LA5536N

Monolithic Linear IC

COMPACT DC MOTOR SPEED CONTROLLER

Applications

. Speed control of compact DC motor for cassette tape recorder, radio-cassette recorder, record player

Features

. 4-pin SEP package facilitating mounting
. On-chip stable voltage reference meeting the requirements for various motors
. Excellent stability in each characteristic against ambient temperature change
. On-chip protector against inverted connection of supply voltage
. Minimum number of external parts required
. On-chip kickback absorber

Maximum Ratings at Ta=25°C

				unit
Maximum Supply Voltage	V_{CC} max		20	V
Allowable Power Dissipation	Pd max		1.2	W
Motor Current	Im max	5sec or 100msec duty 0.1% (at motor lock or start mode)	1.4	A
Operating Temperature	Topg		-20 to +80	°C
Storage Temperature	Tstg		-40 to +150	°C

Operating Conditions at Ta=25°C

			unit
Supply Voltage Range	V_{CC} op	3.8 to 18	V
Recommended Operating Temperature	Topg	-10 to +60	°C

Operating Characteristics at Ta=25°C, See specified Test Circuit.

			min	typ	max	unit
Reference Voltage	Vref	V_{CC}=10V, Im=100mA	1.1	1.2	1.3	V
Quiescent Flow-in Current	Id	V_{CC}=10V, Im=100mA	1.0	1.8	3.0	mA
Shunt Ratio	K	V_{CC}=10V, Im=50-150mA	23	25	27	
Residual Voltage	V(sat)	V_{CC}=4.2V, Im=450mA		0.5	0.8	V

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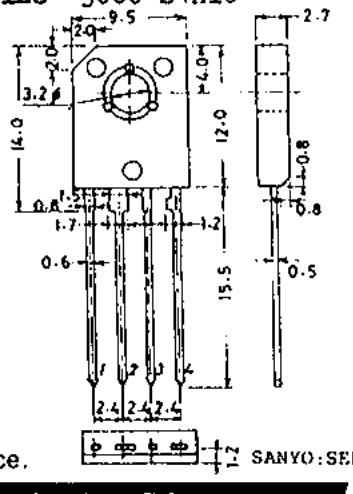
Case Outline 3080-S4HIC
(unit:mm)



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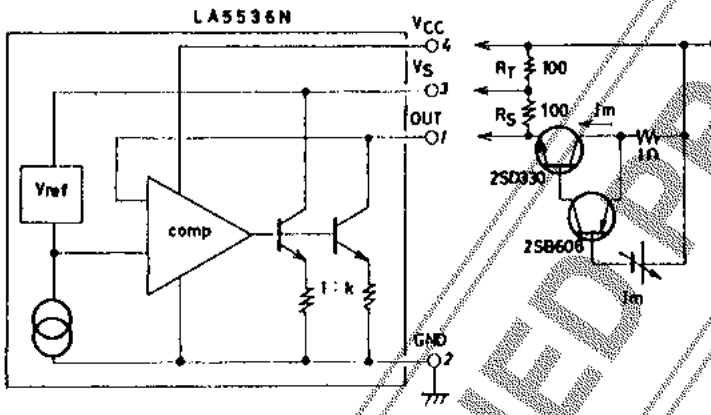
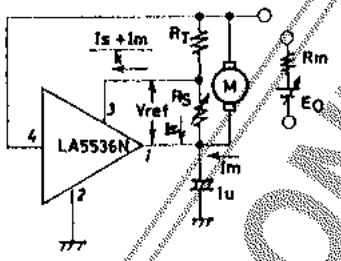
			min	typ	max	unit
Voltage Characteristic of Reference Voltage	$\frac{\Delta Vref}{Vref}/\Delta V_{CC}$	Im=100mA, V_{CC}=3.8 to 18V		0.1	0.3	%/V
Voltage Characteristic of Shunt Ratio	$\frac{\Delta K}{K}/\Delta V_{CC}$	Im=0.05-0.15A, V_{CC}=3.8 to 18V		0.4	0.8	%/V
Current Characteristic of Reference Voltage	$\frac{\Delta Vref}{Vref}/\Delta Im$	V_{CC}=10V, Im=30 to 200mA		0.005	0.02	%/mA
Current Characteristic of Shunt Ratio	$\frac{\Delta K}{K}/\Delta Im$	V_{CC}=10V, Im=30-80mA to 150-200mA		0.03	0.1	%/mA
Temperature Characteristic of Reference Voltage	$\frac{\Delta Vref}{Vref}/\Delta Ta$	V_{CC}=10V, Im=100mA, Ta=-20 to +80°C		0.007		%/°C
Temperature Characteristic of Shunt Ratio	$\frac{\Delta K}{K}/\Delta Ta$	V_{CC}=10V, Im=50-150mA, Ta=-20 to +80°C		0.03		%/°C

Equivalent Circuit Block Diagram and Test Circuit



Sample Application Circuit



The number of revolutions is calculated by using the equation shown below.

From $Im \cdot Rm + Eo = R_T(Is + \frac{Is+Im}{K}) + Vref$,

$Eo = Vref + R_T(1+\frac{1}{K})Is + (\frac{R_T}{K} - Rm)Im$,

Assuming $K \cdot Rm = R_T$,

The number of revolutions is determined by

$Eo = Vref + R_T(1+\frac{1}{K})Is$

Unless $R_T(max) < K \cdot Rm(min)$ in the Application Circuit, the operation becomes unstable.