DATA SHEET

TDA4565
Colour transient improvement circuit

Product specification
File under Integrated Circuits, IC02

November 1989

Philips
Semiconductors

PHILIPS

Colour transient improvement circuit TDA4565

GENERAL DESCRIPTION

The TDA4565 is a monolithic integrated circuit for colour transient improvement (CTI) and luminance delay line in gyrator technique in colour television receivers.

Features

- Colour transient improvement for colour difference signals (R-Y) and (B-Y) with transient detecting-, storage- and switching stages resulting in high transients of colour difference output signals
- A luminance signal path (Y) which substitutes the conventional Y-delay coil with an integrated Y-delay line
- Switchable delay time from 730 ns to 1000 ns in steps of 90 ns and additional fine adjustment of 50 ns
- Two Y output signals; one of 180 ns less delay

QUICK REFERENCE DATA

PARAMETER	CONDITIONS	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply voltage (pin 10)		V_P	10.8	12	13.2	V
Supply current (pin 10)		I_P	–	35	50	mA
Y-signal delay at pin 12	S1 open; $R_{14\text{-}18}$ = 1.2 kΩ; (note 1)					
$V_{15\text{-}18}$ = 0 to 2.5 V		$t_{17\text{-}12}$	670	730	790	ns
$V_{15\text{-}18}$ = 3.5 to 5.5 V		$t_{17\text{-}12}$	760	820	880	ns
$V_{15\text{-}18}$ = 6.5 to 8.5 V		$t_{17\text{-}12}$	850	910	970	ns
$V_{15\text{-}18}$ = 9.5 to 12 V		$t_{17\text{-}12}$	940	1000	1060	ns
Y-signal attenuation	0.5 MHz	α_Y	0	6.5	8.0	dB
(R-Y) and (B-Y) signal						
attenuation		α_{cd}	–1	0	+1	dB
output transient time		t_{tr}	–	100	200	ns

Note

1. Delay time is proportional to resistor $R_{14\text{-}18}$.
   $R_{14\text{-}18}$ also influences the bandwidth; a value of 1.2 kΩ results in a bandwidth of 5 MHz (typ.).

PACKAGE OUTLINE

18-lead DIL; plastic (SOT102); SOT102-1; 1996 November 27.

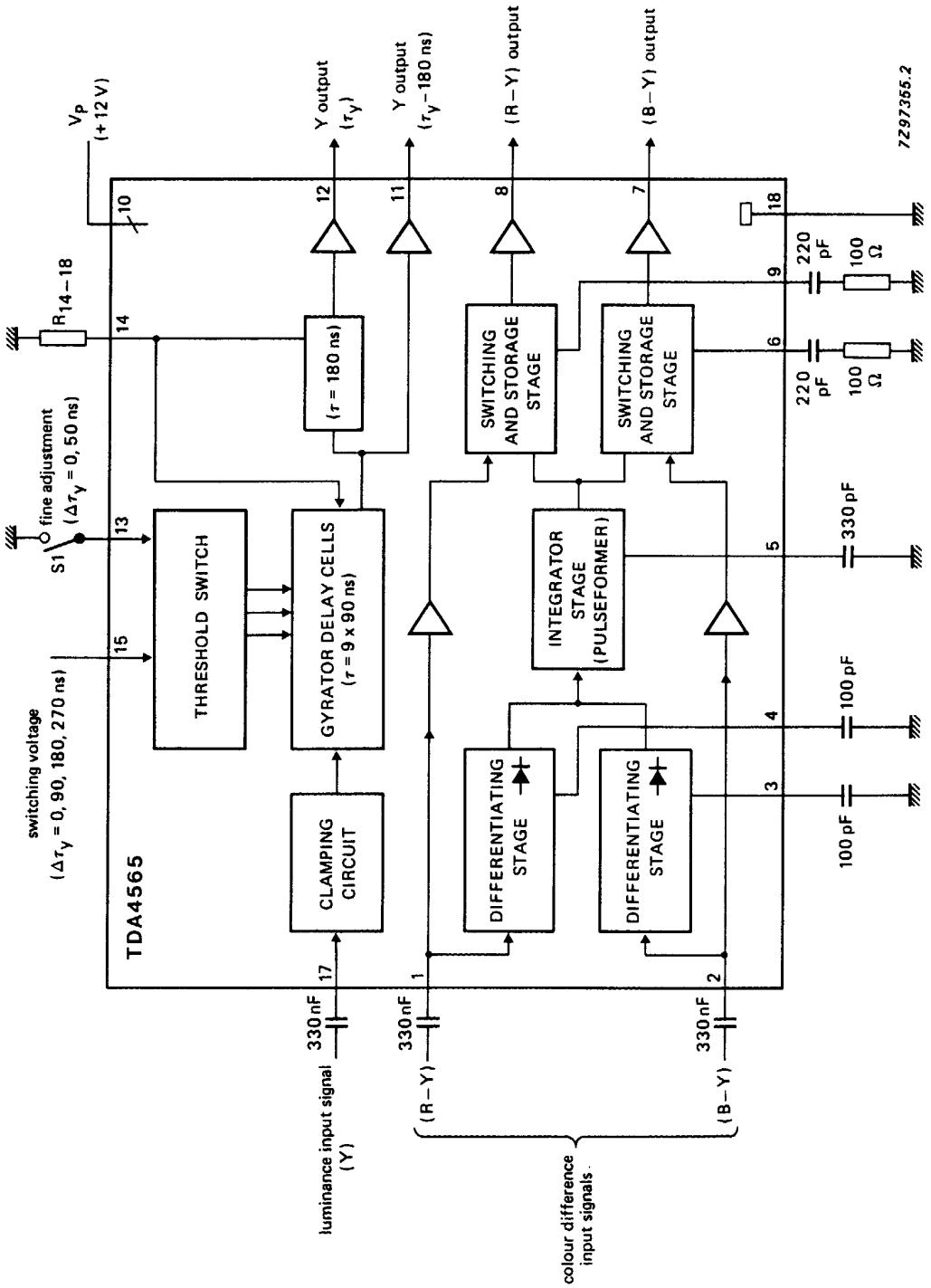


Fig.1 Block diagram.

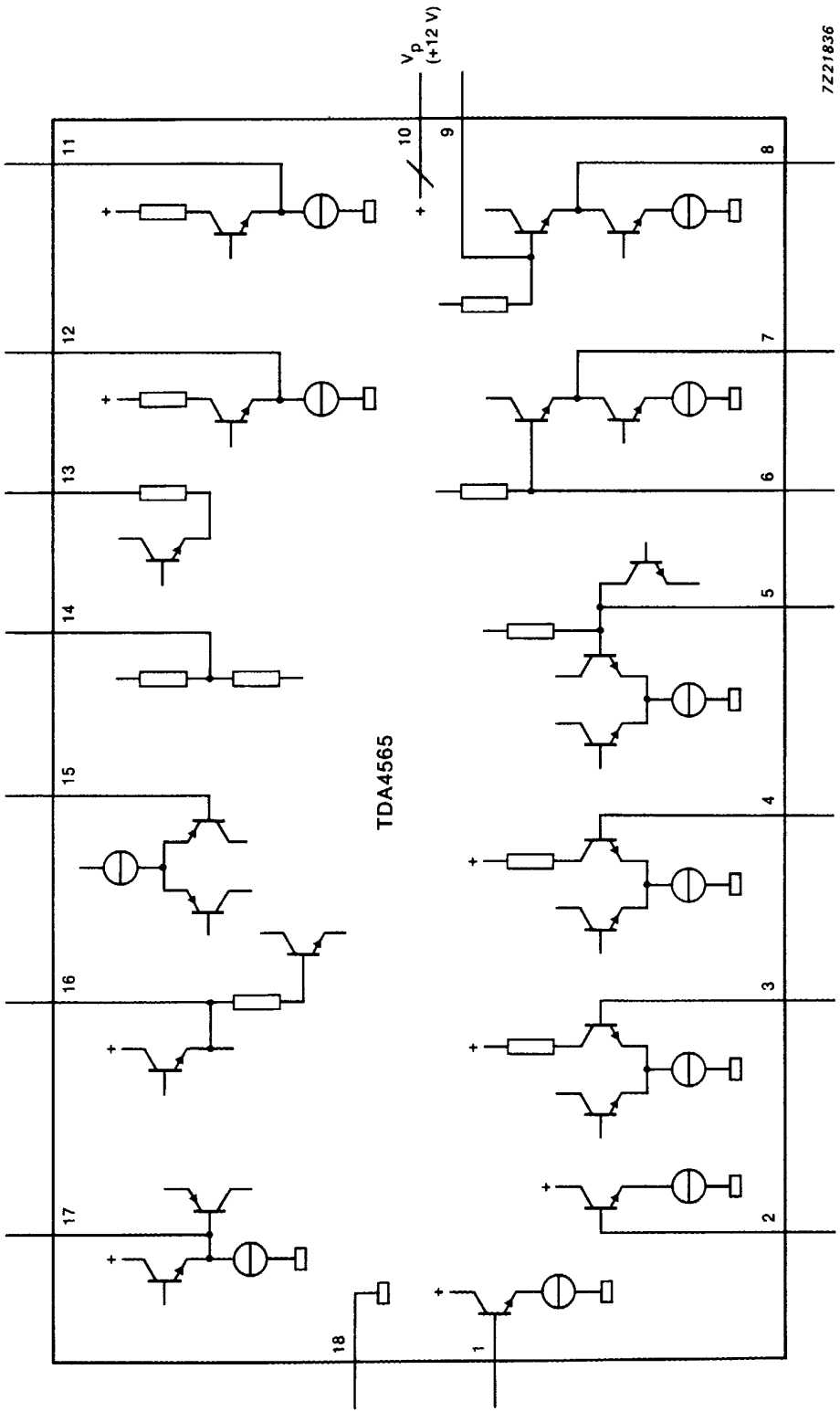


Fig.2 Internal pin circuit diagram.

RATINGS

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

PARAMETER	SYMBOL	MIN.	MAX.	UNIT
Supply voltage range (pin 10)	$V_P = V_{10-18}$	0	13.2	V
Voltage ranges to pin 18 (ground)				
at pins 1, 2, 12 and 15	V_{n-18}	0	V_P	V
at pin 11	V_{11-18}	0	(V_p −3 V)	V
at pin 17	V_{17-18}	0	7	V
Voltage ranges				
at pin 7 to pin 6	V_{7-6}	0	5	V
at pin 8 to pin 9	V_{8-9}	0	5	V
Currents				
at pins 6, 9	$I_{6, 9}$	−10	+10	mA
at pins 7, 8, 11 and 12	$I_{7, 8, 11, 12}$	internally limited		
Total power dissipation				
(T_j = 150 °C; T_{amb} = 70 °C)	P_{tot}	−	1.1	W
Storage temperature range	T_{stg}	−25	+150	°C
Operating ambient temperature range	T_{amb}	0	+70	°C

THERMAL RESISTANCE

From junction to ambient (in free air) $R_{th\ j\text{-}a}$ = 70 K/W

Note

1. Pins 3, 4, 5, 6, 9, 13 and 14 DC potential not published.

CHARACTERISTICS

$V_P = V_{10-18} = 12$ V; $T_{amb} =$ 25 °C; measured in application circuit Fig.3; unless otherwise specified

PARAMETER	CONDITIONS	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply (pin 10)						
Supply voltage		V_P	10.8	12	13.2	V
Supply current		I_P	–	35	50	mA
Colour difference paths						
(R-Y) input voltage						
(75% colour bar signal)						
(peak-to-peak value)		$V_{1(p-p)}$	–	1.05	1.5	V
(B-Y) input voltage						
(75% colour bar signal)						
(peak-to-peak value)		$V_{2(p-p)}$	–	1.33	1.9	V
Input resistance						
(R-Y)		R_{1-18}	8	12	16	kΩ
(B-Y)		R_{2-18}	8	12	16	kΩ
Internal bias voltage						
(R-Y)		V_{1-18}	3.8	4.3	4.8	V
(B-Y)		V_{1-18}	3.8	4.3	4.8	V
Signal attenuation						
(R-Y)		V_8/V_1	–1	0	+1	dB
(B-Y)		V_7/V_2	–1	0	+1	dB
Output transient time	note 1	t_{tr}	–	100	200	ns
Output resistance						
(B-Y)		R_{7-18}	–	100	–	Ω
(R-Y)		R_{8-18}	–	100	–	Ω
DC output voltage						
(B-Y)		V_{7-18}	3.8	4.3	4.8	V
(R-Y)		V_{8-18}	3.8	4.3	4.8	V
Output current	note 2					
source		$I_{7, 8}$	0.4	–	–	mA
sink		$-I_{7, 8}$	1.0	–	–	mA

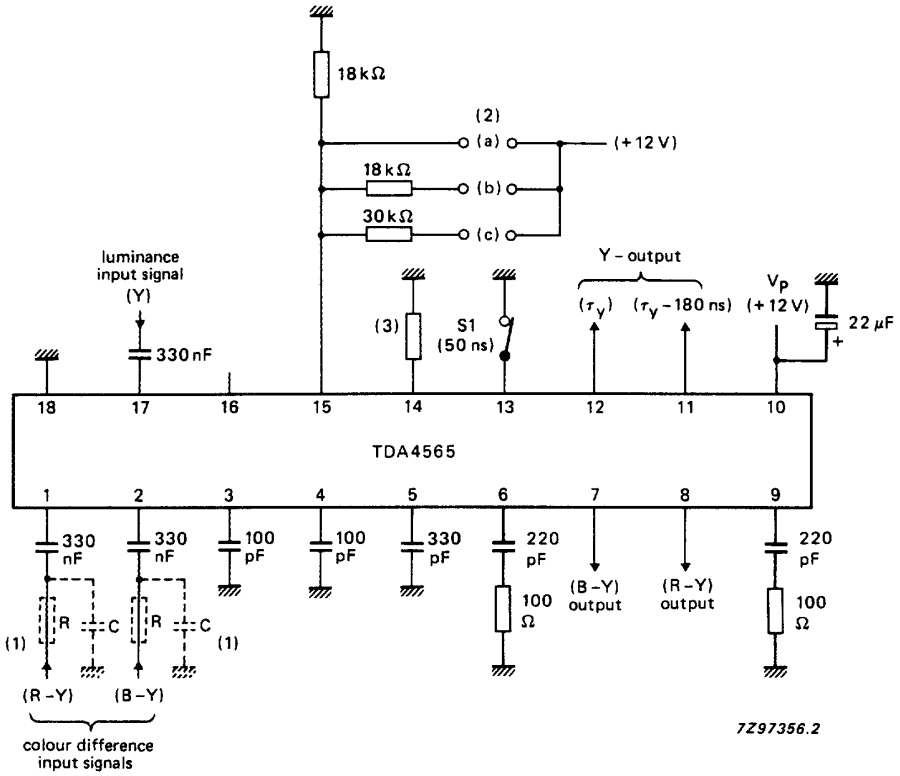
PARAMETER	CONDITIONS	SYMBOL	MIN.	TYP.	MAX.	UNIT
Y-signal path						
Y-input voltage						
(composite signal)	capacitive coupling					
(peak-to-peak value)		$V_{17(p-p)}$	–	1	1.4	V
Internal bias voltage	during clamping	V_{17-18}	1.3	1.5	1.7	V
Input current						
during picture content		I_{17}	–	8	12	μA
during sync. pulse		$-I_{17}$	–	100	150	μA
Y-signal delay at pin 12	S1 open; R_{14} = 1.2 kΩ; (notes 3 and 4)					
at V_{15-18} = 0 to 2.5 V		t_{17-18}	670	730	790	ns
at V_{15-18} = 3.5 to 5.5 V		t_{17-18}	760	820	880	ns
at V_{15-18} = 6.5 to 8.5 V		t_{17-18}	850	910	970	ns
at V_{15-18} = 9.5 to 12 V		t_{17-18}	940	1000	1060	ns
Fine adjustment of Y-signal						
delay for all 4 steps	S1 closed	t_{17-12}	30	50	70	ns
Signal delay between pin 11						
and pin 12	S1 open	t_{11-12}	160	180	200	ns
Dependency of delay time						
on temperature		$\frac{\Delta t_{17-12}}{t_{17-12}.\Delta T_j}$	–	0.001	–	K^{-1}
on supply voltage		$\frac{\Delta t_{17-12}}{t_{17-12}.\Delta V_p}$	–	–0.03	–	V^{-1}
Input switching current		$-I_{15}$	–	15	25	μA
Y-signal attenuation	f = 0.5 MHz					
pin 11 from pin 17		V_{11}/V_{17}	5.0	6.5	8.0	dB
pin 12 from pin 17		V_{12}/V_{17}	5.0	6.5	8.0	dB
Frequency response at						
3 MHz referred to 0.5 MHz	note 5					
pin 11		$\frac{V_{11}(3\ MHz)}{V_{11}(0.5\ MHz)}$	0	–	3.0	dB
pin 12		$\frac{V_{12}(3\ MHz)}{V_{12}(0.5\ MHz)}$	0	–	3.0	dB

PARAMETER	CONDITIONS	SYMBOL	MIN.	TYP.	MAX.	UNIT
Frequency response at						
5 MHz referred to 0.5 MHz	note 5					
pin 11		$\frac{V_{11}(5\ MHz)}{V_{11}(0.5\ MHz)}$	–3.0	–	2.0	dB
pin 12		$\frac{V_{12}(5\ MHz}{V_{12}(0.5\ MHz)}$	–3.0	–	2.0	dB
DC output voltage						
pin 11		V_{11-18}	1.8	2.3	2.6	V
pin 12		V_{12-18}	9.8	10.3	10.8	V
Output current	note 2					
source		$I_{11, 12}$	–	–	0.4	mA
sink		$-I_{11, 12}$	–	–	1.0	mA

Notes to the characteristics

1. Output signal transient time measured with $C_{6-18} = C_{9-18} = 220$ pF without resistor (see Fig.3).
2. Output current measured with emitter follower with constant current source of 0.6 mA.
3. R_{14-18} influences the bandwidth; a value of 1.2 kΩ results in a bandwidth of 5 MHz (typ.).
4. Delay time is proportional to resistor R_{14-18}. Devices with suffix “A” require the value of the resistor to be 1.15 kΩ; a 27 kΩ resistor connected in parallel with $R_{14-18} = 1.2$ kΩ.
5. Frequency response measured with $V_{15-18} = 9.5$ V and switch S1 open.

APPLICATION INFORMATION



(1) Residual carrier reduced to 20 mV peak-to-peak (R = 1 kΩ, C = 100 pF).

(2) Switching sequence for delay times shown in Table 1.

(3) $R_{14\text{-}18}$ = 1.2 kΩ for TDA4565
$R_{14\text{-}18}$ = 1.15 kΩ for TDA4565A (27 kΩ resistor connected in parallel to 1.2 kΩ).

Fig.3 Application diagram and test circuit.

Table 1 Switching sequence for delay times.

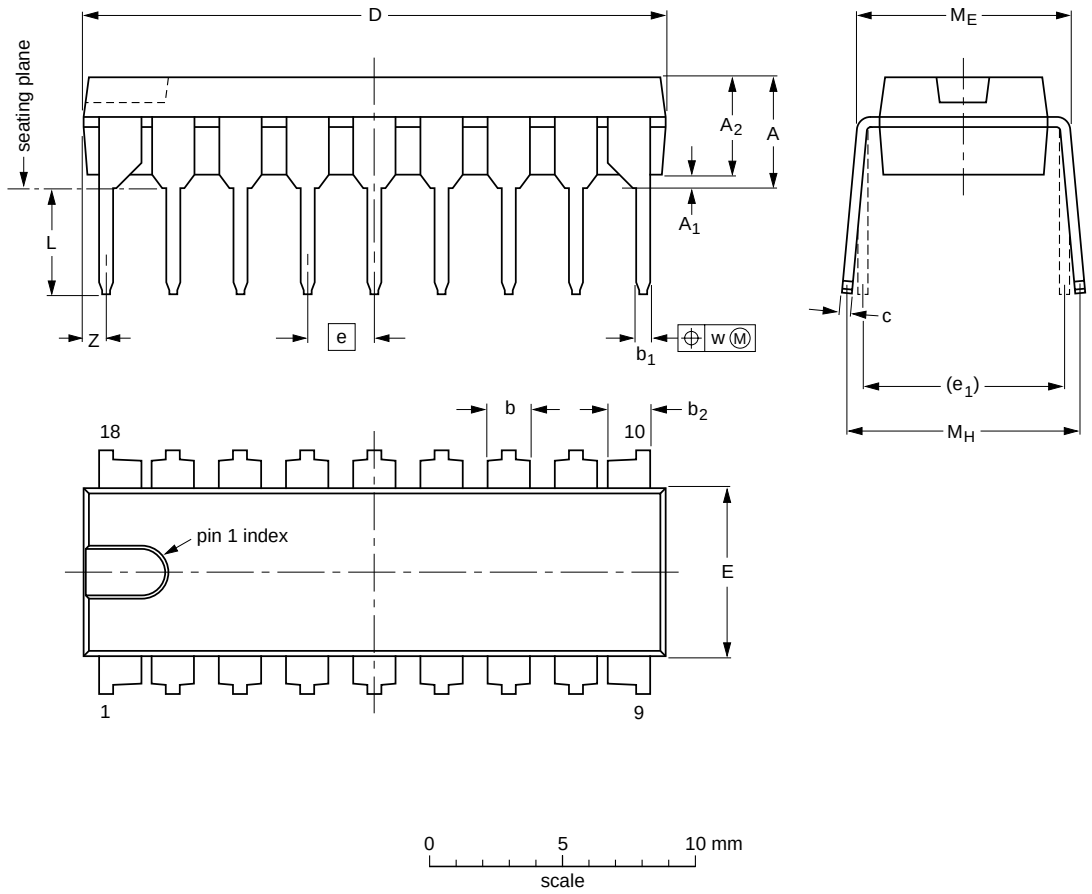
CONNECTION (2)			VOLTAGE AT PIN 15	DELAY TIME (ns) (1)
(a)	(b)	(c)		
0	0	0	0 to 2.5 V	730
0	0	X	3.5 to 5.5 V	820
0	X	X	6.5 to 8.5 V	910
X	X	X	9.5 to 12 V	1000

Note

1. When switch (S1) is closed the delay time is increased by 50 ns.
2. Where: X = connection closed; 0 = connection open.

PACKAGE OUTLINE

DIP18: plastic dual in-line package; 18 leads (300 mil) **SOT102-1**



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

UNIT	A max.	A_1 min.	A_2 max.	b	b_1	b_2	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	1.40 1.14	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	0.85
inches	0.19	0.020	0.15	0.055 0.044	0.021 0.015	0.055 0.044	0.013 0.009	0.86 0.84	0.26 0.24	0.10	0.30	0.15 0.13	0.32 0.31	0.37 0.33	0.01	0.033

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			
SOT102-1						~~93-10-14~~ 95-01-23

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

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