

BIPOLAR ANALOG INTEGRATED CIRCUIT

μ PC1246C

PREDRIVER FOR 3-PHASES DC BRUSHLESS MOTOR

DESCRIPTION

The μ PC1246C is silicon monolithic integrated circuit developed for predriver for 3 phases DC brushless motor.

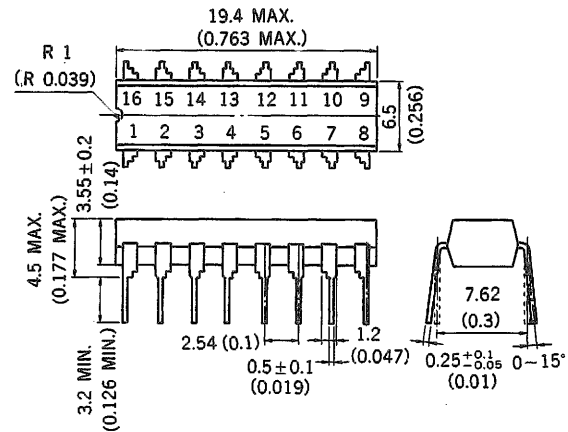
It includes comparators, current switch, rotatory direction switch and drivers in 1 chip. It inputs from hall elements.

FEATURES

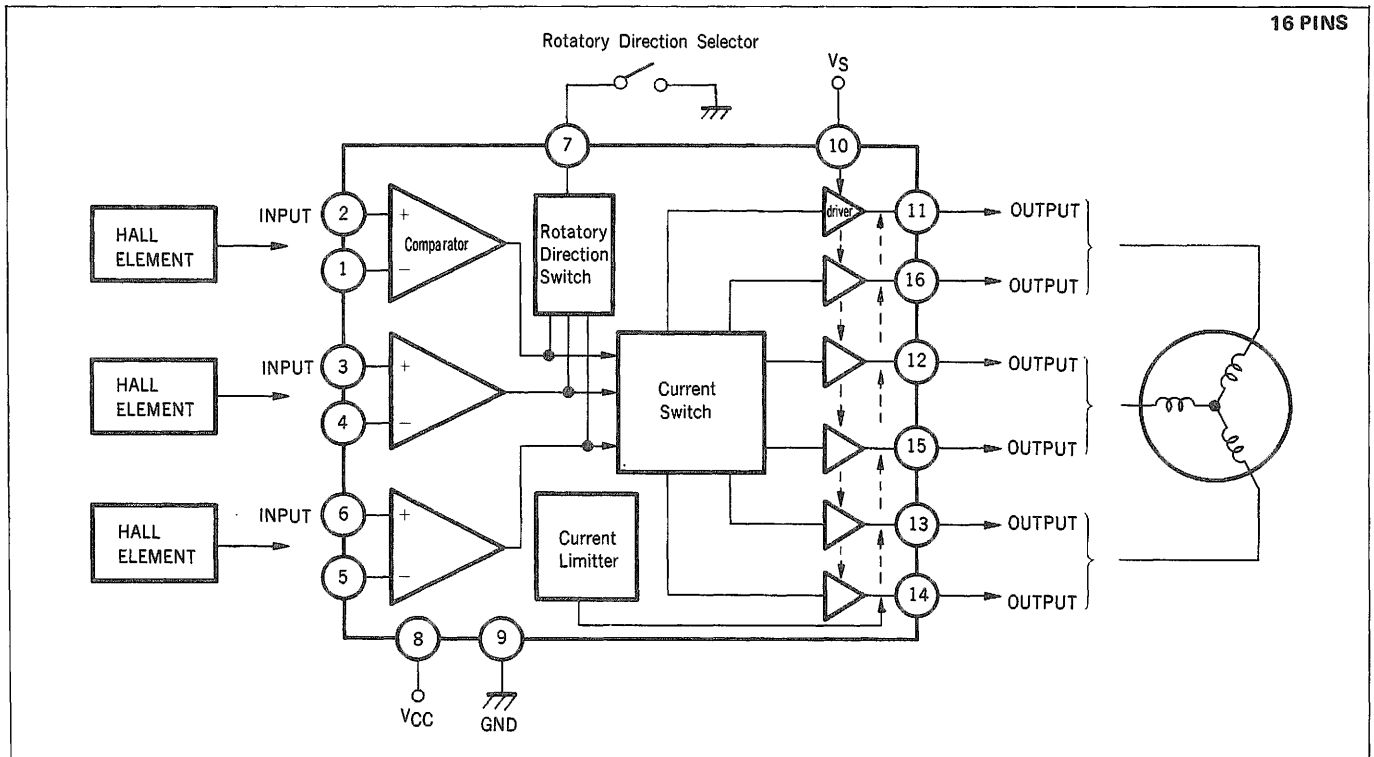
- Current switch.
- Forward/Reverse function.
- Small input/output phase error. $-5 \sim 5$ deg.
- Low current consumption. $I_{CC} = 4.5$ mA TYP.

PACKAGE DIMENSIONS

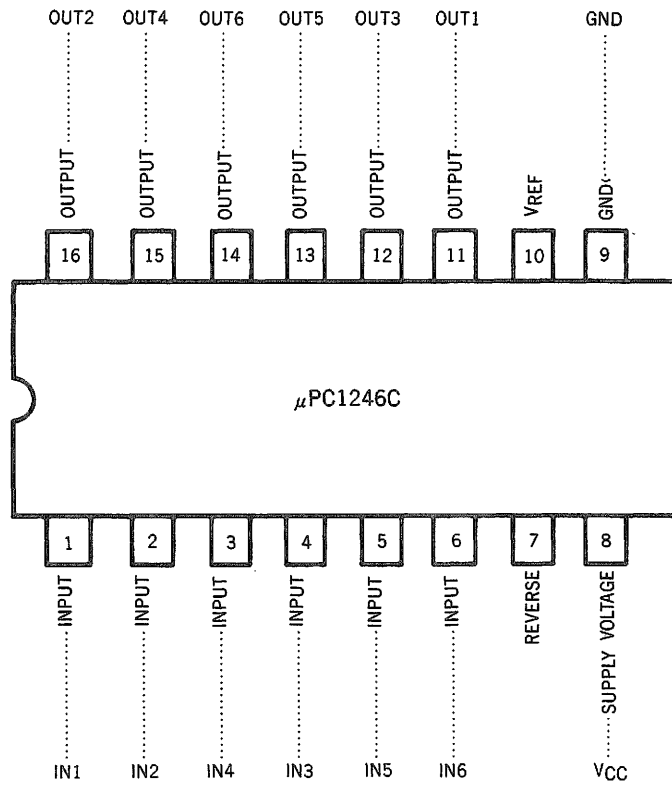
in millimeters (inches)



BLOCK DIAGRAM



CONNECTION DIAGRAM (Top View)



ABSOLUTE MAXIMUM RATINGS (Ta = 25 °C)

| | | | |
|--------------------------------------|---------------------------|------------------------|----|
| Supply Voltage | V _{CC} | 18 | V |
| Input Voltage to Differential Amp. | V _{ID} | 5 | V |
| Common Mode Input Voltage | V _{ICM} | 0.3 to V _{CC} | V |
| Terminal Voltage to V _{REF} | V _{REF} | 0 to V _{CC} | V |
| Reverse Terminal Voltage | V _{REV} | 0 to V _{CC} | V |
| Power Dissipation | P _D Ta = 70 °C | 390 | mW |
| Operating Temperature | T _{opt} | -10 to 70 | °C |
| Storage Temperature | T _{stg} | -55 to 125 | °C |

RECOMMENDED OPERATING CONDITIONS

| CHARACTERISTIC | SYMBOL | MIN. | TYP. | MAX. | UNIT |
|--------------------------------|--------------------------------|--|------|----------------------|------|
| Supply Voltage | V _{CC} | 9 | 12 | 15 | V |
| Common Mode Input Voltage | V _{ICM} | 1.5 | | V _{CC} -1.5 | V |
| V _S -Output Current | V _S -I _O | Ref. Fig. 1 ~ 3 Within Area of Oblique Lines | | | |

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

| CHARACTERISTIC | SYMBOL | MIN. | TYP. | MAX. | UNIT | CONDITIONS |
|-----------------------------------|------------------|------|------|------|------|--|
| Circuit Current | I _{CC} | 2 | 4.5 | 7.5 | mA | V _{REF} = 0 |
| Input/Output Characteristics | | -5 | 0 | 5 | deg | |
| Input Offset Voltage | V _{OFF} | -4.2 | 0 | 4.2 | mV | V _{ICM} = 1.5 to 10.5 V |
| Input Bias Current | I _B | - | 50 | 600 | nA | V _{ICM} = 6 V |
| Propagation Delay Time | T _{pd} | - | 3 | - | μs | V _I = 5 mV, V _{REF} = 10 V, V _O = 9 V |
| Output Voltage H (11, 12, 13 PIN) | V _{OH} | 8.9 | 9.3 | 9.6 | V | V _{REF} = 10 V, R _L = 470 Ω |
| Output Voltage L (14, 15, 16 PIN) | V _{OL} | 8.2 | 8.6 | 9.0 | V | V _{REF} = 8 V, R _L = 470 Ω |
| Output Leak Current | I _S | - | - | 5 | μA | Ref. PAGE 6, 8 |

Fig. 1 OUTPUT CURRENT vs. SERVO VOLTAGE

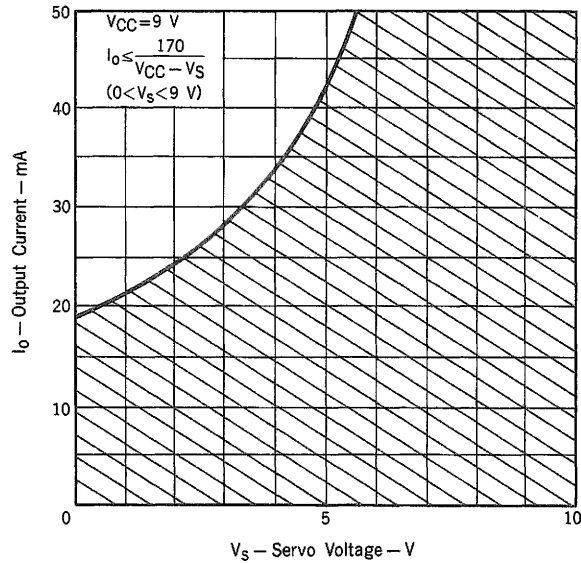


Fig. 2 OUTPUT CURRENT vs. SERVO VOLTAGE

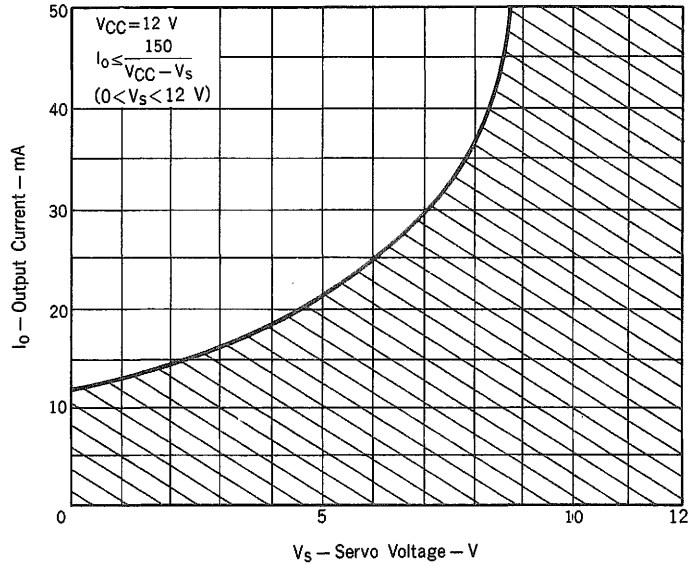
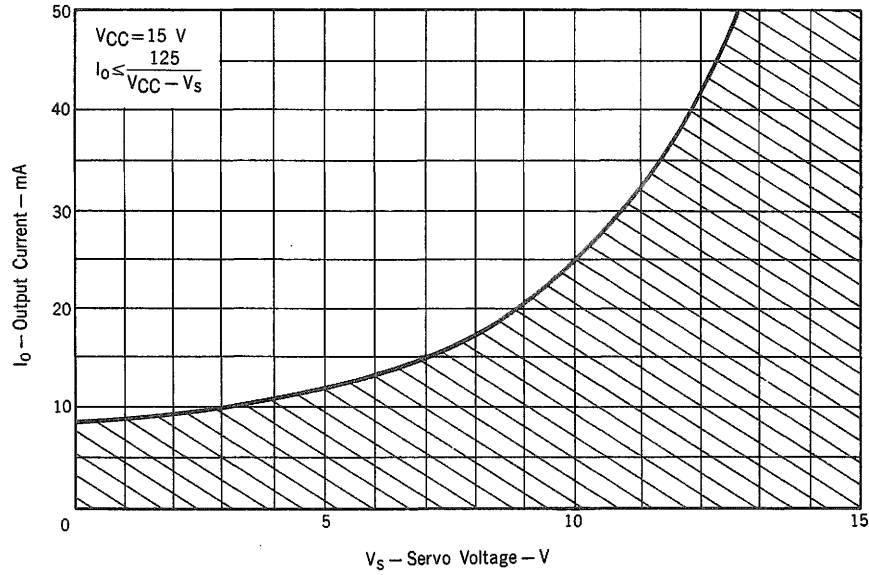
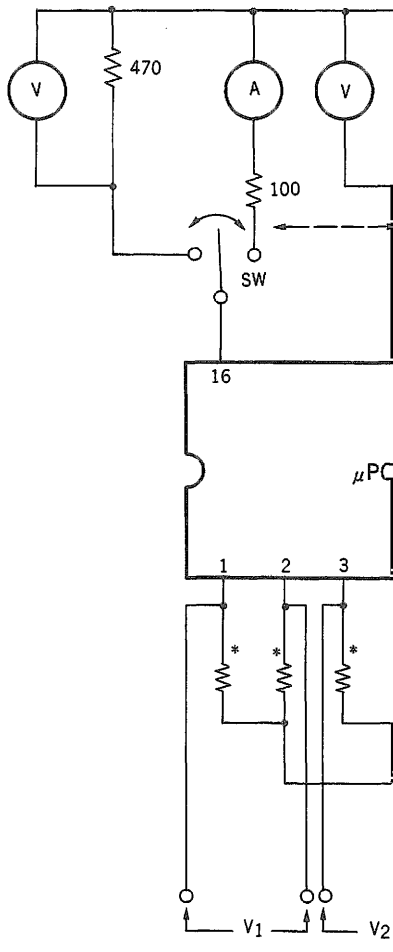


Fig. 3 OUTPUT CURRENT vs. SERVO VOLTAGE



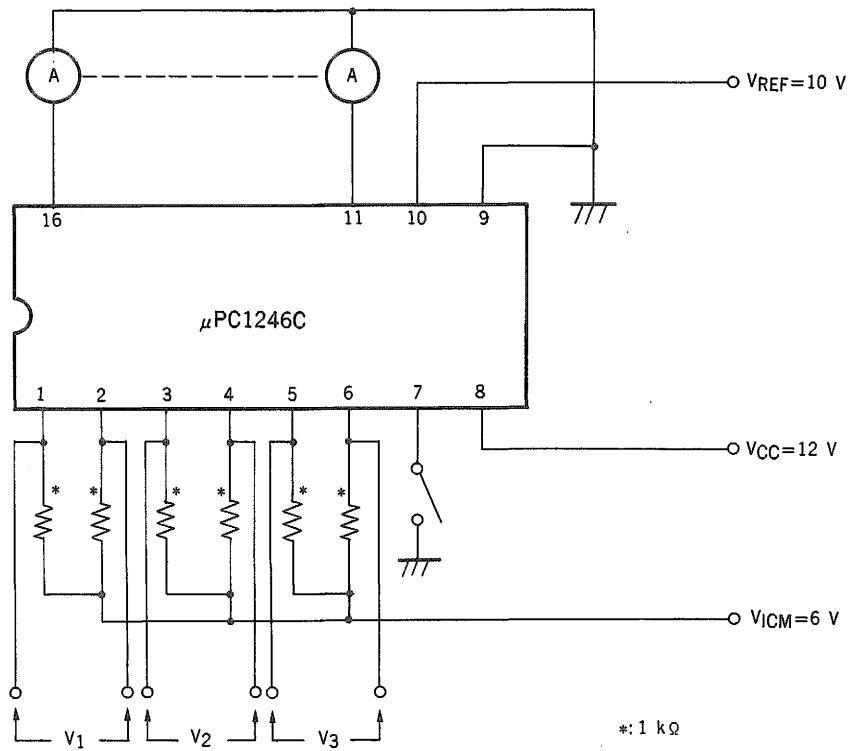
TEST CIRCUIT 1

- INPUT/OUTPUT CHARACTERISTIC
- PROPAGATION DELAY TIME



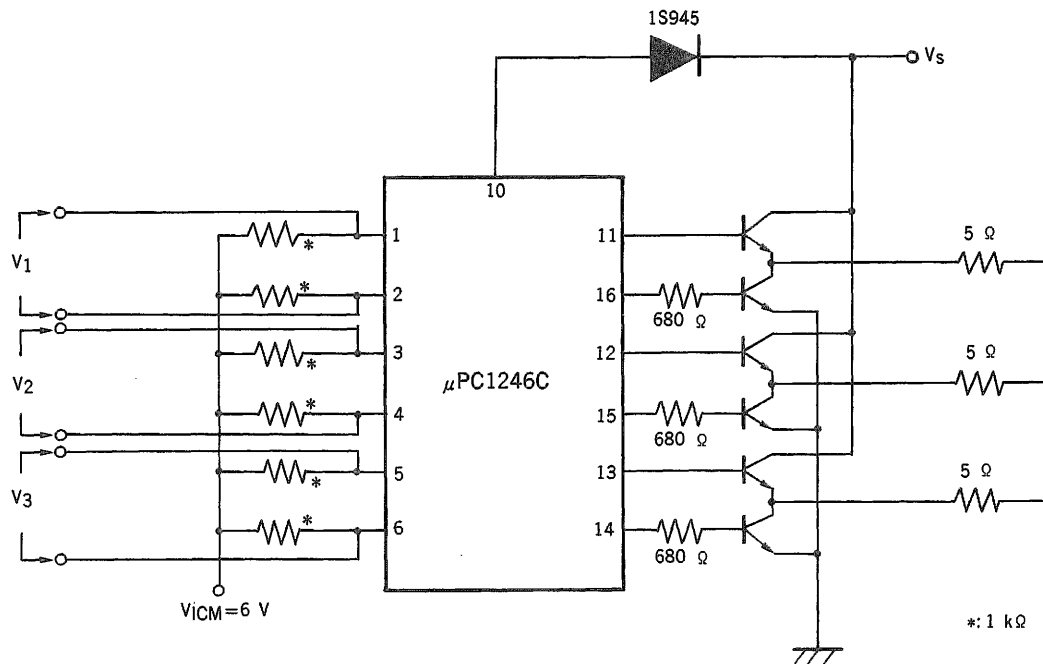
TEST CIRCUIT 2

- OUTPUT LEAKAGE CURRENT I_s

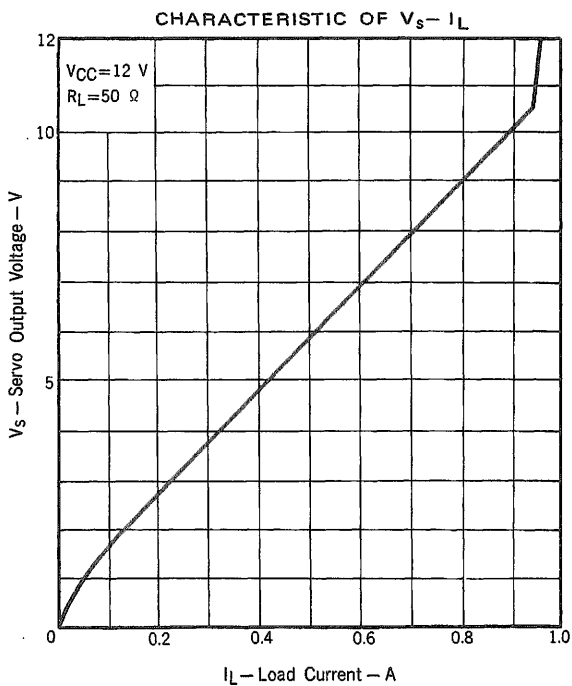


TEST CIRCUIT 3

- CHARACTERISTIC OF SERVO VOLTAGE (V_s) – LOAD CURRENT (I_L)



Input Condition is as same as TABLE 1. (See PAGE8)



INPUT CONDITION FOR MEASUREMENT

● INPUT/OUTPUT CHARACTERISTIC

| TABLE 1 | | IN CASE OF 7 PIN OPEN | | | IN CASE OF 7 PIN SHORT | | |
|-------------------------|-----------------|-----------------------|----------------|----------------|------------------------|----------------|----------------|
| TERMINAL OF MEASUREMENT | INPUT CONDITION | V ₁ | V ₂ | V ₃ | V ₁ | V ₂ | V ₃ |
| 11 | | V _L | V _H | / | V _H | V _L | / |
| 12 | | / | V _L | V _H | / | V _H | V _L |
| 13 | | V _H | / | V _L | V _L | / | V _H |
| 14 | | V _L | / | V _H | V _H | / | V _L |
| 15 | | / | V _H | V _L | / | V _L | V _H |
| 16 | | V _H | V _L | / | V _L | V _H | / |

INPUT LEVEL

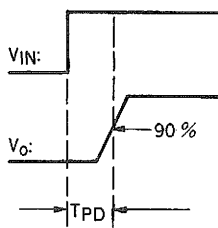
$5\text{ mV} \leq V_H \leq 50\text{ mV}$ OR $-50\text{ mV} \leq V_L \leq 5\text{ mV}$

● PROPAGATION DELAY TIME

| TABLE 2 | | IN CASE OF 7 PIN OPEN | | | IN CASE OF 7 PIN SHORT | | |
|-------------------------|-----------------|-----------------------|-----------------|-----------------|------------------------|-----------------|-----------------|
| TERMINAL OF MEASUREMENT | INPUT CONDITION | V ₁ | V ₂ | V ₃ | V ₁ | V ₂ | V ₃ |
| 11 | | V _{IN} | V _L | / | V _L | V _{IN} | / |
| 12 | | / | V _{IN} | V _L | / | V _L | V _{IN} |
| 13 | | V _L | / | V _{IN} | V _{IN} | / | V _L |
| 14 | | V _{IN} | / | V _L | V _L | / | V _{IN} |
| 15 | | / | V _L | V _{IN} | / | V _{IN} | V _L |
| 16 | | V _L | V _{IN} | / | V _{IN} | V _L | / |

INPUT LEVEL

$V_{IN} = 5\text{ mV}$, $f \leq 10\text{ kHz}$, Duty 50 % PULSE WAVE $-50\text{ mV} \leq V_L < -5\text{ mV}$



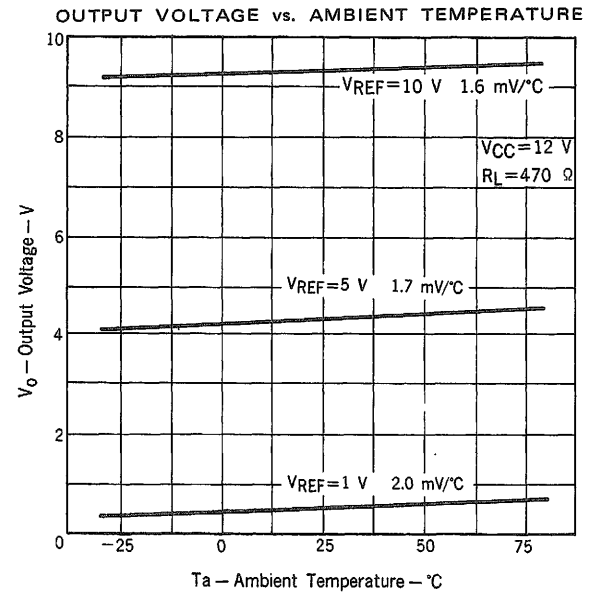
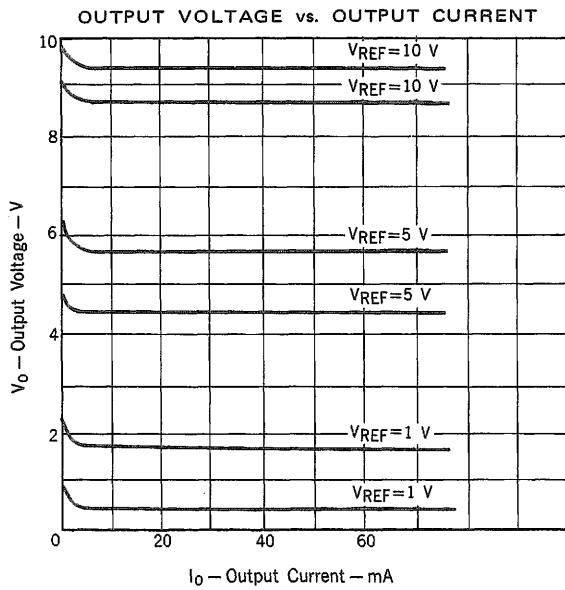
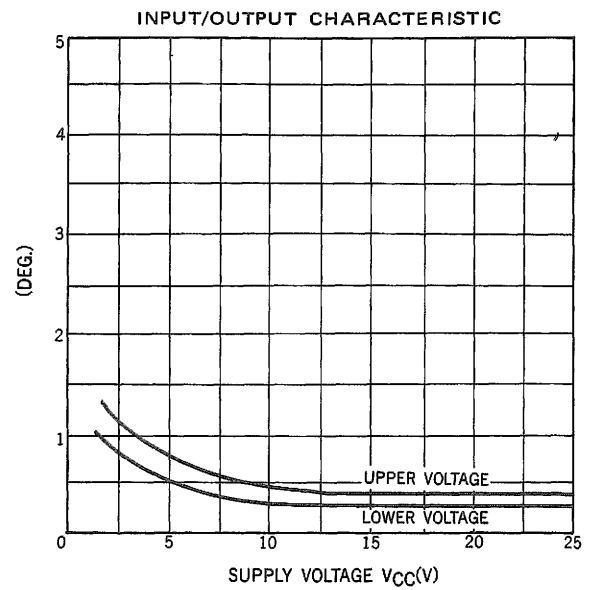
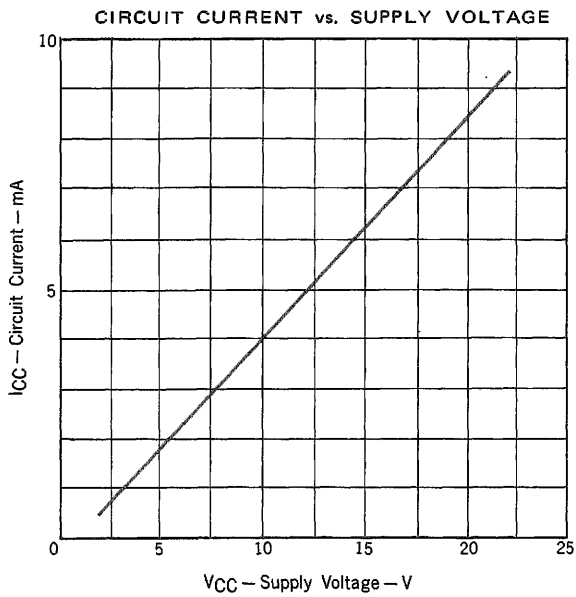
● OUTPUT LEAKAGE CURRENT I_S

INPUT CONDITION FOR MEASUREMENT

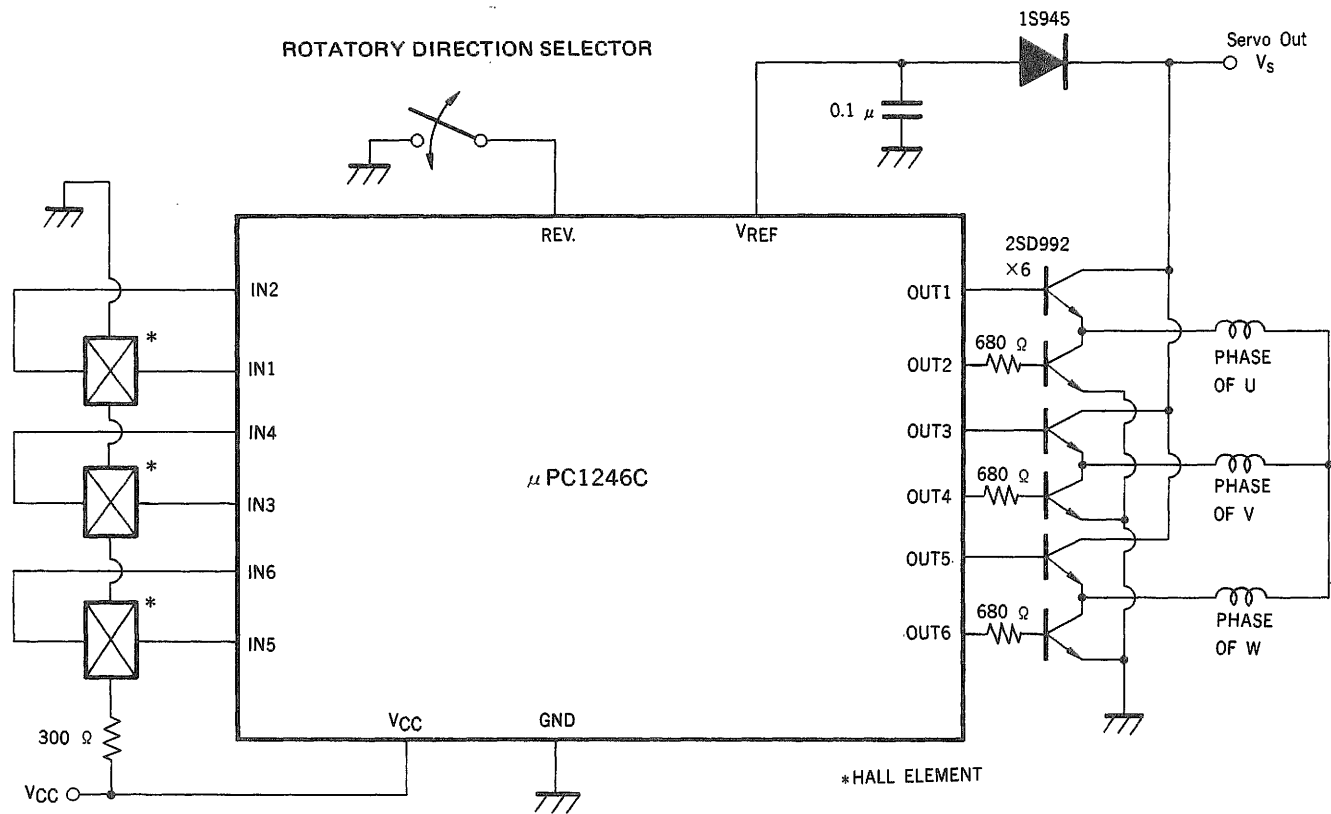
| TABLE 3 | | IN CASE OF 7 PIN OPEN | | | IN CASE OF 7 PIN SHORT | | |
|-------------------------|-----------------|-----------------------|----------------|----------------|------------------------|----------------|----------------|
| TERMINAL OF MEASUREMENT | INPUT CONDITION | V ₁ | V ₂ | V ₃ | V ₁ | V ₂ | V ₃ |
| 11 | | V _H | V _L | / | V _L | V _H | / |
| 12 | | / | V _H | V _L | / | V _L | V _H |
| 13 | | V _L | / | V _H | V _H | / | V _L |
| 14 | | V _H | / | V _L | V _L | / | V _H |
| 15 | | / | V _L | V _H | / | V _H | V _L |
| 16 | | V _L | V _H | / | V _H | V _L | / |

INPUT LEVEL

$-50\text{ mV} \leq V_L \leq -5\text{ mV}$, $5\text{ mV} \leq V_H \leq 50\text{ mV}$



APPLICATION



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