

SANYO

No.3087

LA5537N

Monolithic Linear IC

**Consumer - Use Compact DC Motor
Speed Controller****Use**

Especially suited for speed control of consumer-use compact DC motor for cassette tape recorder, 8mm motion-picture record player.

Features

- Capable of being mounted easily due to 5-pin SEP
- On-chip stable voltage reference meeting the requirements for various motors
- Excellent stability in each characteristic against ambient temperature change
- Strobe pin to control stop, FF, governor
- Minimum number of external parts required
- On-chip kickback absorber
- On-chip protector against inverted connection to power supply

Maximum Ratings at $T_a = 25^\circ\text{C}$

Maximum Supply Voltage	V_{CC} max	20	unit	V
Allowable Power Dissipation	P_d max	1.0	W	
Operating Temperature	T_{opg}	-20 to +80	$^\circ\text{C}$	
Storage Temperature	T_{stg}	-40 to +150	$^\circ\text{C}$	
Motor Current	I_M max	3sec or 100msec duty 0.1% (at motor lock or start mode)	1.0	A

Operating Conditions at $T_a = 25^\circ\text{C}$

Operating Voltage Range	V_{CC}	3.8 to 18	unit	V
Recommended Ambient Temperature	T_a	-10 to +60	$^\circ\text{C}$	

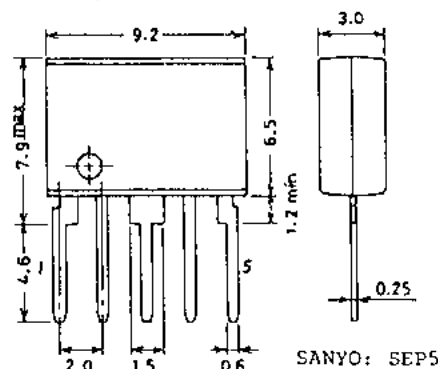
Operating Characteristics at $T_a = 25^\circ\text{C}$, Sec Test Circuit.

			min	typ	max	unit
Reference Voltage	V_{ref}	$V_{CC} = 10\text{V}, I_M = 100\text{mA}$	1.1	1.2	1.3	V
Quiescent Flow-in Current	I_q	$V_{CC} = 10\text{V}, I_M = 100\text{mA}$	1.0	1.8	3.0	mA
Shunt Ratio	K	$V_{CC} = 10\text{V}, I_M = 50 - 150\text{mA}$	23	25	27	
Residual Voltage	$V_{(sat)}$	$V_{CC} = 3.5\text{V}, I_M = 450\text{mA}$		0.5	0.8	V

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The application circuit diagrams and circuit constants herein are included as an example and provide no guarantee for designing equipment to be mass-produced.

The information herein is believed to be accurate and reliable. However, no responsibility is assumed by SANYO for its use, nor for any infringements of patents or other rights of third parties which may result from its use.

**Case Outline 3042A-S51C
(unit: mm)**

Specifications and information herein are subject to change without notice.

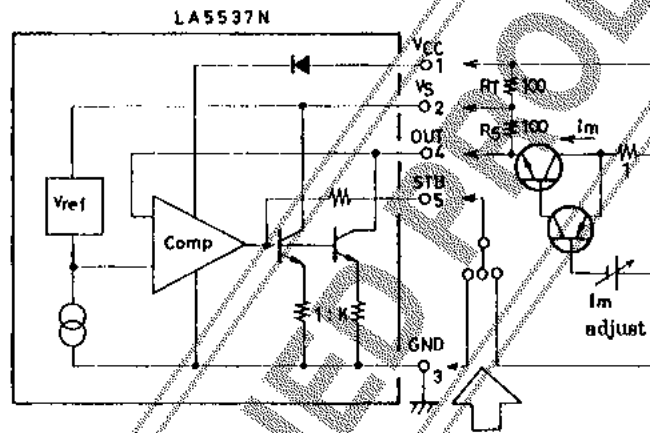
SANYO Electric Co., Ltd. Semiconductor Overseas Marketing Div.
Natsume Bldg., 18-6, 2-chome, Yushima, Bunkyo-ku, TOKYO 113 JAPAN.

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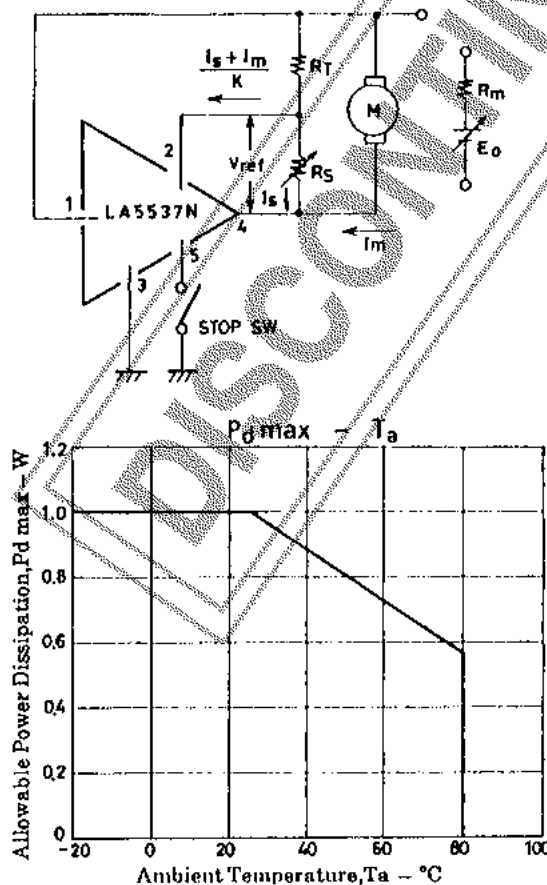
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			min	typ	max	unit
Voltage Characteristic of Reference Voltage	$\frac{\Delta V_{ref}}{V_{ref}} / \Delta V_{CC}$	$I_m = 100\text{mA}, V_{CC} = 3.8 \text{ to } 18\text{V}$		0.1	0.3	%/V
Voltage Characteristic of Shunt Ratio	$\frac{\Delta K}{K} / \Delta V_{CC}$	$I_m = 50 - 150\text{mA}, V_{CC} = 3.8 \text{ to } 18\text{V}$		0.4	0.8	%/V
Current Characteristic of Reference Voltage	$\frac{\Delta V_{ref}}{V_{ref}} / \Delta I_m$	$V_{CC} = 10\text{V}, I_m = 30 \text{ to } 200\text{mA}$		0.005	0.02	%/mA
Current Characteristic of Shunt Ratio	$\frac{\Delta K}{K} / \Delta I_m$	$V_{CC} = 10\text{V}, I_m = 30 - 80 \text{ to } 150 - 200\text{mA}$		0.03	0.1	%/mA
Temperature Characteristic of Reference Voltage	$\frac{\Delta V_{ref}}{V_{ref}} / \Delta T_a$	$V_{CC} = 10\text{V}, I_m = 100\text{mA}$ $T_a = -20 \text{ to } +80^\circ\text{C}$		0.007		%/°C
Temperature Characteristic of Reference Voltage	$\frac{\Delta K}{K} / \Delta T_a$	$V_{CC} = 10\text{V}, I_m = 50 - 150\text{mA}$ $T_a = -20 \text{ to } +80^\circ\text{C}$		0.03		%/°C

Equivalent Circuit and Test Circuit



Sample Application Circuit



$$\text{From } I_m \cdot R_m + E_O = R_T \left(I_S + \frac{I_S + I_m}{K} \right) + V_{ref},$$

$$E_O = V_{ref} + R_T \left(1 + \frac{1}{K} \right) I_S + \left(\frac{R_T}{K} - R_m \right) I_m$$

$$\text{Assuming } K \cdot R_m = R_T,$$

The number of revolutions is determined by

$$E_O = V_{ref} + R_T \left(1 + \frac{1}{K} \right) I_S$$

Unless $R_T(\text{max}) < K \cdot R_m(\text{min})$
in the Sample Application Circuit,
the operation becomes unstable.