Ordering number : EN2574E

SANYO Semiconductors
DATA SHEET

LA5587 — Monolithic Linear IC General-Purpose Compact DC Motor Speed Controller

Overview

LA5587 is a general-purpose compact DC motor speed controller. Especially suited for controlling speed of a DC motor for tape-recorders, radio-cassettes, record-players and etc.

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.

Specifications

Maximum Ratings at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V_{CC} max		12	V
Maximum motor current	I_m max	Switch-on or lock mode	1.4	A
Allowable power dissipation	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 Supply voltage range	V_{CC} op		3.8 to 16	V
Recommended operating temperature	Topg		-10 to +80	°C

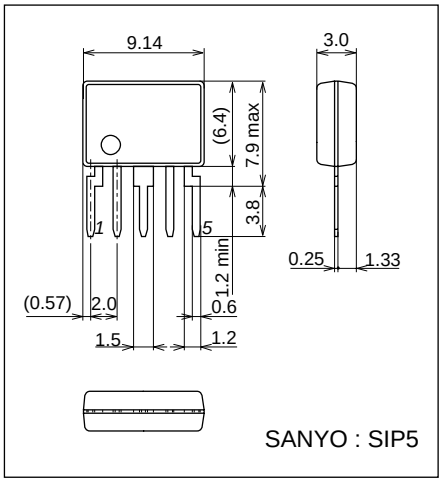
Electrical Characteristics at Ta = 25°C, V_{CC} = 12V, See Test Circuit.

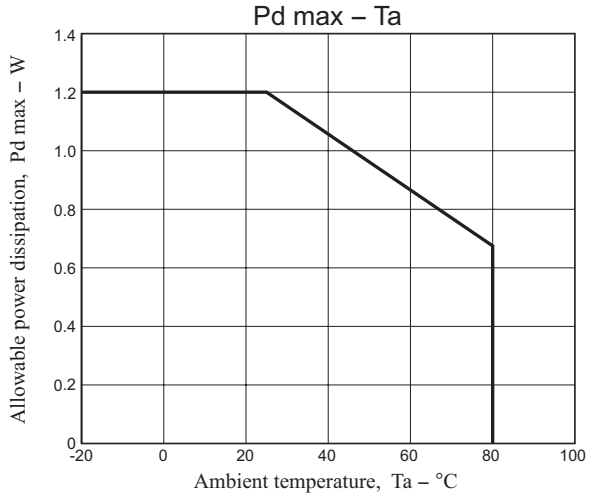
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Reference voltage	Vref	I_m = 10mA	1.08	1.21	1.27	V
Quiescent flow-in current	I_d	I_m = 0mA		1.0	1.6	mA
Shunt ratio	K	I_m = 50–150mA	18	20	22	
Residual voltage	Vsat	V_{CC} = 4.2V, R_T = 4.4Ω		0.94		V
Voltage of characteristic of reference voltage	$\frac{\Delta Vref}{Vref}/\Delta V_{CC}$	V_{CC} = 6.3 to 16V, I_m = 100mA,		0.06		%/V
Voltage of characteristic of shunt ratio	$\frac{\Delta K}{K}/\Delta V_{CC}$	V_{CC} = 6.3 to 16V, I_m = 50–150mA,		0.1		%/V
Current characteristic of reference voltage	$\frac{\Delta Vref}{Vref}/\Delta I_m$	I_m = 30–200mA		-0.01		%/mA
Current characteristic of shunt ratio	$\frac{\Delta K}{K}/\Delta I_m$	I_m = 50–100mA to 150–200mA		0.02		%/mA
voltage characteristic of reference voltage	$\frac{\Delta I_S}{I_S}/\Delta V_{CC}$	V_{CC} = 6 to 16V, I_m = 0mA		0.1		%/V
Temperature characteristic of reference voltage	$\frac{\Delta Vref}{Vref}/\Delta Ta$	I_m = 10mA,Ta = -20 to +80°C		-0.01		%/°C
Temperature characteristic of shunt ratio	$\frac{\Delta K}{K}/\Delta Ta$	I_m = 50–150mA, Ta = -20 to +80°C		-0.01		%/°C

Package Dimensions

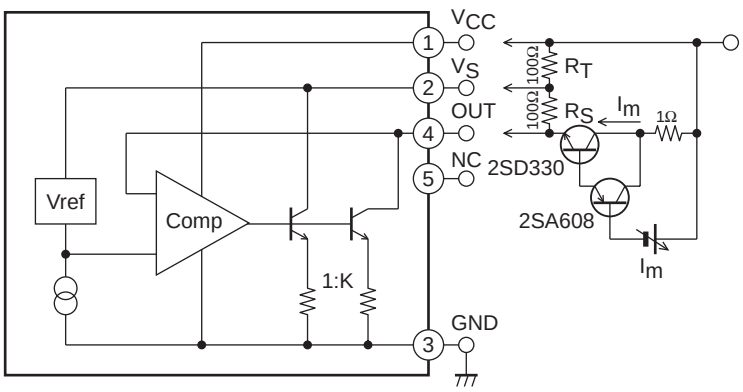
unit : mm (typ)

3042D

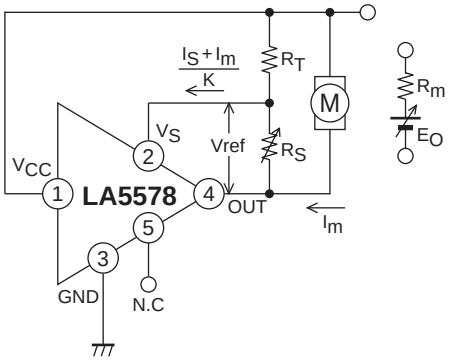




Block Diagram and Test Circuit



Application circuit Example



From $I_m \times R_m + E_O = R_T (I_S + \frac{I_S + I_m}{K}) + Vref$,

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

Assuming $K \times R_m = R_T$,
The number of revolutions is determined by

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

Unless RT (max) < $K \times R_m$ (min) in the Sample Application Circuit, the operation becomes unstable.