DUAL POWER DRIVER

GENERAL DESCRIPTION

The TDA7073 is a dual power driver circuit in a Bridge-Tied-Load (BTL) configuration and is intended for use as a power driver in servo systems with a single supply. It has been primarily designed for use in compact disc players and is capable of driving focus, tracking, sled functions and spindle motors.

Features

- No external components
- Very high slew rate
- Single power supply
- Short-circuit proof
- High output current (0.6 A)
- Wide supply voltage range
- Low output offset voltage
- Suitable for handling pulse width modulated (PWM) signals up to 176 kHz
- Electrostatic discharge (ESD) protection on all pins

QUICK REFERENCE DATA

parameter	conditions	symbol	min.	typ.	max.	unit
Supply voltage range		V_P	3	5	15	V
Total quiescent current	$R_L = \infty$	I_{tot}	–	8	16	mA
Internal voltage gain		G_v	37.5	39	40	dB
Slew rate		SR	–	12	–	V/μs
Repetitive peak output current		I_{ORM}	–	–	0.6	A
Input bias current		I_{bias}	–	100	300	nA
Cut-off frequency	–3 dB	f_h	–	1.5	–	MHz

PACKAGE OUTLINE

16-lead DIL; plastic (SOT38).

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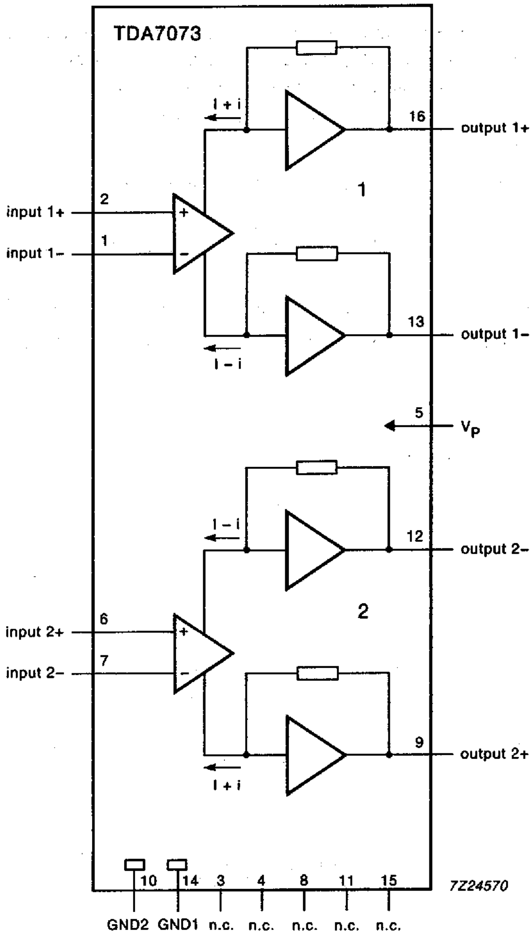

Fig.1 Block diagram.

PINNING

1. Negative input 1
2. Positive input 1
3. Not connected
4. Not connected
5. Supply voltage V_P
6. Positive input 2
7. Negative input 2
8. Not connected
9. Positive output 2
10. Ground 2
11. Not connected
12. Negative output 2
13. Negative output 1
14. Ground 1
15. Not connected
16. Positive output 1

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FUNCTIONAL DESCRIPTION

The TDA7073 is a dual power driver circuit in a BTL configuration and is intended for use as a power driver for servo systems with a single supply. It has been primarily designed for compact disc players and is capable of driving focus, tracking, sled functions and spindle motors.

Utilization of the BTL principle means the device can supply a bidirectional current to the load, with only a single supply voltage.

The voltage gain is fixed by internal feedback at 39 dB and the device operates in a wide supply voltage range (3 to 15 V).

The device can supply a maximum output current of 0.6 A, but the load can be short-circuited under all input conditions.

The differential inputs can handle common mode input voltages from ground (0 V) up to (V_P – 2.2) V.

The device has a very high slew rate and due to the very large bandwidth it can handle PWM signals up to 176 kHz.

RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

parameter	conditions	symbol	min.	max.	unit
Supply voltage		V_P	–	18	V
Peak output current					
repetitive		I_{ORM}	–	1	A
non-repetitive		I_{OSM}	–	1.5	A
Total power dissipation		P_{tot}	see Fig.2		
Crystal temperature		T_c	–	150	°C
Storage temperature range		T_{stg}	–55	+ 150	°C
Short circuit time	note 1	t_{sc}	–	1	hour

Note to the ratings

1. The load can be short-circuited for all input conditions.

THERMAL RESISTANCE

From junction to ambient $R_{th\ j\text{-}a} = 55$ K/W

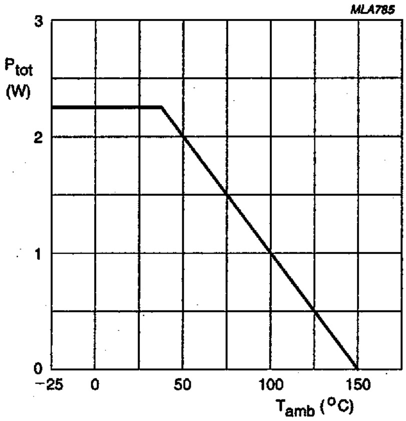

Fig.2 Power derating curve.

Power dissipation example

At $T_{amb} = 60$ °C the maximum allowable power dissipation is:

$$\frac{150 - 60}{55} = 1.64 \text{ W}$$

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CHARACTERISTICS

V_P = 5 V; R_L = 8 Ω; f = 1 kHz; T_{amb} = 25 °C; unless otherwise specified; see test circuit, Fig.3.

parameter	conditions	symbol	min.	typ.	max.	unit
Supply voltage range		V_P	3	5	15	V
Repetitive peak output current		I_{ORM}	–	–	0.6	A
Total quiescent current	$R_L = \infty$	I_{tot}	–	8	16	mA
Output voltage swing (peak-to-peak value)	note 1	$V_{o(p-p)}$	5.2	5.8	–	V
Total harmonic distortion	$V_{o(rms)}$ = 1 V	THD	–	0.1	–	%
Voltage gain		G_v	37.5	39	40	dB
Noise output voltage	note 2	$V_{no(rms)}$	–	150	300	μV
Bandwidth		B	–	1.5	–	MHz
Supply voltage ripple rejection	note 3	SVRR	40	50	–	dB
DC output offset voltage	R_S = 500 Ω	$\lvert\Delta V_{16-13}\rvert$	–	–	100	mV
		$\lvert\Delta V_{12-9}\rvert$	–	–	100	mV
DC common-mode voltage range	note 4	V_I	–	0 - 2.8	–	V
DC common-mode rejection ratio		CMRR	–	100	–	dB
Input impedance		$\lvert Z_I\rvert$	–	100	–	kΩ
Input bias current		I_{bias}	–	100	300	nA
Channel separation		α	50	60	–	dB
Channel unbalance		$\lvert\Delta G_v\rvert$	–	–	1	dB
Slew rate		SR	–	12	–	V/μs

Notes to the characteristics

1. The output voltage swing is typically limited to 2 x (V_P – 2.1) V, (see Fig.4).
2. The noise output voltage (RMS value) is measured with a source impedance (R_S) of 500 Ω, unweighted and a bandwidth of 20 Hz to 20 kHz.
3. The ripple rejection is measured with the source impedance R_S = 0 Ω and a frequency between 100 Hz and 10 kHz. The ripple voltage (200 mV, RMS value) is applied to the positive supply rail.
4. The DC common-mode voltage range is limited to (V_P – 2.2) V.

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TEST AND APPLICATION INFORMATION

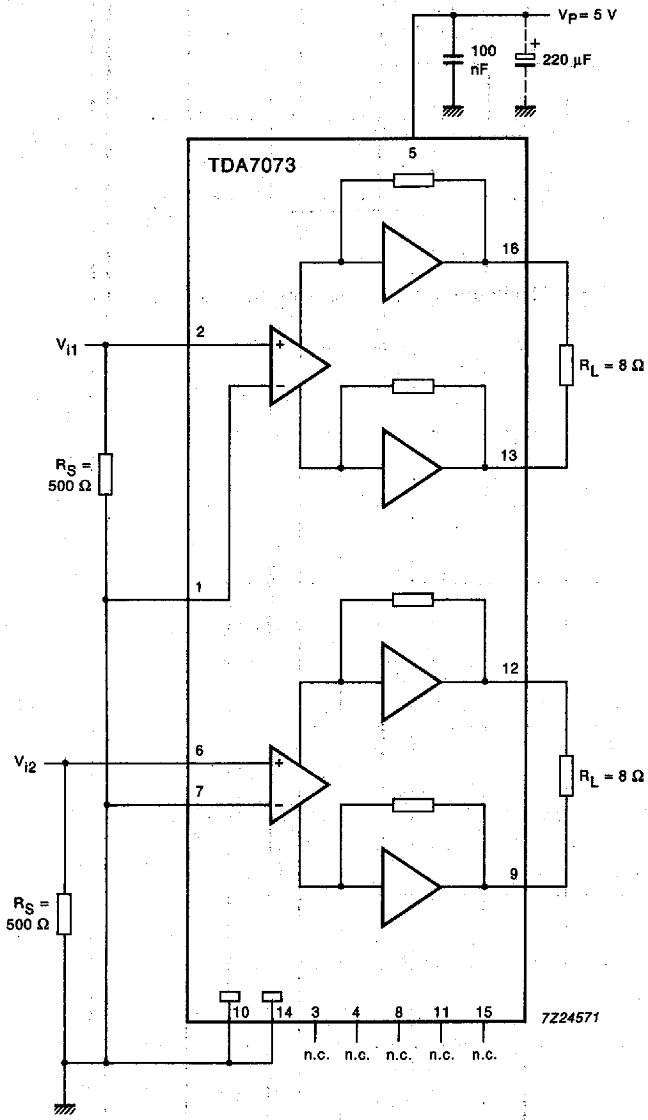

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Fig.3 Test circuit diagram.

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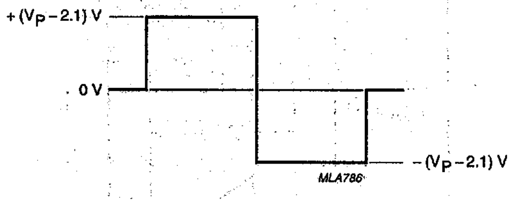

Fig.4 Maximum output voltage swing across R_L.

TEST AND APPLICATION INFORMATION

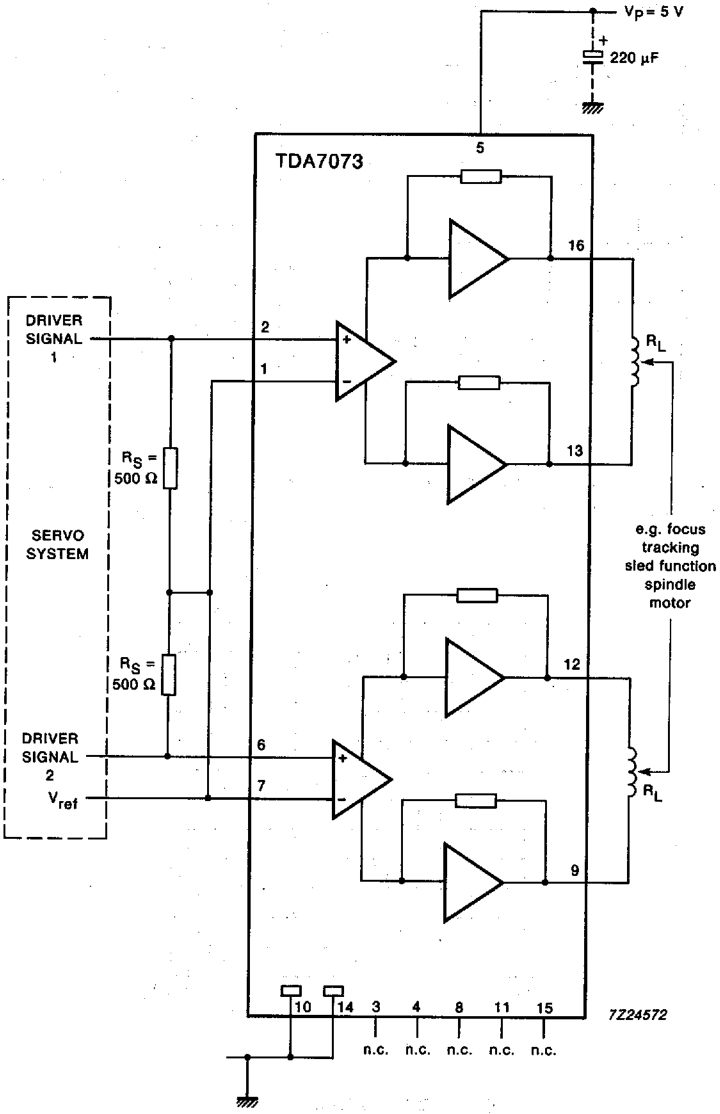

Fig.5 Application circuit diagram.

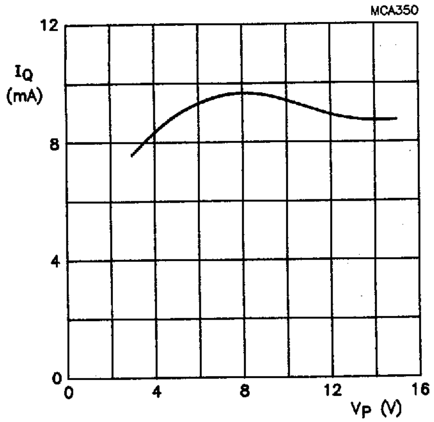

Fig.6 Quiescent current as a function of supply voltage; $R_L = \infty$.

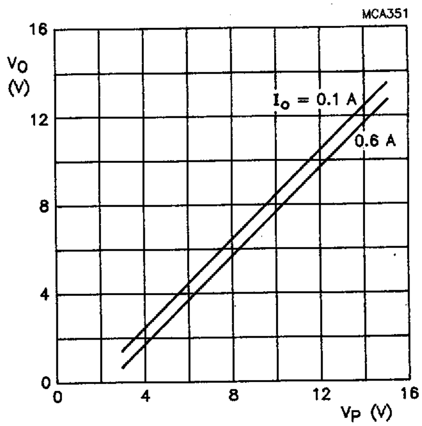

Fig. 7 Output voltage as a function of supply voltage.

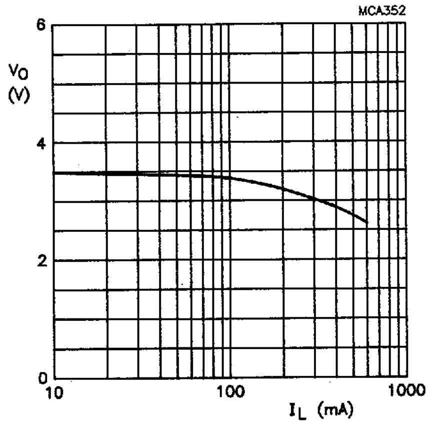

Fig.8 Output voltage as a function of output current; V_P = 5 V.