



Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China



DATA SHEET

TDA7073A; TDA7073AT Dual BTL power driver

Product specification
Supersedes data of 1994 July

1999 Aug 30



Dual BTL power driver

TDA7073A; TDA7073AT

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 TDA7073A/AT are dual 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.

Missing Current Limiter (MCL)

A MCL protection circuit is built-in. The MCL circuit is activated when the difference in current between the output terminal of each amplifier exceeds 100 mA (typical 300 mA). This level of 100 mA allows for headphone applications (single-ended).

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_P	positive supply voltage range		3.0	5.0	18	V
G_V	voltage gain		32.5	33.5	34.5	dB
I_P	total quiescent current	$V_P = 5\text{ V}; R_L = \infty$	–	8	16	mA
SR	slew rate		–	12	–	V/ μ s
I_O	output current		–	–	0.6	A
I_{bias}	input bias current		–	100	300	nA
f_{co}	cut-off frequency	–3 dB	–	1.5	–	MHz

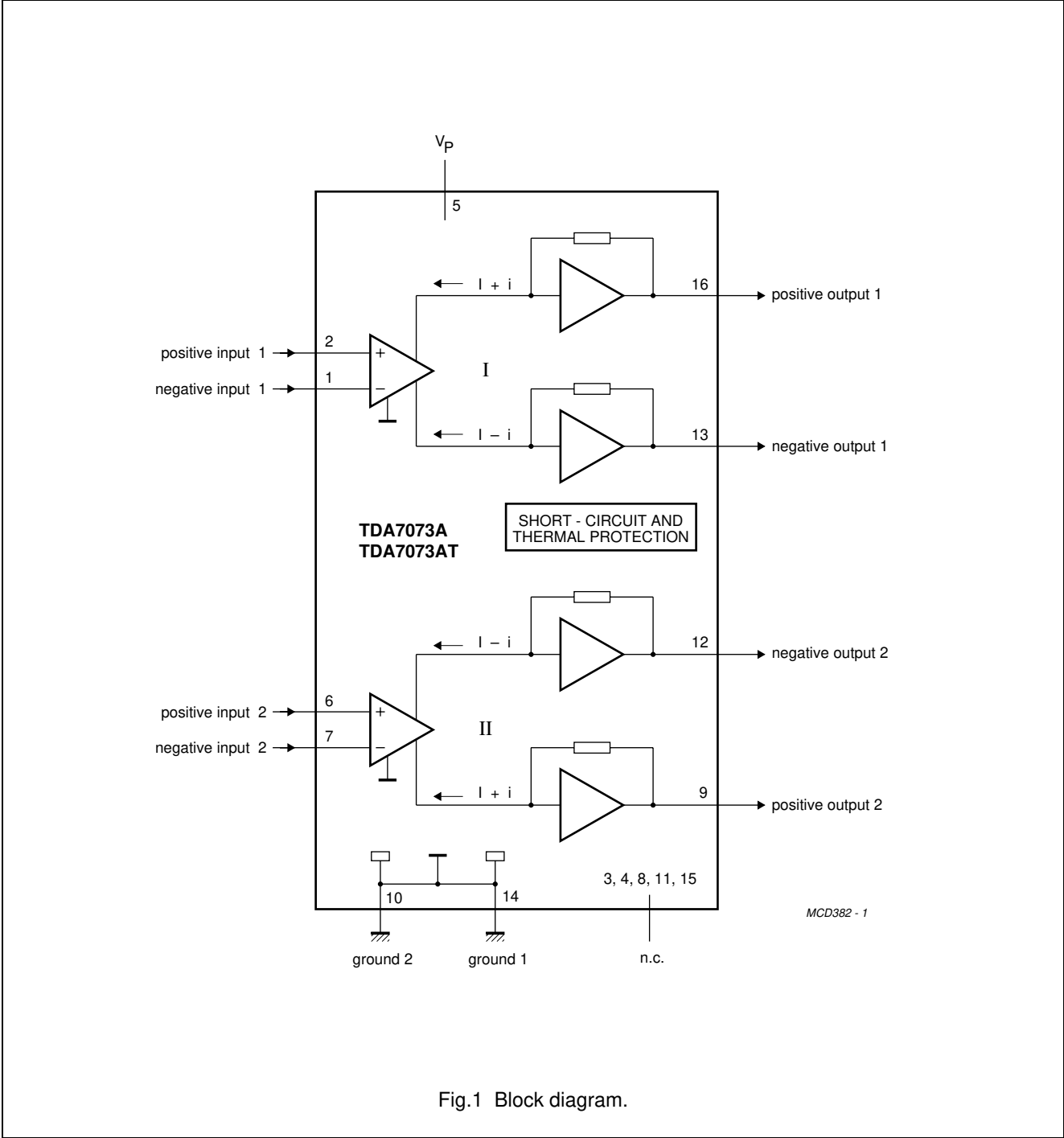
ORDERING INFORMATION

TYPE NUMBER	PACKAGE		
	NAME	DESCRIPTION	VERSION
TDA7073A	DIP16	plastic dual in-line package; 16 leads (300 mil); long body	SOT38-1
TDA7073AT	SO16	plastic small outline package; 16 leads; body width 7.5 mm	SOT162-1

Dual BTL power driver

TDA7073A; TDA7073AT

BLOCK DIAGRAM



Dual BTL power driver

TDA7073A; TDA7073AT

PINNING

SYMBOL	PIN	DESCRIPTION
IN1–	1	negative input 1
IN1+	2	positive input 1
n.c.	3	not connected
n.c.	4	not connected
V _P	5	positive supply voltage
IN2+	6	positive input 2
IN2–	7	negative input 2
n.c.	8	not connected
OUT2+	9	positive output 2
GND2	10	ground 2
n.c.	11	not connected
OUT2–	12	negative output 2
OUT1–	13	negative output 1
GND1	14	ground 1
n.c.	15	not connected
OUT1+	16	positive output 1

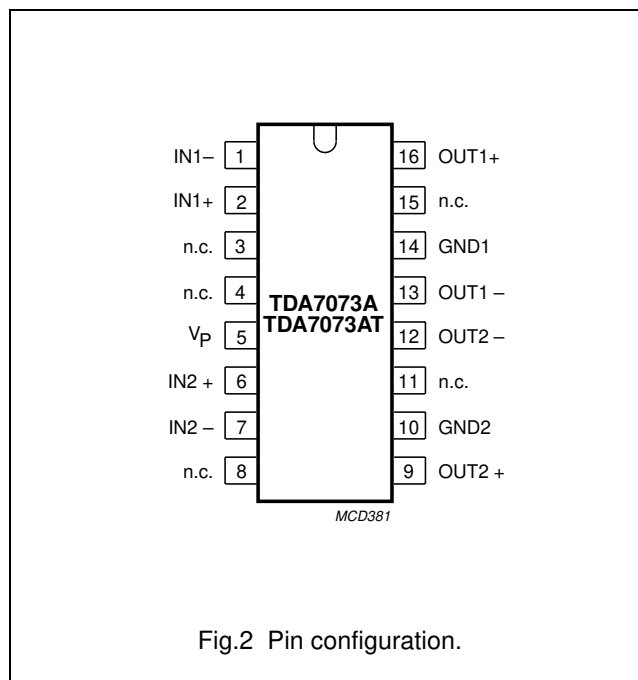


Fig.2 Pin configuration.

FUNCTIONAL DESCRIPTION

The TDA7073A/AT are dual power driver circuits in a BTL configuration, intended for use as a power driver for servo systems with a single supply. They are particularly 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 33.5 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 with a maximum of 10 V). The devices have a very high slew rate. Due to the large bandwidth, they can handle PWM signals up to 176 kHz.

Dual BTL power driver

TDA7073A; TDA7073AT

LIMITING VALUES

In accordance with the Absolute Maximum System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_P	positive 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 TDA7073A	$T_{amb} < 25\text{ °C}$	–	2.5	W
	TDA7073AT	$T_{amb} < 25\text{ °C}$	–	1.32	W
T_{stg}	storage temperature range		–55	+150	°C
T_{vj}	virtual junction temperature		–	150	°C
T_{sc}	short-circuit time	see note 1	–	1	hr

Note

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

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th(j-a)}$	from junction to ambient			
	TDA7073A	in free air; note 1	50	K/W
	TDA7073AT	in free air; note 2	95	K/W

Notes

1. TDA7073A: $V_P = 5\text{ V}$; $R_L = 8\text{ }\Omega$; The typical voltage swing = 5.8 V and V_{loss} is 2.1 V therefore $I_O = 0.36\text{ A}$ and $P_{tot} = 2 \times 0.76\text{ W} = 1.52\text{ W}$; $T_{amb(max)} = 150 - 1.52 \times 50 = 74\text{ °C}$.
2. TDA7073AT: $V_P = 5\text{ V}$; $R_L = 16\text{ }\Omega$; typical voltage swing = 5.8 V and V_{loss} is 2.1 V therefore $I_O = 0.18\text{ A}$ and $P_{tot} = 2 \times 0.38\text{ W} = 0.76\text{ W}$; $T_{amb(max)} = 150 - 0.76 \times 95 = 77\text{ °C}$.

Dual BTL power driver

TDA7073A; TDA7073AT

CHARACTERISTICS

$V_P = 5\text{ V}$; $f = 1\text{ kHz}$; $T_{\text{amb}} = 25\text{ °C}$; unless otherwise specified (see Fig.3). TDA7073A: $R_L = 8\text{ }\Omega$; TDA7073AT: $R_L = 16\text{ }\Omega$.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_P	positive supply voltage range		3.0	5.0	18	V
I_{ORM}	repetitive peak output current		—	—	0.6	A
I_P	total quiescent current	$V_P = 5\text{ V}$; $R_L = \infty$; note 1	—	8	16	mA
ΔV_{OUT}	output voltage swing	note 2	5.2	5.8	—	V
THD	total harmonic distortion					
	TDA7073A	$V_{\text{OUT}} = 1\text{ V (RMS)}$	—	0.3	—	%
	TDA7073AT	$V_{\text{OUT}} = 1\text{ V (RMS)}$	—	0.1	—	%
G_v	voltage gain		32.5	33.5	34.5	dB
$V_{\text{no(rms)}}$	noise output voltage (RMS value)	note 3	—	75	150	μV
B	bandwidth		—	—	1.5	MHz
SVRR	supply voltage ripple rejection	note 4	38	55	—	dB
$ \Delta V_{16-13,12-9} $	DC output offset voltage	$R_S = 500\text{ }\Omega$	—	—	100	mV
$V_{\text{I(CM)}}$	DC common mode voltage range	note 5	0	—	2.8	V
CMRR	DC common mode rejection ratio	note 6	—	100	—	dB
Z_i	input impedance		—	100	—	k Ω
I_{bias}	input bias current		—	100	300	nA
α	channel separation		40	50	—	dB
$ \Delta\text{GV} $	channel unbalance		—	—	1	dB
SR	slew rate		—	12	—	V/ μs

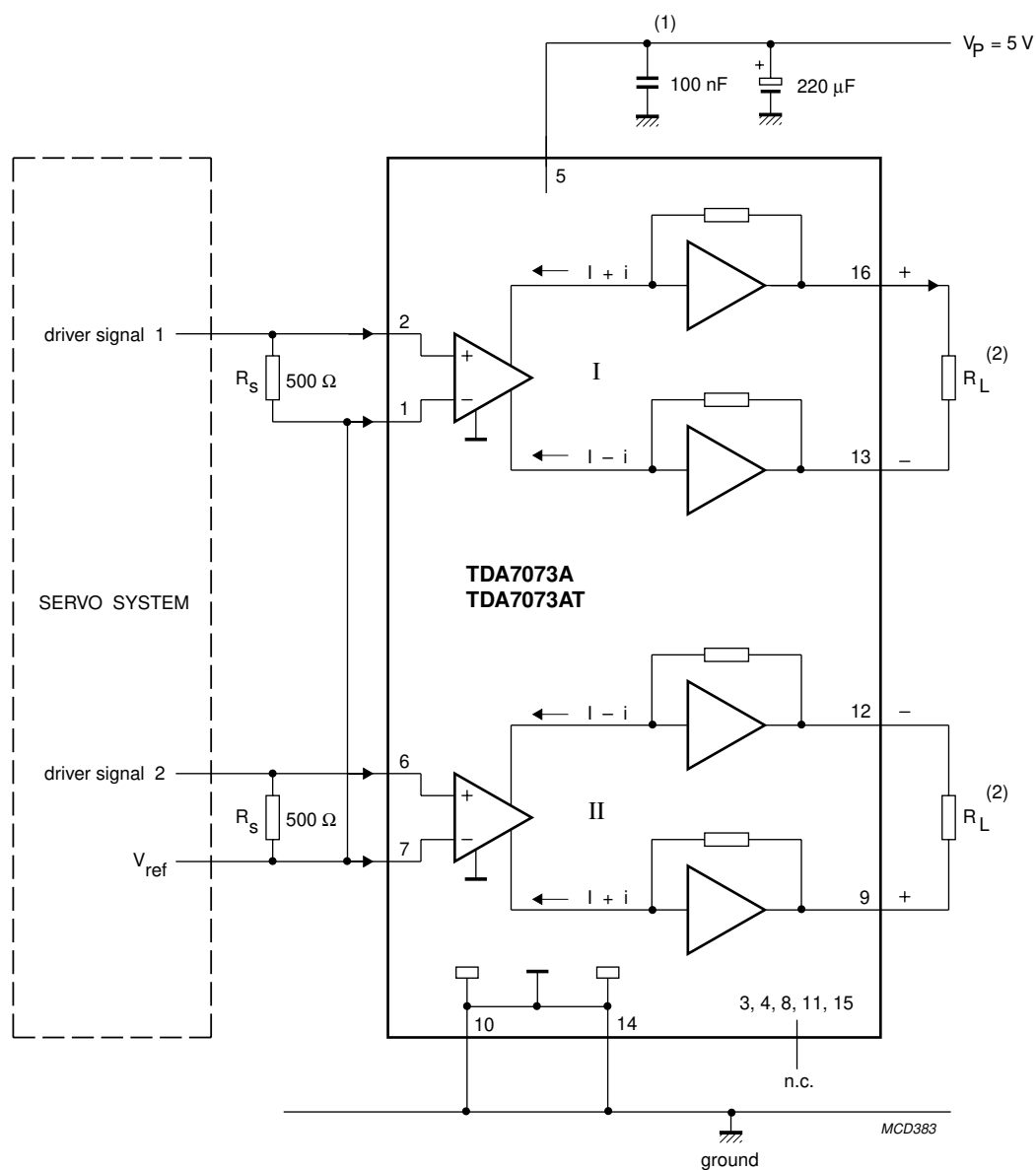
Notes

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 $2 \times (V_P - 2.1\text{ V})$ (see Fig.4).
3. The noise output voltage (RMS value), unweighted (20 Hz to 20 kHz) is measured with $R_S = 500\text{ }\Omega$.
4. The ripple rejection is measured with $R_S = 0\text{ }\Omega$ and $f = 100\text{ Hz}$ to 10 kHz . The ripple voltage of 200 mV (RMS value) is applied to the positive supply rail.
5. The DC common mode voltage range is limited to $(V_P - 2.2\text{ V})$ with a maximum of 10 V .
6. The common mode rejection ratio is measured at $V_{\text{ref}} = 1.4\text{ V}$, $V_{\text{I(CM)}} = 200\text{ mV}$ and $f = 1\text{ kHz}$.

Dual BTL power driver

TDA7073A; TDA7073AT

APPLICATION INFORMATION

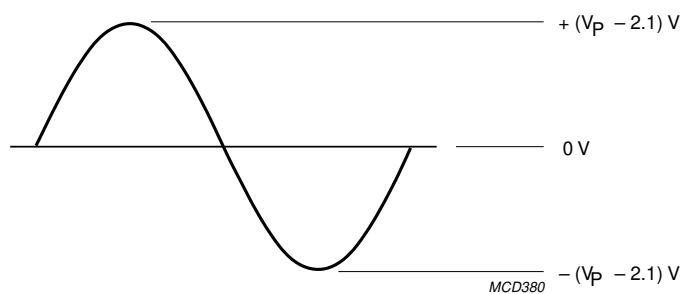


- (1) This capacitor can be omitted if the 220 μ F electrolytic capacitor is connected close to pin 5.
 (2) R_L can be: focus, tracking, sled function or spindle motor.

Fig.3 Test and application diagram.

Dual BTL power driver

TDA7073A; TDA7073AT

Fig.4 Typical output voltage swing over R_L .

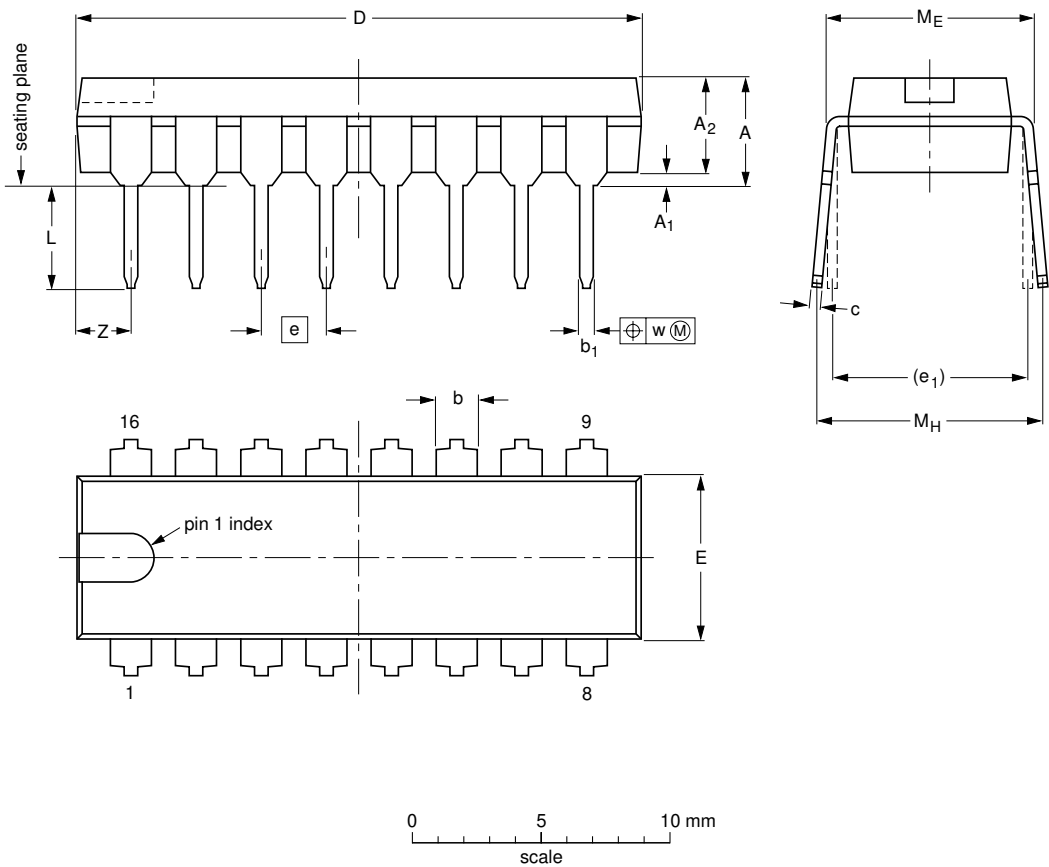
Dual BTL power driver

TDA7073A; TDA7073AT

PACKAGE OUTLINES

DIP16: plastic dual in-line package; 16 leads (300 mil); long body

SOT38-1



DIMENSIONS (inch dimensions are derived from the original mm dimensions)

UNIT	A max.	A ₁ min.	A ₂ max.	b	b ₁	c	D ⁽¹⁾	E ⁽¹⁾	e	e ₁	L	M _E	M _H	w	Z ⁽¹⁾ max.
mm	4.7	0.51	3.7	1.40 1.14	0.53 0.38	0.32 0.23	21.8 21.4	6.48 6.20	2.54	7.62	3.9 3.4	8.25 7.80	9.5 8.3	0.254	2.2
inches	0.19	0.02	0.15	0.055 0.045	0.021 0.015	0.013 0.009	0.86 0.84	0.26 0.24	0.1	0.3	0.15 0.13	0.32 0.31	0.37 0.33	0.01	0.087

Note
1. Plastic or metal protrusions of 0.25 mm (0.01 inch) maximum per side are not included.

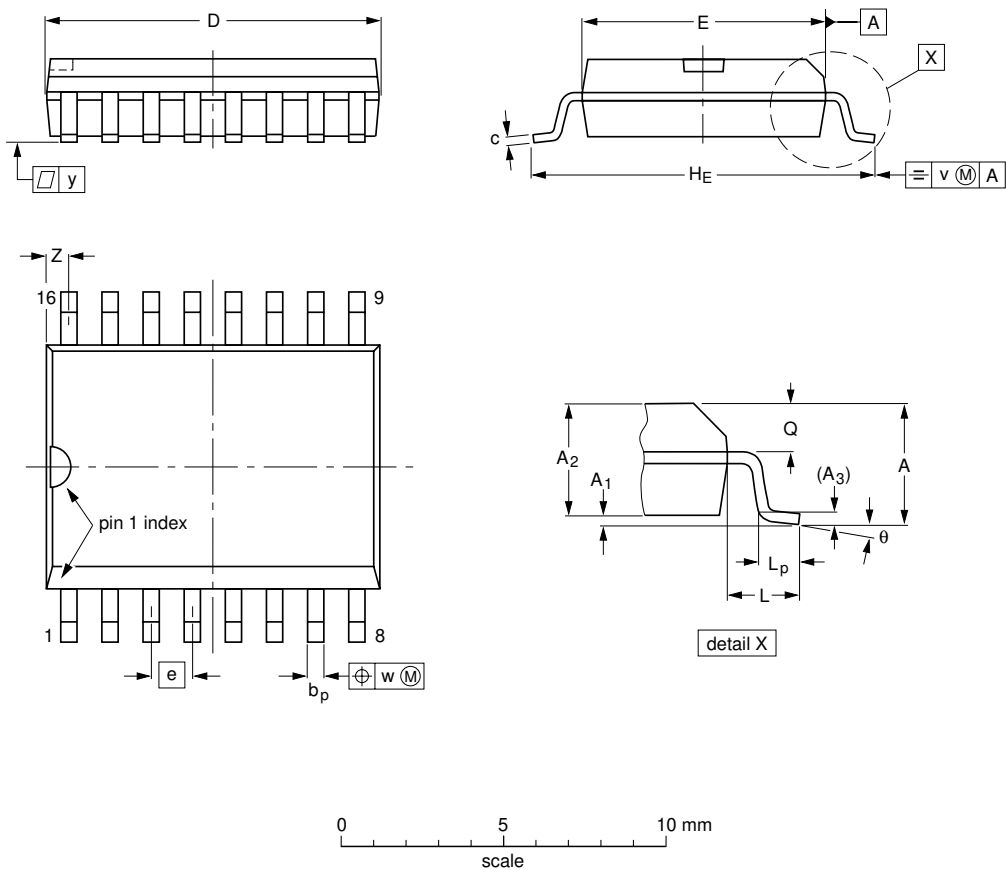
OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT38-1	050G09	MO-001	SC-503-16			99-12-27- 03-02-13

Dual BTL power driver

TDA7073A; TDA7073AT

SO16: plastic small outline package; 16 leads; body width 7.5 mm

SOT162-1



DIMENSIONS (inch dimensions are derived from the original mm dimensions)

UNIT	A max.	A ₁	A ₂	A ₃	b _p	c	D ⁽¹⁾	E ⁽¹⁾	e	H _E	L	L _p	Q	v	w	y	z ⁽¹⁾	θ
mm	2.65	0.3 0.1	2.45 2.25	0.25	0.49 0.36	0.32 0.23	10.5 10.1	7.6 7.4	1.27	10.65 10.00	1.4	1.1 0.4	1.1 1.0	0.25	0.25	0.1	0.9 0.4	8° 0°
inches	0.1	0.012 0.004	0.096 0.089	0.01	0.019 0.014	0.013 0.009	0.41 0.40	0.30 0.29	0.05	0.419 0.394	0.055	0.043 0.016	0.043 0.039	0.01	0.01	0.004	0.035 0.016	

Note

1. Plastic or metal protrusions of 0.15 mm (0.006 inch) maximum per side are not included.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT162-1	075E03	MS-013				99-12-27 03-02-19

Dual BTL power driver

TDA7073A; TDA7073AT

SOLDERING**Introduction**

This text gives a very brief insight to a complex technology. A more in-depth account of soldering ICs can be found in our *"Data Handbook IC26; Integrated Circuit Packages"* (document order number 9398 652 90011).

There is no soldering method that is ideal for all IC packages. Wave soldering is often preferred when through-hole and surface mount components are mixed on one printed-circuit board. However, wave soldering is not always suitable for surface mount ICs, or for printed-circuit boards with high population densities. In these situations reflow soldering is often used.

Through-hole mount packages**SOLDERING BY DIPPING OR BY SOLDER WAVE**

The maximum permissible temperature of the solder is 260 °C; solder at this temperature must not be in contact with the joints for more than 5 seconds. The total contact time of successive solder waves must not exceed 5 seconds.

The device may be mounted up to the seating plane, but the temperature of the plastic body must not exceed the specified maximum storage temperature ($T_{stg(max)}$). If the printed-circuit board has been pre-heated, forced cooling may be necessary immediately after soldering to keep the temperature within the permissible limit.

MANUAL SOLDERING

Apply the soldering iron (24 V or less) to the lead(s) of the package, either below the seating plane or not more than 2 mm above it. If the temperature of the soldering iron bit is less than 300 °C it may remain in contact for up to 10 seconds. If the bit temperature is between 300 and 400 °C, contact may be up to 5 seconds.

Surface mount packages**REFLOW SOLDERING**

Reflow soldering requires solder paste (a suspension of fine solder particles, flux and binding agent) to be applied to the printed-circuit board by screen printing, stencilling or pressure-syringe dispensing before package placement.

Several methods exist for reflowing; for example, infrared/convection heating in a conveyor type oven. Throughput times (preheating, soldering and cooling) vary between 100 and 200 seconds depending on heating method.

Typical reflow peak temperatures range from 215 to 250 °C. The top-surface temperature of the packages should preferably be kept below 230 °C.

WAVE SOLDERING

Conventional single wave soldering is not recommended for surface mount devices (SMDs) or printed-circuit boards with a high component density, as solder bridging and non-wetting can present major problems.

To overcome these problems the double-wave soldering method was specifically developed.

If wave soldering is used the following conditions must be observed for optimal results:

- Use a double-wave soldering method comprising a turbulent wave with high upward pressure followed by a smooth laminar wave.
- For packages with leads on two sides and a pitch (e):
 - larger than or equal to 1.27 mm, the footprint longitudinal axis is **preferred** to be parallel to the transport direction of the printed-circuit board;
 - smaller than 1.27 mm, the footprint longitudinal axis **must** be parallel to the transport direction of the printed-circuit board.

The footprint must incorporate solder thieves at the downstream end.

- For packages with leads on four sides, the footprint must be placed at a 45° angle to the transport direction of the printed-circuit board. The footprint must incorporate solder thieves downstream and at the side corners.

During placement and before soldering, the package must be fixed with a droplet of adhesive. The adhesive can be applied by screen printing, pin transfer or syringe dispensing. The package can be soldered after the adhesive is cured.

Typical dwell time is 4 seconds at 250 °C.

A mildly-activated flux will eliminate the need for removal of corrosive residues in most applications.

MANUAL SOLDERING

Fix the component by first soldering two diagonally-opposite end leads. Use a low voltage (24 V or less) soldering iron applied to the flat part of the lead. Contact time must be limited to 10 seconds at up to 300 °C.

When using a dedicated tool, all other leads can be soldered in one operation within 2 to 5 seconds between 270 and 320 °C.

Dual BTL power driver

TDA7073A; TDA7073AT

Suitability of IC packages for wave, reflow and dipping soldering methods

MOUNTING	PACKAGE	SOLDERING METHOD		
		WAVE	REFLOW ⁽¹⁾	DIPPING
Through-hole mount	DBS, DIP, HDIP, SDIP, SIL	suitable ⁽²⁾	–	suitable
Surface mount	BGA, LFBGA, SQFP, TFBGA	not suitable	suitable	–
	HLQFP, HSQFP, HSOP, HTQFP, HTSSOP, SMS	not suitable ⁽³⁾	suitable	–
	PLCC ⁽⁴⁾ , SO, SOJ	suitable	suitable	–
	LQFP, QFP, TQFP	not recommended ⁽⁴⁾⁽⁵⁾	suitable	–
	SSOP, TSSOP, VSO	not recommended ⁽⁶⁾	suitable	–

Notes

1. All surface mount (SMD) packages are moisture sensitive. Depending upon the moisture content, the maximum temperature (with respect to time) and body size of the package, there is a risk that internal or external package cracks may occur due to vaporization of the moisture in them (the so called popcorn effect). For details, refer to the Drypack information in the “*Data Handbook IC26; Integrated Circuit Packages; Section: Packing Methods*”.
2. For SDIP packages, the longitudinal axis must be parallel to the transport direction of the printed-circuit board.
3. These packages are not suitable for wave soldering as a solder joint between the printed-circuit board and heatsink (at bottom version) can not be achieved, and as solder may stick to the heatsink (on top version).
4. If wave soldering is considered, then the package must be placed at a 45° angle to the solder wave direction. The package footprint must incorporate solder thieves downstream and at the side corners.
5. Wave soldering is only suitable for LQFP, QFP and TQFP packages with a pitch (e) equal to or larger than 0.8 mm; it is definitely not suitable for packages with a pitch (e) equal to or smaller than 0.65 mm.
6. Wave soldering is only suitable for SSOP and TSSOP packages with a pitch (e) equal to or larger than 0.65 mm; it is definitely not suitable for packages with a pitch (e) equal to or smaller than 0.5 mm.

Dual BTL power driver

TDA7073A; TDA7073AT

DATA SHEET STATUS

DOCUMENT STATUS ⁽¹⁾	PRODUCT STATUS ⁽²⁾	DEFINITION
Objective data sheet	Development	This document contains data from the objective specification for product development.
Preliminary data sheet	Qualification	This document contains data from the preliminary specification.
Product data sheet	Production	This document contains the product specification.

Notes

1. Please consult the most recently issued document before initiating or completing a design.
2. The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL <http://www.nxp.com>.

DISCLAIMERS

Limited warranty and liability — Information in this document is believed to be accurate and reliable. However, NXP Semiconductors does not give any representations or warranties, expressed or implied, as to the accuracy or completeness of such information and shall have no liability for the consequences of use of such information.

In no event shall NXP Semiconductors be liable for any indirect, incidental, punitive, special or consequential damages (including - without limitation - lost profits, lost savings, business interruption, costs related to the removal or replacement of any products or rework charges) whether or not such damages are based on tort (including negligence), warranty, breach of contract or any other legal theory.

Notwithstanding any damages that customer might incur for any reason whatsoever, NXP Semiconductors' aggregate and cumulative liability towards customer for the products described herein shall be limited in accordance with the *Terms and conditions of commercial sale* of NXP Semiconductors.

Right to make changes — NXP Semiconductors reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof.

Suitability for use — NXP Semiconductors products are not designed, authorized or warranted to be suitable for use in life support, life-critical or safety-critical systems or equipment, nor in applications where failure or malfunction of an NXP Semiconductors product can reasonably be expected to result in personal injury, death or severe

property or environmental damage. NXP Semiconductors accepts no liability for inclusion and/or use of NXP Semiconductors products in such equipment or applications and therefore such inclusion and/or use is at the customer's own risk.

Applications — Applications that are described herein for any of these products are for illustrative purposes only. NXP Semiconductors makes no representation or warranty that such applications will be suitable for the specified use without further testing or modification.

Customers are responsible for the design and operation of their applications and products using NXP Semiconductors products, and NXP Semiconductors accepts no liability for any assistance with applications or customer product design. It is customer's sole responsibility to determine whether the NXP Semiconductors product is suitable and fit for the customer's applications and products planned, as well as for the planned application and use of customer's third party customer(s). Customers should provide appropriate design and operating safeguards to minimize the risks associated with their applications and products.

NXP Semiconductors does not accept any liability related to any default, damage, costs or problem which is based on any weakness or default in the customer's applications or products, or the application or use by customer's third party customer(s). Customer is responsible for doing all necessary testing for the customer's applications and products using NXP Semiconductors products in order to avoid a default of the applications and the products or of the application or use by customer's third party customer(s). NXP does not accept any liability in this respect.

Dual BTL power driver

TDA7073A; TDA7073AT

Limiting values — Stress above one or more limiting values (as defined in the Absolute Maximum Ratings System of IEC 60134) will cause permanent damage to the device. Limiting values are stress ratings only and (proper) operation of the device at these or any other conditions above those given in the Recommended operating conditions section (if present) or the Characteristics sections of this document is not warranted. Constant or repeated exposure to limiting values will permanently and irreversibly affect the quality and reliability of the device.

Terms and conditions of commercial sale — NXP Semiconductors products are sold subject to the general terms and conditions of commercial sale, as published at <http://www.nxp.com/profile/terms>, unless otherwise agreed in a valid written individual agreement. In case an individual agreement is concluded only the terms and conditions of the respective agreement shall apply. NXP Semiconductors hereby expressly objects to applying the customer's general terms and conditions with regard to the purchase of NXP Semiconductors products by customer.

No offer to sell or license — Nothing in this document may be interpreted or construed as an offer to sell products that is open for acceptance or the grant, conveyance or implication of any license under any copyrights, patents or other industrial or intellectual property rights.

Export control — This document as well as the item(s) described herein may be subject to export control regulations. Export might require a prior authorization from national authorities.

Quick reference data — The Quick reference data is an extract of the product data given in the Limiting values and Characteristics sections of this document, and as such is not complete, exhaustive or legally binding.

Non-automotive qualified products — Unless this data sheet expressly states that this specific NXP Semiconductors product is automotive qualified, the product is not suitable for automotive use. It is neither qualified nor tested in accordance with automotive testing or application requirements. NXP Semiconductors accepts no liability for inclusion and/or use of non-automotive qualified products in automotive equipment or applications.

In the event that customer uses the product for design-in and use in automotive applications to automotive specifications and standards, customer (a) shall use the product without NXP Semiconductors' warranty of the product for such automotive applications, use and specifications, and (b) whenever customer uses the product for automotive applications beyond NXP Semiconductors' specifications such use shall be solely at customer's own risk, and (c) customer fully indemnifies NXP Semiconductors for any liability, damages or failed product claims resulting from customer design and use of the product for automotive applications beyond NXP Semiconductors' standard warranty and NXP Semiconductors' product specifications.

NXP Semiconductors

provides High Performance Mixed Signal and Standard Product solutions that leverage its leading RF, Analog, Power Management, Interface, Security and Digital Processing expertise

Customer notification

This data sheet was changed to reflect the new company name NXP Semiconductors, including new legal definitions and disclaimers. No changes were made to the technical content, except for package outline drawings which were updated to the latest version.

Contact information

For additional information please visit: <http://www.nxp.com>

For sales offices addresses send e-mail to: salesaddresses@nxp.com

© NXP B.V. 2010

All rights are reserved. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner.

The information presented in this document does not form part of any quotation or contract, is believed to be accurate and reliable and may be changed without notice. No liability will be accepted by the publisher for any consequence of its use. Publication thereof does not convey nor imply any license under patent- or other industrial or intellectual property rights.

Printed in The Netherlands

545002/03/pp15

Date of release: 1999 Aug 30

Document order number: 9397 750 06375