To our customers,

Old Company Name in Catalogs and Other Documents

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Renesas Electronics website: http://www.renesas.com

April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (http://www.renesas.com)

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RENESAS

BIPOLAR ANALOG INTEGRATED CIRCUIT

μPC1246C

PREDRIVER FOR 3-PHASES DC BRUSHLESS MOTOR

DESCRIPTION

The μPC1246C is silicon monolithic integrated circuit developed for predriver for 3 phases DC brushless motor.

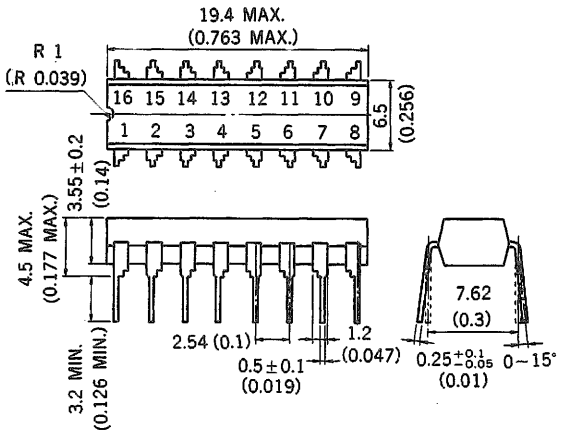
It includes comparators, current switch, rotatory direction switch and drivers in 1 chip. It inputs from hall elements.

FEATURES

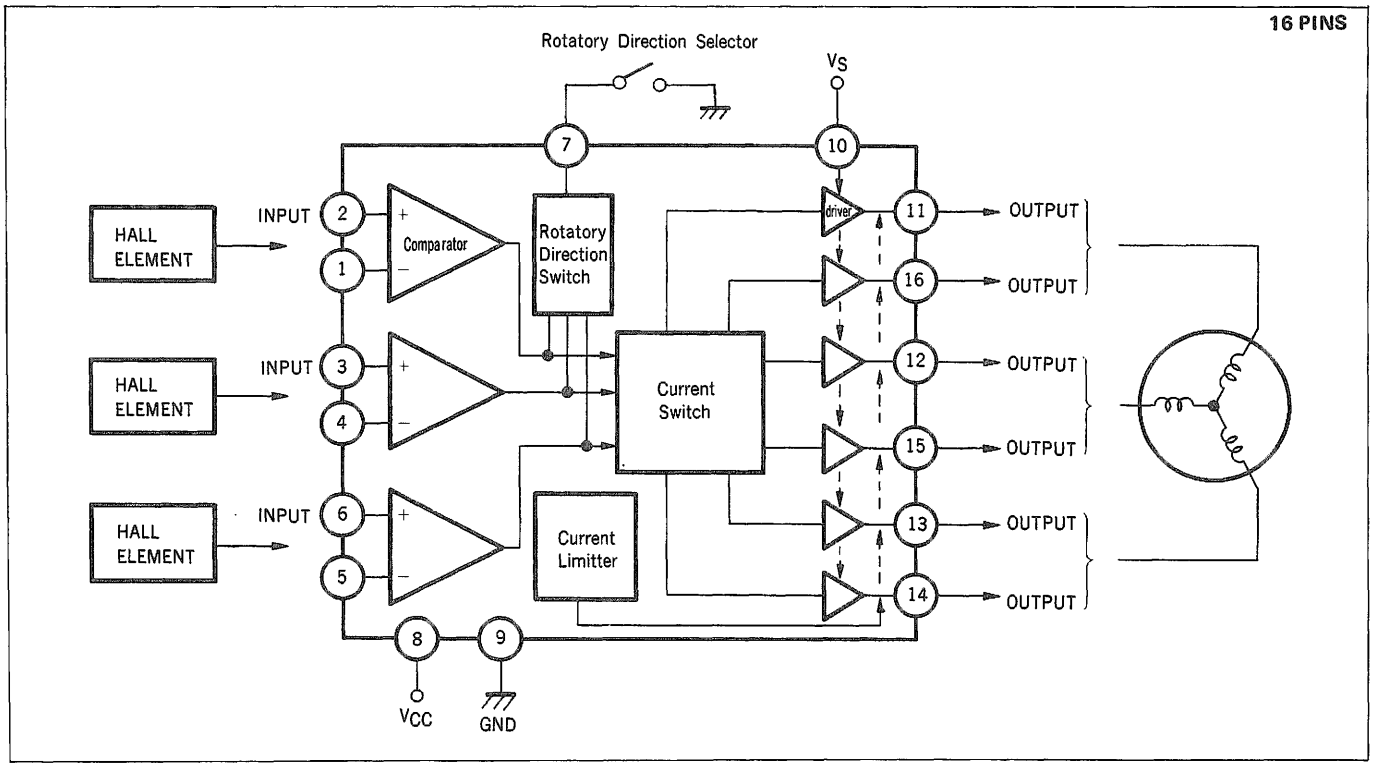
- Current switch.
- Forward/Reverse function.
- Small input/output phase error. −5 ~ 5 deg.
- Low current consumption. I_{CC} = 4.5 mA TYP.

PACKAGE DIMENSIONS

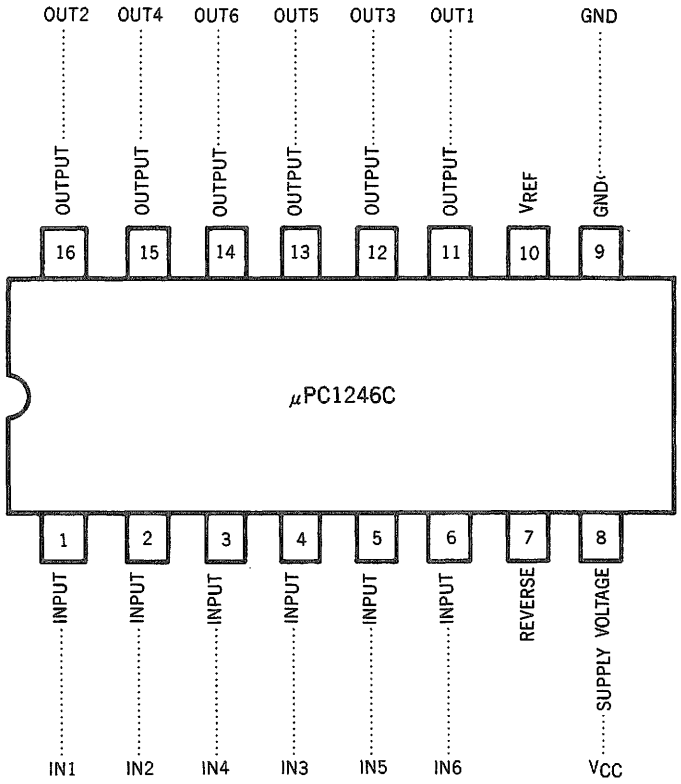
in millimeters (inches)



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 Obligue 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

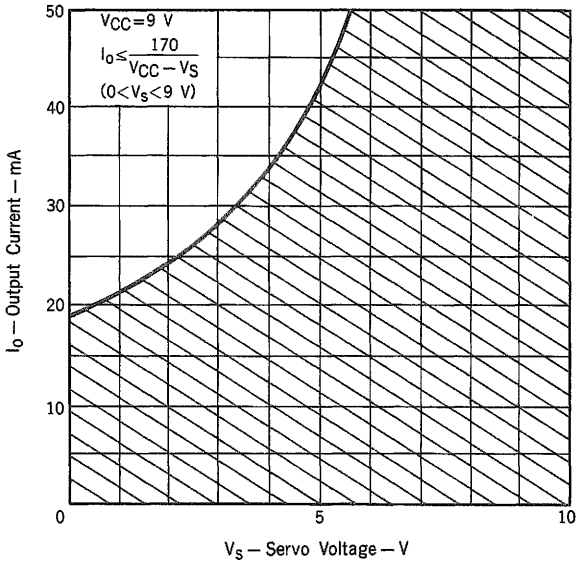


Fig. 2 OUTPUT CURRENT vs. SERVO VOLTAGE

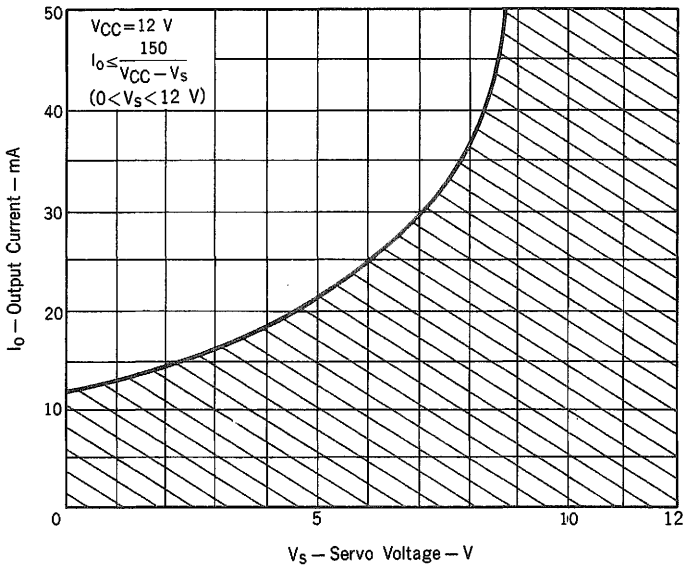
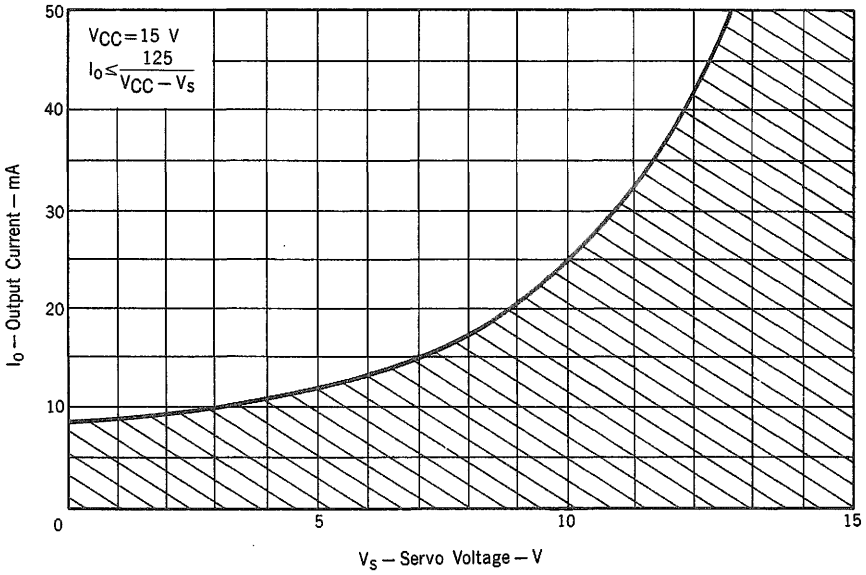
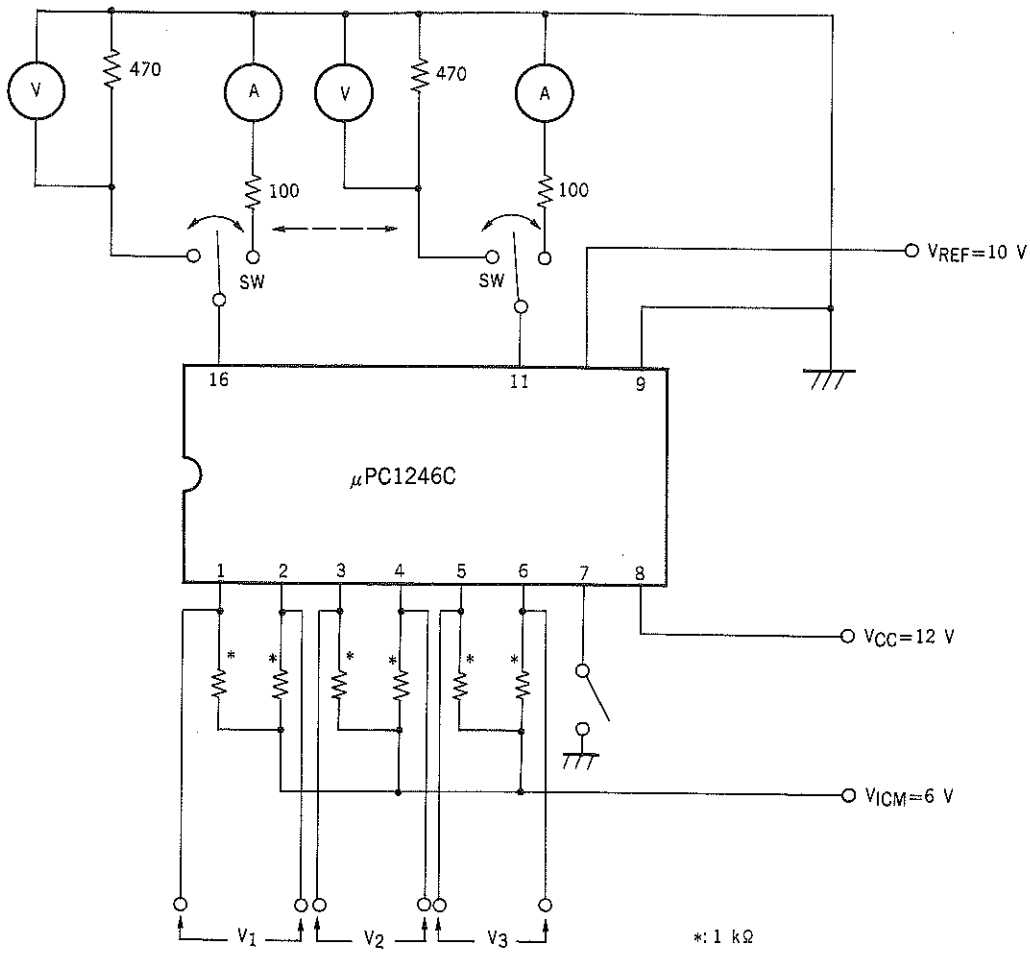


Fig. 3 OUTPUT CURRENT vs. SERVO VOLTAGE



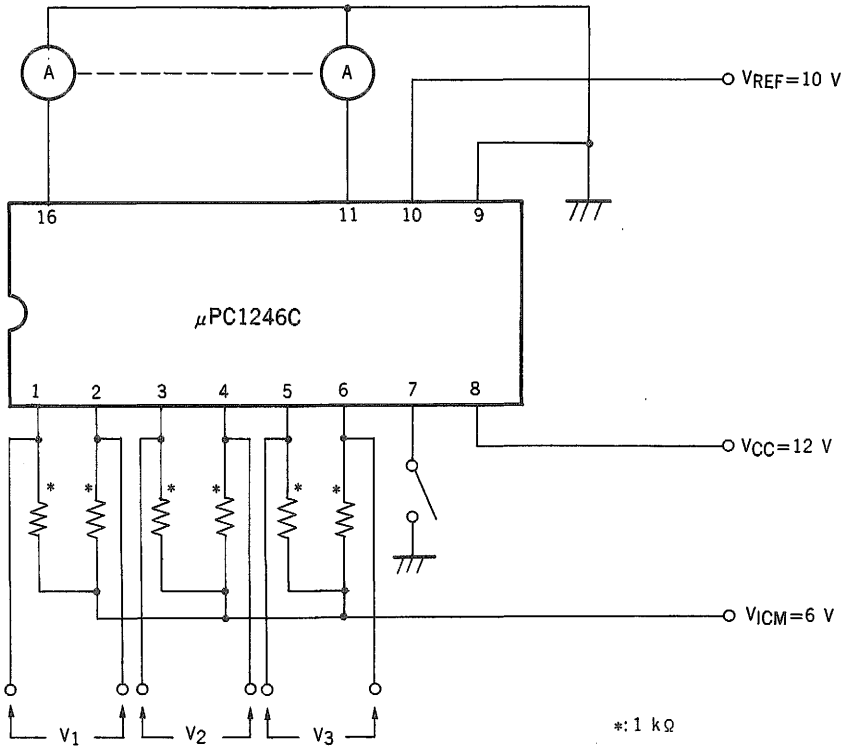
TEST CIRCUIT 1

- INPUT/OUTPUT CHARACTERISTIC
- PROPAGATION DELAY TIME



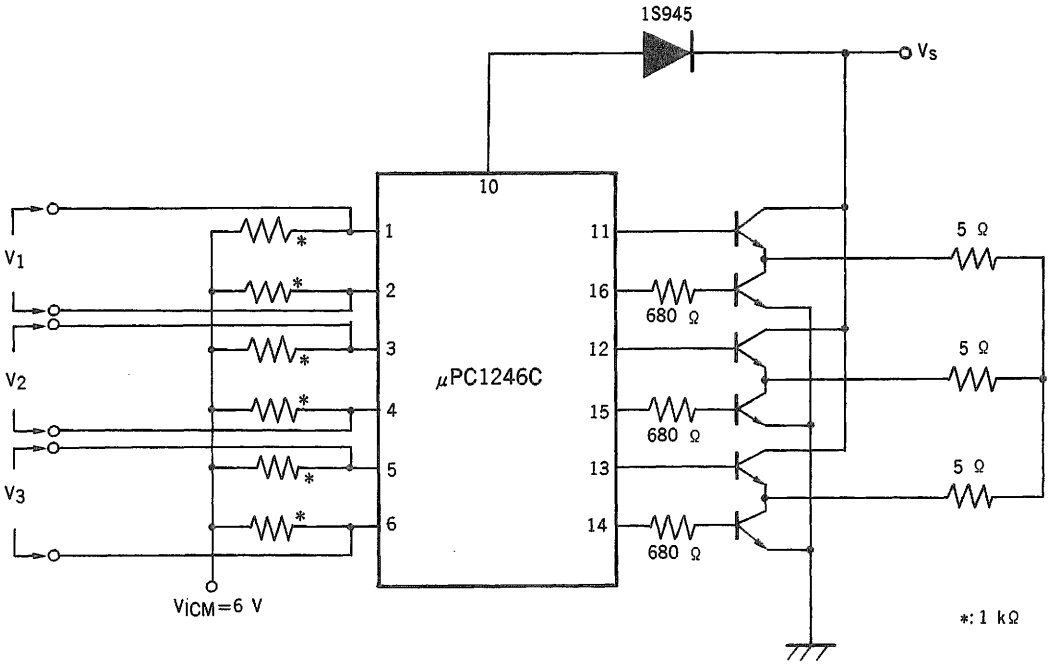
TEST CIRCUIT 2

- OUTPUT LEAKAGE CURRENT I_S

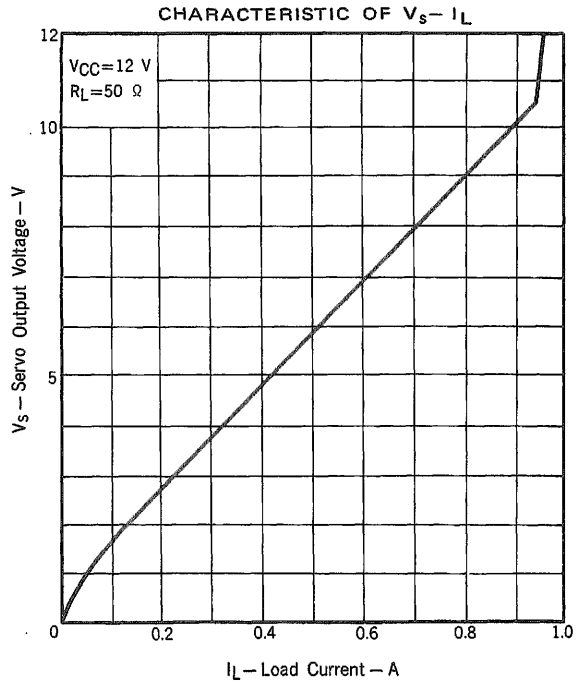


TEST CIRCUIT 3

- 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

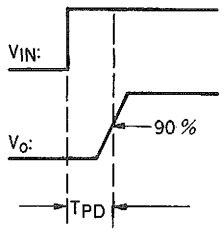
$5\ mV \leq V_H \leq 50\ mV$ OR $-50\ mV \leq V_L \leq 5\ mV$

● 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 mV, f ≤ 10 kHz, Duty 50 % PULSE WAVE $-50\ mV \leq V_L < -5\ mV$



● OUTPUT LEAKAGE CURRENT I_S

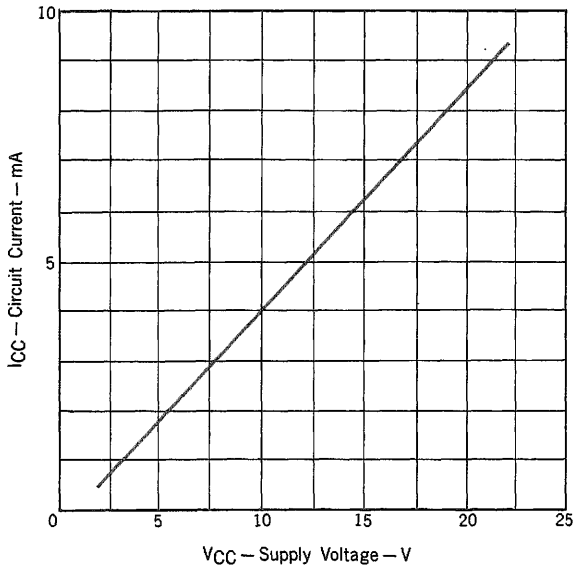
INPUT CONDITION FOR MEASUREMENT

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	

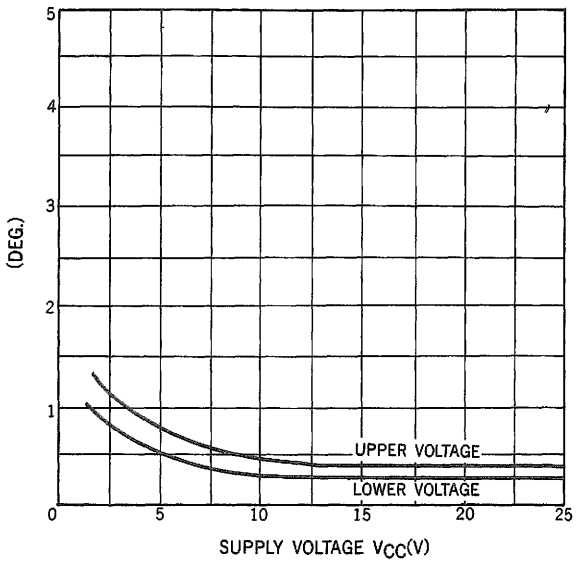
INPUT LEVEL

$-50\ mV \leq V_L \leq -5\ mV$, $5\ mV \leq V_H \leq 50\ mV$

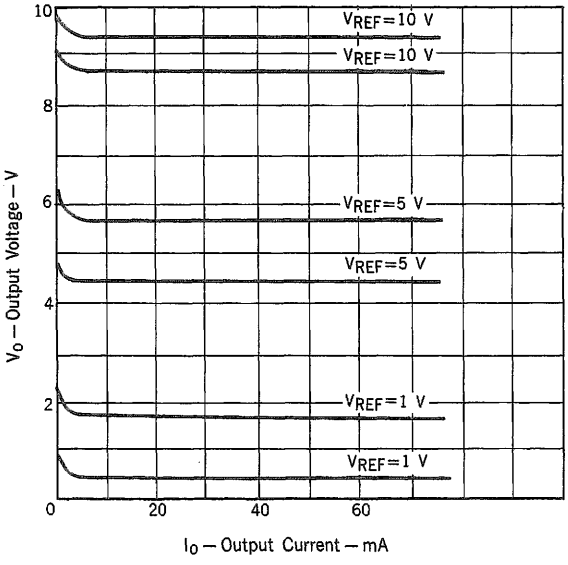
CIRCUIT CURRENT vs. SUPPLY VOLTAGE



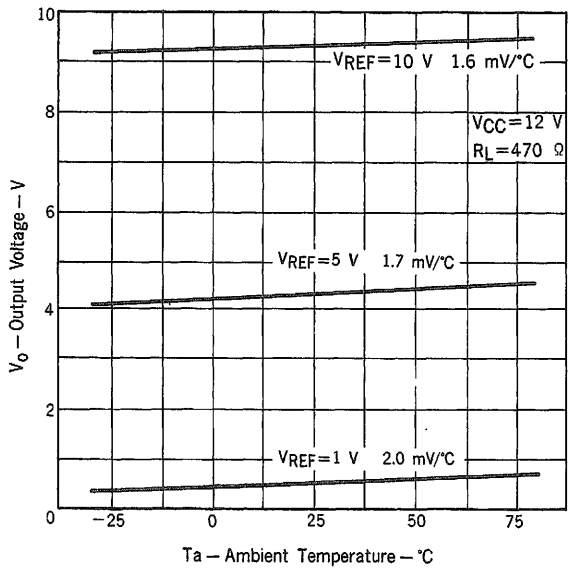
INPUT/OUTPUT CHARACTERISTIC



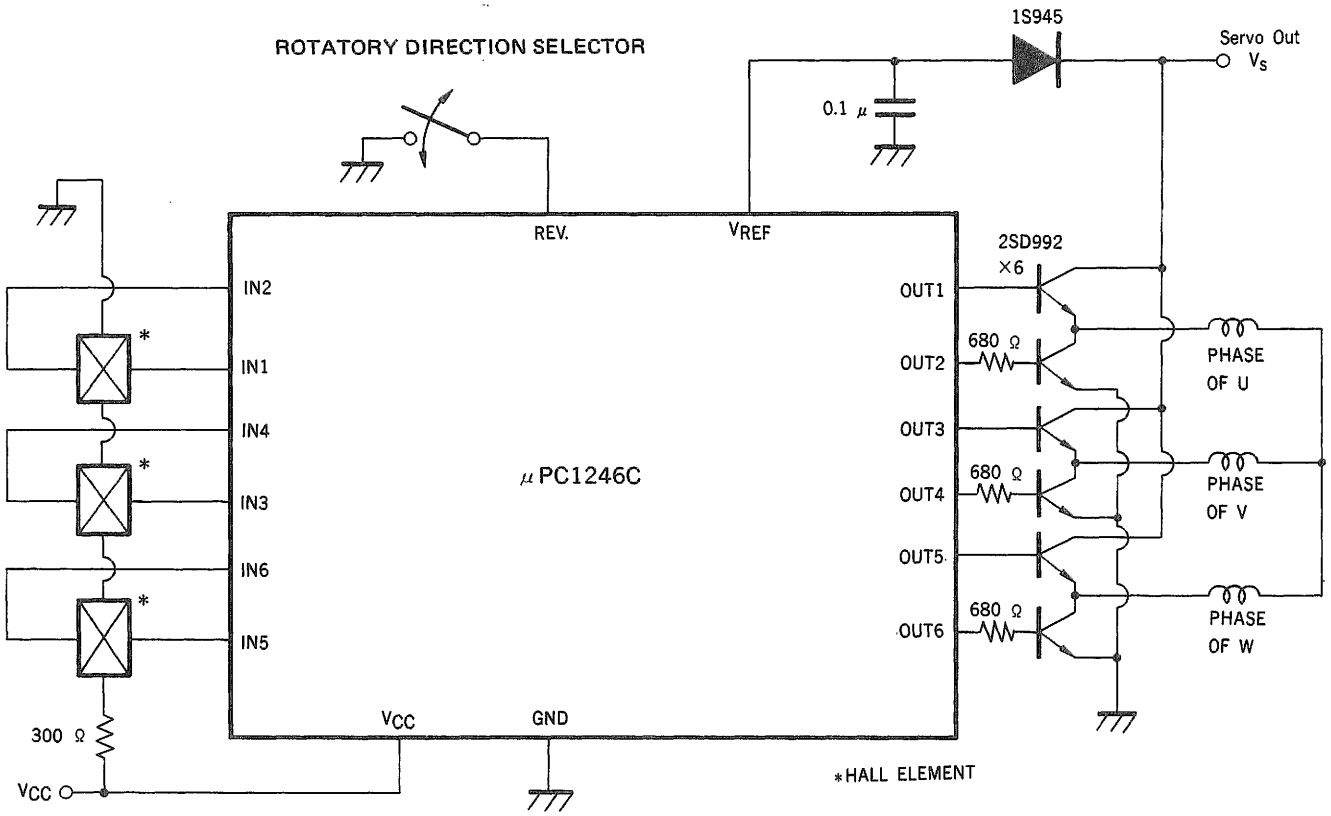
OUTPUT VOLTAGE vs. OUTPUT CURRENT



OUTPUT VOLTAGE vs. AMBIENT TEMPERATURE



APPLICATION



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