Ordering number : EN4391A

Thick Film Hybrid IC

SANYO | No. 4391A

STK4044V

AF Power Amplifier (Split Power Supply) (100 W min, THD = 0.08 %)

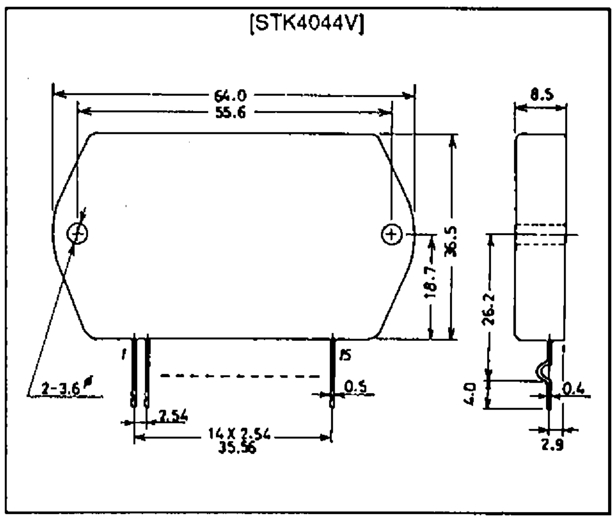
Features

- Compact packaging supports slimmer set designs
- Series designed from 20 up to 100 W (200 W) and pin-compatibility (120 to 200 W have 18 pins)
- Simpler heat sink design facilitates thermal design of slim stereo sets
- Current mirror circuit application reduces distortion to 0.08%
- Supports addition of electronic circuits for thermal shutdown and load-short protection circuit as well as pop noise muting which occurs when the power supply switch is turned on and off

Package Dimensions

unit : mm

4075



Specifications

Maximum Ratings at Ta = 25°C

				Unit
Maximum supply voltage	V_{CC} max		±73	V
Thermal resistance	θj-c		1.1	°C/W
Junction temperature	Tj		150	°C
Operating substrate temperature	Tc		125	°C
Storage temperature	Tstg		-30 to +125	°C
Available time for load shorted	t, *1	V_{CC}=±51V, R_L=8Ω, f=50Hz, P_O=100W	1	s

Recommended Operating Conditions at Ta = 25°C

			Unit
Recommended supply voltage	V_{CC}	±51	V
Load resistance	R_L	8	Ω

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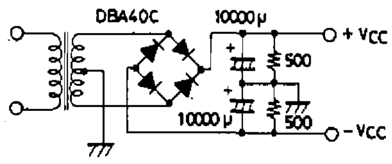
Operating Characteristics
at Ta = 25°C, V_{CC} = ±51V, R_L = 8Ω, VG = 40dB, Rg = 600Ω, 100k LPF ON, R_L (noninductive)

			min	typ	max	Unit
Quiescent current	I_{CCO}	V_{CC}=±61V	15		120	mA
Output power	P_O	THD = 0.08%, f = 20Hz to 20kHz	100			W
Total harmonic distortion	THD	P_O=1.0W, f = 1kHz			0.08	%
Frequency response	f_L, f_H	P_O=1.0W, $^{+0}_{-3}$dB		20 to 50k		Hz
Input resistance	r_i	P_O=1.0W, f=1kHz		55		kΩ
Output noise voltage	V_{NO} *2	V_{CC}=±61V, Rg=10kΩ			1.2	mVrms
Neutral voltage	V_N	V_{CC}=±61V	−70	0	+70	mV

- Use rated power supply for test unless otherwise specified.

*1 When measuring available time for load shorted and output noise voltage, use transformer power supply indicated below.

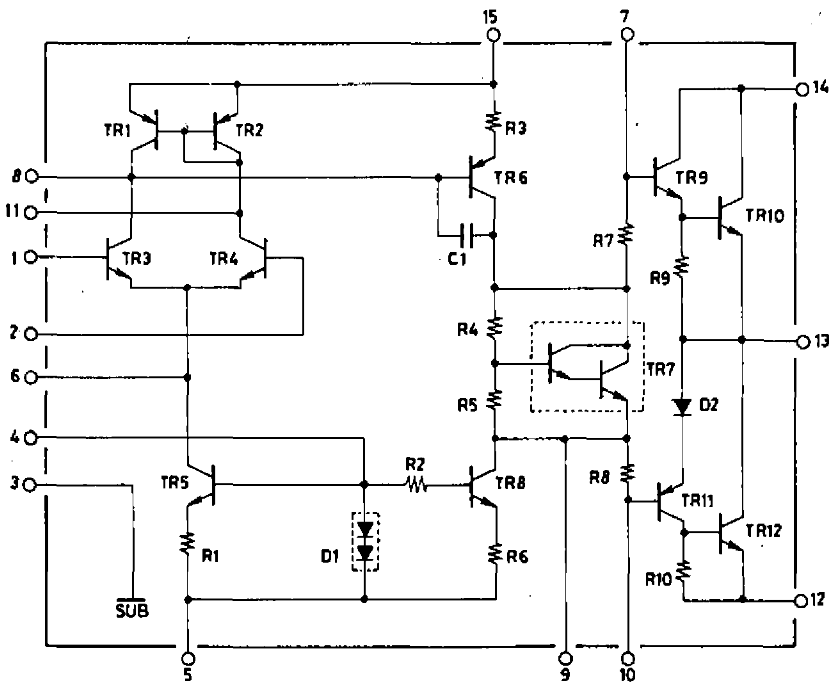
*2 Output noise voltage represents the peak value on the rms scale (VTVM). The noise voltage waveform does not include the pulse noise.



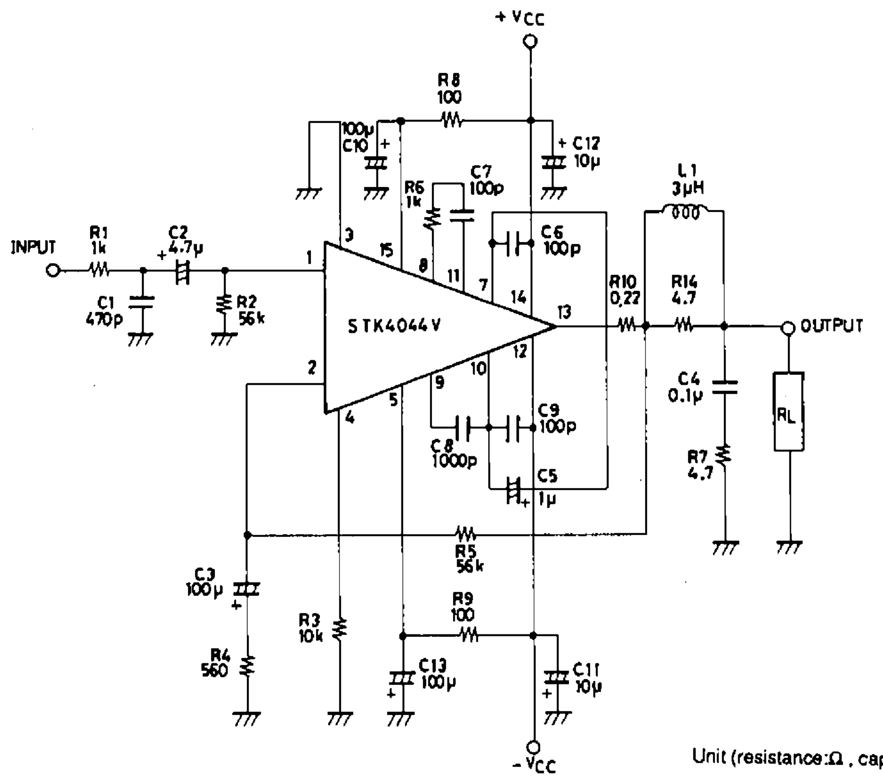
Specified Transformer Power Supply (MG-200 Equivalent)

Unit (resistance:Ω, capacitance: F)

Equivalent Circuit

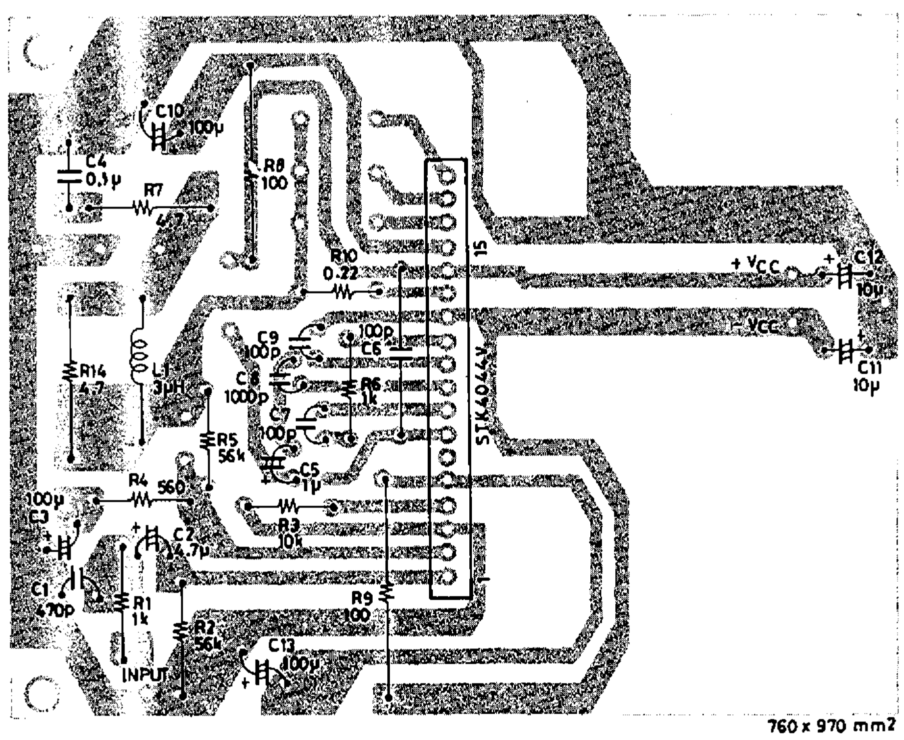


Sample Application Circuit: 100W min Single-Channel AF Power Amplifier



Unit (resistance:Ω , capacitance: F)

Sample Printed Circuit Pattern for Application Circuit (Copper-folled side)



Unit (resistance:Ω , capacitance: F)

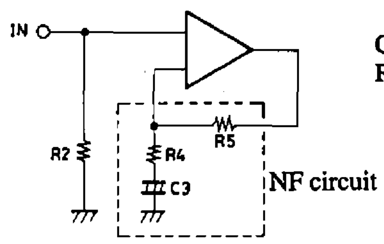
Description of External Parts

R_1, C_1 : Input filter circuit
- Reduces high-frequency noise.

C_2 : Input coupling capacitor
- DC current suppression. A reduction in reactance is effective because of increases in capacitor reactance at low frequencies and 1/f noise dependence on signal source resistance which result in output noise worsening.

R_2 : Input bias resistor
- Biases the input pin to zero.
- Affects V_N stability (refer to NF circuit).
- Due to differential input, input resistance is more or less determined by this resistance value.

R_4, R_5 : NFB circuit (AC NF circuit). Use of resistor with 1% error is suggested.
C_3 (R_2)



C_3 : AC NF capacitor
R_4, R_5 : Used for VG setting.

- VG settings are obtained using R_4 and R_5 according to the following equation:

$$\log 20 \cdot \frac{R_5}{R_4}$$ 40 dB is recommended.

- Low-frequency cutoff frequency settings are obtained using R_4 and C_3 according to the following equation:

$$f_L = \frac{1}{2\pi \cdot R_4 \cdot C_3} \quad [\text{Hz}]$$

When changing the VG setting, you should change R_4 which requires a recheck of the low cutoff frequency setting. When the VG setting is changed using R_5, the setting should ensure R_2 equals R_5 so that V_N balance stability is maintained. If the resistor value is increased more than the existing value, V_N balance may be disturbed and result in deterioration of V_N temperature characteristics.

R_3 : Differential constant-current bias resistor

R_6, R_7 : For oscillation suppression and phase compensation applications
(For use with differential stage applications)

R_7, C_4 : For oscillation suppression and phase compensation applications
(A Mylar capacitor is recommended for C_4 for use with output stage applications)

C_6, C_9 : For oscillation suppression and phase compensation applications
Power stage (Must be connected near the pin) C_6: Positive (+) power C_9: Negative (–) power

C_8 : For oscillation suppression and phase compensation applications
(Oscillation suppression before power step clip)

C_5 : For oscillation suppression and distortion improvement applications

R_8, C_{10} : Ripple filter circuit on positive (+) side.

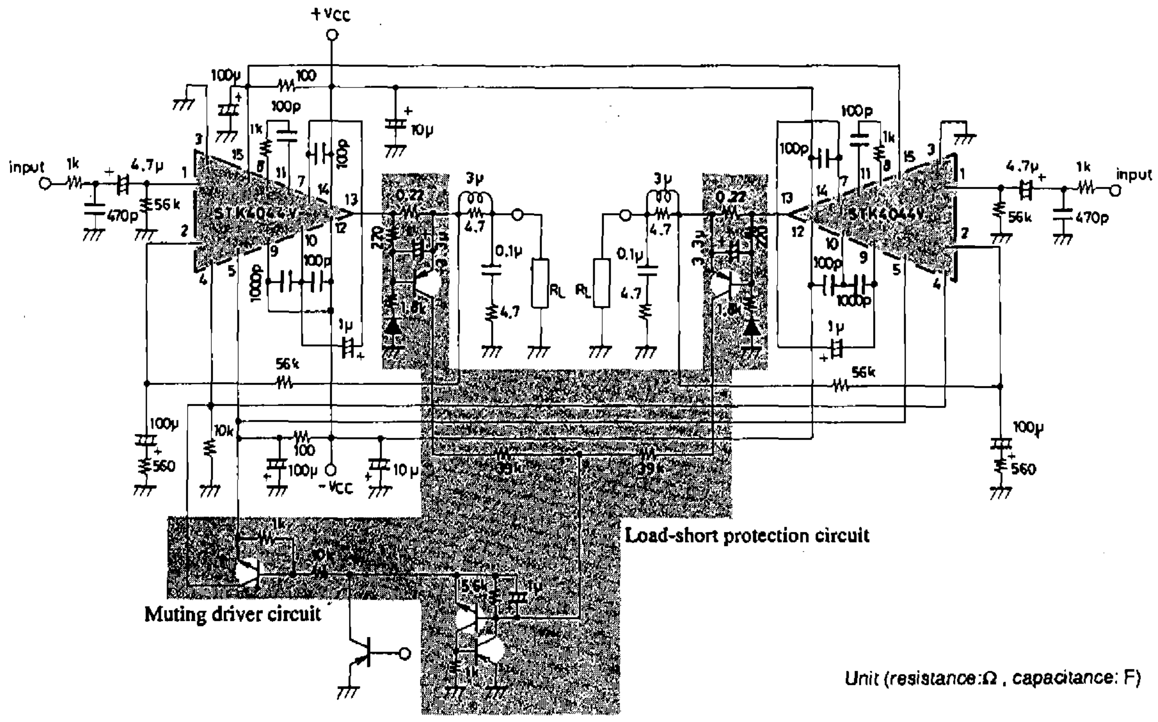
R_9, C_{13} : Ripple filter circuit on negative (–) side.

C_{11}, C_{12} : For oscillation suppression applications
- Used for reducing power supply impedance to stable IC operation and should be connected near the IC pin. We recommend that you use an electrolytic capacitor.

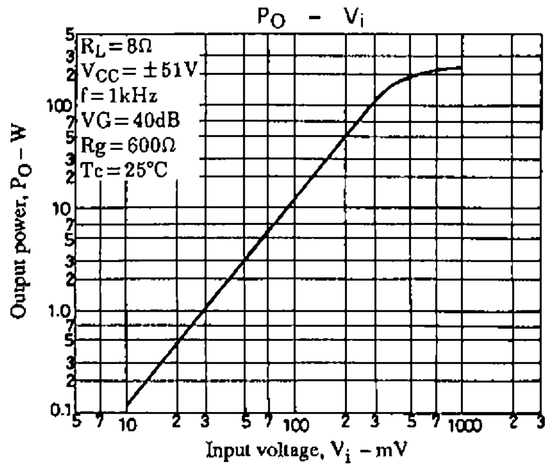
R_{10} : Output resistor
Increases load short handling capability during times of high output.

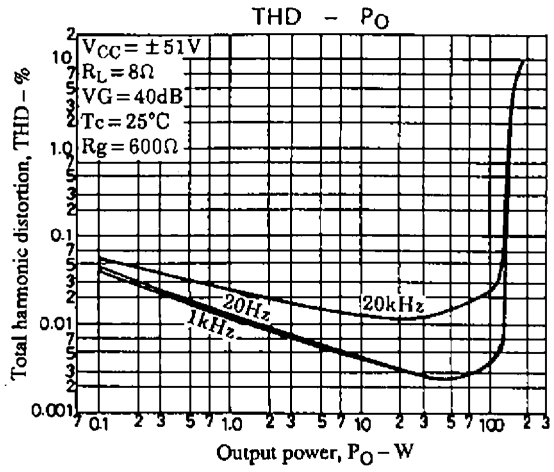
R_{14}, L_1 : For oscillation suppression applications
Increases oscillation stability against capacitance loads.

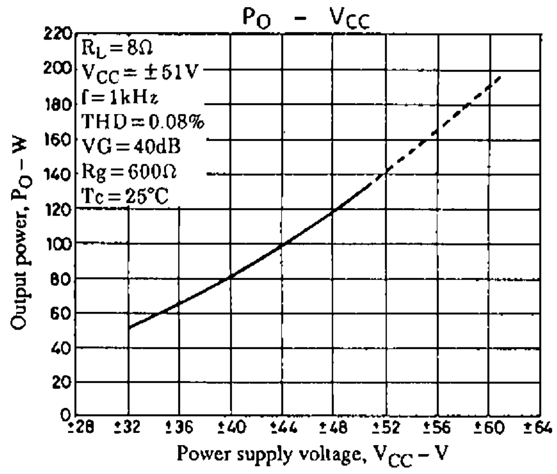
Sample Application Circuit (Protection circuit and muting circuit)

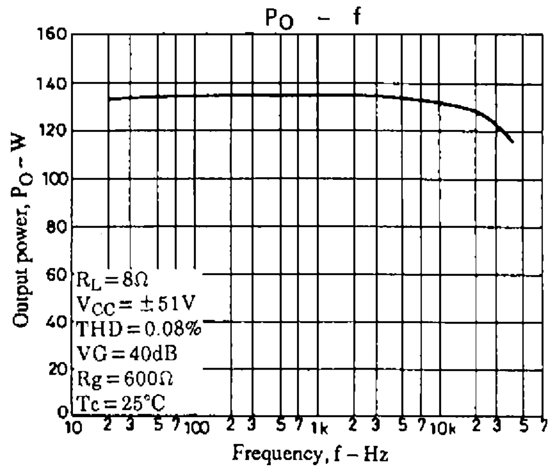


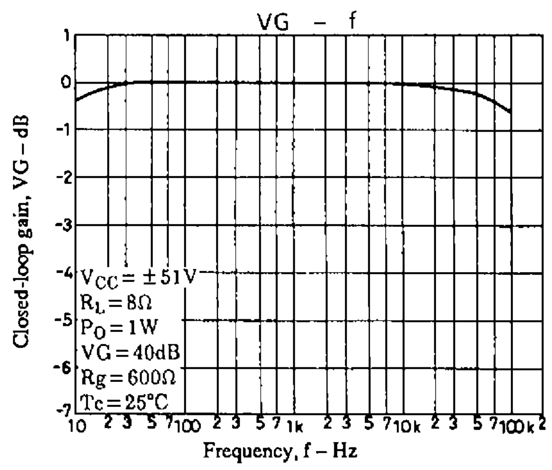
Unit (resistance:Ω , capacitance: F)

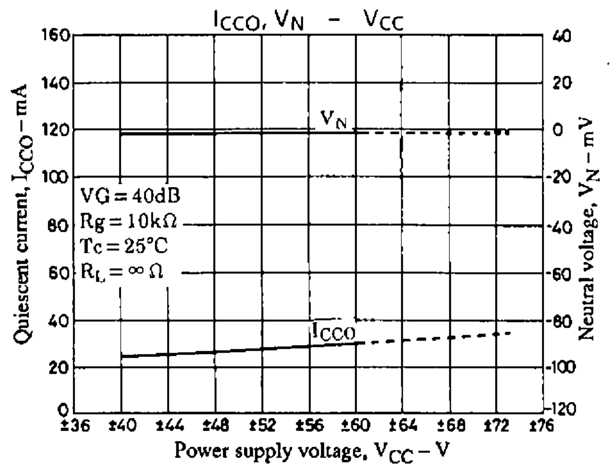

PO - Vi
RL=8Ω
VCC=±51V
f=1kHz
VG=40dB
Rg=600Ω
Tc=25°C
Output power, PO - W
Input voltage, Vi - mV

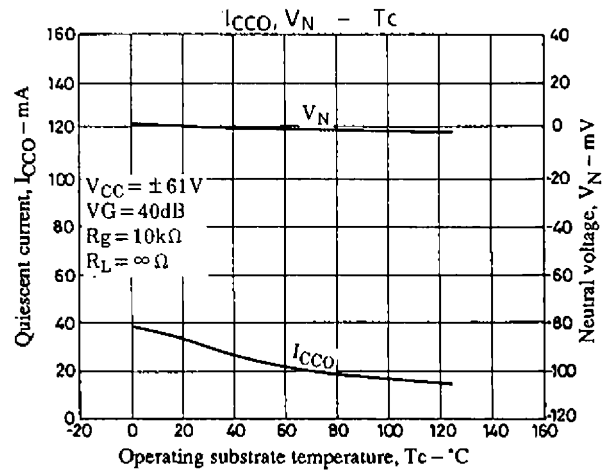

THD - PO
VCC=±51V
RL=8Ω
VG=40dB
Tc=25°C
Rg=600Ω
20Hz
1kHz
20kHz
Total harmonic distortion, THD - %
Output power, PO - W

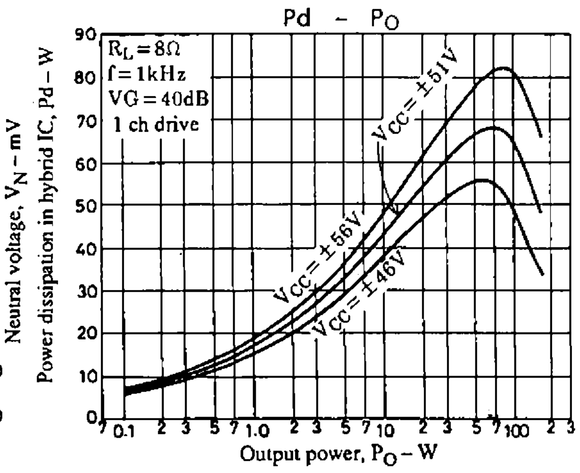

PO - VCC
RL=8Ω
VCC=±51V
f=1kHz
THD=0.08%
VG=40dB
Rg=600Ω
Tc=25°C
Output power, PO - W
Power supply voltage, VCC - V


PO - f
RL=8Ω
VCC=±51V
THD=0.08%
VG=40dB
Rg=600Ω
Tc=25°C
Output power, PO - W
Frequency, f - Hz


VG - f
VCC=±51V
RL=8Ω
PO=1W
VG=40dB
Rg=600Ω
Tc=25°C
Closed-loop gain, VG - dB
Frequency, f - Hz


ICCO, VN - VCC
VN
VG=40dB
Rg=10kΩ
Tc=25°C
RL=∞Ω
ICCO
Quiescent current, ICCO - mA
Neutral voltage, VN - mV
Power supply voltage, VCC - V


ICCO, VN - Tc
VN
VCC=±61V
VG=40dB
Rg=10kΩ
RL=∞Ω
ICCO
Quiescent current, ICCO - mA
Neutral voltage, VN - mV
Operating substrate temperature, Tc - °C


Pd - PO
RL=8Ω
f=1kHz
VG=40dB
1 ch drive
VCC=±51V
VCC=±56V
VCC=±46V
Power dissipation in hybrid IC, Pd - W
Output power, PO - W

This catalog provides information as of May, 1995. Specifications and information herein are subject to change without notice.