Ordering number : EN3028B

SANYO Semiconductors
DATA SHEET

LA5588 — Monolithic Linear IC General-Purpose Compact DC Motor Speed Controller

Overview

LA5588 is a general-purpose compact DC motor speed controller. Especially suited for controlling speed of a DC motor for Radio-cassette tape recorders, car-stereos.

Features

- Wide operating voltage range (4.5 to 18V).
- Possible to make the equipment compact because of minimum number of external parts required and small-sized package.
- Facilitates speed control.
- Easy to control rotational speed from low speed to high speed.
- On-chip kickback absorber.
- High stability in oscillation.
- Facilitates heat radiation because of the use of a fin.

Specifications

Maximum Ratings at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V_S max		20	V
Starting current	I_m max	Switch-on or lock mode	1.4	A
Allowable power dissipation	Pd max		1.0	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_S op		3 to 18	V
Control resistance	R_A+R_B		100	Ω

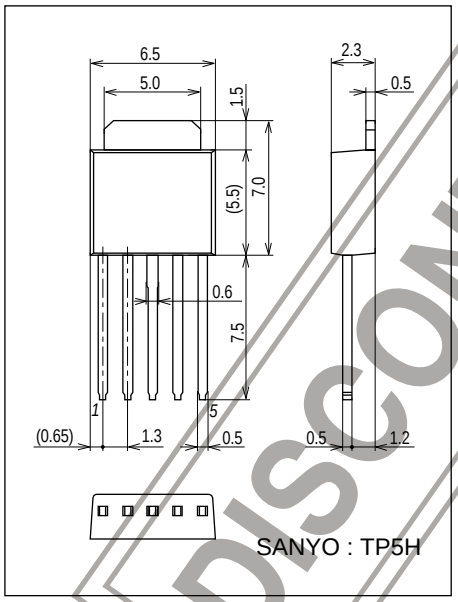
Electrical Characteristics at Ta = 25°C, V_S = 8V, See Test Circuit.

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Reference voltage	Vref	I_m = 100mA	1.1	1.2	1.3	V
2nd reference voltage	Vref'	I_m = 100mA	2.0	2.15	2.3	V
Quiescent flow-in current	I_d	I_m = 0mA	0.5	1.73	2.5	mA
Shunt ratio	K	I_m = 0–100mA	18	20	22	
Residual voltage	Vsat	V_{CC} = 3V, I_m = 200mA		1.1	1.4	V
Voltage of characteristic of 2nd reference voltage	$\frac{\Delta Vref'}{Vref'}/\Delta V_S$	V_{CC} = 3 to 18V, I_m = 100mA	-0.02	0	+0.02	%/V
Voltage of characteristic of reference voltage	$\frac{\Delta Vref}{Vref}/\Delta V_S$	V_{CC} = 3 to 18V, I_m = 100mA	-0.05	+0.025	+0.1	%/V
Voltage of characteristic of quiescent flow-in current	$\frac{\Delta I_d}{I_d}/\Delta V_S$	V_{CC} = 3 to 18V, I_m = 0mA		0.3	0.8	%/V
Voltage of characteristic of shunt ratio	$\frac{\Delta K}{K}/\Delta V_S$	V_{CC} = 3 to 18V, I_m = 0–100mA	-0.8	-0.3	+0.3	%/V
Current characteristic of reference voltage	$\frac{\Delta Vref}{Vref}/\Delta I_m$	I_m = 50–150mA	-0.002	0	+0.002	%/mA
Current characteristic of 2nd reference voltage	$\frac{\Delta Vref'}{Vref'}/\Delta I_m$	I_m = 50–150mA	-0.1	-0.013	+0.05	%/mA
Current characteristic of shunt ratio	$\frac{\Delta K}{K}/\Delta I_m$	I_m = 50–100mA to 150–200mA		0.008	0.025	%/mA
Temperature characteristic of reference voltage	$\frac{\Delta Vref}{Vref}/\Delta Ta$	I_m = 100mA, Ta = -20 to +80°C		0		%/°C
Temperature characteristic of 2nd reference voltage	$\frac{\Delta Vref'}{Vref'}/\Delta Ta$	I_m = 100mA, Ta = -20 to +80°C		0		%/°C
Temperature characteristic of shunt ratio	$\frac{\Delta K}{K}/\Delta Ta$	I_m = 100mA, Ta = -20 to +80°C		0.12		%/°C

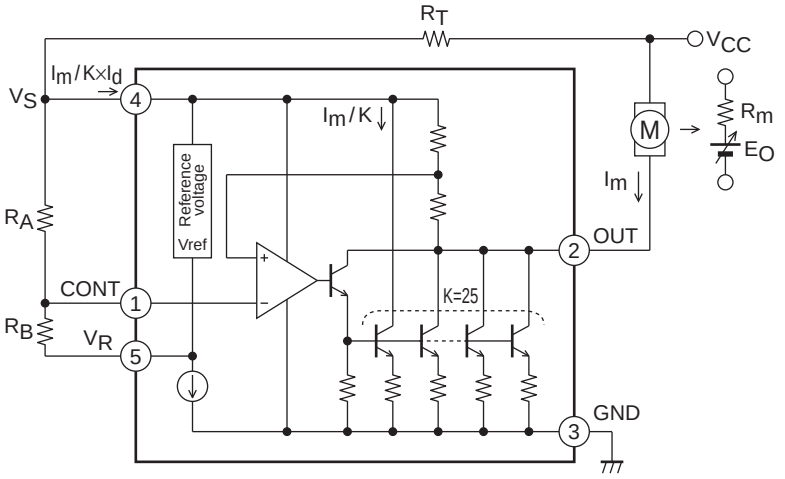
Package Dimensions

unit : mm (typ)

3103A

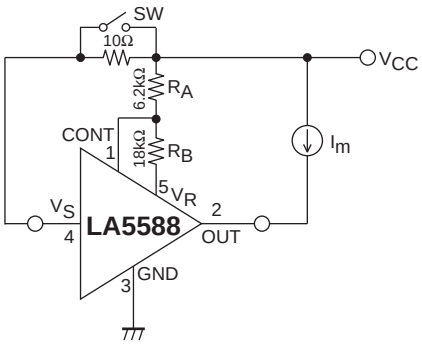


Block Diagram



R_m: Armature winding resistance
E_O: Motor cunter electromotive force
I_m: Motor current

Test Circuit



1) Reference voltage (Vref)
   Measure the voltage across pins V_S and V_R with the Switch-on.
2) 2nd reference voltage (Vref')
   Measure the voltage across pins V_S and OUT with the switch-on.
3) Quiescent flow-in current (I_d)
   Measure using the voltage across the resistor of 10Ω with the switch-on.
4) Shunt ratio (K)
   With the switch-off, measure I_d, I_d1 and I_d, I_d2 at $I_m = I_m2$ and calculate using the following formula.

$$K = \frac{(I_m2 - I_m1)}{(I_d2 - I_d1)}$$

5) Residual voltage (Vsat)
   With the switch-off, measure the voltage across pins OUT and GND at V_S = 3V, I_m = 200mA.