## INTEGRATED CIRCUITS



料 886-3-5753170 胜特力电子(上海) 86-21-54151736 胜特力电子(深圳) 86-755-83298787 WWW.100Y.COM.TW Http://www. 100y. com. tw

## WWW.100Y.COM.TV **TDA1554Q** 4 x 11 W single-ended or 2 x 22 W power amplifier

Product specification File under Integrated Circuits, IC01 May 1992

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**Philips Semiconductors** 

### GENERAL DESCRIPTION

The TDA1554Q is an integrated class-B output amplifier in a 17-lead single-in-line (SIL) plastic power package. The circuit contains  $4 \times 11$  W single-ended or  $2 \times 22$  W bridge amplifiers. The device is primarily developed for car radio applications.

### Features

- Requires very few external components
- Flexibility in use Quad single-ended or stereo BTL
- High output power
- Low offset voltage at outputs (important for BTL)
- Fixed gain
- Good ripple rejection
- Mute/stand-by switch
- Load dump protection
- AC and DC short-circuit-safe to ground and  $\mathsf{V}_\mathsf{P}$

## QUICK REFERENCE DATA

- Thermally protected
- Reverse polarity safe
- Capability to handle high energy on outputs ( $V_P = 0 V$ )
- Protected against electrostatic discharge
- No switch-on/switch-off plop
- Low thermal resistance
- Identical inputs (inverting and non-inverting)
- Flexible leads.

PARAMETER	CONDITIONS	SYMBOL	MIN	TYP.	MAX.	UNIT
Supply voltage range	WWW.100V.	WT. NO		WW.	NY.COM	WT
operating	WWW.100	VP	6.0	14.4	18.0	V
Repetitive peak output current	WW.100	IORM	-	-WW.	4	A
Total quiescent current	W 100	Itot	1-	80	160	mA
Stand-by current	WWWWWWWW	I <sub>sb</sub>	121	0.1	100	μA
Stereo BTL application	WWW.	DOX.COM	WT.	WW	N.100Y.	M
Output power	$R_L = 4 \Omega$ ; THD = 10%	Po	20	22	- 1005	W
Supply voltage ripple rejection		RR	48		474.200	dB
Noise output voltage	WIN IN	M.IUV ST.CO	MI. L		WW.IO	N.CO
(RMS value)	$R_{S} = 0 \Omega$	V <sub>no(rms)</sub>	OW.1	70	L.WW.I	μV
Input impedance	M.TN WY	Z <sub>I</sub>   100	25	30	38	kΩ
DC output offset voltage	W.TW W	$ \Delta V_0 $	-M.T	1-	100	mV
Quad single-ended application	WILM V	100	I.COM	N I	WW	100Y.
Output power	THD = 10%	WWW.100	N.COm	WI	WW.	100
	$R_L = 4 \Omega$	Po	TI.CON	6	- WW	W
	$R_L = 2 \Omega$	Po	- CO	11		W
Supply voltage ripple rejection	COM.TW	RR	48	M.	-	dB
Noise output voltage	OY.COM.TW	W	1001.0	M.TV		WW
(RMS value)	$R_{S} = 0 \Omega$	V <sub>no(rms)</sub>	-100X.C	50	4- 1	μV
Input impedance	NTWON.YOU	Z <sub>I</sub>	50	60	75	kΩ

#### PACKAGE OUTLINE

17-lead SIL-bent-to-DIL; plastic power (SOT243R); SOT243-1; 1996 July 23.

Product specification

TDA1554Q

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TDA1554Q

## 4 x 11 W single-ended or 2 x 22 W power amplifier

#### WW.100Y VP2 V<sub>P1</sub> 5 13 ing input 1 c<sub>m</sub> TDA1554Q 60 kΩ ŦĘ MO; К 2 kΩ L 18 kΩ power stage nute switch N.100X.COM.TV c<sub>m</sub> 60 kΩ ΗË inverting input output 2 2 κΩ ť 18 kΩ power stage Y.COM.TW 14 mute/stand-by switch 100Y.COM.TW tand-by switch stand-by reference W.100Y.COM.TW VA Т voltage WWW.100Y.COM WWW.100Y.COM.TW 15 not connected 15 kΩ supply voltage rejection 15kΩ Vref Ь 17 non-inverting input 2 itch cm 60 kΩ 41 VA 12 output 4 2 kΩ Ł Ь power stage 18 kΩ mute switch cm 60 kΩ ╢ inverting input 2 output 3 ť 2 κΩ ╘ power stage H 18 kΩ **T**11 7224417.1 GND2 GND1 not connected ground (signal) power ground (substrate) W.100X.COM.T Fig.1 Block diagram. 勝特力材料 886-3-5753170

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#### **Philips Semiconductors**

## 4 x 11 W single-ended or 2 x 22 W power amplifier

#### PINNING

1	NINV1	non-inverting input 1	9	n.c.	not connected
2	INV1	inverting input 1	10	OUT3	output 3
3	GND	ground (signal)	11	GND2	power ground 2 (substrate)
4	RR	supply voltage ripple rejection	12	OUT4	output 4
5	V <sub>P1</sub>	positive supply voltage 1	13	V <sub>P2</sub>	positive supply voltage 2
6	OUT1	output 1	14	M/SS	mute/stand-by switch
7	GND1	power ground 1 (substrate)	15	n.c.	not connected
8	OUT2	output 2	16	INV2	inverting input 2
			17	NINV2	non-inverting input 2

#### FUNCTIONAL DESCRIPTION

The TDA1554Q contains four identical amplifiers with differential input stages (two inverting and two non-inverting) and can be used for single-ended or bridge applications. The gain of each amplifier is fixed at 20 dB (26 dB in BTL). A special feature of this device is:

#### Mute/stand-by switch

- low stand-by current (< 100 μA)</li>
- low mute/stand-by switching current (low cost supply switch)
- mute facility

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#### RATINGS

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

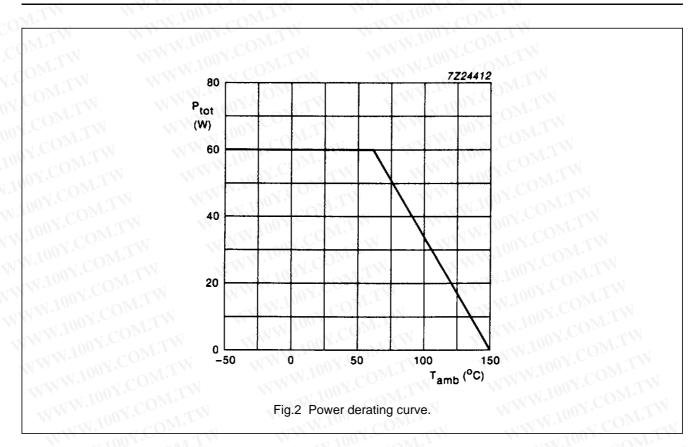
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PARAMETER	CONDITIONS	SYMBOL	MIN.	MAX.	UNIT
Supply voltage	WW 100	T.M.T		1.10	
operating	WWW.10	VP	M	18	V
non-operating	WWW.IC	VP	-N	30	V Z.CU
load dump protected	during 50 ms;	V.COM	W	WWW	· · · · · · · · · · · · · · · · · · ·
	t <sub>r</sub> ≥ 2.5 ms	V <sub>P</sub>	-	45	V
Non-repetitive peak output current	The WI	IOSM	E.T.	6	A
Repetitive peak output current	NTW WW	IORM	$WT.I_{TT}$	4	A 100
Storage temperature range	WW WT	T <sub>stg</sub>	-55	+ 150 🕥	°C
Junction temperature	WW WT	T <sub>j</sub>	Qm. TW	150	°C
AC and DC short-circuit-safe voltage	01.1	V <sub>PSC</sub>	C-OM.	18	V
Energy handling capability at outputs	$V_{P} = 0 V$	WW.100 1	T.0M.1	200	mJ
Reverse polarity	M.TW V	V <sub>PR</sub>	- coM.	6	V
Total power dissipation	see Fig.2	P <sub>tot</sub>	<u>P</u> .Com	60	W

TDA1554Q

## 4 x 11 W single-ended or 2 x 22 W power amplifier



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#### **DC CHARACTERISTICS**

PARAMETER	CONDITIONS	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply	NWW V	V.LOOY.C	WT		ANN. IN	N.COM
Supply voltage range	note 1	VP	6.0	14.4	18.0	V.CO
Total quiescent current		I <sub>tot</sub>	eoM.	80	160	mA
DC output voltage	note 2	Vo	-coM.	6.9	WW.	V
DC output offset voltage	I.I.M. W	ΔV <sub>O</sub>	- coM	1-	100	mV
Mute/stand-by switch	NTN V	10	N.C.	N.T.W	N.	W.100Y.
Switch-on voltage level	WIN	V <sub>ON</sub>	8.5	WT.TM	- 1111	V 100
Mute condition	WTN	V <sub>mute</sub>	3.3	WT.IT	6.4	V
Output signal in mute	$V_{I} = 1 V (max);$	WWW	Cinoy.C	WILL	17	10
position	f = 1 kHz	Vo		<u>0</u> N. TV	2	mV
DC output offset voltage	COM	WW	N.IV.	CONT	W.	WWW.
(between pins 6 to 8 and 10 to 12)	COM.1	ΔV <sub>O</sub>	1.100 ×	5 COM.	100	mV
Stand-by condition	P.COM.TW	V <sub>sb</sub>	0 100	- coM.	2	V
DC current in	OY.COM.TW		W.10	or.coM	TV.	
stand-by condition	OOY.COM.TV	I <sub>sb</sub>		001.00	100	μA
Switch-on current	LOOY.COM	I <sub>sw</sub>	411	12	40	μA

## 4 x 11 W single-ended or 2 x 22 W power amplifier

## TDA1554Q

#### **AC CHARACTERISTICS**

 $V_P = 14.4 V$ ;  $R_L = 4 \Omega$ ; f = 1 kHz;  $T_{amb} = 25 \text{ °C}$ ; measurements taken using Fig.3 for stereo BTL application and Fig.4 for quad single-ended application unless otherwise specified

PARAMETER	CONDITIONS	SYMBOL	MIN.	TYP.	MAX.	UNIT
Stereo BTL application	COM.	VV	W.100	COM.	CN .	
Output power	THD = 0.5%	Po	15	17 01		W
	THD = 10%	Po	20	22	-	W
Output power at $V_P = 13.2 V$	THD = 0.5%	P <sub>o</sub>	1	12	TW	W
	THD = 10%	Po	N.	17	WT.TW	W
Total harmonic distortion	$P_o = 1 W$	THD	-WWW.	0.1	WT	%
Power bandwidth	THD = 0.5%	W	WWW	.Yoo	WT. NO	
	$P_o = -1 dB$		WIT	W.100	CONT	N
	w.r.t. 15 W	Bw	-	20 to	-0M.1	Hz
	NV 100Y.CO	WT.M	N.	15 000	.Mon	
Low frequency roll-off	note 3	WTI	W	100	S.COM	TNI .
	–1 dB	fL		45	NY.COM	Hz
High frequency roll-off	–1 dB	f <sub>H</sub>	20	WW.L	ON.CON	kHz
Closed loop voltage gain	WW.1001.	Gv	25	26	27	dB
Supply voltage ripple rejection	note 4	COM.T		W	1001.00	M.L
ON	WW 100	RR	48		1.100Y.C	dB
mute	WWW.	RR	48	- 1111	-100Y.C	dB
stand-by	WWW.IC	RR	80	- 11	1-100X	dB
Input impedance	I.WW.I	Z <sub>i</sub>  O	25	30	38	kΩ
Noise output voltage	WW		M		WW.100	COM.
(RMS value)	W WI	1.1001.0	M.TW		W.10	COM
ON	$R_{S} = 0 \Omega$ ; note 5	V <sub>no(rms)</sub>	-M.TV	70	- 1	μV
ON COM	$R_S = 10 \text{ k}\Omega;$ note 5	V <sub>no(rms)</sub>	COM.T	100	200	μV
mute	notes 5 and 6	V <sub>no(rms)</sub>	TCOM.	60		μV
Channel separation	$R_{S} = 10 k\Omega$	α	40	1	-	dB
Channel unbalance	V WT	∆G <sub>v</sub>	12.00	WE.	1	dB

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# 4 x 11 W single-ended or 2 x 22 W power amplifier

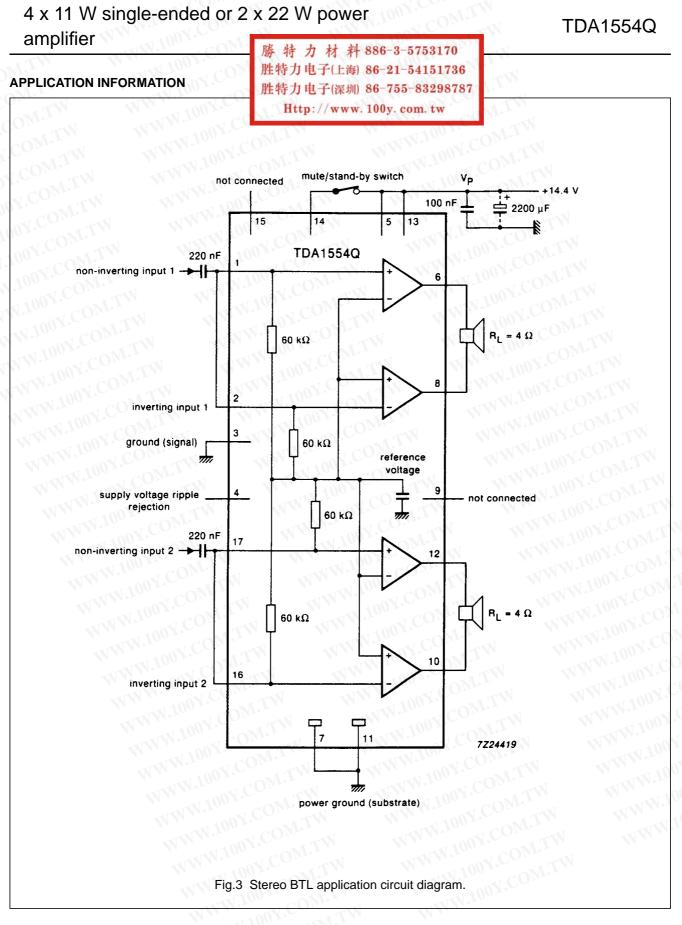
PARAMETER	CONDITIONS	SYMBOL	MIN.	TYP.	MAX.	UNIT
Quad single-ended application	T.MON.	W TANK	1001.	OM.I.	T	
Output power	note 7	N.	N.100Y.C	OM.TV		
	THD = 0.5%	Po	4 100%	5	9_	W
	THD = 10%	P <sub>o</sub>	5.5	6	<u>1</u> 2	W
Output power at R <sub>L</sub> = 2 W	note 7	W	WW. LOO	V.COM	WT	
	THD = 0.5%	Po	7.5	8.5	W75	W
	THD = 10%	Po	10	11 0	1-	W
Total harmonic distortion	$P_o = 1 W$	THD	<u>P</u>	0.1	ML.1	%
Low frequency roll-off	note 3	N N	WW	1001.00	M.TW	
	–3 dB	fL	-WWW	45	WT.M	Hz
High frequency roll-off	-1 dB	f <sub>H</sub>	20	-100Y.		kHz
Closed loop voltage gain	WW.Incox.CON	Gv	19	20	21	dB
Supply voltage ripple rejection	note 4	M.L		W.IVO	CONT	N/
ON	W.1001.C	RR	48	$\pi W.100$	TCOM.	dB
mute	WWW.100Y.C	RR	48	- 10	<u>12.</u> CON	dB
stand-by	WW 100Y.	RR	80		001. C	dB
Input impedance	WWW	Z <sub>i</sub>	50	60	75	kΩ
Noise output voltage	WWW.100	CONT.	N	WWW	.Looy.Cl	WT
(RMS value)	WWW.100	COM.	- N	WW	N. IOON.C	ONT
ON	$R_S = 0 \Omega$ ; note 5	V <sub>no(rms)</sub>		50	VH-100 1	μV
ON COM T	$R_S = 10 \text{ k}\Omega;$ note 5	V <sub>no(rms)</sub>	WT.	70	100	μV
mute	notes 5 and 6	V <sub>no(rms)</sub>	M. M	50	ATN. 10	μV
Channel separation	R <sub>S</sub> = 10 kΩ	α	40	-	WW.IO	dB
Channel unbalance	LA MI	∆G <sub>v</sub>	DM.T.Y	_	1.001.1	dB

#### Notes to the characteristics

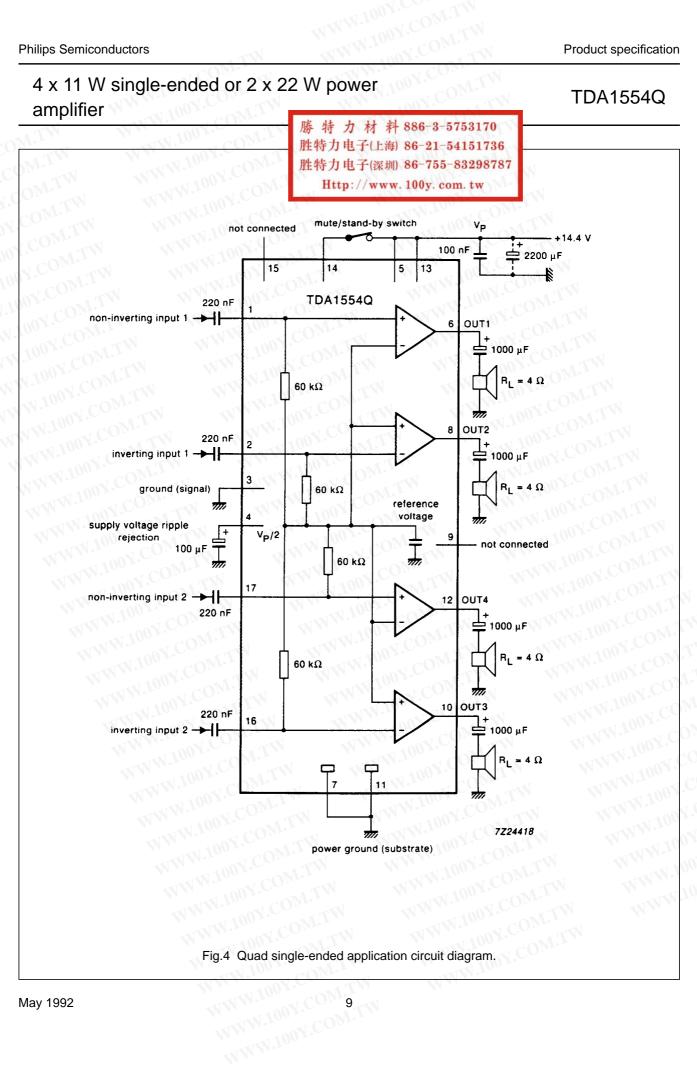
- 1. The circuit is DC adjusted at  $V_P$  = 6 V to 18 V and AC operating at  $V_P$  = 8.5 V to 18 V.
- 2. At 18 V < V<sub>P</sub> < 30 V the DC output voltage  $\leq$  V<sub>P</sub>/2.
- 3. Frequency response externally fixed.
- 4. Ripple rejection measured at the output with a source impedance of 0  $\Omega$  (maximum ripple amplitude of 2 V) and a frequency between 100 Hz and 10 kHz.
- 5. Noise voltage measured in a bandwidth of 20 Hz to 20 kHz.
- 6. Noise output voltage independent of  $R_S (V_I = 0 V)$ .
- 7. Output power is measured directly at the output pins of the IC.

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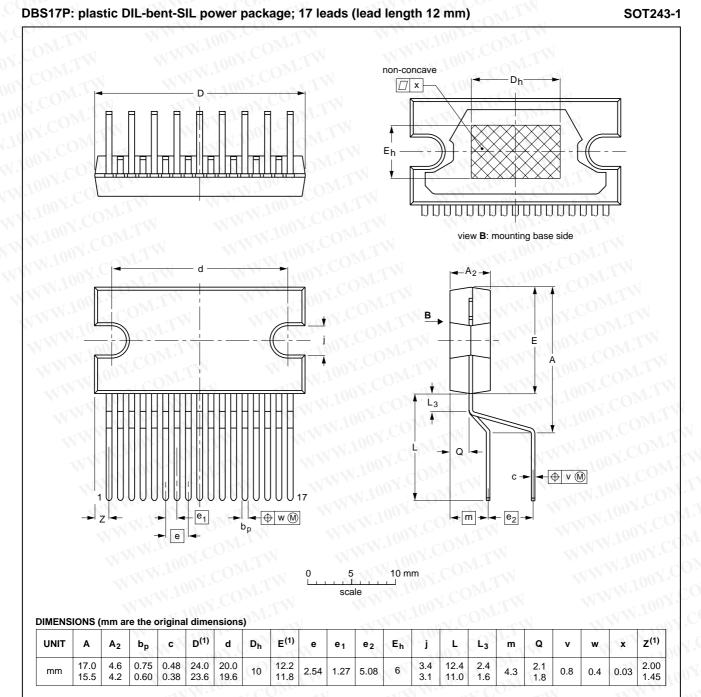


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# 4 x 11 W single-ended or 2 x 22 W power amplifier

#### PACKAGE OUTLINE

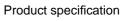


#### Note

1. Plastic or metal protrusions of 0.25 mm maximum per side are not included.

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OUTLINE VERSION		REFER	ENCES	WWW.	EUROPEAN	
	IEC	JEDEC	EIAJ	WW.IV	PROJECTION	ISSUE DATE
SOT243-1	W	WW.1001.CC	MIT	WWW.10		<del>-95-03-11</del> 97-12-16



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# 4 x 11 W single-ended or 2 x 22 W power amplifier

### SOLDERING

#### Introduction

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

This text gives a very brief insight to a complex technology. A more in-depth account of soldering ICs can be found in our *"IC Package Databook"* (order code 9398 652 90011).

#### Soldering by dipping or by wave

The maximum permissible temperature of the solder is 260 °C; solder at this temperature must not be in contact with the joint 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.

#### Repairing soldered joints

Apply a low voltage soldering iron (less than 24 V) to the lead(s) of the package, 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.

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#### 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	CONTRA MANNIE CONTRA MANNIE CONTRA				
more of the limiting values of the device at these or at	n accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or may cause permanent damage to the device. These are stress ratings only and operation t any other conditions above those given in the Characteristics sections of the specification 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.

#### LIFE SUPPORT APPLICATIONS

These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Philips customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Philips for any damages resulting from such improper use or sale.