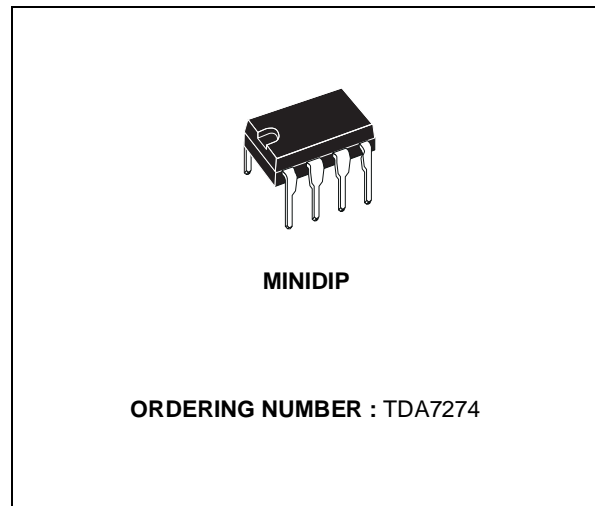


LOW-VOLTAGE DC MOTOR SPEED CONTROLLER

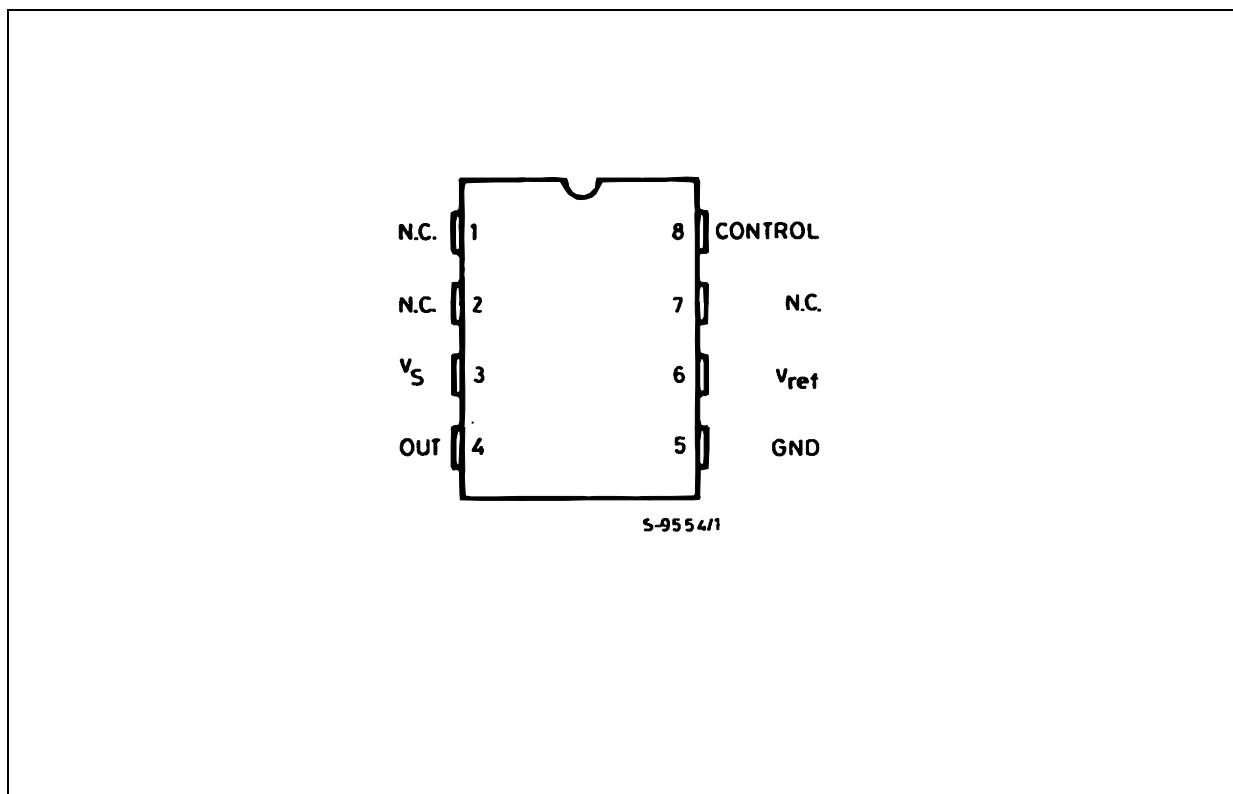
- WIDE OPERATING VOLTAGE RANGE (1.8 to 6 V)
- BUILT-IN LOW-VOLTAGE REFERENCE (0.2 V)
- LINEARITY IN SPEED ADJUSTMENT
- HIGH STABILITY VS. TEMPERATURE
- LOW NUMBER OF EXTERNAL PARTS

DESCRIPTION

The TDA7274 is a monolithic integrated circuit DC motor speed controller intended for use in microcassettes, radio cassette players and other consumer equipment. It is particularly suitable for low-voltage applications.

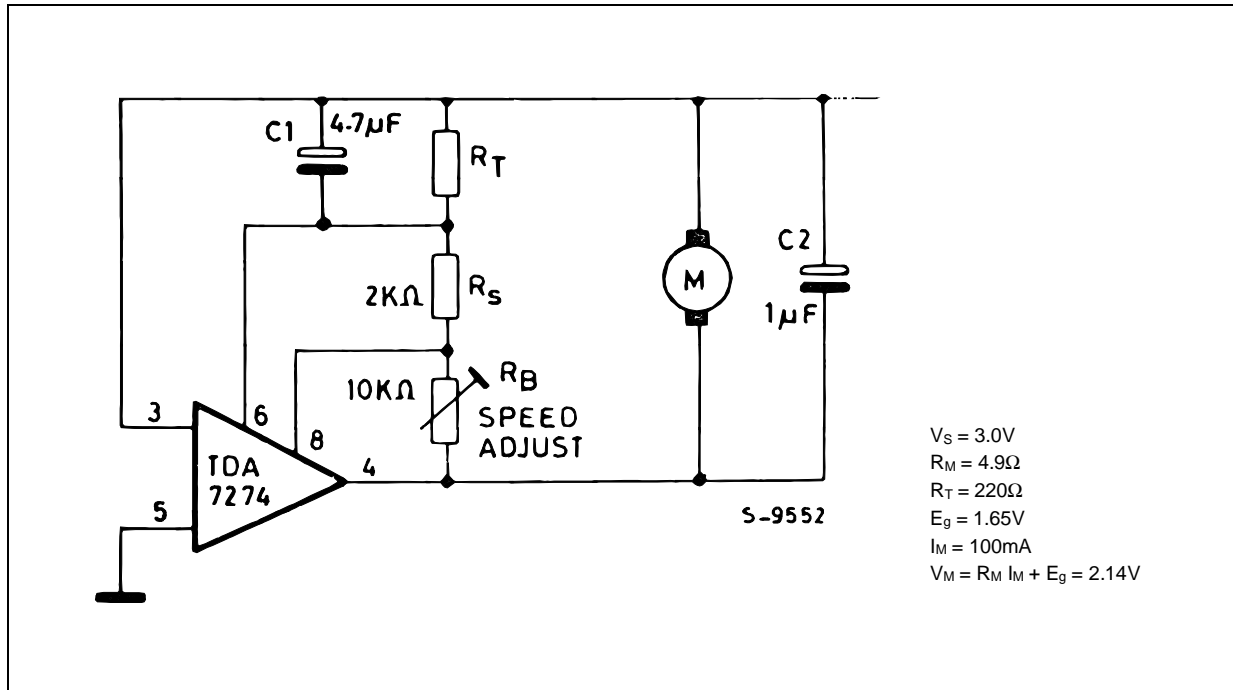


PIN CONNECTION (top view)

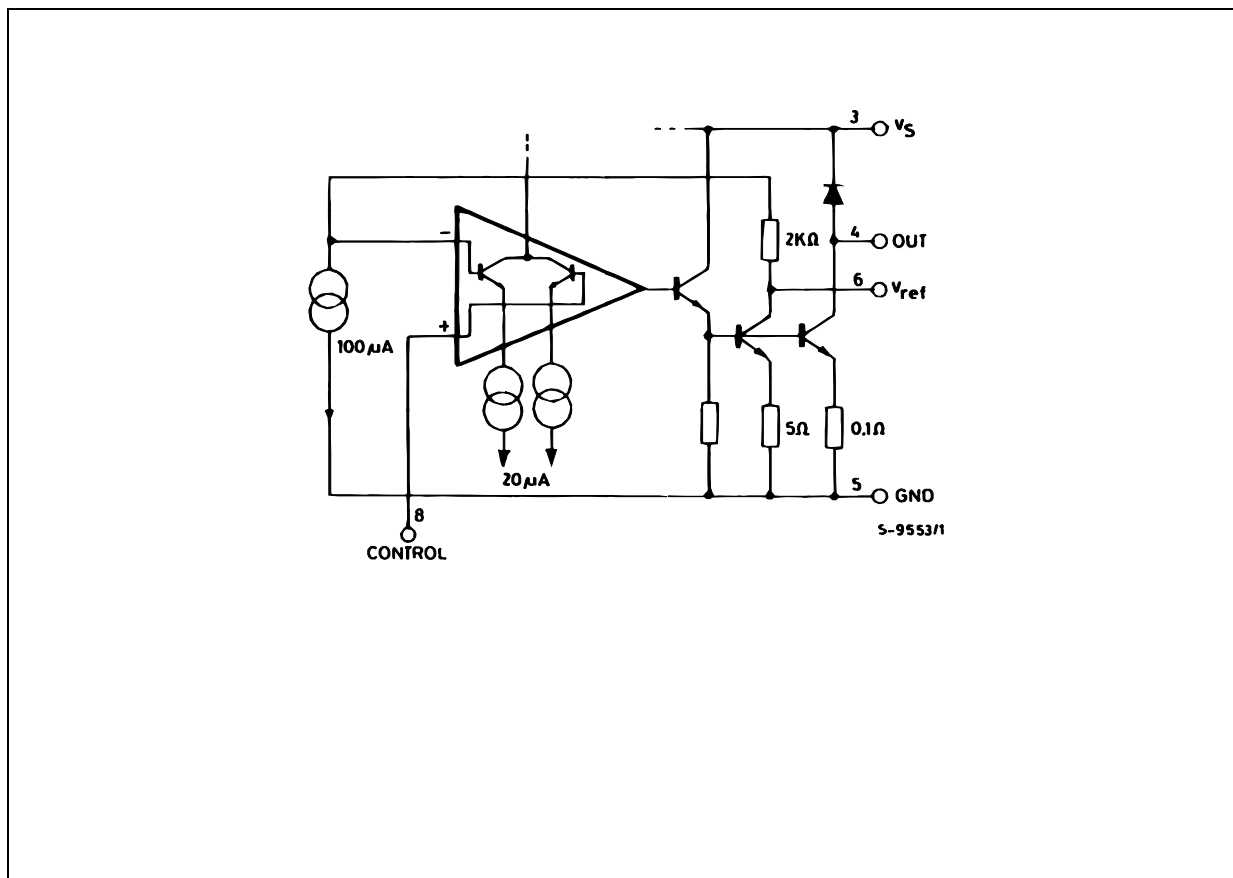


TDA7274

APPLICATION CIRCUIT



SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

| Symbol | Parameter | Value | Unit |
|-----------|---|-------|------|
| V_S | Supply Voltage | 6 | V |
| I_M | Motor Current | 700 | mA |
| P_{tot} | Power Dissipation at $T_{amb} = 25^\circ\text{C}$ | 1.25 | W |

THERMAL DATA

| Symbol | Parameter | Value | Unit |
|-----------------|---|-------|---------------------------|
| $R_{th\ j-amb}$ | Thermal Resistance Junction-ambient Max. | 100 | $^\circ\text{C}/\text{W}$ |

ELECTRICAL CHARACTERISTICS (Refer to test circuit, $V_S = 3\text{V}$, $T_{amb} = 25^\circ\text{C}$ unless otherwise specified)

| Symbol | Parameter | Test Condition | Min. | Typ. | Max. | Unit |
|---|---|--|------|-------|------|---------------------|
| V_S | Supply Voltage Range | | 1.8 | | 6 | V |
| V_{ref} | Reference Voltage | $I_M = 100\text{mA}$ | 0.18 | 0.20 | 0.22 | V |
| I_q | Quiescent Current | | | 2.4 | 6.0 | mA |
| I_d (Pin 6) | Quiescent Current | | | 120 | | μA |
| K | Shunt Ratio | $I_M = 100\text{mA}$ | 45 | 50 | 55 | – |
| V_{sat} | Residual Voltage | $I_M = 100\text{mA}$ | | 0.13 | 0.3 | V |
| $\frac{\Delta V_{ref}}{V_{ref}} / \Delta V_S$ | Line Regulation | $I_M = 100\text{mA}$ $V_S = 1.8$ to 6V | | 0.20 | | $\%/V$ |
| $\frac{\Delta K}{K} / \Delta V_S$ | Voltage Characteristic of Shut Ratio | $I_M = 100\text{mA}$ $V_S = 1.8$ to 6V | | 0.80 | | $\%/V$ |
| $\frac{\Delta V_{ref}}{V_{ref}} / \Delta I_M$ | Load Regulation | $I_M = 20$ to 200mA | | 0.004 | | $\%/mA$ |
| $\frac{\Delta K}{K} / \Delta I_M$ | Current Characteristic of Shut Ratio | $I_M = 20$ to 200mA | | -0.03 | | $\%/mA$ |
| $\frac{\Delta V_{ref}}{V_{ref}} / \Delta T_{amb}$ | Temperature Characteristic of Reference Voltage | $I_M = 100\text{mA}$ $T_{amb} = -20$ to $+60^\circ\text{C}$ | | 0.04 | | $\%/^\circ\text{C}$ |
| $\frac{\Delta K}{K} / \Delta T_{amb}$ | Temperature Characteristic of Shut Ratio | $I_M = 100\text{mA}$ $T_{amb} = 20$ to $+60^\circ\text{C}$ | | 0.02 | | $\%/^\circ\text{C}$ |

Figure 1 : Test Circuit.

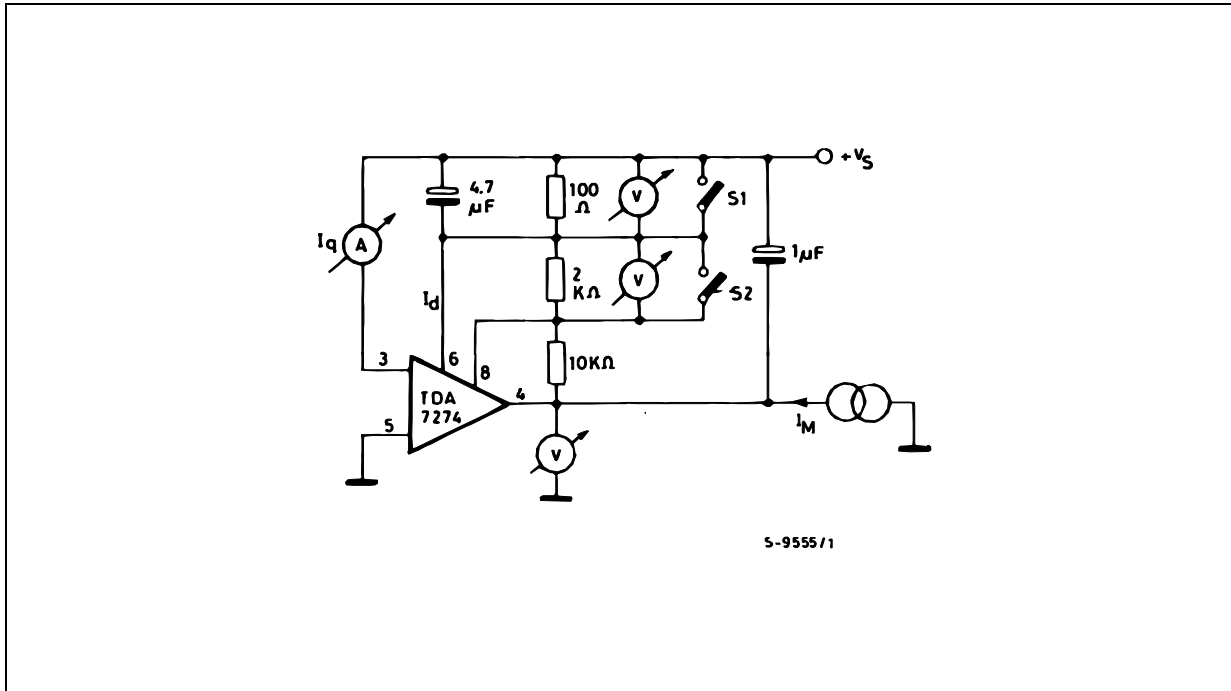


Figure 2 : Quiescent Current vs. Supply Voltage.

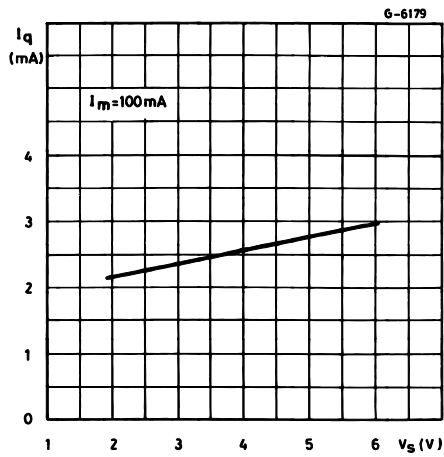


Figure 3 : Reference Voltage vs. Supply Voltage.

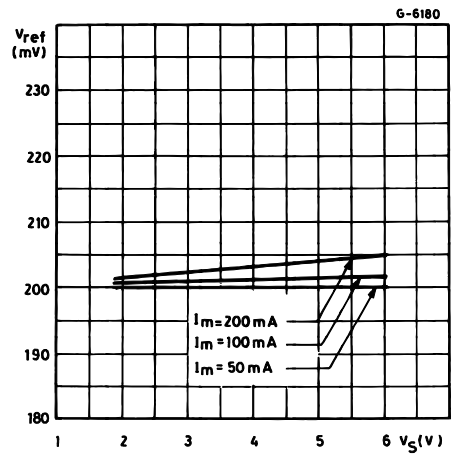


Figure 4 : Shunt Ratio vs. Supply Voltage.

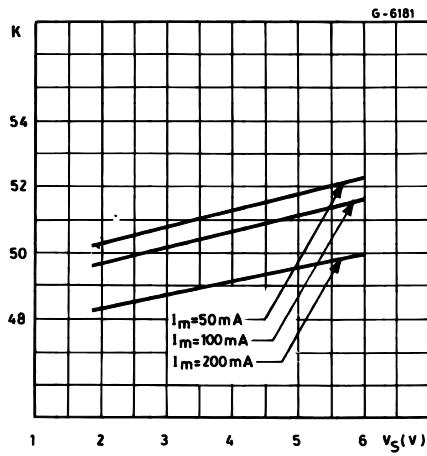


Figure 5 : Reference Voltage vs. Load Current.

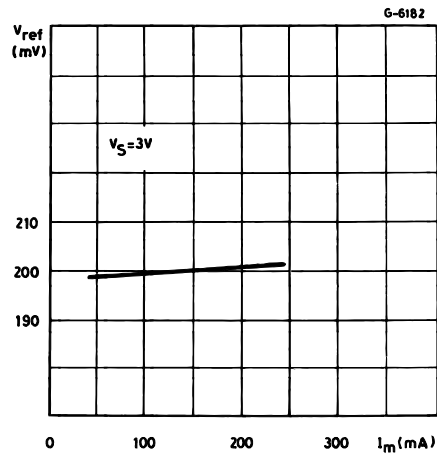


Figure 6 : Shunt Ratio vs. Load Current.

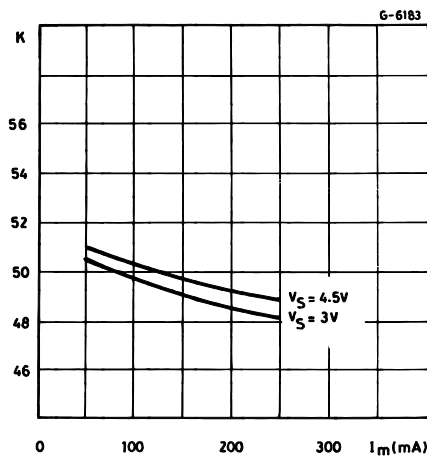


Figure 7 : Minimum Supply Voltage (typical) vs. Load Current.

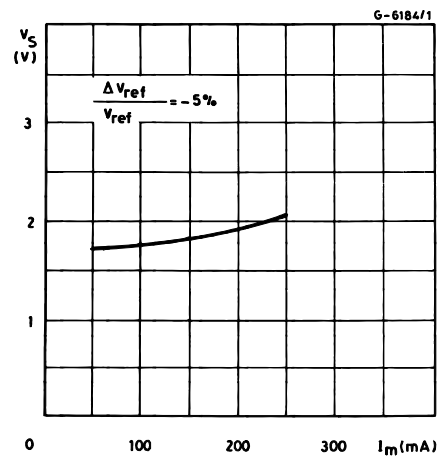


Figure 8 : Saturation Voltage vs. Load Current.

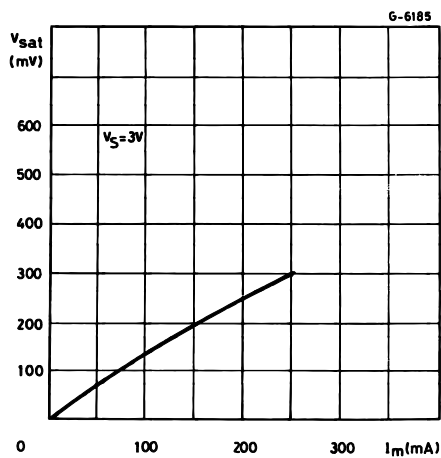


Figure 9 : Quiescent Current vs. Ambient Temperature.

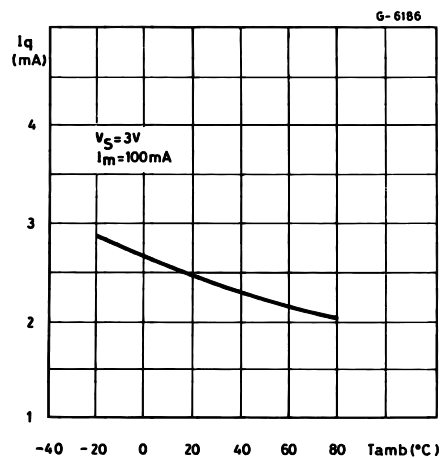


Figure 10 : Reference Voltage vs. Ambient Temperature.

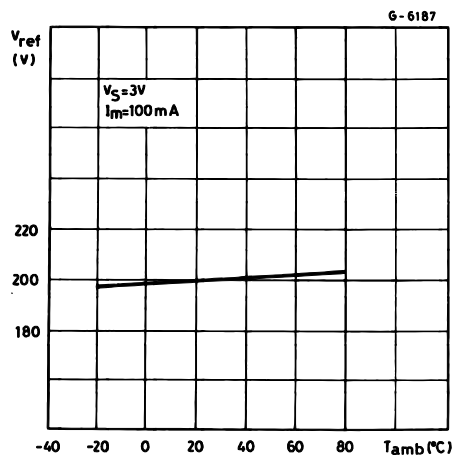


Figure 11 : Application Circuit.

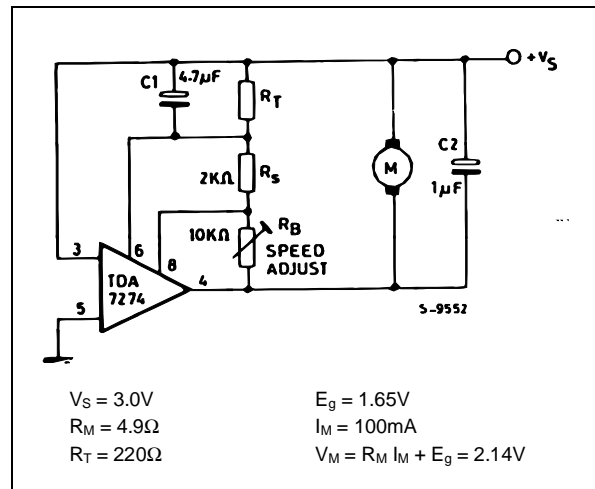


Figure 12 : P. C. Board and Components layout of the Circuit of fig. 11 (1 : 1 scale).

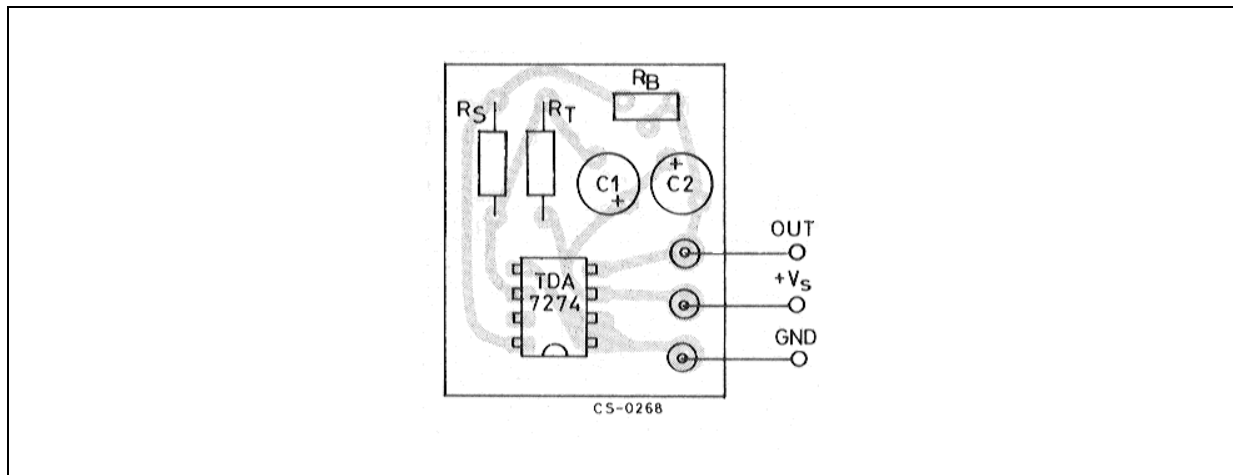


Figure 13 : Speed Variations vs. Supply Voltage.

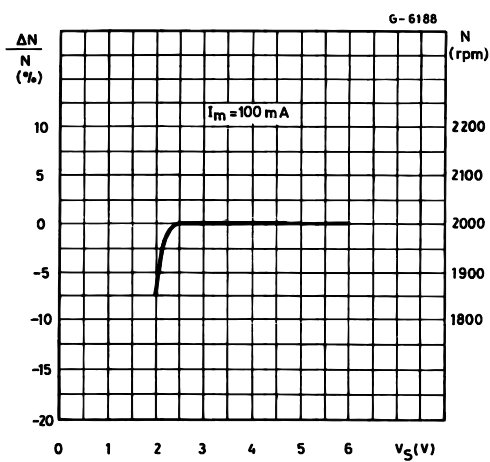


Figure 14 : Speed Variations vs. Motor Current.

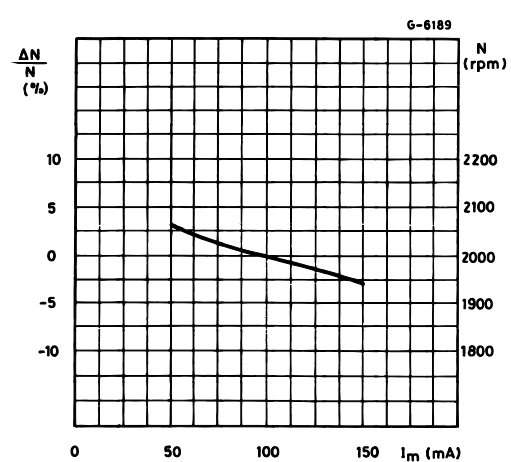
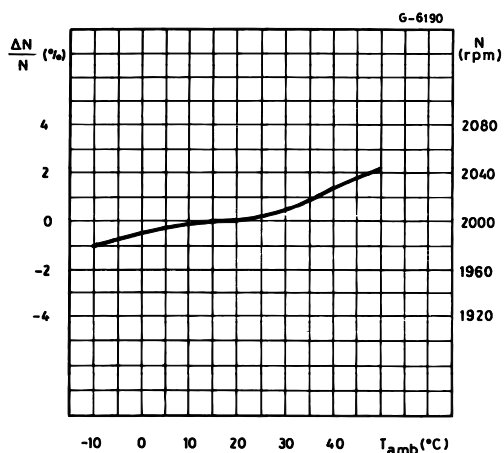
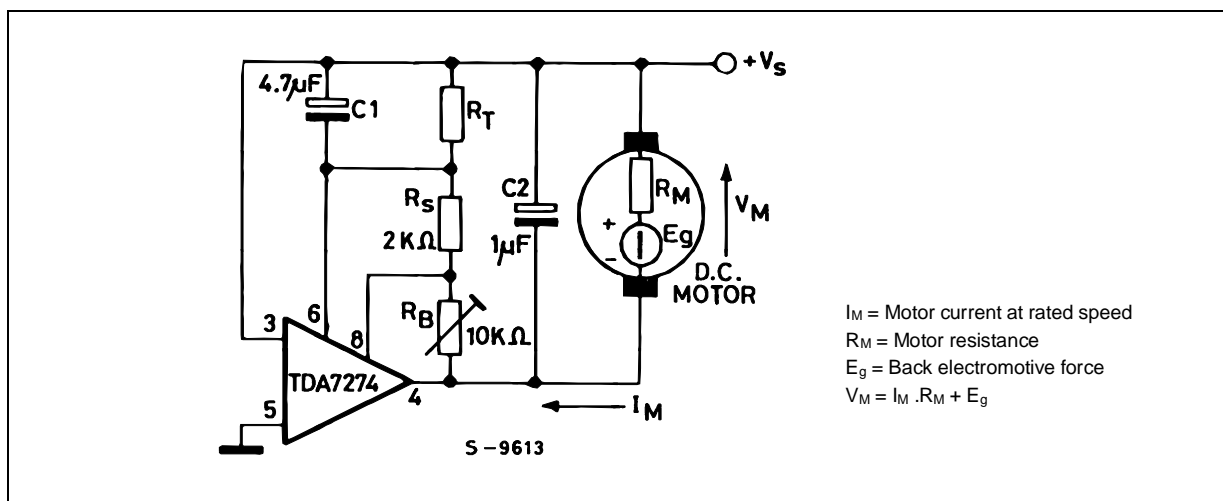


Figure 15 : Speed Variations vs. Ambient Temperature.



APPLICATION INFORMATION

Figure 16.



$$E_g = R_T I_d + I_M \left(\frac{R_T}{K} - R_M \right) + V_{ref}$$

$$\left[1 + \frac{R_B}{R_S} + \frac{R_T}{R_S} \left(1 + \frac{1}{K} \right) \right]$$

R_S has to be adjusted so that the applied voltage V_M is suitable for a given motor, the speed is then linearly adjustable varying R_B.

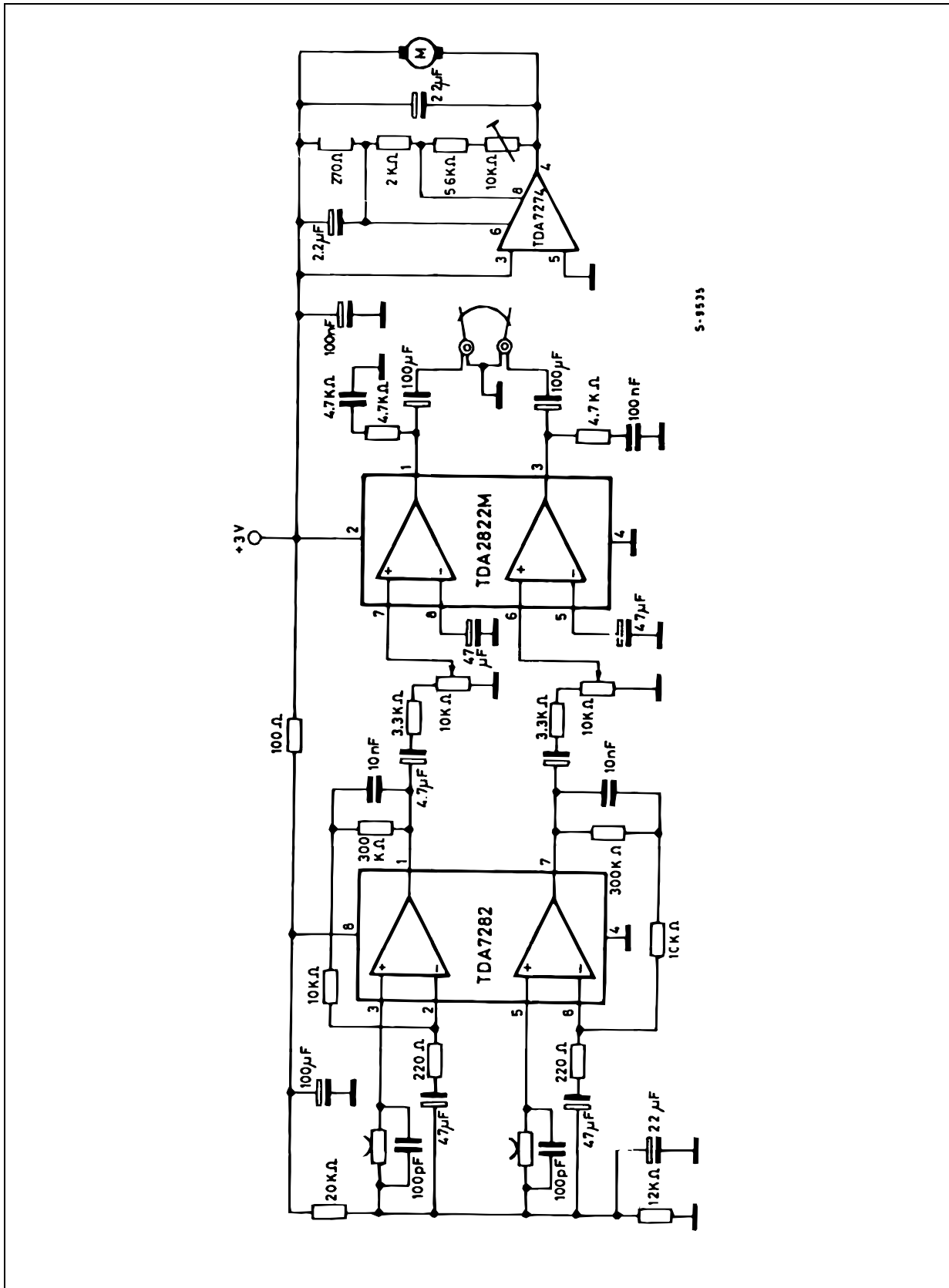
The value of R_T is calculated so that

$$R_T (max.) < K (min.) \cdot R_M (min.)$$

If R_T (max.) > K • R_M, instability may occur.

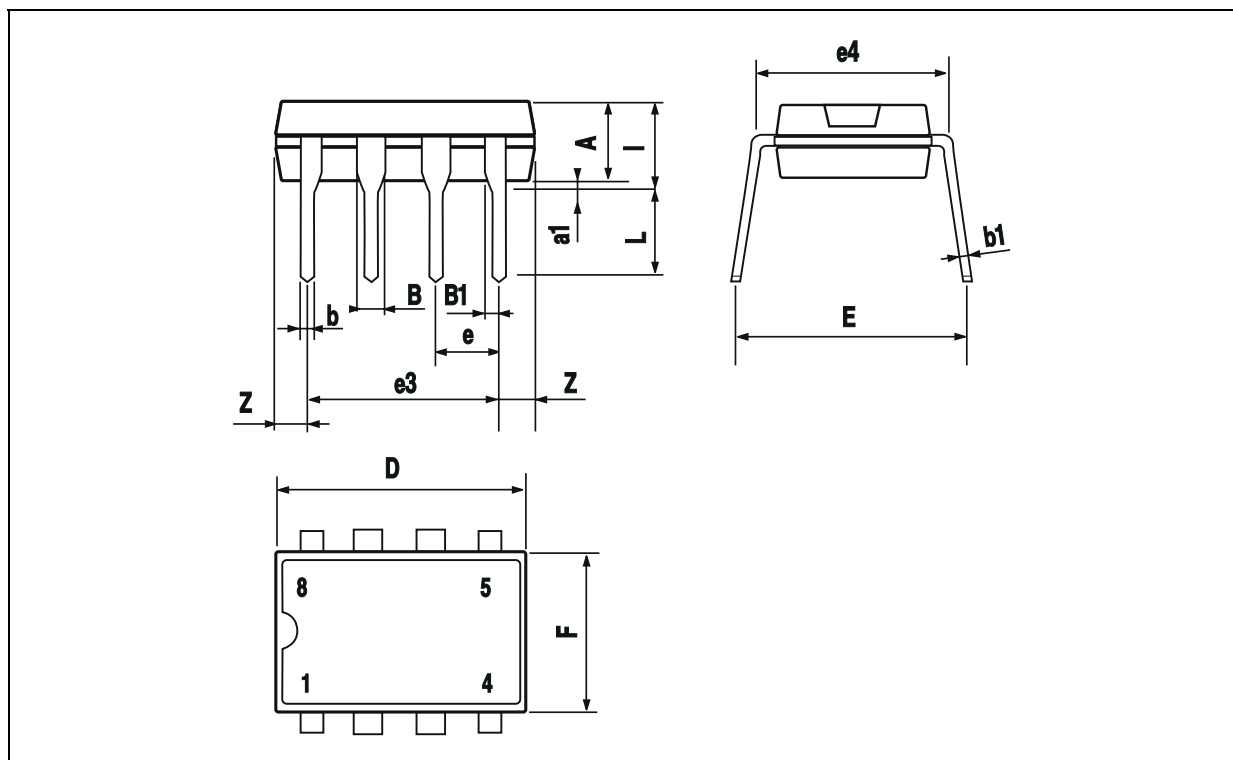
The values of C₁ (4.7 μF typ.) and C₂ (1 μF typ.) depend on the type of motor used. C₁ adjusts WOW and flutter of the system. C₂ suppresses motor spikes.

Figure 17 : 3V Stereo Cassette Miniplayer with Motor Speed Control.



MINIDIP PACKAGE MECHANICAL DATA

| DIM. | mm | | | inch | | |
|------|-------|------|-------|-------|-------|-------|
| | MIN. | TYP. | MAX. | MIN. | TYP. | MAX. |
| A | | 3.32 | | | 0.131 | |
| a1 | 0.51 | | | 0.020 | | |
| B | 1.15 | | 1.65 | 0.045 | | 0.065 |
| b | 0.356 | | 0.55 | 0.014 | | 0.022 |
| b1 | 0.204 | | 0.304 | 0.008 | | 0.012 |
| D | | | 10.92 | | | 0.430 |
| E | 7.95 | | 9.75 | 0.313 | | 0.384 |
| e | | 2.54 | | | 0.100 | |
| e3 | | 7.62 | | | 0.300 | |
| e4 | | 7.62 | | | 0.300 | |
| F | | | 6.6 | | | 0.260 |
| I | | | 5.08 | | | 0.200 |
| L | 3.18 | | 3.81 | 0.125 | | 0.150 |



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