SIEMENS

TDA 4930
Stereo/Bridge AF Amplifier 2 x 10 W/20 W

The TDA 4930 can be applied as a class B stereo amplifier or mono amplifier in bridge configuration for AF signals. In addition, the component is provided with a protective circuitry against overtemperature and overload.

Features

- Universal application as stereo amplifier or mono amplifier in bridge configuration
- Wide supply voltage range
- Minimum of external components
- Outputs AC and DC short-circuit resistant

Maximum ratings

Supply voltage	V_S	32	V
Output peak current	I_1; $I_{9\,pp}$	2.5	A
Input voltage range	V_2; V_3; V_7	−0.3 to V_S	V
Junction temperature	T_j	150	°C
Storage temperature range	T_{stg}	−40 to 125	°C
Thermal resistance (system-case)	$R_{th\,JC}$	6	K/W

Operating range

Supply voltage			
$R_L \geq 8\ \Omega$	V_S	8 to 26	V
$R_L = 4\ \Omega$	V_S	8 to 22	V
Case temperature	T_C	−20 to 85	°C
$P_V = 10$ W			

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Characteristics

$V_S = 19\ V;\ T_A = 25\ °C$

	Test circuit	min	typ	max	
Quiescent current ($V_i = 0$) $\quad I_5$	1		30	60	mA
Output voltage ($V_i = 0$) $\quad V_{q\,9;1}$	1	9	9.5	10	V
Input resistance[1] $\quad R_{i\,7;3}$	1		20		kΩ
Output power ($f = 1$ kHz)					
— stereo operation					
$THD = 1\%$ $\quad P_{q\,9;1}$	1	7	8		W
$THD = 10\%$ $\quad P_{q\,9;1}$	1	9	10		W
— bridge operation					
$THD = 1\%$ $\quad P_{q\,9;1}$	2	14	16		W
$THD = 10\%$ $\quad P_{q\,9;1}$	2	18	20		W
Line hum suppression[2] $\quad a_{hum}$ $f_r = 100$ Hz; $V_r = 0.5$ V	1	40	46		dB
Current consumption $\quad I_5$ $P_9 = P_1 = 10$ W; $f_i = 1$ kHz	1		1.5		A
Efficiency $\quad \eta$ $P_9 = P_1 = 10$ W; $f_i = 1$ kHz	1		70		%
Total harmonic distortion $\quad THD$ $P_{9/1} = 0.05$ to 6 W $f_i = 40$ Hz to 15 kHz	1		0.2	0.5	%
Cross-talk rejection $\quad a_{cr}$ $f_i = 1$ kHz; P_9 or $P_1 = 10$ W	1		50		dB
Transmission range[3] $\quad B$	1	40 Hz to 60 kHz			
Disturbance voltage ($B = 30$ Hz to 20 kHz) $\quad V_d$ in acc. with DIN 45405 referred to input[4]	1		5		µV
Noise voltage (CCIR filter) $\quad V_n$ in accordance with DIN 45405 referred to the input[4]	1		15		µVs
Difference in transmission measure $\quad \Delta G_V$ $P_9 = P_1 = 7$ W $f_i = 40$ Hz to 20 kHz	1			1	dB
Voltage gain stereo $\quad G_V$	1		30		dB
Voltage gain bridge configuration $\quad G_V$	2		36		dB
DC output voltage at $\quad V_{q\,9;1}$ active DC protection if S1/9 is closed; $V_S \geq 10$ V	2		0.15	0.30	V

1) S2a(b) open/closed
2) S1a(b) and S3 in position 2
3) $P_{9/1} = 6$ W; -3 dB referred to 1 kHz
4) S1a(b) in position 2

Circuit description

The IC contains 2 complete amplifiers and can be used for a wide variety of applications with a minimum of external circuitry.

The TDA 4930 can be applied as stereo amplifier or amplifier in bridge configuration for operating voltages ranging between 8 V and 26 V, with speakerload impedance from 1 to 16 Ω.

The prestages are differential amplifiers with strong negative feedback. Internal frequency compensation in the driver amplifier limits the gain-bandwidth product to 4.5 MHz.

The power output stages are comprised of quasi PNP transistors (small saturation voltage).

Each power element is equipped with an independent protective circuit, rendering the outputs of the amplifiers AC and DC short-circuit resistant.

A DC protective circuit of the outputs prevents overloading of the loudspeakers, if ground connections become apparent during bridge operations. To avoid overheating, a temperature fuse affecting both amplifiers prevents current supply to the power output stages during inadmissibly high chip temperatures.

As a special economic feature, the negative feedback resistances for $G_v = 30$ dB and the input voltage reference divider have been integrated.
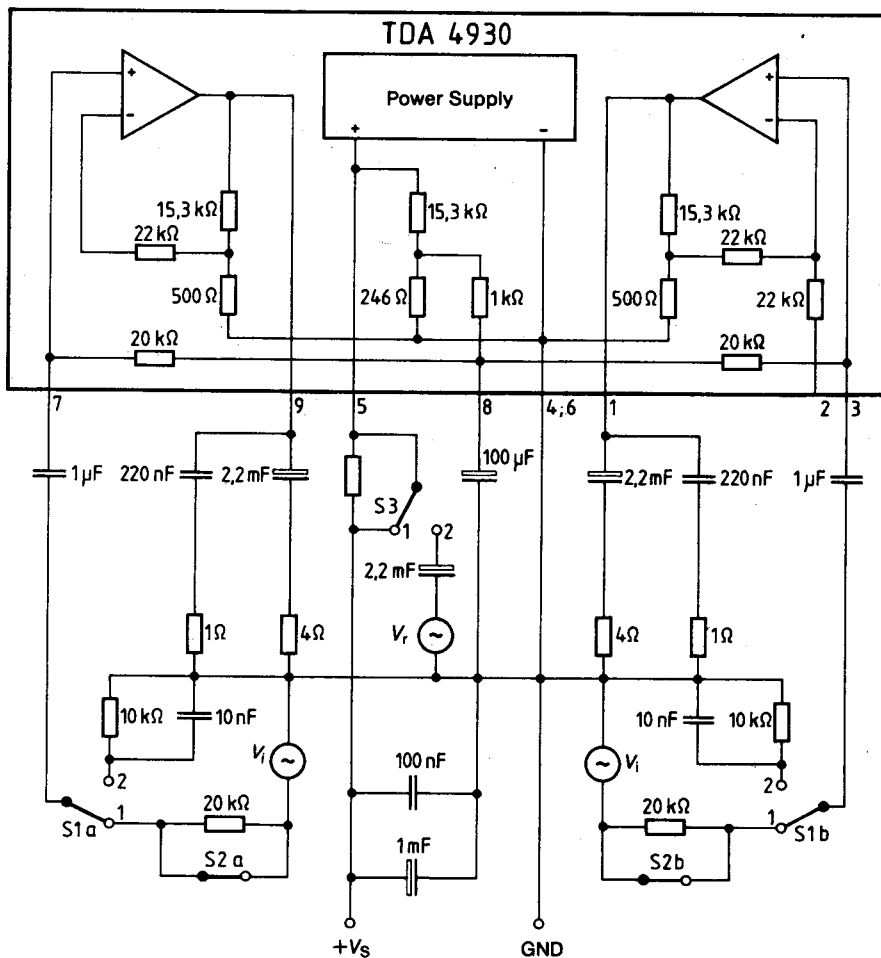
Pin description

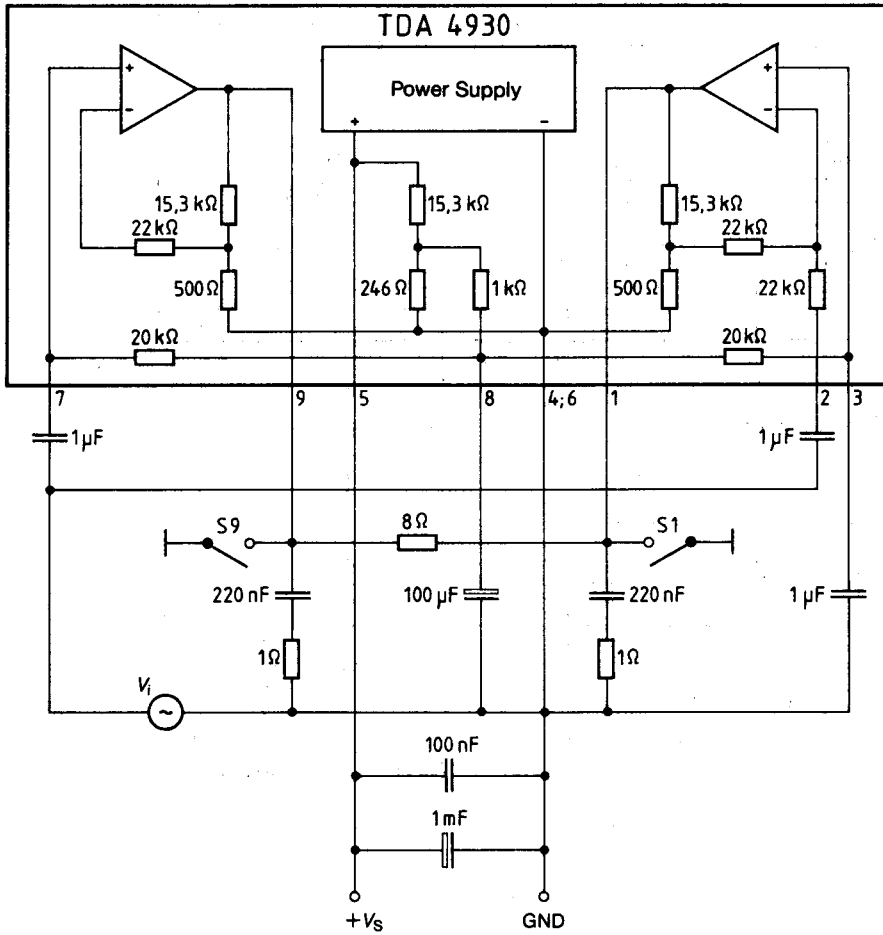| Pin	Function
1	Output right channel
2	Inverting input right channel (more than 22 kΩ)
3	Non-inverting input right channel
4	GND
5	$+V_s$
6	GND
7	Non-inverting input left channel
8	Line hum suppression right and left channel
9	Output left channel

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Block diagram
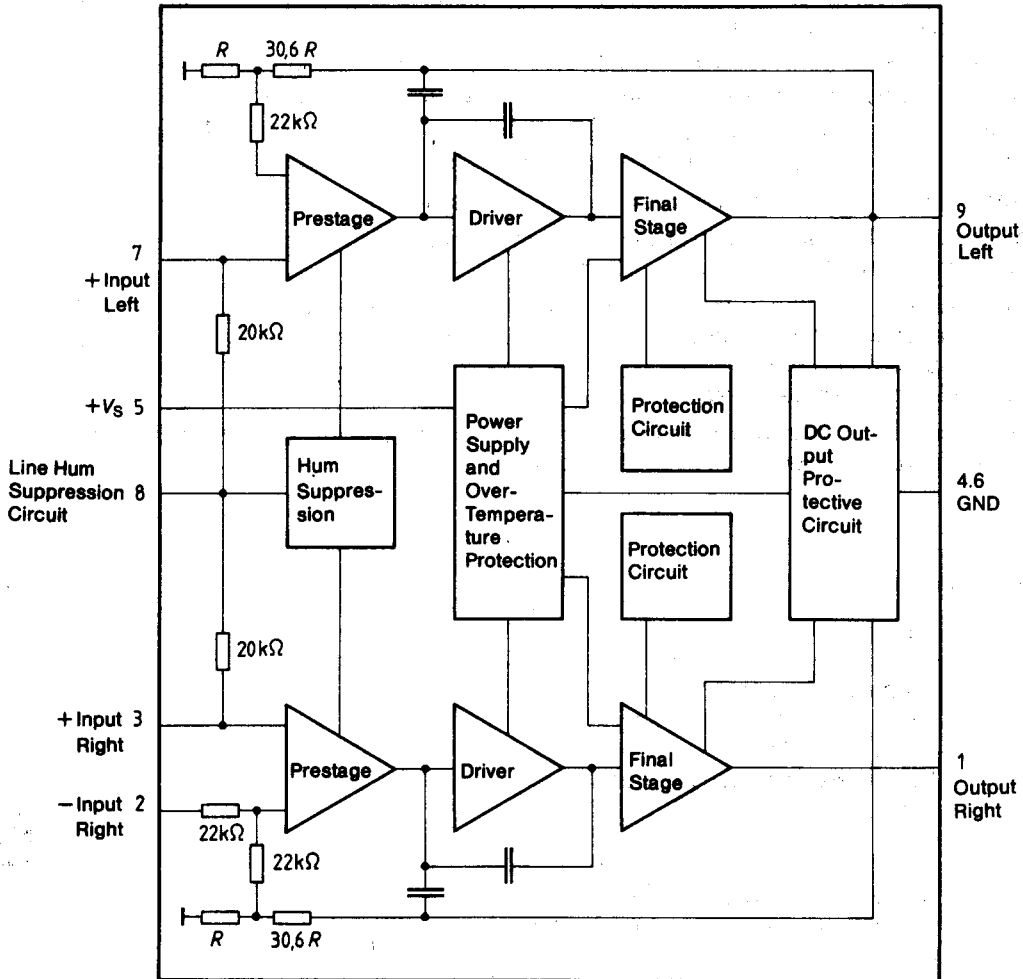
Test and measurement circuit
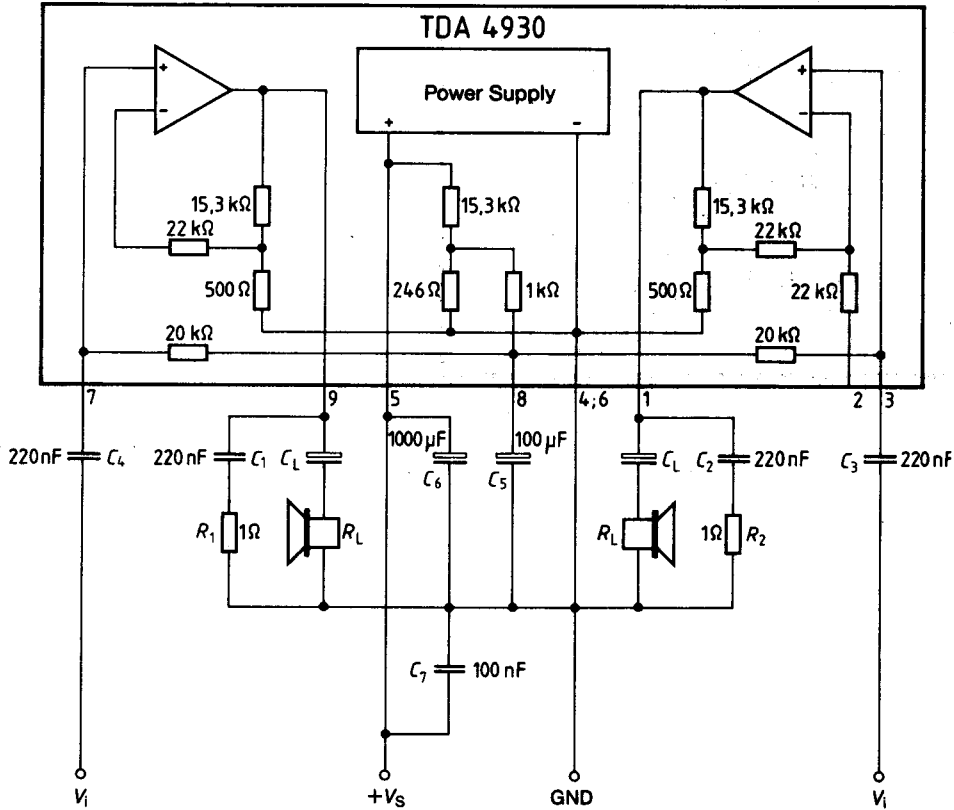
1. Stereo operation
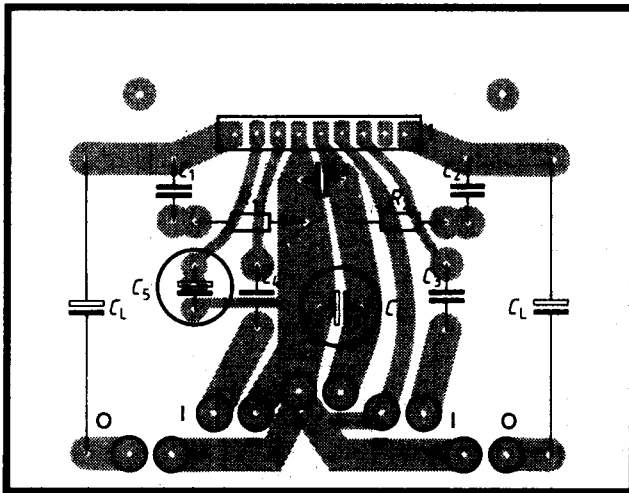
Test and measurement circuit

2. Bridge operation

Application circuit

1. Stereo operation

TDA 4930

Power Supply

15,3 kΩ	15,3 kΩ	15,3 kΩ
22 kΩ		22 kΩ
500 Ω	246 Ω	1 kΩ	500 Ω	22 kΩ
20 kΩ		20 kΩ

| 7 | 9 | 5 | 8 | 4;6 | 1 | 2 | 3 |

220nF C_4 220 nF C_1 C_L 1000 µF C_6 100 µF C_5 C_L C_2 220nF C_3 220nF

R_1 1Ω R_L R_L 1Ω R_2

C_7 100 nF

V_i $+V_S$ GND V_i

V_S	19 V	26 V
R_L	4Ω	8Ω
C_L	1000µF	470µF

Layout/Plug-in location plan

Application circuit

2. Bridge operation (only one channel)

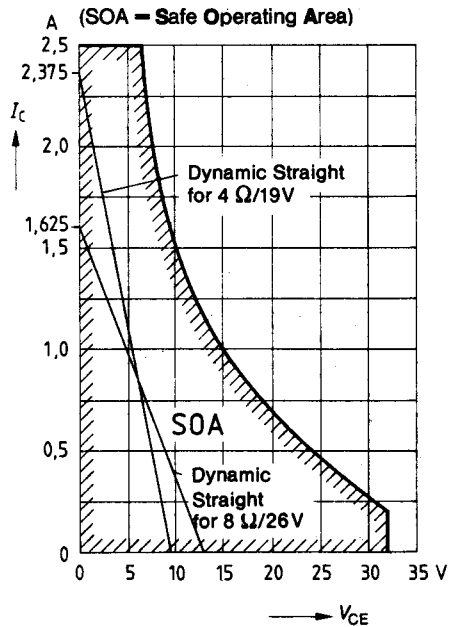| V_S	19 V	26 V
R_L	8 Ω	16 Ω
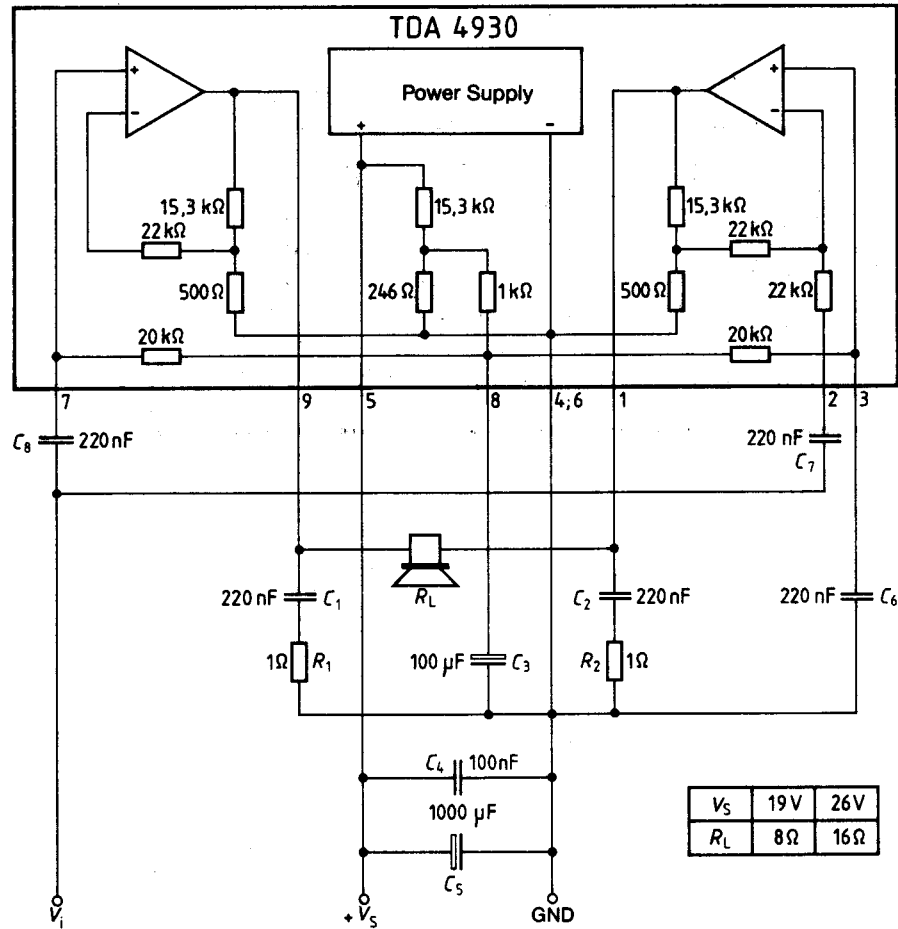
Layout/Plug-in location plan
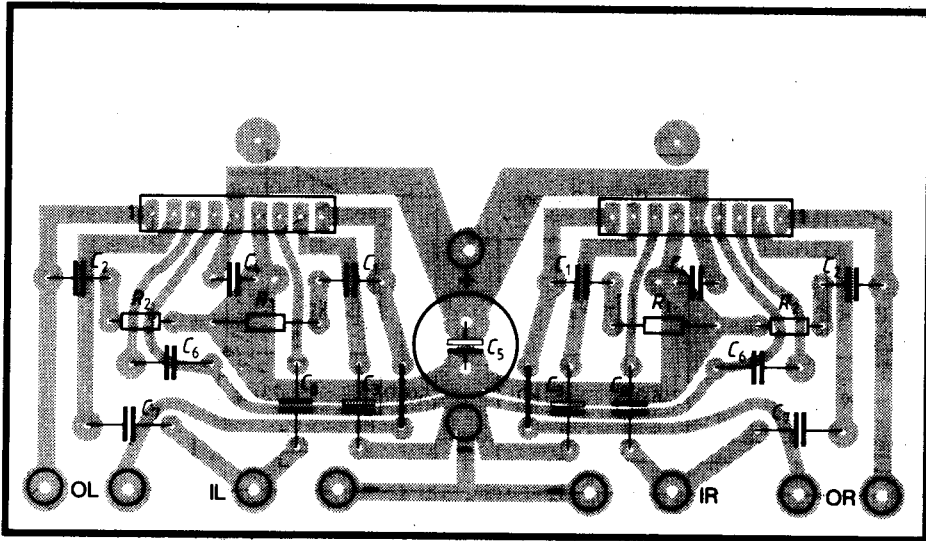
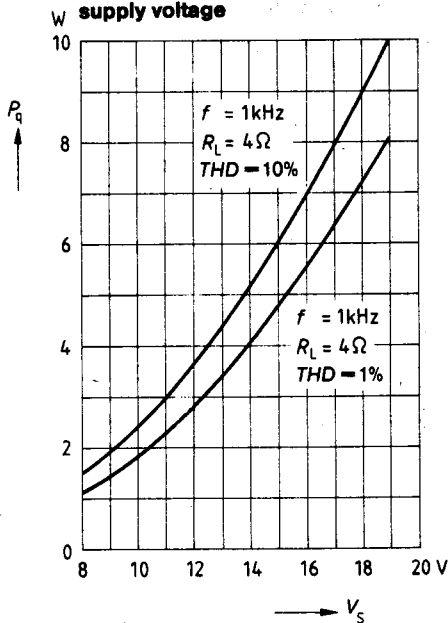## Quiescent current versus supply voltage
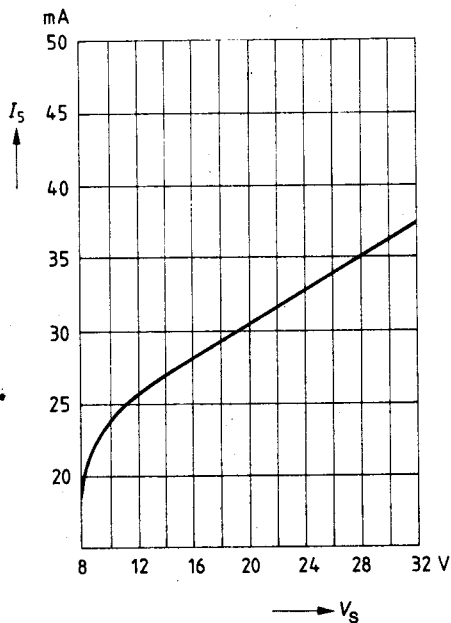
Typical operating range of the final transistors adjusted by internal protective circuits

(SOA = Safe Operating Area)

Stereo operation

Output power versus supply voltage

Stereo operation
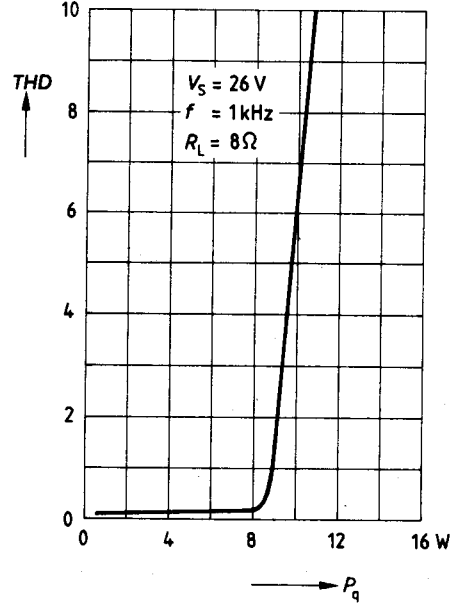
Output power versus supply voltage

Bridge operation

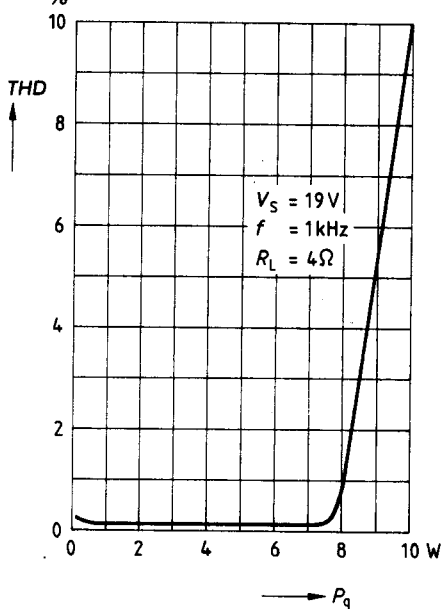**Output power versus supply voltage**

W

P_q

$f = 1\,\text{kHz}$
$R_L = 8\,\Omega$
$THD = 10\,\%$

$f = 1\,\text{kHz}$
$R_L = 8\,\Omega$
$THD = 1\,\%$

V_S

Stereo operation

Total harmonic distortion versus output power

%

THD

$V_S = 26\,\text{V}$
$f = 1\,\text{kHz}$
$R_L = 8\,\Omega$

P_q

Stereo operation

Total harmonic distortion versus output power

%

THD

$V_S = 19\,\text{V}$
$f = 1\,\text{kHz}$
$R_L = 4\,\Omega$

P_q

Stereo operation

Power dissipation (each channel) versus output power

W

P_{tot}

$V_S = 19\,\text{V}$
$f = 1\,\text{kHz}$
$R_L = 4\,\Omega$

P_q

Stereo operation

Power dissipation (each channel) versus output power

$V_S = 26V$
$f = 1kHz$
$R_L = 8\Omega$

Stereo operation

Efficiency versus output power

$V_S = 19V$
$f = 1kHz$
$R_L = 4\Omega$

Stereo operation

Efficiency versus output power

$V_S = 26V$
$f = 1kHz$
$R_L = 8\Omega$
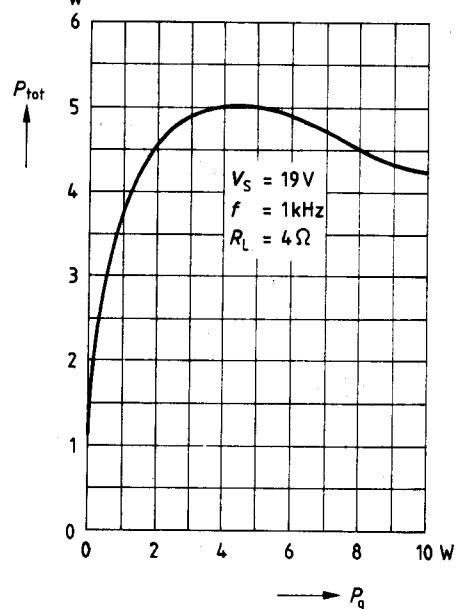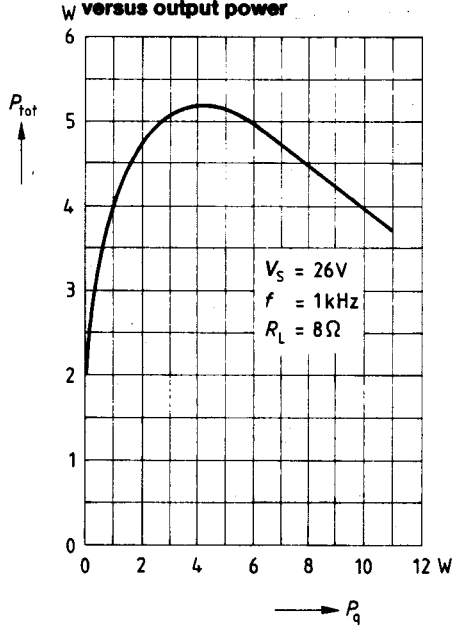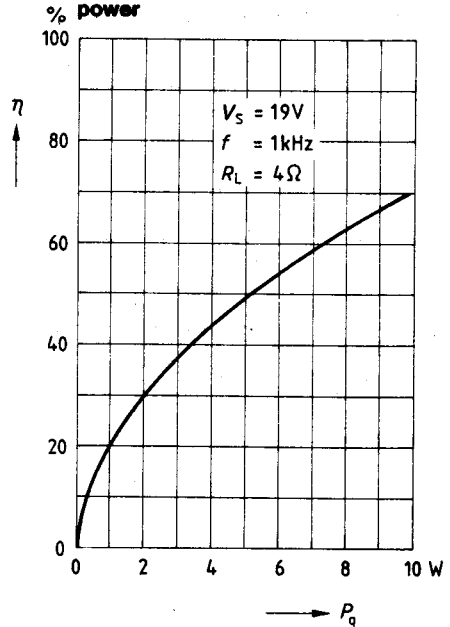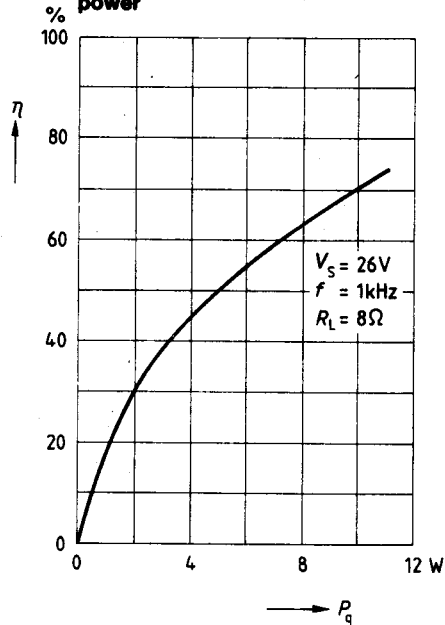
Stereo operation

Power dissipation (each channel) versus supply voltage

$f = 1kHz$
$R_L = 4\Omega$
$THD = 1\%$

$f = 1kHz$
$R_L = 8\Omega$
$THD = 1\%$

8
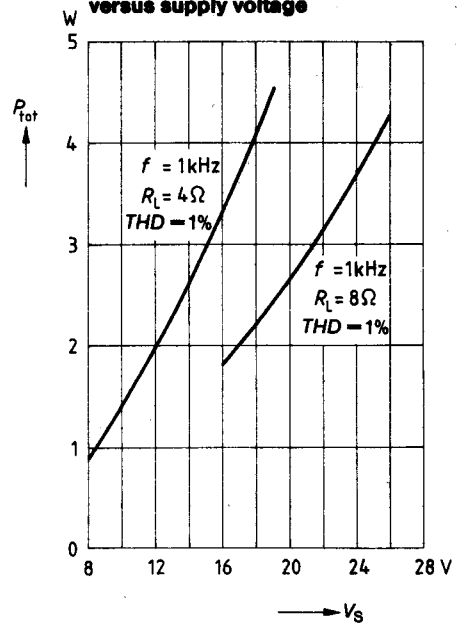
Stereo operation

Supply current (one channel modulated) versus output power

Graph: I_S (A) versus P_q

$V_S = 19\,V$
$f = 1\,kHz$
$R_L = 4\,\Omega$

$V_S = 26\,V$
$f = 1\,kHz$
$R_L = 8\,\Omega$

Stereo operation

Total harmonic distortion versus frequency

Graph: THD (%) versus f

$V_S = 19\,V$
$R_L = 4\,\Omega$

$P_q = 8\,W$

$P_q = 7\,W$
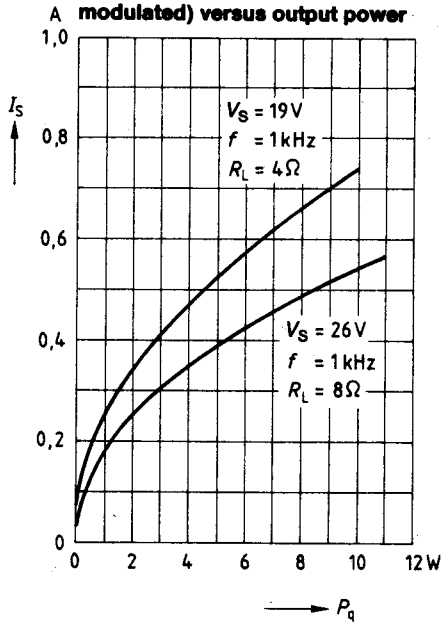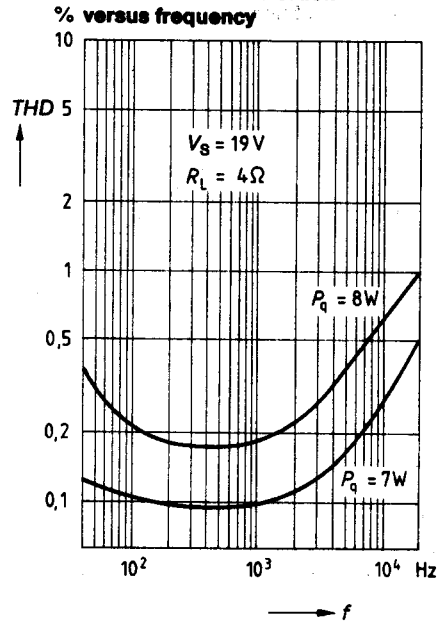
Line hum suppression versus frequency

Graph: a_{hum} (dB) versus f

$V_S = 19\,V$
$R_L = 4\,\Omega$
$R_S = 10\,k\Omega$
$V_r = 0,5\,V$
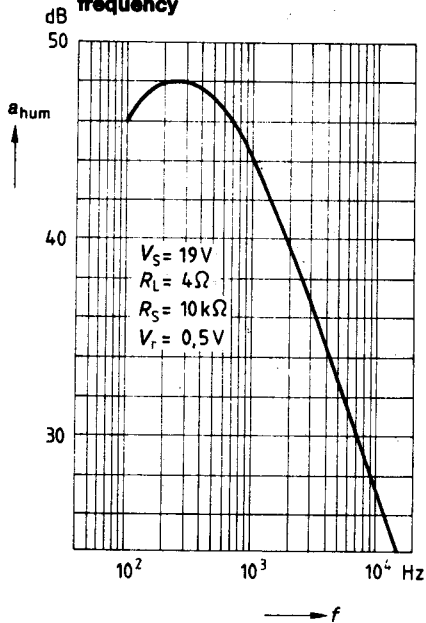
Cross-talk rejection versus frequency

Graph: a_{cr} (dB) versus f

$V_S = 19\,V$
$R_L = 4\,\Omega$

$P_q = 8\,W$

$P_q = 10\,W$