Ordering number:ENN2574A

Monolithic Linear IC

LA5587

General-Purpose Compact DC Moter Speed Controller

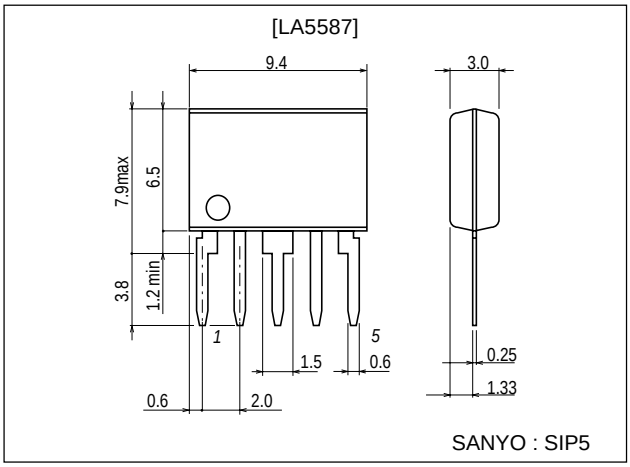
Features

- On-chip stable voltage reference meeting the requirements for various motors.
- Wide operating voltage range (3.8 to 16V).
- Minimum number of external parts required and small-sized package.
- Facilitates speed control.
- On-chip kickback absorber.
- On-chip protector against inverted connection to power supply.

Package Dimensions

unit:mm

3042C-SIP5



Specifications

Maximum Ratings at Ta = 25˚C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V_{CC} max		18	V
Motor current	Im max	Switch ON or lock mode	1.4	A
Allowable power dssipation	Pd max		1.2	W
Operating temperature	Topr		–20 to +80	˚C
Storage temperature	Tstg		–40 to +150	˚C

Operating Conditions at Ta = 25˚C

Parameter	Symbol	Conditions	Ratings	Unit
Recommended operating voltage	V_{CC} op		3.8 to 16	V
Recommended operating temperature	Topr		–20 to +80	˚C

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

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Reference voltage	Vref	V_{CC}=12V, Im=10mA	1.08	1.21	1.27	V
Quiescent current drain	Id	V_{CC}=12V, Im=0mA		1.0	1.6	mA
Shunt ratio	K	V_{CC}=12V, Im=50–150mA	18	20	22	
Residual voltage	V(sat)	V_{CC}=4.2V, R_T=4.4Ω		0.94		V

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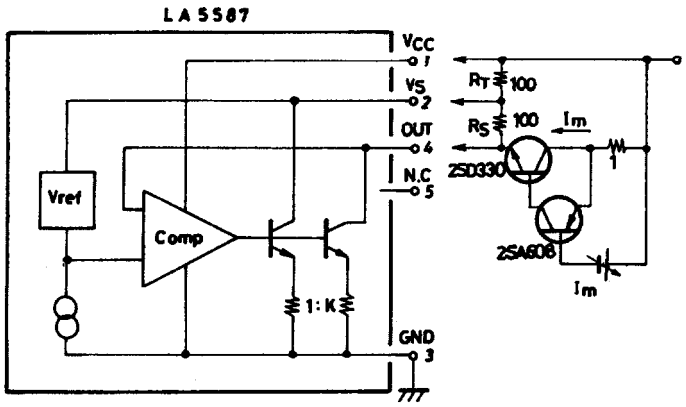
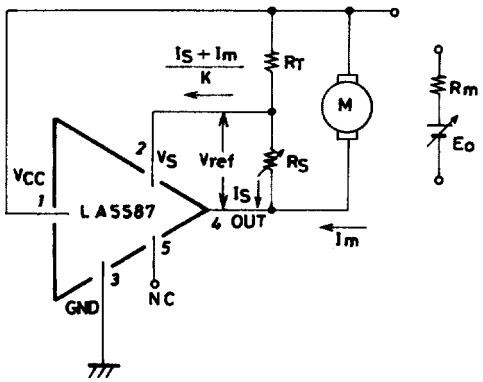
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Voltage characteristic of reference voltage	$\frac{\Delta Vref}{Vref}/\Delta V_{CC}$	V_{CC}=6.3 to 16V, Im=100mA		0.06		%/V
Voltage characteristic of shunt ratio	$\frac{\Delta K}{K}/\Delta V_{CC}$	V_{CC}=6.3 to 16V, Im=50–150mA		0.1		%/V
Current characteristic of reference voltage	$\frac{\Delta Vref}{Vref}/\Delta Im$	V_{CC}=12V, Im=30 to 200mA		–0.01		%/mA
Current characteristic of shunt ratio	$\frac{\Delta K}{K}/\Delta Im$	V_{CC}=12V, Im=50–100 to 150–200mA		0.02		%/mA
Voltage characteristic of reference voltage	$\frac{\Delta Is}{Is}/\Delta V_{CC}$	V_{CC}=6 to 16V, Im=0mA		0.1		%/V
Temperature characteristic of reference voltage	$\frac{\Delta Vref}{Vref}/\Delta Ta$	V_{CC}=12V, Im=10mA, Ta=–20 to +80°C		–0.01		%/°C
Temperature characteristic of reference voltage	$\frac{\Delta K}{K}/\Delta Ta$	V_{CC}=12V, Im=50–150mA, Ta=–20 to +80°C		–0.01		%/°C

Equivalent Circuit Block Diagram and Test Circuit



Sample Application Circuit



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

$E_O = Vref + R_T (1 + \frac{1}{K}) I_S + (\frac{R_T}{K} - Rm) Im$

Assuming $K \cdot Rm = R_T$,
The number of revolutions is determined by

$E_O = Vref + R_T (1 + \frac{1}{K}) I_S$

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