TDA 1037
AF Power Amplifier IC
with Thermal Shutdown

AF power amplifier designed for a wide range of supply voltages to enable versatile application in entertainment electronics. The amplifier operates in the push-pull B mode and is available in the SIP 9 package. The integrated shutdown protects the IC from overheating.

Features

● Wide supply voltage range: 4 V to 28 V
● High output power up to 8 W
● Large output current up to 2.5 A
● Simple mounting

Maximum ratings

Supply voltage	$R_L \geq 16 \, \Omega$	V_S	30	V
	$R_L \geq 8 \, \Omega$	V_S	24	V
	$R_L \geq 4 \, \Omega$	V_S	20	V
Output peak current (not repetitive)		I_q	3.5	A
Output current (repetitive)		I_q	2.5	A
Junction temperature[1]		T_j	150	°C
Storage temperature range		T_{stg}	—40 to 125	°C
Thermal resistance				
junction-case		$R_{th\,JC}$	12	K/W
system-air		$R_{th\,SA}$	70	K/W

Operating range

Supply voltage	V_S	4 to 28	V
Ambient temperature	T_A	—25 to 85	°C

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Characteristics

with reference to test circuit

1. $V_S = 12$ V; $R_L = 4\ \Omega$; $C_1 = 1000\ \mu F$; $f_i = 1$ kHz; $T_A = 25\ °C$

		min	typ	max	
Quiescent output voltage	V_{q2}	5.4	6.0	6.6	V
Quiescent drain current	$I_3 + I_4$		12	20	mA
Input DC current	I_{i8}		0.4	4	μA
Output power $THD = 1\%$	P_q	2.5	3.5		W
$THD = 10\%$	P_q	3.5	4.5		W
Voltage gain (closed loop)	G_V	37	40	43	dB
Voltage gain (open loop)	G_{V0}		80		dB
Total harmonic distortion ($P_q = 0.05$ to 2.5 W)	THD		0.2		%
Noise voltage referred to input	V_n		3.8	10	μV_S
($f_i = 3$ Hz to 20 kHz)					
Disturbance voltage in acc. with					
DIN 45405 referred to input	V_d		2.5		μV
Hum suppression ($f_{hum} = 100$ Hz)	a_{hum}		48		dB
Frequency range (−3 dB)					
$C_4 = 560$ pF	f	40		20,000	Hz
$C_4 = 1000$ pF	f	40		10,000	Hz
Input resistance	R_{i8}	1	5		MΩ

2. $V_S = 24$ V; $R_L = 16\ \Omega$; $C_1 = 220\ \mu F$; $f_i = 1$ kHz; $T_A = 25\ °C$

Quiescent output voltage	V_{q2}	11	12	13	V
Quiescent drain current	$I_3 + I_4$		18	30	mA
Input DC current	I_{i8}		0.8	8	μA
Output power $THD = 1\%$	P_q		3.5		W
$THD = 10\%$	P_q	4.5	5.0		W
Voltage gain (closed loop)	G_V	37	40	43	dB
Voltage gain (open loop)	G_{V0}		80		dB
Total harmonic distortion ($P_q = 0.05$ to 3 W)	THD		0.2	0.5	%
Noise voltage with reference to input	V_n		5	15	μV_S
$f_i = 3$ Hz to 20 kHz					
Disturbance voltage in acc. with					
DIN 45405 referred to input	V_d		3.8		μV
Hum suppression ($f_{hum} = 100$ Hz)	a_{hum}		40		dB
Frequency range (−3 dB)					
$C_4 = 560$ pF	f	40		20,000	Hz
$C_4 = 1000$ pF	f	40		10,000	Hz
Input resistance	R_{i8}	1	5		MΩ

Circuit diagram
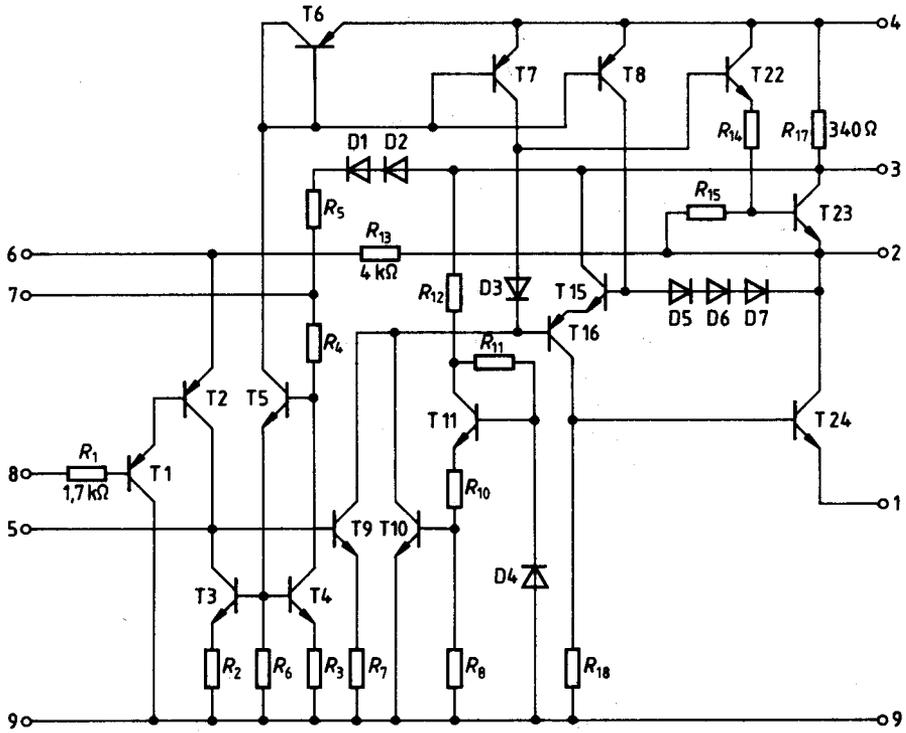
Measurement circuit
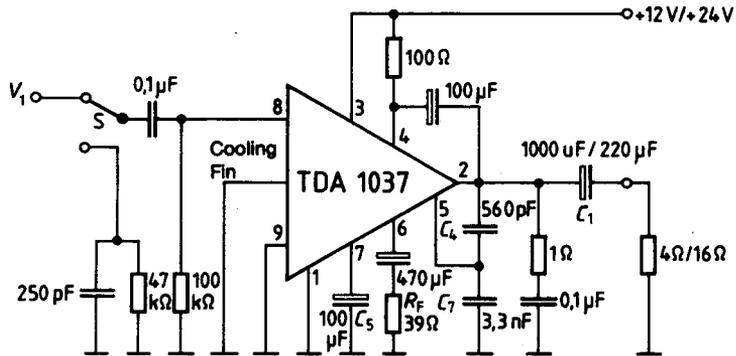
S Closed for Noise Measurement

Application circuit
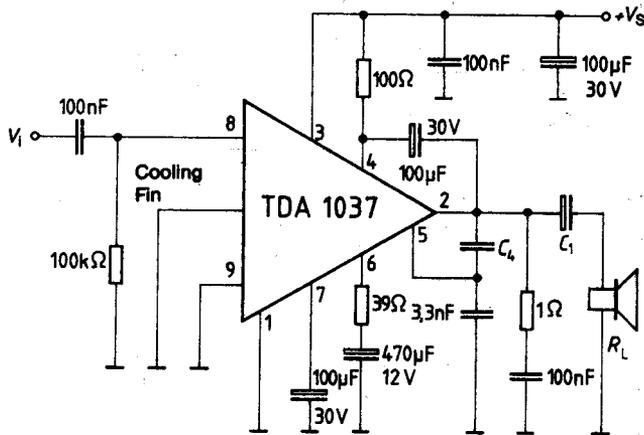
V_S	12 V	18 V	24 V
R_L	4 Ω	8 Ω	16 Ω
C_1	1000 µF	470 µF	220 µF

| f_{max}	10 kHz	20 kHz
C_4	1000 pF	560 pF

Output power versus supply voltage
$THD = 10\%$; $R_L = 4, 8, 16\ \Omega$; $f = 1$ kHz
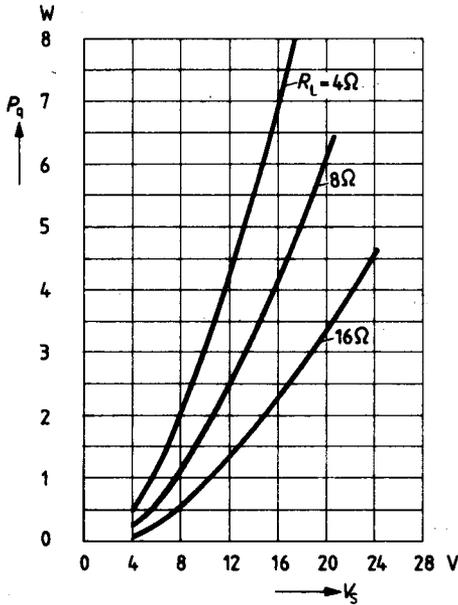
Max. power dissipation versus supply voltage at sine-shaped driving
$f = 1$ kHz; $R_L = 4, 8, 16\ \Omega$, $THD = 10\%$
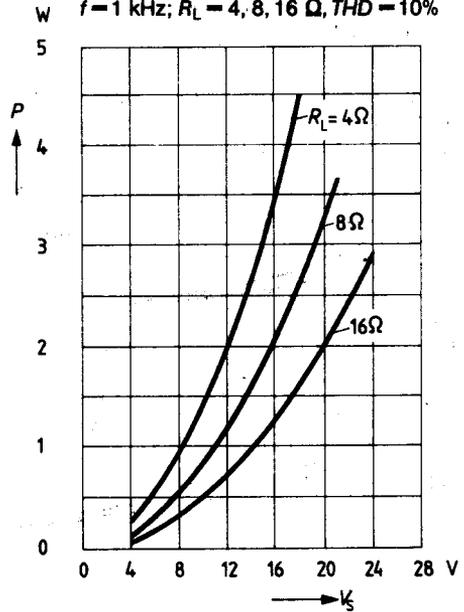
Total power dissipation and efficiency versus output power
$THD = 10\%$; $f = 1$ kHz
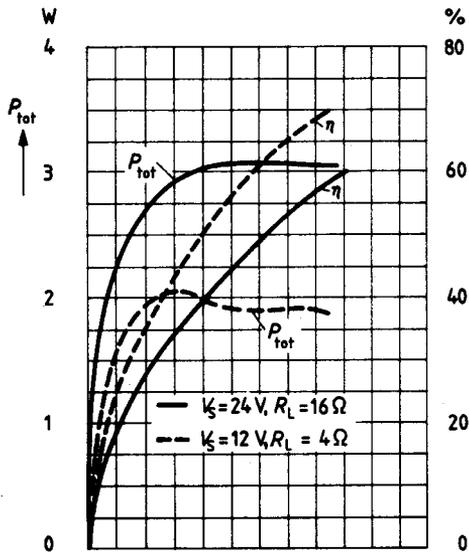
**Quiescent drain current, quiescent current of output transistors, quiescent output voltage versus supply voltage**

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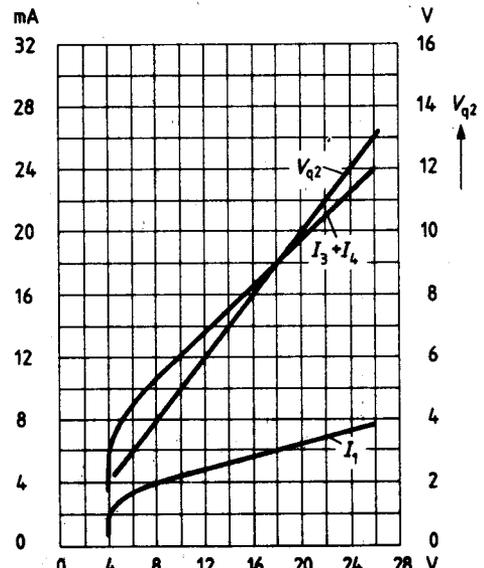
**Hum suppression versus feedback resistance**
$f_{hum} = 100$ Hz; $C_5 = 100$ μF
a: input short-circuited
b: input open

$\longrightarrow R_F$

$V_S = 12$ V
$R_L = 4$ Ω

$V_S = 24$ V
$R_L = 16$ Ω

$\longrightarrow R_F$
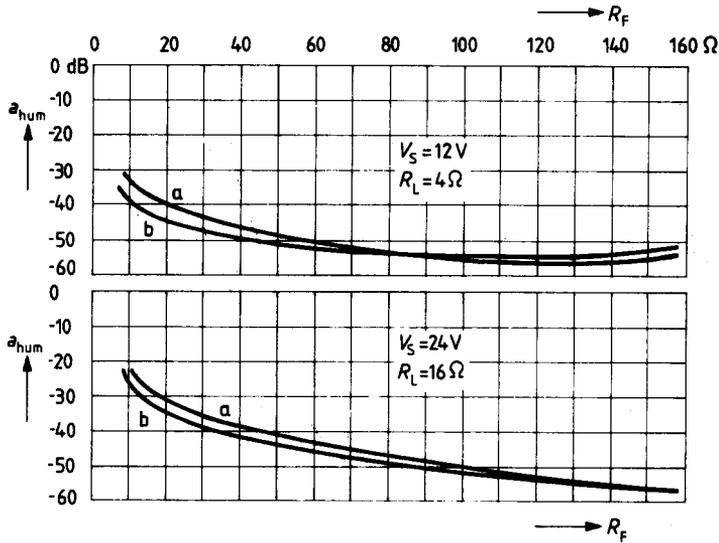
Max. total power dissipation versus ambient temperature

$R_{th\,JC}$

$R_{th\,SA}$
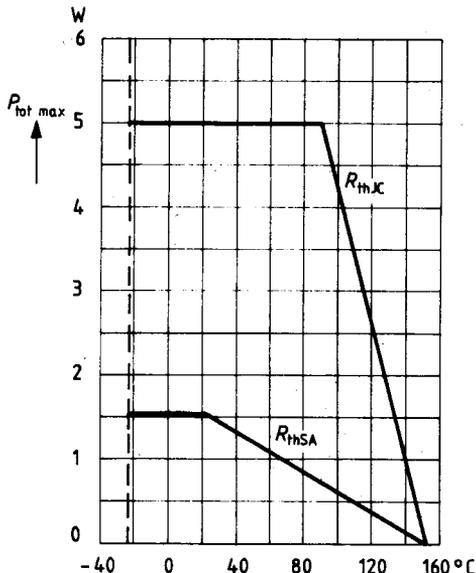
**Total harmonic distortion
versus output power**
$f = 1$ kHz

$V_S = 12V/4\Omega$

$V_S = 24V/16\Omega$

THD

% 10 9 8 7 6 5 4 3 2 1 0

10^{-1} 10^0 10^1 W

P_q
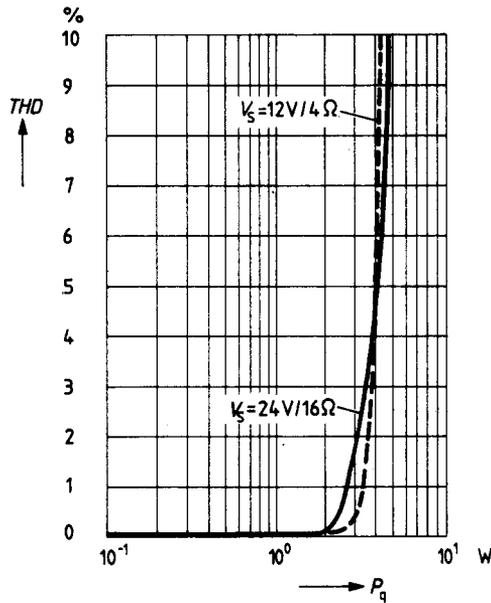
Total harmonic distortion versus frequency

% 5 4 3 2 1 0

THD

$P_q = 3W$ $P_q = 50$ mW

$V_S = 12$ V, $R_L = 4\Omega$

5 4 3 2 1 0

THD

$P_q = 3W$ $P_q = 50$ mW

$V_S = 24V, R_L = 16\Omega$

10^{-2} 10^{-1} 10^0 10^1 10^2 kHz

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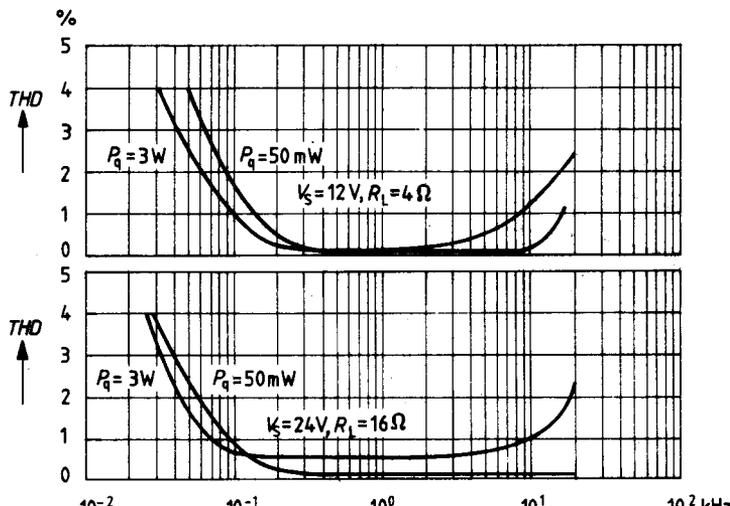
**Voltage gain versus frequency**
$V_S = 12$ V; $R_L = 4$ Ω
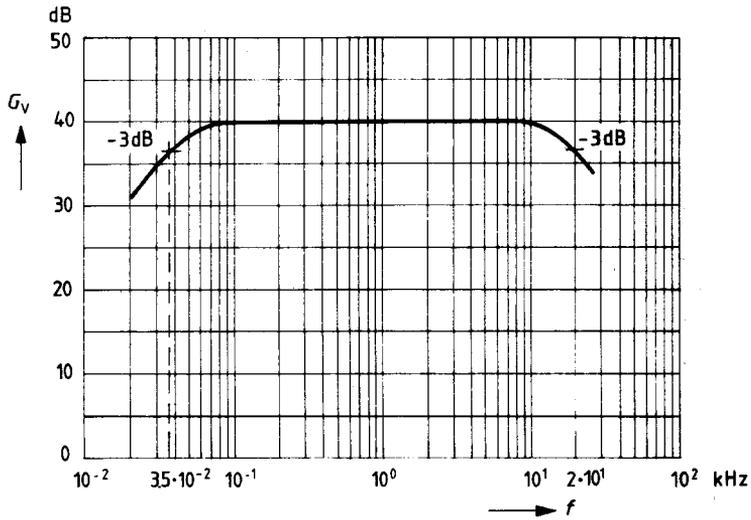
Bandwidth C_3 versus feedback resistance
$V_S = 12$ V; $R_L = 4$ Ω, $G_V = 40$ dB
$C_1 = 5 \cdot C_4$
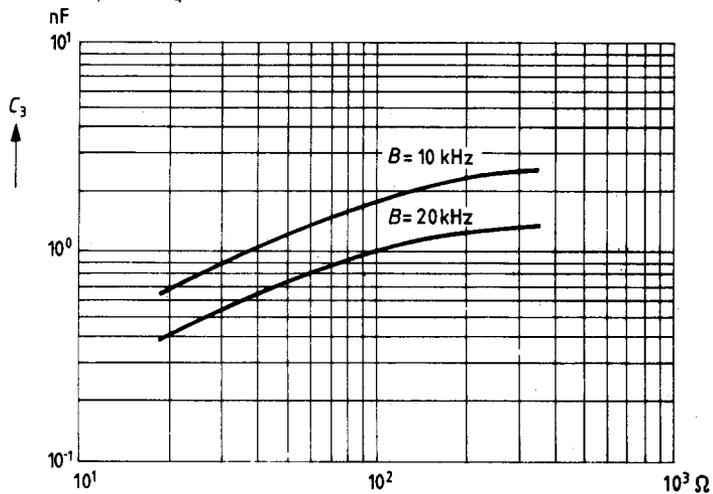
**Output power and voltage gain versus
feedback resistance and input voltage**
$V_S = 12$ V; $R_L = 4$ Ω; $f = 1$ kHz
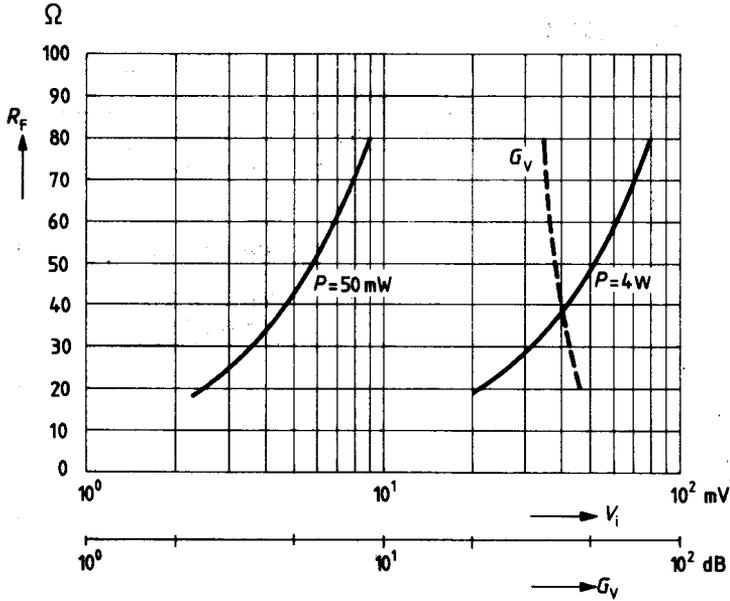
Output power versus feedback resistance and input voltage
$V_S = 24$ V; $R_L = 16$ Ω; $f = 1$ kHz

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