	—	0.5	1.0	
	ℓ_a, ℓ_b, ℓ_c Side	V_{SU}		I_ℓ = 1.0mA	—	—	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 = 1A	—	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 = 200mA	—	—	50	mV
Leakage Current		I_L		V = 18V	—	—	50	μA

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

TA7745P

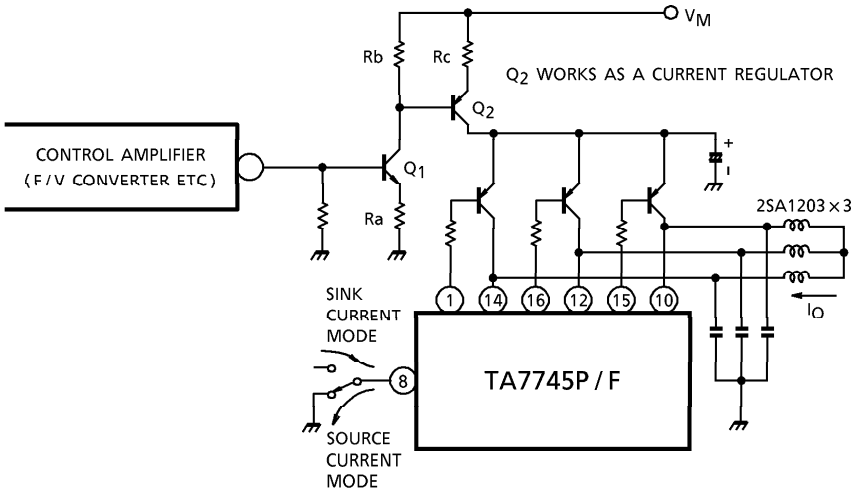


TA7745F



APPLICATION CIRCUIT 1

(3 phase Bi-Pola drive)



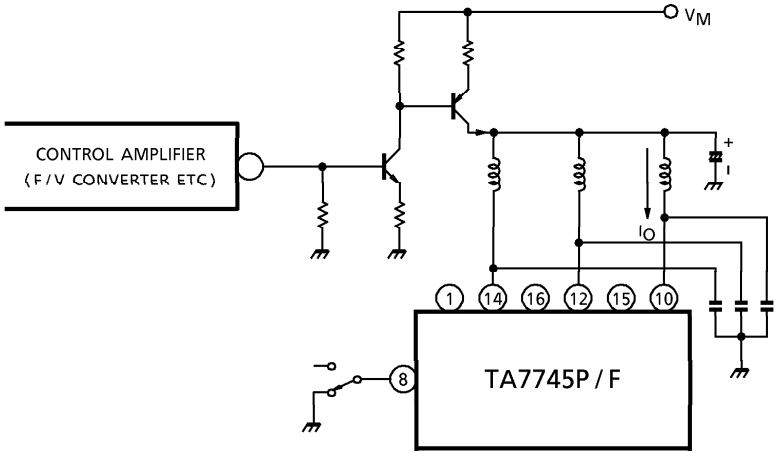
$$I_O \fallingdotseq \frac{Rb}{Ra\,Rc} \cdot V_{IN} - \frac{1}{Rc}\left(\frac{Rb}{Rc} V_{BE1} + V_{BE2}\right)$$

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

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

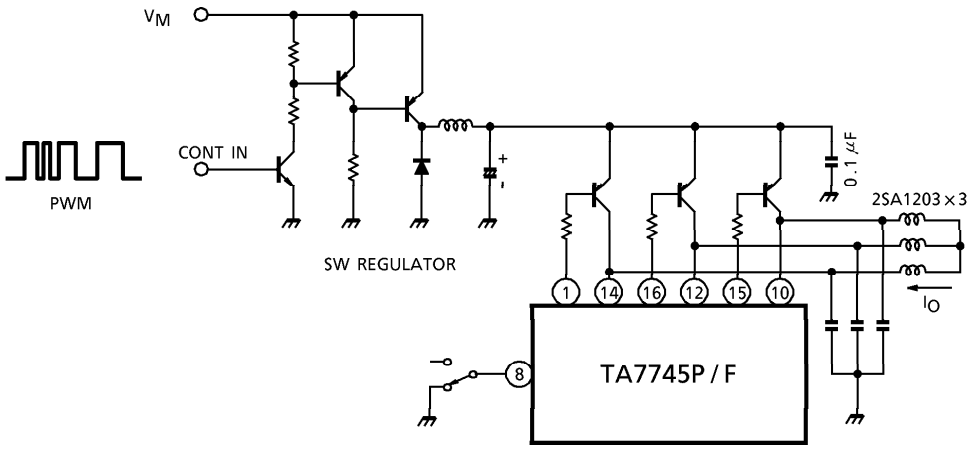
APPLICATION CIRCUIT 2

(3 phase UNI-Pola drive)



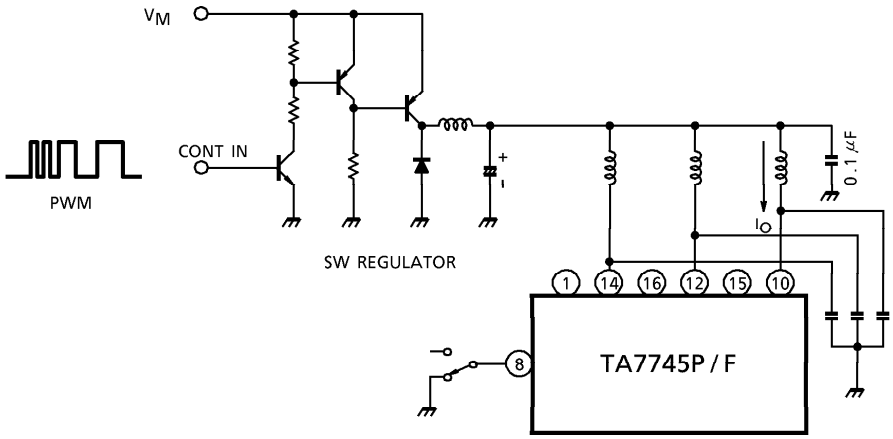
APPLICATION CIRCUIT 3

(High efficiency drive (UNI-Pola))



APPLICATION CIRCUIT 4

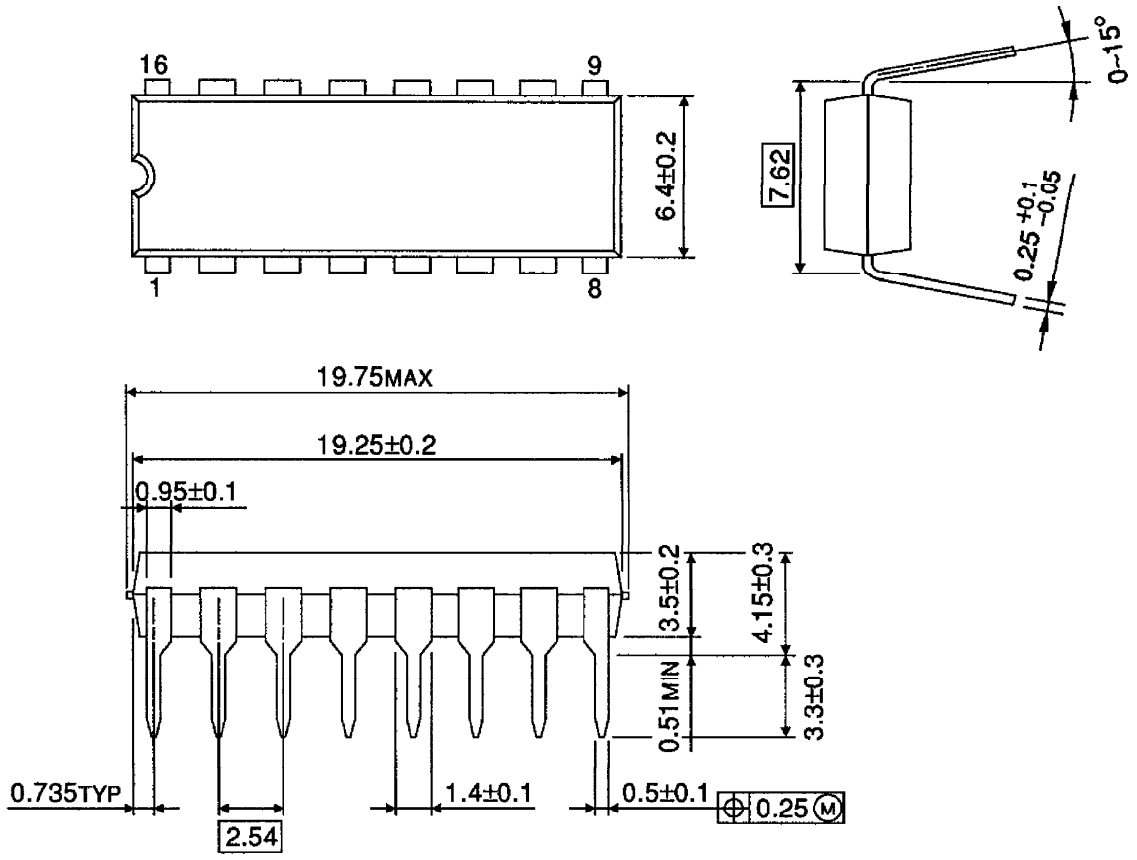
(High efficiency drive (Bi-Pola))



OUTLINE DRAWING

DIP16-P-300-2.54A

Unit : mm

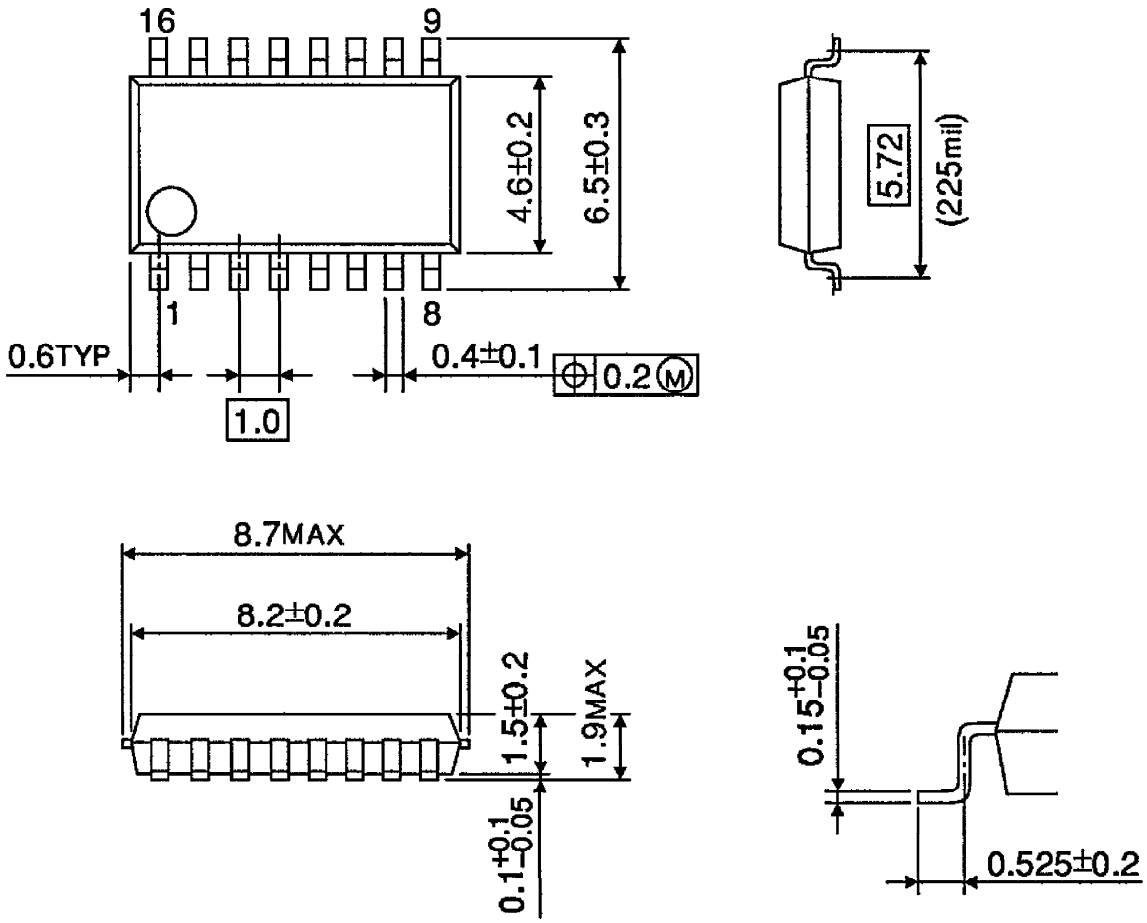


Weight : 1.11g (Typ.)

OUTLINE DRAWING

SSOP16-P-225-1.00A

Unit : mm



Weight : 0.14g (Typ.)