

DEVELOPMENT SAMPLE DATA

This information is derived from development samples made available for evaluation. It does not form part of our data handbook system and does not necessarily imply that the device will go into production.

TDA1034; N
TDA1034B; BN
TDA1034D; DN

OPERATIONAL AMPLIFIER

The TDA1034 is a high performance general purpose operational amplifier. Compared to most of the standard operational amplifiers (e.g. μ A741, TBA221, LM301A and LM307), it shows better noise performance, improved output drive capability and considerably higher small-signal and power bandwidth.

This makes the device especially suitable for application in high quality and professional audio equipment, in instrumentation and control circuits and telephone channel amplifiers. The op-amp is internally compensated for gain equal to, or higher than, three.

The frequency response can be optimized with an external compensation capacitor for various applications (unity gain amplifier, capacitive load, slew-rate, low overshoot, etc.). If very low noise is of prime importance, it is recommended that the TDA1034N version be used which has guaranteed noise specifications and somewhat lower input current.

Features

- Small-signal bandwidth : 10 MHz
- Output drive capability : 600 Ω , 10 V (r.m.s.) at $V_P = -V_N = 18$ V
- Input noise voltage : 4 nV/ $\sqrt{\text{Hz}}$
- D.C. voltage gain : 100 000
- A.C. voltage gain : 6000 at 10 kHz
- Power bandwidth : 200 kHz
- Slew-rate : 13 V/ μ s

PACKAGE OUTLINES see pages 10 and 11.

TDA1034; N : TO-99 (8-lead metal envelope).

TDA1034B; BN : SOT-97 (plastic 8-lead dual in-line).

TDA1034D; DN : SOT-96A (plastic 8-lead flat pack).

TDA1034; N
TDA1034B; BN
TDA1034D; DN

TDA1034; N
TDA1034B; BN
TDA1034D; DN

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

Voltages

Positive supply voltage	V_p	max.	20	V
Negative supply voltage	$-V_N$	max.	20	V
Common mode input voltage (pins 2 and 3)	V_p to $-V_N$			
Differential input voltage	V_{2-3}	max. ± 0.5	V	1)

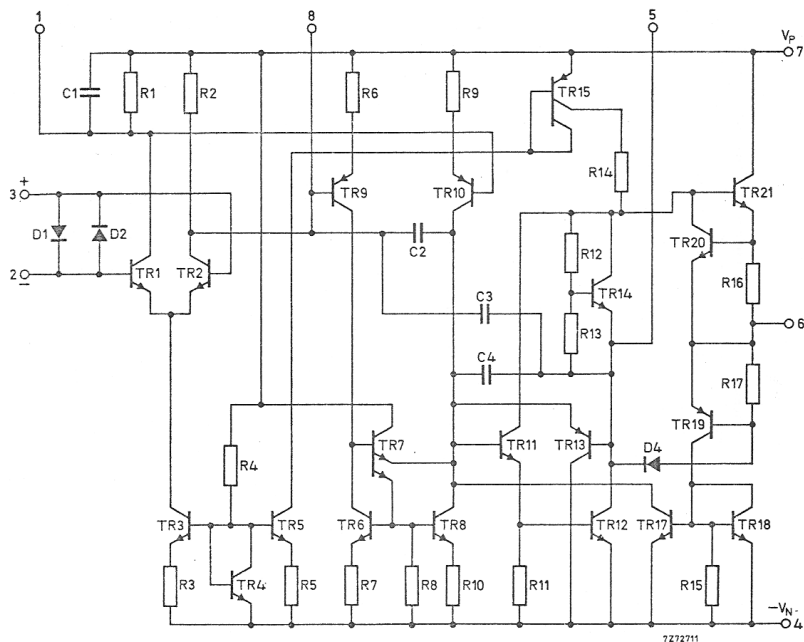
Temperatures

Operating ambient temperature	T_{amb}	-25 to +85	°C
Storage temperature: metal envelope	T_{stg}	-65 to +150	°C
Storage temperature: plastic envelope	T_{stg}	-65 to +125	°C

Maximum power dissipation in free air

package	mounting	max. power dissipation at $T_{amb} = 50^\circ\text{C}$ (mW)	derating factor for $T_{amb} > 50^\circ\text{C}$ (mW/°C)	max. junction temperature (°C)	thermal resistance $R_{th j-a}$ (°C/W)
TO-99	on PC board with 33 °C/W cooling fin; on PC board	625 1100	6,25 11	150 150	160 90
SOT-97	on PC board	450	6	125	165
SOT-96A	on ceramic substrate of 4 cm ² on PC board of 4 cm ²	500 325	6,7 4,3	125 125	150 230

CIRCUIT DIAGRAM



1) Diodes protect the inputs against over-voltage. Therefore, unless current-limiting resistors are used, large currents will flow if the differential input voltage exceeds 0,6 V.

TDA1034; N
TDA1034B; BN
TDA1034D; DN

TDA1034; N
TDA1034B; BN
TDA1034D; DN

CHARACTERISTICS at $V_p = 15\text{ V}$; $-V_N = 15\text{ V}$; $T_{\text{amb}} = 25^\circ\text{C}$ unless otherwise specified

Input offset voltage	V_{io}	typ.	0,5 mV
Input bias current	I_i	typ.	4,0 nA
Input offset current	I_{io}	typ.	0,5 nA
Input voltage range	V_i	typ.	0,02 nA
Differential input resistance	R_i	typ.	0,3 nA
Common mode rejection ratio	CNRR	typ.	+12; -13 V
Power supply voltage rejection ratio	PSRR	typ.	+13; -14 V
Large-signal voltage gain	G_v	typ.	30 K2
Output voltage swing at $R_L = 600\ \Omega$	V_o	typ.	100 K2
Output resistance; closed loop	R_o	typ.	70 dB
Output short-circuit current	I_{sc}	typ.	100 dB
Supply current at $I_o = 0$	$I_p; N$	typ.	10 pV/V
Transient response (voltage follower)			50 pV/V
$V_i = 50\text{ mV}$; $R_L = 600\ \Omega$; $C_C = 22\text{ pF}$; $C_L = 100\text{ pF}$	t_r	typ.	30 000
rise time		typ.	100 000
overshoot		typ.	$\pm 12\text{ V}$
$V_i = 50\text{ mV}$; $R_L = 600\ \Omega$; $C_C = 47\text{ pF}$; $C_L = 500\text{ pF}$	t_r	typ.	$\pm 13\text{ V}$
rise time		typ.	0,3 Ω
overshoot		typ.	38 mA
A. C. gain at $f = 10\text{ kHz}$; $C_C = 0$	G_v	typ.	5 mA
at $f = 10\text{ kHz}$; $C_C = 22\text{ pF}$	G_v	typ.	8 mA
Unity gain frequency at $C_C = 22\text{ pF}$; $C_L = 100\text{ pF}$		typ.	
Slew-rate at $C_C = 0$		typ.	
at $C_C = 22\text{ pF}$		typ.	
Power bandwidth at $V_{o(p-p)} = 20\text{ V}$		typ.	
$C_C = 0$		typ.	
$C_C = 22\text{ pF}$		typ.	

CHARACTERISTICS (continued)

Input noise voltage at $f = 30\text{ Hz}$	V_n	typ.	7 nV/ $\sqrt{\text{Hz}}$
at $f = 1\text{ kHz}$	V_n	typ.	4 nV/ $\sqrt{\text{Hz}}$
Input noise current at $f = 30\text{ Hz}$	I_n	typ.	2,5 pA/ $\sqrt{\text{Hz}}$
at $f = 1\text{ kHz}$	I_n	typ.	0,6 pA/ $\sqrt{\text{Hz}}$

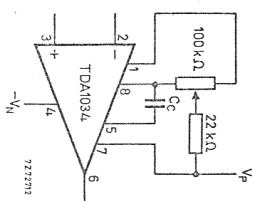
CHARACTERISTICS at $V_p = 18\text{ V}$; $-V_N = 18\text{ V}$; $T_{\text{amb}} = 25^\circ\text{C}$ unless otherwise specified

Output voltage swing at $R_L = 600\ \Omega$	V_o	typ.	$\pm 15\text{ V}$
Supply current at $I_o = 0$	$I_p; N$	typ.	$\pm 16\text{ V}$
Power bandwidth at $V_{o(p-p)} = 28\text{ V}$		typ.	5,5 mA
$R_L = 600\ \Omega$; $C_C = 22\text{ pF}$		typ.	9 mA
	B	typ.	70 kHz

TDA1034N version

The TDA1034N version has the same electrical specifications as the TDA1034, with the following exceptions:

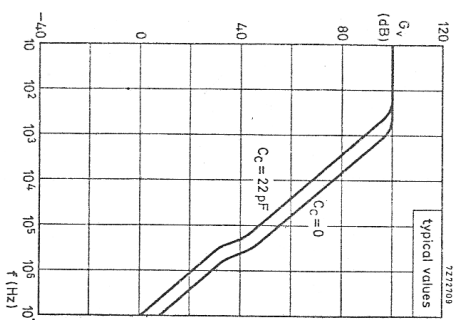
Input bias current	I_i	typ.	0,4 μA
Input offset current	I_{io}	typ.	0,8 μA
Input noise voltage at $f = 30\text{ Hz}$	V_n	typ.	0,01 μA
at $f = 1\text{ kHz}$	V_n	typ.	0,2 μA
Input noise current at $f = 30\text{ Hz}$	I_n	typ.	5,5 nV/ $\sqrt{\text{Hz}}$
at $f = 1\text{ kHz}$	I_n	typ.	7 nV/ $\sqrt{\text{Hz}}$
Broadband noise figure	F	typ.	3,5 nV/ $\sqrt{\text{Hz}}$
$f = 10\text{ Hz}$ to 20 kHz ; $R_S = 5\text{ K}\Omega$		typ.	4,5 nV/ $\sqrt{\text{Hz}}$
		typ.	1,5 pA/ $\sqrt{\text{Hz}}$
		typ.	0,4 pA/ $\sqrt{\text{Hz}}$



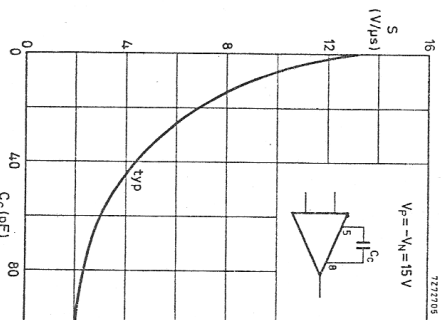
Frequency compensation and offset voltage adjustment circuit.

TDA1034: N
TDA1034B; BN
TDA1034D; DN

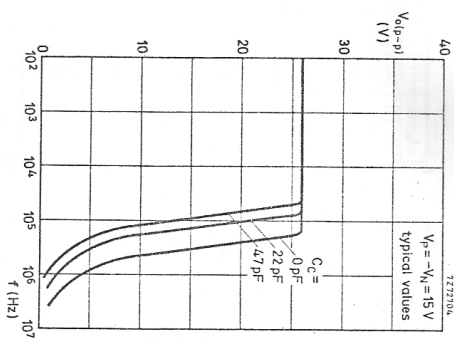
TDA1034: N
TDA1034B; BN
TDA1034D; DN



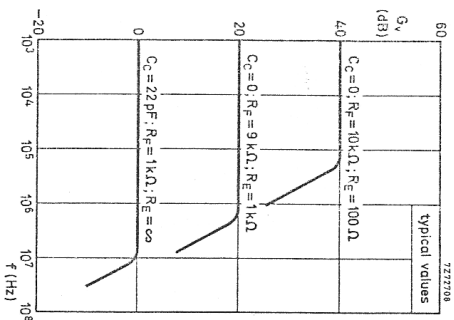
Open loop frequency response.



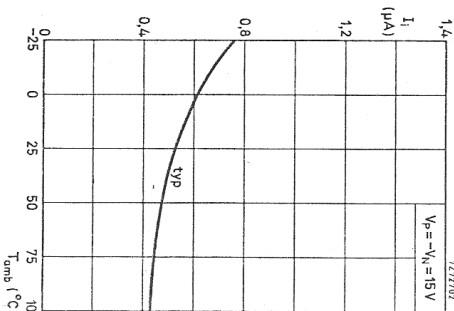
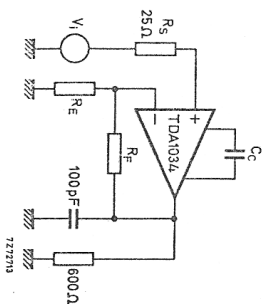
Slew-rate as a function of compensation capacitance.



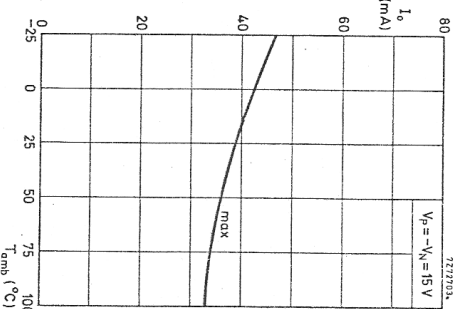
Large-signal frequency response.



Closed loop frequency response.



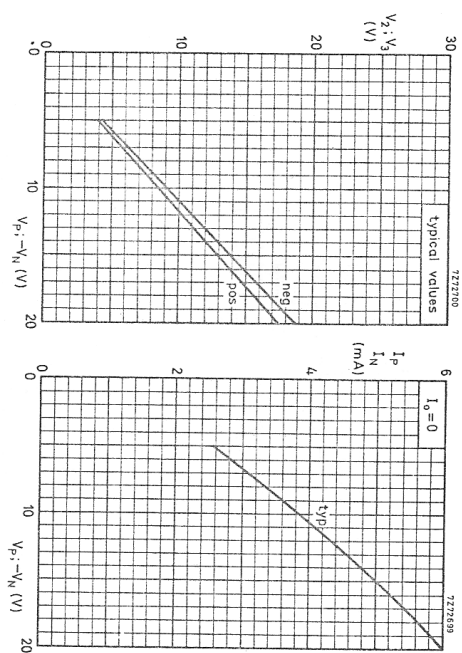
Input bias current.



Output short-circuit current.

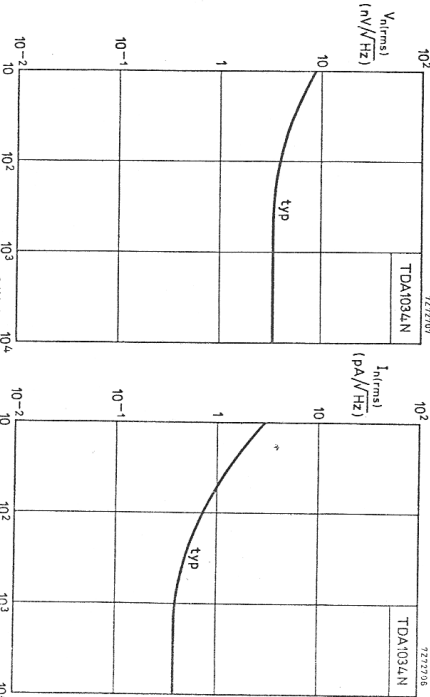
TDA1034; N
TDA1034B; BN
TDA1034D; DN

TDA1034; N
TDA1034B; BN
TDA1034D; DN



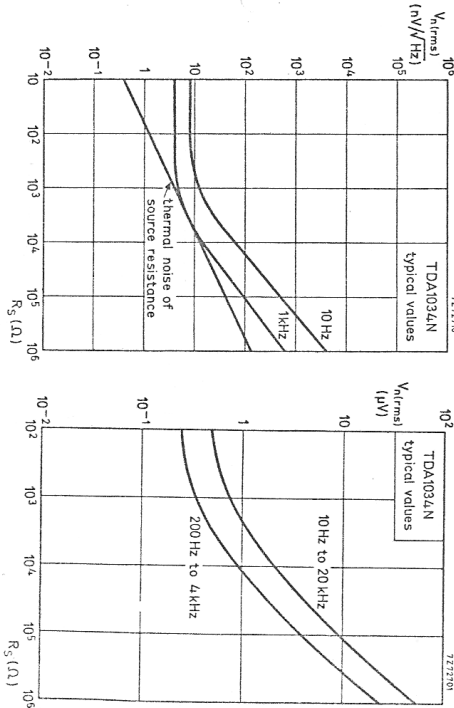
Input common mode voltage range.

Supply current.



Input noise voltage density.

Input noise current density.



Total input noise density.

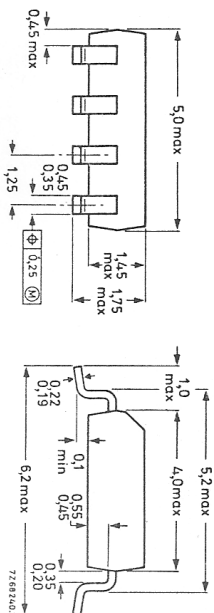
Broadband input noise voltage.

TDA1034; N
TDA1034B; BN
TDA1034D; DN

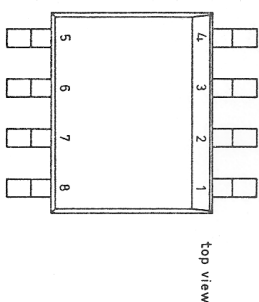
Dimensions in mm

PACKAGE OUTLINES (continued)

SOT-96A; plastic 8-lead flat pack



SOT-97; plastic 8-lead dual in-line



top view

\oplus Locational truth.
 \textcircled{M} Maximum Material Condition.

