



TDA8133/D

+5.1 V AND +8 V DUAL-VOLTAGE REGULATOR WITH DISABLE AND RESET FUNCTIONS

PRELIMINARY DATA

FEATURES

- Input Voltage Range: 7 V to 18 V
- Output Currents up to 750 mA
- Fixed Precision Output 1 Voltage: 5.1 V $\pm 2\%$
- Fixed Precision Output 2 Voltage: 8 V $\pm 2\%$
- Output 1 with Reset Function
- Output 2 with Disable Function by TTL Input
- Short-circuit Protection at both Outputs
- Thermal Protection
- Low Dropout Voltage

DESCRIPTION

The TDA8133 and the TDA8133D are monolithic dual positive voltage regulators designed to provide fixed precision output voltages of 5.1 V and 8.0 V for currents up to 750 mA.

An internal reset circuit generates a reset pulse when the voltage of Output 1 drops below the regulated voltage value.

Output 2 can be disabled via the TTL input.

Short-circuit and thermal protections are included in all versions.

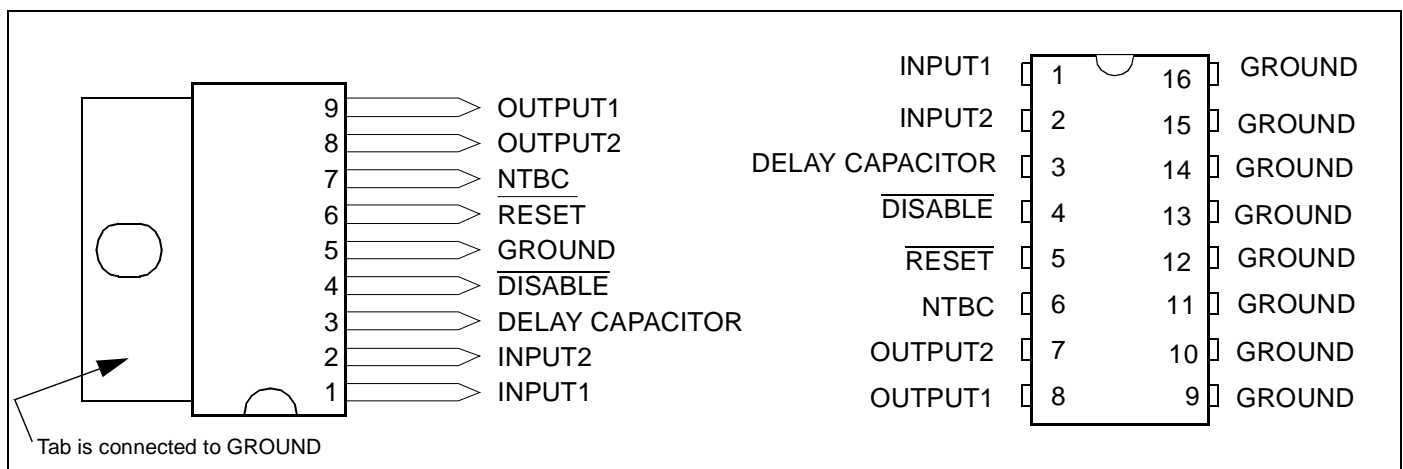
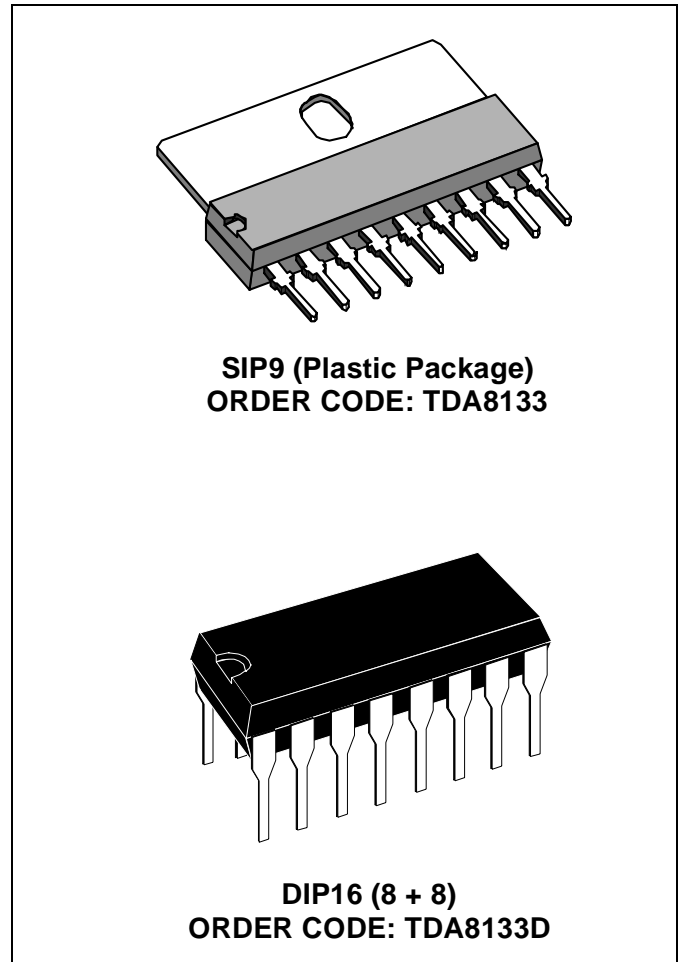


TABLE OF CONTENTS

Chapter 1	GENERAL INFORMATION	3
Chapter 2	ELECTRICAL CHARACTERISTICS	4
2.1	Absolute Maximum Ratings	4
2.2	Thermal Data	4
2.3	Electrical Characteristics	4
Chapter 3	CIRCUIT DESCRIPTION	6
Chapter 4	APPLICATION DIAGRAMS	8
Chapter 5	POWER DISSIPATION AND LAYOUT INDICATIONS	9
Chapter 6	PACKAGE MECHANICAL DATA	10
Chapter 7	REVISION HISTORY	12

1 GENERAL INFORMATION

Figure 1: TDA8133 Block Diagram

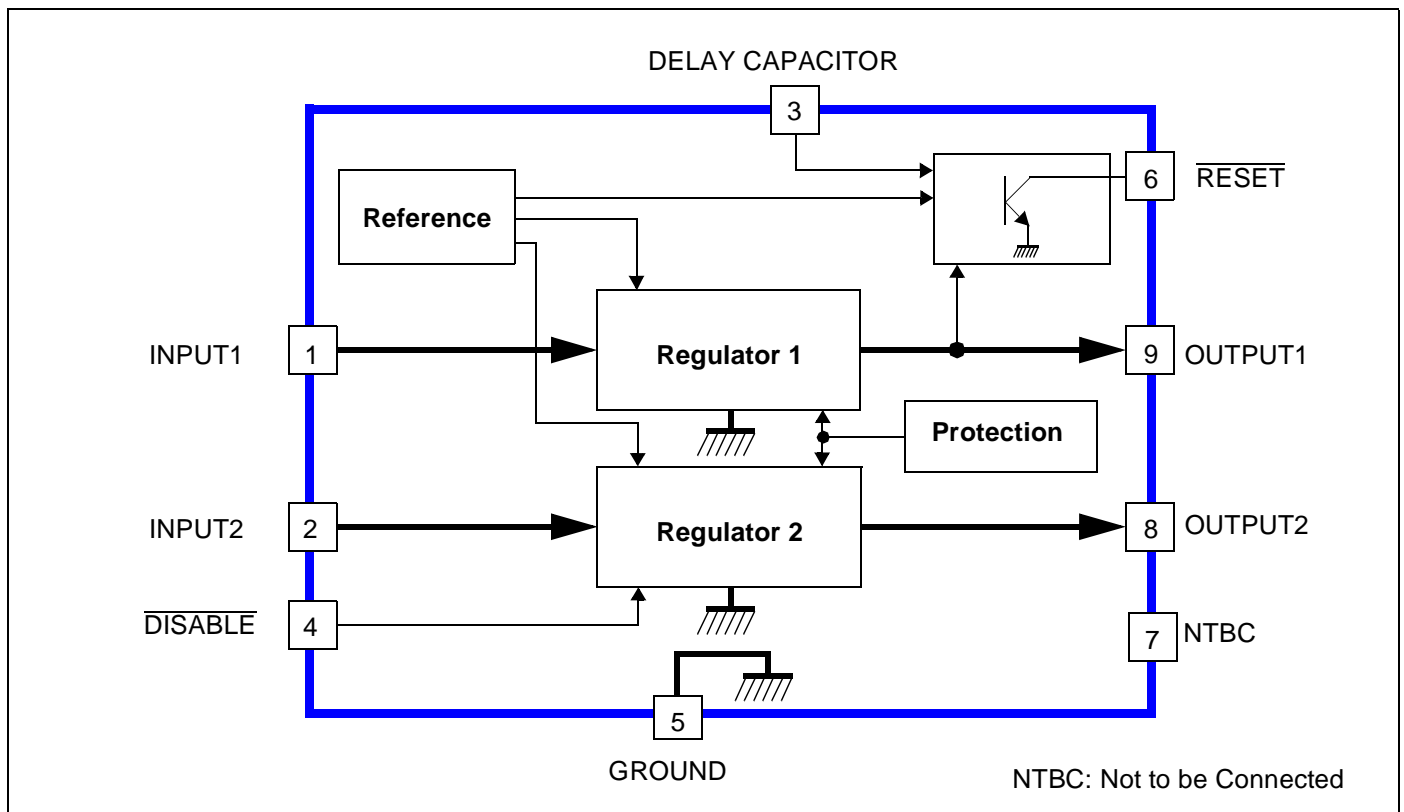
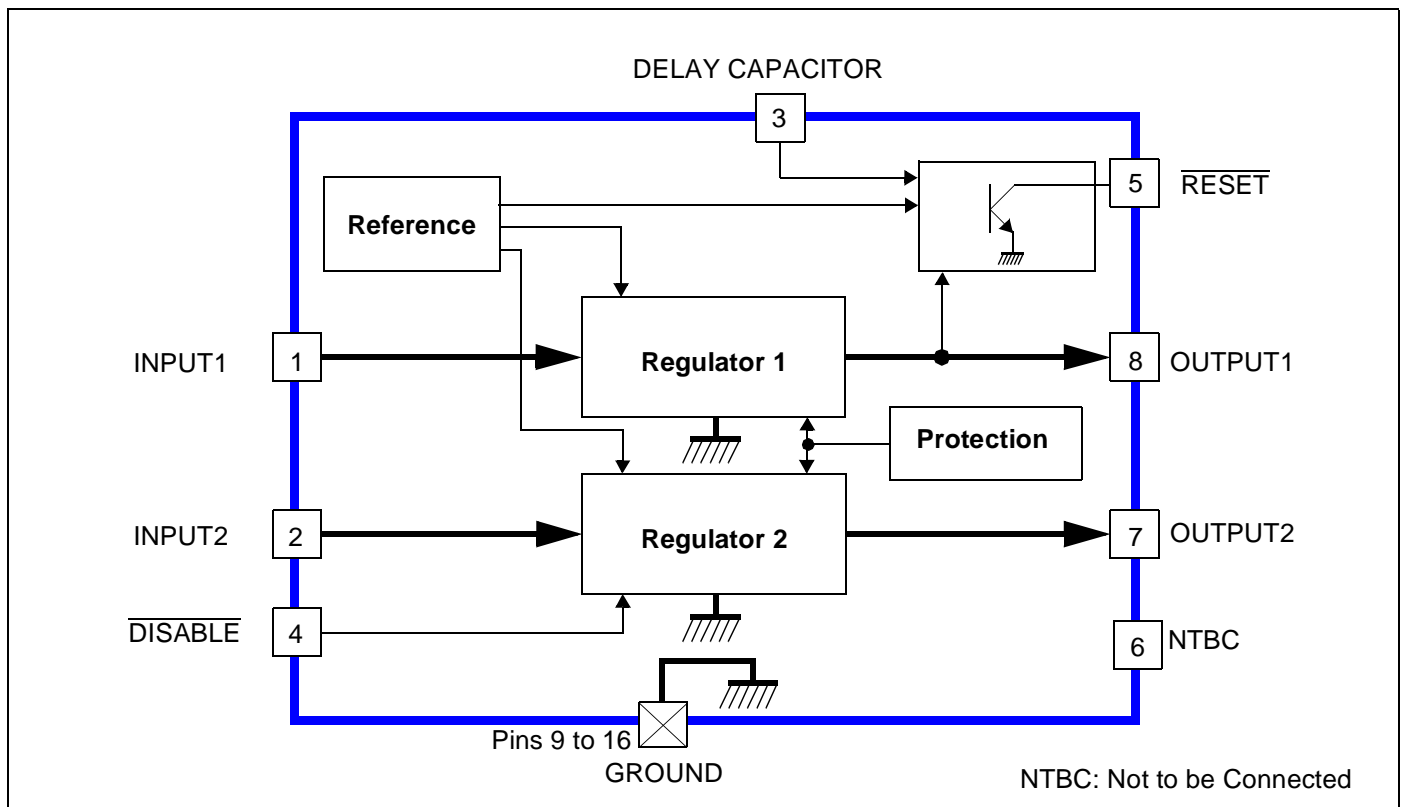


Figure 2: TDA8133D Block Diagram



2 ELECTRICAL CHARACTERISTICS

2.1 Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
V_{IN}	DC Input Voltage at pins INPUT1 and INPUT2	20	V
V_{DIS}	Disable Input Voltage at pin $\overline{DISABLE}$	20	V
V_{RST}	Output Voltage at pin \overline{RESET}	20	V
$I_{O1,2}$	Output Currents	Internally Limited	
P_t	Power Dissipation	Internally Limited	
T_{STG}	Storage Temperature	-65 to +150	°C
T_J	Junction Temperature	0 to +150	°C

2.2 Thermal Data

Symbol	Parameter	Value	Unit	
R_{thJC}	Thermal Resistance (Junction-to-Case)	TDA8133	9	°C/W
		TDA8133D	15	
R_{thJA}	Thermal Resistance ¹ (Junction-to-Ambient)	TDA8133	50	°C/W
		TDA8133D	56	
T_J	Maximum Recommended Junction Temperature	140	°C	
T_{OPER}	Operating Free Air Temperature Range	0 to +70	°C	

1. Mounted on board. For more information, refer to [Section 5](#).

2.3 Electrical Characteristics

$T_{AMB} = 25^\circ \text{C}$, $V_{IN1} = 7 \text{V}$, $V_{IN2} = 10 \text{V}$, unless otherwise specified.

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_{O1}	Output Voltage	$I_{O1} = 10 \text{mA}$	5	5.1	5.2	V
V_{O2}	Output Voltage	$I_{O2} = 10 \text{mA}$	7.84	8.00	8.16	V
$V_{IO1,2}$	Dropout Voltage	$I_{O1,2} = 750 \text{mA}$			1.4	V
$V_{O1,2LI}$	Line Regulation	$7 \text{V} < V_{IN1} < 14 \text{V}$			50	mV
		$10 \text{V} < V_{IN2} < 14 \text{V}$			80	
$V_{O1,2LO}$	Load Regulation	$5 \text{mA} < I_{O1} < 600 \text{mA}$			100	mV
		$5 \text{mA} < I_{O2} < 600 \text{mA}$			160	
I_Q	Quiescent Current	$I_{O1} = 10 \text{mA}$, OUTPUT2 Disabled			2	mA

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_{O1RST}	Reset Threshold Voltage	$K = V_{O1}, V_{IN1} \geq 7 \text{ V}$	K - 0.4	K - 0.25	K - 0.1	V
V_{RTH}	Reset Threshold Hysteresis	See circuit description.	20	50	75	mV
t_{RD}	Reset Pulse Delay	$C_e = 100 \text{ nF}$ See circuit description.		25		ms
V_{RL}	Saturation Voltage in Reset Condition	$I_{RESET} = 5 \text{ mA}$			0.4	V
I_{RH}	Leakage Current in Normal Condition	$V_{RESET} = 10 \text{ V}$			10	μA
$K_{O1,2}$	Output Voltage Thermal Drift	$K_0 = \frac{\Delta V_0 \cdot 10^6}{\Delta T \cdot V_0}$ $T_J = 0 \text{ to } +125^\circ\text{C}$		100		ppm/ $^\circ\text{C}$
$I_{O1,2SC}$	Short Circuit Output Current	$V_{IN1} = 7 \text{ V}, V_{IN2} = 10 \text{ V}$ $V_{IN1,2} = 16 \text{ V}^1$			1.6 1.0	A
V_{DISH}	Disable Voltage when pin $\overline{\text{DISABLE}}$ is High (OUTPUT2 active)		2			V
V_{DISL}	Disable Voltage when pin $\overline{\text{DISABLE}}$ is Low (OUTPUT2 disabled)				0.8	V
I_{DIS}	Disable Bias Current	$0 \text{ V} < V_{DIS} < 7 \text{ V}$	-100		2	μA
T_{JSD}	Junction Temperature for Thermal Shutdown			145		$^\circ\text{C}$

1. The output short-circuit currents are tested one channel at time. During a short-circuit, a large consumption of power occurs, but the thermal protection circuit prevents any excessive temperatures. A safe permanent short-circuit protection is only guaranteed for input voltages up to 16 V.

3 CIRCUIT DESCRIPTION

The TDA8133 and the TDA8133D are dual-voltage regulators with Reset and Disable functions.

The two regulation parts are supplied from a single voltage reference circuit trimmed by zener zapping during EWS testing. Since the supply voltage of this voltage reference is connected to pin INPUT1 (V_{IN1}), the second regulator will not work if pin INPUT1 is not supplied.

The output stages are designed using a Darlington configuration with a typical dropout voltage of 1.2 V.

The Disable circuit will switch off pin OUTPUT2 if a voltage less than 0.8 V is applied to pin $\overline{\text{DISABLE}}$.

The Reset circuit checks the voltage at pin OUTPUT1. If this voltage drops below $V_{O1} - 0.25 \text{ V}$ (4.85 V Typ.), the "a" comparator (Figure 3) rapidly discharges the external capacitor (C_e) and the reset output immediately switches to low. When the voltage at pin OUTPUT1 exceeds $V_{O1} - 0.2 \text{ V}$ (4.9 V Typ.), the V_{C_e} voltage increases linearly to the reference voltage ($V_{REF} = 2.5 \text{ V}$) corresponding to a Reset Pulse Delay (t_{RD}) as shown in Figure 4.

$$t_{RD} = \frac{C_e \times 2.5 \text{ V}}{10 \mu\text{A}}$$

Afterwards, the reset output returns to high. To avoid glitches in the reset output, the second comparator "b" has a large hysteresis (1.9 V).

Figure 3: Reset Diagram

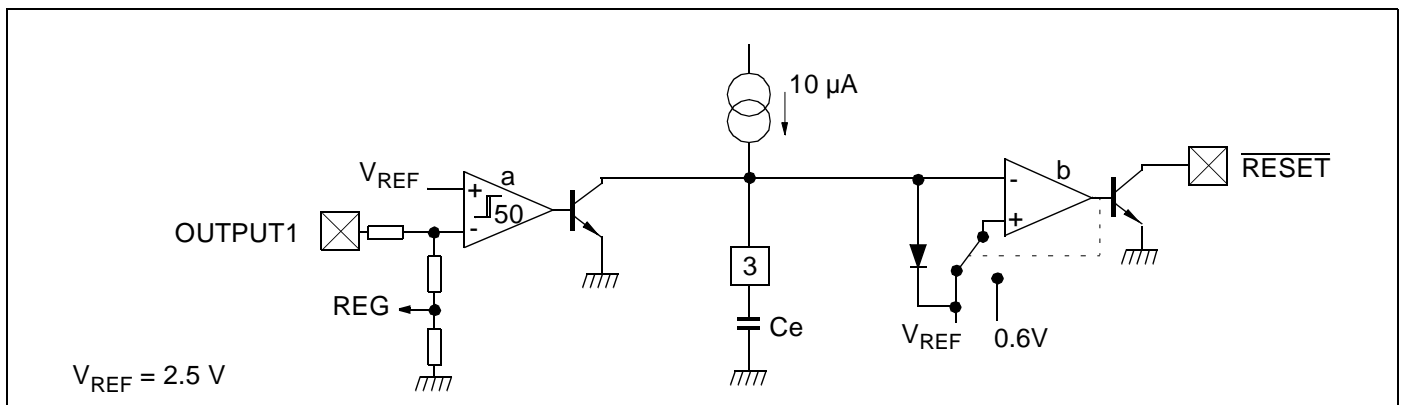
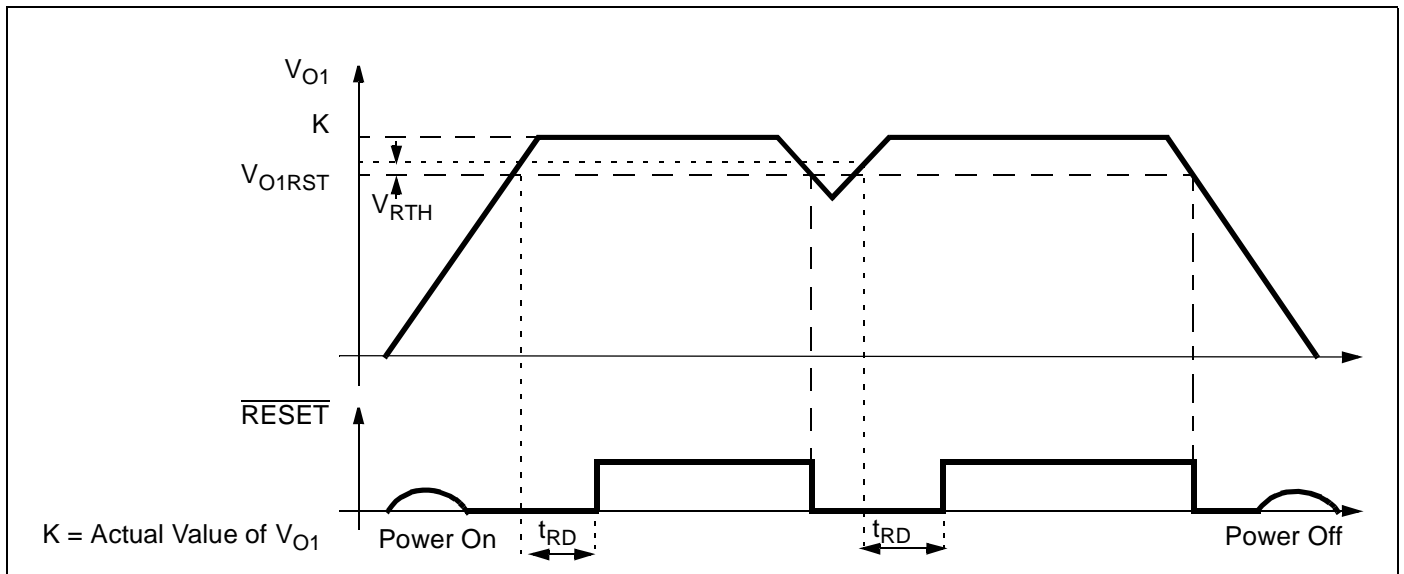


Figure 4: Internal Reset Voltage



4 APPLICATION DIAGRAMS

Figure 5: TDA8133 Typical Application

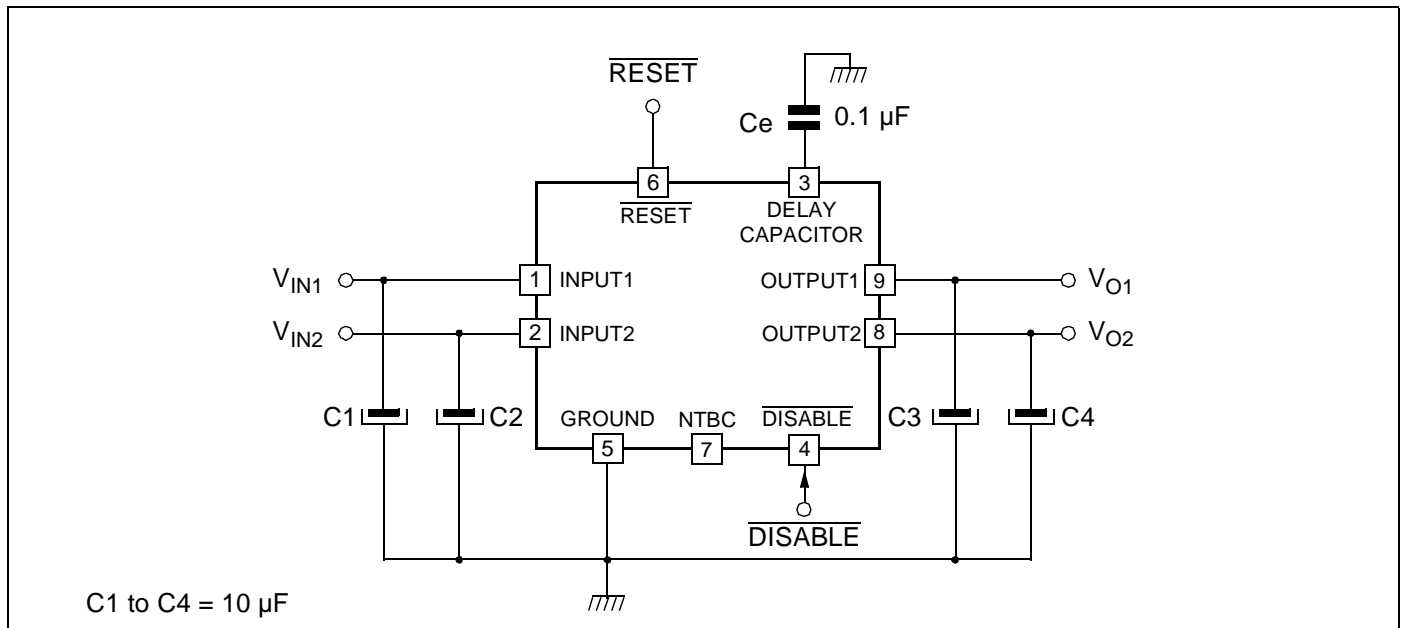
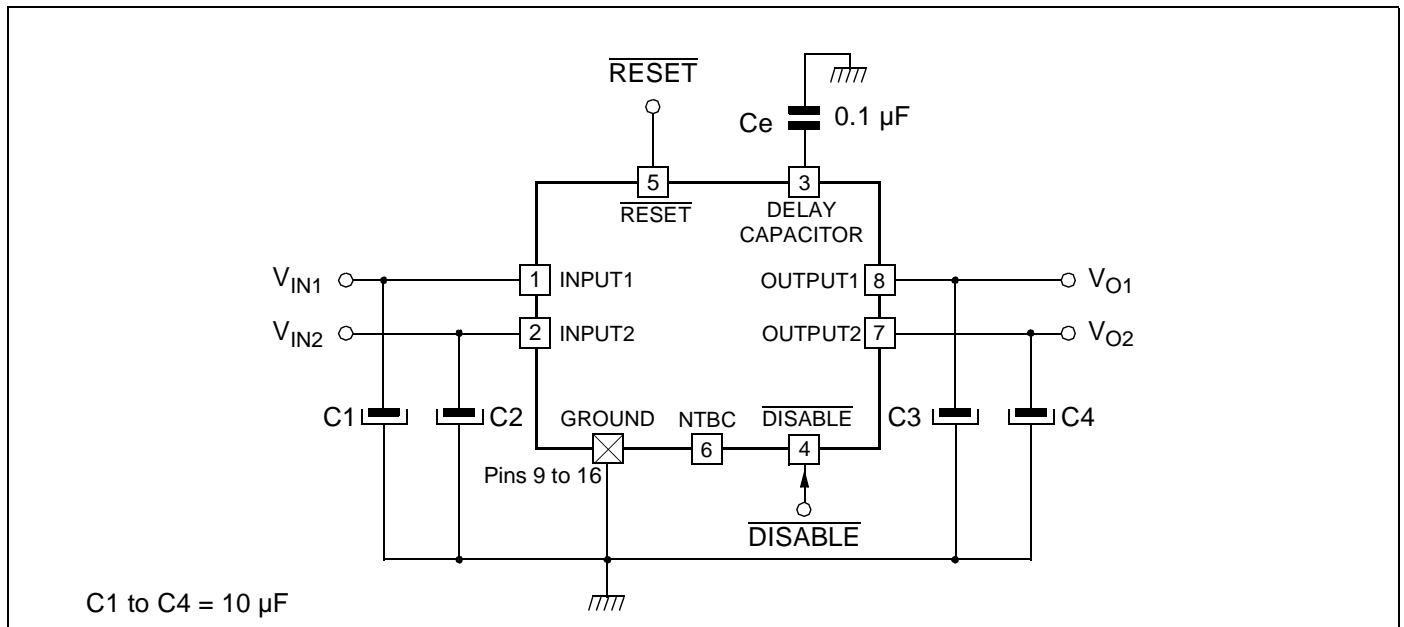


Figure 6: TDA8133D Typical Application



5 POWER DISSIPATION AND LAYOUT INDICATIONS

The power is mainly dissipated by the two device buffers. It can be calculated by the equation:

$$P = (V_{IN1} - V_{O1}) \times I_{O1} + (V_{IN2} - V_{O2}) \times I_{O2}$$

The following table lists the different R_{thJA} values of these packages with or without a heat sink and the corresponding maximum power dissipation assuming:

- Maximum Ambient Temperature = 70° C
- Maximum Junction Temperature = 140° C

Device	Heat Sink	R_{thJA} in °C/W	P_{MAX} in W
TDA8133	No	50	1.4
	Yes	20	3.5
TDA8133D	No	56 to 40	1.25 to 1.75
	Yes	32	2.2

Figure 7: Thermal Resistance (Junction-to-Ambient) of DIP16 Package without Heat Sink

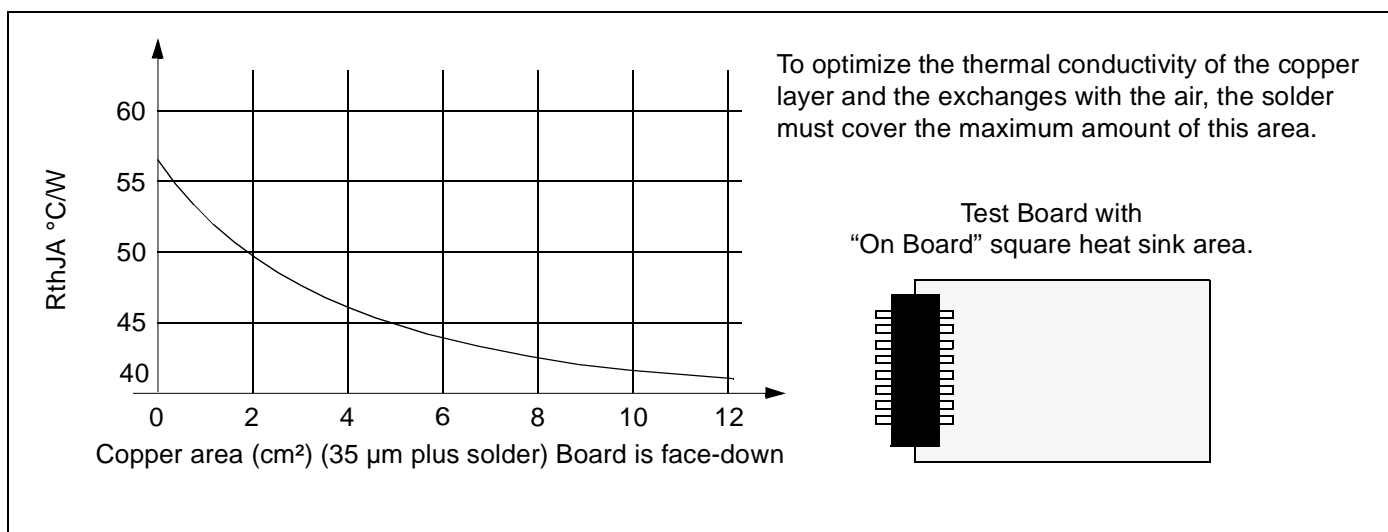


Figure 8: Metal plate mounted near the TDA8133D for heat sinking

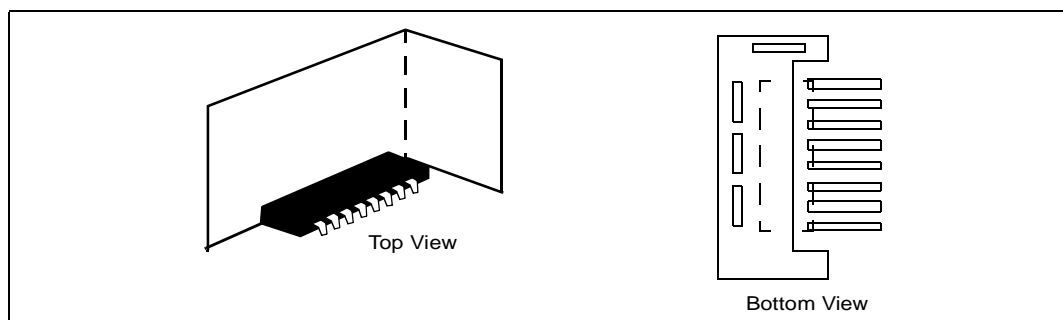
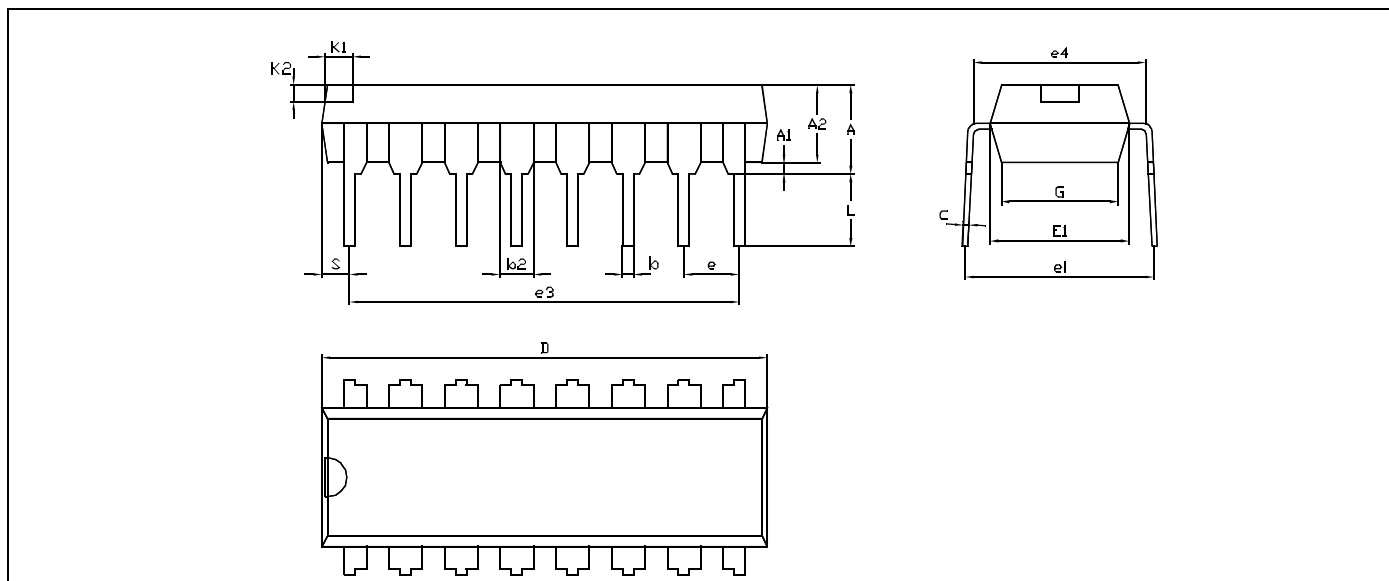


Figure 10: 16-Pin Plastic Dual In-Line Package, 300-mil Width



Dim.	mm			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A			5.33			0.210
A1	0.38			0.015		
A2	2.92	3.30	4.95	0.115	0.130	0.195
b	0.36		0.56	0.014		0.022
b2		1.52	1.78		0.060	0.070
c	0.20	0.25	0.36	0.008	0.010	0.014
D	18.67	19.18	19.69	0.735	0.755	0.775
e		2.54			0.100	
E1	6.10	6.35	7.11	0.240	0.250	0.280
L	2.92	3.30	3.81	0.115	0.130	0.150

7 REVISION HISTORY

Revision	Main Changes	Date
1.0	First Issue	March 1994
1.1	Datasheet Update and addition of DIP16 Package	July 2001
1.2	General Update; DISABLE pin renamed $\overline{\text{DISABLE}}$ (function remains unchanged).	August 2001
1.3	Thermal Data updated.	September 2001
1.4	Thermal Data updated. Figure 1 and Figure 2 updated.	October 2001

Information furnished is believed to be accurate and reliable. However, STMicroelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of STMicroelectronics. Specifications mentioned in this publication are subject to change without notice.

This publication supersedes and replaces all information previously supplied. STMicroelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of STMicroelectronics.

The ST logo is a registered trademark of STMicroelectronics

© 2003 STMicroelectronics - All Rights Reserved

STMicroelectronics GROUP OF COMPANIES

Australia - Brazil - China - Finland - France - Germany - Hong Kong - India - Italy - Japan
Malaysia - Malta - Morocco - Singapore - Spain - Sweden - Switzerland - United Kingdom - U.S.A.

www.st.com

This datasheet has been download from:

www.datasheetcatalog.com

Datasheets for electronics components.