



SANYO Semiconductors

DATA SHEET

Thick Film Hybrid IC

STK4044V — AF Power Amplifier (Split Power Supply) (100W min, THD = 0.08%)

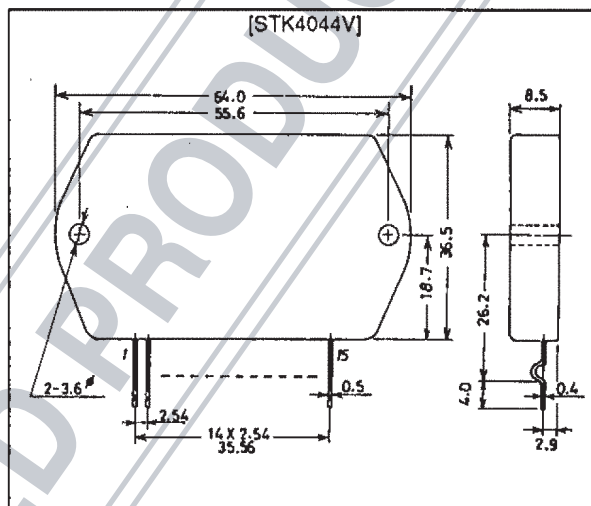
Features

- 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 $T_a = 25^\circ\text{C}$

Maximum supply voltage	$V_{CC \text{ max}}$	± 73	V
Thermal resistance	θ_{j-c}	1.1	$^\circ\text{C}/\text{W}$
Junction temperature	T_j	150	$^\circ\text{C}$
Operating substrate temperature	T_c	125	$^\circ\text{C}$
Storage temperature	T_{stg}	-30 to +125	$^\circ\text{C}$
Available time for load shorted	$t_{\text{sh}} \cdot 1$	1	s

 $V_{CC} = \pm 51\text{V}$, $R_L = 8\Omega$, $f = 50\text{Hz}$, $P_O = 100\text{W}$

Recommended Operating Conditions at $T_a = 25^\circ\text{C}$

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

Operating Characteristics

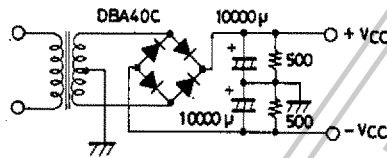
at $T_a = 25^{\circ}\text{C}$, $V_{CC} = \pm 51\text{V}$, $R_L = 8\Omega$, $V_G = 40\text{dB}$, $R_g = 600\Omega$, 100k LPF ON, R_L (noninductive)

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

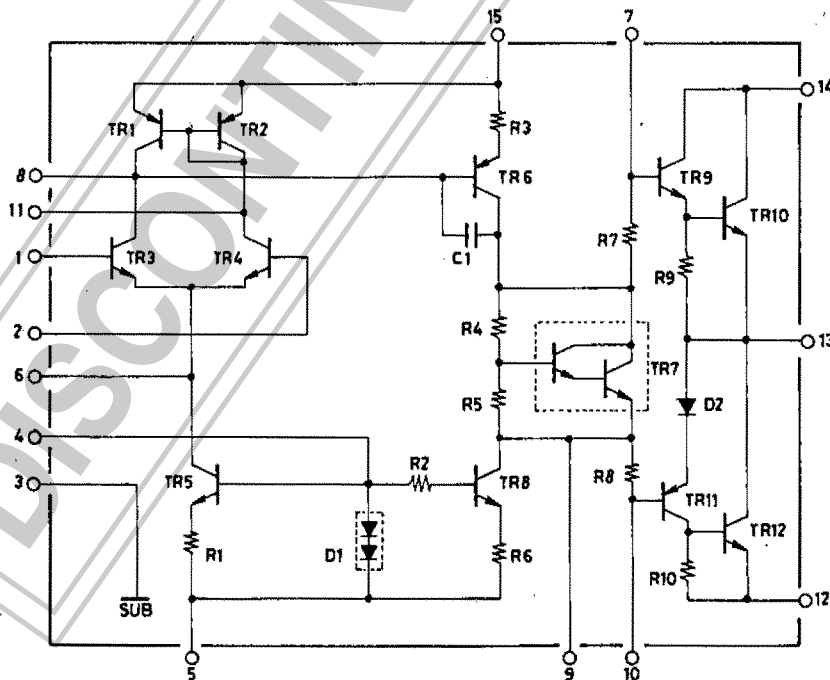
*2 Output noise voltage represents the peak value on the rms scale (VTVM). The noise voltage waveform does not include the pulse noise.



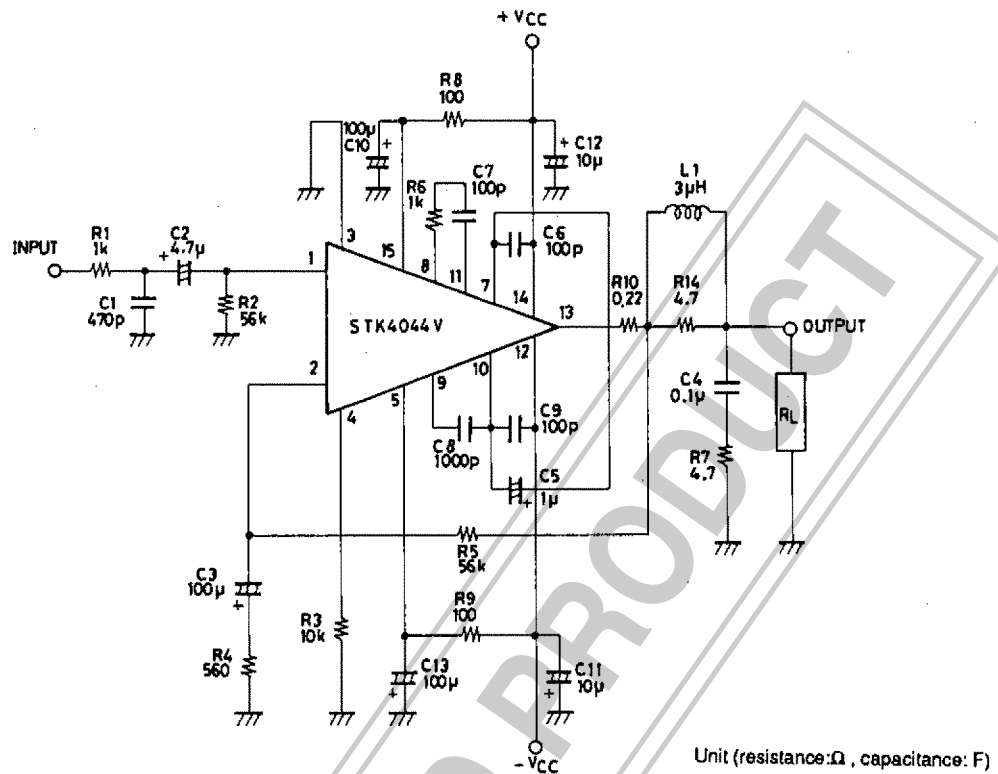
Specified Transformer Power Supply
(MG-200 Equivalent)

Unit (resistance: Ω , capacitance: F)

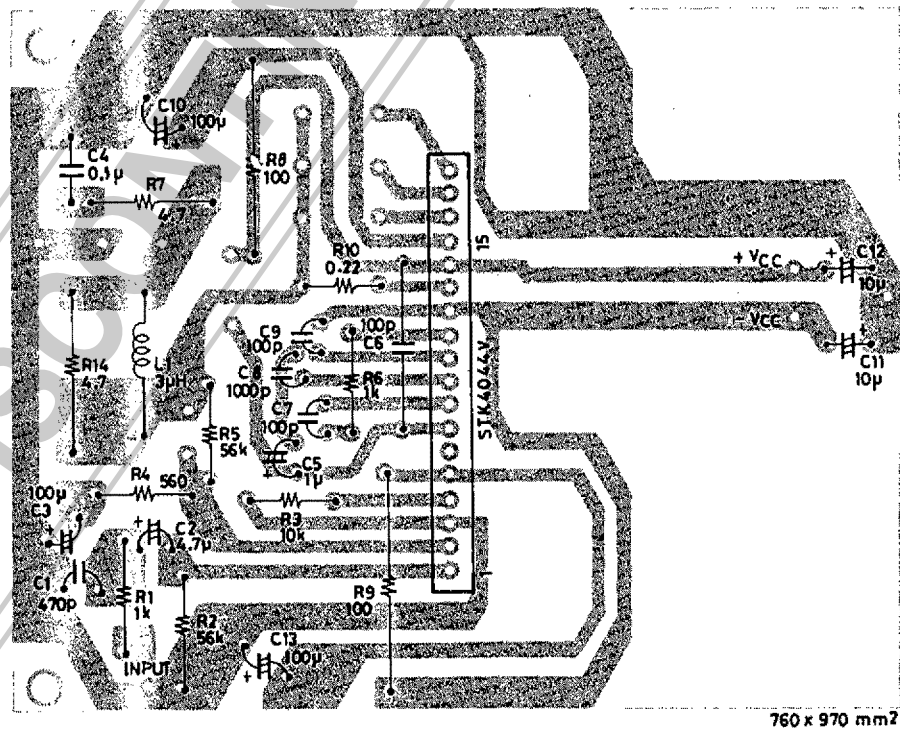
Equivalent Circuit



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



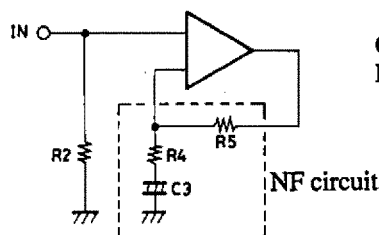
Sample Printed Circuit Pattern for Application Circuit (Copper-folied side)



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:

$$\log_{20} \frac{R_5}{R_4} \quad 40 \text{ dB is recommended.}$$

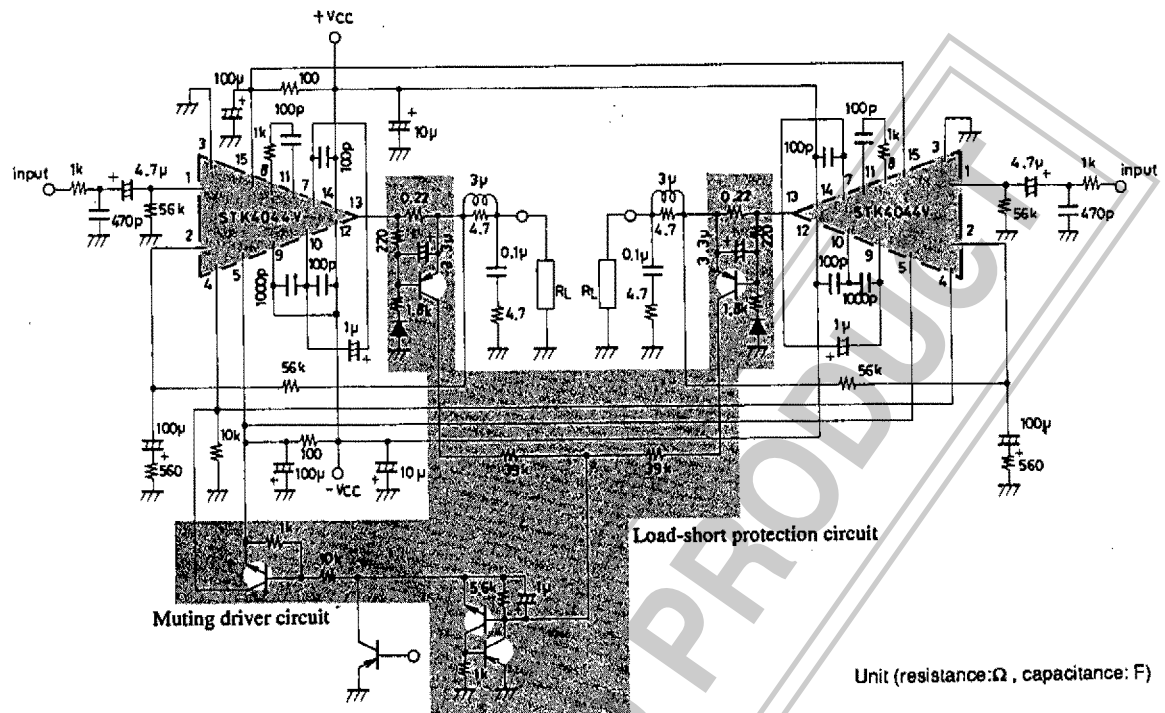
- Low-frequency cutoff frequency settings are obtained using R_4 and C_3 according to the following equation:

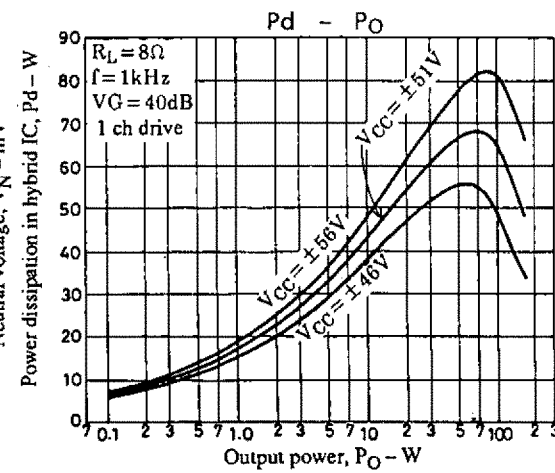
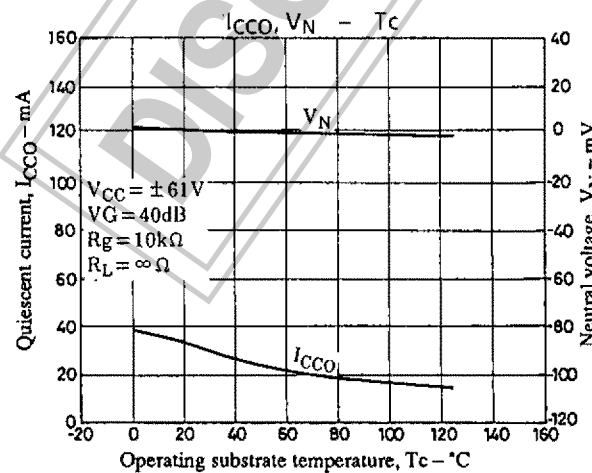
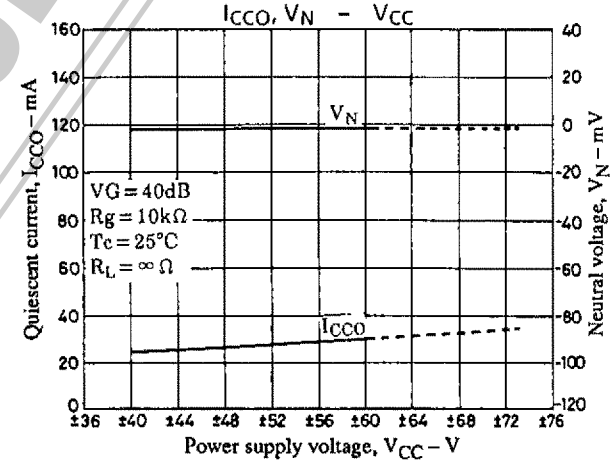
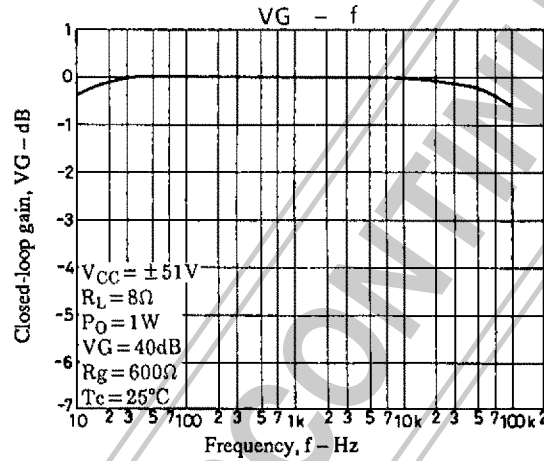
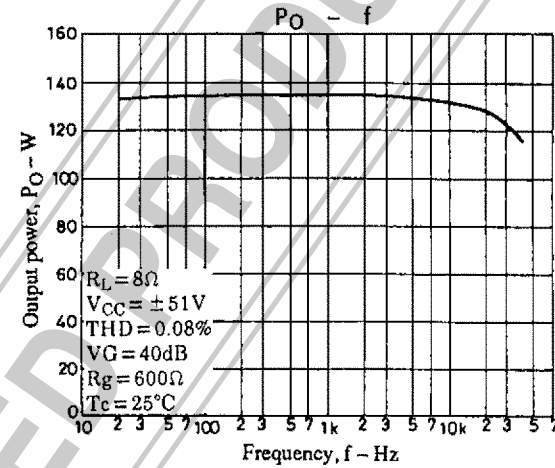
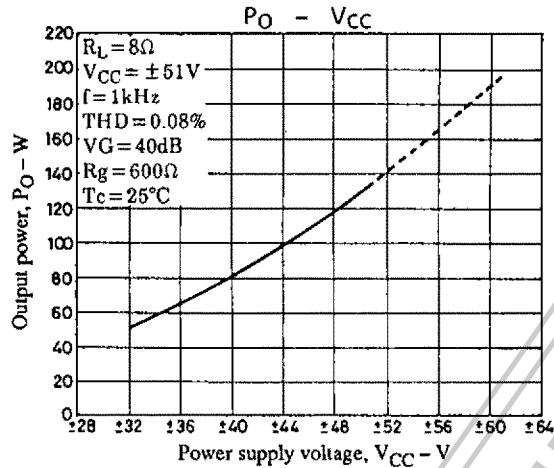
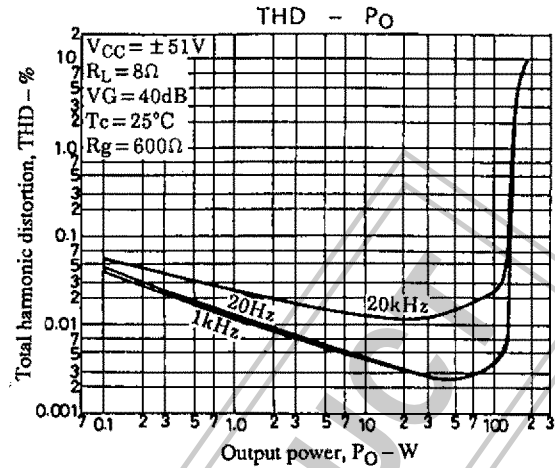
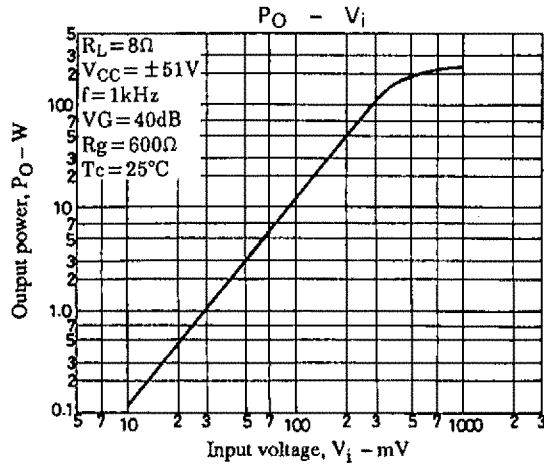
$$f_L = \frac{1}{2\pi \cdot R_4 \cdot C_3} \quad [\text{Hz}]$$

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)





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