DC MOTOR SPEED CONTROLLER

The KA2401 is a monolithic integrated circuit designed for DC motor speed controllers.

8 DIP

FEATURES

- **Suitable for DC motor speed controllers of cassette tape recorders and radio cassettes.**
- **Excellent stability of each characteristics against ambient temperature.**
- **Low quiescent current (0.8mA; Typ).**
- **Low reference voltage.**
- **Wide operating supply voltage range (4V ~ 12V).**

ORDERING INFORMATION

Device	Package	Operating Temperature
KA2401	8 DIP	- 20°C ~ + 70°C

BLOCK DIAGRAM

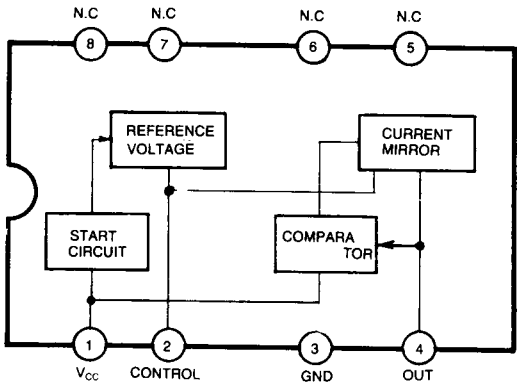


Fig. 1

ABSOLUTE MAXIMUM RATINGS (T_a=25°C)

Characteristic	Symbol	Value	Unit
Supply Voltage	V_{CC}	16	V
Circuit Current	I_4	*2	A
Power Dissipation	P_D	600	mW
Operating Temperature	T_{OPR}	−20 ~ +70	°C
Storage Temperature	T_{STG}	−40 ~ +125	°C

*t<5 sec

ELECTRICAL CHARACTERISTICS

(Ta=25°C, V_{CC}=6V, unless otherwise specified)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit	Test Fig
Reference Voltage	V_{REF}	I_4=10mA	1.10	1.27	1.40	V	2
Quiescent Circuit Current	I_{CCQ}	R_M=180Ω	0.5	0.8	1.2	mA	5
Current Coefficient	K	Rm_1=44Ω, Rm_2=33Ω	18	20	22		3
Saturation Voltage	$V_{4(SAT)}$	V_{CC}=4.2V, Rm=4.4Ω		1.5	20	V	4
Voltage Characteristic of Shunt-Current Coefficient	$\frac{\Delta K}{K}/\Delta V_{CC}$	I_4=100mA, V_{CC}=4~12V		0.4		%/V	3
Voltage Characteristic of Reference Voltage	$\frac{\Delta V_{REF}}{V_{REF}}/\Delta V_{CC}$	I_4=100mA, V_{CC}=4~12V		0.6		%/V	2
Current Characteristic of Current Coefficient	$\frac{\Delta K}{K}/\Delta I_4$	I_4=30~200mA		−0.02		%/mA	3
Current Characteristic of Reference Voltage	$\frac{\Delta V_{REF}}{V_{REF}}/\Delta I_4$	I_4=30~200mA		−0.02		%/mA	2
Temperature Characteristic of Current Coefficient	$\frac{\Delta K}{K}/\Delta T_a$	I_4=100mA T_a=−20~+75°C		0.01		%/°C	3
Temperature Characteristic of Reference Voltage	$\frac{\Delta V_{REF}}{V_{REF}}/\Delta T_a$	I_4=100mA T_a=−20~+75°C		0.01		%/°C	2

TEST CIRCUIT 1

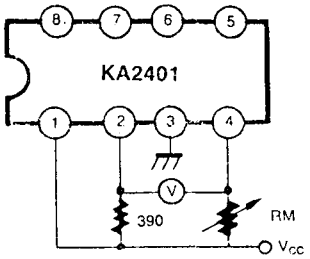


Fig. 2

$$Vref, \frac{\Delta V_{REF}}{V_{REF}}/\Delta Vcc, \frac{\Delta V_{REF}}{V_{REF}}/\Delta I_4, \frac{\Delta V_{REF}}{V_{REF}}/\Delta T_a$$

TEST CIRCUIT 2

Current Coefficient

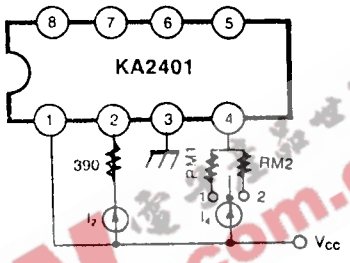


Fig. 3

$$K, \frac{\Delta K}{K}/\Delta Vcc, \quad \frac{\Delta K}{K}/\Delta I_4, \quad \frac{\Delta K}{K}/\Delta T_a$$

$$K = \frac{I_4\,(SW\ 2) - I_4\,(SW\ 1)}{I_2\,(SW\ 2) - I_2\,(SW\ 1)}$$

TEST CIRCUIT 3

Saturation Voltage

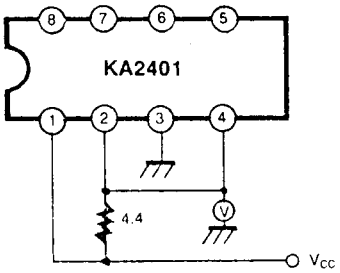


Fig. 4

TEST CIRCUIT 4

Quiescent Circuit Current

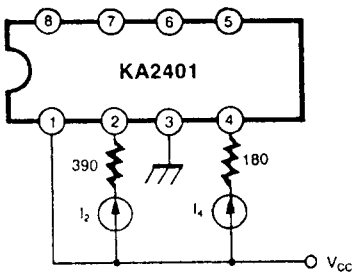
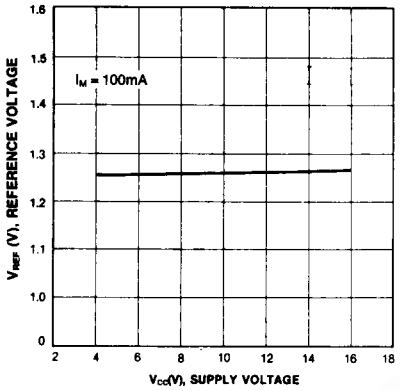
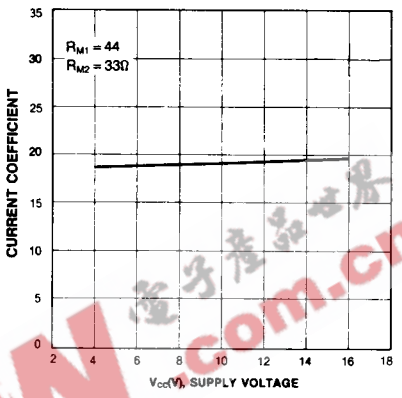


Fig. 5

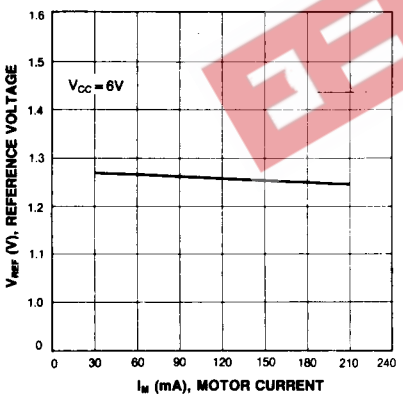
REFERENCE VOLTAGE-SUPPLY VOLTAGE



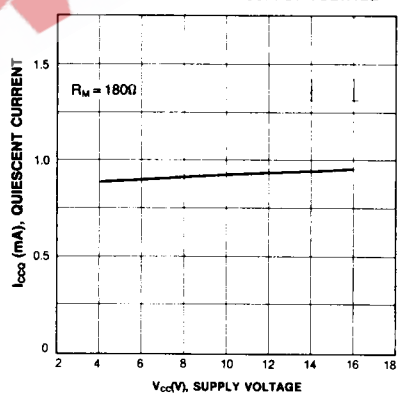
CURRENT COEFFICIENT SUPPLY VOLTAGE



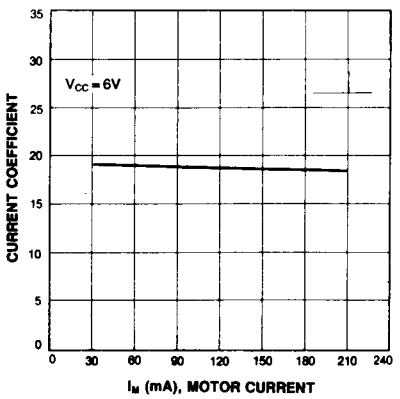
REFERENCE VOLTAGE-MOTOR CURRENT



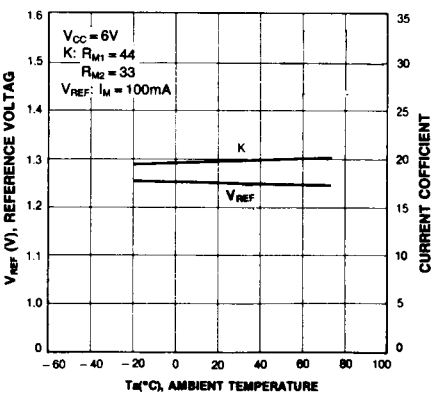
QUIESCENT CURRENT-SUPPLY VOLTAGE

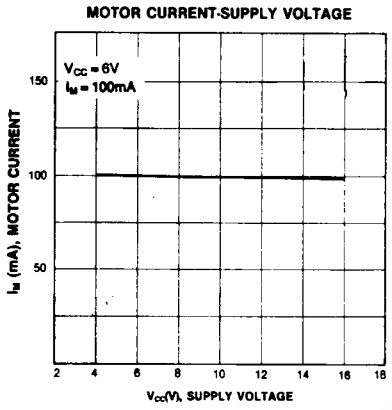


CURRENT COFFICIENT-MOTOR CURRENT



REFERENCE VOLTAGE REFLECTION COEFFICIENT -AMBIENT TEMPERATURE





APPLICATION CIRCUIT

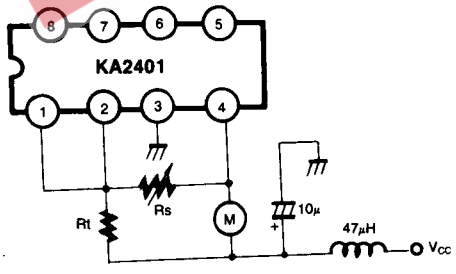


Fig. 6