Power driver/amplifier

TDA7072A/AT

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
- Suited for handling PWM signals up to 176 kHz
- ESD protected on all pins

GENERAL DESCRIPTION

The TDA7072A/AT are single power driver circuits in a BTL configuration, intended for use as a power driver for servo systems with a single supply. They are specially designed for compact disc players and are capable of driving focus, tracking, sled functions and spindle motors.

ORDERING INFORMATION

EXTENDED TYPE NUMBER	PACKAGE			
	PINS	PIN POSITION	MATERIAL	CODE
TDA7072A	8	DIL	plastic	SOT97
TDA7072AT	8	mini-pack	plastic	SOT96A

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_p	supply voltage range		3	5	18	V
G_v	internal voltage gain		32.5	33.5	34.5	dB
I_p	total quiescent current	V_p = 5 V; R_L = ∞	–	4	8	mA
SR	slew rate		–	12	–	V/μs
I_{ORM}	output current		–	–	0.6	A
I_{bias}	input bias current		–	100	300	nA
f_h	cut-off frequency	–3 dB	–	1.5	–	MHz

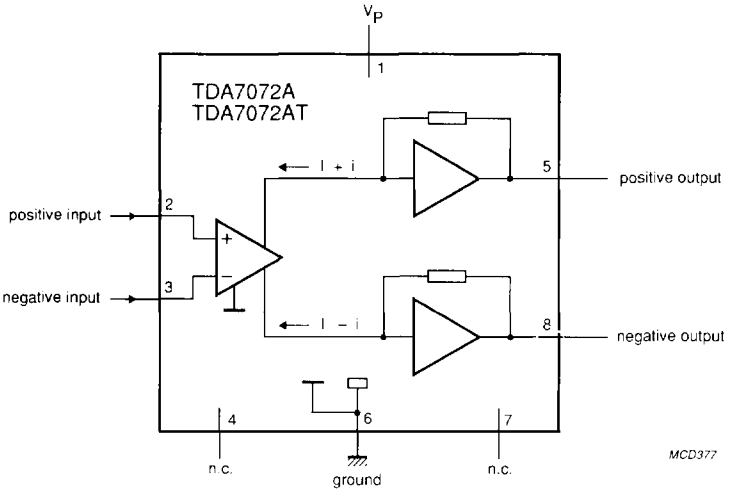


Fig.1 Block diagram.

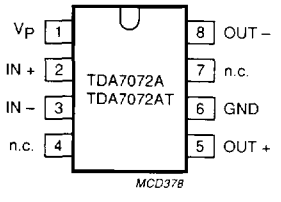


Fig.2 Pinning diagram.

PINNING

SYMBOL	PIN	DESCRIPTION
V_p	1	positive supply voltage
IN+	2	positive input
IN−	3	negative input
n.c.	4	not connected
OUT+	5	positive output
GND	6	ground
n.c.	7	not connected
OUT−	8	negative output

FUNCTIONAL DESCRIPTION

The TDA7072A/AT are single power driver circuits in a BTL configuration, intended for use as a power driver for servo systems with a single supply. They are particular designed for compact disc players and are capable of driving focus, tracking, sled functions and spindle motors.

Because of the BTL configuration, the devices can supply a bi-directional DC current in the load, with only a single supply voltage. The voltage gain is fixed by internal feedback at 34 dB and the devices operate in a wide supply voltage range (3 to 18 V). The devices can supply a maximum output current of 0.6 A. The outputs can be short-circuited over the load, to the supply and to ground at all input conditions. The differential inputs can handle common mode input voltages from ground level up to (V_p –2.2 V). The devices have a very high slew rate. Due to the large bandwidth, they can handle PWM signals up to 176 kHz.

LIMITING VALUES

In accordance with the Absolute Maximum System (IEC 134.

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_p	supply voltage range		–	18	V
I_{ORM}	repetitive peak output current		–	1	A
I_{OSM}	non repetitive peak output current		–	1.5	A
P_{tot}	total power dissipation	T_{amb} < 25 °C			
	TDA7072A		–	1.25	W
	TDA7072AT		–	0.54	W
T_{stg}	storage temperature range		–55	150	°C
T_{vj}	virtual junction temperature		–	150	°C
T_{sc}	short-circuit time	see note	–	1	hr

Note

The outputs can be short-circuited over the load, to the supply and to ground at all input conditions.

THERMAL RESISTANCE

SYMBOL	PARAMETER	TYP.	MAX.	UNIT
$R_{th\ j\text{-}a}$	from junction to ambient in free air			
	TDA7072A	–	100	K/W
	TDA7072AT	–	230	K/W

Note

TDA7072A: V_p = 5 V; R_L = 8 Ω; The typical voltage swing = 5.8 V and V_{loss} is 2.1 V
therefore I_O = 0.36 A and P_{tot} = 0.76 W; $T_{amb\ (max)}$ = 150 – 0.76 x 100 = 74 °C
TDA7072AT: V_p = 5 V; R_L = 16 typical voltage swing = 5.8 V and V_{loss} is 2.1 V therefore I_O = 0.18 A and P_{tot} = 0.38 W;
$T_{amb\ (max)}$ = 150 – 0.38 x 230 = 62 °C

CHARACTERISTICS

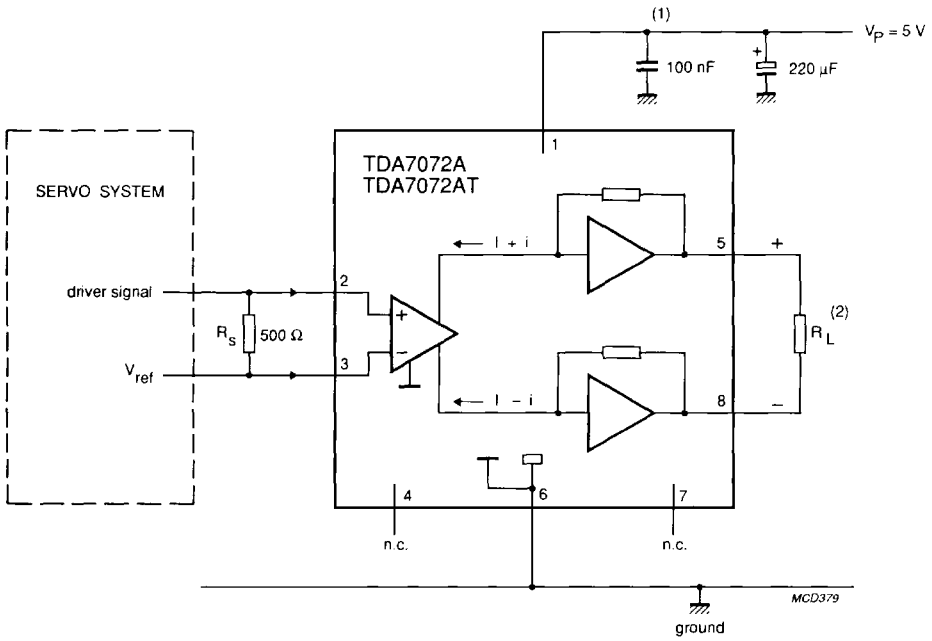
V_p = 5 V; f = 1 kHz; T_{amb} = 25 °C; unless otherwise specified (see Fig.3).
TDA7072A: R_L = 8 Ω.
TDA7072AT: R_L = 16 Ω.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_p	supply voltage range		3	5	18	V
I_{ORM}	repetitive peak output current		–	–	0.6	A
I_p	total quiescent current	$R_L = \infty$; note 1	–	4	8	mA
ΔV_{OUT}	output voltage swing	note 2	5.2	5.8	–	V
THD	total harmonic distortion	V_{OUT} = 1 V (RMS)	–	0.3	–	%
G_v	voltage gain		32.5	33.5	34.5	dB
$V_{no(rms)}$	noise output voltage (RMS value)	note 3	–	75	150	μV
B	bandwidth		–	–	1.5	MHz
RR	ripple rejection	note 4	40	50	–	dB
$\lvert\Delta V_{5-8}\rvert$	DC output offset voltage	note 5	–	–	100	mV
$V_{I(CM)}$	DC common mode voltage range	note 6	0	–	2.8	V
CMRR	DC common mode rejection ratio	note 7	–	100	–	dB
Z_I	input impedance		–	100	–	kΩ
I_{bias}	input bias current		–	100	300	nA
SR	slew rate		–	12	–	V/μs

Notes to the characteristics

1. With a load connected to the outputs the quiescent current will increase, the maximum value of this increase being equal to the DC output offset voltage divided by R_L.
2. The output voltage swing is typically limited to 2 x (V_p –2.1 V) (see Fig.4).
3. The noise output voltage (RMS value), unweighted (20 Hz to 20 kHz) is measured with R_S = 500 Ω.
4. The ripple rejection is measured with R_S = 0 Ω and f = 100 Hz to 10 kHz. The ripple voltage of 200 mV (RMS value) is applied to the positive supply rail.
5. R_S = 500 Ω.
6. The DC common mode voltage range is limited to (V_p –2.2 V).
7. The common mode rejection ratio is measured at V_{ref} = 1.4 V, $V_{I(CM)}$ = 200 mV and f = 1 kHz.

APPLICATION INFORMATION



(1) This capacitor can be omitted if the 220 µF electrolytic capacitor is connected close to pin 1.

(2) R_L can be: focus, tracking, sled function or spindle motor.

Fig.3 Test and application diagram.

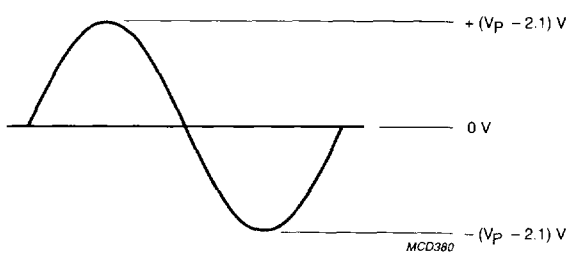


Fig.4 Typical output voltage swing over R_L.