Monolithic Linear IC

SANYO No.3028

LA5588

General-Purpose Compact DC Motor Speed Controller

Suited for use in speed control of general-purpose compact DC motors for radio-cassette recorders, car stereos

Features and Functions

- 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

Maximum Ratings at Ta = 25°C

				unit
Maximum Supply Voltage	V_S max		20	V
Allowable Power Dissipation	Pd max	Heat is radiated to Cu foil of 1cm²: 1.7W	1.0	W
Operating Temperature	Topr		−20 to +80	°C
Storage Temperature	Tstg		−40 to +150	°C
Starting Current	I_M max	Switch ON or lock	1.4	A

Operating Conditions at Ta = 25°C

			unit
Supply Voltage	V_S	3 to 18	V
Control Resistance	RA + RB	100	kΩ

Operating Characteristics at Ta = 25°C

			min	typ	max	unit
Reference Voltage	Vref	V_S=8V, I_M=100mA	1.1	1.2	1.3	V
2nd Reference Voltage	Vref'	V_S=8V, I_M=100mA	2.0	2.15	2.3	V
Quiescent Flow-in Current	Id	V_S=8V, I_M=0	0.5	1.73	2.5	mA
Shunt Ratio	K	V_S=8V, I_M=0−100mA	22	24	26	
Residual Voltage	$V_{(sat)}$	V_S=3V, I_M=200mA		1.1	1.4	V
Voltage Characteristic of Reference Voltage	$\frac{\Delta Vref}{Vref}/\Delta V_S$	V_S=3 to 18V, I_M=100mA	−0.02	0	+0.02	%/V

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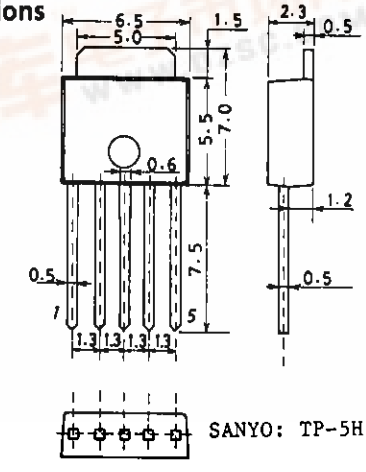
Package Dimensions (unit: mm)
3103



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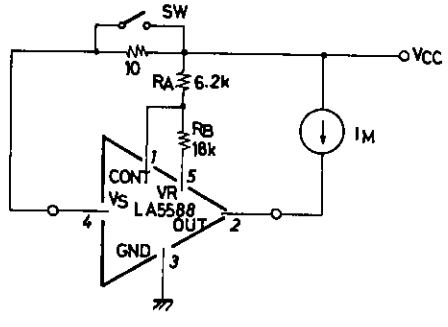
			min	typ	max	unit
Voltage Characteristic of 2nd Reference Voltage	$\frac{\Delta Vref'}{Vref'}/\Delta V_S$	V_S=3 to 18V, I_M=100mA	−0.05	0.025	0.1	%/V
Voltage Characteristic of Quiescent Flow-in Current	$\frac{\Delta Id}{Id}/\Delta V_S$	V_S=3 to 18V, I_M=0		0.3	0.8	%/V
Voltage Characteristic of Shunt Ratio	$\frac{\Delta K}{K}/\Delta V_S$	V_S=3 to 18V, I_M=0-100mA	−0.8	−0.3	0.3	%/V
Current Characteristic of Reference Voltage	$\frac{\Delta Vref}{Vref}/\Delta I_M$	V_S=8V, I_M=50 to 150mA	−0.002	0	0.002	%/mA
Current Characteristic of 2nd Reference Voltage	$\frac{\Delta Vref'}{Vref'}/\Delta I_M$	V_S=8V, I_M=50 to 150mA	−0.1	−0.013	0.05	%/mA
Current Characteristic of Shunt Ratio	$\frac{\Delta K}{K}/\Delta I_M$	V_S=8V, I_M=50−100mA to 150−200mA		0.008	0.025	%/mA
Temperature Characteristic of Reference Voltage	$\frac{\Delta Vref}{Vref}/\Delta Ta$	V_S=8V, I_M=100mA, Ta=20 to 80°C		0		%/°C
Temperature Characteristic of 2nd Reference Voltage	$\frac{\Delta Vref'}{Vref'}/\Delta Ta$	V_S=8V, I_M=100mA, Ta=20 to 80°C		0		%/°C
Temperature Characteristic of Quiescent Flow-in Current	$\frac{\Delta Id}{Id}/\Delta Ta$	V_S=8V, I_M=100mA, Ta=20 to 80°C		0.12		%/°C
Temperature Characteristic of Shunt Ratio	$\frac{\Delta K}{K}/\Delta Ta$	V_S=8V, I_M=100mA, Ta=20 to 80°C		0.02		%/°C

Test Circuit

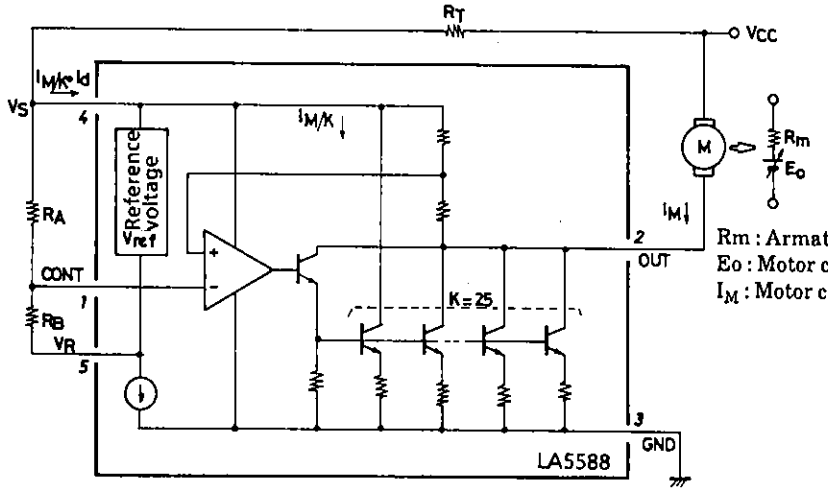


1) Reference voltage (Vref)
   Measure the voltage across pins V_S and V_R with the SW ON.
2) 2nd reference voltage (Vref')
   Measure the voltage across pins V_S and OUT with the SW ON.
3) Quiescent flow-in current (Id)
   Measure using the voltage across the resistor of 10Ω with the SW OFF.
4) Shunt ratio (K)
   With the SW OFF, measure Id,Id1 at $I_M=I_M1$ and Id,Id2 at $I_M=I_M2$ and calculate using the following formula.

$$K=\frac{(I_M2-I_M1)}{(Id2-Id1)}$$

5) Residual voltage (V_{sat})
   With the SW OFF, measure the voltage across pins OUT and GND at V_S=3V, I_M=200mA.

Block Diagram



Rm : Armature winding resistance
Eo : Motor counter electromotive force
I_M : Motor current