

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	$I_1; I_{9pp}$	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_{thJC}	6	K/W

Operating range

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

Characteristics

$V_S = 19\text{ V}$; $T_A = 25\text{ }^\circ\text{C}$

		Test circuit	min	typ	max	
Quiescent current ($V_i = 0$)	I_5	1		30	60	mA
Output voltage ($V_i = 0$)	$V_{q9;1}$	1	9	9.5	10	V
Input resistance ¹⁾	$R_{i7;3}$	1		20		k Ω
Output power ($f = 1\text{ kHz}$)						
– stereo operation						
THD = 1%	$P_{q9;1}$	1	7	8		W
THD = 10%	$P_{q9;1}$	1	9	10		W
– bridge operation						
THD = 1%	$P_{q9;1}$	2	14	16		W
THD = 10%	$P_{q9;1}$	2	18	20		W
Line hum suppression ²⁾	a_{hum}	1	40	46		dB
$f_r = 100\text{ Hz}$; $V_r = 0.5\text{ V}$						
Current consumption	I_5	1		1.5		A
$P_9 = P_1 = 10\text{ W}$; $f_i = 1\text{ kHz}$						
Efficiency	η	1		70		%
$P_9 = P_1 = 10\text{ W}$; $f_i = 1\text{ kHz}$						
Total harmonic distortion	THD	1		0.2	0.5	%
$P_{9/1} = 0.05\text{ to }6\text{ W}$						
$f_i = 40\text{ Hz to }15\text{ kHz}$						
Cross-talk rejection	a_{cr}	1		50		dB
$f_i = 1\text{ kHz}$; P_9 or $P_1 = 10\text{ W}$						
Transmission range ³⁾	B	1	40 Hz to 60 kHz			
Disturbance voltage ($B = 30\text{ Hz to }20\text{ kHz}$)	V_d	1		5		μV
in acc. with DIN 45405 referred to input ⁴⁾						
Noise voltage (CCIR filter)	V_n	1		15		μV_S
in accordance with DIN 45405						
referred to the input ⁴⁾						
Difference in transmission measure	ΔG_V	1			1	dB
$P_9 = P_1 = 7\text{ W}$						
$f_i = 40\text{ Hz to }20\text{ kHz}$						
Voltage gain stereo	G_V	1		30		dB
Voltage gain bridge configuration	G_V	2		36		dB
DC output voltage at active DC protection	$V_{q9;1}$	2		0.15	0.30	V
if S1/9 is closed; $V_S \geq 10\text{ V}$						

1) S2a(b) open/closed

2) S1a(b) and S3 in position 2

3) $P_{9/1} = 6\text{ W}$; -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.

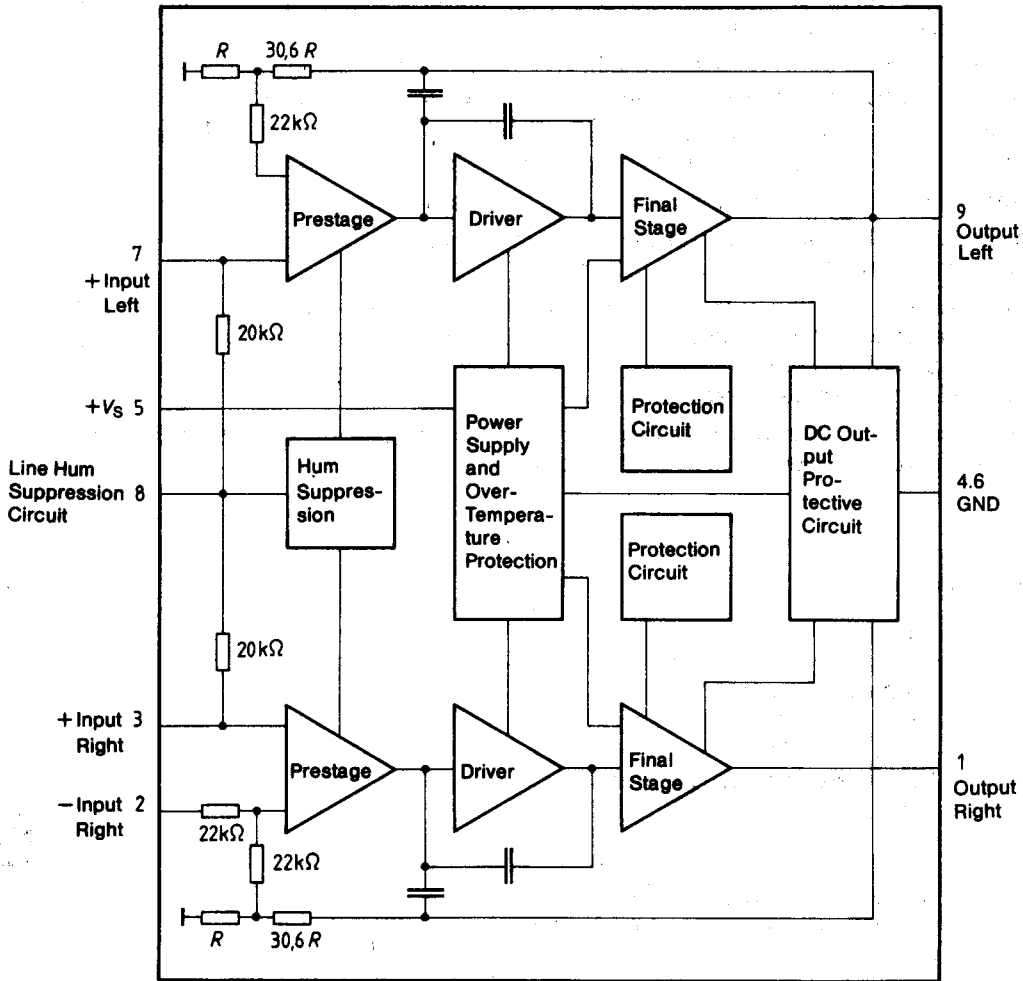
A DC protective circuit of the outputs prevents overloading of the loudspeakers, if ground connections become apparent during bridge operations. To avoid overheating, a temperature fuse affecting both amplifiers prevents current supply to the power output stages during inadmissibly high chip temperatures.

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

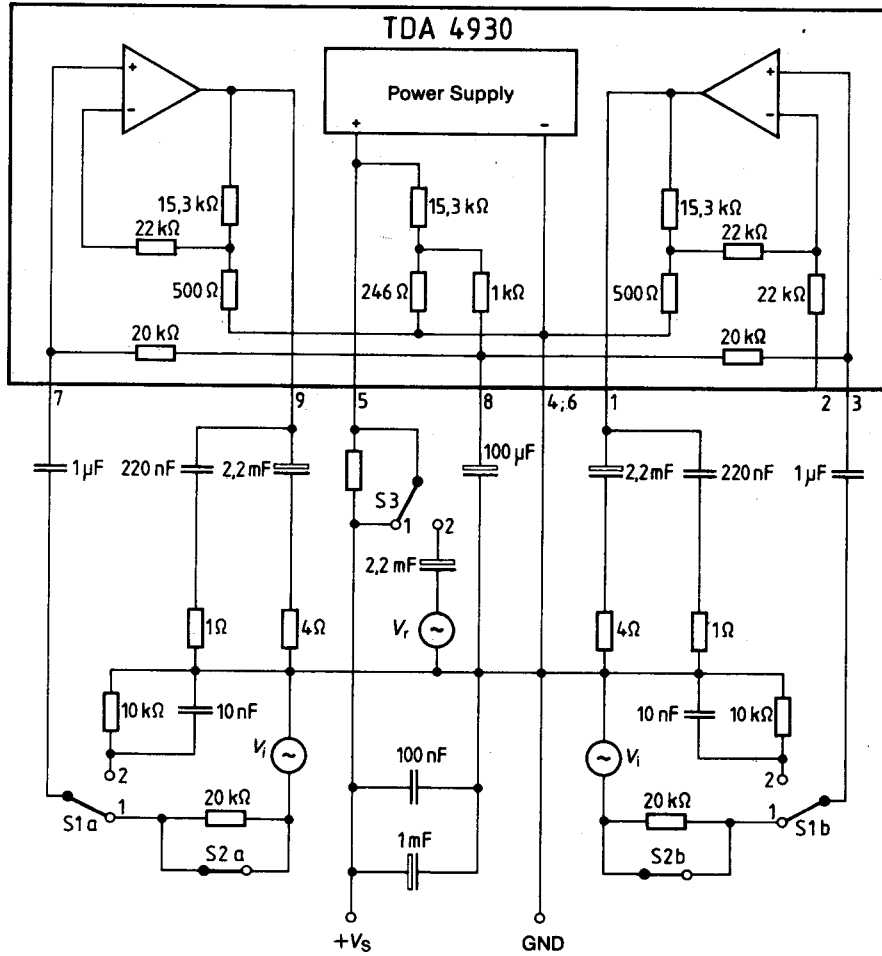
Pin	Function
1	Output right channel
2	Inverting input right channel (more than 22 k Ω)
3	Non-inverting input right channel
4	GND
5	+V _s
6	GND
7	Non-inverting input left channel
8	Line hum suppression right and left channel
9	Output left channel

Block diagram



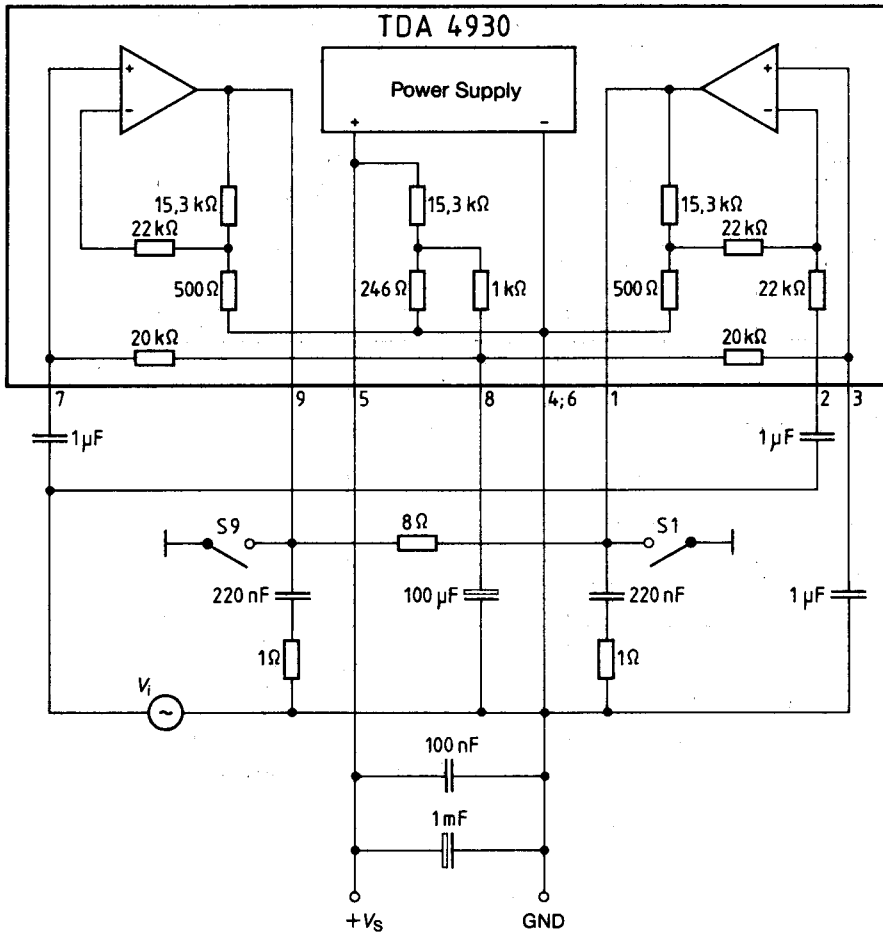
Test and measurement circuit

1. Stereo operation



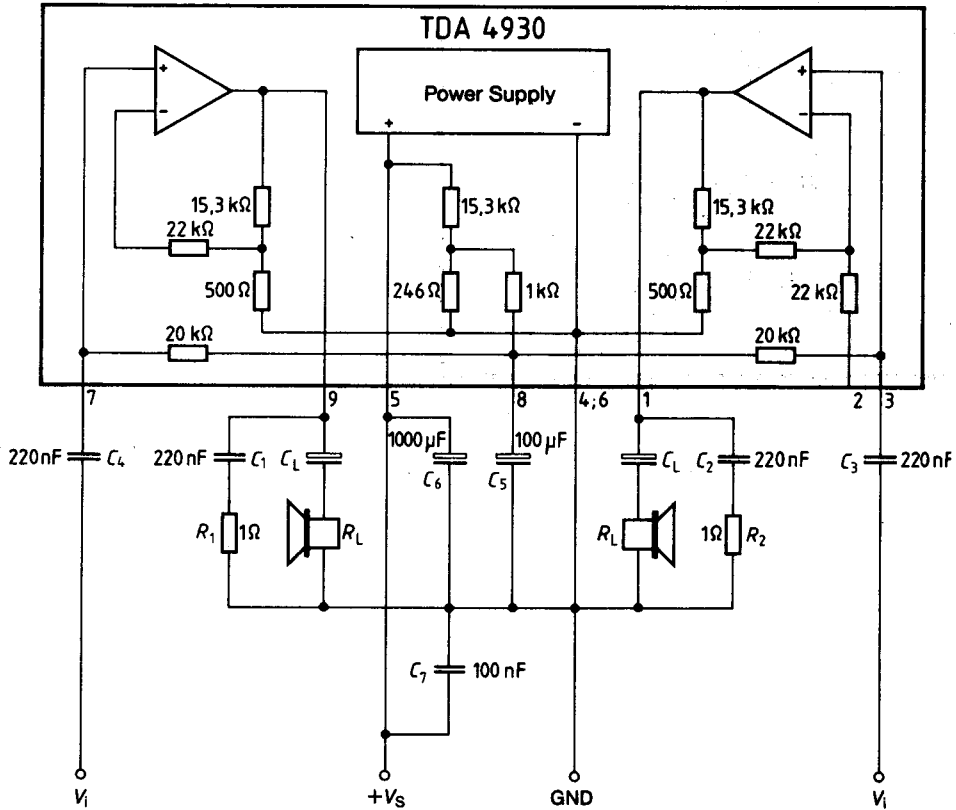
Test and measurement circuit

2. Bridge operation



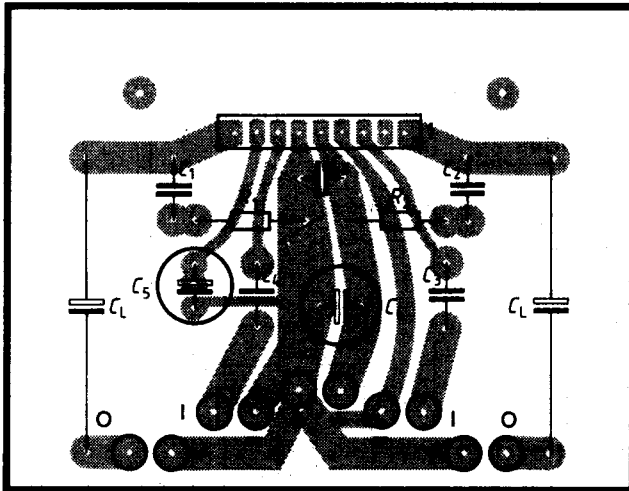
Application circuit

1. Stereo operation



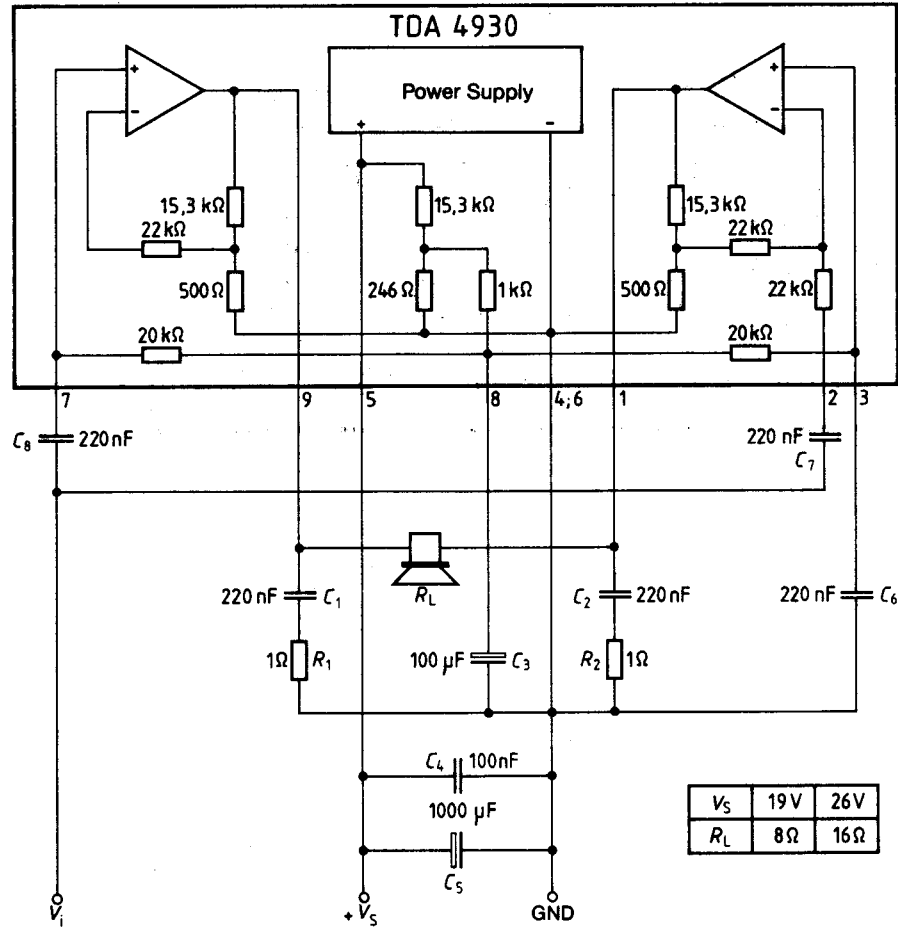
V_S	19 V	26 V
R_L	4 Ω	8 Ω
C_L	1000 μF	470 μF

Layout/Plug-in location plan

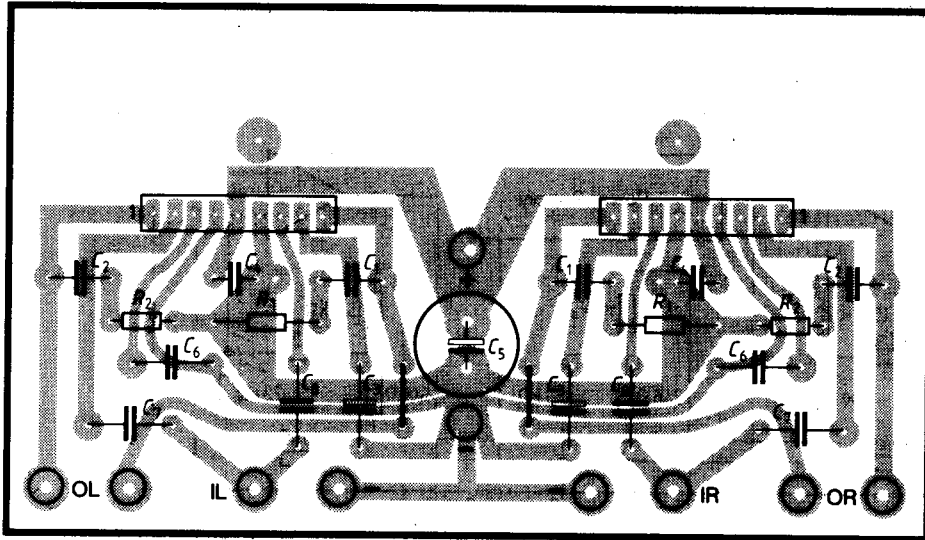


Application circuit

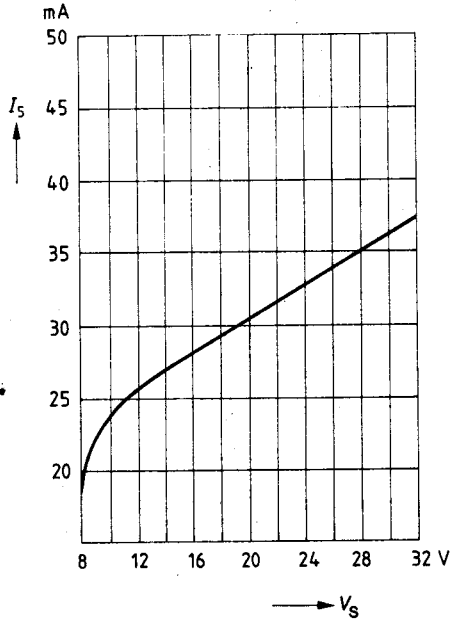
2. Bridge operation (only one channel)



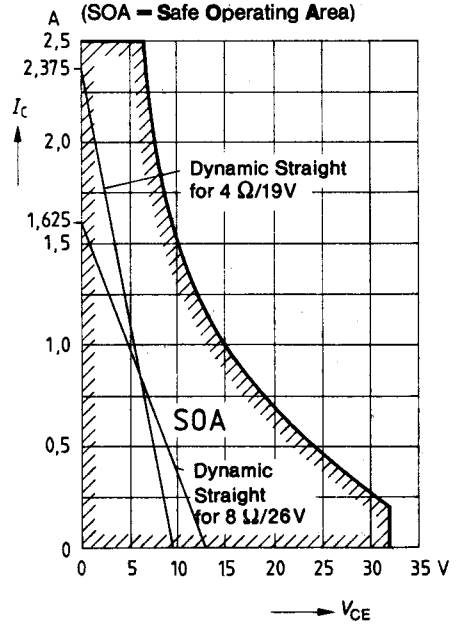
Layout/Plug-in location plan



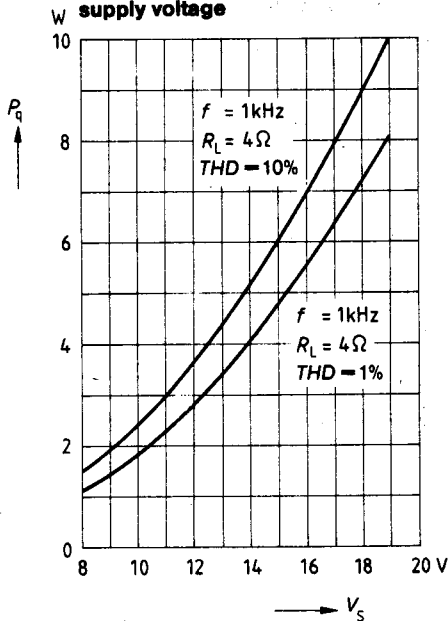
Quiescent current versus supply voltage



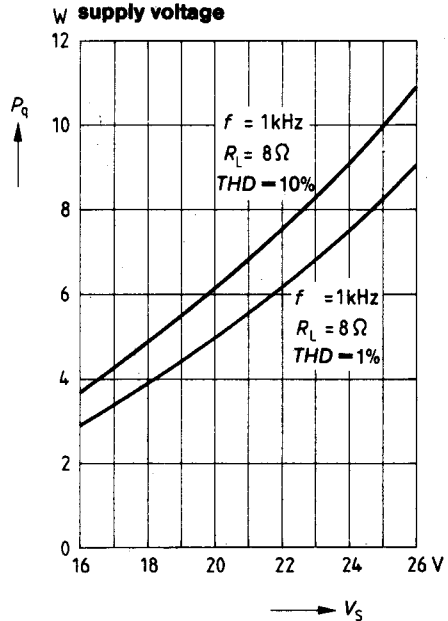
Typical operating range of the final transistors adjusted by internal protective circuits



Stereo operation Output power versus supply voltage

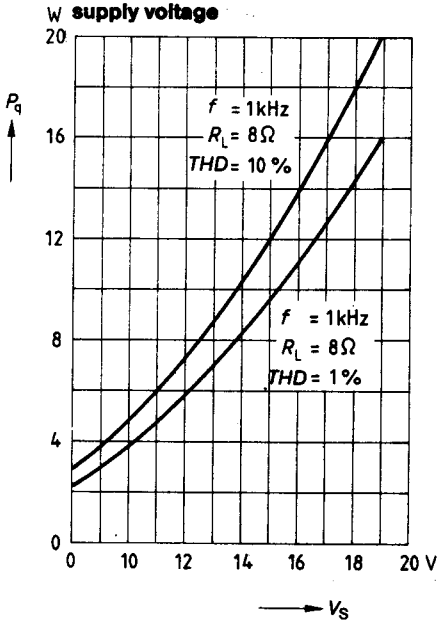


Stereo operation Output power versus supply voltage



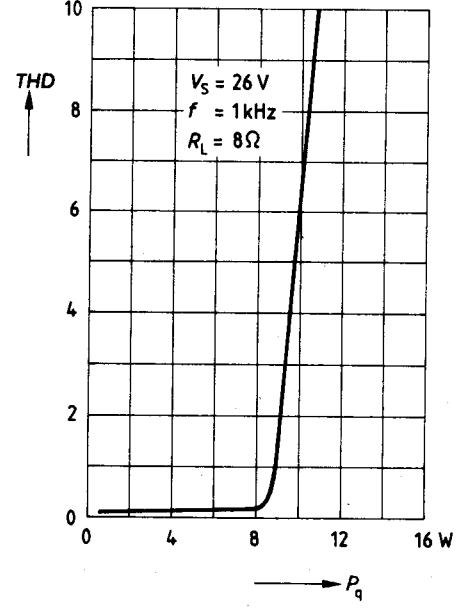
Bridge operation

Output power versus supply voltage



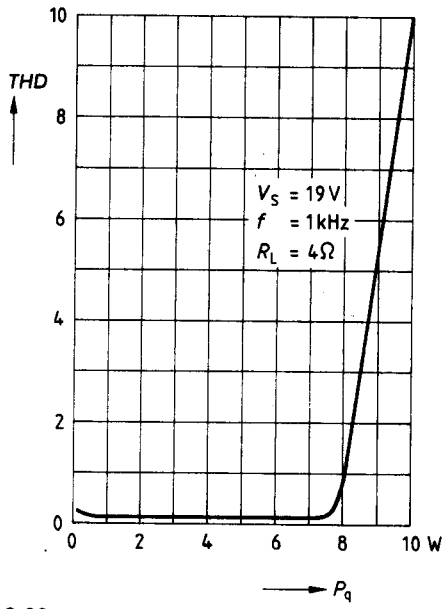
Stereo operation

Total harmonic distortion versus output power



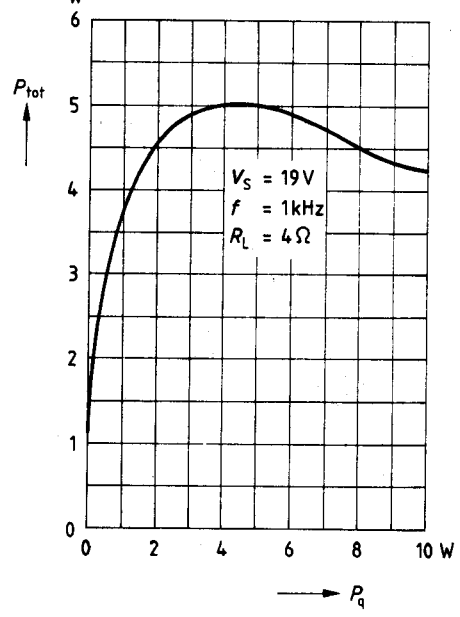
Stereo operation

Total harmonic distortion versus output power

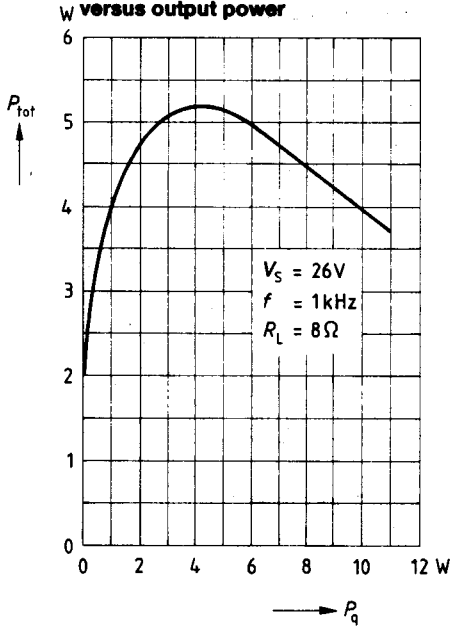


Stereo operation

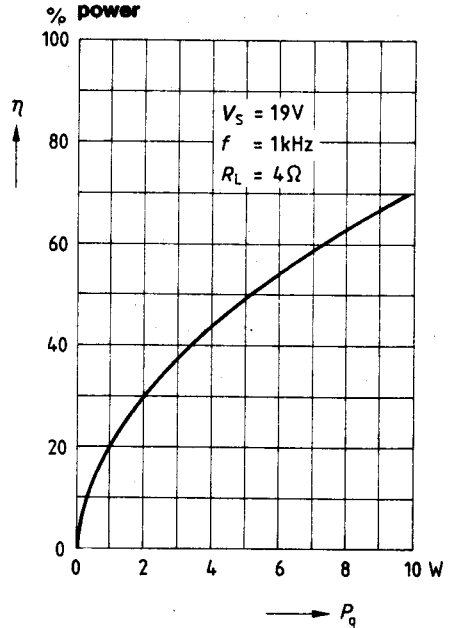
Power dissipation (each channel) versus output power



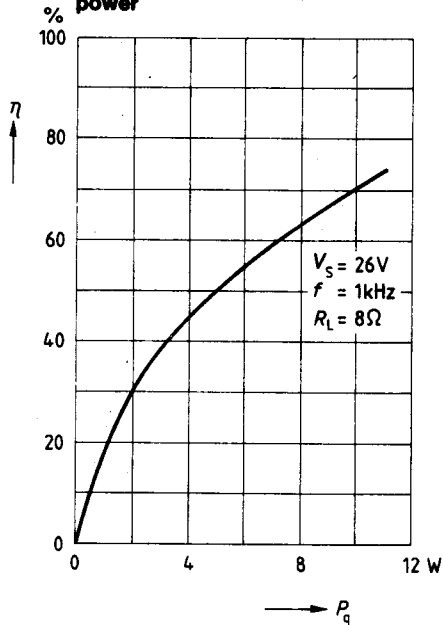
Stereo operation
Power dissipation (each channel)
versus output power



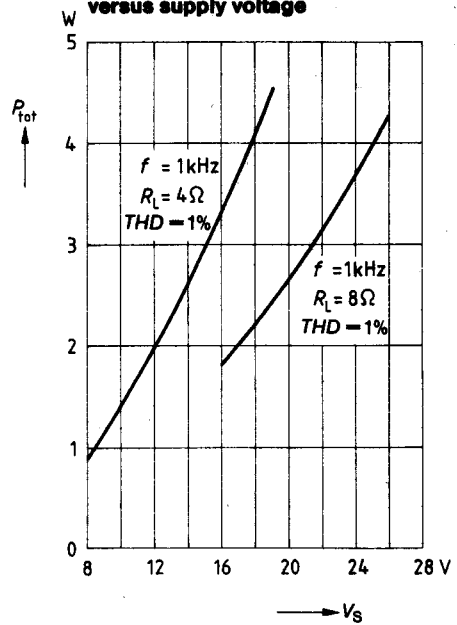
Stereo operation
Efficiency versus output power



Stereo operation
Efficiency versus output power

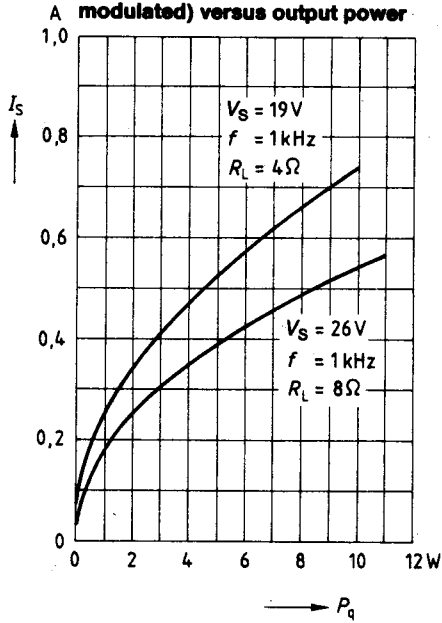


Stereo operation
Power dissipation (each channel)
versus supply voltage



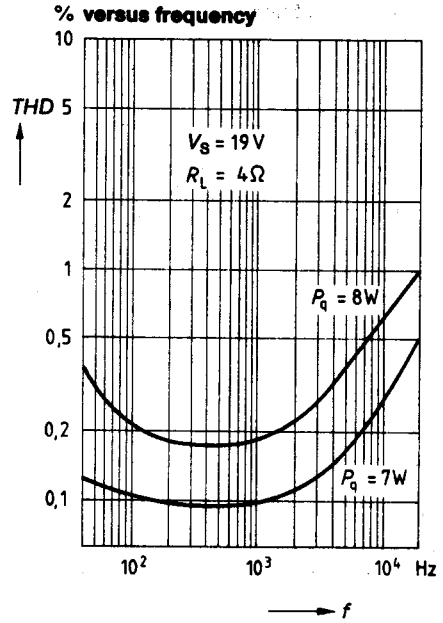
Stereo operation

Supply current (one channel modulated) versus output power

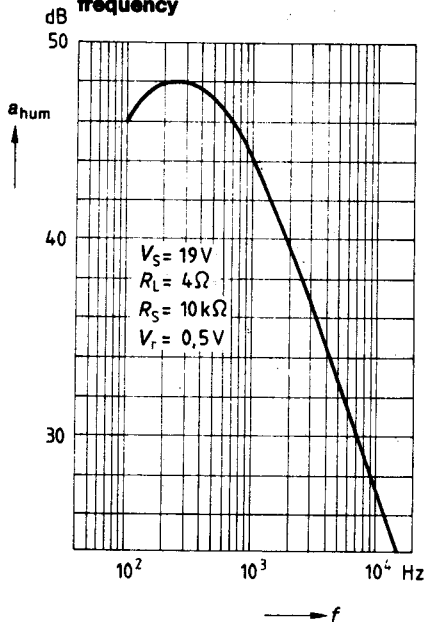


Stereo operation

Total harmonic distortion versus frequency



Line hum suppression versus frequency



Cross-talk rejection versus frequency

