

INTEGRATED CIRCUITS

DATA SHEET

TDA2615

2 x 6 W hi-fi audio power amplifier

Product specification
File under Integrated Circuits, IC01

September 1991

Philips Semiconductors



PHILIPS

2 x 6 W hi-fi audio power amplifier**TDA2615****GENERAL DESCRIPTION**

The TDA2615 is a dual power amplifier in a 9-lead single-in-line (SIL9) plastic medium power package. It has been especially designed for mains fed applications, such as stereo TV and stereo radio.

FEATURES

- Requires very few external components
- No switch-on/switch-off clicks
- Input mute during switch-on and switch-off
- Low offset voltage between output and ground
- Excellent gain balance of both amplifiers
- Hi-fi in accordance with IEC 268 and DIN 45500
- Short-circuit proof and thermal protected
- Mute possibility.

QUICK REFERENCE DATA

Stereo application

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$\pm V_P$	supply voltage range		7.5	–	20	V
P_o	output power	$V_S = \pm 12\text{ V}$; THD = 0.5%	–	6	–	W
G_v	internal voltage gain		–	30	–	dB
$ G_v $	channel unbalance		–	0.2	–	dB
α	channel separation		–	70	–	dB
RR	supply voltage ripple rejection		–	60	–	dB

ORDERING INFORMATION

EXTENDED TYPE NUMBER	PACKAGE			
	PINS	PIN POSITION	MATERIAL	CODE
TDA2615	9	SIL	plastic	SOT110BE2

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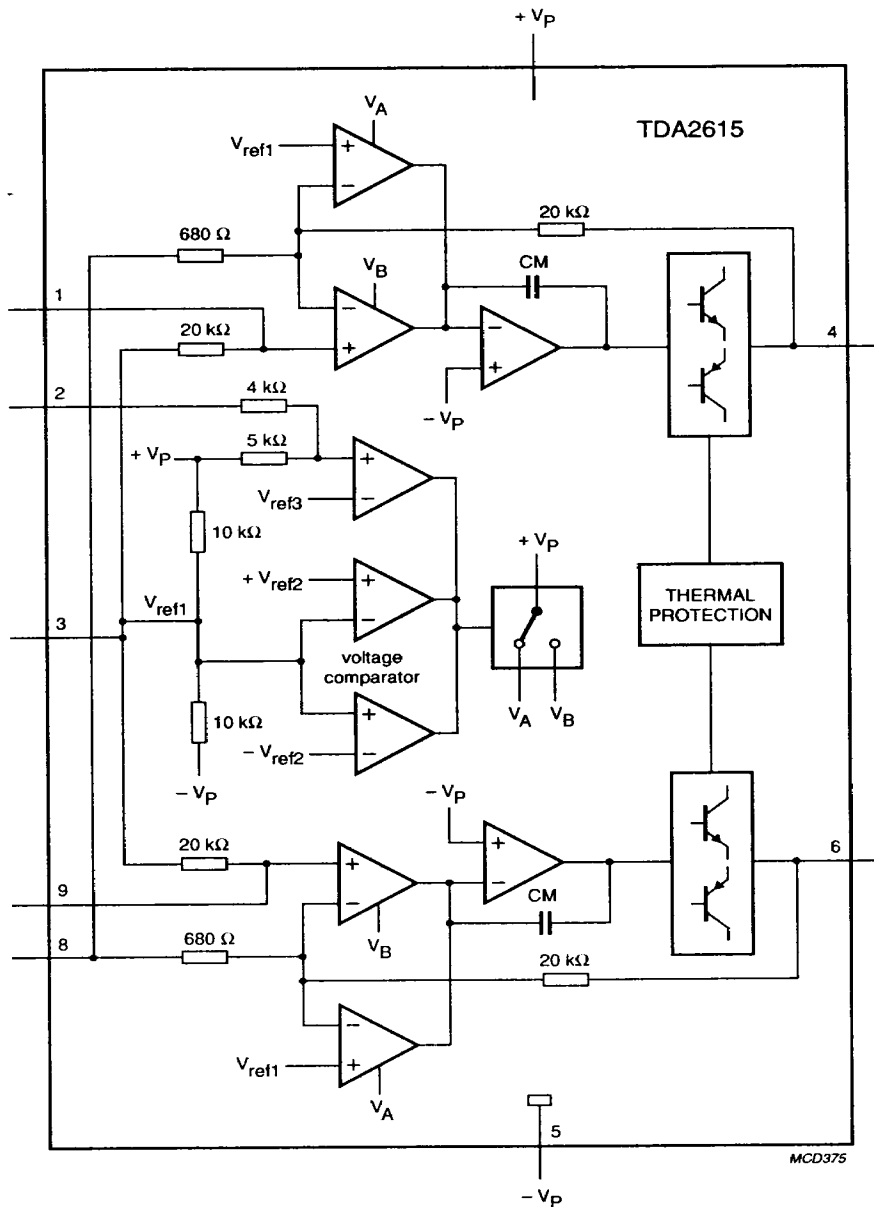


Fig.1 Block diagram.

2 x 6 W hi-fi audio power amplifier

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PINNING

SYMBOL	PIN	DESCRIPTION
-INV1	1	non-inverting input 1
MUTE	2	mute input
1/2V _P /GND	3	1/2 supply
OUT1	4	output 1
-V _S	5	supply voltage (negative)
OUT2	6	output 2
V _S	7	supply voltage (positive)
INV1/2	8	inverting input 1 and 2
-INV2	9	non-inverting input 2

FUNCTIONAL DESCRIPTION

The TDA2615 is a hi-fi stereo amplifier designed for mains fed applications, such as stereo TV. The circuit is optimally designed for symmetrical power supplies, but is also well-suited to asymmetrical power supply systems.

An output power of 2 x 6 W (THD = 0.5%) can be delivered into an 8 Ω load with a symmetrical power supply of ±12 V. The gain is internally fixed at 30 dB, thus offering a low gain spread and a very good gain balance between the two amplifiers (0.2 dB).

A special feature is the input mute circuit. This circuit disconnects the non-inverting inputs when the supply voltage drops below ±6 V, while the amplifier still retains its DC operating adjustment. The circuit features suppression of unwanted signals at the inputs, during switch-on and switch-off.

The mute circuit can also be activated via pin 2. When a current of 300 μA is present at pin 2, the circuit is in the mute condition.

The device is provided with two thermal protection circuits. One circuit measures the average temperature of the crystal and the other measures the momentary

temperature of the power transistors. These control circuits attack at temperatures in excess of 150 °C, so a crystal operating temperature of max. 150 °C can be used without extra distortion.

With the derating value of 6 K/W, the heatsink can be calculated as follows:

at $R_L = 8 \Omega$ and $V_S = \pm 12 V$, the measured maximum dissipation is 7.8 W.

With a maximum ambient temperature of 60 °C, the thermal resistance of the heatsink is:

$$R_{th} = \frac{150 - 60}{7.8} - 6 = 5.5 \text{ K/W.}$$

The metal tab has the same potential as pin 5.

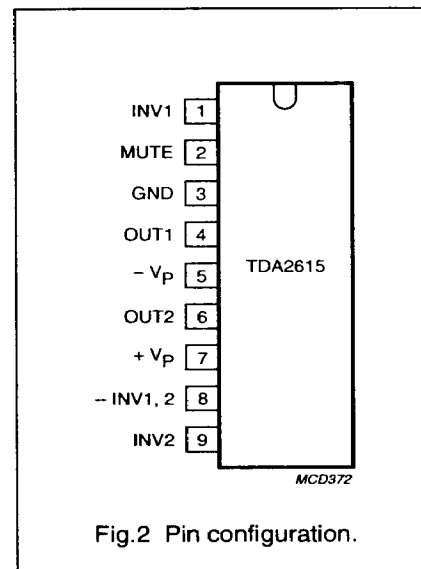


Fig.2 Pin configuration.

2 x 6 W hi-fi audio power amplifier

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LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$\pm V_P$	supply voltage		–	20	V
I_{OSM}	non-repetitive peak output current		–	4	A
P_{tot}	total power dissipation	see Fig.3	–	12	W
T_{stg}	storage temperature range		–55	150	°C
T_c	crystal temperature		–	150	°C
T_{amb}	ambient operating temperature range		–25	150	°C
t_{sc}	short-circuit time	short-circuit to ground (see note 1)	–	1	h

Note

1. For asymmetrical power supplies (with the load short-circuited), the maximum unloaded supply voltage is limited to $V_P = 28$ V and with an internal supply resistance of $R_S \geq 4 \Omega$.

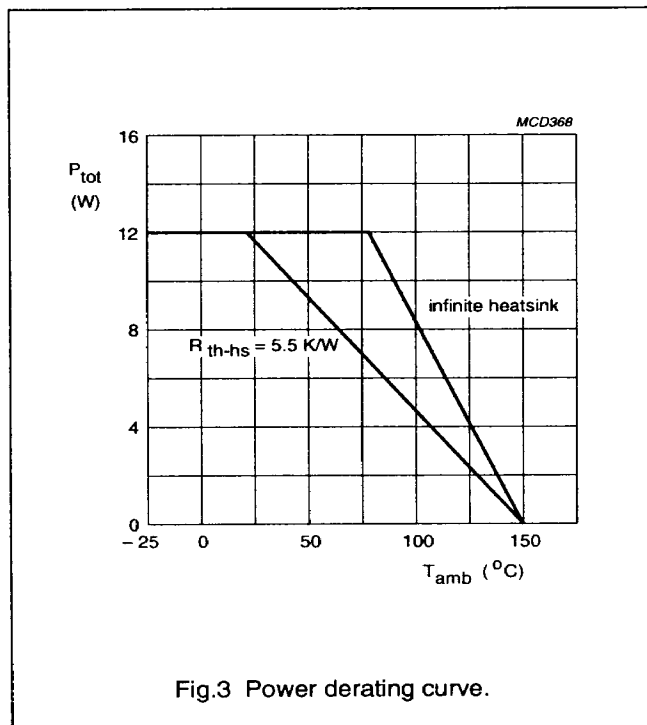


Fig.3 Power derating curve.

THERMAL RESISTANCE

SYMBOL	PARAMETER	VALUE	UNIT
$R_{th\ j-c}$	from junction to case	6	K/W

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CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Supply						
$\pm V_P$	supply voltage range		–	12	20	V
I_{ORM}	repetitive peak output current		–	–	2.2	A
Operating position ($V_P = \pm 12$ V; $R_L = 8 \Omega$; $T_{amb} = 25^\circ\text{C}$; $f = 1$ kHz; symmetrical power supply. See Fig.4.)						
$\pm V_P$	supply voltage range		7.5	12	20	V
I_P	total quiescent current	$R_L = \infty$	18	40	70	mA
P_o	output power	THD = 0.5%	5	6	–	W
		THD = 10%	6.5	8	–	W
THD	total harmonic distortion	$P_o = 4$ W	–	0.15	0.2	%
BW	power bandwidth	THD = 0.5% note 1	–	20 to 20 000	–	Hz
G_v	voltage gain	$I_{mute} < 30 \mu\text{A}$	29	30	31	dB
$ G_v $	gain unbalance		–	0.2	1	dB
V_{no}	noise output voltage	note 2	–	70	140	μV
$ Z_i $	input impedance		14	20	26	$k\Omega$
RR	supply voltage ripple rejection	note 3	40	60	–	dB
α	channel separation	$R_s = 0$	46	70	–	dB
I_{bias}	input bias current		–	0.3	–	μA
$ \Delta V_{GND} $	DC output offset voltage		–	30	200	mV
$ \Delta V_{4-6} $	DC output offset voltage	between two channels	–	4	–	mV
Mute position (at $I_{mute} \geq 300 \mu\text{A}$)						
V_o	output voltage	$V_i = 600$ mV	–	0.6	1.8	mV
Z_{2-7}	mute input impedance		–	9	–	$k\Omega$
I_P	total quiescent current	$R_L = \infty$	18	40	70	mA
V_{no}	noise output voltage	note 2	–	70	140	μV
RR	supply voltage ripple rejection	note 3	40	55	–	dB
$ \Delta V_{GND} $	DC output offset voltage		–	40	200	mV
$ \Delta V_{off} $	offset voltage with respect to operating position		–	40	–	mV
I_2	current if pin 2 is connected to pin 5		–	–	6	mA
Mute position ($\pm V_P = 4$ V; $R_L = 8 \Omega$; $T_{amb} = 25^\circ\text{C}$; $f = 1$ kHz; symmetrical power supply. See Fig.4.)						
$\pm V_P$	supply voltage range		2	–	5.8	V
I_P	total quiescent current	$R_L = \infty$	9	30	40	mA
V_o	output voltage	$V_i = 600$ mV	–	0.6	1.8	mV
V_{no}	noise output voltage	note 2	–	70	140	μV
RR	supply voltage ripple rejection	note 3	40	55	–	dB

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SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$ \Delta V_{\text{GND}} $	DC output offset voltage		–	40	200	mV
Operating position ($V_p = 24 \text{ V}$; $R_L = 8 \Omega$; $T_{\text{amb}} = 25^\circ \text{C}$; $f = 1 \text{ kHz}$; asymmetrical power supply. See Fig.5.)						
I_p	total quiescent current		18	40	70	mA
P_o	output power	THD = 0.5%	5	6	–	W
		THD = 10%	6.5	8	–	W
THD	total harmonic distortion	$P_o = 4 \text{ W}$	–	0.13	0.2	%
BW	power bandwidth	THD = 0.5%; note 1	–	40 to 20 000	–	Hz
G_v	voltage gain	$I_{\text{mute}} < 30 \mu\text{A}$	29	30	31	dB
$ G_v $	gain unbalance		–	0.2	1	dB
V_{no}	noise output voltage	note 2	–	70	140	μV
$ Z_i $	input impedance		14	20	26	$\text{k}\Omega$
RR	supply voltage ripple rejection		35	44	–	dB
α	channel separation		–	45	–	dB
Mute position ($I_{\text{mute}} \geq 300 \mu\text{A}$)						
V_o	output voltage	$V_i = 600 \text{ mV}$	–	0.6	1.8	mV
Z_{2-7}	mute input impedance		–	9	–	$\text{k}\Omega$
I_p	total quiescent current		18	40	70	mA
V_{no}	noise output voltage	note 2	–	70	140	μV
RR	supply voltage ripple rejection	note 3	35	44	–	dB
$ \Delta V_{\text{off}} $	offset voltage with respect to operating position		–	40	–	mV
I_2	current if pin 2 is connected to pin 5		–	–	6	mA

Notes to the characteristics

1. The power bandwidth is measured at an output power of $P_{o \text{ max}} - 3 \text{ dB}$.
2. The noise output voltage (RMS value) is measured at $R_s = 2 \text{ k}\Omega$, unweighted (20 Hz to 20 kHz).

QUALITY SPECIFICATION

Quality according to
UZW-BO/FQ-0601, if this type is
used as an audio amplifier.

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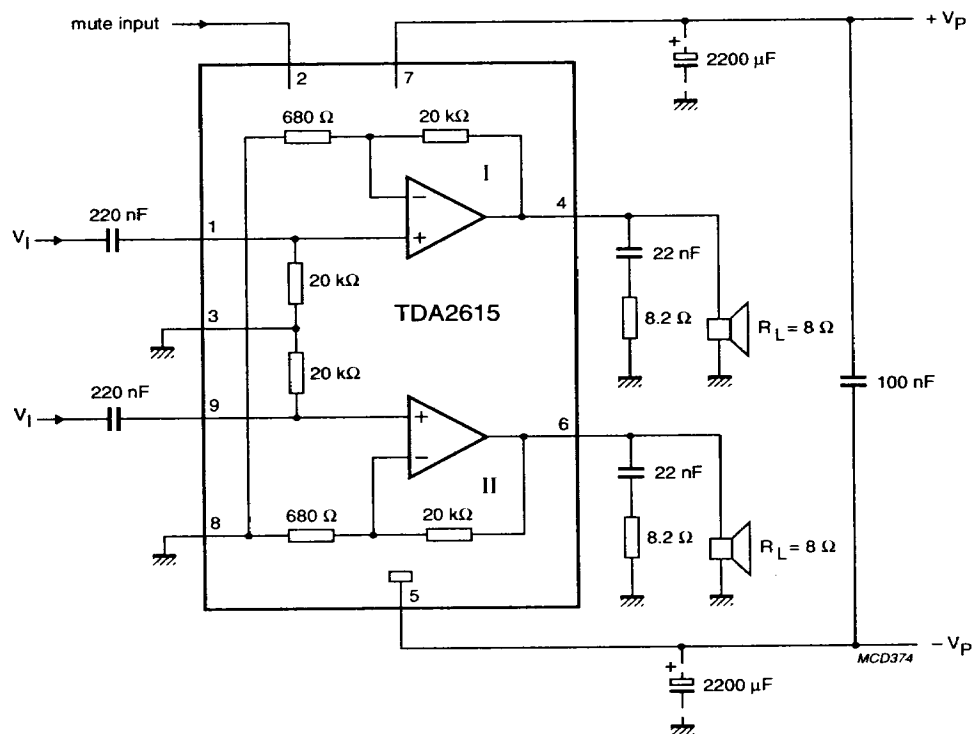


Fig.4 Test and application circuit with symmetrical power supply.

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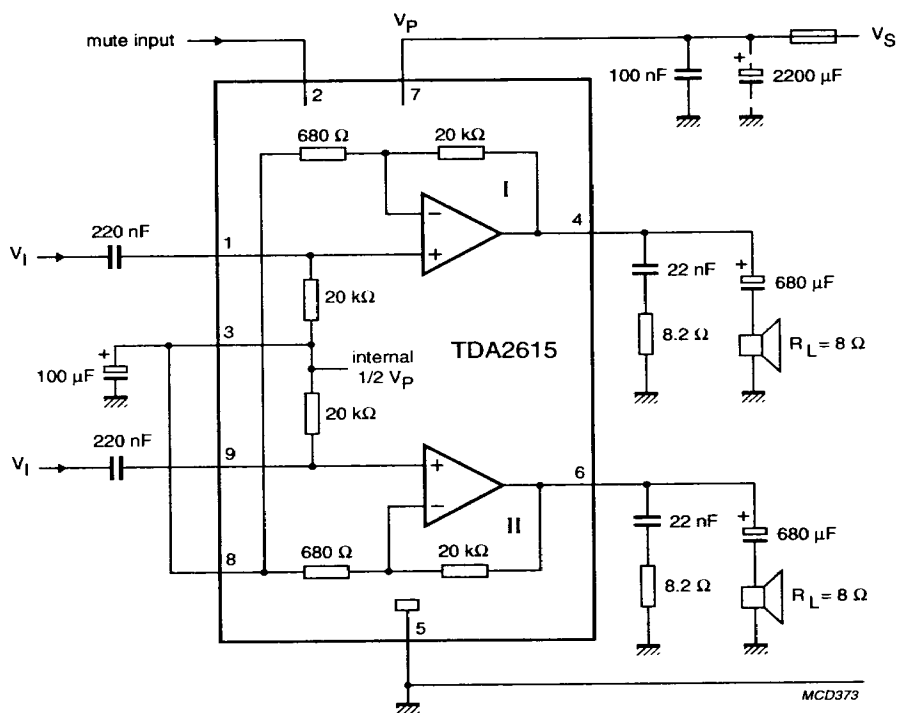


Fig.5 Test and application circuit with asymmetrical power supply.

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PACKAGE OUTLINE

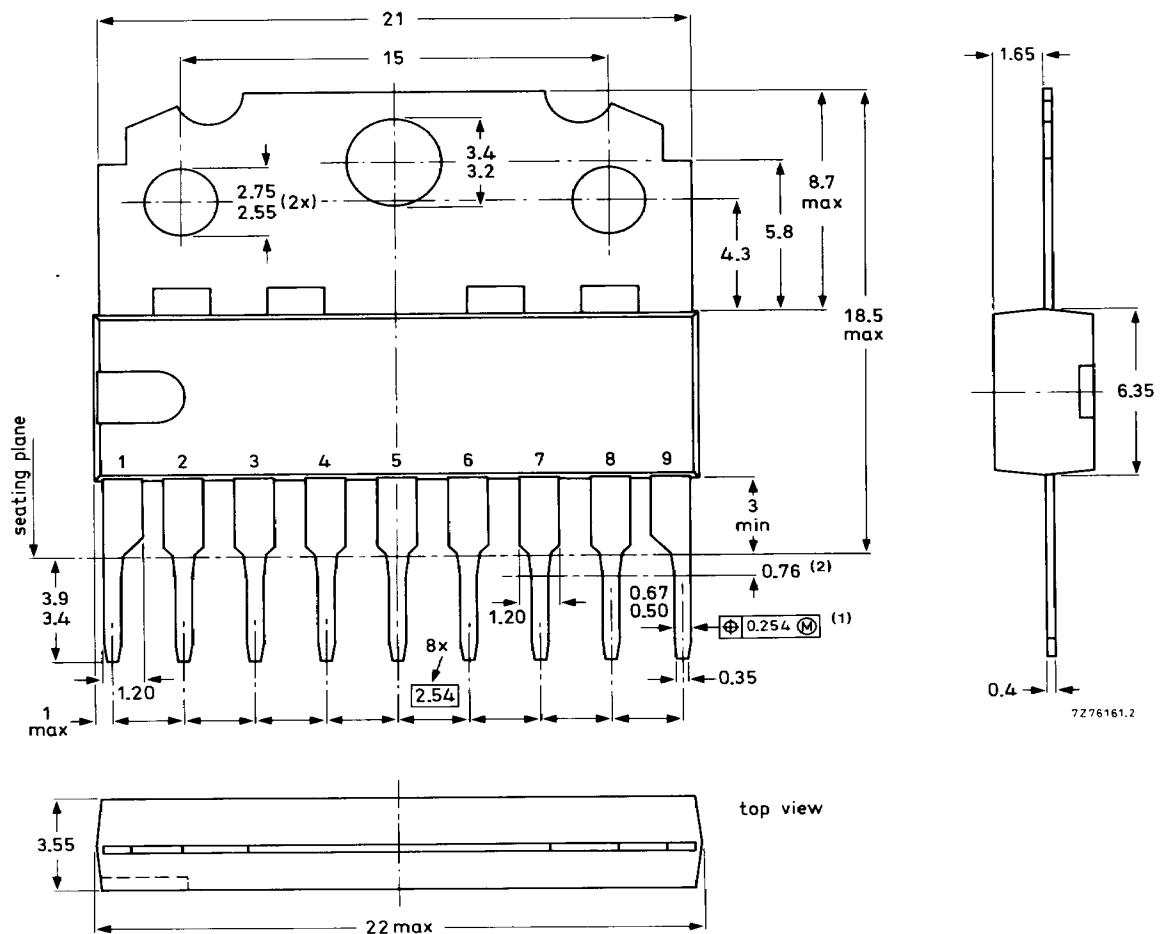


Fig.6 9-lead SIL plastic medium power (SOT110BE2).

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SOLDERING**Plastic dual in-line packages****BY DIP OR WAVE**

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

The device may be mounted up to the seating plane, but the temperature of the plastic body must not exceed the specified storage maximum. 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.

REPAIRING SOLDERED JOINTS

Apply the soldering iron below the seating plane (or not more than 2 mm above it). If its temperature is below 300 °C, it must not be in contact for more than 10 s; if between 300 and 400 °C, for not more than 5 s.

DEFINITIONS

Data sheet status	
Objective specification	This data sheet contains target or goal specifications for product development.
Preliminary specification	This data sheet contains preliminary data; supplementary data may be published later.
Product specification	This data sheet contains final product specifications.
Limiting values	
Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of this specification is not implied. Exposure to limiting values for extended periods may affect device reliability.	
Application information	
Where application information is given, it is advisory and does not form part of the specification.	

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Printed in The Netherlands

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