

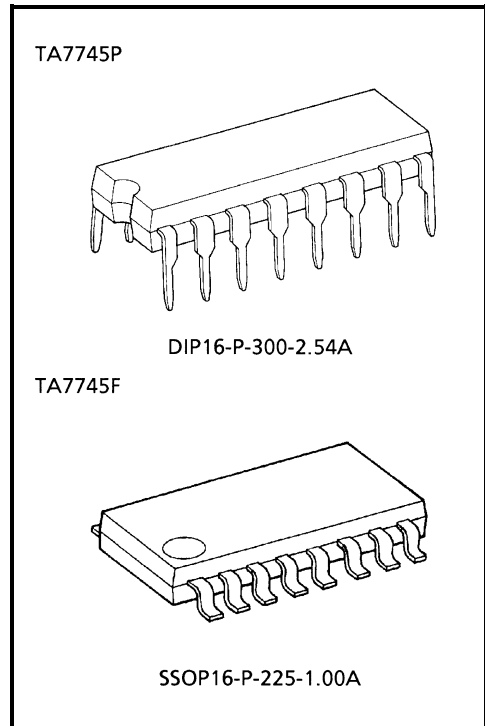
TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

TA7745P, TA7745F

DC MOTOR DRIVER

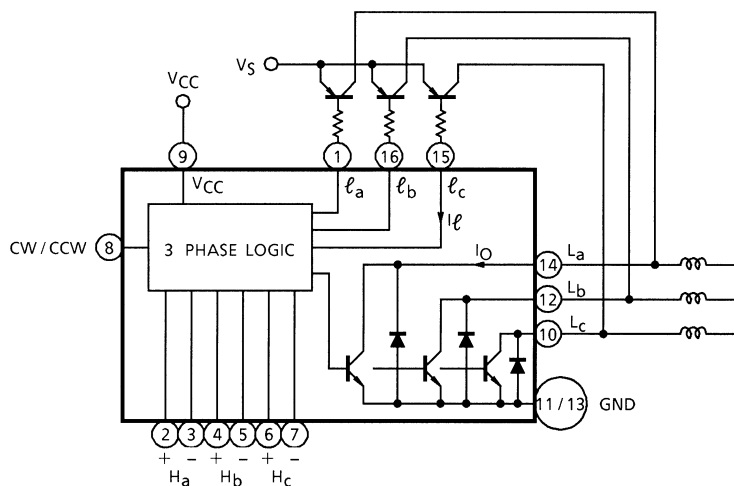
FEATURES

- 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



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PIN FUNCTION

| PIN No. | SYMBOL | FUNCTIONAL DESCRIPTION |
|---------|--------------|---|
| 1 | 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 | I_c | c-phase Pre-drive stage output terminal |
| 16 | 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 | | | |

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- The information contained herein is subject to change without notice.

MAXIMUM RATINGS (Ta = 25°C)

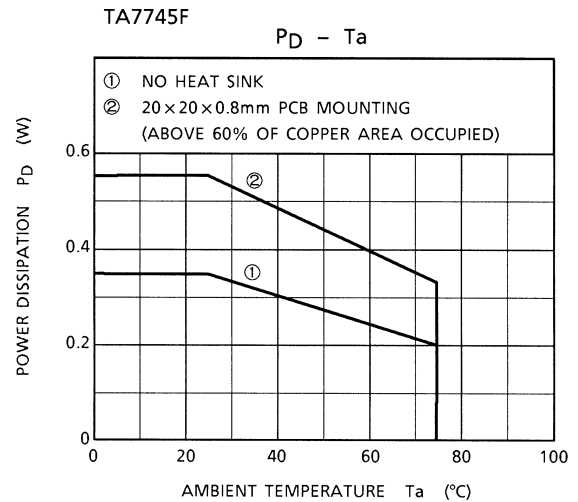
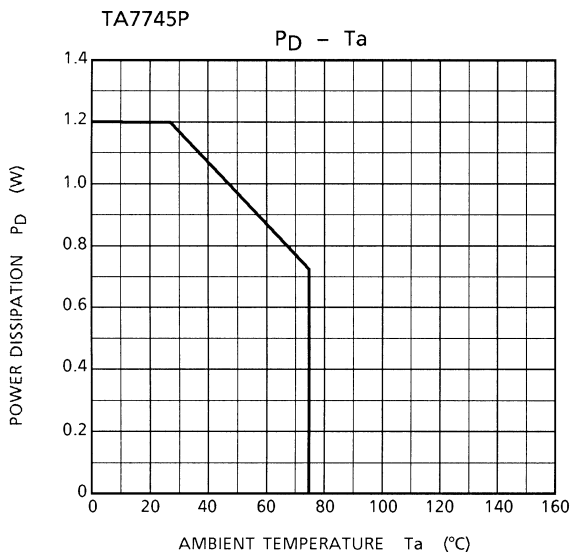
| CHARACTERISTIC | | SYMBOL | RATING | UNIT |
|-----------------------|---------|------------------|------------|------|
| Supply Voltage | | V _{CC} | 18 | V |
| | | V _S | 18 | V |
| Output Current | | I _O | 1.0 | A |
| | | I _t | 20.0 | mA |
| Power Dissipation | TA7745P | P _D | 350 | mW |
| | | | 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.

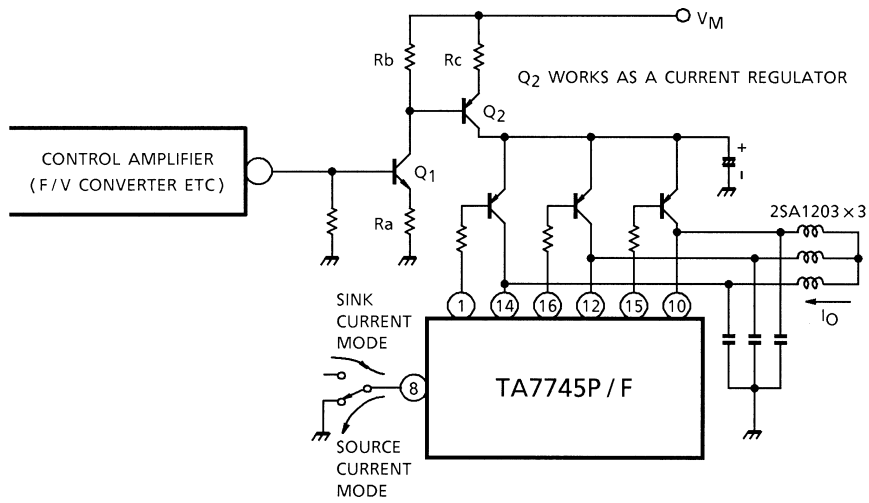
ELECTRICAL CHARACTERISTICS (Unless otherwise specified, Ta = 25°C)

| 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.



APPLICATION CIRCUIT 1
(3 phase Bi-Pola drive)

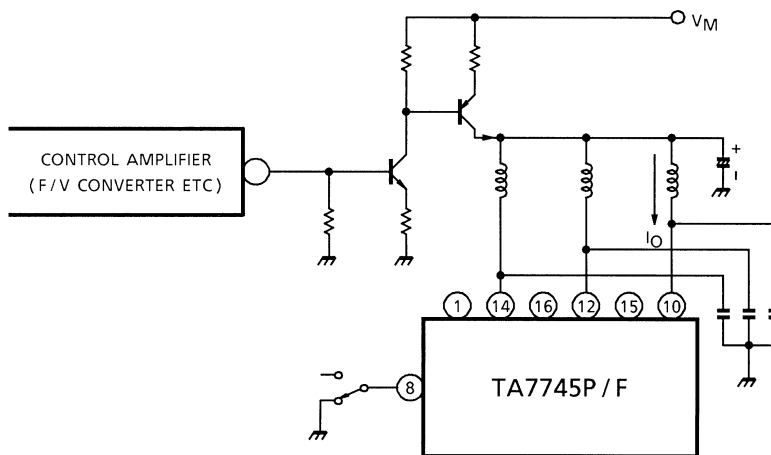


$$I_o \approx \frac{R_b}{R_a R_c} V_{IN} - \frac{1}{R_c} \left(\frac{R_b}{R_c} V_{BE1} + V_{BE2} \right)$$

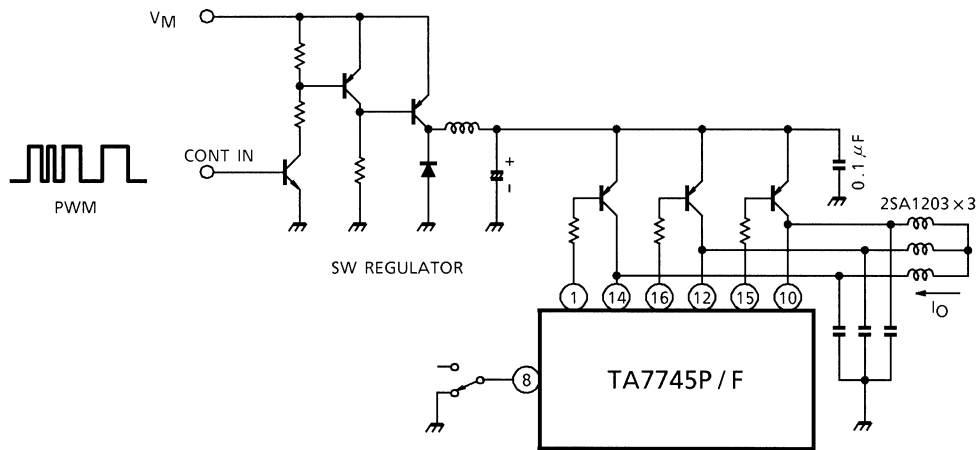
$$\approx (K_1 \cdot V_{IN}) + K_2$$

(K₁, K₂ = CONSTANT)

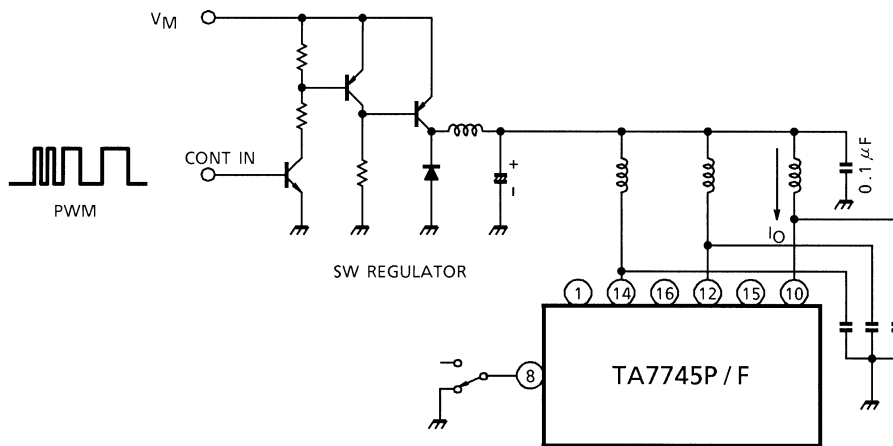
APPLICATION CIRCUIT 2
(3 phase UNI-Pola drive)



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



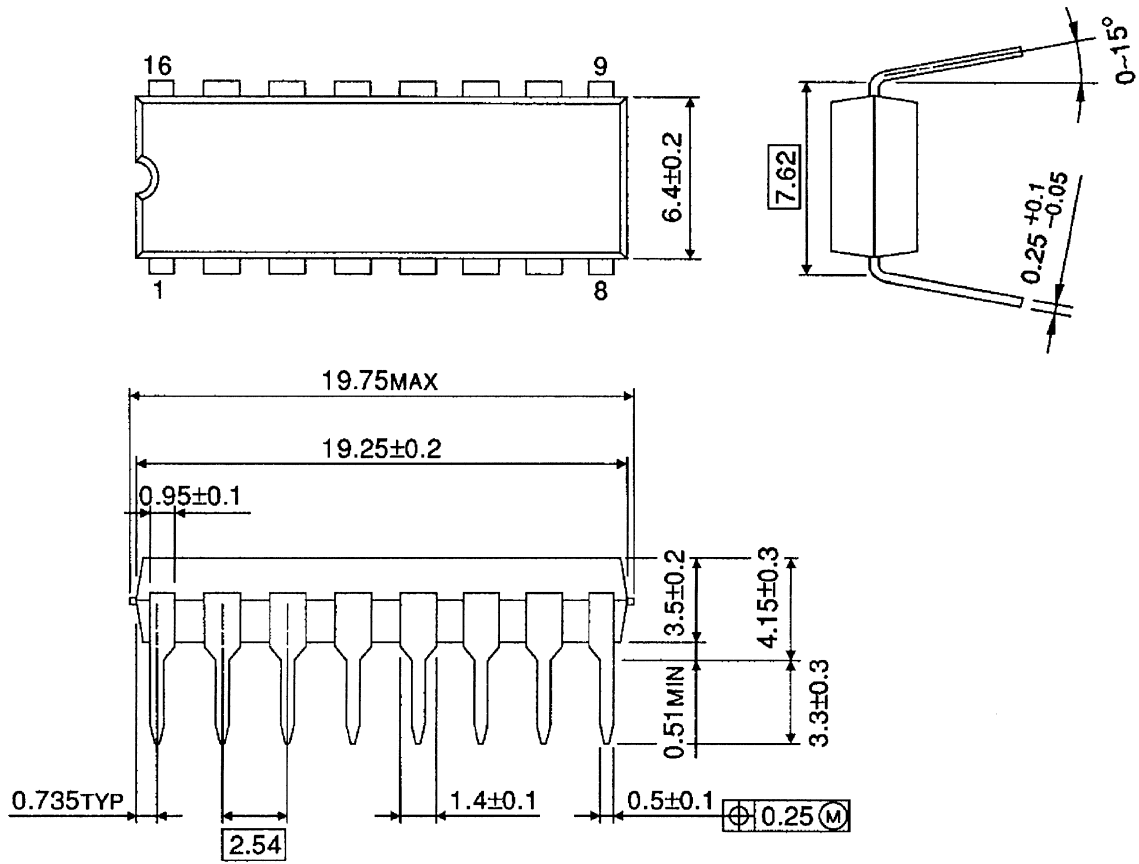
APPLICATION CIRCUIT 4
(High efficiency drive (Bi-Pola))



OUTLINE DRAWING

DIP16-P-300-2.54A

Unit: mm

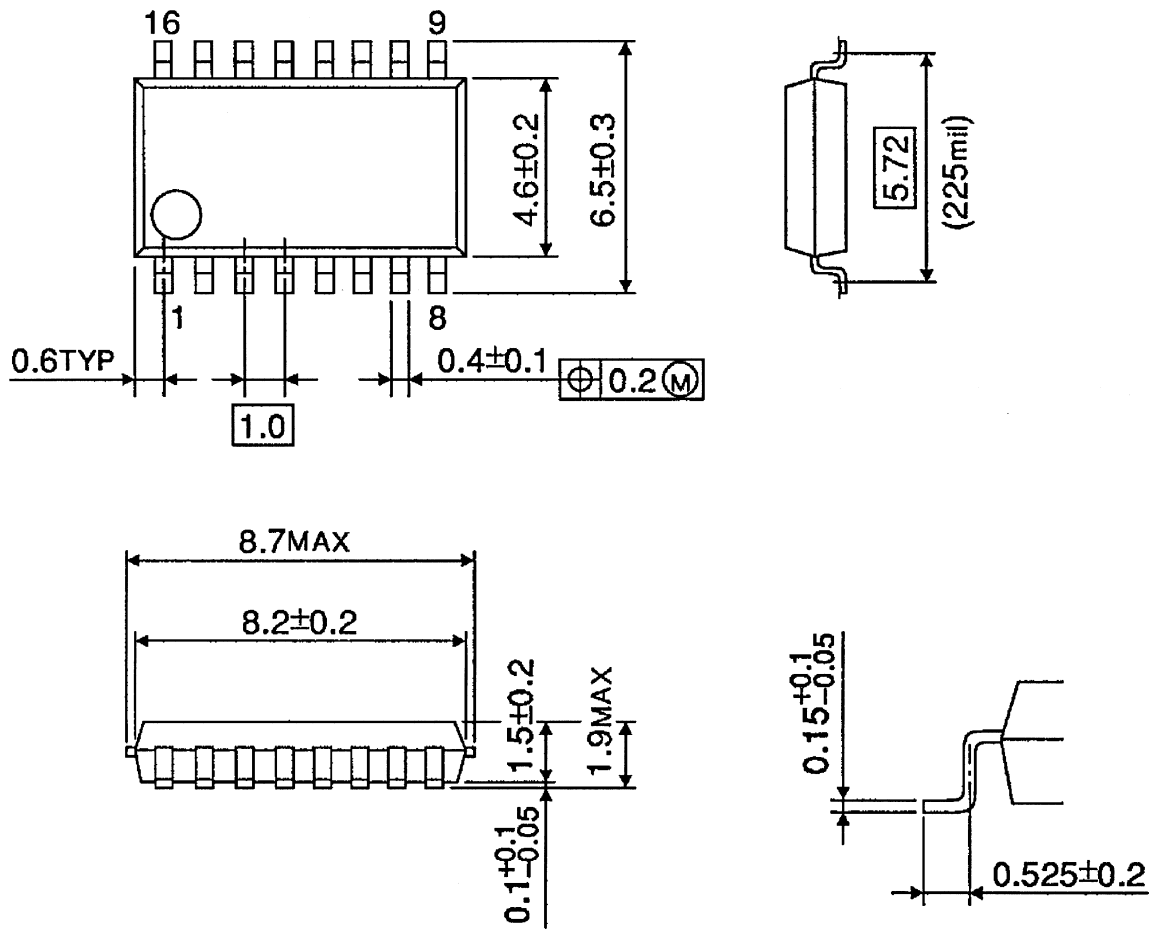


Weight: 1.11 g (Typ.)

OUTLINE DRAWING

SSOP16-P-225-1.00A

Unit: mm



Weight: 0.14 g (Typ.)