

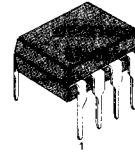
DC MOTOR SPEED CONTROLLER

The KA2401 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.
- Low quiescent current (0.8mA; Typ).
- Low reference voltage.
- Wide operating supply voltage range (4V ~ 12V).

8 DIP



ORDERING INFORMATION

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

BLOCK DIAGRAM

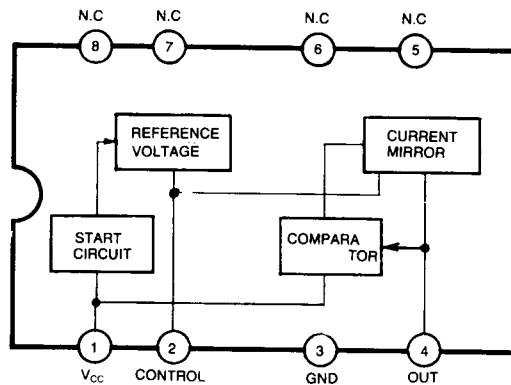


Fig. 1

ABSOLUTE MAXIMUM RATINGS ($T_a = 25^\circ\text{C}$)

| 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 | $^\circ\text{C}$ |
| Storage Temperature | T_{STG} | -40 ~ +125 | $^\circ\text{C}$ |

*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} | $I_4 = 10\text{mA}$ | 1.10 | 1.27 | 1.40 | V | 2 |
| Quiescent Circuit Current | I_{CCQ} | $R_M = 180\Omega$ | 0.5 | 0.8 | 1.2 | mA | 5 |
| Current Coefficient | K | $R_{M1} = 44\Omega, R_{M2} = 33\Omega$ | 18 | 20 | 22 | | 3 |
| Saturation Voltage | $V_4 (SAT)$ | $V_{CC} = 4.2\text{V}, R_M = 4.4\Omega$ | | 1.5 | 20 | V | 4 |
| Voltage Characteristic of Shunt-Current Coefficient | $\frac{\Delta K}{K} / \Delta V_{CC}$ | $I_4 = 100\text{mA}, V_{CC} = 4 \sim 12\text{V}$ | | 0.4 | | %/V | 3 |
| Voltage Characteristic of Reference Voltage | $\frac{\Delta V_{REF}}{V_{REF}} / \Delta V_{CC}$ | $I_4 = 100\text{mA}, V_{CC} = 4 \sim 12\text{V}$ | | 0.6 | | %/V | 2 |
| Current Characteristic of Current Coefficient | $\frac{\Delta K}{K} / \Delta I_4$ | $I_4 = 30 \sim 200\text{mA}$ | | -0.02 | | %/mA | 3 |
| Current Characteristic of Reference Voltage | $\frac{\Delta V_{REF}}{V_{REF}} / \Delta I_4$ | $I_4 = 30 \sim 200\text{mA}$ | | -0.02 | | %/mA | 2 |
| Temperature Characteristic of Current Coefficient | $\frac{\Delta K}{K} / \Delta T_a$ | $I_4 = 100\text{mA}$ $T_a = -20 \sim +75^\circ\text{C}$ | | 0.01 | | %/°C | 3 |
| Temperature Characteristic of Reference Voltage | $\frac{\Delta V_{REF}}{V_{REF}} / \Delta T_a$ | $I_4 = 100\text{mA}$ $T_a = -20 \sim +75^\circ\text{C}$ | | 0.01 | | %/°C | 2 |

TEST CIRCUIT 1

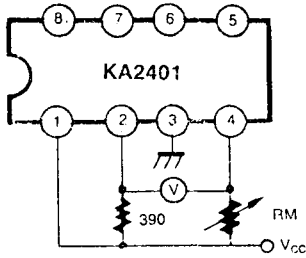


Fig. 2

$$V_{ref}, \frac{\Delta V_{REF}}{V_{REF}} / \Delta V_{CC}, \frac{\Delta V_{REF}}{V_{REF}} / \Delta I_4, \frac{\Delta V_{REF}}{V_{REF}} / \Delta T_a$$

TEST CIRCUIT 2

Current Coefficient

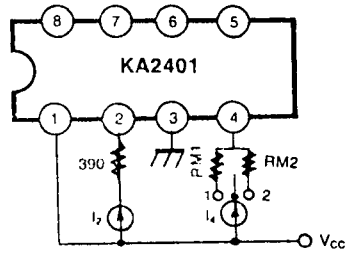


Fig. 3

$$K, \frac{\Delta K}{K} / \Delta V_{CC}, \frac{\Delta K}{K} / \Delta I_4, \frac{\Delta K}{K} / \Delta T_a$$

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

TEST CIRCUIT 3

Saturation Voltage

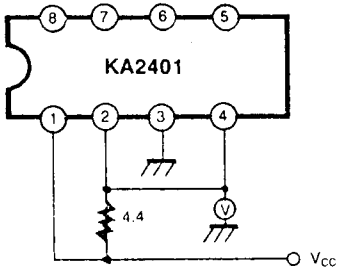


Fig. 4

TEST CIRCUIT 4

Quiescent Circuit Current

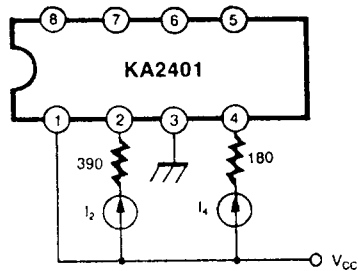
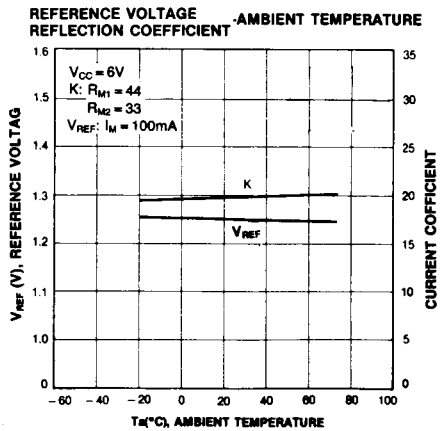
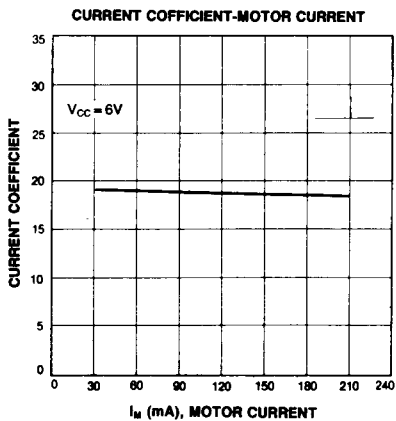
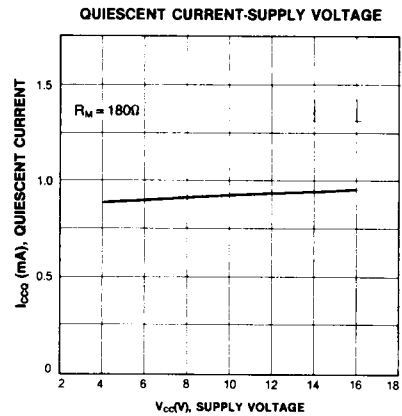
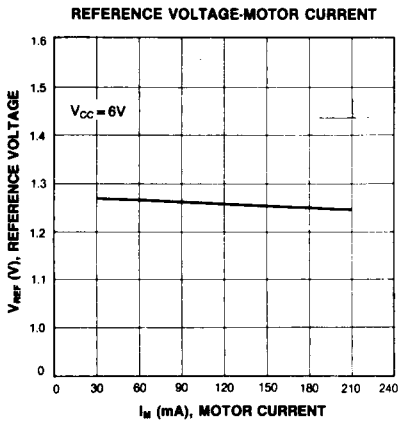
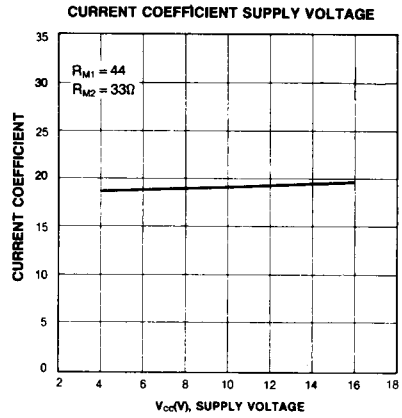
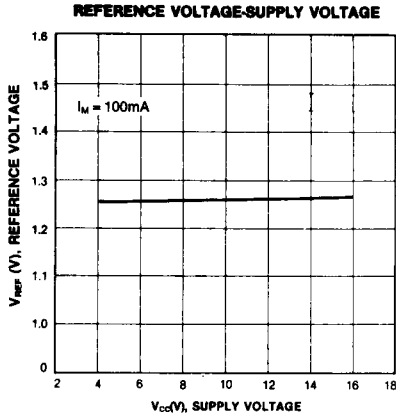
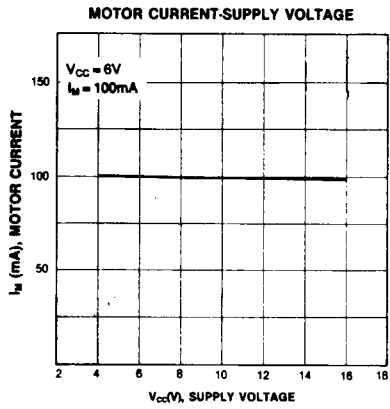


Fig. 5





3

APPLICATION CIRCUIT

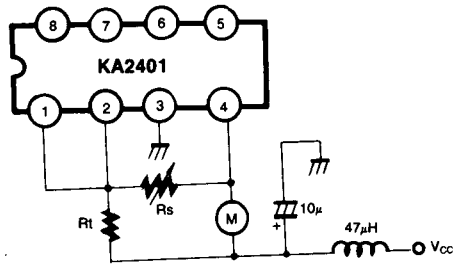


Fig. 6



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