

Baseband delay line

TDA4661

FEATURES

- Two comb filters, using the switched-capacitor technique, for one line delay time (64 μ s)
- Adjustment-free application
- No crosstalk between SECAM colour carriers (diaphoty)
- Handles negative or positive colour-difference input signals
- Clamping of AC-coupled input signals ($\pm(R-Y)$ and $\pm(B-Y)$)
- VCO without external components
- 3 MHz internal clock signal derived from a 6 MHz CCO, line-locked by the sandcastle pulse (64 μ s line)
- Sample-and-hold circuits and low-pass filters to suppress the 3 MHz clock signal
- Addition of delayed and non-delayed output signals
- Output buffer amplifiers
- Comb filtering functions for NTSC colour-difference signals to suppress cross-colour.

GENERAL DESCRIPTION

The TDA4661 is an integrated baseband delay line circuit with one line delay. It is suitable for decoders with colour-difference signal outputs $\pm(R-Y)$ and $\pm(B-Y)$.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	MIN.	TYP.	MAX.	UNIT
V_{P1}	analog supply voltage (pin 9)	4.5	5	6	V
V_{P2}	digital supply voltage (pin 1)	4.5	5	6	V
$I_{P(\text{tot})}$	total supply current	–	4.9	7.0	mA
V_i	$\pm(R-Y)$ input signal PAL/NTSC (peak-to-peak value; pin 16)	–	525	–	mV
	$\pm(B-Y)$ input signal PAL/NTSC (peak-to-peak value; pin 14)	–	665	–	mV
	$\pm(R-Y)$ input signal SECAM (peak-to-peak value; pin 16)	–	1.05	–	V
	$\pm(B-Y)$ input signal SECAM (peak-to-peak value; pin 14)	–	1.33	–	V
G_v	gain V_O / V_i of colour-difference output signals				
	V_{11} / V_{16} for PAL and NTSC	5.3	5.8	6.3	dB
	V_{12} / V_{14} for PAL and NTSC	5.3	5.8	6.3	dB
	V_{11} / V_{16} for SECAM	–0.6	–0.1	+0.4	dB
	V_{12} / V_{14} for SECAM	–0.6	–0.1	+0.4	dB

ORDERING INFORMATION

TYPE NUMBER	PACKAGE		
	NAME	DESCRIPTION	VERSION
TDA4661	DIP16	plastic dual in-line package; 16 leads (300 mil) long body	SOT38-4
TDA4661T	SO16	plastic small outline package; 16 leads; body width 3.9 mm	SOT109-1

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BLOCK DIAGRAM

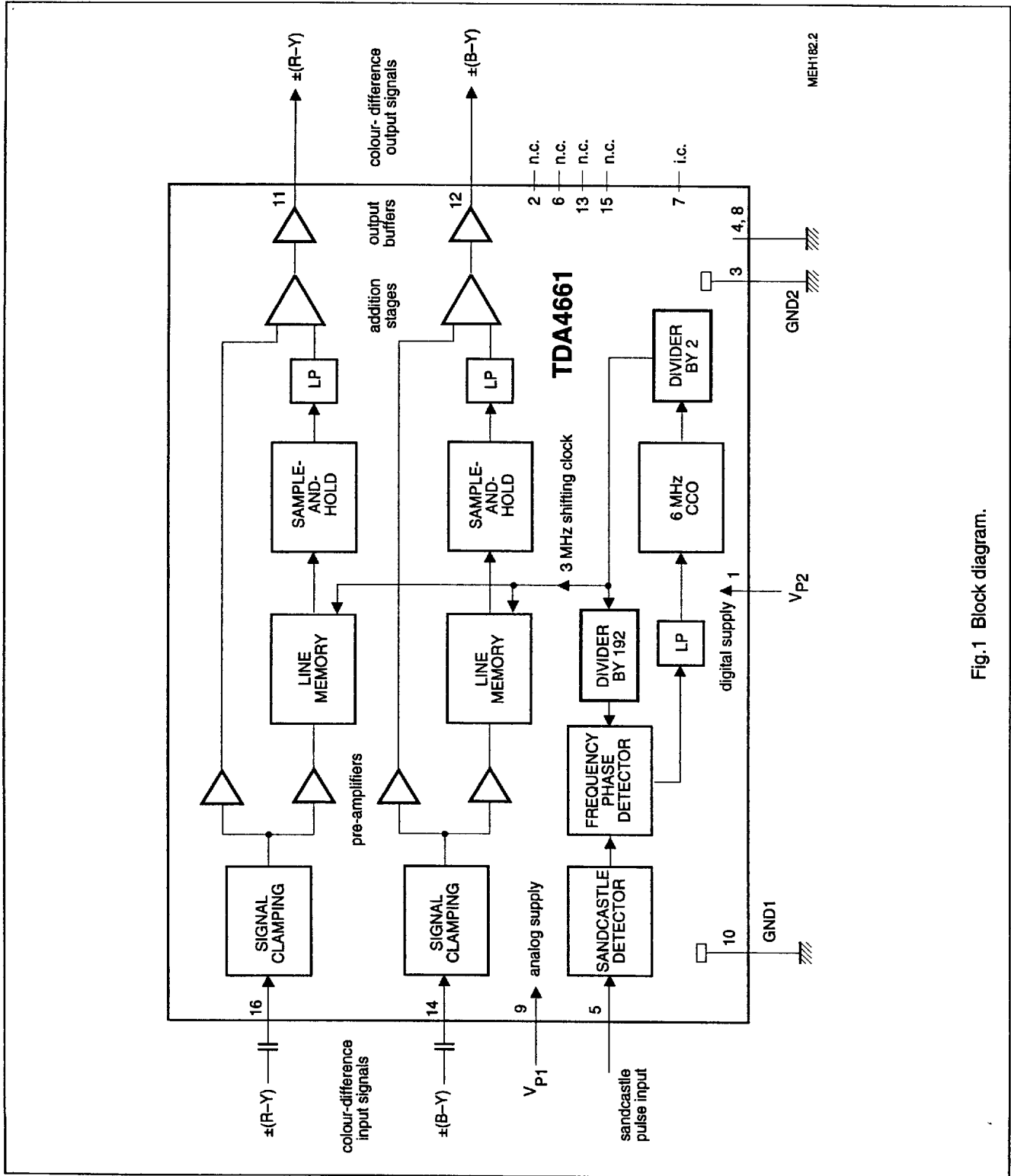


Fig.1 Block diagram.

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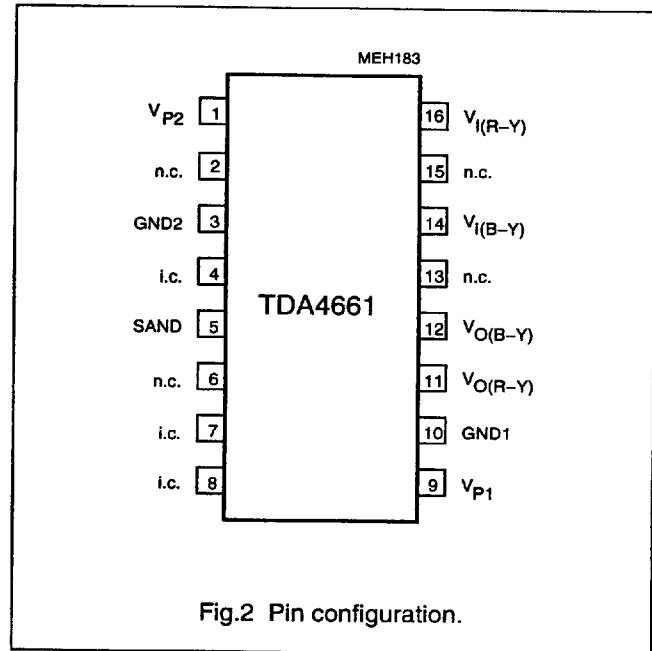
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PINNING

SYMBOL	PIN	DESCRIPTION
V _{P2}	1	+5 V supply voltage for digital part
n.c.	2	not connected
GND2	3	ground for digital part (0 V)
i.c.	4	internally connected
SAND	5	sandcastle pulse input
n.c.	6	not connected
i.c.	7	internally connected
i.c.	8	internally connected
V _{P1}	9	+5 V supply voltage for analog part
GND1	10	ground for analog part (0 V)
V _{O(R-Y)}	11	±(R-Y) output signal
V _{O(B-Y)}	12	±(B-Y) output signal
n.c.	13	not connected
V _{I(B-Y)}	14	±(B-Y) input signal
n.c.	15	not connected
V _{I(R-Y)}	16	±(R-Y) input signal



LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134). Ground pins 3 and 10 connected together.

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V _{P1}	supply voltage (pin 9)	-0.5	+7	V
V _{P2}	supply voltage (pin 1)	-0.5	+7	V
V ₅	voltage on pin 5	-0.5	V _P + 1.0	V
V _n	voltage on pins 11, 12, 14 and 16	-0.5	V _P	V
T _{stg}	storage temperature	-25	+150	°C
T _{amb}	operating ambient temperature	0	70	°C
V _{ESD}	electrostatic handling for all pins (note 1)	-	±500	V

Note

1. Equivalent to discharging a 200 pF capacitor through a 0 Ω series resistor.

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	VALUE	UNIT
R _{thj-a}	thermal resistance from junction to ambient in free air		
	SOT38-4	75	K/W
	SOT109-1	220	K/W

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CHARACTERISTICS

$V_P = 5.0$ V; input signals as specified in characteristics with 75% colour bars; super-sandcastle frequency of 15.625 kHz; $T_{amb} = +25$ °C; measurements taken in Fig.3 unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{P1}	supply voltage (analog part; pin 9)		4.5	5	6	V
V_{P2}	supply voltage (digital part; pin 1)		4.5	5	6	V
I_{P1}	supply current		–	4.2	6.0	mA
I_{P2}	supply current		–	0.7	1.0	mA
Colour-difference input signals						
V_i	input signal (peak-to-peak value)					
	$\pm(R-Y)$ PAL and NTSC (pin 16)		–	525	–	mV
	$\pm(B-Y)$ PAL and NTSC (pin 14)		–	665	–	mV
	$\pm(R-Y)$ SECAM (pin 16)	note 1	–	1.05	–	V
	$\pm(B-Y)$ SECAM (pin 14)	note 1	–	1.33	–	V
$V_{I(max)}$	maximum symmetrical input signal (peak-to-peak value)					
	$\pm(R-Y)$ or $\pm(B-Y)$ for PAL and NTSC	before clipping	1	–	–	V
	$\pm(R-Y)$ or $\pm(B-Y)$ for SECAM	before clipping	2	–	–	V
$R_{14, 16}$	input resistance		–	–	40	k Ω
$C_{14, 16}$	input capacitance		–	–	10	pF
$V_{14, 16}$	input clamping voltage	proportional to V_P	1.3	1.5	1.7	V
Colour-difference output signals						
V_O	output signal (peak-to-peak value)					
	$\pm(R-Y)$ on pin 11	all standards	–	1.05	–	V
	$\pm(B-Y)$ on pin 12	all standards	–	1.33	–	V
V_{11}/V_{12}	ratio of output amplitudes at equal input signals	$V_{14, 16} = 1.33$ V (p-p)	–0.4	0	+0.4	dB
$V_{11, 12}$	DC output voltage	proportional to V_P	2.5	2.9	3.3	V
$R_{11, 12}$	output resistance		–	330	400	Ω
G_v	gain for PAL and NTSC	ratio V_O/V_i	5.3	5.8	6.3	dB
	gain for SECAM	ratio V_O/V_i	–0.6	–0.1	+0.4	dB
V_n/V_{n+1}	ratio of output signals on pins 11 and 12 for adjacent time samples at constant input signals	$V_{14, 16} = 1.33$ V (p-p); SECAM signals	–0.1	0	+0.1	dB
V_n	noise voltage (RMS value; pins 11 and 12)	$V_{14, 16} = 0$ V; note 2	–	–	1.2	mV
S/N(W)	weighted signal-to-noise ratio	$V_O = 1$ V (p-p); note 2	–	54	–	dB
t_d	delay of delayed signals		63.94	64.0	64.06	μ s
	delay of non-delayed signals		40	60	80	ns
t_r	transient time of delayed signal on pins 11 respectively 12	300 ns transient of SECAM signal	–	350	–	ns
	transient time of non-delayed signal on pins 11 respectively 12	300 ns transient of SECAM signal	–	320	–	ns

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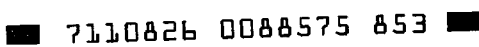
SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Sandcastle pulse input (pin 5)						
f_{BK}	burst-key frequency		14.2	15.625	17.0	kHz
f_{SAND}	sandcastle frequency		14.2	15.625	17.0	kHz
V_5	top pulse voltage	note 3	4.0	–	$V_P + 1.0$	V
V_{slice}	internal slicing level		$V_5 - 1.0$	–	$V_5 - 0.5$	V
I_5	input current		–	–	10	μA
C_5	input capacitance		–	–	10	pF

Notes

1. The signal must be blanked line-sequentially. The blanking level must be equal to the non-colour signal.
2. Noise voltage at $f = 10$ kHz to 1 MHz; $V_{114, 16} = 0$ ($R_S < 300 \Omega$).
3. The leading edge of the burst-key pulse or H-blanking pulse is used for timing.

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APPLICATION INFORMATION

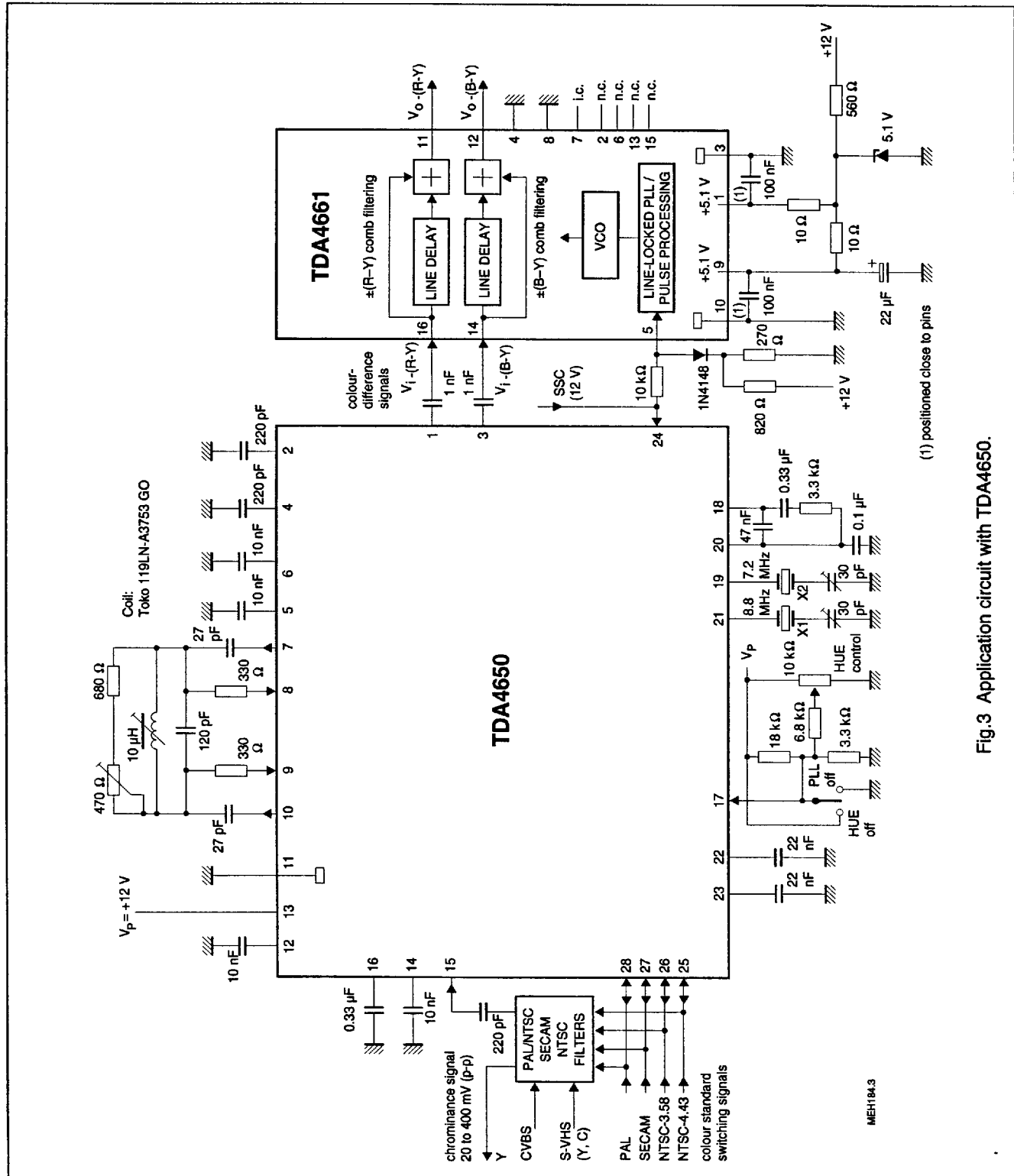


Fig.3 Application circuit with TDA4650.

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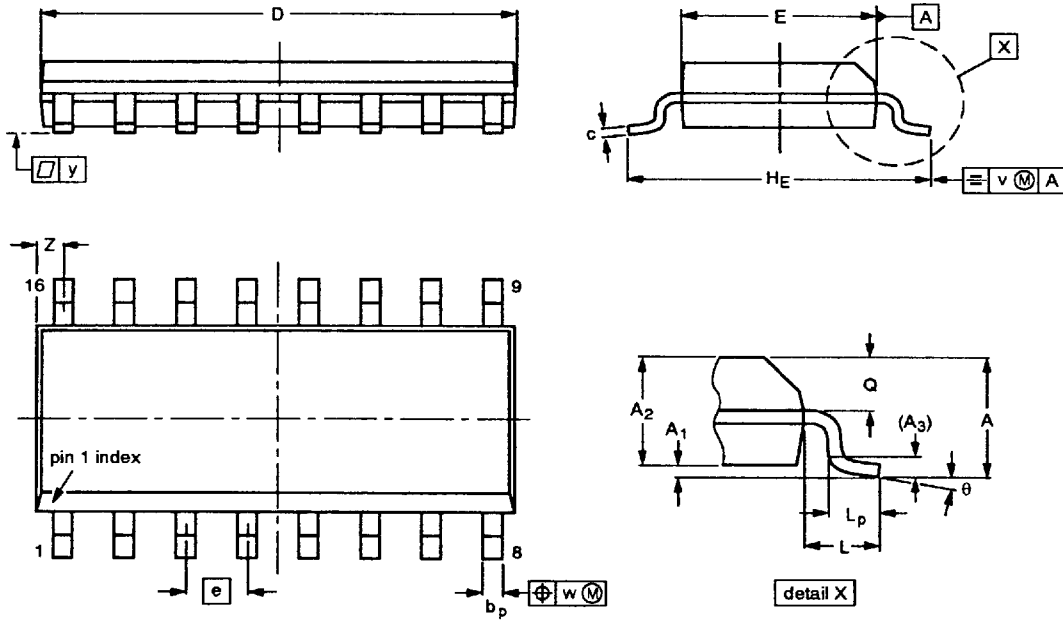
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Package outlines

SO16: plastic small outline package; 16 leads; body width 3.9 mm

SOT109-1



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

UNIT	A _{max}	A ₁	A ₂	A ₃	b _p	e	D ⁽¹⁾	E ⁽¹⁾	e	H _E	L	L _p	Q	v	w	y	Z ⁽¹⁾	θ
mm	1.75	0.25 0.10	1.45 1.25	0.25	0.49 0.36	0.25 0.19	10.0 9.8	4.0 3.8	1.27	6.2 5.8	1.05	1.0 0.4	0.7 0.6	0.25	0.25	0.1	0.7 0.3	8° 0°
inches	0.069	0.0098 0.0039	0.057 0.049	0.01	0.019 0.014	0.0098 0.0075	0.39 0.38	0.16 0.15	0.050	0.24 0.23	0.041	0.039 0.016	0.028 0.020	0.01	0.01	0.004	0.028 0.012	

Note

1 Plastic or metal protrusions of 0.15 mm maximum per side are not included.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT109-1	076E07S	MS-012AC				91-08-10 95-01-23

1995 Jan 23

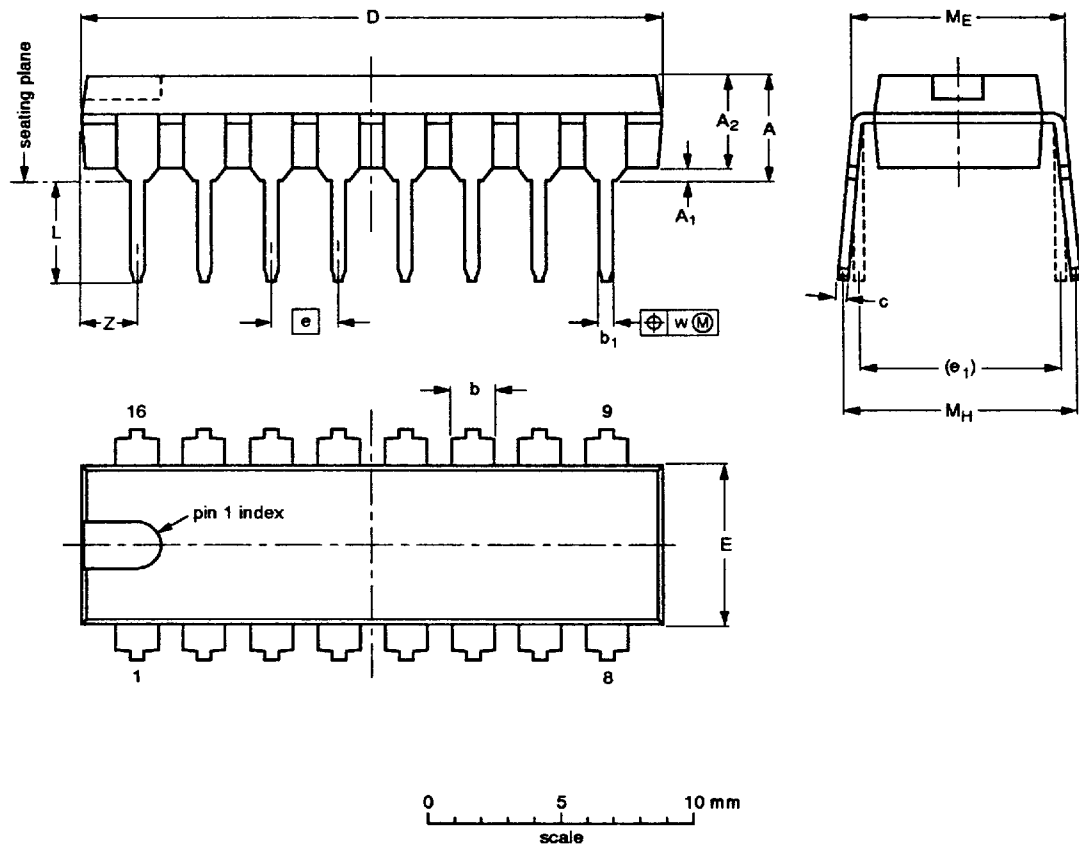
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Package outlines

DIP16: plastic dual in-line package; 16 leads (300 mil); long body

SOT38-1



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	4.7	0.51	3.7	1.40 1.14	0.53 0.38	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	2.2
inches	0.19	0.020	0.15	0.055 0.045	0.021 0.015	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	0.087

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			
SOT38-1	050G09	MO-001AE				92-10-02 95-01-19