

**PREDRIVER FOR 3-PHASES DC BRUSHLESS MOTOR**

**DESCRIPTION**

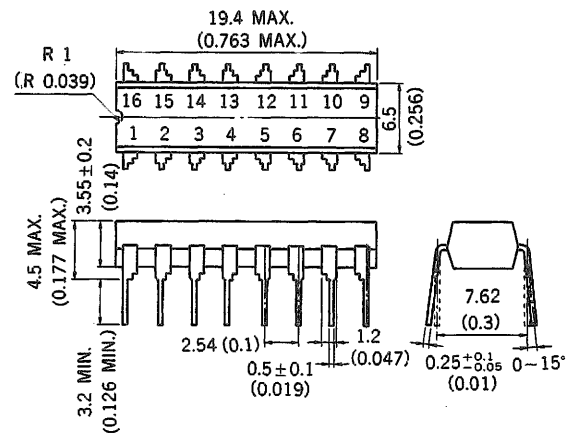
The  $\mu$ PC1246C is silicon monolithic integrated circuit developed for predriver for 3 phases DC brushless motor.

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

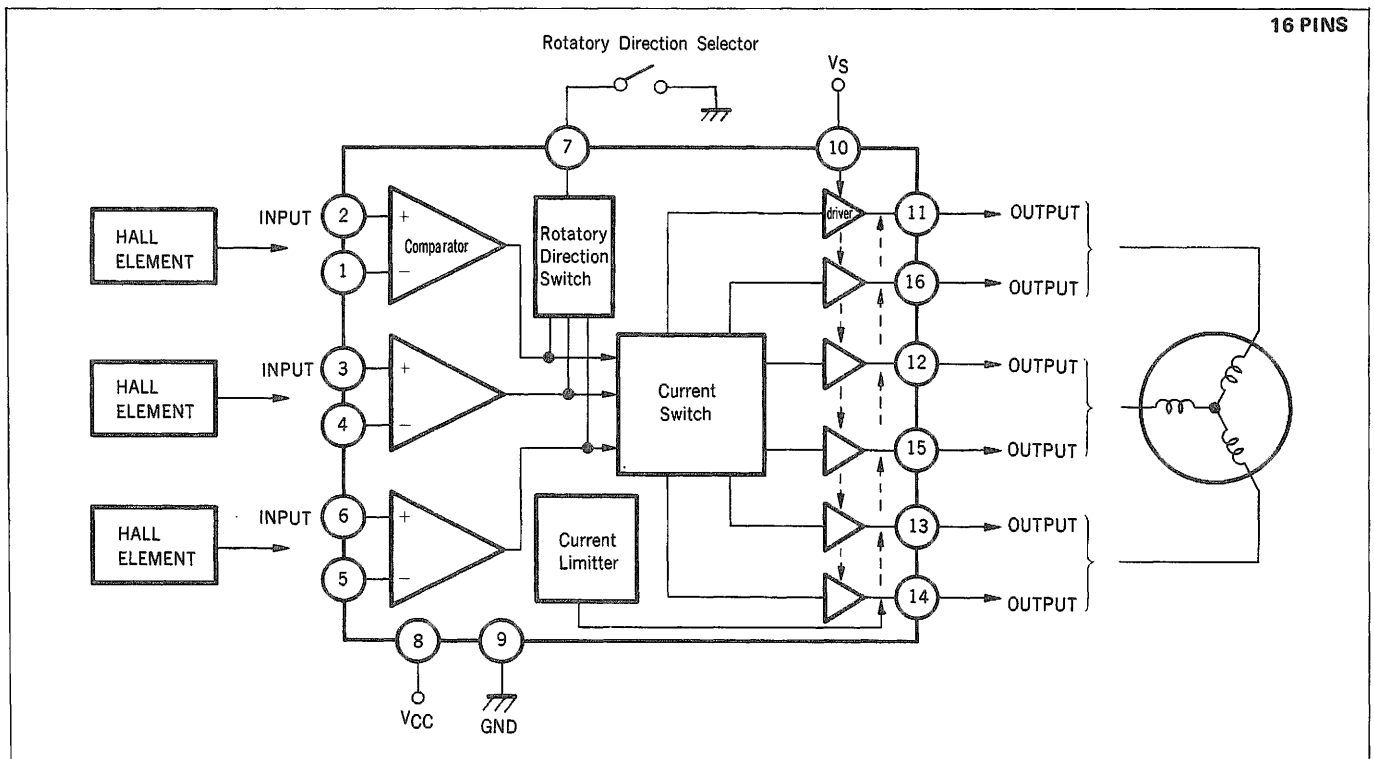
**FEATURES**

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

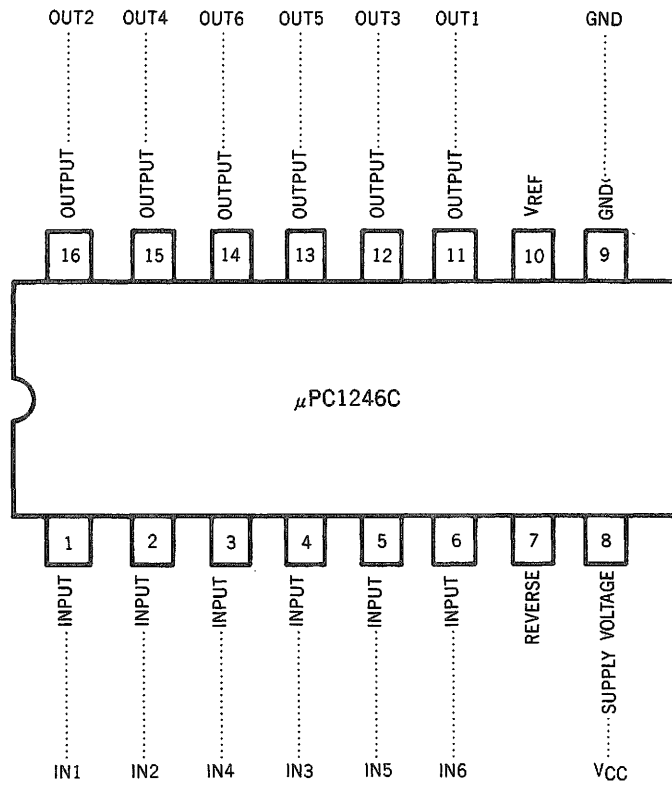
**PACKAGE DIMENSIONS**  
in millimeters (inches)



**BLOCK DIAGRAM**



CONNECTION DIAGRAM (Top View)



ABSOLUTE MAXIMUM RATINGS (Ta = 25 °C)

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

RECOMMENDED OPERATING CONDITIONS

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply Voltage	V <sub>CC</sub>	9	12	15	V
Common Mode Input Voltage	V <sub>ICM</sub>	1.5		V <sub>CC</sub> -1.5	V
V <sub>S</sub> -Output Current	V <sub>S</sub> -I <sub>O</sub>	Ref. Fig. 1 ~ 3 Within Area of Oblique Lines			

ELECTRICAL CHARACTERISTICS (T<sub>a</sub> = 25 °C, V<sub>CC</sub> = 12 V)

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

Fig. 1 OUTPUT CURRENT vs. SERVO VOLTAGE

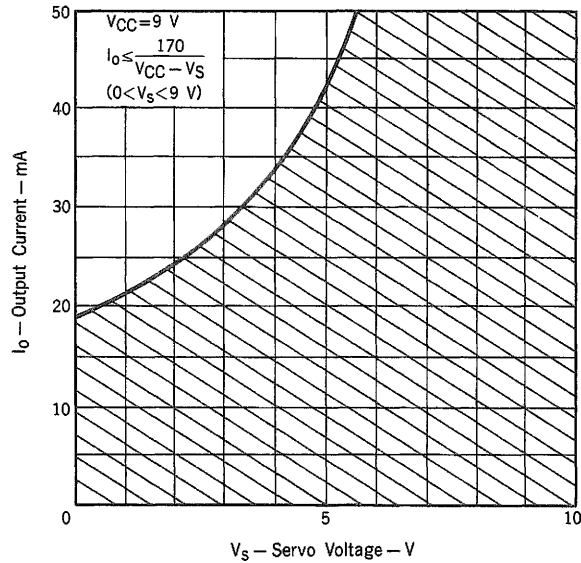


Fig. 2 OUTPUT CURRENT vs. SERVO VOLTAGE

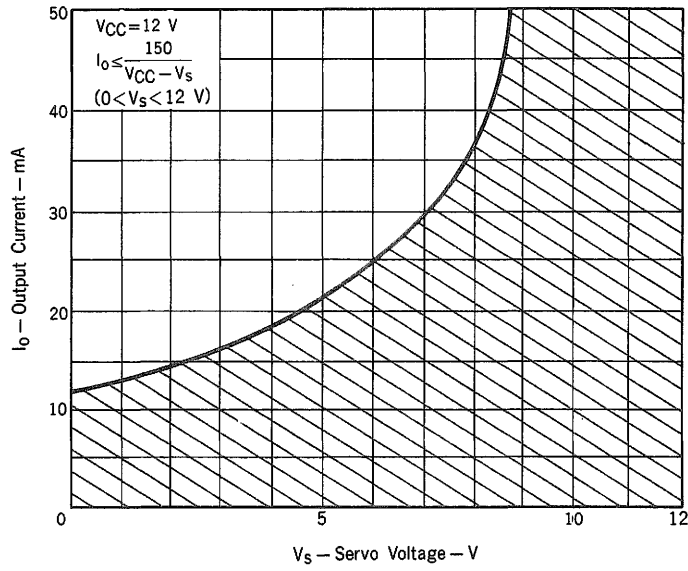
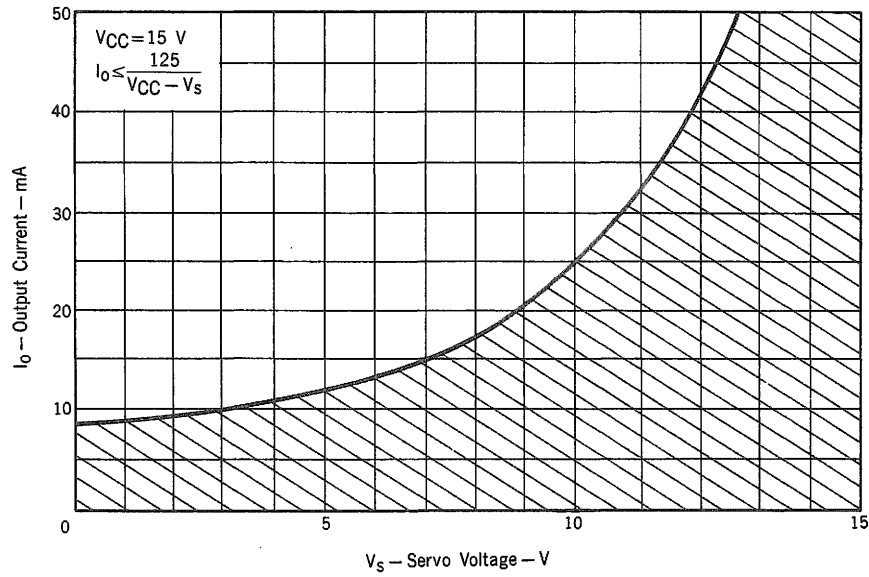
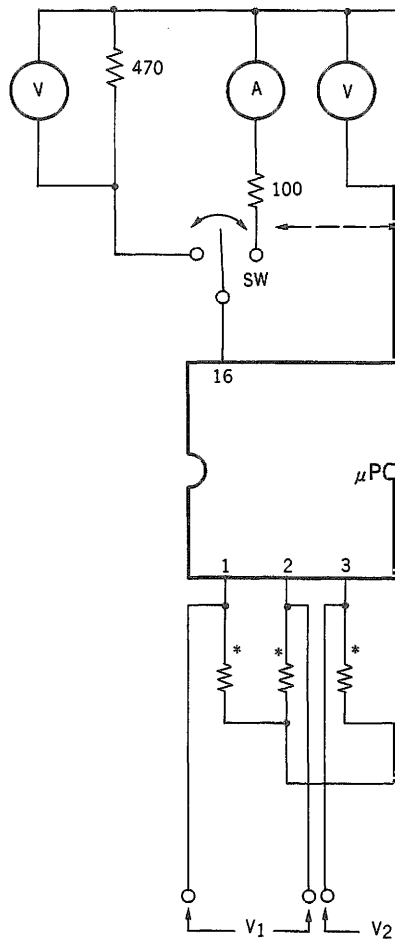


Fig. 3 OUTPUT CURRENT vs. SERVO VOLTAGE



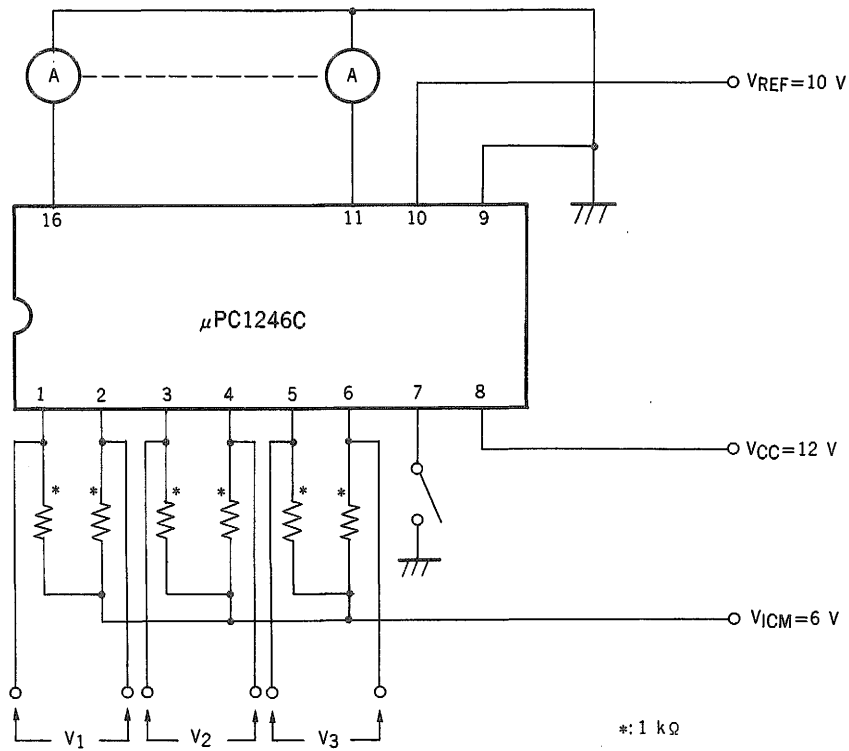
### TEST CIRCUIT 1

- INPUT/OUTPUT CHARACTERISTIC
- PROPAGATION DELAY TIME



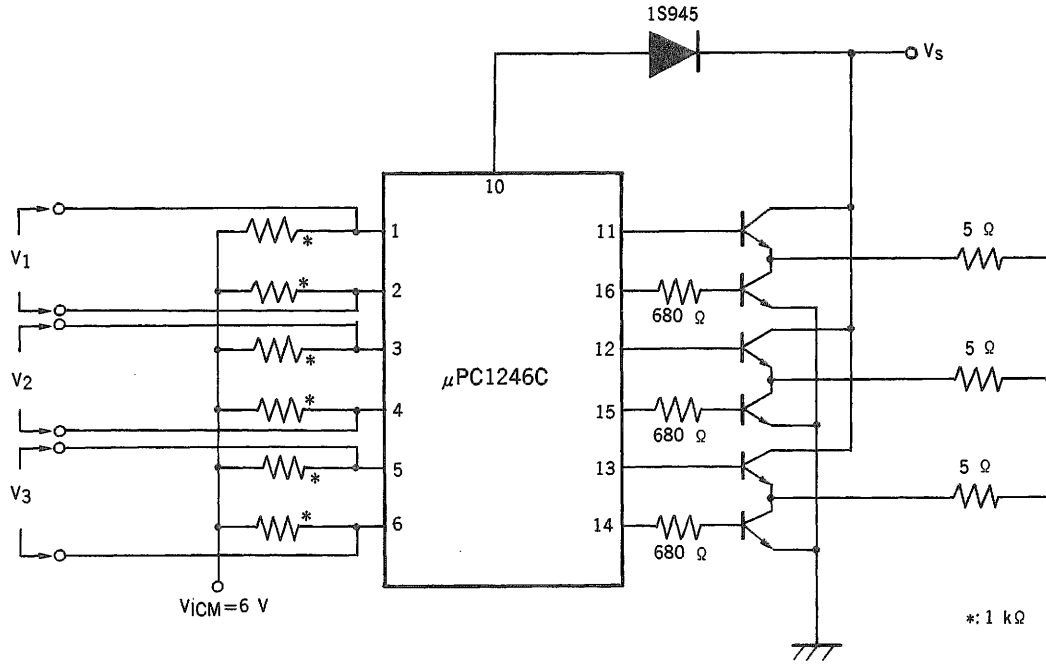
TEST CIRCUIT 2

- OUTPUT LEAKAGE CURRENT  $I_s$

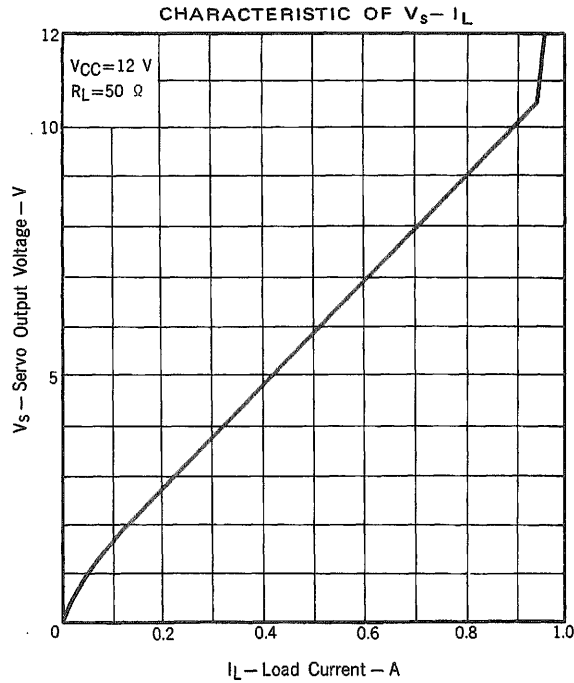


### TEST CIRCUIT 3

- 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 <sub>1</sub>	V <sub>2</sub>	V <sub>3</sub>	V <sub>1</sub>	V <sub>2</sub>	V <sub>3</sub>
11		V <sub>L</sub>	V <sub>H</sub>	/	V <sub>H</sub>	V <sub>L</sub>	/
12		/	V <sub>L</sub>	V <sub>H</sub>	/	V <sub>H</sub>	V <sub>L</sub>
13		V <sub>H</sub>	/	V <sub>L</sub>	V <sub>L</sub>	/	V <sub>H</sub>
14		V <sub>L</sub>	/	V <sub>H</sub>	V <sub>H</sub>	/	V <sub>L</sub>
15		/	V <sub>H</sub>	V <sub>L</sub>	/	V <sub>L</sub>	V <sub>H</sub>
16		V <sub>H</sub>	V <sub>L</sub>	/	V <sub>L</sub>	V <sub>H</sub>	/

INPUT LEVEL

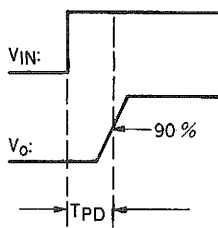
$5\text{ mV} \leq V_H \leq 50\text{ mV}$  OR  $-50\text{ mV} \leq V_L \leq 5\text{ mV}$

● PROPAGATION DELAY TIME

TABLE 2		IN CASE OF 7 PIN OPEN			IN CASE OF 7 PIN SHORT		
TERMINAL OF MEASUREMENT	INPUT CONDITION	V <sub>1</sub>	V <sub>2</sub>	V <sub>3</sub>	V <sub>1</sub>	V <sub>2</sub>	V <sub>3</sub>
11		V <sub>IN</sub>	V <sub>L</sub>	/	V <sub>L</sub>	V <sub>IN</sub>	/
12		/	V <sub>IN</sub>	V <sub>L</sub>	/	V <sub>L</sub>	V <sub>IN</sub>
13		V <sub>L</sub>	/	V <sub>IN</sub>	V <sub>IN</sub>	/	V <sub>L</sub>
14		V <sub>IN</sub>	/	V <sub>L</sub>	V <sub>L</sub>	/	V <sub>IN</sub>
15		/	V <sub>L</sub>	V <sub>IN</sub>	/	V <sub>IN</sub>	V <sub>L</sub>
16		V <sub>L</sub>	V <sub>IN</sub>	/	V <sub>IN</sub>	V <sub>L</sub>	/

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<sub>S</sub>

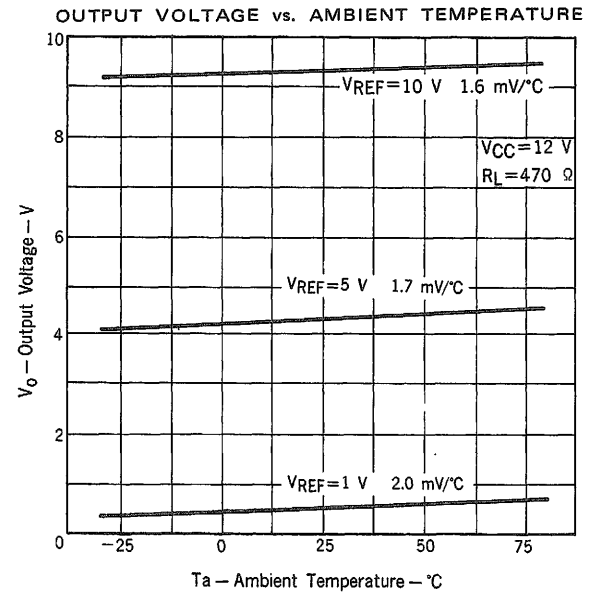
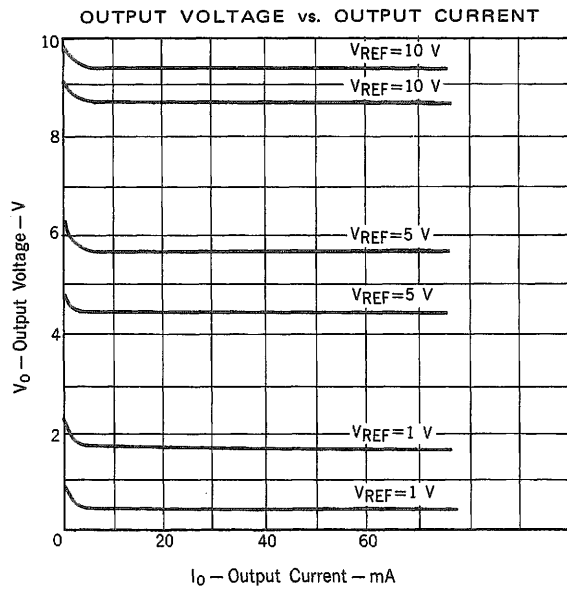
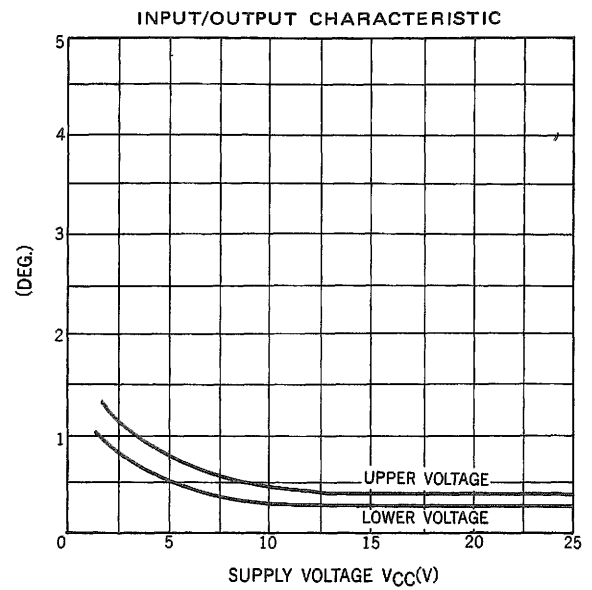
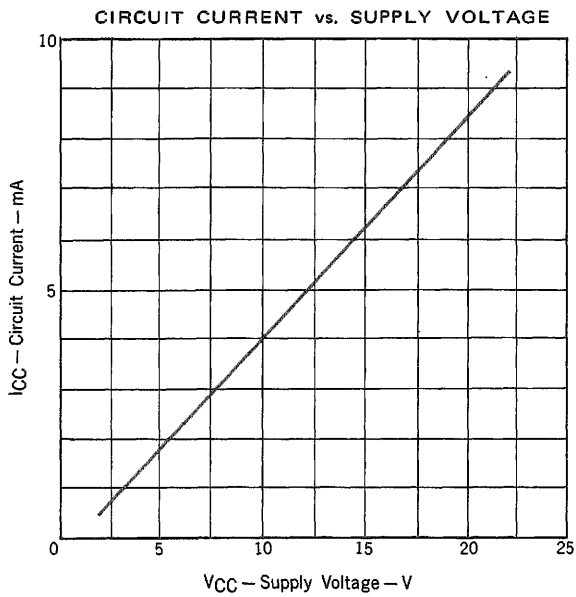
INPUT CONDITION FOR MEASUREMENT

TABLE 3		IN CASE OF 7 PIN OPEN			IN CASE OF 7 PIN SHORT		
TERMINAL OF MEASUREMENT	INPUT CONDITION	V <sub>1</sub>	V <sub>2</sub>	V <sub>3</sub>	V <sub>1</sub>	V <sub>2</sub>	V <sub>3</sub>
11		V <sub>H</sub>	V <sub>L</sub>	/	V <sub>L</sub>	V <sub>H</sub>	/
12		/	V <sub>H</sub>	V <sub>L</sub>	/	V <sub>L</sub>	V <sub>H</sub>
13		V <sub>L</sub>	/	V <sub>H</sub>	V <sub>H</sub>	/	V <sub>L</sub>
14		V <sub>H</sub>	/	V <sub>L</sub>	V <sub>L</sub>	/	V <sub>H</sub>
15		/	V <sub>L</sub>	V <sub>H</sub>	/	V <sub>H</sub>	V <sub>L</sub>
16		V <sub>L</sub>	V <sub>H</sub>	/	V <sub>H</sub>	V <sub>L</sub>	/

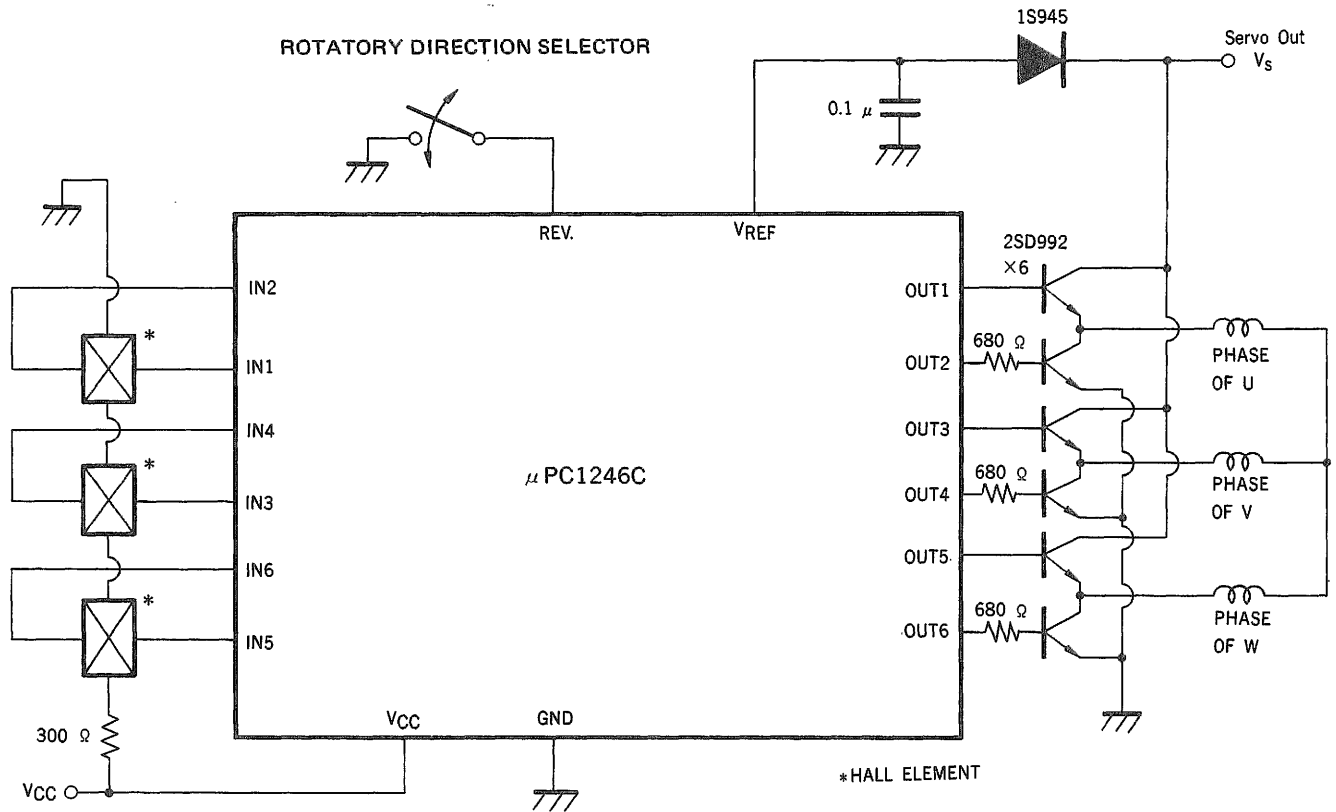
INPUT LEVEL

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





APPLICATION



**Nippon Electric Co., Ltd.**

NEC Building, 33-1, Shiba-Gochome, Minato-ku, Tokyo 108, Japan  
Tel: Tokyo 454 - 1111  
Telex Address: NECTOK J22686  
Cable Address: MICROPHONE TOKYO

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