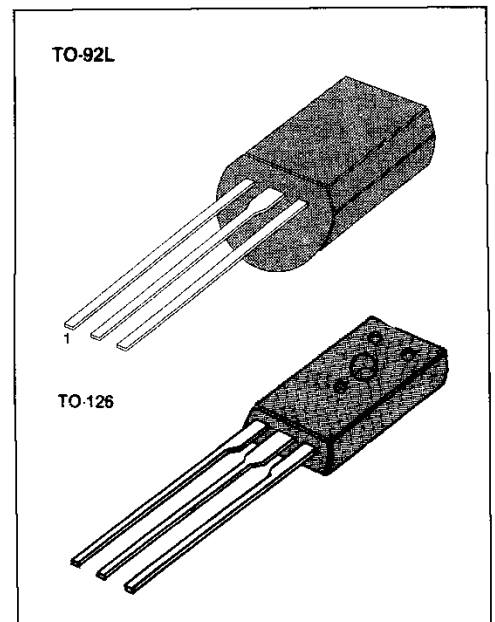


DC MOTOR SPEED CONTROLLER

The KA2404 is a monolithic integrated circuit designed for DC motor speed controllers.

FEATURES

- Suitable for DC motor speed controllers of cassette tape recorders and radio cassettes.
- Excellent stability of each characteristics against ambient temperature.
- High output current.
- Low quiescent current (1.3mA: typ).
- Low reference voltage.
- Wide operating supply voltage range ($V_{CC} = 4V \sim 12V$)
- KA2404A: To-126 PKG type



EQUIVALENT CIRCUIT BLOCK DIAGRAM

ORDERING INFORMATION

Device	Package	Operating Temperature
KA2404	TO-92L	- 20°C ~ + 70°C
KA2404A	TO-126	

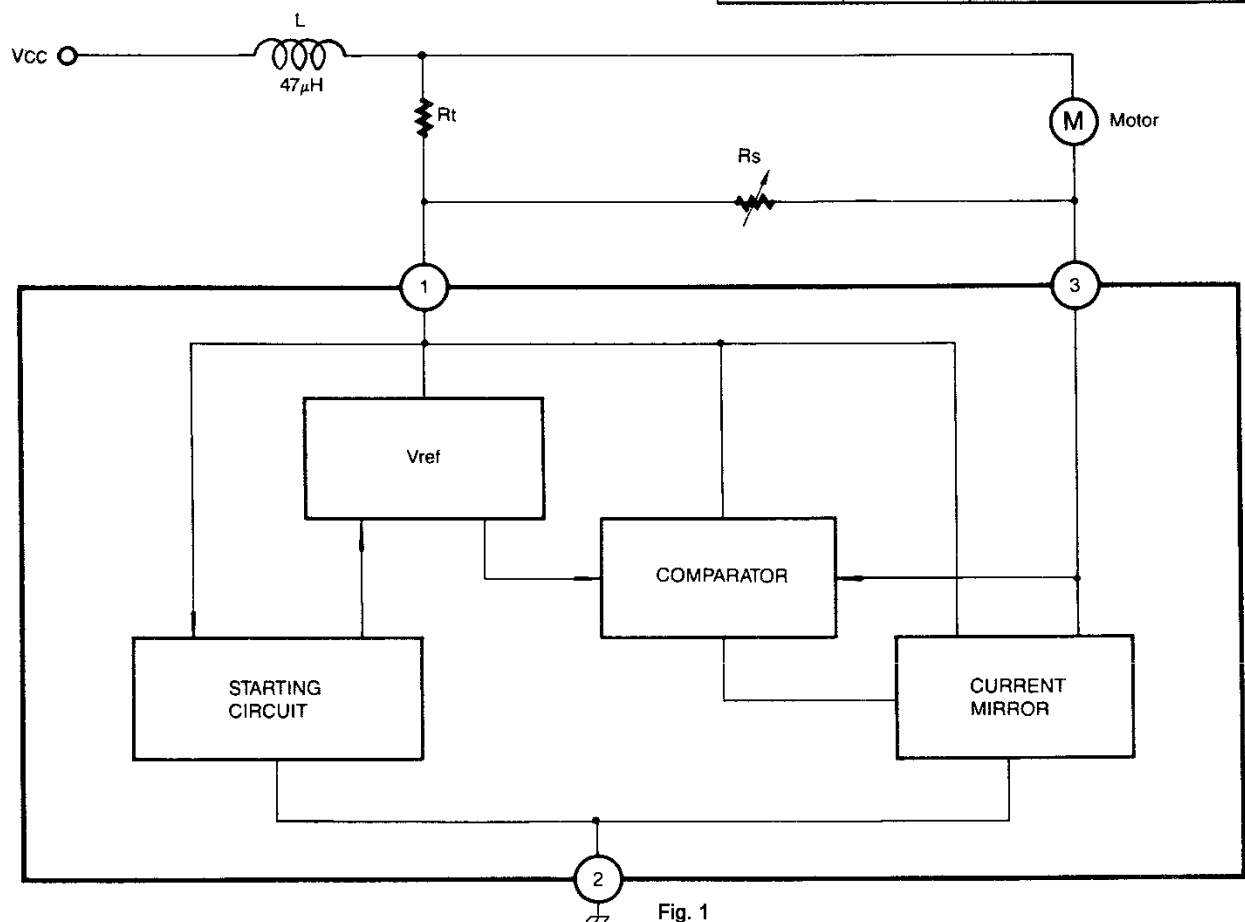


Fig. 1

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristics	Symbol	Value	Unit
Supply Voltage	V_{CC}	16	V
Circuit Current	I_3	2 (Note 1)	A
Power Dissipation (TO-126)	P_D (TO-92L) 1.3 (Note 2)	800 W	mW
Operating Temperature	T_{OPR}	-20 ~ +70	°C
Storage Temperature	T_{STG}	-40 ~ +125	°C

Note 1: 5 > 5 sec

Note 2: Ta = 25°C, with a 100 × 100mm bakelite printed circuit board (35μ Cu leaf)

ELECTRICAL CHARACTERISTICS(Ta = 25°C, V_{CC} = 9V, unless otherwise specified)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit	Fig
Reference Voltage	V_{REF}	$I_3 = 10\text{mA}$	1.10	1.27	1.40	V	2
Quiescent Circuit Current	I_{CCA}	$R_m = 180\Omega$	0.8	1.3	1.8	mA	4
Current Coefficient	K	$R_{m1} = 44\Omega$ $R_{m2} = 33\Omega$	16	18	20		3
Voltage Characteristic of Current Coefficient	$\frac{\Delta K}{K} / \Delta V_{CC}$	$I_3 = 100\text{mA}$ $V_{CC} = 4 \sim 12\text{V}$		0.4		%/V	3
Voltage Characteristic of Reference Voltage	$\frac{\Delta V_{REF}}{V_{REF}} / \Delta V_{CC}$	$I_3 = 100\text{mA}$ $V_{CC} = 4 \sim 12\text{V}$		0.06		%/V	2
Current Characteristic of Current Coefficient	$\frac{\Delta K}{K} / \Delta I_3$	$I_3 = 30 \sim 200\text{mA}$		-0.02		%/mA	3
Current Characteristic of Reference Voltage	$\frac{\Delta V_{REF}}{V_{REF}} / \Delta I_3$	$I_3 = 30 \sim 200\text{mA}$		-0.02		%/mA	2
Temperature Characteristics of Current Coefficient	$\frac{\Delta K}{K} / \Delta T_a$	$I_3 = 100\text{mA}$ $T_a = -20 \sim +75^\circ\text{C}$		0.01		%/°C	3
Temperature Characteristics of Reference Voltage	$\frac{\Delta V_{REF}}{V_{REF}} / \Delta T_a$	$I_3 = 100\text{mA}$ $T_a = -20 \sim +75^\circ\text{C}$		0.01		%/°C	2

TEST CIRCUIT 1

Reference Voltage

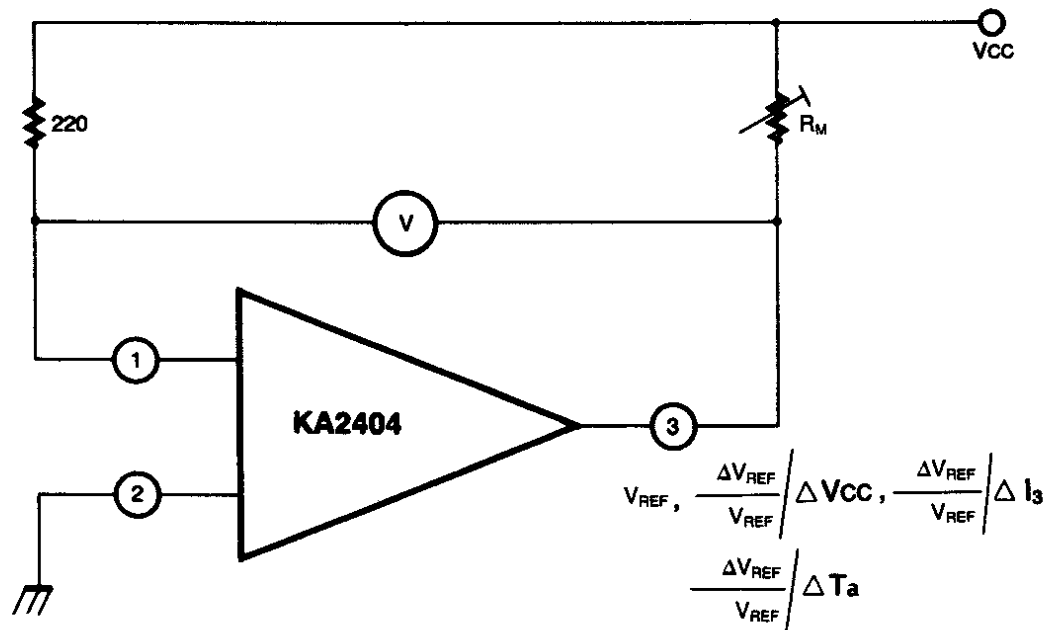


Fig. 2

TEST CIRCUIT 2

Current Coefficient

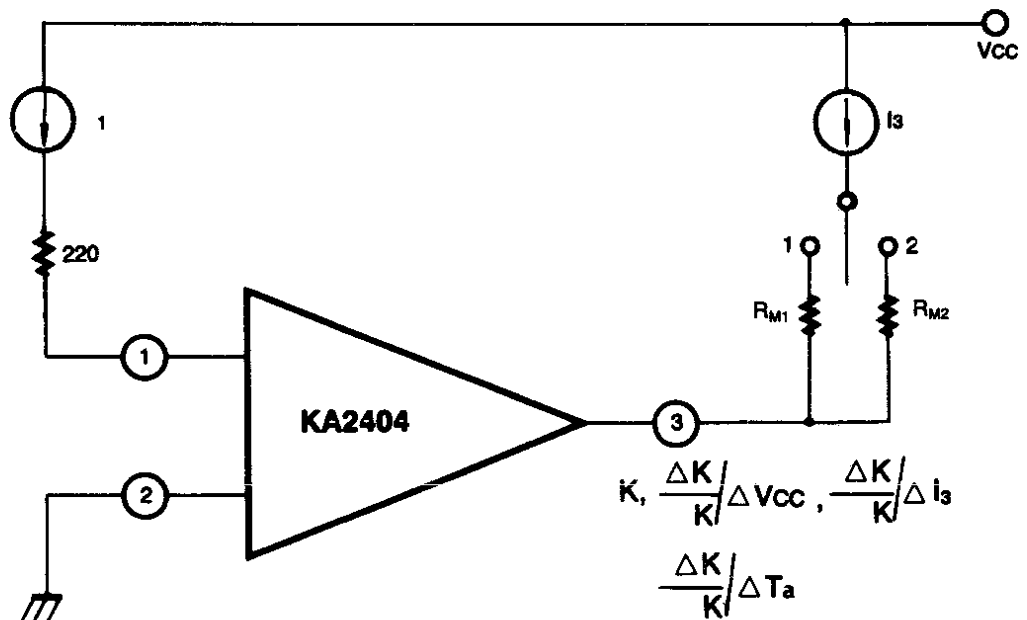


Fig. 3

$$K = \frac{I_3 (\text{SW } 2) - (\text{SW } 1)}{I_1 (\text{SW } 2) - (\text{SW } 1)}$$

TEST CIRCUIT 3

Quiescent Circuit Current

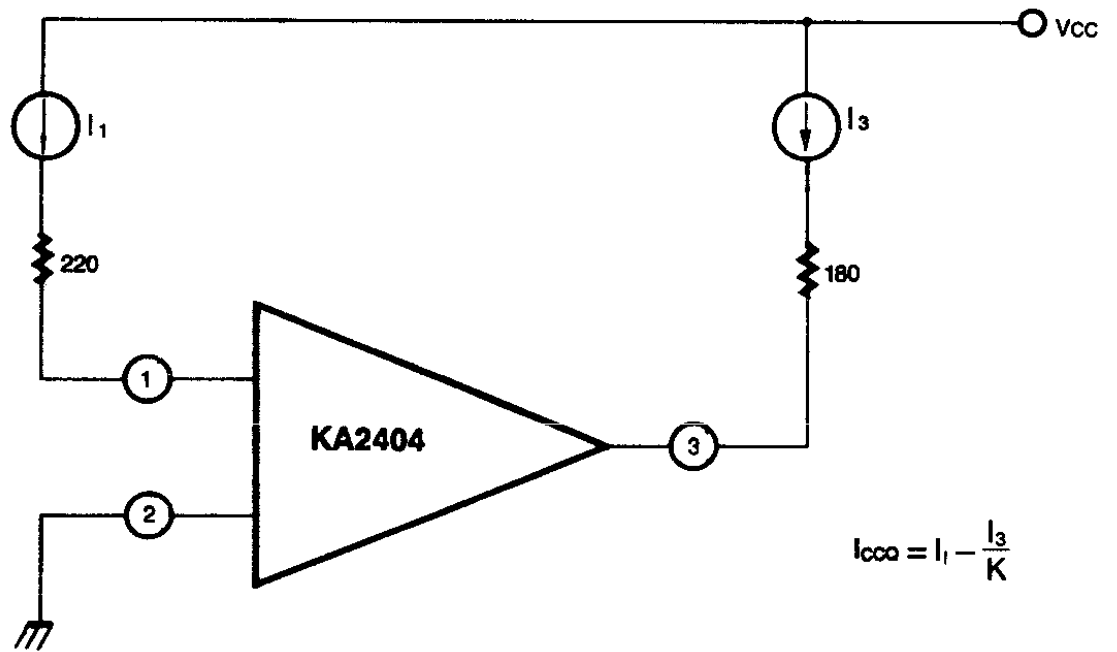
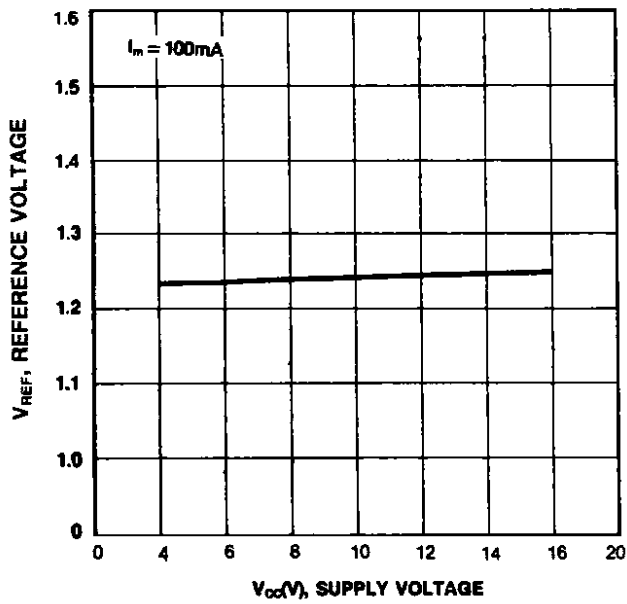
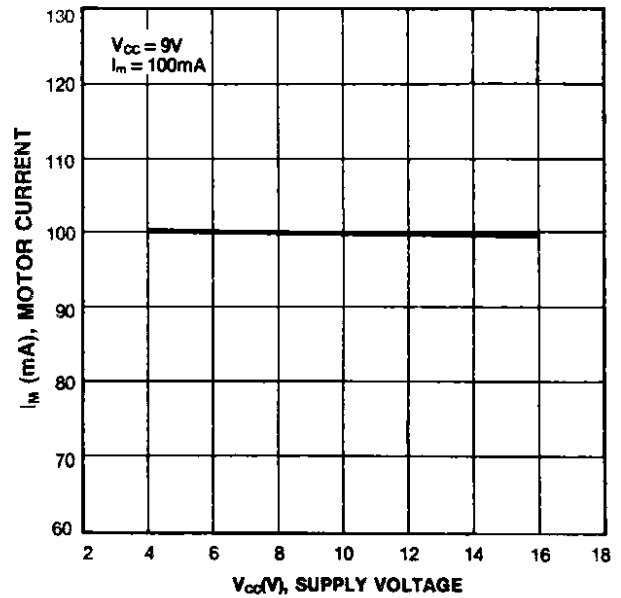


Fig. 4

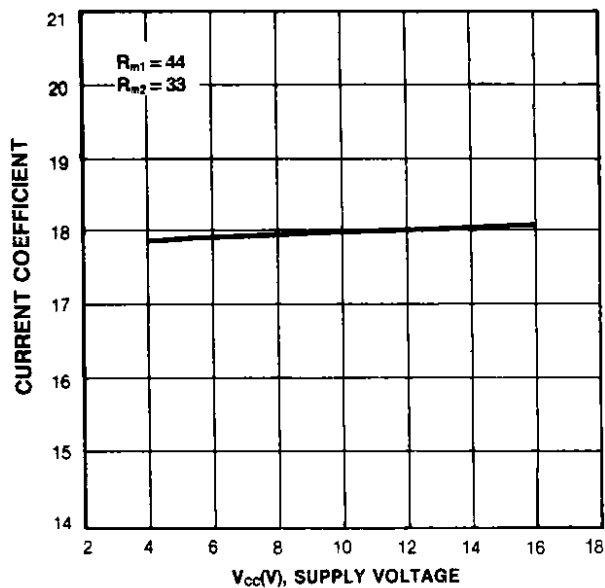
REFERENCE VOLTAGE-SUPPLY VOLTAGE



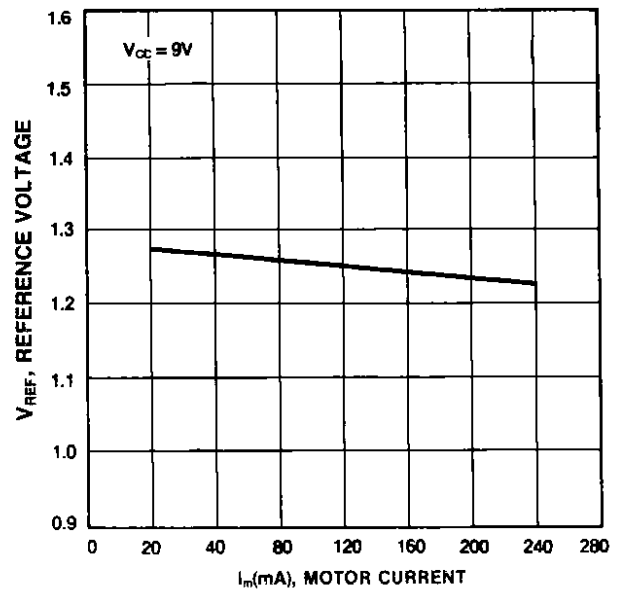
MOTOR CURRENT-SUPPLY VOLTAGE



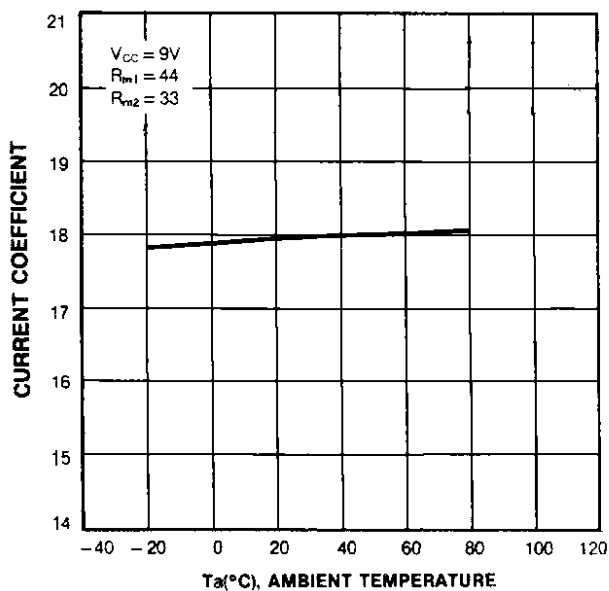
CURRENT COEFFICIENT-SUPPLY VOLTAGE



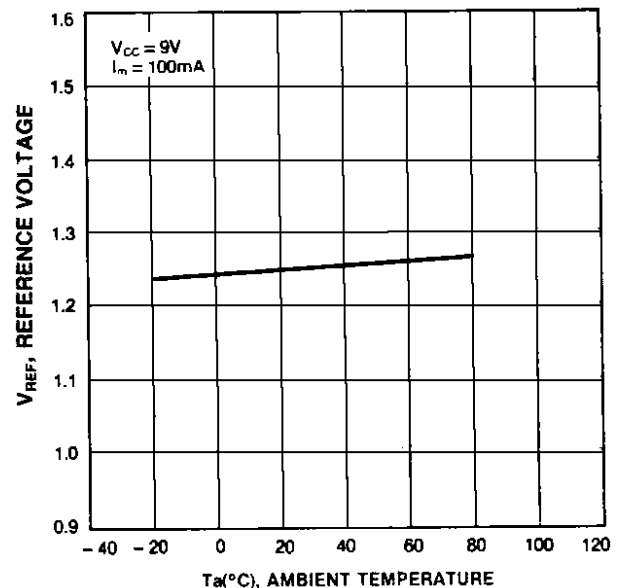
REFERENCE VOLTAGE-MOTOR CURRENT



CURRENT COEFFICIENT-AMBIENT TEMPERATURE



REFERENCE VOLTAGE-AMBIENT TEMPERATURE



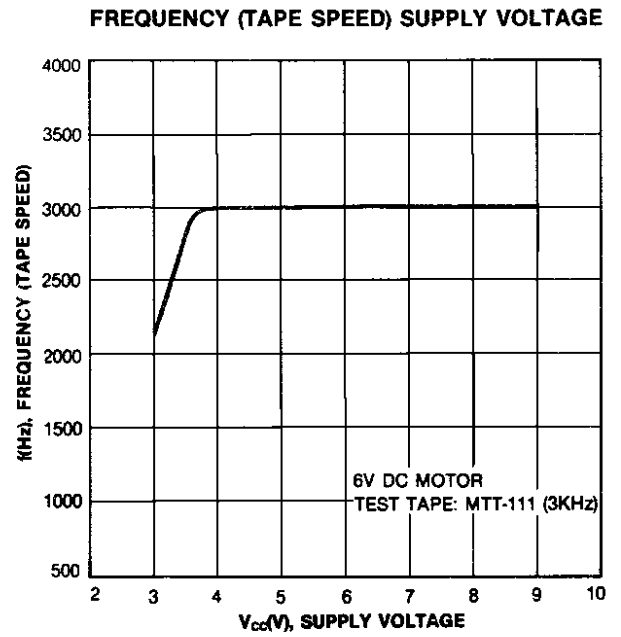
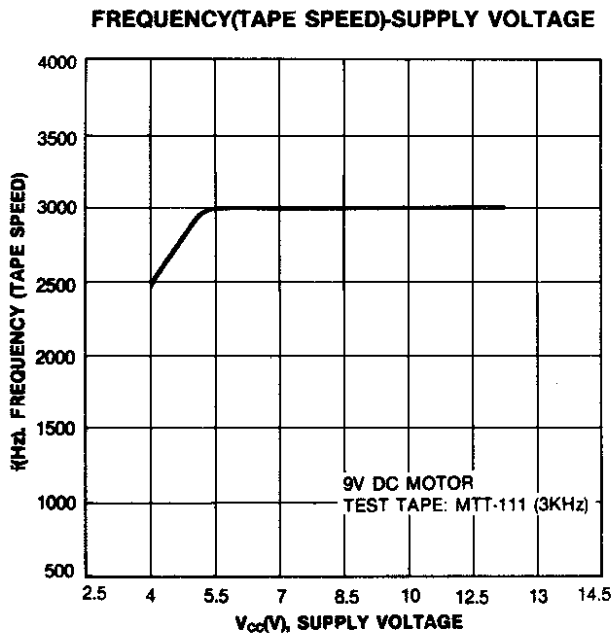
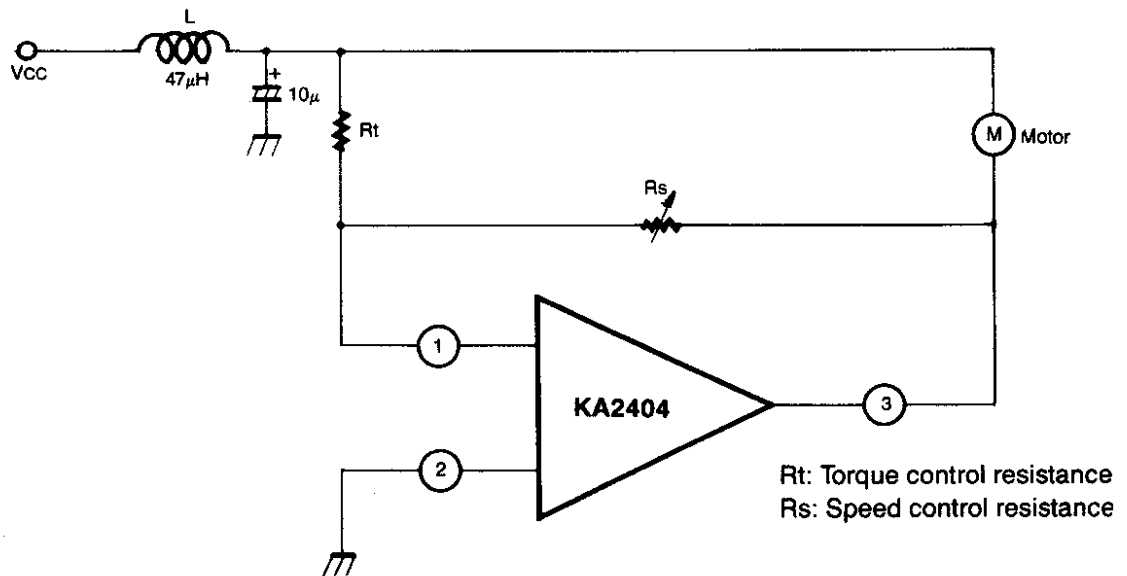
(APPLICATION CHARACTERISTICS)**APPLICATION CIRCUIT**

Fig. 5