SGS **TDA1151**

LINEAR INTEGRATED CIRCUIT

MOTOR SPEED REGULATOR

- EXCELLENT VERSATILITY IN USE
- HIGH OUTPUT CURRENT (UP TO 800 mA)
- LOW QUIESCENT CURRENT (1.7 mA)
- LOW REFERENCE VOLTAGE (1.2V)
- EXCELLENT PARAMETERS STABILITY VERSUS TEMPERATURE

The TDA 1151 is a monolithic integrated circuit in Jedec TO-126 plastic package. It is intended for use as speed regulator for DC morors of record players, tape and cassette recorders, movie cameras, toys etc.

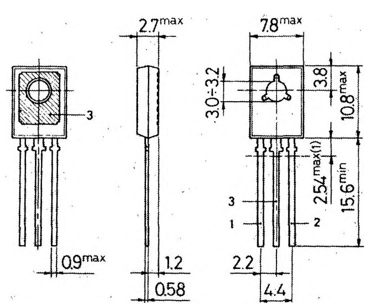
ABSOLUTE MAXIMUM RATINGS

V_s	Supply voltage	20	V
P_{tot}	Total power dissipation at T_{amb} = 70°C	0.8	W
	at T_{case} = 100°C	5	W
T_{stg}, T_j	Storage and junction temperature	-40 to 150	°C

ORDERING NUMBER: TDA 1151

MECHANICAL DATA

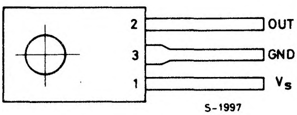
Dimensions in mm

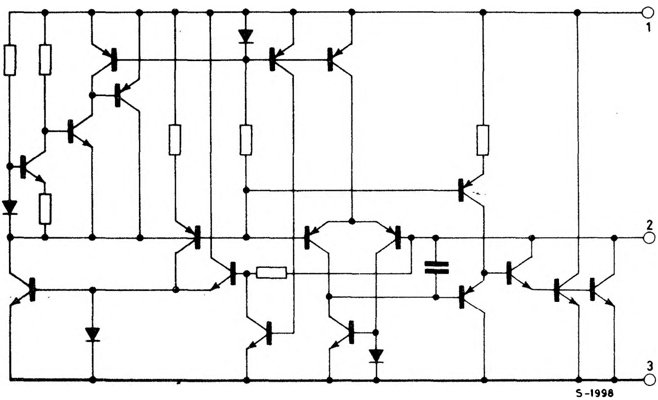


(1) Within this region the cross-section of the leads is uncontrolled

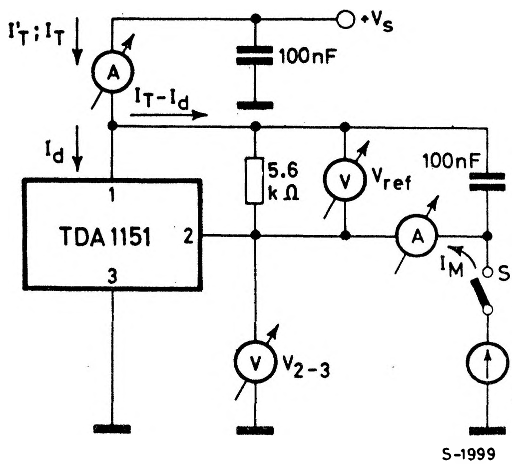
TO-126 (SOT 32)

CONNECTION AND SCHEMATIC DIAGRAMS





TEST CIRCUIT



THERMAL DATA

$R_{th\ j\text{-}case}$	Thermal resistance junction–case	max	10	°C/W
$R_{th\ j\text{-}amb}$	Thermal resistance junction–ambient	max	100	°C/W

ELECTRICAL CHARACTERISTICS (Refer to the test circuit, T_{amb} = 25°C)

	Parameter	Test conditions	Min.	Typ.	Max.	Unit
V_{ref}	Reference voltage (between pins 1 and 2)	V_s = 6V I_M = 0.1A	1.1	1.2	1.3	V
I_d	Quiescent drain current	V_s = 6V I_M = 100 μA		1.7		mA
I_{MS}	Starting current	V_s = 5V $\Delta V_{ref}/V_{ref}$ = -50%	0.8			A
V_{1-3}	Minimum supply voltage	I_M = 0.1A $\Delta V_{ref}/V_{ref}$ = -5%			2.5	V
$K = I_M/I'_T$	Reflection coefficient	V_s = 6V I_M = 0.1A	18	20	22	–
$\frac{\Delta K}{K}/\Delta V_s$		V_s = 6V to 18V I_M = 0.1A		0.45		%/V
$\frac{\Delta K}{K}/\Delta I_M$		V_s = 6V I_M = 25 to 400 mA		0.005		%/mA
$\frac{\Delta K}{K}/\Delta T$		V_s = 6V I_M = 0.1A T_{amb} = -20 to 70°C		0.02		%/°C
$\frac{\Delta V_{ref}}{V_{ref}}/\Delta V_s$	Line regulation	V_s = 6V to 18V I_M = 0.1A		0.02		%/V
$\frac{\Delta V_{ref}}{V_{ref}}/\Delta I_M$	Load regulation	V_s = 6V I_M = 25 to 400 mA		0.009		%/mA
$\frac{\Delta V_{ref}}{V_{ref}}/\Delta T$	Temperature coefficient	V_s = 6V I_M = 0.1A T_{amb} = -20 to 70°C		0.02		%/°C

Fig. 1 - Quiescent drain current vs. power supply

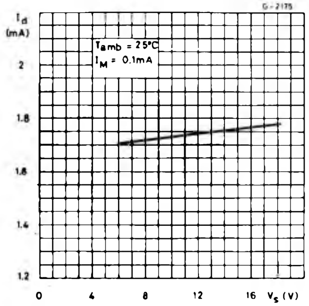


Fig. 2 - Quiescent drain current vs. ambient temperature

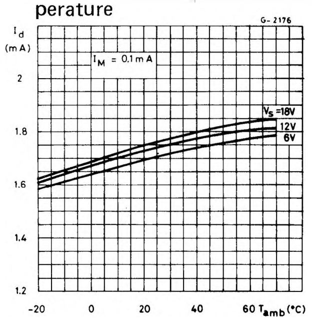


Fig. 3 - Reference voltage vs. supply voltage

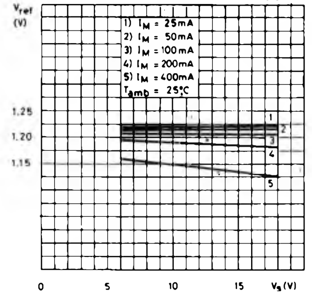


Fig. 4 - Reference voltage vs. motor current

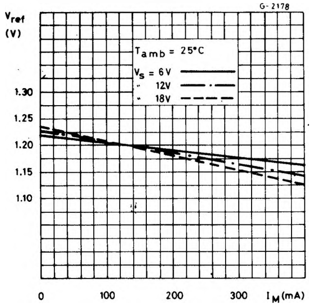


Fig. 5 - Reference voltage vs. ambient temperature

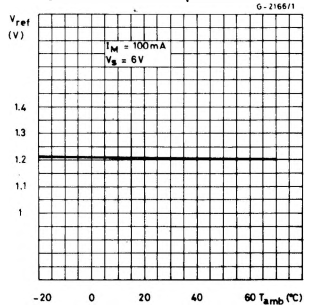


Fig. 6 - Reflection coefficient vs. supply voltage

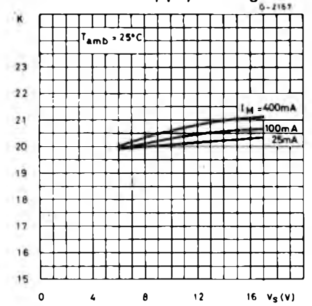


Fig. 7 - Reflection coefficient vs. motor current

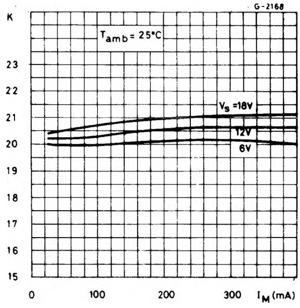


Fig. 8 - Reflection coefficient vs. ambient temperature

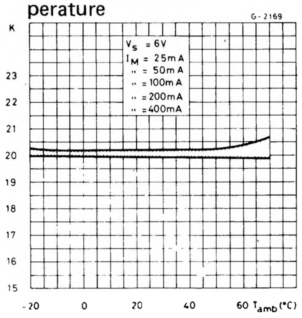
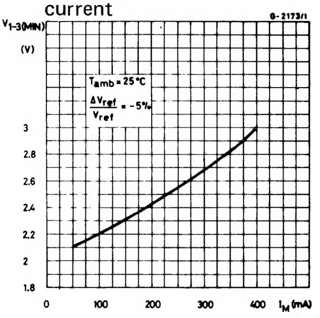
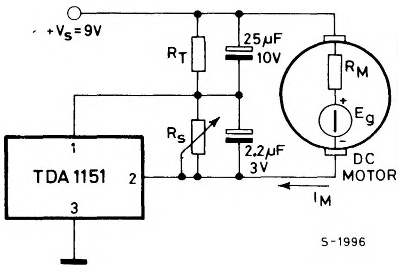


Fig. 9 - Typical minimum supply voltage vs. motor current



APPLICATION INFORMATION

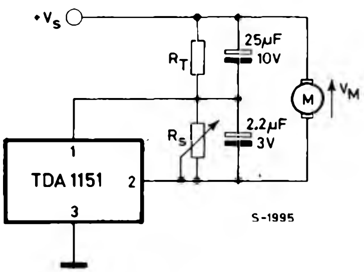


I_M = Motor current at rated speed
R_M = Motor resistance
E_g = Back electromotive force

$$R_{S\ min} = \frac{V_{ref} \cdot R_T}{E_g - (V_{ref} - I_d \cdot R_T)}$$

$R_T = K \cdot R_M$
$R_T = K_{typ} \cdot R_{M\ typ}$
If $R_{T\ max} > KR_{M\ min}$ instability may occur

Application circuit



$V_s = +9V$
$R_M = 14.2\Omega$
$R_T = 280\Omega$
$R_S = 1\ k\Omega$
$E_g = 2.9V$
$I_M = 150\ mA$
$V_M = R_M \cdot I_M + E_g = 5.03V$

Note: A ceramic capacitor of 10 nF between pins, 1 and 2 improves stability in some applications.

Fig. 10 - Speed variation vs. supply voltage

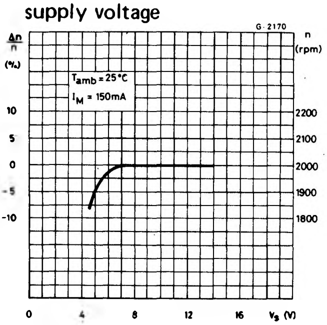


Fig. 11 - Speed variation vs. motor current

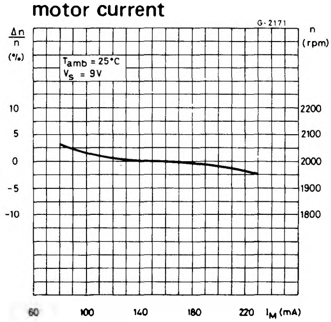
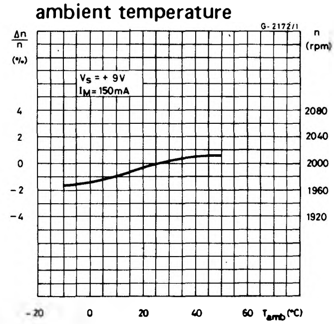
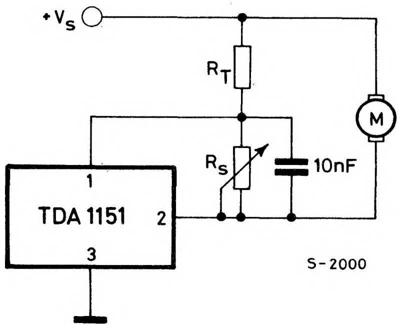


Fig. 12 - Speed variation vs. ambient temperature



APPLICATION INFORMATION (continued)

Low cost application circuit



V_S = +12V
R_M = 14.7Ω
R_T = 290Ω
R_S = 1 kΩ
E_g = 2.65V
I_M = 110 mA

Fig. 13 - Speed variation vs. supply voltage

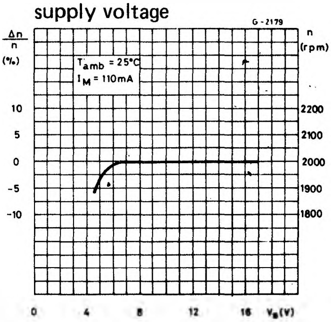


Fig. 14 - Speed variation vs. motor current

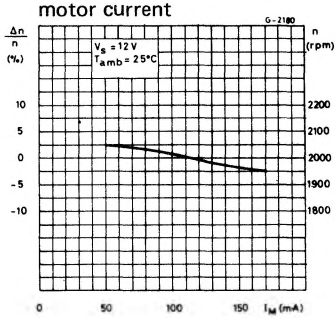


Fig. 15 - Speed variation vs. ambient temperature