DATA SHEET

SAA5191
Teletext video processor

Preliminary specification
File under Integrated Circuits, IC02

March 1991

Philips
Semiconductors

PHILIPS

Teletext video processor SAA5191

FEATURES

- Adaptive data slicer
- Crystal-controlled data clock regeneration with a bit rate of 6.9375 MHz
- Adaptive sync separator, horizontal phase detector and 13.5 MHz VCO to provide display phase locked loop (PLL)
- TV synchronization at teletext mode

GENERAL DESCRIPTION

The SAA5191 is a bipolar integrated circuit that extracts teletext data from the video signal (CVBS), regenerates the teletext clock (TTC) and synchronizes the text display to the television signals (VCS). This device operates in conjunction with the Digital Video Teletext (back-end) Decoder (DVTB - SAA9042A) or any other compatible device.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	MIN.	TYP.	MAX.	UNIT
V_P	supply voltage (pin 16)	–	12	–	V
I_P	supply current	–	70	–	mA
$V_{i\ CVBS}$	CVBS input signal on pin 27 (peak-to-peak value)				
	at pin 2 LOW	–	1	–	V
	at pin 2 open-circuit	–	2.5	–	V
V_o	outputs signals TTC and TTD (peak-to-peak value, pins 14, 15)	2.5	3.5	4.5	V
V_{F13}	13.5 MHz clock output signal (peak-to-peak value pin 17)	1	2	3	V
V_{SYNC}	video sync output signal (peak-to-peak value, pin 1)	–	–	1	V
	SYNC output signal $\overline{TCS}$	200	450	650	mV
VCS	video composite sync level on output pin 25				
	LOW	–	–	0.4	V
	HIGH	2.4	–	5.5	V
T_{amb}	operating ambient temperature	0	–	+70	°C

ORDERING AND PACKAGE INFORMATION

EXTENDED TYPE NUMBER	PACKAGE			
	PINS	PIN POSITION	MATERIAL	CODE
SAA5191	28	DIL	plastic	SOT117(1)

Note

1. SOT117-1;1996 November 14

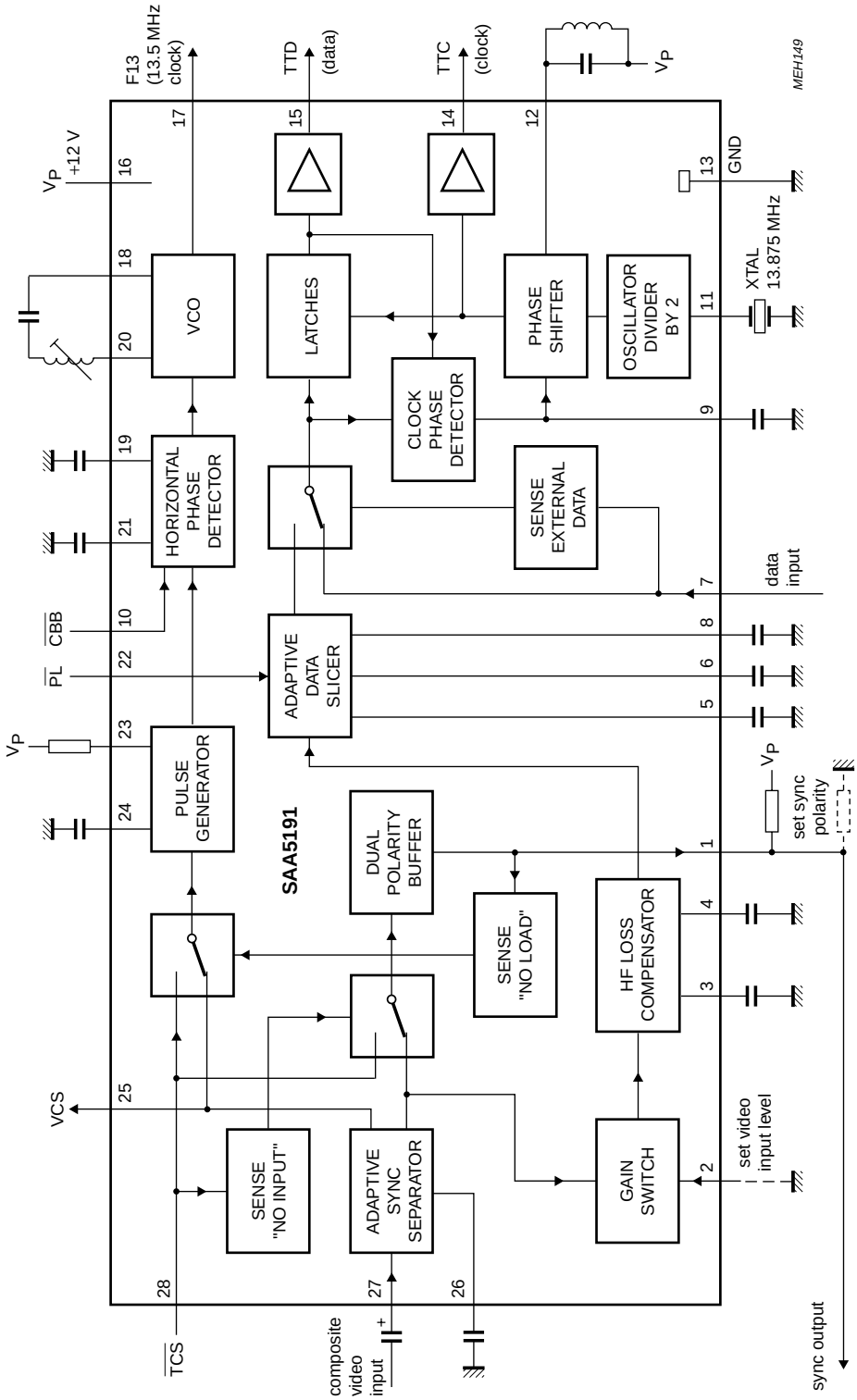


Fig.1 Block diagram.

PINNING

SYMBOL	PIN	DESCRIPTION
STTV	1	sync output signal to TV (positive or negative going)
VILS	2	level select input of video input (LOW equals 1 V)
C_{filt}	3	video filtering capacitor of HF loss compensation
C_{store}	4	HF storage capacitor
C_{ampl}	5	amplitude capacitor
C_{zero}	6	zero level capacitor
EXD	7	external data current input (note 1)
C_{time}	8	data timing capacitor for the adaptive data slicer
C_{CLK}	9	clock phase detector capacitor
$\overline{CBB}$	10	blanking insertion input
XTAL	11	13.875 MHz crystal (double of data rate)
CLF	12	6.9375 MHz clock frequency filter
GND	13	ground (0 V)
TTC	14	teletext clock output (for computer controlled teletext)
TTD	15	teletext data output (for computer controlled teletext)
V_P	16	+12 V supply voltage
F13	17	13.5 MHz VCO output (for sandcastle generation)
OSCO	18	oscillator output to series LC-circuit or crystal
C_{VCR}	19	short time constant capacitor at video recorder mode (note 2)
OSCI	20	oscillator input from series LC-circuit or crystal
C_{hor}	21	horizontal phase capacitor / VCR mode
$\overline{PL}$	22	sandcastle input (generated in CCT)
R_T	23	timing resistor for pulse generator
C_T	24	timing capacitor for pulse generator
VCS	25	video composite sync output to CCT
C_{BL}	26	black level capacitor
CVBS	27	composite video input signal from TV
$\overline{TCS}$	28	text-composite/scan-composite sync input ($\overline{TSC}$/$\overline{SCS}$)

PIN CONFIGURATION

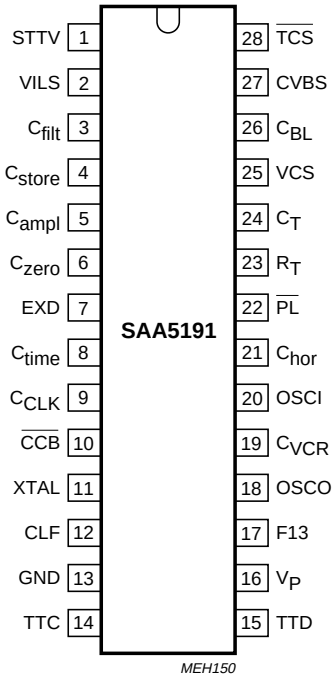


Fig.2 Pin configuration.

Notes

1. Sliced teletext data from external: active HIGH level (current), low impedance input.
2. While the loop is locking up.

LIMITING VALUES

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

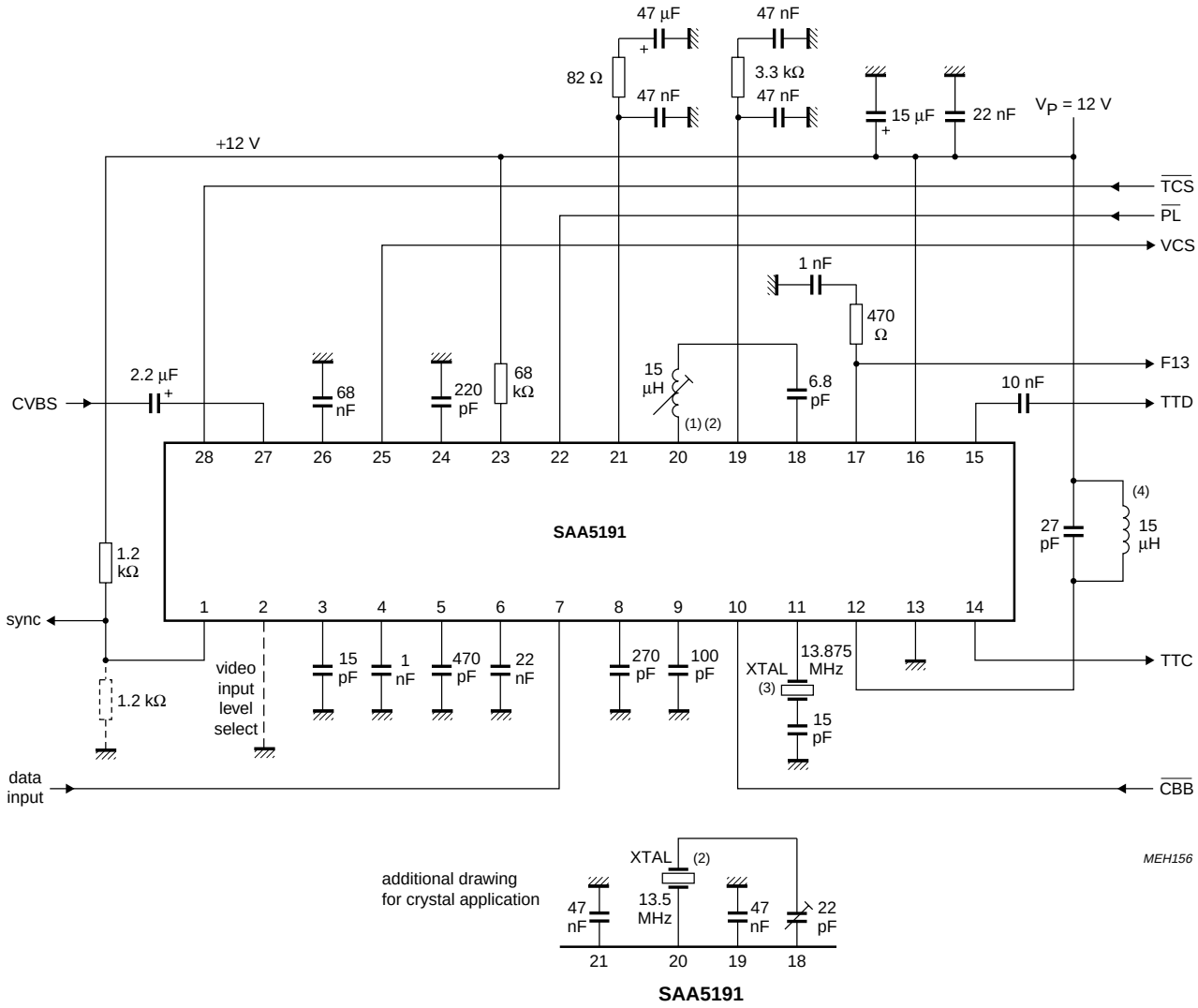
SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_P	supply voltage (pin 16)	0	13.2	V
V_5	voltage on pin 5	0	5.5	V
T_{stg}	storage temperature range	–20	125	°C
T_{amb}	operating ambient temperature range	0	+70	°C

CHARACTERISTICS

V_P = 12 V; T_{amb} = 25 °C and measurements taken in Fig.3, unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_P	supply voltage range (pin 16)		10.8	12.0	13.2	V
I_P	supply current		50	70	105	mA
Video input, sync separator and data slicer		$Z_S \leq 250\ \Omega$				
$V_{i\ CVBS}$	input signal sync to white (peak-to-peak value, pin 27)	V_2 = LOW	0.7	1	1.4	V
		V_2 = HIGH	1.75	2.5	3.5	V
	sync amplitude (peak-to-peak value)		0.1	–	1	V
	data slicing level	V_2 = LOW	0.3	0.46	0.7	V
		V_2 = HIGH	0.75	1.15	1.75	V
V_2	input voltage LOW (pin 2)		0	–	0.8	V
	input voltage HIGH	open-circuit equals HIGH	2.0	–	5.5	V
I_2	input current LOW		0	–	–150	µA
	input current HIGH	$V_2 < 5.5$ V	0	–	1	mA
Teletext data output (TTD)						
V_{22}	phase lock pulse (PL) input voltage (peak-to-peak value, pin 22)	phase locked	0	–	3	V
		phase unlocked	3.9	–	5.5	V
$V_{o\ TTD}$	data output signal on pin 15 (peak-to-peak value)		2.5	3.5	4.5	V
V_{15}	DC output voltage	mean level	3	4	5	V
C_L	load capacitance on pin 15		–	–	40	pF
t_r, t_f	rise and fall time		20	30	45	ns
Teletext clock output (TTC)						
$V_{o\ TTC}$	clock output signal on pin 14 (peak-to-peak value)		2.5	3.5	4.5	V
V_{14}	DC output voltage	mean level	3	4	5	V
C_L	load capacitance on pin 14		–	–	40	pF
t_r, t_f	rise and fall time		20	30	45	ns
t_d	delay time of falling edge relative to other edges of TTD		–	–	± 20	ns

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Text/ scan composite sync input ($\overline{TCS}$/$\overline{SCS}$)						
V_{28}	input voltage LOW for $\overline{TCS}$ (pin 28)		0	–	0.8	V
	input voltage HIGH for $\overline{TCS}$		2.0	–	7.0	V
	input voltage LOW for $\overline{SCS}$		0	–	1.5	V
	input voltage HIGH for $\overline{SCS}$		3.5	–	7.0	V
I_{28}	input current	V_{28} = 0 to 7 V	–40	–70	–100	μA
		V_{28} = 10 to V_P	–	–	± 5	μA
SYNC output buffer						
V_o	CVBS sync output signal on pin 1 (peak-to-peak value)	$R_{L\,1}$ = 1.2 kΩ to V_P	–	–	1	V
	$\overline{TCS}$ output signal	$R_{L\,1}$ = 1.2 kΩ to GND	200	450	650	mV
V_1	DC output voltage at positive sync signal	$R_{L\,1}$ = 1.2 kΩ to GND	1.0	1.4	2.0	V
	DC output voltage at negative sync signal	$R_{L\,1}$ = 1.2 kΩ to V_P	9.0	10.1	11.0	V
I_1	output current		–	–	± 3	mA
Video composite sync output (VCS)						
V_{25}	output voltage LOW (pin 25)		0	–	0.4	V
	output voltage HIGH		2.4	–	5.5	V
I_{25}	output current LOW		0	–	0.5	mA
	output current HIGH		0	–	–1.5	mA
t_d	sync separator delay time		250	350	400	ns
Horizontal phase detector and 13.5 MHz VCO						
V_{10}	input voltage LOW ($\overline{CBB}$), pin 10	blanking inserted	0	–	0.5	V
	blanking insertion HIGH	no blanking	1.0	–	5.5	V
I_{10}	input current		–	–	–5	μA
V_o	13.5 MHz clock output signal (peak-to-peak value, pin 17)		1	2	3	V
V_{17}	DC output voltage	maximum swing	4	–	8.5	V
C_L	load capacitance on pin 17		–	–	40	pF
t_r, t_f	rise and fall time		10	–	30	ns



(1) inductance 15 µH at 1 kHz, C_o = 2.2 pF. Adjust free-running frequency to 13.5 ± 0.1 MHz or apply 13.5 MHz quartz crystal as shown in additional drawing

(2) Crystal: f = 13.5 MHz (e.g. Philips catalogue number 4322 143 04101); adjustment tolerance $\pm 40 \times 10^{-6}$; load capacitance C_L = 22 pF; resonance resistance R_r = 22 pF; typical motional capacitance C_1 = 23 fF; static parallel capacitance C_0 = 5.5 pF; frequency tolerance $\pm 30 \times 10^{-6}$ in temperature range T = −20 to +70°. Adjust free-running frequency to 13.5 ± 0.5 MHz.

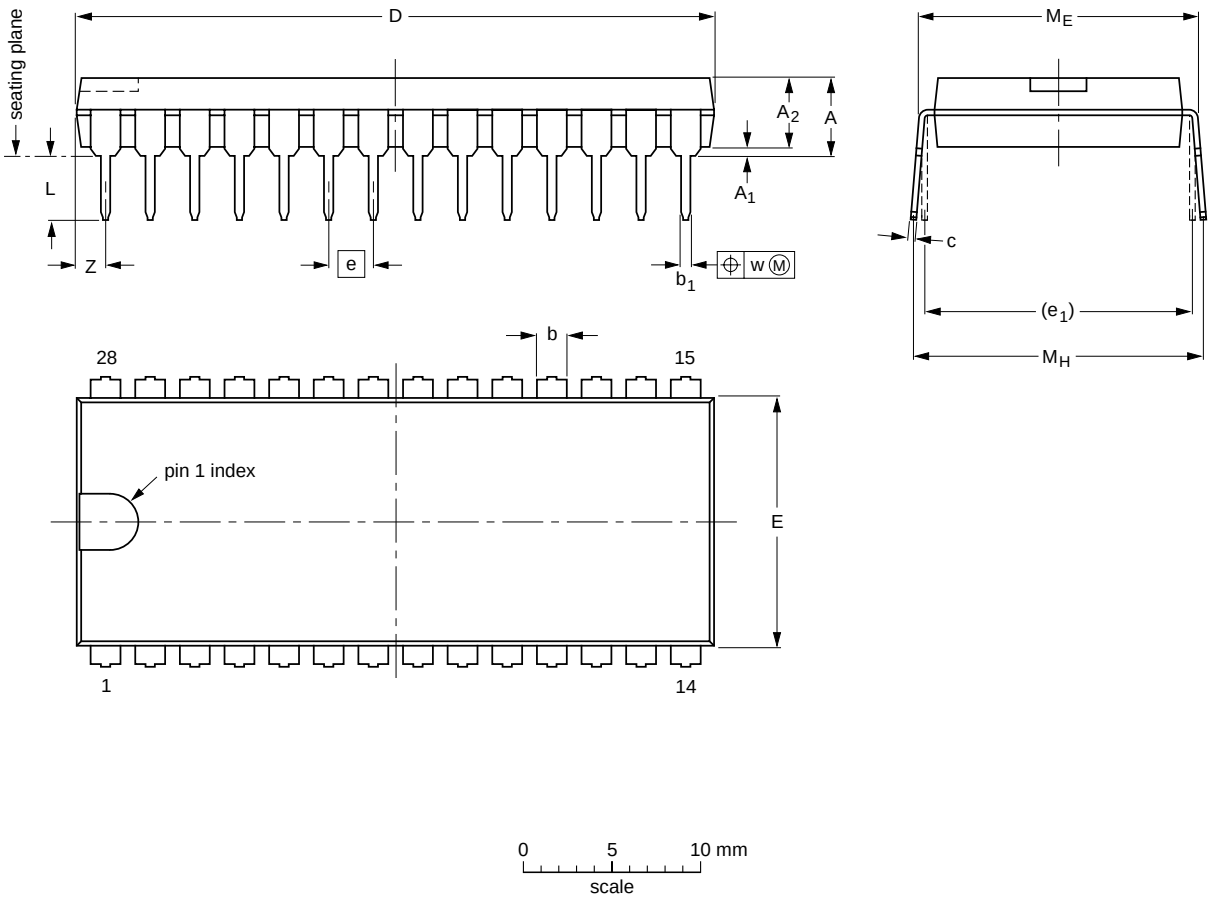
(3) Crystal: f = 13.875 MHz; adjustment tolerance $\pm 40 \times 10^{-6}$; load capacitance C_L = 15 pF; typical resonance resistance R_r = 15 Ω (maximum 60 Ω); typical motional capacitance C_1 = 19 fF; static parallel capacitance C_o = 5 pF; frequency tolerance $\pm 30 \times 10^{-6}$ in temperature range T = −20 to +70°.

(4) Coil: Fixed inductance 15 µH ±20%, quality factor Q > 20.

Fig.3 Test circuit and application circuit using LC-circuit or a crystal for VCO (clock F13).

PACKAGE OUTLINE

DIP28: plastic dual in-line package; 28 leads (600 mil) **SOT117-1**



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	5.1	0.51	4.0	1.7 1.3	0.53 0.38	0.32 0.23	36.0 35.0	14.1 13.7	2.54	15.24	3.9 3.4	15.80 15.24	17.15 15.90	0.25	1.7
inches	0.20	0.020	0.16	0.066 0.051	0.020 0.014	0.013 0.009	1.41 1.34	0.56 0.54	0.10	0.60	0.15 0.13	0.62 0.60	0.68 0.63	0.01	0.067

Note

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

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT117-1	051G05	MO-015AH				~~92-11-17~~ 95-01-14

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.

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 the 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.	

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.